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EVERGREEN • EAST HILLS VISION STRATEGY

SAN JOSÉ, CALIFORNIA

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SAN JOSÉ MUNICIPAL WATER

WATER SUPPLY ASSESSMENT

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

DRAFT

Water Supply Assessment
for
Evergreen East Hills Vision Strategy

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INTRODUCTION

Background

Project Description

The Evergreen East Hills Vision Strategy (EEHVS) is a group of development plans that will form a comprehensive vision for the future of the Evergreen area of San José, California. Evergreen is an area of 10,000 acres bounded in the west by Hwy 101 and in the east the foothills. Tully Road forms the northern boundary of the area and the city limits form the southern boundary The Evergreen area is currently 70 percent developed (LAFCO 2005), with six different scenarios of potential development ranging from no new development to complete development of the sites (NOP 2005). The scenarios include different mixtures of residential, commercial, and industrial development over six project sites including the Arcadia Property, Berg/IDS Property, Legacy Partners Property, Evergreen Valley College Property, and Pleasant Hills Golf Course. All sites, excluding Pleasant Hills Golf Course are served by the City of San José Municipal Water System (SJMWS). Pleasant Hills Golf Course is served by San José Water Company and will not be included in this water supply assessment.

Although this project increases demand over current usage, the estimated increase in demand is less than the SJMWS projected long term demand without the project, as it was assumed that more development would have occurred in the Evergreen area (ABAG 2005). Proposed sources of water supply for the proposed development include additional imported water from the Santa Clara Valley Water District, groundwater from the Santa Clara Valley groundwater basin, which is managed by Santa Clara Valley Water District, and recycled water. Recycled water for landscape irrigation use is produced by the San José-Santa Clara Water Pollution Control Plant (WPCP) located in Alviso. Plans are currently being developed to expand the recycled water infrastructure in the Evergreen area. Use of recycled water would require installation of additional recycled water pipelines.

It is estimated the proposed development may be complete as soon as 2015. For the purposes of this report it is assumed that half of the proposed development will be finished in 2010, and the entire development will be completed in 2015. No additional growth is anticipated after 2015 as new growth is restricted by the Evergreen Development Policy and no significant remaining undeveloped land exists.

The California Water Code section 10910 (also termed Senate Bill 610 or SB610) requires that a water supply assessment be provided to cities and counties for a project that is subject to the California Environmental Quality Act (CEQA). The cities and counties are mandated to identify the public water system that might provide water supply to the project and then to request a water supply assessment. The water supply assessment documents sources of water supply, quantifies water demands, evaluates drought impacts, and provides a comparison of water supply and demand that is the basis for an assessment of water supply sufficiency. If the assessment concludes that water supplies are or will be insufficient, then the public water system must provide plans for acquiring the additional water. If the lead agency decides that the water supply is insufficient, the lead agency may still approve the project, but must include that determination in its findings for the project and must include substantial evidence in the record to support its approval of the project.

Purpose

The purpose of this Water Supply Assessment is to document the City of San José's existing and future water supplies for its Evergreen service area and compare them to the area's build-out water demands, including the portions of the Evergreen project within the City's service area. This comparison, conducted for both normal and drought conditions, is the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code section 10910 (Senate Bill 610).

Figure 1 shows the location of the Evergreen service area and the proposed development sites with reference to the Santa Clara Valley groundwater subbasin boundaries (shown in inset).

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WATER DEMAND

This section summarizes water demands for the study area. The first part describes the factors affecting total water demand, including climate, population, and the mix of customer types, such as residential, industrial, commercial, and landscaping. The second part documents water demands not only under normal climatic conditions, but also during drought.

Climate

Climate has a significant influence on water demand on a seasonal and annual basis. This influence increases with the portion of water demand for outside uses, primarily landscaping or agricultural irrigation. With regard to seasonal influences, rainfall in the winter months fulfills much of the water demand for irrigation, while lack of rainfall during the warm, high-evapotranspiration summer season results in peak monthly water demands that are nearly three times that of winter. With regard to annual influences, the local climate is subject to recurring droughts during which water demands would tend to increase, barring water conservation measures.

Table 1 summarizes representative climate data for the study area, including average monthly precipitation, temperature, and evapotranspiration (ETO). The City of San José has a semi-arid, Mediterranean climate, characterized by warm dry summers and cool winters. As indicated in the table, precipitation occurs primarily in the winter months (November through April) and averages 14.3 inches per year.

Figure 2 is a chart of annual rainfall from calendar year 1949 through 2001 for the NOAA San José station. As illustrated in **Figure 2**, San José is subject to wide variations in annual precipitation; an extreme single-year drought occurred in 1976, when annual rainfall amounted to only 7.2 inches, or about one-half of the average rainfall. A severe, prolonged drought occurred in the late 1980s and early 1990s; over a four-year period, annual rainfall averaged only two-thirds of the annual average.

Population

In general as population increases, so does water demand. The population increase due to the EEHVS depends on which land use scenario is selected for development. **Table 2** shows the population increases based on each of the six scenarios, while **Table 3a** provides a summary of the scenarios. **Table 3b** summarizes the future water demand of each scenario by customer type. The methodology used to develop these water demand estimates are explained in detail in the Water Demand section. As shown in **Table 2**, the greatest population increase would occur in Scenario V and involves a 15 percent increase from the current Evergreen area population. The Association of Bay Area Governments (ABAG) publishes projections of population increases. *Projections 2005* is ABAG's most recent forecast of population, housing, jobs, and income. For the area served by SJMWS, ABAG projects an increase of 5,937 housing units from 2000 to 2030. The EEHVS is expected to bring the Evergreen area to build out and includes a maximum increase in housing units of 5,110, 14 percent less than ABAG projected. ABAG's population estimates are also higher than the increase of population estimated by EEHVS. ABAG estimates the area of Evergreen served by SJMWS will increase by 21,614 people compared to the expected maximum population increase of 15,600 people.

Water Use Sectors and Water Demand

Table 4 documents the water demand for the City's Evergreen service area by water use sectors for the years 1990, 1995, 2000, and current conditions. Water use data are not available for the entire year 2005, so data for 2004 are provided for current conditions. **Figure 3** shows the actual water use by customer type for each year from 1987 to 2004. In **Table 4**, the water use sectors (customer types) are listed on the left; public customers include institutional and government sectors. Irrigation is equivalent to landscape irrigation, because no significant agriculture exists in the area. All water used for irrigation is included in this total, including the demand that is supplied by recycled water. There are no sales to other agencies, saltwater barriers, groundwater recharge, or conjunctive use projects in Evergreen. Temporary uses are primarily related to construction. Before 1995, irrigation was not accounted as a separate use and was included within other types (commercial, industrial, and multi-family). While the City now maintains separate irrigation meters for many parcels, some landscape irrigation use is included in the residential and commercial water demand values. Single family residences have the largest water use, approximately 67 percent of the total. The water use for a single family home includes both indoor use and outdoor use as the water used for residential is not metered separately. Since 1990, the water use for single family residences has doubled, showing the greatest increase of all customer types. Single family homes also show the greatest potential for water conservation through appliance upgrades and efficient irrigation practices. Other uses have increased at a slower rate. The total water used by all sectors excluding single family residences has increased only 17 percent in the past ten years.

The EEHVS is organized into six scenarios of potential development, each with a different mixture of customer types (residential, commercial, industrial). **Table 3** shows the proposed mixture of customer types for each scenario (as number of units for residential uses, and square feet for all other). The type of use and the quantity of that use (units or square feet) indicates the future water demand. To determine the proposed increase in water demand, water use coefficients were developed for each type of residential use (large lot, small lot, townhouse, multi-family, and affordable housing) as well as commercial and industrial uses. These water use coefficients (acre-feet per unit or acre-feet per sq ft) used for each type are shown in **Table 5**. Although commercial and industrial uses have a wide range of water use coefficients, one average value for each was used. The water demand for each scenario, determined by the water use coefficients are shown in **Table 3b**.

The single-family residential development for the EEHVS is subdivided into several categories based on the square footage of the lot where the residence is located. Residences are classified as either large lots, small lots, or lots with small alleys based on lot sizes of 5,000 sq. ft, 4000 sq. ft., or 3000 sq. ft. respectively. Townhouses, another type single family residence, are attached homes with lots less than 3000 sq. ft. The multi-family housing is divided into two categories: multi-family and affordable. For each category of residential housing, an indoor water demand per housing unit was calculated assuming 3.2 people per housing unit for all types of housing (ABAG 2005). An average indoor water use of 60 gallons per day per person (gpd/p), as estimated by the Pacific Institute (PI, 2003), was used to calculate the average indoor water use by unit type. In addition, the U.S. Environmental Protection Agency reports that outdoor water demand represents 44 percent of total water demand for average California single family residences (USEPA, 2003). Estimates for the percent of total residential water demand used outdoors varies from 30 percent to 60 percent depending on the geographic location and type of community (Gleick 2004). . Santa Clara Valley Water District estimate an average of 52 percent used outdoors (ref). For all multi-family residences, outdoor water demand was assumed to represent 10 percent of total water demand. For the purpose of calculating total residential water demand, the percentage of water used outside the home was varied based on lot size. The average 44 percent was applied to the small lot (4000 sq. ft). Since the large lot size (5000 sq. ft) is 20 percent larger than the small lot it was assumed to use 20 percent more water outdoors, or 55 percent of the total water demand. The small alley (3000 sq. ft) outdoor use was considered to be 25 percent less than the small lot size. The percent of residential water demand used outside the home was assumed to be 55 percent, 44 percent, 33 percent, and 10 percent for large lots, small lots, small alley lots, and townhouses and multifamily units, respectively. The average total water use by unit was extrapolated from the total indoor water use using these estimates.

Commercial and industrial water use coefficients (in terms of square feet) were assumed to be similar to the proposed development in North San José; these North San José coefficients are restated in **Table 5**. The commercial water use values used in North San José only represent indoor use. In Evergreen, in contrast to North San José where land is being redeveloped and is already irrigated, the area is currently vacant and without irrigation. To determine how much additional water may be used for irrigation, the historic water use by customer was examined. In 1995, SJMWS began tabulating irrigation separately for most parcels. The water use for commercial customers decreased 58 percent from 1994, when irrigation was included in the commercial category, to 1995, when irrigation was placed under a separate category. Although this value may represent an above average water use for irrigation, it is a conservative estimate for future use. The amount of water used for irrigation represents a significant opportunity for conservation and recycled water use. During the same time period (1994 to 1995) there was no significant change in industrial water use. However, proposed industrial developments will be campus industrial facilities with a large amount of irrigation; accordingly, outdoor use by industrial customers was assumed to be the same as commercial. The water demands (as acre-feet per square foot) for commercial and industrial facilities for indoor, outdoor and total uses are shown in the **Table 5**.

Based on the above water use coefficients, the projected water uses based on the proposed development scenarios are shown in **Table 6a – Table 6f**. The development is anticipated to be complete by 2015. For planning purposes, it is estimated the project will be 50 percent complete by 2010. No significant additional development is expected to occur after build out in 2015, thus the water demand is assumed to remain the same. **Figure 4** illustrates the total annual water demand for Evergreen for each of the six scenarios at build out (2015), compared with the current water demand (2004). The water demand is greatest in Scenario V, (19,234 AFY) involving an 11 percent increase over current demand. Single family, multi-family, and commercial water use is increased from current water use under Scenario V.

Water Demand in Normal and Drought Periods

The City of San José's *DRAFT 2005 Urban Water Management Plan Update* (City of San José, in progress) addresses water demands for the City's water service areas, including Evergreen. The Update describes the response to the severe, prolonged drought of 1987 through 1991, which involved an overall decline in water demand in response to water conservation and rationing.

Figure 5, showing water use of water supply in Evergreen from 1975 through 2004, also includes the recent drought. As shown, water use declined slightly in the drought years of 1989, 1990, and 1991. Specifically, water use in 1988 amounted to 10,099 AF and then declined to a low of 8,291 AFY in 1991 representing a decline of 19 percent. After the drought, water use rebounded and then increased steadily, resuming the expected growth for the area.

The Water Supply Shortage Contingency Plan summarized in the 2005 Urban Water Management Plan creates stages of action, or in other words, the various levels of conservation needed to respond to the severity of the supply reduction. Each stage represents a different level of reduction, beginning with Stage 1, a voluntary reduction in water use of up to 15 percent and proceeding with Stages 2, 3, and 4, which are mandatory reductions enforced by the City of San José and Santa Clara Valley Water District (SCVWD). The four stages of action are briefly described as follows:

Stage	Program	Demand Reduction	Shortage	Summary of actions taken
1	Voluntary	Up to 15 %	Up to 15 %	• Coordinate water conservation programs • Initiate Public Information Program • Initiate a media campaign including news and advertising
2	Mandatory	Up to 25 %	15-25%	• Continue Stage 1 Activities • Institute mandatory water use reduction program • Additional water use prohibitions • Monitor and report monthly to ensure compliance
3	Mandatory	Up to 35 %	25-35%	• Continue Stage 1-2 Activities • Monitor and report weekly to ensure compliance
4	Mandatory	Up to 50 %	35-50%	• Continue Stage 1-3 Activities • Ban on all irrigation

Table 7 and **Table 8** present an analysis of how water demand will change in response to drought. **Table 7** represents existing land uses and customer types and **Table 8a-8f** represents future land uses and customer types for each proposed scenario.

The left columns in the table show the customer types (water use sectors) in Evergreen and the water demand in a normal rainfall year. For this analysis, the year 2004 was selected because it is representative of recent water demand conditions. In addition, the rainfall in calendar year 2004 was slightly higher than the average rainfall of 14.3 inches. Based on past performance, the anticipated reduction for a severe single year is expected to be comparable to the response set forth as Stage 2. This response is similar to the one observed during the 1977 single year drought. In the SCVWD *Draft 2005 Urban Water Management Plan,* the reduction in supply during the 1977 drought is used to predict the reduction of supply during a future single year drought. For a multiple year drought, the response is expected to be comparable to the Stage 1 plan. This response is similar to the drought that occurred during 1988 to 1992 drought. The SCVWD's UWMP uses this event as an indication of effects of future multiple year droughts. There is no historical information on the reduction of supply for a severe drought in stage 3 and 4.

Installation of water-conserving plumbing (as mandated by the current building code) will conserve water overall, but will reduce the ability to save water in the long term, a phenomenon termed "demand hardening." This is not accounted for in **Table 8**. Lastly, given the reliability of recycled water in normal years and in drought, its future use would obviate the need for significant landscape irrigation conservation. This is approximated in **Table 8** by weighting the expected demand reduction by the percent of the demand that is anticipated to be supplied from recycled water. For example the 2015 total irrigation demand in Scenario V is 4,341 AF. The amount of the demand, accounted separately as irrigation, to be supplied by recycled water is 2,079 AF. This includes 1,719 AF currently served and 360 AF for future irrigation use. A minor amount of additional recycled water use is subsumed in other water demand categories. About half (52 percent) of this irrigation demand is supplied by potable water; thus the decrease during drought will affect only this portion of the demand. In a Stage I drought, the potable demand would be decreased by 15 percent, or 7.8 percent of the total demand (52 percent of the 15 percent reduction).

Different customer types entail a different potential for water conservation during a drought. Each scenario was examined individually to determine which mix of proposed land use has the potential for the greatest water demand during a drought. Scenario V has the highest water demand in a normal year, a single dry year, or multiple dry years.

WATER SUPPLY

Water supply in the Evergreen area is supplied primarily by imported water through Santa Clara Valley Water District. Four groundwater wells in the area are used as a backup system in the event of a temporary interruption of the imported water. Recycled water has been used in the area since 1998 and current plans will significantly expand the recycled water infrastructure in the Evergreen area.

Proposed sources of water supply include additional imported water from the Santa Clara Valley Water District water system, groundwater from the Santa Clara Valley groundwater basin (which is managed by SCVWD in collaboration with local water agencies), and additional recycled water. In addition, water conservation is anticipated to reduce water demand from current projected amounts.

Table 9 lists the existing and proposed water supply sources in terms of water rights, entitlements, and contracts. **Table 10a** summarizes historic and current water supply sources under normal conditions. Data are reported in five-year increments in order to provide a long-term overview. For the historical data, a near-normal rainfall year was selected to represent each five-year increment, as summarized in the footnote to **Table 10a**. Currently, imported water from SCVWD contributes 91 percent of the total water supply for the Evergreen area and the remaining 9 percent is supplied by recycled water.

Table 10b show the projected supply in the Evergreen area for Scenario V. This scenario has the greatest water demand of all scenarios. With the proposed development outlined in the EEHVS project, the total water demand in Evergreen is increased in Scenario V by 1,981 AFY (the difference in water demand from 17,253 AFY in 2004 and the water demand in 2015, 19,234 AFY). The total potable water demand of Scenario V is anticipated to be met with imported water in a normal water year. As the proposed development is less than the development projected by ABAG, it is assumed the supply of imported water could be met during a normal year. With regard to population estimates, the EEHVS proposes a maximum increase of 15,600 persons (a total of 100,663) in the SJMWS Evergreen service area by 2015, an increase of 18 percent (Scenario V). This population is anticipated to remain at this level through 2030 based on the relatively restrictive Evergreen Development Plan and the lack of vacant property.

Recycled water is also a future source of water supply. The amount supplied is limited by the available uses, which are described in greater detail in the Recycled Water section. The additional supplies of recycled water needed to satisfy future supply in each Scenario is shown in **Table 11** A total of 2,196 AFY of recycled water in Scenario V is expected to be supplied by 2015, an additional 477 AFY over current supplies (360 AFY for park irrigation and 117 AFY for other uses).

Wholesale Water Supply

Imported Water (SCVWD)

SCVWD has contracts with the State of California Department of Water Resources and the United States Bureau of Reclamation to receive, treat, and distribute surface water in the Santa Clara Valley. In 1972 SCVWD entered into the first contract to supply the City of San José with imported water. Another contract initiated in 1981 remains in effect until 2051; a copy of the 1981 contract and various amendments are found in **Appendix A**. The contract established a schedule of water deliveries where the City submits a projected request for a five-year period to facilitate planning and SCVWD contracts annually for minimum deliveries, with restrictions based on peak demand and annual distribution. The City may have access to surplus water as available.

Water supply data are available from the City of San José from 1975 to present. The monthly and annual contributions of SCVWD imported water are shown in **Figures 5** and **6**, respectively. Imported water has been the primary source of water over the period of record, supplemented with both groundwater and recycled water. Imported water is expected to remain the primary water supply for the Evergreen area.

Groundwater Supply (SCVWD)

As indicated in **Table 9**, groundwater has been a source of backup supply for Evergreen. Groundwater is available from the Santa Clara Valley groundwater basin, which is managed by SCVWD in collaboration with other agencies. The City of San José currently has four wells that provide water to Evergreen; as shown on **Figure 1,** these are located west of the Evergreen area. The wells are located in the confined portion of the Santa Clara Valley groundwater basin. Their depths range from 376 to 392 feet and their capacities range from 1,100 gallons per minute to 2,175 gallons per minute. The combined capacity of the four wells is reported at 6,000 gpm (Mansour Nasser, personal communication). Assuming these wells were pumped on a year-round basis for 12 hours per day, they would produce 4,842 AFY. However, the wells are currently maintained as a backup supply and have not been operated to produce water supply since 1988, as shown in **Figures 5** and **6**. Maximum annual pumping occurred in 1981, with pumping of 1,566 AF. These wells are checked regularly per DHS Standards to ensure water supply readiness both quality and quantity. On **Table 9**, no entitlement or water right is indicated because the Santa Clara Valley groundwater basin has not been adjudicated and groundwater entitlements or rights have not otherwise been defined.

Assuming that groundwater would serve as a supplemental source of supply (with SCVWD imported water as the primary potable source and recycled water as the irrigation source), the amount of groundwater to be pumped can be estimated as the residual of the equation:

Water demand – SCVWD imported water supply – Recycled water supply = Groundwater supply.

The current SJMWS plans for future water supplies include groundwater to supplement imported water in order to meet water demands associated with the relatively high ABAG population projections. The volume of projected groundwater use range from 500 AFY in 2010 to 3,000 AFY in 2030. However, with the lower population projections associated with the Evergreen Development Plan and with SCVWD provision of imported water to meet the proposed demand to the area, it is unlikely groundwater will be used as a primary source in the future. The small difference between the SJMWS current projected water supply and the supply presented in this Water Supply Assessment is discussed in further detail in the Supply and Demand Comparison section. Wells should remain as backup water supply is case of unforeseen interruption of the imported water supply. In addition to using the wells as backup, they may also be used as a supplemental source during peak water use times. The water demand in summer months is three times greater than winter months (**Figure 6**). During these high water use times, groundwater may serve to lessen the stress on the imported water system.

The long-term reliability of groundwater supply for the project is not likely to be predicated on well capacity, but is likely to be defined by the overall state of the groundwater basin. This is recognized by the SB610 sections of the California Water Code, which require a detailed description and analysis of the location, amount, and sufficiency of groundwater to be pumped. The following sections describe the Santa Clara Valley groundwater basin, its management, and existing condition in terms of groundwater quantity and quality.

Santa Clara Valley Groundwater Basin

Evergreen overlies the unconfined portion of Santa Clara subbasin, part of the larger Santa Clara Valley Groundwater Basin, designated by the Department of Water Resources (DWR) with groundwater basin number 2-9.02 (California DWR, October 2003). The wells that serve Evergreen overlie the confined portion of the basin. The Santa Clara subbasin occupies a structural trough between the Diablo Range on the east and the Santa Cruz Mountains on the west. It extends from the northern border of Santa Clara County to Coyote Narrows. The Santa Clara valley is drained to the north by tributaries to San Francisco Bay including Coyote Creek and the Guadalupe River. The wells that supply water to Evergreen are located along Coyote Creek just west of the service area, shown **Figure 1**.

The principal water bearing formations of the Santa Clara subbasin are alluvial deposits of unconsolidated to semi-consolidated gravel, sand, silt and clay (DWR, October 2003). The permeability of the valley alluvium is generally high and most large production wells derive their water from it (DWR 1975). The southern portion and margins of the subbasin are unconfined areas, characterized by permeable alluvial fan deposits. A confined zone is created by an extensive clay aquitard in the northern portion of the subbasin (SCVWD, July 2001). This aquitard divides the water-bearing units into an upper zone and a lower zone; the latter is tapped by most of the local wells.

Groundwater in the Santa Clara subbasin is recharged through natural infiltration along stream channels and by direct percolation of precipitation. In addition, SCVWD maintains an active artificial recharge program. Groundwater flow generally is from the margins of the basin toward San Francisco Bay.

Water Resources Management

SCVWD is the groundwater management agency in Santa Clara County (as authorized by the California legislature under the Santa Clara Valley Water District Act) and has the primary responsibility for managing the Santa Clara Valley groundwater basin. SCVWD has worked to minimize subsidence and protect groundwater resources through artificial recharge of the groundwater basin, water conservation, acquisition of surface water and imported water supplies, and prevention of water waste.

The District's principal water supply planning documents are the *Draft Integrated Water Resources Plan 2003* (IWRP) and the *2005 Urban Water Management Plan* currently being prepared. As indicated in the IWRP, SCVWD uses ABAG projections to forecast water demand through 2040. Because the EEHVS development will result in less water demand than that based on ABAG projections, the project's water demand is already incorporated into future water supply plans. It is recognized that SCVWD water supply planning encompasses the entire county with some inherent uncertainty that some areas might have higher-than-expected water demands and others (such as Evergreen) might have lower-than-projected demands. In addition, the IWRP identifies sources of risk and uncertainty that may affect the District's future management. Potential risks include random occurrences of hazards and extreme events, climate change, more stringent water quality standards, uncertainty of future imported water supplies, and demand growth that is greater than projected. The District is dedicated to providing a reliable water supply to the people and businesses of Santa Clara County. In order to meet these water needs in the future and manage potential risk, SCVWD maintains a flexible management of the water resources. SCVWD also is in the process of preparing the 2005 Urban Water Management Plan which summarizes its groundwater supply management, groundwater monitoring, and groundwater quality management programs.

The groundwater supply management program is intended to replenish the groundwater basin, sustain the basin's water supplies, help mitigate groundwater overdraft, and sustain storage reserves for use during dry periods. SCVWD operates artificial recharge systems to augment groundwater supply, including the groundwater in the vicinity of Evergreen wells. SCVWD also conserves local surface water, provides imported water, operates water treatment plants, maintains water conveyance systems, supports water recycling, and encourages water conservation.

Groundwater Quantity

Groundwater conditions throughout the County are generally very good, reflecting SCVWD's water management efforts (SCVWD, July 2001). Historically, groundwater pumping caused groundwater level declines that induced subsidence in the confined portion of the Santa Clara subbasin and saltwater intrusion into aquifers adjacent to San Francisco Bay. These declines were halted in the mid-1960s and then reversed through the artificial recharge program and the importation of surface water. Groundwater levels in the Santa Clara Valley have generally risen since 1965 as demonstrated by hydrographs of index wells monitored by SCVWD; these hydrographs can be viewed online:

http://www.valleywater.org/Water/Where_Your_Water_Comes_From/Local_Water/Wells/Depth-to-Water_Index_Well_Hydrographs.shtm

SCVWD recognizes the benefits of using the vast subsurface storage provided by the groundwater basin, particularly during drought. SCVWD has defined an operational groundwater storage capacity that amounts to 350,000 acre-feet in the Santa Clara Valley subbasin (SCVWD, 2001). This storage is defined in part by the groundwater levels that need to be maintained to prevent subsidence and saltwater intrusion problems.

In its *Integrated Water Resources Plan*, SCVWD has analyzed the reliability of its water supplies in very wet years, average years, and dry years, including successive dry years (SCVWD, June 2004). The IWRP concludes that SCVWD water supplies are sufficient for very wet years and normal years. In addition, the IWRP states that SCVWD will be able to meet the water needs of Santa Clara County during single dry years, even with increasing demand. However, SCVWD is challenged to meet demands in multiple dry years, when water supplies become increasingly reliant upon storage reserves, including groundwater storage with its risk of inducing land subsidence. The IWRP indicates that additional water supply management activities must be developed to meet the water demands of Santa Clara County businesses and residents.

Groundwater Quality

Overall, groundwater quality in the Santa Clara Valley is good. The groundwater in the major producing aquifers is generally of a bicarbonate type, with sodium and calcium the principal cations (DWR, 1975). Although hard, it is of good to excellent mineral composition and suitable for most uses. Treatment has not been needed to meet drinking water standards in public supply wells (SCVWD, July 2001).

As required by the California Department of Health Services (DHS) for the Drinking Water Source Assessment and Protection (DWSAP) Program, drinking water source assessments have been conducted for the four groundwater wells. The assessment was conducted by the San José Municipal Water System (SJMWS) staff and included information gathered from City records, data bases, and staff; the Regional Water Resources Control Board; and visual field surveys. The assessments concluded that contaminants have not been detected in the four wells although the wells are vulnerable to potential contamination from local sources and activities. These include electronic manufacturing facilities, gas stations, confirmed leaking underground storage tanks, and sewer collection systems. However, well location and construction in combination with the local hydrogeology have provided a high level of protection against contamination of the local groundwater (California DHS, 2003).

A review of available 1999 through 2002 water quality data for the four wells indicates that contaminants have not been detected above water quality standards in any of the four wells. Analyses have included regulated organic chemicals, purgeable organic compounds, and general mineral, physical and inorganic chemicals. Nitrate as nitrogen has been detected in all four wells in 1999 ranging between 1.7 and 3.6 parts per million (ppm). These detections are within the water quality standard (primary maximum contaminant level) of 10 ppm.

SCVWD has ongoing groundwater protection programs that include well permitting, well destruction, wellhead protection, leaking underground storage tank, toxic cleanup, land use and development review, nitrate management (targeted to areas of elevated nitrate in the South County), and saltwater intrusion programs (SCVWD, July 2001). SCVWD collects water quality data from 60 wells throughout the groundwater basin.

Saltwater intrusion has occurred in the shallow aquifer in the northern part of the basin. Saltwater from the Bay moves upstream during high tides and leaks through the clay cap into the upper aquifer zone when this zone is pumped (SCVWD, July 2001). Land subsidence has also aggravated this condition. Elevated salinity is also present in the lower aquifer zone but on a much smaller scale, and is attributed to improperly constructed, maintained, or abandoned wells that penetrate the clay aquitard and provide a conduit from the upper to the lower aquifer zone (SCVWD, July 2001). In response, SCVWD has established an extensive program to locate and properly destroy such conduit wells. SCVWD also monitors saltwater intrusion, collecting water quality samples quarterly from 16 wells in the upper aquifer and 5 wells in the lower aquifer in the vicinity of the intruded area.

Recycled Water

The City of San José operates the San José-Santa Clara Water Pollution Control Plant (WPCP) located in Alviso. This plant produces recycled water that is appropriate for landscape irrigation among other uses. As described in the North San José DEIR (City of San José, March 2005), the WPCP currently treats an average of 116.8 mgd and discharges 100 mgd (dry weather peak) into San Francisco Bay. There are concerns over the environmental impacts of wastewater discharge to San Francisco Bay. In response, the City has developed a Clean Bay Strategy and a South Bay Action Plan that are intended to maintain wastewater discharge below a level of 120 mgd. Expansion of water recycling is an important part of this effort, including provision of recycled water to Evergreen. Recycled water is already supplied to the Evergreen area (1,719 AFY in 2004) and the recycled water delivery system is currently being upgraded.

Water recycling is an element of SCVWD planning for future water supplies, as summarized in the draft document, *Integrated Water Resources Planning Study 2003-Draft* (SCVWD, June 2004). Water recycling is part of SCVWD's baseline projection, which envisions recycled water use throughout Santa Clara County of 16,000 AFY by 2010, including recycled water from the WPCP. SCVWD also considers water recycling as a building block with an estimated potential future use of 33,000 AFY.

As shown in **Table 9**, water recycling has been identified as a water supply source for the Evergreen service area. Recycled water can provide for landscape irrigation, ornamental features (fountains), toilet flushing, and specific industrial uses. In 2004, recycled water use in the Evergreen area amounted to 1,719 AF, used only for irrigation. It is assumed that this use will continue in the future. Recycled water also can be extended to supply additional existing landscape irrigation demand (on separate landscape meters and around multi-family complexes) and to supply the irrigation demand of proposed multi-family, commercial, industrial, and park land uses. However the retrofitting of existing irrigation systems is unlikely in the near future, due to the cost of replacing the potable infrastructure supplying these uses with the needed recycled water infrastructure. Dual plumbing, while possible, for multi-family units and other uses has not been considered as a potential use of recycled water because of the considerable cost and oversight needed for implementation.

In addition to existing uses, recycled water could be extended to serve the landscape irrigation water demands of residential, commercial, industrial and park land uses proposed as part of the Evergreen East Hills Vision Strategy (EEHVS). **Table 11** shows the potential demand for recycled water by customer type under each scenario.

Commercial and industrial developments proposed as part of the EEHVS would also require landscape irrigation. To determine this water demand, the historical water use by customer was examined with particular attention to the period in 1995 when SJMWS began metering irrigation separately. The initiation of separate irrigation metering resulted in a decline in total water use for commercial customers of 58 percent from 1994 to 1995, revealing the portion of total water demand represented by irrigation. The change in water use likely represents a variety of factors and therefore may represent an above-average water use for irrigation; however, it is considered a reasonable estimate for future use. From 1994 to 1995, there was no significant change in industrial water use. However, EEHVS industries will likely involve campus developments with considerable irrigation; accordingly, outdoor use by industrial customers was assumed to be the same as commercial. With regard to proposed multi-family complexes, the expected increase in water demand amounts to as much as 520 AFY. Assuming that 10 percent of the total demand is for landscape irrigation, then 52 AFY of the demand could be served potentially by recycled water in Scenario V.

The EEHVS also proposes about 103 acres of irrigated park land in Scenarios II-V. The water demand for park irrigation was estimated as the average monthly evapotranspiration demand of turf, less the average monthly precipitation. The irrigation water demand of the turf was calculated for each month (January through December) and totaled to obtain a yearly water demand. Irrigation efficiency was assumed to be 90 percent. The total water applied to parks was estimated to be 3.5 AFY per acre, or 360 AFY for Scenarios II-V, which could be supplied with recycled water assuming that extension of infrastructure is feasible.

The amount of future demand that may be served by recycled water ranges from 455 AF in Scenario II to 659 in Scenario VI. The total demand that could be met by recycled water would vary from 2,173 AFY to 2,377 AFY. It should be noted that the above estimated future demand for recycled water does not include landscape irrigation around single family homes or dual plumbing. SJMWS and SCVWD are working together to maximize the appropriate use of recycled water.

Water Supply in Normal and Drought Periods

While **Table 10 a, b, and c** documents past, current and future water supply under normal conditions, **Tables 12 and 13** quantify the amount of water supply during normal and drought conditions, for current conditions and for projected conditions with the Evergreen, respectively. The California Water Code section 10910 (also termed Senate Bill 610 or SB610) requires a discussion of how supply will meet demand during a normal, single dry, and multiple dry water years during a 20-year projection. These 20-year projections of supply during normal and dry years are shown in **Table 13a**. The EEHVS is expected to reach build out by 2015 and the demand is expected to remain the same from 2015 to 2025. To ensure sufficient water supply when build out occurs, the 10-year projections of supply during normal and dry years are examined in **Table 13b**. In **Tables 12** and **13**, the imported water supply in dry years is reduced based on past supply during droughts, and groundwater is used to supplement supply.

The Evergreen area relies on imported water from SCVWD, which accounts for 92 percent of current supply. Although SJMWS holds contracts for water deliveries, the SCVWD maintains the right to decrease deliveries to SJMWS in the case of inadequate imported water supply. In the event of a drought, SCVWD will first reduce the amount of water imported for groundwater recharge and agricultural deliveries. If the SCVWD imported water requires further reductions, deliveries to the City may be reduced. Evergreen is the only area of SJMWS that receives imported water from SCVWD.

In the 2005 Urban Water Management Plan, SCVWD assesses current the effects of potential droughts on future county-wide water supply and demand by examining the impact of historical droughts. The most extreme single year drought occurred in the Santa Clara Valley in 1977, while the period 1987 to 1992 was marked by a severe multi-year drought. Occurrence of another drought similar in magnitude to that of 1977 would result in a reduction in imported water supplies and in increased groundwater pumping to meet demand (SCVWD 2005). SCVWD predicts that such an extreme single year drought would result in reduction of imported water (including State Water Project, Central Valley Water Project, and transfers from the Semitropic water bank) to 54 percent of the normal supply. Similarly, a multi-year drought similar to 1987-1992 would result in a reduction of imported water supply to 74.6 percent of normal.

Clearly, these county-wide reductions will result in reductions of imported water supply to retailers like SJMWS. For the purposes of planning the future reliability of water supply in the Evergreen area, it is assumed the reduction of supply to Evergreen during a drought would be comparable to the county-wide reductions. In the case of a drought and reduced imported water, groundwater will be relied on to supplement supply. The maximum use of groundwater would occur during a single dry year in Scenario V, 3,848 AFY. The wells that serve Evergreen have the capacity to supply this amount of water when needed. However, it is recognized that drought conditions will prompt other local retailers to use groundwater to supplement their supplies, so that SJMWS, SCVWD, and other groundwater users will work cooperatively to ensure the water supply reliability.

SCVWD has developed a planning framework to ensure water supply reliability through its *Integrated Water Resources Planning Study 2003*. Based on the population projections from ABAG, SCVWD is making sound investment decisions on long-term water supply management to meet the projected needs of the Santa Clara Valley. The proposed development in Evergreen would result in less population and jobs than projected by ABAG and thus the EEHVS adds less water demand than planned.

Recycled water is recognized for its reliability during dry conditions. Accordingly, in **Tables 12 and 13**, the water supply from recycled water remains constant during normal, single dry, and multiple dry years.

COMPARISON OF SUPPLY AND DEMAND

Table 14 provides a comparison of current water supplies and water demands under normal and drought conditions while **Table 15a and 15b** compares water supplies and demands in 2025 and 2015 with Scenario V of the Evergreen project.

For planning purposes, SJMWS prepares estimates of projected water supply through 2030. SJMWS relies on ABAG projections to determine future water demand, assuming that a 25 percent increase in population projected by ABAG will result in a 25 percent in water demand. The calculated water demand based on ABAG 2003 projections for the Evergreen service would be 23,219 AFY in 2030. In order to meet this demand, SJMWS plans use of 18,500 AFY of SCVWD imported water supplemented with groundwater and recycled water, as shown in the table below:

SJMWS Projected Water Demand Based on ABAG 2003 Population

Water Supply Sources	2010	2015	2020	2025	2030
SCVWD (Imported Water)	17,400	17,350	17,750	18,500	18,500
SCVWD (Groundwater)*	500	1,500	2,000	2,500	3,000
Recycled Water	1,719	1,719	1,719	1,719	1,719
Total	19,619	20,569	21,469	22,719	23,219

For this water supply assessment, the water demand for the Evergreen area was based on the proposed land uses and expected water use rates for the various EEHVS Scenarios. Based on this methodology, the total build out water demand is expected to be between 18,291 AFY and 19,234 AFY, depending on the scenario. This water demand is less than that calculated water demand based on ABAG population projections. The proposed demand for the EEHVS in 2015 is 1,335 AFY (6 percent) lower than the demand increase previously projected. By 2030, the difference between the EEHVS proposed water demand and the previous projections is more than 3,985 AFY (17 percent) lower than the previous projections.

The proposed project is estimated to result in less water demand than the demand based on ABAG population projections. Water demand may be decreased further through water demand management. The City of San José is currently working (in cooperation SCVWD and other agencies) to conserve water and decrease overall system demand. Their ongoing work in conservation includes the following best management practices (BMPs):

- Water Survey Programs for Residential Customers
- Residential Plumbing Retrofit
- System Water Audits, Leak Detection and Repair
- Metering with Commodity Rates for All New Connections and Retrofit Existing
- Large Landscape Conservation Programs and Incentives
- High Efficiency Washing Machine Rebate Program

- Public Information Programs
- School Education Programs
- Conservation Programs for All CII Accounts
- Conservation Pricing
- Conservation Coordinator
- Water Waste Prohibition
- Residential ULF Toilets Replacement Programs

These conservation measures and other future programs will decrease the overall water demand. However, as mentioned previously, the ability for short-term drought reduction would be limited as a result of demand hardening.

Indoor residential water demand is a large portion of the total potable water demand for the proposed Evergreen project. If the City of San Jose takes an aggressive approach in water conservation, building on the programs already developed, the water demand can be decreased significantly. To quantify the decrease in demand, the largest indoor residential water uses were examined. Toilets, showers, and washing machines typically account for 50 to 75 percent of the water used indoors in residential units. By increasing the efficiency of these uses, the residential demand can be reduced, as explained below.

The City of San José has mandated installation of Ultra Low Flow toilets (ULFT) in all new residential units built since the early 1990's. The City's plumbing code requires low flow toilets to have no greater than 2 gallons per flush but new models exist that use only 1.6 gallons per flush. Another household use that presents an opportunity for water conservation is the shower, which accounts for about 20 percent of indoor residential water use. Efficient low flow shower heads can decrease the amount of water used per shower. Newer shower heads use approximately 8 gallons of water less per shower than those on the market in the mid-1990's. In addition, the City of San José currently has a program to provide rebates for high efficiency washing machines. It is estimated that the replacement of inefficient toilets, showerheads, washing machines, and dishwashers and the reduction of leaks in residential units would result in a reduction of the average water demand. In addition, water demand can be further decreased through conservation of water used outside the home, or by commercial, industrial, or public users.

CONCLUSIONS

1. The proposed Evergreen project entails modification of plans and policies, including the City's General Plan, and implementation of infrastructure improvements to support proposed development.

2. The proposed project entails increased water demands; this report addresses the Evergreen service area of the City of San José, including the six scenarios of development in Evergreen. The greatest increase in demand would result from Scenario V.

3. Proposed sources of water supply include additional imported water from SCVWD, groundwater from the Santa Clara Valley groundwater basin, which is managed by Santa Clara Valley Water District (SCVWD), and recycled water.

4. Water demand could increase from the current (2004) 17,253 AFY to 19,234 AFY at build out of the Evergreen project in 2015 (under Scenario V).

5. Groundwater has been identified as a source of water supply for the project. The City has four wells serving Evergreen and has used groundwater in the past as a supplemental supply.

6. Groundwater is actively managed by SCVWD to replenish the groundwater basin, sustain the basin's water supplies, help to mitigate groundwater overdraft and prevent subsidence, and sustain storage reserves for use during dry periods.

7. Recycled water has been identified as a significant water supply source for the Evergreen project for landscape irrigation and other uses. Recycled water could reduce potable demand by 2,196 AFY for Scenario V in Evergreen by 2015; additional water recycling opportunities exist.

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TABLES

Table 1. Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Precip, in	3.06	2.53	2.30	1.07	0.39	0.09	0.04	0.08	0.20	0.72	1.74	2.32	14.30
Temp,˚F	56.00	59.22	62.78	65.89	71.45	75.69	78.76	78.75	77.63	71.20	61.43	55.70	67.88
ETO, in	1.35	1.87	3.45	5.03	5.93	6.71	7.11	6.29	4.84	3.61	1.8	1.36	49.35

Sources: Precipitation and temperature from the NOAA NCDC San Jose station, and evapotranspiration from CIMIS San Jose station

Table 2. Population Projections

	2005	2010	2015	2020	2025
City of San Jose: Evergreen					
Scenario I	85,063	85,410	85,757	85,757	85,757
Scenario II	85,063	89,959	94,855	94,855	94,855
Scenario III	85,063	90,823	96,583	96,583	96,583
Scenario IV	85,063	91,367	97,671	97,671	97,671
Scenario V	85,063	92,863	100,663	100,663	100,663
Scenario VI	85,063	89,983	94,903	94,903	94,903

Table 3a. Summary of Land Use Development Scenarios (including area served by SJMWS only)

Scenario	Residential (dwelling units)	Commercial/ Office (square feet)	Industrial (square feet)	Parks (acres)
Scenario I	217	0	4,660,000	0
Scenario II	3,060	575,000	0	103
Scenario III	3,600	575,000	0	103
Scenario IV	3,940	575,000	0	103
Scenario V	4,875	575,000	0	103
Scenario VI	3,075	575,000	4,660,000	0

Table 3b. Summary of Development Scenarios Water Demand AFY in 2015 (including area served by SJMWS only)

Scenario	Residential	Commercial/ Office	Industrial	Parks	Total
Scenario I	103.8	0	934.0	0	1,038
Scenario II	925.0	112.0	0.0	360.1	1,397
Scenario III	1,079.2	112.0	0.0	360.1	1,551
Scenario IV	1,180.4	112.0	0.0	360.1	1,653
Scenario V	1,508.5	112.0	0.0	360.1	1,981
Scenario VI	836.9	112.0	934.0	0	1,883

Table 5. Water Use Coefficients for Evergreen

Residential	Indoor				Outdoor			Total	
	People/unit	Gallons per capita	gdu	AFY	used outdoors	gdu	AFY	gdu	AFY
Large Lot	3.2	60	192	0.215	55%	235	0.263	**427**	**0.478**
Small Lot	3.2	60	192	0.215	44%	151	0.169	**343**	**0.384**
Small Alley	3.2	60	192	0.215	33%	95	0.106	**287**	**0.321**
Townhome	3.2	60	192	0.215	10%	21	0.024	**213**	**0.239**
Multi-Family	3.2	60	192	0.215	10%	21	0.024	**213**	**0.239**
Affordable	3.2	60	192	0.215	10%	21	0.024	**213**	**0.239**

Other			Gal /sq ft	AFY	used outdoors		AFY		AFY
Commercial			0.073	0.0001	58%		0.0001		**0.0002**
Industrial			0.075	0.0001	58%		0.0001		**0.0002**
Parks				0	100%		3.4959		**3.4959**

Table 4. Existing Water Demand by Water Use Sectors, AFY

Customer Type	1990	1995	2000	2004
Residence - Single	5,078	6,044	9,448	10,337
Residence - Multi	1,837	1,245	1,385	1,622
Irrigation	0	1,962	3,271	3,981
Commercial	1,092	702	1,179	912
Industrial	0	61	47	49
Public	348	339	270	234
Temporary	13	141	214	118
TOTAL	8,368	10,493	15,815	17,253

* includes potable and recycled water demand

Table 6a. Proposed Water Demand Under Scenario I, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,389	10,440	10,440	10,440
Residence - Multi	1,622	1,622	1,622	1,622
Irrigation	3,981	3,981	3,981	3,981
Commercial	912	912	912	912
Industrial	516	983	983	983
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	17,772	18,291	18,291	18,291

* includes potable and recycled water demand

Table 6b. Proposed Water Demand Under Scenario II, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,650	10,964	10,964	10,964
Residence - Multi	1,771	1,920	1,920	1,920
Irrigation	4,161	4,341	4,341	4,341
Commercial	968	1,024	1,024	1,024
Industrial	49	49	49	49
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	17,952	18,650	18,650	18,650

* includes potable and recycled water demand

Table 6c. Proposed Water Demand Under Scenario III, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,697	11,057	11,057	11,057
Residence - Multi	1,802	1,981	1,981	1,981
Irrigation	4,161	4,341	4,341	4,341
Commercial	968	1,024	1,024	1,024
Industrial	49	49	49	49
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	18,029	18,805	18,805	18,805

* includes potable and recycled water demand

Table 6d. Proposed Water Demand Under Scenario IV, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,730	11,124	11,124	11,124
Residence - Multi	1,819	2,016	2,016	2,016
Irrigation	4,161	4,341	4,341	4,341
Commercial	968	1,024	1,024	1,024
Industrial	49	49	49	49
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	18,079	18,906	18,906	18,906

* includes potable and recycled water demand

Table 6e. Proposed Water Demand Under Scenario V, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,831	11,325	11,325	11,325
Residence - Multi	1,883	2,143	2,143	2,143
Irrigation	4,161	4,341	4,341	4,341
Commercial	968	1,024	1,024	1,024
Industrial	49	49	49	49
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	18,243	19,234	19,234	19,234

* includes potable and recycled water demand

Table 6f. Proposed Water Demand Under Scenario VI, AFY

Customer Type	2010	2015	2020	2025
Residence - Single	10,495	10,653	10,653	10,653
Residence - Multi	1,883	2,143	2,143	2,143
Irrigation	3,981	3,981	3,981	3,981
Commercial	968	1,024	1,024	1,024
Industrial	516	983	983	983
Public	234	234	234	234
Temporary	118	118	118	118
TOTAL	18,195	19,136	19,136	19,136

* includes potable and recycled water demand

Table 8d. Future Water Demand in Normal and Dry Years Scenario IV, AFY

		Estimated Drought Reduction		Stage 2		Stage 1	
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**Multiple Dry - 2**	**Multiple Dry - 3**	**Multiple Dry - 4**
Residence - Single	11,124	15.0%	25.0%	9,455	9,455	9,455	9,455
Residence - Multi	2,016	14.7%	24.5%	1,719	1,719	1,719	1,719
Irrigation	4,341	5.3%	8.9%	4,110	4,110	4,110	4,110
Commercial	1,024	14.0%	23.4%	880	880	880	880
Industrial	49	15.0%	25.0%	42	42	42	42
Public	234	15.0%	25.0%	199	199	199	199
Temporary	118	15.0%	25.0%	100	100	100	100
TOTAL	18,906	13.4%	22.4%	16,505	16,505	16,505	16,505

Table 8e. Future Water Demand in Normal and Dry Years Scenario V, AFY

		Estimated Drought Reduction		Stage 2		Stage 1	
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**Multiple Dry - 2**	**Multiple Dry - 3**	**Multiple Dry - 4**
Residence - Single	11,325	15.0%	25.0%	8,494	9,626	9,626	9,626
Residence - Multi	2,143	14.6%	24.4%	1,620	1,829	1,829	1,829
Irrigation	4,341	4.1%	6.8%	4,046	4,164	4,164	4,164
Commercial	1,024	14.0%	23.4%	784	880	880	880
Industrial	49	15.0%	25.0%	37	42	42	42
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	19,234	13.3%	22.1%	15,244	16,840	16,840	16,840

Table 8f. Future Water Demand in Normal and Dry Years Scenario VI, AFY

		Estimated Drought Reduction		Stage 2		Stage 1	
Customer type	**Normal (2025)**	**Stage 1**	**Stage 2**	**Single dry**	**Multiple Dry - 2**	**Multiple Dry - 3**	**Multiple Dry - 4**
Residence - Single	10,653	15.0%	25.0%	7,990	9,055	9,055	9,055
Residence - Multi	2,143	14.6%	24.4%	1,620	1,829	1,829	1,829
Irrigation	3,981	8.5%	14.2%	3,416	3,642	3,642	3,642
Commercial	1,024	14.0%	23.4%	784	880	880	880
Industrial	983	6.7%	11.2%	873	917	917	917
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	19,136	12.7%	21.2%	14,946	16,622	16,622	16,622

Table 7. Existing Water Demand in Normal and Dry Years, AFY

Customer type	Normal (2004)	Estimated Drought Reduction: Stage 1	Estimated Drought Reduction: Stage 2	Stage 2: Single dry	Stage 1: Multiple Dry - 2	Stage 1: Multiple Dry - 3	Stage 1: Multiple Dry - 4
Residence - Single	10,337	15.0%	25.0%	7,752	8,786	8,786	8,786
Residence - Multi	1,622	15.0%	25.0%	1,217	1,379	1,379	1,379
Irrigation	3,981	8.5%	14.2%	3,416	3,642	3,642	3,642
Commercial	912	15.0%	25.0%	684	775	775	775
Industrial	49	15.0%	25.0%	37	42	42	42
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	17,253	14.1%	23.5%	13,370	14,923	14,923	14,923

Table 8a. Future Water Demand in Normal and Dry Years Scenario I, AFY

Customer type	Normal (2025)	Estimated Drought Reduction: Stage 1	Estimated Drought Reduction: Stage 2	Stage 2: Single dry	Stage 1: Multiple Dry - 2	Stage 1: Multiple Dry - 3	Stage 1: Multiple Dry - 4
Residence - Single	10,440	15.0%	25.0%	7,830	8,874	8,874	8,874
Residence - Multi	1,622	15.0%	25.0%	1,217	1,379	1,379	1,379
Irrigation	3,981	8.5%	14.2%	3,416	3,642	3,642	3,642
Commercial	912	15.0%	25.0%	684	775	775	775
Industrial	983	6.7%	11.2%	873	917	917	917
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	18,291	12.9%	21.5%	14,283	15,886	15,886	15,886

Table 8b. Future Water Demand in Normal and Dry Years Scenario II, AFY

Customer type	Normal (2025)	Estimated Drought Reduction: Stage 1	Estimated Drought Reduction: Stage 2	Stage 2: Single dry	Stage 1: Multiple Dry - 2	Stage 1: Multiple Dry - 3	Stage 1: Multiple Dry - 4
Residence - Single	10,964	15.0%	25.0%	8,223	9,319	9,319	9,319
Residence - Multi	1,920	14.8%	24.6%	1,448	1,637	1,637	1,637
Irrigation	4,341	7.8%	13.0%	3,776	4,002	4,002	4,002
Commercial	1,024	14.0%	23.4%	784	880	880	880
Industrial	49	15.0%	25.0%	37	42	42	42
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	18,650	13.8%	23.0%	14,531	16,179	16,179	16,179

Table 8c. Future Water Demand in Normal and Dry Years Scenario III, AFY

Customer type	Normal (2025)	Estimated Drought Reduction: Stage 1	Estimated Drought Reduction: Stage 2	Stage 2: Single dry	Stage 1: Multiple Dry - 2	Stage 1: Multiple Dry - 3	Stage 1: Multiple Dry - 4
Residence - Single	11,057	15.0%	25.0%	8,293	9,399	9,399	9,399
Residence - Multi	1,981	14.7%	24.5%	1,495	1,689	1,689	1,689
Irrigation	4,341	6.6%	11.0%	3,866	4,056	4,056	4,056
Commercial	1,024	14.0%	23.4%	784	880	880	880
Industrial	49	15.0%	25.0%	37	42	42	42
Public	234	15.0%	25.0%	175	199	199	199
Temporary	118	15.0%	25.0%	88	100	100	100
TOTAL	18,805	13.6%	22.7%	14,738	16,365	16,365	16,365

Table 9. Water Supply Sources

Supply	AFY	Entitlement	Right	Contract	Ever used
SCVWD (Imported Water)	17,500			x	yes
SCVWD (Groundwater)*	4,842				yes
Recycled Water**	1,719				yes

*The annual amount is based on a reported existing well capacity of 6,000 gpm with year-round pumping for 12 hours per day; see text.
** Recycled Water volume based on maximum usage (2004)

Table 10a. Past and Present Water Supply in a Normal Year, AFY

Water Supply Sources	1980*	1985	1990	1995	2000	2005
SCVWD (Imported Water)	5,915	8,083	10,198	11,846	14,805	16,561
SCVWD (Groundwater)*	697	810	11	11	2	0
Recycled Water	0	0	0	0	1,162	1,719
Total	6,612	8,893	10,209	11,857	15,969	18,280

* The water received in the nearest normal year (precipitation within 20% of average) was selected. The water received in 1982 was used for 1980, 1985 for 1985, 1992 for 1990, 1996 for 1995, 2001 for 2000, and 2004 for 2005.

Table 10b. Projected Water Supply in a Normal Year Scenario V, AFY

Water Supply Sources	2010	2015	2020	2025	2030
SCVWD (Imported Water)	17,038	17,038	17,038	17,038	17,038
SCVWD (Groundwater)*	0	0	0	0	0
Recycled Water	1,957	2,196	2,196	2,196	2,196
Total	18,995	19,234	19,234	19,234	19,234

*Groundwater may be used during peak times

Table 11. Proposed Recycled Water Use (AFY)

Customer Type	Scenarios I	II	III	IV	V	VI
Current Irrigation	1,719	1,719	1,719	1,719	1,719	1,719
Commercial	0	65	65	65	65	65
Industrial	542	0	0	0	0	542
Multi-Family	0	30	36	39	52	52
Parks	0	360	360	360	360	0
GRAND TOTAL	2,260	2,173	2,180	2,183	2,196	2,377

Table 12. Current supply (AF) available by source for single-dry and multiple-dry years

Source	Normal*	Single Dry	Multiple Dry Years 2	3	4
SCVWD (Imported Water)	16,561	8,943	12,189	12,189	12,189
SCVWD (Groundwater)	0	2,745	1,334	1,334	1,334
Recycled Water	1,719	1,719	1,451	1,451	1,451
TOTAL	18,280	13,407	14,974	14,974	14,974

Table 13a. Projected supply (AF) available by source for single-dry and multiple-dry years, Scenario V

Source	Normal (2025)	Single Dry	Multiple Dry Years 2	3	4
SCVWD (Imported Water)	17,038	9,201	12,540	12,540	12,540
SCVWD (Groundwater)	0	3,848	2,104	2,104	2,104
Recycled Water	2,196	2,196	2,196	2,196	2,196
TOTAL	19,234	15,244	16,840	16,840	16,840

Table 13b. Projected supply (AF) available by source for single-dry and multiple-dry years, Scenario V

Source	Normal (2015)	Single Dry	Multiple Dry Years 2	3	4
SCVWD (Imported Water)	17,038	9,201	12,540	12,540	12,540
SCVWD (Groundwater)	0	3,848	2,104	2,104	2,104
Recycled Water	2,196	2,196	2,196	2,196	2,196
TOTAL	19,234	15,244	16,840	16,840	16,840

Table 14. Comparison of current supply and demand for normal, single-dry and multiple-dry years

Current Supply and Demand	Normal	Single Dry	Multiple Dry Years 2	3	4
Supply total	18,280	13,407	14,974	14,974	14,974
Demand total	17,253	13,370	14,923	14,923	14,923
Difference*	1,027	37	51	51	51

* Supply and Demand differ slightly because of varying accounting measures

Table 15a. Scenario V, Comparison of 20 year projection of supply and demand for normal, single dry and multiple dry years

2025 Supply and Demand with Project	Normal	Single Dry	Multiple Dry Years 2	3	4
Supply total	19,234	15,244	16,840	16,840	16,840
Demand total	19,234	15,244	16,840	16,840	16,840
Difference	0	0	0	0	0

Table 15b. Scenario V, Comparison of 10 year projection of supply and demand for normal,

2015 Supply and Demand with Project	Normal	Single Dry	Multiple Dry Years 2	3	4
Supply total	19,234	15,244	16,840	16,840	16,840
Demand total	19,234	15,244	16,840	16,840	16,840
Difference	0	0	0	0	0

FIGURES

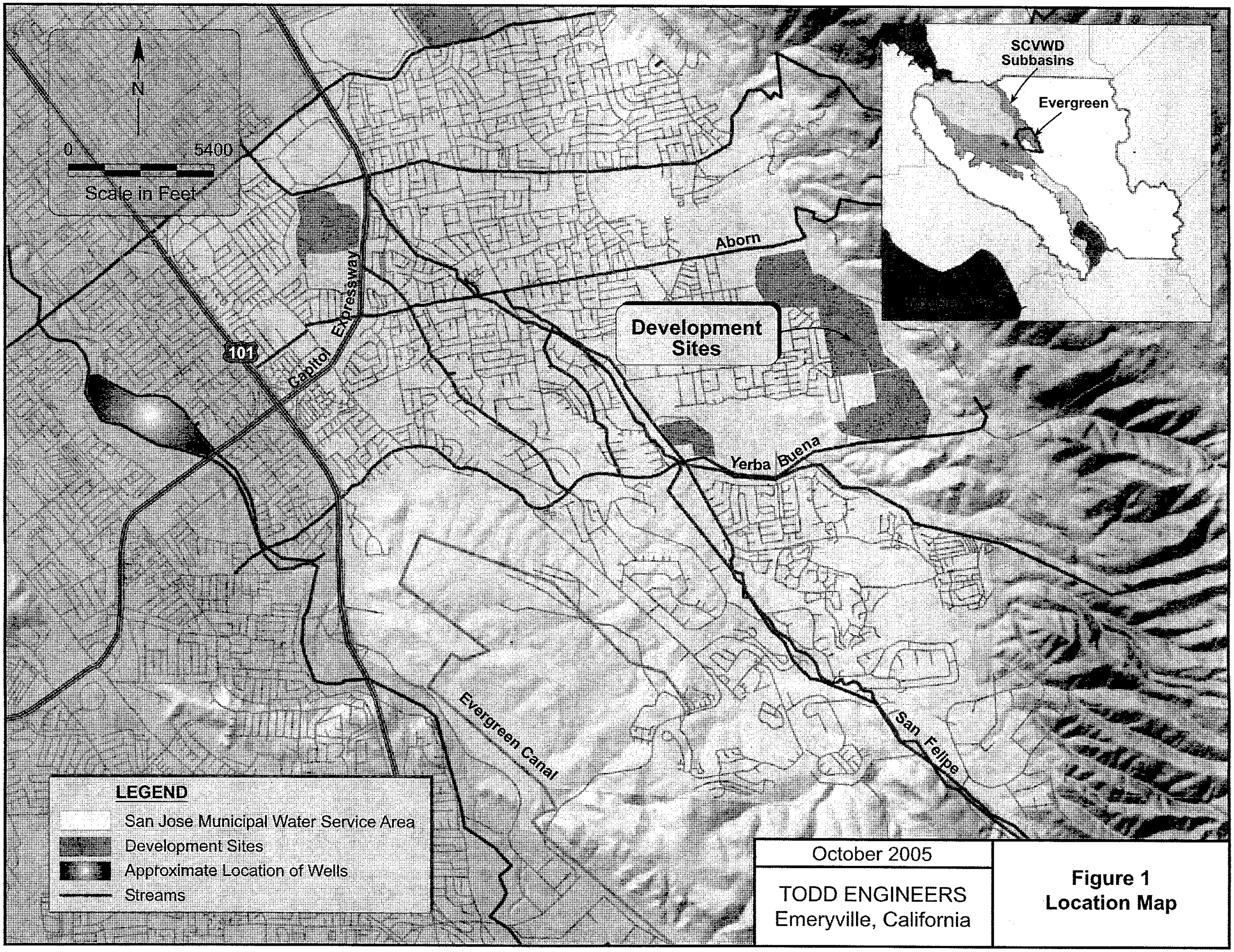

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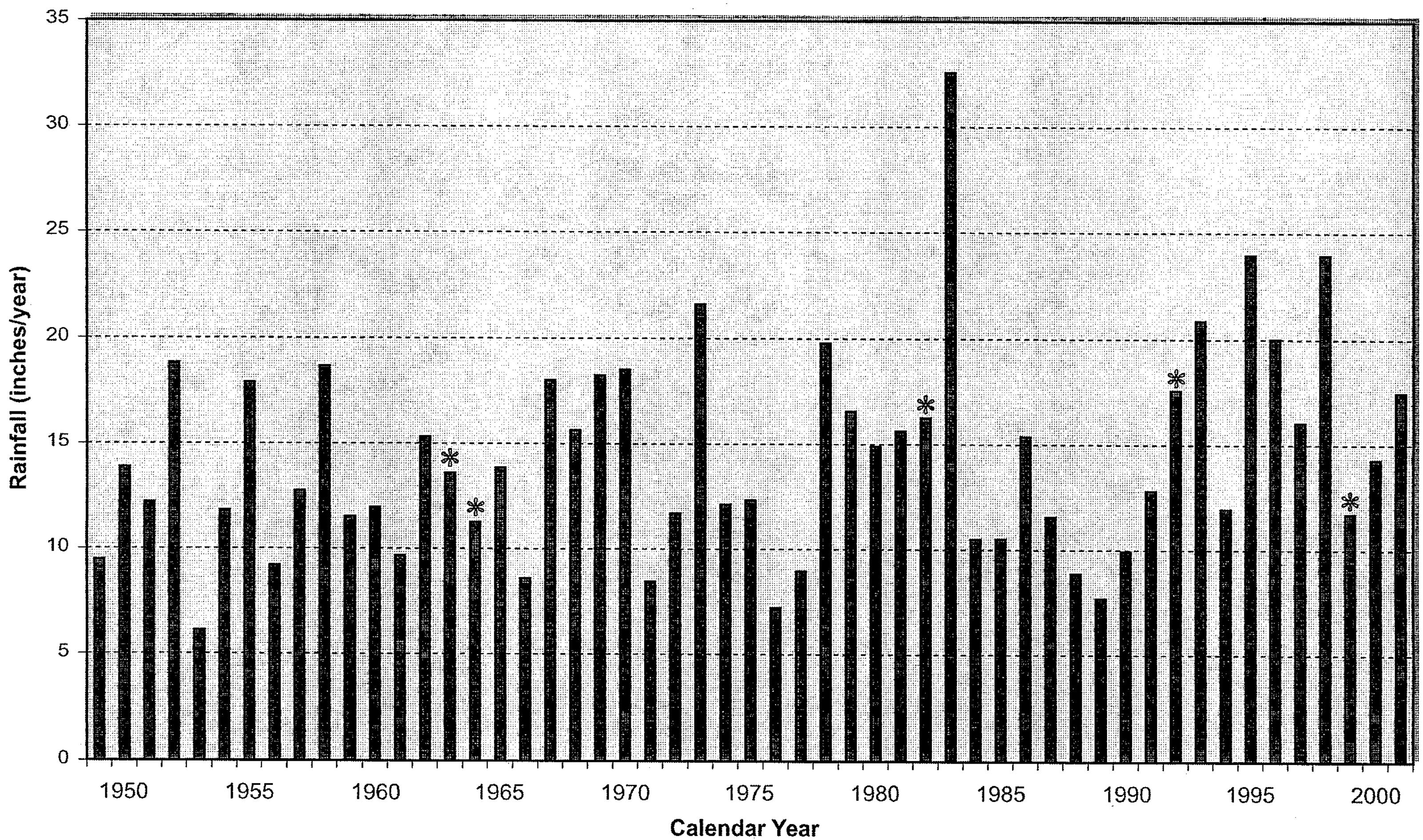
Figure 1
Location Map



Year	* Missing Month(s)
1963	October, November, December
1964	January
1982	March
1992	August
1999	September, October

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Figure 2
Annual Precipitation, San Jose

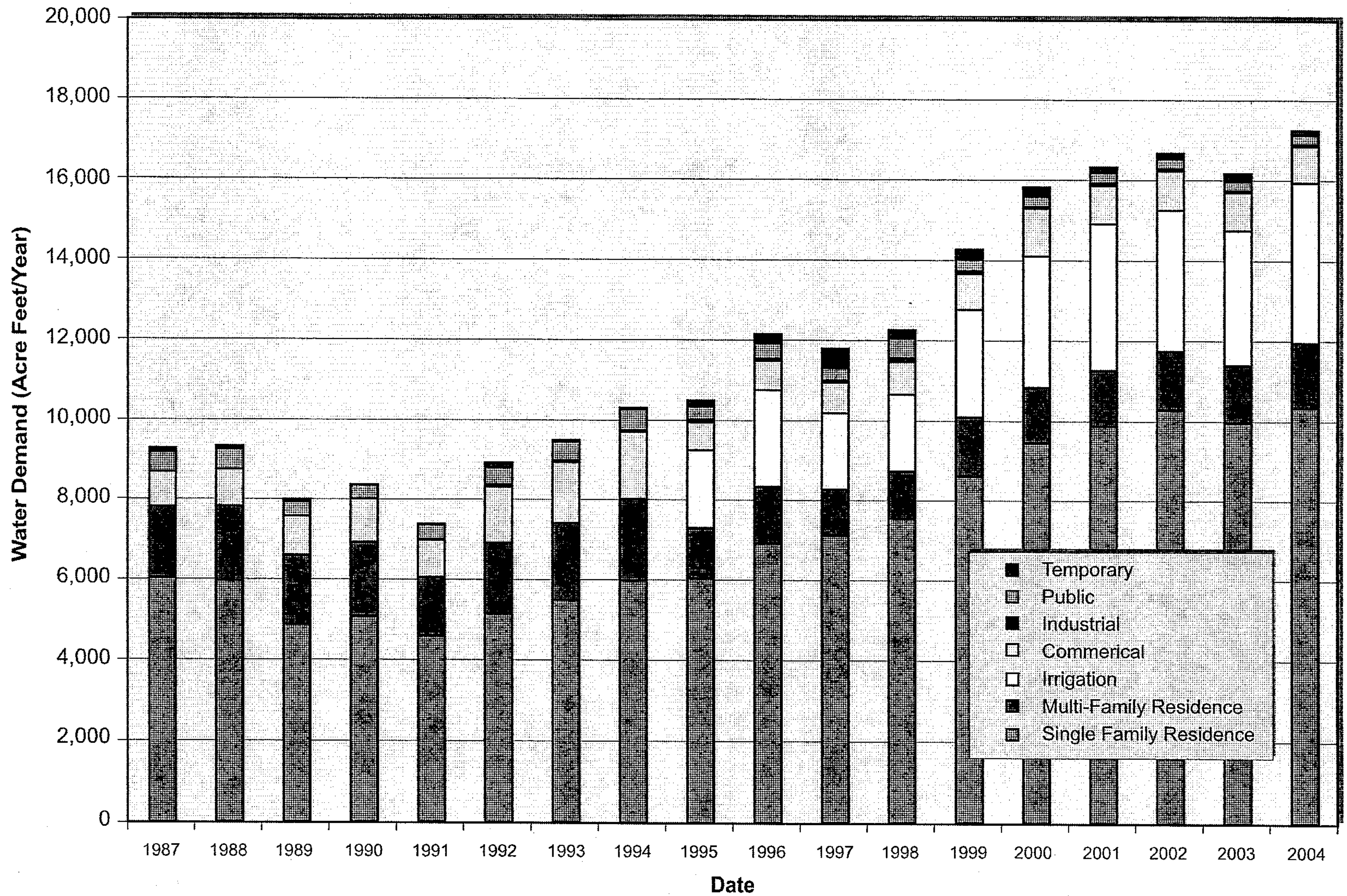

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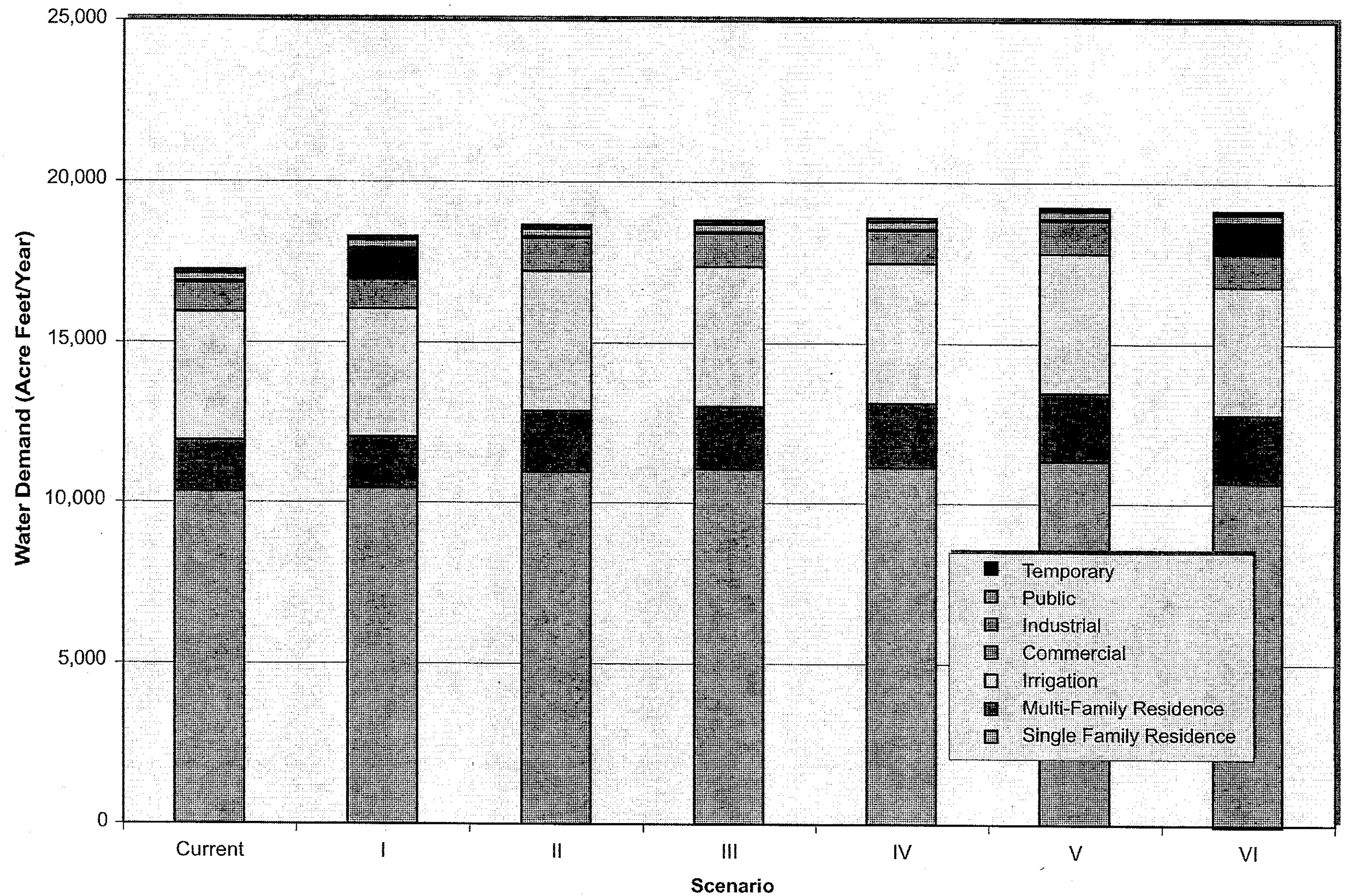
Figure 3
Evergreen Water Demand, 1987 - 2004



October 2005	**Figure 4**
TODD ENGINEERS Emeryville, California	**Current and Proposed Water Demand**

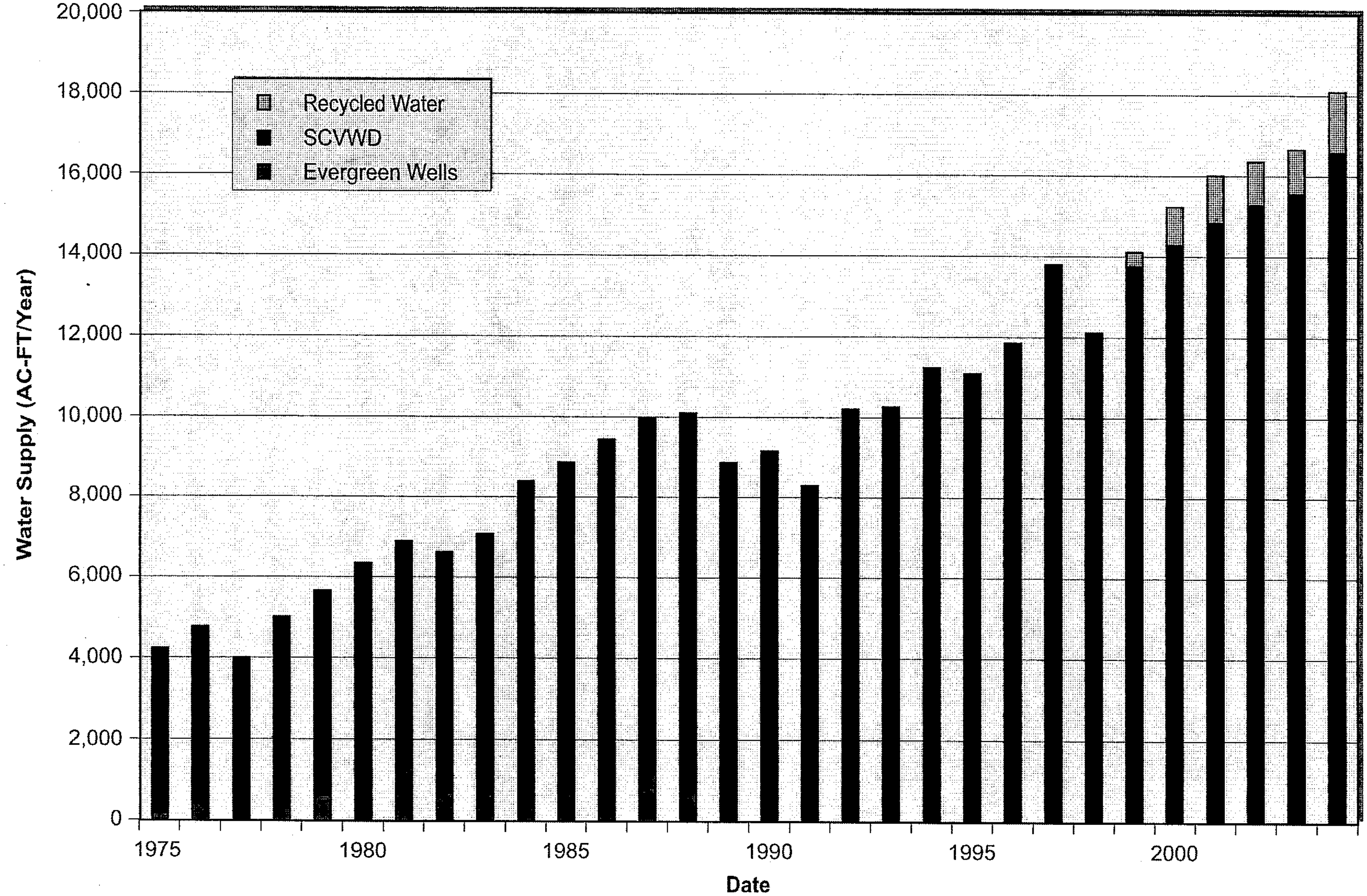


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Figure 5
Annual
Water Supply

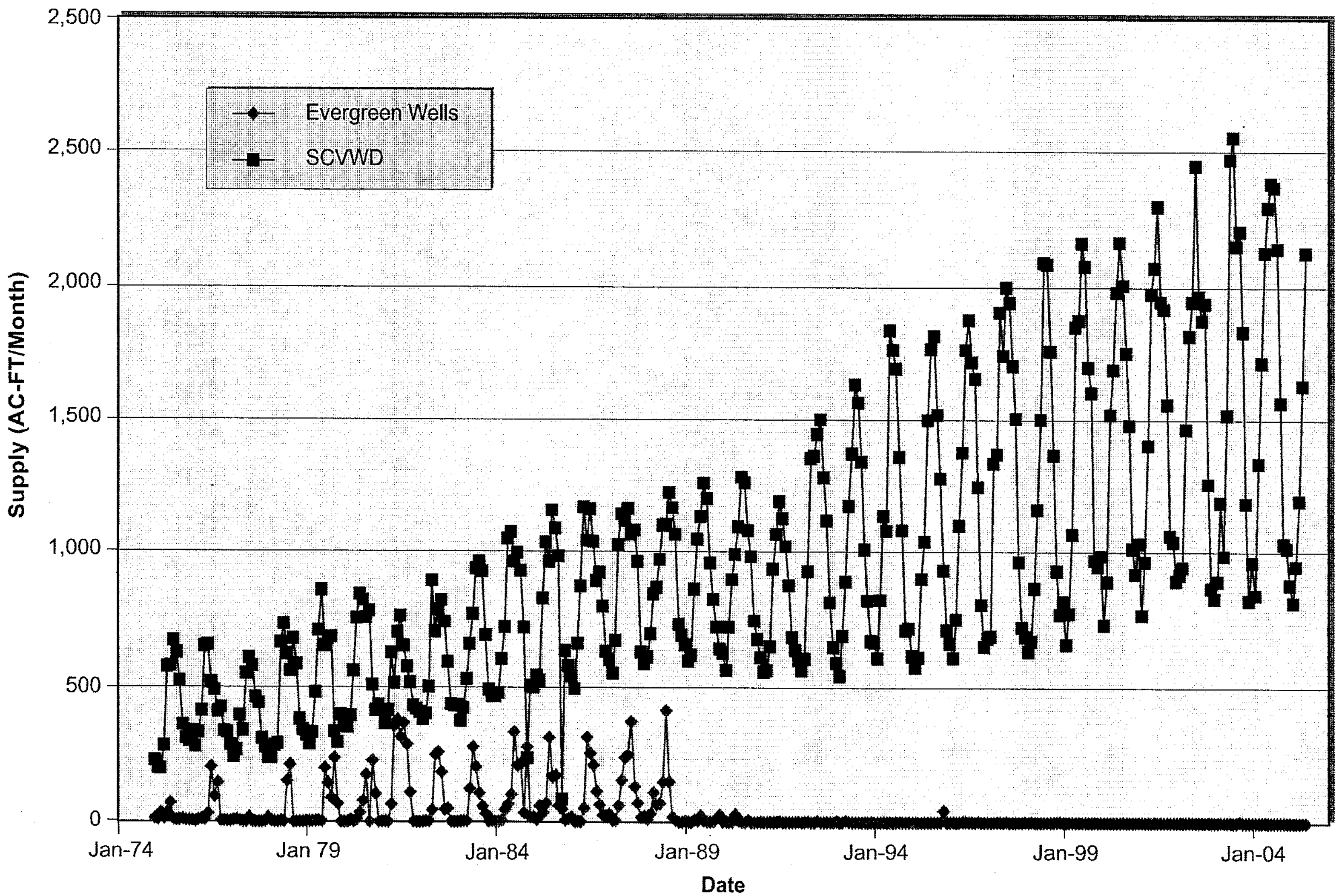

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Figure 6
Monthly
Water Supply