CHAPTER 7

ENVIRONMENTAL MANAGEMENT

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WATER SUPPLY

GOAL EM-1
ADEQUATE WATER SUPPLIES

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

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

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

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

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Figure 7-1
Water System
Facilities Map

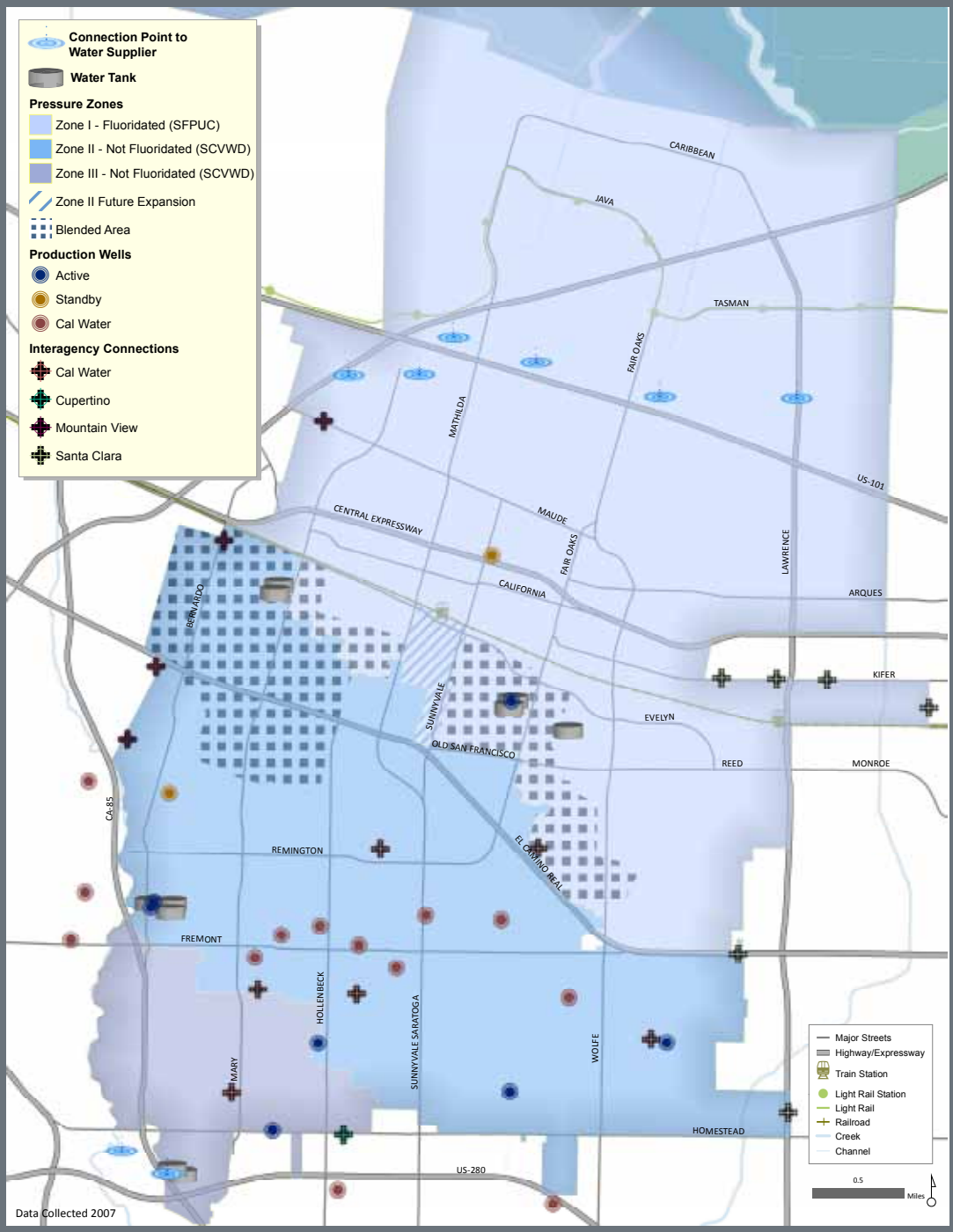

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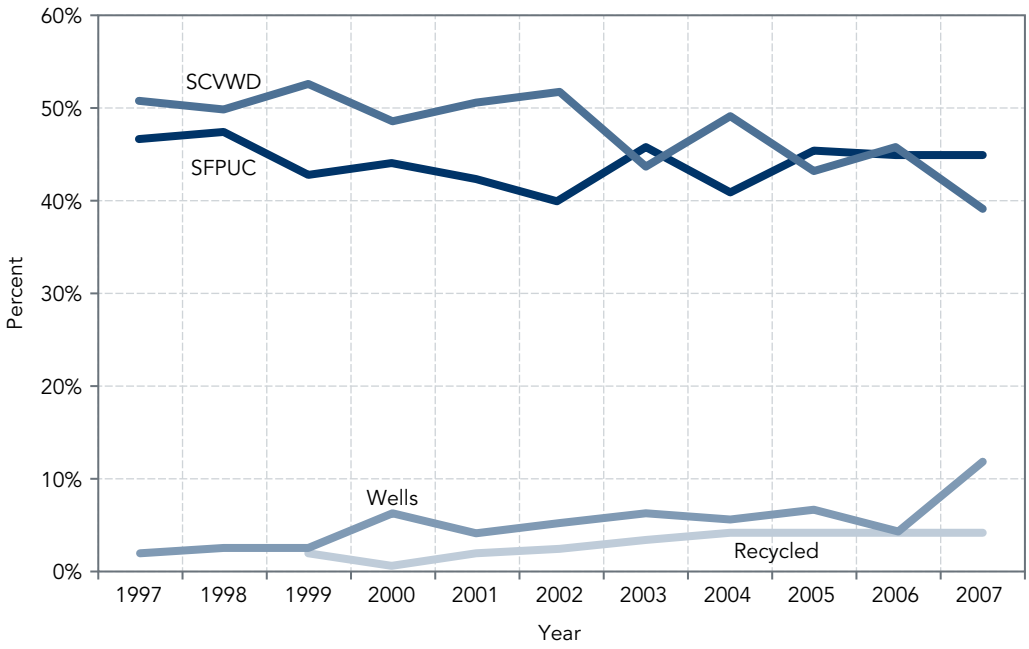
Figure 7-2
Historical Percentage of Annual Water Deliveries by Source



San Francisco Public Utilities Commission (SFPUC)

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

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

Santa Clara Valley Water District (SCVWD)

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

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

City Wells

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

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

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

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

Recycled Water

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

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

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

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

Future Water Supply Issues

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

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

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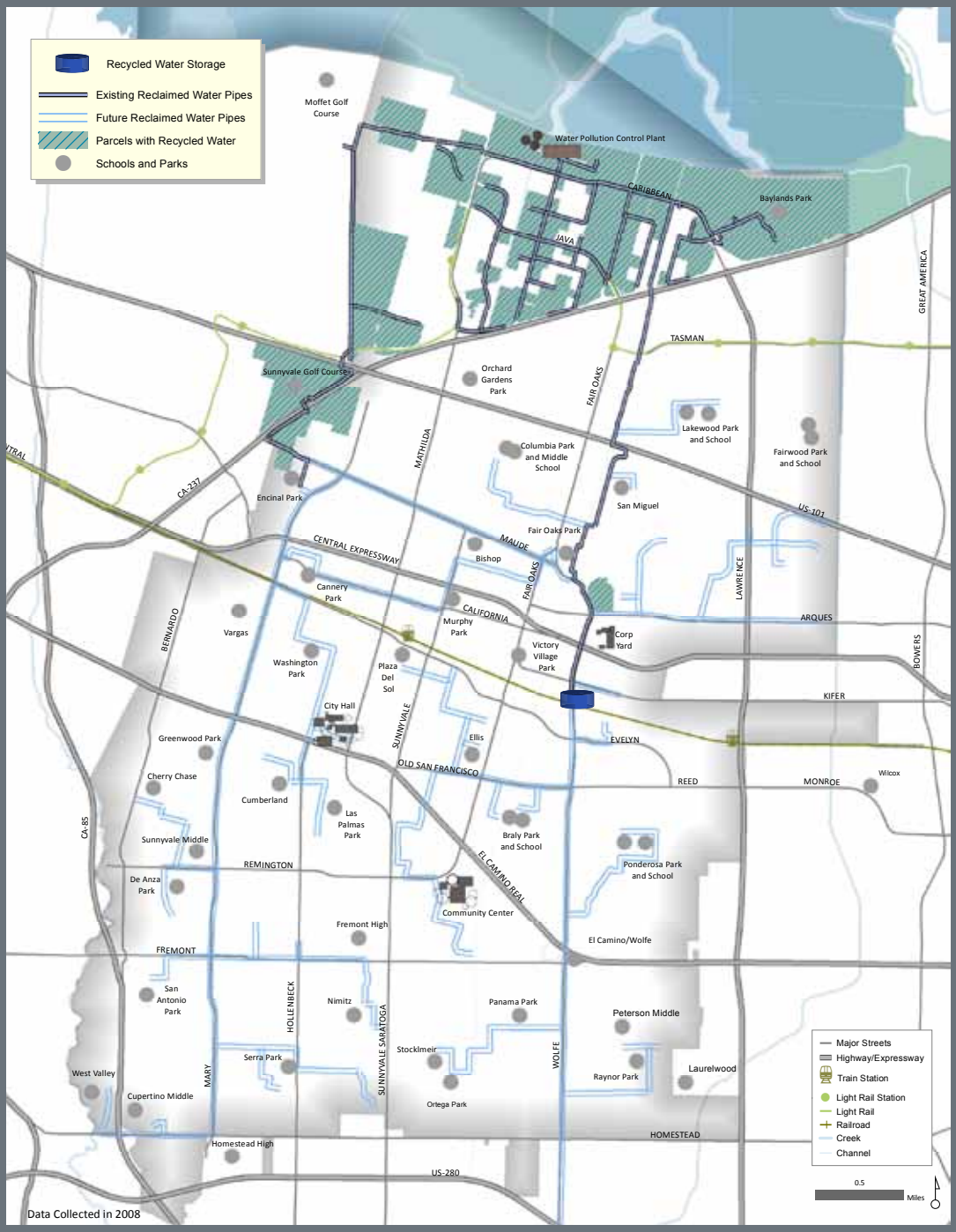

Figure 7-3
Recycled Water System Map

The City will also continue to address the following:

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

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

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

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

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

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

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

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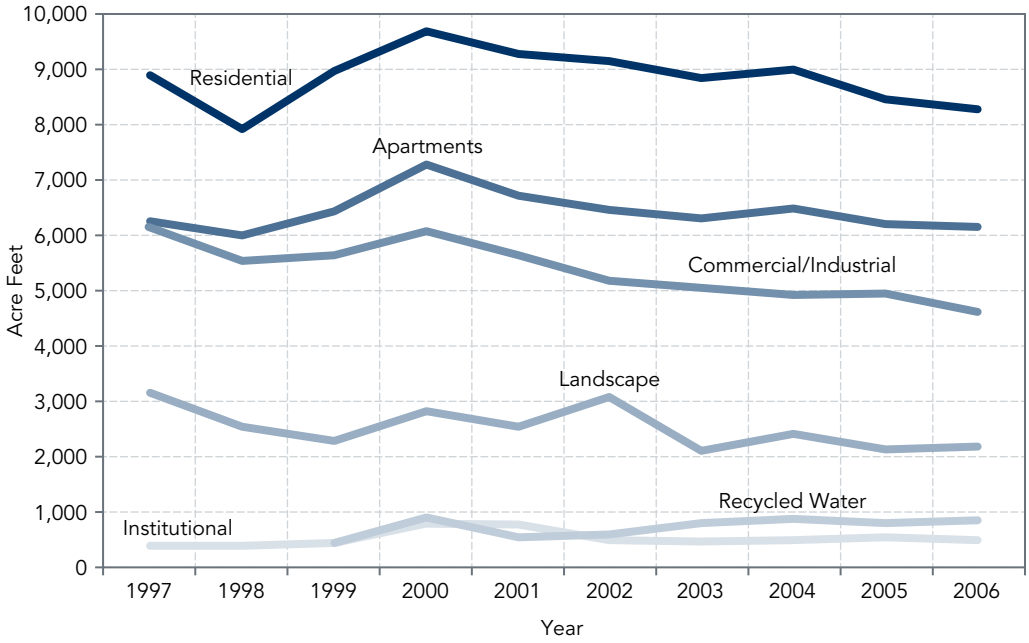
Policy EM-1.3 Provide enough redundancy in the water supply system so that minimum potable water demand and fire suppression requirements can be met under both normal and emergency circumstances. (Previously Water Resources Policy A.3)

GOAL EM-2
WATER CONSERVATION

PROMOTE MORE EFFICIENT USE OF THE CITY'S WATER RESOURCES TO REDUCE THE DEMANDS PLACED ON THE CITY'S WATER SUPPLIES. *(Previously Water Resources Goal B / Adopted in 2008)*

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

Figure 7-4
Annual Water Consumption by Use Category



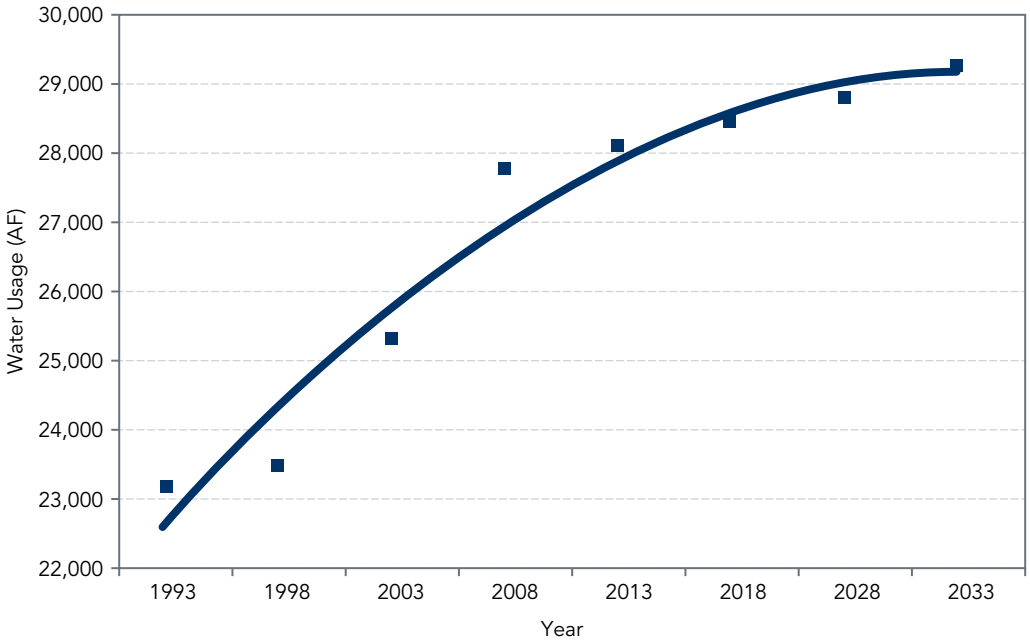
From 1987 to 1992, California experienced a prolonged drought, with severe water shortages and water rationing in Santa Clara County. Through the cooperative efforts of water retailers and their customers, Santa Clara County endured the drought with minimal economic and aesthetic impacts. Between 1984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

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

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

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

Figure 7-5
Historic and Projected Water Demand



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

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

Conservation measures include the following:

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

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

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

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

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

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

GOAL EM-3
RELIABLE AND SAFE WATER DISTRIBUTION

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

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

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

Perhaps the largest water system issue for the City is the need for significant and on-going investment in improvements to the water system infrastructure. A significant portion of the City's investment in water system infrastructure is represented by the transmission and distribution pipelines. Approximately 80 percent of the 330 miles of transmission and distribution pipelines and related facilities were constructed in the 1960s and are

potentially approaching the end of their estimated 50 year service life. While actual service life varies depending on site specific factors, utility services provided today are "using up" infrastructure resources which must be replaced to serve future customers.

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

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

GOAL EM-4
ADEQUATE WATER QUALITY

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

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

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

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

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

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

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

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

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

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

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

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

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WASTEWATER COLLECTION AND TREATMENT

GOAL EM-5
MINIMAL POLLUTION AND QUANTITY OF WASTEWATER

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

GOAL EM-6
EFFECTIVE WASTEWATER COLLECTION SYSTEM

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

GOAL EM-7
EFFECTIVE WASTEWATER TREATMENT

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

The wastewater from homes and businesses (toilet, shower, kitchen sink, etc.) is carried by sanitary sewer lines to the Sunnyvale Water Pollution Control Plant (WPCP), where it is treated before being discharged to local waterways which flow into the San Francisco Bay. Many significant changes have occurred that affect the City's wastewater collection system and the WPCP. These changes are important because maintaining an efficient and functioning wastewater collection and treatment system reduces pollution to the San Francisco Bay and to the City of Sunnyvale and also reduces health risks and environmental damage associated with untreated sewage.

High quality effluent and recycled water are important to maintaining the San Francisco Bay. San Francisco Bay supports both fresh and salt water plants and animals that require a delicate balance of fresh and salt water to survive. If too much fresh water from

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treatment is discharged into the Bay, it may upset the balance. That is one of the many reasons why reducing wastewater and adequate wastewater treatment are important to the City.

WASTEWATER COLLECTION SYSTEM

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

Figure 7-6 Capacities of Individual Sewer Collection Areas

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

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

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

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

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

WATER POLLUTION CONTROL PLANT

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

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

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

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

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

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

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

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

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

Wastewater Pre-Treatment Program

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

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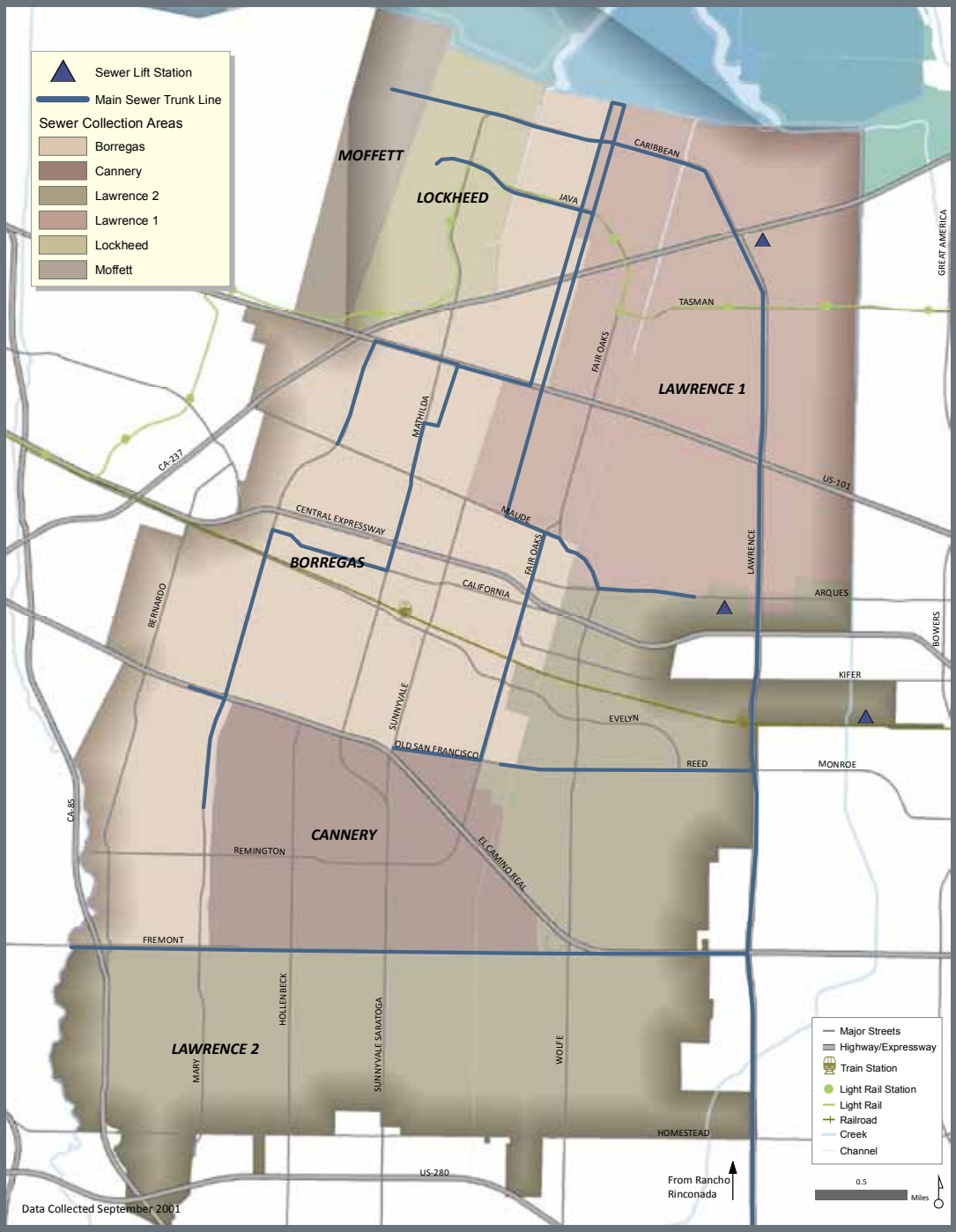

Figure 7-7 Sewer Collection Area Maps

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

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

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

Regulatory Compliance Activities

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

Future Water Pollution Control Plant Improvements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

URBAN RUNOFF

GOAL EM-8
PROTECTION OF CREEKS AND BAY

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

GOAL EM-9
ADEQUATE STORM DRAIN SYSTEM

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

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GOAL EM-10
REDUCED RUNOFF AND POLLUTANT DISCHARGE

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

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

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

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

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

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

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

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

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

Regulations and Permit Requirements

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

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

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

Collaboration with Regional Agencies

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

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

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

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

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

Future Trends

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

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

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Figure 7-8
Storm Drain System

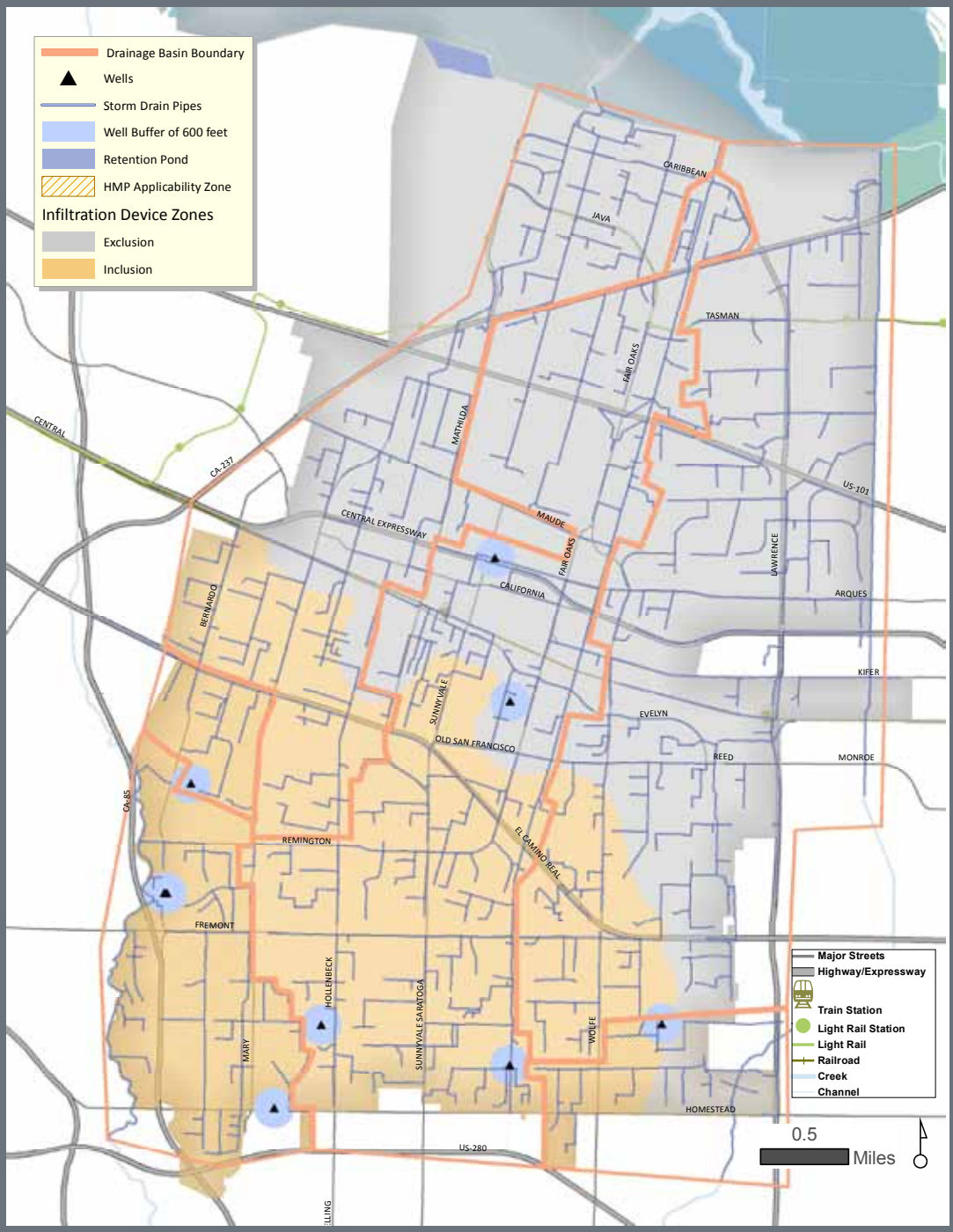

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Figure 7-9: Where does it go?

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

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

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

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

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

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

POLICY EM-8.5 PREVENT ACCELERATED SOIL EROSION.

- Continue implementation of a construction site inspection and control program to prevent discharges of sediment from erosion and discharges of other pollutants from new and redevelopment projects. (Previously Surface Runoff Policy A.5)

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

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

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

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

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

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

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

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

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

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

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AIR QUALITY

GOAL EM-11
IMPROVED AIR QUALITY

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

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

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

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

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

Cooperation with Regional Agencies

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

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

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

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

Land Use and Air Quality

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Transportation Improvements and Air Quality

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

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Reduce Congestion

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

Alternative Transportation Modes

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

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

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

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

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

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

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

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SOLID WASTE

Collection Programs

GOAL EM-12
SAFE AND HEALTHY SOLID WASTE COLLECTION

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

GOAL EM-13
CLEAN NEIGHBORHOODS

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

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

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

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

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

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

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

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RECYCLING AND SOURCE REDUCTION

GOAL EM-14
RECYCLING AND SOURCE REDUCTION PROGRAMS

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

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

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

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

Zero Waste Strategic Plan

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

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

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

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

Product Stewardship

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

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

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Household Hazardous Wastes

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

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

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

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

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

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

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

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

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Policy EM-14.1 Reduce generation of solid waste by providing source reduction programs and promoting reduction behavior. (Previously Solid Waste Policy 3.2B.1)

Policy EM-14.2 Maximize diversion of solid waste from disposal by use of demand management techniques, providing and promoting recycling programs and encouraging private sector recycling. (Previously Solid Waste Policy 3.2B.2)

Policy EM-14.3 Meet or exceed all federal, state and local laws and regulations concerning solid waste diversion and implementation of recycling and source reduction programs. (Previously Solid Waste Policy 3.2B.3)

Policy EM-14.4 Increase demand for recycled materials by advocating local, state and federal legislation that will increase use of recycled content products. (Previously Solid Waste Policy 3.2B.4)

DISPOSAL PROGRAMS

GOAL EM-15
ENVIRONMENTALLY-SOUND DISPOSAL

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

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

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

Closed Sunnyvale Landfill

The Sunnyvale Landfill stopped accepting refuse on September 30, 1993. Final cover placement in compliance with state regulations commenced in 1986 and was completed in 1994. Approximately 93 of the landfill's 100 acres contain waste. An area of about 7 acres is developed for post-closure use as a biosolids monofill disposal site. It is designed to accept biosolids from the WPCP when market conditions or the characteristics of the biosolids make it difficult or expensive to take them elsewhere.

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

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

Asphalt and Concrete Recycling Facility

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

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

Household Hazardous Waste

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

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Kirby Canyon Landfill

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

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

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

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

Planning For Future Disposal

The fact that Sunnyvale has landfill disposal capacity under contract until 2021 should not lead to complacency. There were 16 years between the designation of the SMaRT Station site as suitable for a transfer station and the date the facility was ready for operation. It should be assumed that acquiring new disposal capacity will take a

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minimum of five years—possibly longer if coordination with other cities is required. Thus, the City should begin the process of arranging for post-2021 disposal no later than 2016. The time prior to 2016 should be used to determine a Zero Waste Strategic Plan and investigate potential technologies, partnerships and funding issues, all of which will affect the amount and type of disposal capacity required post-2021.

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

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

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

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

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