# CITY OF SAN BRUNO

# Urban Water Management Plan

**January 2007**

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## COMMONLY USED ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AB3030 | Assembly Bill 3030, Groundwater Management Act |
| AB303 | Assembly Bill 303, Local Groundwater Assistance |
| ABAG | Association of Bay Area Governments |
| BAWSCA | Bay Area Water Supply and Conservation Agency |
| BMP | Best Management Practice |
| CEQA | California Environmental Quality Act |
| CII | Commercial, Industrial, and Institutional |
| DSS Model | Decision Support System Model |
| DWR | Department of Water Resources |
| EOP | Emergency Operation Plans |
| ERP | Emergency Response Plan |
| ET | Evapo-transpiration |
| FY | Fiscal year |
| GWMP | Groundwater Management Plan |
| HHSA | Hetch Hetchy Supply Assurance |
| HTWTP | Harry Tracy Water Treatment Plant |
| in/mo | Inches per month |
| IWSAP | Interim Water Shortage Allocation Plan |
| MG | Million gallons |
| MGD | Million gallons per day |
| MOU | Memorandum of Understanding |
| PEIR | Programmatic Environmental Impact Report |
| psi | Pounds per square inch |
| RMF | Residential multifamily |
| RSF | Residential single family |
| SBMC | San Bruno Municipal Code |
| SCVWD | Santa Clara Valley Water District |
| SFPUC | San Francisco Public Utilities Commission |
| SFPD | San Francisco Planning Department |
| TDS | Total dissolved solids |
| UAW | Unaccounted for water |
| ULFT | Ultra Low Flow Toilets |
| UWMP | Urban Water Management Plan |
| WSIP | Water System Improvement Plan |
| WQCP | Water Quality Control Plant |

## UWMP ACT CROSS REFERENCES

| UWMP Act Section | Corresponding Section in this UWMP | |
|---|---|---|
| *10620 (d) (2)* | 1.3 | Agency Coordination |
| *10620 (f)* | 1.4 | Water Management Tools |
| *10621 (b)* | 1.5 | Notification of UWMP Preparation |
| *10631 (a)* | 2 | Service Area Information |
| *10631 (b)* | 4 | Water Sources |
| *10631 (b) (1) through (4)* | 4.3 | Groundwater |
| *10631 (c)* | 5 | Reliability of Water Supply |
| *10631 (d)* | 6.1 | Water Transfers |
| *10631 (e)* | 3 | Water Demands |
| *10631 (f)* | 9 | Demand Management Measures |
| *10631 (g)* | 9.6 | Evaluation of Demand Management Measures Not Implemented |
| *10631 (h)* | 6 | Potential Water Supply Projects and Programs |
| *10631 (i)* | 6.2 | Development of Desalinated Water |
| *10631 (k)* | 5.1 | SFPUC Wholesale Water Supply Reliability |
| *10632(a) through (i)* | 10 | Water Shortage Contingency Plan |
| *10633(a) through (g)* | 7 | Recycled Water |
| *10634* | 5.5 | Water Quality Impacts on Reliability |
| *10635 (a)* | 8 | Supply Versus Demand |

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# 1. INTRODUCTION

In 1983, the California Legislature enacted the Urban Water Management Planning Act ("UWMP Act") (Water Code Sections 10610 - 10656). The UWMP Act states that every urban water supplier that provides water to 3,000 or more customers, or that provides over 3,000 acre-feet of water annually, should make every effort to ensure the appropriate level of water service reliability to meet the needs of its customers during normal, dry, and multiple dry years. Further, the UWMP Act requires urban water suppliers to update their Urban Water Management Plan ("UWMP") and submit a complete plan to California Department of Water Resources ("DWR") every five years. In accordance with the UWMP Act, Erler and Kalinowski ("EKI") has prepared, on behalf of the City of San Bruno ("City" or "San Bruno"), this update to the City's 2001 Urban Water Management Plan.

This UWMP has been prepared in general accordance with the format suggested in DWR's Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan, dated 18 January 2005. The text of specific sub-sections of the UWMP Act has been included in indented, italicized font at the beginning of specific sections of this UWMP. The information presented in that section of the UWMP and associated figures, tables, attachments, and references are collectively intended to comply with the requirements of that sub-section of the UWMP Act. To the extent practicable, supporting documentation has been provided in Appendices A through J. Other sources for the information contained herein are provided in the references section of the document.

In addition, as described below, this UWMP has been prepared to reflect the recent changes to the UWMP Act and the regional coordination efforts between the Bay Area Water Supply and Conservation Agency ("BAWSCA"), the BAWSCA member agencies, and the San Francisco Public Utilities Commission ("SFPUC").

## 1.1. CHANGES TO THE UWMP ACT

San Bruno's updated UWMP describes how the City intends to manage its current and future water supplies and demands to continue to provide customers with an adequate and reliable water supply. Additionally, San Bruno's updated UWMP reflects the following significant revisions that have been made to the UWMP Act since 2000. The most recent version of the UWMP Act is included as Appendix A.

- Pursuant to Senate Bill ("SB") 610, Costa, 2001:
    - If groundwater is identified as a source of available water, the UWMP must include (1) a copy of a groundwater management plan, if available, (2) a description of groundwater basin, including any adjudication information, and (3) a description and analysis of amount and location of groundwater pumped for past five years and projected pumping.

  - The UWMP must include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use identified.
- Pursuant to Assembly Bill ("AB") 901, Daucher, 2001: The UWMP must include information, to the extend practicable, relating to the quality of existing sources of available water over given time periods and the manner in which water quality affects water management strategies and supply reliability.
- Pursuant to SB 672, Machado, 2001: The UWMP must describe water management tools and options used by the urban water supplier that will maximize resources and minimize the need to import water from other regions.
- Pursuant to SB 1518, Torlakson, 2002: The UWMP must include a description of the actual use of recycled water in comparison to previously projected uses. Additionally, an UWMP must include a description of the quantity of treated wastewater that meets recycled water standards being discharged that would otherwise be available for use in a recycled water project.
- Pursuant to SB 318, Alpert, 2004: The UWMP must describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

## 1.2. REGIONAL COORDINATION EFFORTS

Additionally, San Bruno's updated UWMP reflects coordination with BAWSCA and SFPUC. BAWSCA is the agency that, among other responsibilities, represents San Bruno and the 27 other cities, water districts, and utilities in negotiations with SFPUC. SFPUC is the wholesale water supplier to all of the BAWSCA member agencies, also referred to as the "Suburban Purchasers" or "Wholesale Customers." Together with SFPUC, BAWSCA developed common language for inclusion in each Suburban Purchasers' UWMP regarding the following issues:

- Quantity and reliability of SFPUC's Wholesale Water Supply;
- Description of SFPUC's Water System Improvement Plan ("WSIP") and the associated Programmatic Environmental Impact Report ("PEIR");
- Description of the Settlement Agreement and Master Water Sales Contract (collectively, the "Master Contract") between SFPUC and each BAWSCA agency (i.e., each Suburban Purchaser) and implications of the contract expiration in 2009;
- Description of BAWSCA and its powers and role;
- Description of the Interim Water Shortage Allocation Plan ("IWSAP") between BAWSCA agencies;
- Description of the Hetch Hetchy Supply Assurance ("HHSA"); and
- Description of BAWSCA's regional coordination efforts towards water demand management.

For clarification purposes, the common language provided to San Bruno by BAWSCA is presented indented and in a lighter color and different font from the remainder of the UWMP text. As a result, there may be some redundancies in the information presented and the number of times that certain terms are abbreviated or defined.

As part of the coordination effort between SFPUC, BAWSCA, and each Suburban Purchaser, San Bruno's UWMP incorporates the wholesale water supply and demand projection information developed by SFPUC on behalf of the Suburban Purchasers. SFPUC estimated its entire water supply and supply reliability, including the portion allocated to BAWSCA's Suburban Purchasers, using its Water System Reliability Model and the current IWSAP methodology. In addition, water demand projections for each individual Suburban Purchaser were made by SFPUC using a different model called a Decision Support System Model ("DSS Model"). SFPUC conducted these modeling efforts as part of developing water demand information for its WSIP and associated PEIR. Additional information related to the two models that SFPUC used to develop San Bruno's wholesale water supply and demand projections is included in Section 5.1 of this UWMP.

## 1.3. AGENCY COORDINATION

*10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

The Bay Area Water Supply and Conservation Agency (BAWSCA) was created on May 27, 2003 to represent the interests of 26 cities and water districts, and two private utilities, in Alameda, Santa Clara and San Mateo counties that purchase water on a wholesale basis from the San Francisco Regional Water System.

BAWSCA is the only entity having the authority to directly represent the needs of the cities, water districts and private utilities (wholesale customers) that depend on the regional water system. BAWSCA provides the ability for the customers of the regional system to work with San Francisco on an equal basis to ensure the water system gets fixed, and to collectively and efficiently meet local responsibilities.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

Compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance the responsibility for completing an UWMP lies with the individual BAWSCA member agencies. BAWSCA's role in the development of the 2005 UWMP updates is to work closely with its member agencies and the SFPUC to maintain consistency

between the multiple documents being developed and to ensure overall consistency with the WSIP and the associated environmental documents.

As a member of BAWSCA and the BAWSCA Technical Advisory Committee, the City has coordinated with BAWSCA and its 27 other member agencies throughout the update of San Bruno's UWMP. A summary of San Bruno's efforts to coordinate with SFPUC, the San Francisco Planning Department ("SFPD"), BAWSCA, and the 27 other BAWSCA member agencies is provided in Section 1.5.1 and Table 1. An example of each of the notices that San Bruno sent to the relevant agencies is provided in Appendix B.

## 1.4. WATER MANAGEMENT TOOLS

*10620 (f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.*

In order to help maximize the City's water resources and reduce dependency on imported water, San Bruno has been proactive in protecting the quality and reliability of its groundwater supplies and in instituting measures to control water consumption within the City. San Bruno coordinated with other groundwater users to develop a Groundwater Management Plan for the Westside Basin in 1999, participated in a Conjunctive Use Pilot Program with SFPUC and the other Westside Basin Partners between 2002 and 2005, and was recently awarded a grant from DWR's Local Groundwater Assistance Program (Assembly Bill 303, "AB303") to institute a saltwater intrusion monitoring program to protect the quality of its groundwater in future years. A detailed description of each of these activities can be found in Section 4.3 of this UWMP.

San Bruno is currently implementing, or planning to implement the water demand management tools described in Section 9 of this UWMP. These demand management measures will assist the City in its efforts toward improving water use efficiency.

## 1.5. NOTIFICATION OF UWMP PREPARATION

*10621. (b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.*

Notifications and interactions between San Bruno and other stakeholders throughout the UWMP process are discussed below.

### 1.5.1 Agency Notification

Prior to preparing this UWMP, on 10 August 2005, the City sent a letter to BAWSCA and to each BAWSCA member agency informing them that the City was in the process of updating its UWMP and soliciting their input in the update process. In addition, San

Bruno sent a notification letter to SFPUC, SFPD, and the County of San Mateo ("County").

Prior to publishing a draft UWMP for public review, on 28 November 2006, San Bruno sent letters to BAWSCA, its 27 additional member agencies, SFPUC, SFPD, and the County informing them of the time and location that the draft UWMP would be available for review, the time and location of the public hearing, and requesting their input and comments on the draft UWMP. The draft UWMP was available for public review from 15 December 2006 to 23 January 2007. A copy of this notice is included in Appendix B.

### 1.5.2 Public Notification

Consistent with requirements of California Government Code 6066,[1] San Bruno issued public notifications soliciting public input during the preparation of the UWMP.

Prior to commencing preparation of the UWMP, on 4 June 2005, the City published a notice in *The Independent*, San Bruno's local newspaper, informing the public that the City was in the process of updating its UWMP. The public notice solicited input during the UWMP update process. A copy of the newspaper announcement is included in Appendix B.

Prior to publishing a draft UWMP for public review, on 2 and 9 December 2006, San Bruno published a public notice in the San Mateo County Times informing the public that the draft UWMP would be available for public review at City Hall and at the Public Library and that the public hearing would be held on 23 January 2007 at the San Bruno Senior. Additional notice of the public hearing was published in the San Mateo Daily Journal on 13 and 20 January 2007. The document was available for public review from between 15 December 2006 and 23 January 2007. A copy of the public notices are included in Appendix B.

[1] Government Code section 6066. Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.

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# 2. SERVICE AREA INFORMATION

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631. (a) Describe the service area of the supplier; including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

San Bruno is located in northern San Mateo County just west of the San Francisco International Airport (Figure 1). The City is bounded on the east by Highway 101, and on the west by the northern-most portion of the Golden Gate National Recreation Area. To the north lies the City of South San Francisco and to the south the City of Millbrae. San Bruno is approximately 3.5 miles wide with elevations ranging from near sea level in the east, to almost 1,200 feet in along its western edge. These changes in elevation correspond with different land uses, including low-density residential areas to the west and higher-density residential, commercial, and institutional land uses in the lower-lying eastern portion of the City. Major transportation corridors include Highway 101, Interstates 280 and 380, El Camino Real, and two public transit lines – Caltrain and Bay Area Rapid Transit ("BART").

As required by the UWMP Act, specific information related to the City's population, climate, and demographics is provided below. A brief description of the City's water system is also included.

## 2.1. HISTORICAL POPULATION AND EMPLOYMENT

San Bruno was founded as a railroad suburb to San Francisco in 1914. The City's population has grown steadily since its inception, through World War II when it was used to house military personnel and other activities, and into the 1970s when San Bruno's population reached its peak growth rate and a population of 36,000 people (Draft General Plan, 2006). The City's most rapid growth occurred between 1940 and 1970 and then declined slightly in the subsequent decade. Since the 1980s San Bruno's population has grown steadily, but at an increasingly slower rate (Table 2). During the City's most rapid growth period in the 1960s and 1970s, its population comprised 6.5% of the total San Mateo County population. Most recently, the City's share of the County's population has been slightly less than 6% (Draft General Plan, 2006). Though the City's growth rate has decreased in recent years, residential and commercial infill projects have continued to develop smaller portions of the City and may continue to do so into the future. Since 2000, San Bruno's population has risen from 40,165 to 41,700 in 2005 (Draft General Plan, 2006).

San Bruno's proximity to San Francisco and Silicon Valley job centers make it a desirable residential location and San Bruno remains primarily a residential community. Though San Bruno is predominately a residential community, between 1980 and 2000 the

City's residential growth measured less than 1% annually, while the number of jobs within the City grew by an annual rate of 2.5% (from 10,030 to 17,180), indicating a slight change in the make-up of the City. Whether this trend was temporary or on-going is unclear, as the total number of jobs in San Bruno since 2000 has dropped down to 13,910 (Draft General Plan, 2006).

## 2.2. FUTURE DEVELOPMENTS, POPULATION, AND EMPLOYMENT

According to the 2006 Draft General Plan, San Bruno's population is expected to increase from the current 41,700 people to a total of 43,973 residents by 2025. The projected population estimates are based on approved and planned development projects within the City and the designated housing density for each project. For comparative purposes, population projections from the Association of Bay Area Governments' ("ABAG's") *Projection 2005* and the updated 2001 Draft General Plan estimates (used in SFPUC's estimate of San Bruno's future water demand, see Section 3.2) are also shown in Table 2. [2]

The following statistics on City demographics and existing, approved, and planned developments is summarized from the City of San Bruno's 2006 Draft General Plan:

- The average household size is 2.67 people:
- Job to employed resident ratio is 0.88
- San Bruno currently has 15,776 housing units

Approved developments include the U.S. Navy Site Specific Plan and housing at Skyline College with 763 and 115 units respectively. Planned housing developments that the City expects to be completed by buildout in 2025 include 160 low-density residential, 127 high-density residential units, 126 transit-oriented development units, 103 multi-use units (focusing on residential units), and 166 downtown mixed-use units. Thus, the City projects a total of 17,336 housing units within San Bruno at buildout in 2025.[3]

In addition to residential growth, the City expects to see the following jobs created by new developments: 493 transit oriented, 120 multi-use, 579 downtown mixed-use, 110 neighborhood commercial, 1,103 regional commercial, 2,050 regional office, 195 industrial, and 232 construction and transportation. The City anticipates 4,882 new jobs from the aforementioned development projects.

## 2.3. CLIMATE

The climate in San Bruno is generally considered temperate. The average temperature is 57 degrees Fahrenheit ("ºF"), with an average low of 49ºF and an average high of 65ºF.

[2] The San Bruno Planning Department is currently updating the Draft General Plan. This draft plan is expected to be finalized in the near future.
[3] ABAG projections are based on regional information and population trends, and not on the specific development projects used for the Draft General Plans.

The mean summer temperature (i.e., June through September) is 63ºF. Precipitation averages 20 inches per year with most of the precipitation falling between November and March and little to none occurring April through September (Table 3). The lack of rainfall during the warmer summer months contributes to a higher water demand in the summer, which is exacerbated by high evapo-transpiration ("ET") rates. ET records indicate an average loss of four inches per month ("in/mo"), with a high of 6 in/mo in June and July, and lows of 1 to 2 in/mo from December to January (Table 3).

## 2.4. SAN BRUNO WATER DISTRIBUTION SYSTEM

San Bruno owns, operates, and maintains the potable water distribution system that serves drinking water to residential, commercial, institutional, and limited industrial establishments within San Bruno's service area. Water supplied through the City's distribution system is a combination of groundwater pumped at San Bruno's five groundwater supply wells, and water purchased from SFPUC and the North Coast County Water District ("NCCWD") (see Section 4).

The City's water system consists of five groundwater supply wells, eleven pressure zones which are maintained with eight booster pump stations, eight water storage tanks, one filtering plant, 900 fire hydrants, 9,000 valves, over 100 miles of water mains ranging from 2 inches to 16 inches in diameter, and 12,415 metered service connections (BC, 2001a; San Bruno Consumption Reports, 2006). San Bruno has four connections to the SFPUC water supply system and one connection to the NCCWD water supply system The City's water system can deliver water at a pressure of at least 30 pounds per square inch ("psi") during peak-hour demand and 20 psi during maximum-day demand coincident with a fire flow (BC, 2001a).

San Bruno's Public Works Department maintains and replaces portions of the water system on an as needed basis. Recent changes to the distribution system include the addition of one new groundwater supply well (Well 20 – Lions Field), the merging of Pressure Zones 1 and 4 and Pressure Zones 3 and 5, and the switching of the City's connection to SFPUC's Sunset Supply line from active to standby status. The following paragraphs describe each of these changes to the water system in further detail. The City's water supply facilities are shown in Figure 2, pressure zones in Figure 3, and a system flowchart is provided in Figure 4.

### 2.4.1 Pressure Zones

Table 4 gives the elevations served and the means of supply for each of the City's eleven pressure zones. In 2005, the City combined four of its former pressure zones (Zones 1, 3, 4, and 5) into two larger pressure zones, termed Zones 1/4 and 3/5. The service areas of each zone are shown in Figure 3. Pressure Zone 1/4, which includes the eastern, lower-lying portion of the City, serves the largest sector of San Bruno's population (approximately 40%), followed by Zones 11, 6, 9, and 10 (ranging from 11% to 8% of the population). The remaining six pressure zones each serve between 5% and 1% of San Bruno's customers (BC, 2001a).

### 2.4.2 Groundwater Wells

Since 2000, San Bruno has made a number of changes to its groundwater management and production well system, including changing the groundwater disinfection process from chlorine to chloramines in 2003, reducing groundwater extraction as part of the regional Conjunctive Use Pilot Project conducted between January 2003 and March 2005, installing a new groundwater extraction well, Well 20, and replacing the pump motors at groundwater extraction Wells 15 and 18. The groundwater supply wells currently operated by the City are referred to as:

- Well 15 - Commodore
- Well 16 - Forest Lane
- Well 17 - Corporate Yard
- Well 18 - Cypress
- Well 20 - Lions Field

San Bruno's groundwater extraction wells range from 2 to 22 years in age, and have production capacities from 250 to 610 gallons per minute (Table 5). San Bruno's groundwater supply wells are screened in the Westside Basin's lower aquifer- the Merced Formation (see Section 4.3 for detailed information about the groundwater basin).

All of San Bruno's groundwater supply wells are equipped with sodium hypochlorite and ammonium hydroxide feed equipment to provide disinfection and residual disinfectant that matches the chloraminated SFPUC water supplies.

### 2.4.3 Pump Stations and Storage Tanks

The City's water supply is conveyed throughout the distribution system by eight pump stations presented in Table 6. All of the pumps, except pumps numbers 1 and 2 at Pump Station 6 are vertical turbine, constant speed pumps, and range in size between 30 and 125 horsepower. The pumping stations transfer water from the City's groundwater supply wells and the SFPUC connections to the City's pressure zones and storage tanks. San Bruno's pump stations are operated either manually or based on the water levels in the storage tanks to which they pump. Each station is equipped with chlorine residual analyzers (BC, 2001a; and Mr. Brust, personal communication, January 2006).

Water is stored in the City's eight water storage tanks that provide an aggregate water storage volume of 8.3 million gallons ("MG"), but are generally operated between 50% and 75% of capacity based on daily and seasonal conditions (Table 7). The largest water storage facility is the Tank 1-Cunningham Drive Tank, which holds 2.5 MG. The smallest water storage facilities are Tank 6-Lake Drive South, and Tank 7-Sweeney Ridge, which each hold 0.40 MG.

The direction of flow within the City's water distribution system and the relationship between pump stations, storage tanks, and other system components are presented in

Figure 4. Additional details are described in the *City of San Bruno Water System Master Plan*, prepared by Brown & Caldwell, dated July 2001.

### 2.4.4 Purchased Water Connections

San Bruno has four connections to the SFPUC's water supply system and one connection to NCCWD (Table 8, Figure 2). During normal conditions, water from SFPUC is transported through the 54 inch-diameter San Andreas Pipeline, which carries water down from the Harry Tracy Filtration Plant near Crystal Springs Reservoir, and delivered to two of San Bruno's turnouts. San Bruno also has a connection to SFPUC's 60 inch-diameter Sunset Supply Pipeline, which was recently fitted with a pressure reducing valve, and is currently used only for fireflow and other emergency situations. The Sunset Supply Pipeline delivers water directly from SFPUC's Hetch Hetchy System (see Section 4.1.1 for more detailed information on SFPUC's water system supply).[4] Each of the four connections is equipped with an isolation valve, a check valve, and a recording meter. When the pressure within San Bruno's distribution system drops below a designated psi, the check valve opens and water flows from the SFPUC system into San Bruno's distribution system.

San Bruno's connection from the NCCWD extends from SFPUC's Harry Tracy Filtration Plant to the Crystal Springs Terrace. San Bruno purchases treated water from the NCCWD to serve the Crystal Springs Terrace in Pressure Zone 13 (Figure 2). This connection is equipped with a pressure reducing valve at Regulating Station 1 (BC, 2001a).

[4] The City will no longer be diverting water from the Sunset Supply turnout during normal conditions in an effort to minimize the production of trihalomethanes ("THMs"), which are created by mixing water supplies from different sources.

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# 3. WATER DEMANDS

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:*

*(A) Single family residential.*
*(B) Multifamily.*
*(C) Commercial.*
*(D) Industrial.*
*(E) Institutional and governmental.*
*(F) Landscape.*
*(G) Sales to other agencies.*
*(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.*
*(I) Agricultural.*

*(2) The water use projections shall be in the same five-year increments described in subdivision(a).*

Water demand is dependent on a variety of factors, including climate, population, local economy, income level, water prices, and the types of development present in a community. San Bruno's total water demand includes water that is consumed by the City's customer accounts and water that is lost, or unaccounted for, within the system ("unaccounted for water" or "UAW"). The following sections describe San Bruno's historical, current, and projected water demands for residential, commercial, industrial, institutional, and landscape irrigation purposes within the City (water use sectors A through F outlined above), and for unaccounted for water. This discussion does not include consumption for the water use sectors G and I (*Sales to Other Agencies* and *Agricultural*, respectively) because they do not apply to San Bruno (see Section 3.3). Discussion pertaining to water use sector H (*Conjunctive Use*) is included in Section 4.3.4).

## 3.1. CURRENT AND HISTORICAL WATER DEMAND

Records of San Bruno's water consumption are maintained by the City's Finance Department for each customer account.

### 3.1.1 Water Use Sectors

Trends in water use within each customer sector are tracked based on sewer code categories and grouped according to six water use sectors described below:

- The *Residential Single Family ("RSF")* sector includes all single family residential accounts within San Bruno's service area;

- The *Residential Multifamily ("RMF")* sector includes apartments, boarding houses, multiple dwellings, and townhouse accounts;
- The *Commercial* sector includes businesses such as restaurants, hotels, hospitals, laundries, car washes, and other commercial operations;
- San Bruno's *Industrial* accounts include construction and food wholesale customers;
- The *Institutional* sector includes government-related services, such as the police and fire departments, as well as religious and educational buildings; and
- Accounts grouped into the *Other* sector include dedicated irrigation meters for commercial and institutional customers, as well as temporary meters and water main flushing.

Table 9 shows the current number of accounts in each of the aforementioned water use sectors. The majority of San Bruno's customers are *RSF* accounts (83% of total accounts). An additional 10% are *RMF* accounts, 5% are *Commercial* accounts, and less than 1% of the City's customers are found in each of the *Industrial*, *Institutional*, or *Other* water use sectors. Though San Bruno has increased from 12,138 accounts in fiscal year ("FY") 2000-01 to 12,415 accounts today, the distribution of accounts within the water use sectors described above has remained fairly constant.

### 3.1.2 Water Consumption Patterns

The patterns in San Bruno's water consumption by sector and by year are discussed below.

#### 3.1.2.1 Water Use by Sector

Based upon a review of historical billing records, it is apparent that certain sectors generally consume more water per account than other sectors. For example, since *RMF* accounts include multiple dwelling units per account, the number of occupants is much higher for one *RMF* account than for one *RSF* account. Though 83% of San Bruno's accounts are for single family homes, these accounts only constitute 54% of the City's total water use. *RMF* accounts, in comparison, account for 10% of the City's total accounts and 23% of the water use. Table 9 illustrates the relationship between customer accounts and water consumption for San Bruno, for the FY 2004-05. The *RSF* sector consumes an average of 1.96 million gallons per day ("MGD"), which is significantly more water than is consumed by the *RMF* and *Commercial* sectors (0.82 MGD and 0.46 MGD respectively). The *Other* sector, which includes irrigation, temporary meters, and main flushing, uses 0.32 MGD, and the *Institutional* and *Industrial* sectors consume 0.06 MGD and less than 0.01 MGD, respectively.

#### 3.1.2.2 Water Use by Year

The total quantity of water consumed by San Bruno's customers has decreased from 4.22 MGD in FY 2000-01 to 3.76 MGD in FY 2004-05 (Table 10). As discussed above, water consumption is a result of a number of different factors, including:

- annual variations in precipitation and evapo-transpiration rates,
- changes in population and employment rates,
- changes in the regional and local economies,
- income level,
- changes in the City's water rate schedules, and
- the types of developments (or water use sectors) in a community.

Though each factor may independently increase or reduce San Bruno's water demand, the compounded effects of all factors is what ultimately dictates San Bruno's total water demand. Thus, even though the number of residents and jobs in San Bruno have increased in the previous five years (see Section 2.1), San Bruno has also experienced increased rainfall, and changed the City's water rate schedules to an increasing block system. The combination of these factors has resulted in a decreased water demand over the last five years.

### 3.1.3 Unaccounted for Water

Estimates of UAW are made by comparing customer water use to the total quantity of water supplied into the system. As summarized in Table 10, San Bruno's UAW has varied from 4% to 8% over the past five years.[5] Typically, water suppliers try to maintain a UAW at less than 10% of total demand.

## 3.2. PROJECTED FUTURE WATER DEMAND

The water demand projections for this Urban Water Management Plan were developed as part of a series of technical studies performed in support of the Capital Improvement Program *[also referred to herein as the "WSIP"]*for the SFPUC Regional Water System: SFPUC Wholesale Customer Water Demand Projections (URS, 2004b); SFPUC Wholesale Customer Water Conservation Potential (URS, 2004a); SFPUC Wholesale Customer Recycled Water Potential (RMC, 2004); and SFPUC 2030 Purchase Estimates (URS, 2005).

Water demand projections for the wholesale were developed using an "End Use" model *[also referred to herein as the "DSS Model"]*. Two main steps are involved in developing an End Use model: (1) Establishing base year water demand at the end-use level (such as toilets, showers) and calibrating the model to initial conditions; and (2) Forecasting future water demand based on future demands of existing water service accounts and future growth in the number of water service accounts.

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

[5] Due to changes in the City's recording and reporting methods, the estimates of UAW calculated for, and presented in this UWMP may vary from previous estimates.

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

The total water demand projections that were developed for San Bruno using the DSS Model include water used by customers and water lost within the system (the UAW). These projections are independent of the hydrology in any given year and thus represent the estimated water demand during a year of normal precipitation. Years with greater than average rainfall may reduce this demand while years with less than average rainfall may increase them. The DSS Model used the year 2001 as the "base year" from which to project future demands.[6] As described above, the DSS Model also incorporates the effects of plumbing codes on the replacement rates of water use fixtures in San Bruno's future water demand projections.[7]

Population and growth estimates incorporated into the DSS Model were based on the adjusted 2001 Draft General Plan shown in Table 2. Though these population projections have been revised in the new Draft General Plan (2006), the City still considers the DSS Model projections to be a reasonable estimate of future water demand within San Bruno's service area. Table 11 presents the DSS Model results for future water demand in San Bruno's service area.

According to the DSS Model, San Bruno's total water demand is expected to increase from the current 3.76 MGD to 4.5 MGD by 2030. Since San Bruno's water use records prior to 2000 did not distinguish between certain customer categories, the DSS Model projections are grouped into four customer categories: *RMF, RSF, Commercial,* and *Other*. The *Other* category includes fireflow and other internal uses of water within the City (e.g., main flushing). Compared to San Bruno's FY 2004-05 water use, the City's future water projection shows an increase in the quantity of water used by each sector, but a shift in the distribution of water use among sectors (as developed using the DSS Model). Residential sectors are projected to comprise 72% of water consumed by customers in San Bruno's service area in 2030, down from 77% in FY 2004-05, while Commercial, Industrial, and Institutional ("*CII"*) users are expected to rise from 14% to 21% and water use by the *Other* sector is expected to drop from 9% to 7% in 2030. Of the total water demand (water consumed plus UAW), 8.5% is projected to be UAW.

### 3.3. WATER USE SECTORS NOT INCLUDED IN THE DEMAND PROJECTIONS

Historical and projected water demands for the water use sectors described in §10631(e)(1)(G) and §10631(e)(1)(I) of the UWMP Act (*Sales to Other Agencies* and

[6] Developers of the DSS Model developers considered 2001 as representative of a normal year, where precipitation is approximately average, and not significantly above or below.
[7] The effects of plumbing replacements was not quantified in years prior to 2010.

*Agricultural*, respectively) were not included in San Bruno's water demand calculations because the City does not currently sell water to other water agencies or agricultural customers and does not expect to in the future.

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# 4. WATER SOURCES

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631. (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). .*

San Bruno receives water from three supply sources: wholesale surface water from the SFPUC Regional Water System ("Regional System"), retail surface water purchased from NCCWD, and local groundwater from the Westside Basin. The following sections describe each of these sources and quantify the historical, current, and projected availability of water from each source. The City's wholesale water supply is delivered through the Regional System, originating from the Tuolumne River and the Alameda County and Peninsula watersheds. Water from SFPUC is purchased in accordance with the Settlement Agreement and Master Water Sales Contract, dated 21 May 1984, supplemented by an individual Water Supply Contract between SFPUC and San Bruno. Water purchased from the NCCWD is also from the Regional System, but is served directly from NCCWD, and is used exclusively to meet the demands of the Treetop Apartments, located in Pressure Zone 13. Local groundwater is from the southern Westside Basin, which is used by the cities of San Bruno, Daly City, South San Francisco.[8]

## 4.1. SFPUC WHOLESALE WATER

San Bruno receives water from the City and County of San Francisco's regional system, operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local facilities in Alameda and San Mateo Counties.

In 1984 San Bruno, along with 29 other Bay Area water suppliers signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in June 2009, provide for a 184 million gallon a day (MGD, expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers collectively. San Bruno's individual Supply Assurance is 3.25 MGD (or approximately 3,600 acre feet per year). Although the Master Contract and accompanying Water Supply Contract expire in 2009, the Supply Assurance (which quantified San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

The SFPUC can meet the demands of its retail and wholesale customers in years of average and above average precipitation. The Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies and for scheduled maintenance activities. The SFPUC and all wholesale customers

[8] The northern portion of the Westside Basin is managed by SFPUC.

> adopted an Interim Water Shortage Allocation Plan in 2000 to address the allocation of water between San Francisco and wholesale customers in aggregate and among individual wholesale customers during water shortages of up to 20% of system-wide use. This plan, which also expires in June 2009, is described in more detail in Section 5.1.1.

### 4.1.1 Description of Wholesale Water Supply

Approximately 85% of the SFPUC water supply originates in the Hetch Hetchy watershed, located in Yosemite National Park, and runs down the Tuolumne River into the Hetch Hetchy Reservoir. The remaining 15% of SFPUC's water is produced in the Alameda and Peninsula watersheds and stored in six different reservoirs in Alameda and San Mateo Counties. Details of the various components of the Regional System are provided below in Sections 4.1.2, 4.1.3, and 4.1.4. Information on the Hetch Hetchy, Alameda, and Peninsula water systems is from SFPUC and BAWSCA websites. The following language was provided by BAWSCA:

> San Bruno receives water from the City and County of San Francisco's Regional System, operated by SFPUC. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties.
>
> The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.
>
> The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

#### 4.1.1.1 Hetch Hetchy Watershed & System

The Hetch Hetchy system is supplied by runoff from the upper Tuolumne River watershed on the western slope of the central Sierra Nevada. Three major reservoirs collect runoff: Hetch Hetchy Reservoir; Lake Lloyd; and Lake Eleanor. Storage space in New Don Pedro Reservoir is integrated into system operations. New Don Pedro Reservoir is owned by the Modesto and Turlock Irrigation Districts and is located on the Tuolumne River downstream of the Hetch Hetchy System. Water is diverted from Hetch Hetchy Reservoir into a series of tunnels and aqueducts from the Sierra Nevada to the San Joaquin Pipelines that cross the San Joaquin Valley to the Coast Range Tunnel which connects to the Alameda system at the Alameda East Portal. Water stored in Hetch Hetchy reservoirs is also used for hydroelectric generation and released downstream to satisfy instream flow requirements.

Normally only Hetch Hetchy reservoir supplies water for municipal and industrial uses. Releases from Lake Eleanor and Lake Lloyd are used to satisfy instream flow requirements, satisfy downstream obligations, and produce hydroelectric power. Water stored in New Don Pedro Reservoir is credited to San Francisco's water bank account to allow diversions upstream and is also used to meet fishery water requirements on the lower Tuolumne River under the Federal Energy Regulatory Commission license held by the Modesto and Turlock Irrigation Districts.

Runoff from the protected, high altitude, granitic watershed upstream of Hetch Hetchy is of relatively high water quality. The quality of water provided from Hetch Hetchy Reservoir has been sufficient to support an exemption from filtration requirements from the United States Environmental Protection Agency. Consequently, Hetch Hetchy water normally is not filtered prior to delivery.

#### 4.1.1.2 Alameda System

The Alameda System includes conveyance facilities connecting the Hetch Hetchy system and Alameda water sources to the Peninsula System. These conveyance facilities include pipelines known as the Alameda Creek Siphons that connect the Coast Range Tunnel to the Irvington Tunnel. The Irvington Tunnel supplies the four Bay Division Pipelines that cross the South Bay Area to the Peninsula System. Bay Division Pipelines 1 and 2 cross the Bay near the Dumbarton Bridge. Bay Division Pipelines 3 and 4 traverse the southerly edge of the Bay delivering water to SFPUC customers along the way. All four pipelines reconnect near the inlet to the Pulgas Tunnel on the Peninsula. The Alameda System includes two reservoirs, San Antonio Reservoir and Calaveras Reservoir, which collect water from the upper Alameda Creek watershed in Alameda County. The Sunol Valley Water Treatment Plant filters and disinfects water supplied from San Antonio and Calaveras Reservoirs in the Alameda watershed. Water from the Sunol Water Treatment Plant comprises approximately 15 percent of total water delivered to the Bay Area.

A turnout from the South Bay Aqueduct of the California State Water Project can supply limited supplemental water to San Antonio Reservoir. However, SFPUC currently possesses no entitlements to water to be delivered from the State Water Project.

#### 4.1.1.3 Peninsula System

The Peninsula System includes conveyance facilities connecting the Bay Division Pipelines to San Francisco's in-City distribution system and to other SFPUC customers on the Peninsula. Two reservoirs, Crystal Springs and San Andreas, collect runoff from the San Mateo Creek watershed. Water from Pilarcitos Reservoir, on Pilarcitos Creek, serves the Coastside County Water District (which includes Half Moon Bay) directly and can also deliver water to Crystal Springs and San Andreas Reservoirs. Water delivered from the Bay Division Pipelines in excess of Peninsula System and San Francisco in-City demands spills into Crystal Springs and San Andreas Reservoirs.

The Harry Tracy Water Treatment Plant ("HTWTP") filters and disinfects water supplied from Crystal Springs and San Andreas Reservoirs before it is delivered to Peninsula customers and San Francisco's in-City distribution system. Under normal conditions, the City receives its water supply via the San Andreas Pipeline from the HTWTP, located in the adjacent City of Millbrae. Currently, SFPUC provides water from the HTWTP through three pressure reducing valves within the San Andreas Pipeline that open during high demand periods (i.e., lower pressure) allowing water from HTWTP to flow into the City. San Bruno also has a turnout from SFPUC's Sunset Supply pipeline, which carries water directly from Hetch Hetchy, that is currently used only for emergency purposes.

### 4.1.2 Water Master Contract and Implications for Long Term Supply

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

In terms of water supply, the Master Contract provides for a 184 million gallon per day (MGD, expressed on an annual average basis) "Supply Assurance" to the SFPUC's wholesale customers subject to reduction in the event of drought, water shortage, earthquake, other acts of God, or rehabilitation and maintenance of the system. The Master Contract does not guarantee that San Francisco will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Assurance. The SFPUC's wholesale customers have agreed to the allocation of the 184 MGD Supply Assurance among themselves, with each entity's share of the Supply Assurance set forth on a schedule adopted in 1993. This Supply Assurance survives the termination of the Master Contract in 2009.

The SFPUC can meet the water demands of its retail and wholesale customers in wet and normal years. The Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies, and for scheduled maintenance activities. The Interim Water Shortage Allocation Plan (IWSAP) between the SFPUC and its wholesale customers adopted in 2000 provides that the SFPUC determines the available water supply in drought years for shortages of up to 20% on an average, system-wide basis.

Further detail about the IWSAP is described in detail in Section 5.1.1.

### 4.1.3 Water System Improvement Program

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing

high quality water to its customers in a reliable, affordable and environmentally sustainable manner.

The origins of the WSIP are rooted in the "Water Supply Master Plan" (April 2000). Planning efforts for the WSIP gained momentum in 2002 with the passage of San Francisco ballot measures Propositions A and E, which approved the financing for the water system improvements. Also in 2002, Governor Davis approved Assembly Bill No. 1823, the Wholesale Regional Water System Security and Reliability Act. The WSIP is expected to be completed in 2016.

Figure 5 shows the locations of the various capital improvement projects which comprise the WSIP.

### 4.1.4 Program Environmental Impact Report

A Program Environmental Impact Report (PEIR) is being prepared under the California Environmental Quality Act (CEQA) for the Water Supply Improvement Program. A PEIR is a special kind of Environmental Impact Report under CEQA that is prepared for an agency program or series of actions that can be characterized as one large project. PEIRs generally analyze broad environmental effects of the program with the acknowledgment that site-specific environmental review may be required at a later date.

Projects included in the WSIP will undergo individual project specific environmental review as required. Under CEQA, project specific environmental review would result in preparation of a Categorical Exemption, Negative Declaration or Environmental Impact Report. Each project will also be reviewed for compliance with the National Environmental Policy Act and local, state and federal permitting requirements as necessary.

### 4.1.5 Historical Wholesale Water Supply

San Bruno has historically used SFPUC regional water to meet demands that could not otherwise be met through local groundwater production. The percentage of San Bruno's total water supply that is purchased from SFPUC has historically ranged from 41% to 64%.[9] Between 2000 and 2005, an average of 2.25 MGD, or 55% of the City's total supply, was purchased as part San Bruno's normal SFPUC purchases. An additional quantity of water, averaging 1.2 MGD, was purchased during 2003 through 2005 as part of the Conjunctive Use Pilot Project described in Section 4.3.4. Though this water was purchased from and delivered by SFPUC, San Bruno does not consider water bought through the Conjunctive Use Pilot Project to be part of the City's historical wholesale supply because it is water that would have otherwise been extracted form the City's local groundwater supplies and not purchased from SFPUC. Table 12 shows San Bruno's historical wholesale water purchases for the FY 2000-01 through FY 2004-05, including

[9] Estimates of the percentage of San Bruno's total water supply that comes from SFPUC does not include supplemental purchases made during the Conjunctive Use Project.

the supplemental surface water that was purchased in lieu of groundwater pumping, groundwater, and the SFPUC purchases noted above.

### 4.1.6 Projected Wholesale Water Supply

As described previously, San Bruno has a HHSA of 3.24 MGD of water during normal or wet years, in accordance with the Master Contract.[10] The quantity of water that San Bruno purchases from SFPUC in the future, however, depends on the City's future water demand and the availability and reliability of groundwater supplies (see Section 3.2 and Section 4.3.6). While the City is taking measures to protect the quality of the Westside Basin Aquifer, in the event that groundwater supplies are not available in the future, San Bruno plans to augment these supplies with wholesale water purchased through the SFPUC regional system. In their 1 June 2005 letter to San Bruno, included in Appendix C, SFPUC projected that up to 4.30 MGD of surface water from SFPUC would be available to the City during normal or wet years in 2030. Table 13 shows the supplies that SFPUC has estimated to be available for 2010, 2015, 2020, 2025, and 2030.

## 4.2. NORTH COAST COUNTY WATER DISTRICT WATER WHOLESALE WATER

San Bruno purchases approximately 0.05 MGD of water from the NCCWD (Table 13). This water is served from the Crystal Springs turnout in Pressure Zone 13 (Figure 2). San Bruno does not anticipate any changes to its NCCWD water supply in the near future.

## 4.3. GROUNDWATER

San Bruno has historically relied on local groundwater from the Westside Groundwater Basin ("Basin") to for as much as 50% of the City's water supply. The following sections provide a description of the hydrogeology of the Basin, current management efforts within the Basin, and San Bruno's historical use of groundwater.

### 4.3.1 Groundwater Basin Description

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (b) . . . . If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan: (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.*

[10] The HHSA will survive the expiration of the Master Contract.

San Bruno overlies the central portion of the 40 square mile Westside Groundwater Basin. The Basin consists of unconsolidated colluvium that was deposited in a northwest trending trough in the underlying impervious bedrock. The approximate boundaries of the Basin are shown in Figure 6. The Basin is bounded by bedrock highs in Golden Gate Park to the north and at Coyote Point to the south (Rogge, 2003; Yates, 2003a; DWR, 2003). San Bruno Mountain and San Francisco Bay form the eastern boundary of the Basin while the Serra Fault[11] and the Pacific Ocean form the western boundary (Rogge, 2003; Yates, 2003a; DWR, 2003). Adjoining groundwater basins are the Lobos Basin to the North and the San Mateo Plain Aquifer to the South.

#### 4.3.1.1 Aquifer Conditions and Properties

The Basin is composed of two main water-bearing units, the shallow, unconfined Colma aquifer and the deeper, confined Merced aquifer. Within the two major water bearing zones in the Basin, there are multiple smaller aquifer zones that are delineated vertically by different sand and clay layers within the Merced and Colma formations. The thickness and extent of these interbedded sand and clay layers vary spatially throughout the Basin.

All of the municipal groundwater extraction wells in San Bruno, South San Francisco, and Daly City are screened in the deeper, confined Merced aquifer where the water quality is better. The specific yield in the Basin has been observed to be greater in the northern portions of the Basin than in the southern (SBMP, 2001; Yates, 2003a). Shallow wells have been installed within the Colma, typically to monitor groundwater in the vicinity of chemical release sites. Steep downward vertical gradients exist between the unconfined (upper) and confined (deeper) aquifers, but the hydraulic connection between the two aquifers is thought to be limited (Yates, 2003a; Luhdorff & Scalmanini, 2002).

#### 4.3.1.2 Groundwater Levels and Flow Directions

Groundwater levels have stayed fairly stable in the Basin in recent years, showing seasonal fluctuations and decreases in times of drought (SBMP 2001; Yates, 2003a). Figure 7 presents a conceptual model of the Basin with arrows indicating the general groundwater flow directions.

At the northern end of the Basin, groundwater in the shallow aquifer tends to flow in a westerly direction towards the Pacific Ocean. From South San Francisco southward to Burlingame, groundwater within the shallow aquifer generally flows east towards San Francisco Bay (Burns and McDonnell, 2002; Rogge, 2003; Yates, 2003a).

Throughout the Basin, groundwater flow in the deeper aquifer is generally east towards San Francisco Bay. The groundwater mounds observed near Coyote Point and Golden

[11] The Serra Fault is a series of thrust faults parallel to the San Andreas Fault in the Coast Ranges (Rogge, 2003).

Gate Park add a northern and southern component to the flow, respectively. In the vicinity of San Bruno, groundwater extraction has created a local depression in the water table. A flow divide near the south end of the San Francisco airport separates the area where groundwater flows toward the pumping depression in San Bruno from the area where groundwater flows toward the Bay (Yates, 2003a). The divide trends south-southwest from near the Millbrae exit on Highway 101, and groundwater west of the divide is captured by the San Bruno wells (Yates, 2003a). As mentioned in Section 1.4, San Bruno has recently instituted a program to monitor the potential effects of groundwater extraction on saltwater intrusion. This program is described further in Section 4.3.3.

### 4.3.2 Groundwater Management Plan

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631. (b) . . . . If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan: (1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.*

In 1996, San Bruno, Daly City, SFPUC, and other stakeholders ("the Westside Partners") received an Assembly Bill 3030 ("AB3030") grant to develop a Groundwater Management Plan ("GWMP") to aid in managing groundwater use within the Basin.[12] The GWMP for the Basin was completed in 1999 as a series of Technical Memoranda and are included in Appendix D.

The City of Daly City also received a grant from the AB3030 program in 2001 to complete several tasks directed toward improving groundwater management. One of the tasks was to combine the elements of previous hydrologic models created for the Basin into a unified and updated modeling tool for ongoing use by entities involved in managing the Basin (Yates, 2003a). In 2003, Daly City approved a budget allocation from its Water Fund to continue work on the Basin model. Work currently being done on the model includes additional sensitivity testing of the model's initial and boundary conditions as well as assumptions regarding permeability of the Serra Fault in the San Bruno-Burlingame area (Yates, 2003b).

In addition to the aforementioned efforts to improve management of the Westside Basin in general, SFPUC has recently completed a GWMP for the North Westside Basin (the portion of the Westside Basin that lies beneath the City and County of San Francisco), in April 2005. Though the focus of SFPUC's GWMP is on the supply and long-term sustainability of groundwater and interrelated surface waters in the North Westside Basin,

[12] The intent of the AB3030 Grant Program (Section 10750 et seq. of the California Water Code) was to encourage local water service agencies to cooperatively manage groundwater resources within their jurisdictions. As such, AB3030 provides a systematic procedure for development of a GWMP, which is intended to include guidelines for groundwater basin extraction, recharge, conveyance, and quality.

the objectives and elements of the plan are consistent with ongoing efforts to manage the overall Westside Basin.

### 4.3.3 Saltwater Intrusion

San Bruno was recently awarded approximately $250,000 from the DWR's Local Groundwater Assistance Program (AB303) to institute a saltwater intrusion monitoring program for portions of the Westside Basin near the City. San Bruno's program will coordinate with efforts by the City of Daly City, described above, to monitor saltwater intrusion in the Westside Basin. Both programs are aimed at protecting groundwater quality in the Basin to assure the reliability of future supplies. San Bruno has installed two monitoring well clusters and is developing a hydrologic data management system to better understand the effects of groundwater extraction on saltwater intrusion in the Westside Basin. Construction of the monitoring wells was completed in Fall of 2006.

### 4.3.4 Conjunctive Use

As discussed in Sections 4.1.5 and 4.3.5, San Bruno's water supply is met by a combination of groundwater from the Westside Basin and surface water supplied from SFPUC's Regional System. In 2002, SFPUC instituted a pilot project to evaluate the effects of in-lieu recharge on groundwater levels within the Basin.[13] As part of the Conjunctive Use Pilot Project, SFPUC provided the cities of Daly City, South San Francisco (served by California Water Service Company, or "Cal Water"), and San Bruno with additional surface water to supplement water that otherwise would have been pumped from their respective municipal water supply wells.

Between January 2003 and March 2005, San Bruno received an average of 1.2 MGD of surface water from SFPUC as part of the Conjunctive Use Pilot Project. During this time, San Bruno ceased production in water supply wells 15, 16, 17, and 18, with the exception of November 2003 through January 2004, when the Conjunctive Use Pilot Project was interrupted because surplus SFUPC system water was not available to offset groundwater use.

Results from the 2002 through 2005 Conjunctive Use Pilot Project showed that water can be successfully stored in the aquifer system through in-lieu recharge. Since the end of the Conjunctive Use Pilot Project in 2005, Daly City has instituted a long-term conjunctive use program with SFPUC. The potential for success of an in-lieu project in San Bruno continues to be studied, focusing on the impact of the extraction portion of the project. To date, South San Francisco and San Bruno have not negotiated final agreements with SFPUC regarding a long-term conjunctive use program, though discussions are ongoing.

[13] "In lieu" recharge refers to the act of using surface water supplies to meet demands such that groundwater that would have been extracted is allowed to remain in the basin, thus increasing the quantity of groundwater in storage. This water is then available for subsequent use during drought years.

### 4.3.5 Historical Groundwater Use

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631. (b) . . . . If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan: (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

The City currently operates five water supply wells, Wells 15, 16, 17, 18, and 20 (see Section 2.4.2). Since 1990, groundwater has comprised between 23% and 56% of San Bruno's total water supply (from 0.9 to 2.7 MGD).[14] As described above in Section 4.3.4, San Bruno ceased production in four wells between January 2003 and March 2005 as part of SFPUC's Conjunctive Use Pilot Project. Well 20, which was not included in the Conjunctive Use Pilot Project, has been used to supply groundwater to the City since its completion in October 2004. Monthly groundwater production values for each well from 1997 through 2005 are provided in Appendix E.

Table 12 shows San Bruno's annual groundwater production for FY 2000-01 through FY 2004-05. Though production has decreased from 1.68 MGD to 0.77 MGD over the last five years, this reduction is an artifact of the Conjunctive Use Pilot Project and is not reflective of the actual quantities of groundwater San Bruno would have extracted in the absence of the project. The "normalized" groundwater supply shown in Table 12 for FY 2002-03 through FY 2004-05 is equal to the sum of the groundwater produced by San Bruno's water supply wells and the quantity of supplemental water that was purchased from SFPUC. This value represents the actual quantity of water that the City would have produced in the absence of the Conjunctive Use Pilot Program.

### 4.3.6 Projected Future Groundwater Use

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631. (b) . . . . If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan: (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

In the future, San Bruno intends to utilize its water supply wells to meet as much of the City's future demands as possible without negatively impacting groundwater quality or the health of the aquifer. The quantity of groundwater available to San Bruno will depend on multiple factors, including groundwater quality and potential future agreements that San Bruno may enter into with other Westside Partners as part of future groundwater management or conjunctive use programs. In the event that groundwater

[14] Historical use data were provided by the City of San Bruno Public Works Department. Estimates do not include conjunctive use periods.

continues to remain a reliable source, the City will continue to rely on groundwater as a water source. Though San Bruno does not currently anticipate a total cessation of groundwater pumping in the future, for planning purposes, the City's forward projections are meant to reflect any unforeseen reduction in groundwater supplies. Table 13 summarizes San Bruno's estimated groundwater production during normal and wet years from 2010 to 2030 in five year increments.

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# 5. RELIABILITY OF WATER SUPPLY

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631. (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:*

*(1) An average water year.*
*(2) A single dry water year.*
*(3) Multiple dry water years.*

*For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.*

The following paragraphs describe the projected supply and reliability of each San Bruno's water sources in a normal year (and/or a wet year), in a single dry year, and during a multiple dry year period. These supply sources include water purchased through the SFPUC Regional System, water purchased from the NCCWD, and groundwater extracted from the southern Westside Basin.

## 5.1. SFPUC WHOLESALE WATER SUPPLY RELIABILITY

As described in Section 4.1, during any normal or wet year each Suburban Purchaser is guaranteed to receive SFPUC regional water up to their Supply Assurance (or HHSA), as defined in the Master Contract. Though the Master Contract is set to expire in 2009, the Supply Assurances are survivable in perpetuity, thus providing each Suburban Purchaser with a minimum quantity of reliable wholesale water during normal and wet years. Any water requested above and beyond an agency's HHSA may be provided by SFPUC but is not expressly guaranteed. SFPUC's ability to provide such additional water is contingent upon completion of the WSIP.[15]

In years when precipitation is below average and SFPUC is unable to provide the Suburban Purchasers with their Supply Assurances, each Suburban Purchaser is allocated a percentage of the total system supply in accordance with the Interim Water Shortage Allocation Plan (described below). These allocations are then applied to the total projected system wide supplies from 2005 through 2030, using the SFPUC Water System Reliability Model, to estimate each Suburban Purchaser's reliable dry year wholesale water supplies for the next 25 years.

[15] The availability of water above and beyond the HHSA is subject to the successful implementation of the WSIP. Further, it is not expected that these supplemental supplies will have the same guarantees and reliabilities of HHSA water. These issues and others will likely be addressed as part of the 2009 Water Master Contract renegotiations.

Further, according to BAWSCA and SFPUC:

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

The following sections describe the terms of the IWSAP's two-tiered agreement, SFPUC's Water System Reliability Model (used by SFPUC to project each Suburban Purchasers' dry year supplies), and the effects that both models have on San Bruno's future water supply reliability.

### 5.1.1 Interim Water Shortage Allocation Plan

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

The IWSAP has two components. The Tier One component of the IWSAP allocates water between San Francisco and the wholesale customer agencies collectively. The IWSAP distributes water between two customer classes based on the level of shortage:

| Level of System Wide Reduction in Water Use Required | Share of Available Water | |
|---|---|---|
| | SFPUC Share | Suburban Purchasers Share |
| 5% or less | 35.5% | 64.5% |
| 6% through 10% | 36.0% | 64.0% |
| 11% through 15% | 37.0% | 63.0% |
| 16% through 20% | 37.5% | 62.5% |

The Tier Two component of the IWSAP allocates the collective wholesale customer share among each of the 28 wholesale customers. This allocation is based on a formula that takes three factors into account, the first two of which are fixed: (1) each agency's Supply Assurance from SFPUC, with certain exceptions, and (2) each agency's purchases from SFPUC during the three

years preceding adoption of the Plan. The third factor is the agency's rolling average of purchases of water from SFPUC during the three years immediately preceding the onset of shortage.

### 5.1.2 SFPUC's Water System Reliability Model

SFPUC's Water System Reliability Model was developed to estimate the future reliability of SFPUC's entire water supply including the water supply for all the Suburban Purchasers. Key assumptions that are incorporated into the SFPUC Water System Reliability Model are outlined below:

- The expansion of SFPUC's water supply portfolio (e.g., with groundwater from the Westside Basin) is consistent with SFPUC's Water Supply Master Plan and SFPUC's adopted WSIP.

- The hydrologic record (1920 to 2002) is used as a predictor of the frequency and severity of future droughts (and future water supply availability). The years 1987 through 1992 were selected to represent a six-year dry year period in the future.[16]

- The allocation of drought water supplies to each Suburban Purchaser is based on the terms of the current IWSAP (see Section 5.1.1).

Based upon the results of the Water System Reliability Model, SFPUC estimated that, if hydrologic conditions were the same in 2005 as they were in 1987, the first year of a multiple dry year period, there would have been a 10% system-wide water shortage in 2005 while subsequent dry year water supplies would be reduced by as much as 20%. From 2010 to 2025, SFPUC projects system reliability to increase as the WSIP is completed,[17] such that if the representative dry years were projected forward there would be no system shortage during a representative single dry year, and up to a 20% shortage during a representative multiple dry year period. SFPUC's reliability projection for 2030 results in a 10% system-wide cutback in the first year of a drought, and up to 20% cutbacks in subsequent dry years.[18]

The impacts of these system wide cutbacks to the Suburban Purchasers as a collective is dictated by Tier 1 of the IWSAP (see Section 5.1.1 above). Thus a 10% and 20% system wide reduction in supply would translate to approximately 12% and 23% cutbacks, respectively, to the Suburban Purchasers' collective share of the total system supply.

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[16] This methodology is consistent with the methodology SFPUC employed in its 2005 UWMP Update, though SFPUC incorporated an 8.5-year design drought for purposes of developing its WSIP.

[17] The WSIP is planned to include (1) additional transmission capacity to improve the transfer of water from the Hetch Hetchy reservoir to local reservoirs, (2) additional local system storage capacity, and (3) additional water supplies to supplement existing water sources. Based upon these and other improvements, SFPUC's water supply reliability projections and the estimate system-wide water cutbacks vary over the planning horizon of this UWMP.

[18] SFPUC's Water System Reliability Model does not incorporate potential changes due to climate change. Instead the model relies upon the hydrologic record to predict the frequency and severity of future climate trends.

The impacts of the 12% and 23% Suburban Purchaser cutbacks to San Bruno are dictated by Tier 2 of the IWSAP, described in Section 5.1.1, and modeled by SFPUC's Water System Reliability Model to predict San Bruno's percent allocation of the total Suburban Purchasers' collective share. These projected allocations are based on San Bruno's historical wholesale water use and are heavily influenced by the City's wholesale purchases during the three years immediately preceding the onset of the shortage. Therefore, if San Bruno were to increase wholesale purchases between now and 2030 then SFPUC's estimates of San Bruno's future dry year allocation may underestimate the City's actual dry year supplies. Conversely, if the City were to reduce its future wholesale water purchases, San Bruno's dry year allocation may decrease in future years. Despite these uncertainties, at present, SFPUC's Water Supply Reliability Model remains the best estimate of future dry year allocations and its results are presented in Appendix C.

## 5.2. NCCWD RELIABILITY

Water received within the San Bruno service area from NCCWD originates from the SFPUC Regional System and is thus subject to the same reliability as described above (Section 5.1).

## 5.3. GROUNDWATER RELIABILITY

The reliability of San Bruno's groundwater supply (Westside Basin) is dependent on the quantity of water that is recharged and extracted each year and quality of those supplies. Historically, the Westside Basin has received sufficient recharge such that it has maintained relatively stable groundwater levels in recent years (see Section 4.3.1.2). Combined efforts by the Westside Partners and other entities to maintain the integrity of the Basin and its supplies are further explained in Section 4.3.

San Bruno is concerned about the effect of saltwater intrusion on the quality of its groundwater supplies. To protect the quality of its groundwater source the City is actively studying effects of groundwater extraction on saltwater intrusion, as described in Section 4.3.3. To date however, no data are available to indicate that saltwater intrusion has occurred or that it will occur in the future.

## 5.4. TOTAL FUTURE WATER SUPPLY RELIABILITY

The following sections describe San Bruno's total projected future water supply reliability during normal or wet years, single dry years, or multiple dry year periods. For the purposes of this UWMP, a normal or wet year is defined as a year in which precipitation is equal to or above average precipitation. Years in which precipitation is below average are referred to as "single dry year", or as a "multiple dry year period" if the duration of below average precipitation exceeds a single year. As described above, in order to project deliveries of wholesale water during dry years, SFPUC modeled its total system water supply based on a repeat of the historical hydrologic record, from 1920 to 2002. This UWMP presents San Bruno's dry year wholesale water supplies as the

quantity of water projected to be available if the precipitation of any given year, or sequence of years, were equal to the precipitation during the years 1987 through 1992.[19]

### 5.4.1 Normal Year Reliability

Normal or wet water years are those water years that match or exceed average precipitation levels. During such years SFPUC is obligated to supply San Bruno with water up to 100% of its HHSA. In accordance with the Master Contract and survivable in perpetuity, San Bruno has an HHSA of 3.24 MGD. In previous years, San Bruno has not utilized its entire HHSA. In the future, if the City were to need additional wholesale water, the HHSA supply is considered 100% reliable.

If additional wholesale water supplies are needed, SFPUC has estimated (using the Water System Reliability Model described in Section 5.1) that San Bruno may receive supplies above and beyond its HHSA, up to 4.30 MGD in 2030 (see Appendix C). The availability of this surplus water is contingent upon completion of all of the projects outlined in the WSIP, as well as future demand from all retail and wholesale SFPUC customers. To the extent that any of these projects are delayed or not completed, the water supplies may not be available. Table 13 shows San Bruno's normal year water supply projections through the year 2030.

### 5.4.2 Single Dry Year Reliability

#### 5.4.2.1 Single Dry Year Wholesale Water Supply

Based on the hydrologic record from 1920 to 2002, a single dry year is considered to be a year when annual rainfall is equal to rainfall in 1987, SFPUC's design single dry year. SFPUC's wholesale water supply projections during a single dry year are based on the Water System Reliability Model and the current IWSAP allocation methodology, with the assumption that the IWSAP will be extended beyond its current 2009 expiration date.[20]

SFPUC used the Water System Reliability Model to model the total available water supplies in the Regional Water System from 2005 to 2030. One outcome of the increased reliability provided by the WSIP is that SFPUC projects sufficient water within the Regional System during single dry years from 2010 and 2025, such that SFPUC should be able to provide customers with 100% of their normal year supplies.[21] In 2005 and 2030, however, the Water System Reliability Model projects a 10% shortage in system-

[19] The years 1987 through 1992 were chose to represent a multiple dry year period based on recommendations from BAWSCA sent to the wholesale customers on 3 November 2005 and the results of SFPUC's Water System Reliability Model- shown in Appendix C.
[20] Though the IWSAP is scheduled to expire in June 2009, it currently presents the best method of estimating future allocations among BAWSCA agencies.
[21] The results and methodology used in this UWMP for total dry year supplies within the Regional System are consistent with projections provided in San Francisco's 2005 UWMP Update (SFPUC, 2005).

wide water supplies, which then would be allocated among customers in accordance with Tier One and Tier Two of the IWSAP.

During a 10% system-wide shortage, the Tier One IWSAP allocates 64% of the total supply to BAWSCA agencies, compared to the 64.5% of the total water supplies they receive during a normal year (see Section 5.1.1). Based on the Tier Two IWSAP allocation method, it is estimated that San Bruno would receive 1.45% of the total BASWCA allocation during a single dry year in 2005, and 1.27% of BAWSCA's total allocation for a single dry year occurring from 2010 to 2030.[22] It is important to note that San Bruno's allocation is based on three factors, one of which is the City's wholesale water purchases during the three normal years leading up to a dry year. Thus, San Bruno's percent allocation in 2030 will be contingent upon the City's actual wholesale water purchases during the preceding three normal years (e.g., 2027, 2028, 2029). Therefore, the actual percentage of BAWSCA's total allocation received by San Bruno will deviate from that shown herein as San Bruno's use of SFPUC wholesale water increases or decreases from the projections contained herein. Similarly, if the actual water purchased by all other Suburban Purchasers varies, so would the percent allocation of every other Suburban Purchaser. At present however, SFPUC's Water System Reliability Model provides the best estimate of San Bruno's dry year wholesale water supplies and the results are presented in Table 14.

#### 5.4.2.2 Single Dry Year Groundwater Supply

During single dry years when SFPUC is able to supply the City with 100% of its normal year wholesale water supply, San Bruno will produce the same quantity of groundwater as during a normal year. When SFPUC reduces deliveries of wholesale water to San Bruno, the City plans to increase groundwater production such that the City's cutbacks are equal to the overall Regional System cutbacks (0% to 10%). Table 14 shows San Bruno's projected future groundwater supplies during single dry year for the years 2010 through 2030.

As described in Section 5.3, projections of San Bruno's groundwater supply presented in this UWMP do not account for potential groundwater management or conjunctive use agreements that the City may enter into with other entities regarding groundwater use within the Westside Basin.

Additionally, future single dry year wholesale water supplies will be contingent upon whether the IWSAP, as currently formulated, will be renewed in 2009. Changes in any of these factors would result in different multiple dry year wholesale water supplies for the City.

[22] From SFPUC's letter to San Bruno, dated 1 June 2005, included in Appendix C.

### 5.4.3 Multiple Dry Year Reliability

A multiple dry year period is considered to be any number of consecutive years in which precipitation is below average. For the purposes of this UWMP, a multiple dry year period was assumed to be a repeat of the hydrologic record from 1987 through 1992.

#### 5.4.3.1 Multiple Dry Year Wholesale Water Supply

In their future wholesale water reliability projections, SFPUC estimated between 10% and 20% reduction in the total available water supplies in the Regional System during a multiple dry year period. The severity of the cutback in any given year is contingent upon the estimated future demand on the Regional System and on completion of the WSIP projects as scheduled. According to SFPUC's Water System Reliability Model, if precipitation were equal to what it was from 1987 through 1992 in the years leading up to 2010, then the Regional System would experience a 10% reduction in supply in years two and three of the drought, and a 20% supply reduction in years four, five, and six of the drought. The same precipitation patterns between 2010 and 2015 however, would yield a 10% supply reduction in the second through the fifth dry year, while a 20% reduction in supply is not anticipated until the six year of the multiple dry year period. This increased reliability is due to the scheduling of new projects, which are expected to come online and provide added supplies by 2015. See Table 15 for an explanation of multiple dry year cutbacks through 2030. [23]

As described in Section 5.1.1, BAWSCA agencies would be allocated 64% of the total system water supply during a 10% shortage and 62.5% during a 20% shortage, compared to the 64.5% of the total system water supply they receive during a normal year. This results in approximately 12% and 23% cutbacks in BAWSCA's total wholesale water supply.

San Bruno's portion of the BAWSCA allocation, as described above in Section 5.4.2.1, is approximately 1.27% from 2010 to 2030, assuming all previously noted assumptions, including:

- the City's actual wholesale water purchases during the three normal years preceding the multiple dry year period,
- the actual future growth in wholesale water demand of the other BAWSCA agencies,
- the actual water supply availability in any given dry year.

If the City were to purchase a larger quantity of water in the three years proceeding a drought than it did in 2002, 2003, and 2004, then its allocation may exceed 1.27%.

[23] Because San Bruno currently utilizes only a portion of its HHSA (an average of 70% in the last five years), SFPUC's Water Reliability Model allocates San Bruno a greater quantity of water during certain dry years (10% cutback in total Regional System supplies for 2005, 2010, and 2015) than the City's projected normal year supply.

Similarly, as the actual quantity of wholesale water purchased from SFPUC from all other Suburban Purchases varies from their projected purchases, San Bruno's allocation may increase or decrease accordingly. Additionally, future multiple dry year wholesale water supplies will be contingent upon whether the IWSAP, as currently formulated, will be renewed in 2009. Changes in any of these factors would result in different multiple dry year wholesale water supplies for the City.

Table 15 shows San Bruno's estimated multiple dry year wholesale water supply based on the SFPUC Water System Reliability Model and an assumed 1.27% allocation of BAWSCA's wholesale supplies.

#### 5.4.3.2 Multiple Dry Year Groundwater Supply

San Bruno intends to manage its groundwater supplies in such a way that the City's multiple dry year cutbacks are equal to the total Regional System cutbacks (between 10% and 20%). Table 15 shows San Bruno's future groundwater supplies during multiple dry year periods for the years 2010 through 2030.

## 5.5. WATER QUALITY IMPACTS ON RELIABILITY

> *10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.*

### 5.5.1 SFPUC Wholesale Water Quality

As discussed in Section 4.1.1, the majority of the water supply to the Hetch Hetchy Regional Water System is from the Hetch Hetchy Reservoir in the Sierra Nevada Mountains. The Hetch Hetchy Reservoir is considered a very high quality water source due to low total dissolved solid ("TDS") concentrations and other factors. Additional water supplies from the Alameda and Peninsula sources come from areas with restricted access to protect the source water quality.

The quality of San Bruno's wholesale water is monitored by both by the City and by SFPUC's Water Quality Bureau and presented annually in the City's Water Quality Report (Appendix F). SFPUC uses an extensive water sample collection and testing protocol at its various water sources throughout the Regional Water System. Every year, SFPUC staff collect over 111,000 water samples from within the Regional System and perform over 345,000 analytical tests[24] The City also routinely collects and analyzes samples throughout the City's water distribution system, including the storage reservoirs. Samples are tested for chemicals regulated by State and Federal drinking water standards, such as turbidity, organic chemicals, disinfection by-products, inorganic chemicals, and other water quality parameters. As shown in Appendix F, all of the analyzed constituents were detected at concentrations below drinking water standards in 2005.

[24] Based upon information provided on SFPUC's website at http://sfwater.org/.

Future supplemental water sources are currently being pursued by SFPUC, but the quality of these supplies is unknown at this time. Depending on the quality of such future water sources of water and how SFPUC proposes to blend these supplies into the existing system, some impacts to water quality are possible.

### 5.5.2 Groundwater Quality

Analysis of groundwater quality is performed regularly by City staff and reported annually in the City's Water Quality Report. A copy of this report is included as Appendix F and includes the range and average analysis results for disinfection by-products, radionuclides, inorganic chemicals (e.g., nitrate and chlorine), and additional constituents such as lead and copper in 2005. The quality of San Bruno's groundwater supply meets all State and Federal drinking water requirements. Select chemical constituents (e.g., hardness, TDS, and turbidity) are found in higher concentrations in San Bruno's groundwater than in its wholesale water supply, but these constituents are well within the secondary maximum contaminant levels set by the state Department of Health Services and the federal Environmental Protection Agency.

United Airlines conducts quarterly sampling at the San Francisco International Airport to monitor the status of a groundwater plume containing chlorinated volatile organic compounds. Since 2002, several areas have been remediated to address chemical impacts to soil and groundwater. The current groundwater monitoring programs provide ongoing assessment of the plume extent to ensure that off-site migration does not occur (ERM, 2005). Based on conversations with the City and review of the "Third Quarter 2005 Ground Water Monitoring Report" (ERM, 2005), this plume appears unlikely to impact the quality of San Bruno's groundwater supply.

San Bruno's new saltwater intrusion monitoring program (see Section 4.3.3) is also aimed at protecting the quality of groundwater in the area of San Bruno and in the entire Westside Basin. San Bruno expects that these efforts and other groundwater management programs implemented initiated by the Westside Partners will allow for a continued high-quality, reliable groundwater supply in the future.

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# 6. POTENTIAL WATER SUPPLY PROJECTS AND PROGRAMS

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.*

## 6.1. WATER TRANSFERS

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis….*

Though the SFPUC Master Contract does permit water transfers, San Bruno does not presently anticipate the need for water right transfers during normal year conditions, other than the water that it currently purchases from NCCWD. However, should that condition change in the future, it is possible that San Bruno could purchase water from another BAWSCA agency.

In the event that San Bruno should need additional water in a future drought, the IWSAP allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customer agencies. Additionally, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred. In addition to the five turnouts described in Section 2.4 (to the SFPUC Regional System and the NCCWD water system), San Bruno has three additional connections available for use during emergency situations. These connections are to NCCWD, Cal Water in South San Francisco, and the City of Millbrae.

## 6.2. DEVELOPMENT OF DESALINATED WATER

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.*

At this time, San Bruno is not contemplating development of a desalinated water program.

## 6.3. CONJUNCTIVE USE

As described in Section 4.3.4, between 2002 and 2005 major groundwater users within the southern Westside Basin agreed to reduce their groundwater extraction from the Basin in exchange for additional surface water supplies from SFPUC, as part of a Conjunctive Use Pilot Project. Since the completion of the project in 2005, Daly City and SFPUC have continued with a permanent extension of the project in the area of Daly City. At this time however, agreements for an on-going conjunctive use project between SFPUC and San Bruno have not been negotiated.

## 6.4. RECYCLED WATER PROJECTS

San Bruno does not presently anticipate the use of recycled water in the near future. See Section 7 for a detailed description of the joint San Bruno / South San Francisco 2004 Recycled Water Feasibility Study.

# 7. RECYCLED WATER

*10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:*

Recycling, or reclaiming, water involves treating wastewater to an acceptable level such that it can be reused for irrigation, cooling, and other non-potable applications. The regulatory requirements for recycled water are defined in the California Code of Regulations, Title 22, Article 3 (see Table 16). In 2004 San Bruno participated in a feasibility study examining the potential uses of recycled water in the San Bruno and South San Francisco area. The following sections describe these efforts to evaluate potential costs and benefits from recycled water, and include a description of the City's wastewater treatment facilities, current and projected wastewater flows, and potential recycled water demand.

## 7.1. COORDINATION

The City coordinates with adjacent municipalities, water, and wastewater agencies in managing its wastewater and studying potential recycled water uses in the area. Wastewater treatment is coordinated with the City of South San Francisco at a joint water quality control plant located in South San Francisco. Wastewater disposal is coordinated with South San Francisco, Burlingame, and Millbrae as effluent from all four cities is discharged together into the San Francisco Bay. Joint efforts to study the potential use of recycled water include coordination between San Bruno, South San Francisco, Cal Water (South San Francisco's water provider), and SFPUC. These efforts are described in further detail below.

## 7.2. WASTEWATER QUANTITY, QUALITY, AND CURRENT USES

*10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*

*(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.*

*(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.*

Wastewater collected by San Bruno is treated at the South San Francisco-San Bruno Water Quality Control Plant ("WQCP"). The Plant was last upgraded in 1997 to provide capacity for projected wastewater flows from South San Francisco, San Bruno, and parts of Colma and Daly City through the year 2015.

Information regarding the WQCP collection, treatment, and disposal system, wastewater quantities, and current uses of wastewater within San Bruno provided below is from conversations with the WQCP Superintendent, and the WQCP Improvement Project Facility Plan (Carollo Engineers, 1997).

### 7.2.1 Wastewater Treatment and Disposal System

The South San Francisco-San Bruno WQCP is a Class IV secondary treatment plant with activated sludge and aerobic biodegradation. It serves a population of approximately 95,000 people, 33,000 residences, 2,000 businesses, and 30 major industries (Carollo Engineers, 1997). The WQCP's design capacity affords for 13.0 MGD of dry-weather flow and 61.8 MGD of peak wet-weather flow. Treatment processes at the WQCP include:

1. Preliminary bar screens and grit chambers to remove rags, towels, paper, grit, sand, etc.,
2. Primary clarifiers to remove grease, floatable and settleable solids,
3. Secondary (activated sludge) treatment to remove dissolved organic matter by aerobic biochemical oxidation,
4. Disinfection (chlorination) to kill pathogenic micro-organisms with sodium hypochlorite
5. Dechlorination to neutralize excess chlorine with sodium bisulfite
6. Sludge (bio-solids) stabilization through anaerobic digestion at 95-98º F for an average of about 50 days (approximately 65,000 gallons per day)

Effluent from the WQCP is discharged into the San Francisco Bay through the North Bayside System Unit Outfall. Bio-solids are trucked to the Vasco Road Landfill in Livermore (approximately 35 tons per day), and methane gas produced by digesters during the sludge stabilization process generates heat and electricity that is used to meet one third of the Plant's total electricity demand. Figure 8 shows a flow diagram of the processes described above.

### 7.2.2 Wastewater Quantity and Current Uses

San Bruno currently owns capacity rights to an average dry weather flow of 3.8 MGD. In 2005, total average dry weather flows from the WQCP were 8.73 MGD, of which 2.91 MGD were from San Bruno. Since 1996, San Bruno's dry weather flows have ranged from 2.68 MGD to 3.30 MGD. On average, the City's wastewater flows are equal to approximately 76% of total water consumed by the City. Table 17 shows San Bruno's historical, current, and projected wastewater flows. The City does not produce wastewater that meets Title 22 standards for tertiary disinfected recycled water and does not current utilize the WQCP's secondary disinfected effluent for beneficial uses; see results from the Recycled Water Feasibility Study below.

## 7.3. POTENTIAL RECYCLED WATER USE

*10633 (d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.*

Table 16 identifies the accepted uses of recycled water as outlined by Title 22. These uses include specific types of irrigation, impoundment, cooling and air conditioning, and other uses such as groundwater recharge, dust control, and flushing toilets and urinals. All of the activities identified in Table 16 are allowed for disinfected, tertiary treated recycled water. A smaller subset of these activities is permitted for use with disinfected, secondary treated recycled water. To determine the viability of utilizing wastewater effluent for recycled water purposes in the area of San Bruno, the City participated in a regional Recycled Water Feasibility Study evaluating the potential demands and costs for recycled water programs. A summary of this study is provided in the following sections.

### 7.3.1 Recycled Water Feasibility Study

In 2004, a consortium of agencies with interests in the South San Francisco and San Bruno area developed a Recycled Water Feasibility Study ("Feasibility Study") evaluating the feasibility of implementing a recycled water treatment and distribution system. The Feasibility Study compared decentralized treatment alternatives with the more traditional centralized treatment and distribution approach, and included the identification and screening of potential customers, analysis of water quality suitability, and preliminary project cost estimates.

#### 7.3.1.1 Potential Customers and Demands

The study area for the Feasibility Study encompassed the cities of South San Francisco, San Bruno, and Colma.[25] Overall, 91 potential recycled water customers were identified and separated into seven groupings based on customer location, potential quantity of recycled water use, and type of use (irrigation or commercial/industrial).[26] Two of these groupings, the "South San Bruno Cluster' and the "West San Bruno Cluster" were identified within San Bruno's service area and estimated to have a potential average annual recycled water demand of 0.22 MGD each. One hundred percent of the 0.44 MGD potential demand identified the San Bruno area was irrigation based (compared to approximately 80% over the entire study area).

[25]Though not an active participant in the study, Colma was included in the market identification phase of the project because of the large acreage of irrigated cemeteries within the city's boundaries.
[26] Some potential customers were not placed in any of the groupings; usually this was because they were geographically isolated and smaller users.

#### 7.3.1.2 Alternative Programs and Cost Estimates

Thirteen different alternatives were evaluated within the Feasibility Study. Each alternative included different variations of customer groupings, treatment technologies and wastewater sources (including disinfected secondary effluent from the South San Francisco-San Bruno WQCP, Burlingame/Millbrae secondary effluent, North Bayside System Unit Outfall secondary effluent, raw wastewater from a scalping plant, and blended Crestmoor Creek water). The "South San Bruno Cluster" was included in eight of these alternatives, while the "West San Bruno Cluster" was not included in any alternatives.

San Bruno's (and other groupings') large percentage of demand from irrigation had two major impacts on project feasibility:

- Because most irrigation occurs during an eight or nine hour period during the night time hours, the distribution system must have the capacity to supply all of the irrigation users' daily demand during an eight hour period; and
- Since irrigation is unnecessary during the rainy season, the recycled water system is underutilized during the winter and spring months.

Since the potential recycled water demand within San Bruno is entirely irrigation based, the production cost per unit of recycled water was particularly high for alternatives including the "South San Bruno Cluster", or other irrigation-intensive groupings. Consequently, the five alternatives that excluded customers in San Bruno, but included "Year-Round" industrial customers, were estimated to be less expensive than the irrigation-intensive alternatives.

The preliminary estimates of the total projects costs for each alternative (e.g., treatment, pumping, distribution, administration, planning, and design) ranged from $5 million to $45 million. The production cost for each unit of recycled water produced ranged from $1,000 to $7,000 per acre-foot. Compared to the current cost of wholesale water from SFPUC and groundwater production within the City at this time (approximately $500 and $400 per acre-foot respectively), even the least expensive alternatives evaluated in the Feasibility Study are significantly more costly than San Bruno's other supply sources.

Furthermore, high sodium and chloride concentrations found in the wastewater and secondary effluent cause concern regarding the effects of irrigating plants with recycled waters. If the effects of such concentrations on local plant species were found to be negative, the alternatives would need to include steps to reduce these impacts (e.g., through reverse osmosis, gypsum additives, or exclusion of industrial wastewater flow from the project). Such actions would provided additional costs not included in the preliminary cost estimates given in the preceding paragraph.

## 7.4. PROJECTED RECYCLED WATER USE

*(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.*

*(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.*

*(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.*

Based on the results of the Feasibility Study described above, the City does not currently view recycled water as a cost-effective alternative to potable water. If, in the future, economic factors change such that this is no longer the case, than San Bruno will re-evaluate the utility of a recycled water program.

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# 8. SUPPLY VERSUS DEMAND

*10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.*

As discussed previously, San Bruno's water demand projections and the volume and reliability of its water supplies are expected to vary as a function of time and hydrologic conditions. The following sections compare San Bruno's projected water supplies and demands for years with normal and less than normal precipitation over a period of 20 years (see Table 18 through Table 20).

## 8.1. PROJECTED NORMAL YEAR SUPPLY AND DEMAND COMPARISON

Based on San Bruno's water supply projections described in Section 4 and the water demand projections explained in Section 3, the City is projected to have sufficient water to meet all of its projected demands through the year 2030 during years of normal precipitation (see Table 18). This projection is based on the assumptions described in Section 4.

## 8.2. PROJECTED SINGLE DRY YEAR SUPPLY AND DEMAND COMPARISON

Comparison of San Bruno's single dry year water supply projections to its water demand projections indicates that the City will likely have sufficient water supplies to meet 100% of its projected water demands through 2025. As explained in Section 5.4.2, these projections are based on assumptions regarding San Bruno's use of groundwater to offset shortages in surface water supply and SFPUC's Water System Reliability Model, which incorporates (1) projected future water demands for each BAWSCA agency, (2) San Bruno's wholesale water purchases for three years prior to a dry year, and (3) scheduled completion of water supply projects outlined in SFPUC's WSIP. Table 19 shows that the projected single dry year water supply in 2030 may not be sufficient to meet San Bruno's projected water demands for 2030 and the City may have to decrease its total water demand by up to 10%.

It is estimated that water demand cutbacks on the order of 10% can be met by implementing Stage I of San Bruno's Water Shortage Contingency Plan (see Section 10.1).

## 8.3. PROJECTED MULTIPLE DRY YEAR SUPPLY AND DEMAND COMPARISON

Comparison of San Bruno's projected water supply and demand during a multiple dry year period indicates that the City may experience shortages of 10% to 20% in future

years. The severity of the shortage is based on the results of SFPUC's Water System Reliability Model described in Section 5.4.3.1. San Bruno will operate its groundwater supplies during multiple dry years as needed to buffer the effects of cutbacks in the City's wholesale water supply. The City's management of groundwater supplies during dry years will aim to maintain a maximum total water supply cutback at 20%. Such a cutback can be achieved through implementation of Stage II of San Bruno's Water Shortage Contingency Plan (see Section 10.1), but would likely have significant impacts on the City's economy, among other negative impacts. Another option the City retains to avoid such impact is to use additional groundwater to make up some or all of such a shortfall.

# 9. DEMAND MANAGEMENT MEASURES

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:*

*(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*

*A) Water Surveys for Single Family and Multi-Family Residential Customers*
*B) Residential Plumbing Retrofit*
*C) System Water Audits, Leak Detection, and Repair*
*D) Metering*
*E) Large Landscape Conservation Program and Incentives*
*F) High-Efficiency Appliance Promotion Programs*
*G) Public Information Programs*
*H) School Education Programs*
*I) Conservation Programs for Commercial, Industrial, Institutional Customers*
*J) Wholesale Agency Assistance Programs*
*K) Non-Promotional Water Pricing Programs*
*L) Water Conservation Coordinator*
*M) Waste Water Prohibition*
*N) Residential Ultra Low Flush Toilet Replacement*

To the degree that information is available, San Bruno has described its current and projected future efforts to conserve water use within the City. For the purposes of this UWMP, EKI has referred to the UWMP Act Demand Management Measures as Best Management Practices ("BMPs").

## 9.1. REGIONAL WATER CONSERVATION

BAWSCA and its member agencies look for opportunities to work with other water agencies, including the SFPUC and SCVWD, and leverage available resources in implementing water use efficiency projects. For example, in 2005, the SFPUC and BAWSCA entered into a Memorandum of Understanding (MOU) regarding the administration of a Spray Valve Installation Program. Through this MOU, SFPUC and BAWSCA will work cooperatively to offer and coordinate installation of water conserving spray valves to food service providers in BAWSCA member service areas. Recently the Bay Area Efficient Clothes Washer Rebate Program, a single rebate program offered by all major water agencies in the greater Bay Area including BAWSCA and the SFPUC, was recipient of $1.5M in Proposition 50 grant funds for implementation as early as FY 2006/2007.

BAWSCA and its member agencies will continue to look to partner with other agencies to develop regional water conservation efforts that look beyond local issues of supply and cost-effectiveness to examine costs, benefits and other related issues on a system-wide level. The goal is to maximize the efficient use

of water regionally by capitalizing on variations in local conditions and economies of scale.

## 9.2. SAN BRUNO WATER CONSERVATION

San Bruno is committed to water conservation and efficient use of water. The City has, at some level, implemented the majority of the UWMP Act's 14 "Demand Management Measures", also referred to as "Best Management Practices", or "BMPs". The following sections summarize actions taken by San Bruno to encourage water conservation pursuant to each of the 14 BMPs.

### 9.2.1 BMP 1 - Residential Surveys

San Bruno's residential surveys ("surveys") are performed on request or when triggered by abnormally high bills or leak investigations.[27] The survey consists of a personal visit to the residence by the Water Conservation Coordinator or other Public Works staff member aimed at determining the source of increased water use (e.g., leaks, swimming pools, guests, etc.). This site visit includes checks for leaks in toilets and faucets, showerhead flow rates and replacement recommendations, as well as checks on irrigation and landscape systems.

### 9.2.2 BMP 2 - Residential Retrofits

Information regarding residential plumbing water saving fixtures and retrofits is available at the San Bruno Public Works Department and on the City's Water Conservation Website.[28] The City does not currently distribute fixture retrofits free of charge, but does provide information on water saving tips for residential plumbing fixtures in the form of brochures, pamphlets, and on the City's website.

San Bruno is considering participation in BAWSCA's new "Water Wise" school education program, described in Section 9.2.8, as a method to further implement this BMP for FY 2006-07. The "Water Wise" program is new for FY 2005-06 but the City was not able to participate this year due to staffing changes in the Public Works Department.

### 9.2.3 BMP 3 - System Water Audits

To help minimize water loss within the system, San Bruno's Pubic Works Department staff conducts leak investigation and repair on a regular basis. Leak investigations are triggered by abnormally high water bills (e.g., a 20% increase in water use from the previous month or from the same billing cycle of the previous year). When leaks in the system are detected, they are repaired by the City. Leaks on the customer's side of the meter are reported to the customer and the City advises them on repair.

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[27] An abnormally high bill is defined as a 20% increase in water use from the previous month or from the same billing cycle of the previous year.
[28] http://www.sanbrunowater.ca.gov

The City conducts annual system water audits to determine the quantity of water lost (UAW) by comparing the City's total water supplies with its recorded water consumption. San Bruno's total water supplies are recorded by the Public Works Department, while water consumption is recorded by the City Finance Department. Table 10 shows the City's UAW for FY 2000-01 through FY 2004-05, an average of 7%.

The City will continue to monitor its potable water distribution system efficiency to maintain it above 90% efficient.

### 9.2.4 BMP 4 - Metering

San Bruno presently meters all 12,415 of its customers. Since its 2000 UWMP, San Bruno has completed installation of meters at all previously-unmetered parks and government property.

The City charges its customers based on the size of their meter, type of customer account (e.g., single family home versus commercial establishment), and the quantity of water used. Meter service charges range from $7.90 per month for a 3/4-inch diameter meter, to $395 for a 10-inch meter. Table 21 gives the full range of service charges based on meter size and account type. Section 9.2.11, BMP 11, describes the City's tiered rate structure.

### 9.2.5 BMP 5 - Large Landscape

In response to 1990s Assembly Bill 325, the City Council adopted the City of San Bruno Water Efficient Landscape and Irrigation Guidelines ("Landscape Guidelines"). San Bruno's Landscape Guidelines includes provisions for new and rehabilitated landscapes, as well as for existing landscapes including: maximum water allowances; estimated water use; landscape and irrigation design plans; schedules for irrigation, maintenance, and auditing; grading design plans; and a soils analysis. Compliance with the Landscape Guidelines is overseen by the City Planning Department. A copy of San Bruno's Landscape Guidelines are included as Appendix G.

### 9.2.6 BMP 6 - High-Efficiency Clothes Washers

San Bruno has participated in BAWSCA's regional high-efficiency clothes washer rebate program since 2004. This program offers rebates to RSF customers who purchase any clothes washer designated as "high-efficiency." A list of the applicable machines is included as Appendix G. Rebates range from $100 to $200 depending on the model and are currently paid for by funds from San Bruno and BAWSCA DWR grants. As of 30 March 2006, 84 rebates have been given to RSF customers within San Bruno's service area. In FY 2004-05, a total of 167 San Bruno residents received rebates from the regional program. Table 22 details the amount and types of rebates given to RSF customers since 2004.

### 9.2.7 BMP 7 - Public Information

San Bruno distributes information about water conservation to the public through bill inserts and brochures. The City also maintains a website providing water conservation tips and rebate applications for high-efficiency clothes washers.[29] Information provided by the City includes tips for both indoor water use (e.g., toilets, washers, showers, and leak detection), as well as outdoor water use (e.g., irrigation, xeriscape, ET controllers, etc.). This site is usually maintained by the Water Conservation Coordinator.

### 9.2.8 BMP 8 - School Education

In 2003 and 2004 San Bruno participated in BAWSCA's "Our Water" school education program. Due to contractor difficulties, however, BAWSCA is not offering the "Our Water" program for the 2005-06 fiscal year. "Our Water" was intended to be a creative and user-friendly approach to water conservation education at the elementary school level developed by Kollage Community School for the Arts in Belmont. "Our Water" was an integrated curriculum that combined water conservation lessons from the Water Education Foundation's "California Water Story" curriculum for 4th grade, with instruction in visual, performing, and literary arts. The "Our Water" curriculum was presented in 50-minute sessions conducted once a week over nine weeks. Each school or class was assigned an arts instructor in visual art, dance, or poetry. Pre- and post-tests were given to students to measure the effectiveness of the program in enhancing their water conservation awareness.

Since discontinuing the "Our Water" school education program in 2005, BAWSCA has implemented a new "Water Wise" conservation and education program that will provide school-age children with water efficient plumbing fixtures and education material in participating communities. Due to changes in staff within the City's Public Works Department, San Bruno was not able to participate in the "Water Wise" program during FY 2005-06, but is considering participation in FY 2006-07.

The City has also facilitated poster competitions for elementary school children since FY 2000-01. Each year contestants submit drawing depicting water conservation. The winning drawing is made into a poster for distribution within the City promoting water conservation education.

### 9.2.9 BMP 9 - Commercial, Industrial, Institutional Accounting

San Bruno's Finance Department previously tracked water use by customer account using a software program developed by the City of Redwood City. This program allowed the City to track water users in the Commercial, Industrial, and Institutional sectors and identify top consumers, the software program was used primarily for accounting purposes and for triggering leak investigations. As of January 2006, the City has switched to a

[29] http://www.sanbrunowater.ca.gov/

new accounting software that will facilitate easier tracking of individual CII accounts and enable San Bruno to target these accounts for water conservation purposes.

### 9.2.10 BMP 10 - Wholesaler Incentives

This BMP does not apply to San Bruno because San Bruno is not a wholesale water agency.

### 9.2.11 BMP 11 - Conservation Pricing

As described in Section 9.2.4, BMP 4- Metering, San Bruno's customers are billed for every 100 cubic feet of water used ("unit"), with an additional fixed monthly service charge according to their meter size. Rates are based on wholesale water prices from SFPUC and the cost of groundwater production and water distribution. A complete list of current water rates is included in Table 21. Customers in the RSF sector are billed at a lower base rate than RMF and CII customers ($2.75 per unit versus $2.92 per unit, respectively). The City also institutes an increasing tiered rate structure for RSF accounts (i.e., customers are charged an additional $0.98 for each unit of water consumed over the accounts base allocation). RMF and CII accounts are not subject to the tiered rate structure.

Additionally, to compensate for revenue losses and the resulting fiscal impacts during periods of water conservation, the City Council maintains the authority to adopt conservation pricing and water use surcharges in times of drought (San Bruno's Municipal Code "SBMC" §10.16.140).

### 9.2.12 BMP 12 - Conservation Coordinator

The City currently has a vacancy in its Water Conservation Coordinator position. Included in Appendix G is the advertisement published by the City during its job search. Interviews are ongoing.

From 2000 through 2004 Phil Hanes served as the City's Water Conservation Coordinator.[30] In addition, the City maintained a student intern through the summer of 2003 to assist Mr. Hanes in his conservation duties. These duties included maintaining the City's water conservation brochures and website,[31] as well as responding to leak investigations and other water conservation activities for the City.

### 9.2.13 BMP 13 - Waste Prohibitions

San Bruno's Water Conservation Plan, outlined in SBMC §10.16, defines and prohibits "non-essential" water uses during times of drought. Section 10.4 describes these prohibitions in further detail. The SBMC §10.16 identifies a variety of activities related to indoor and outdoor water use (e.g., excess landscape watering, indiscriminate running

[30] Approximately 50% of Mr. Hanes' duties were conservation oriented.
[31] http://www.sanbrunowater.ca.gov

of water that results in runoff into the street or gutter) and empowers City staff to enforce these prohibitions with both civil and criminal penalties (see Section 10.4).

### 9.2.14 BMP 14 - Ultra Low Flow Toilets

San Bruno does not currently institute a water conservation program for ultra low flow toilets. As mentioned in Section 9.2.12, the City's Water Conservation Coordinator position has been vacant since late 2004. Additional turnover in San Bruno's Public Works Department in the past year has also posed additional roadblocks in the Water Conservation Coordinator program, and thus also in the institution of new demand management measures. San Bruno will consider participation in BAWSCA's new regional ultra low flow toilet ("ULFT") replacement program, or implementing an independent rebate program designed and run by City staff, once the Water Conservation Coordinator and other key positions are filled.

## 9.3. SCHEDULE OF IMPLEMENTATION

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (f) (2) A schedule of implementation for all water demand management measures proposed or described in the plan.*

San Bruno intends to implement each BMP as described above under the individual subsections.

## 9.4. EFFECTIVENESS OF IMPLEMENTATION

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (f)(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.*

The City does not currently evaluate the effectiveness (in terms of water savings) of each individual BMP described above. However, as described in Section 3.1, total water demand within the City has declined since 2000, and although no official study has been conducted regarding the specific causes of this decline, it has been attributed, in part, to the City's increased water conservation efforts.

## 9.5. CONSERVATION SAVINGS

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (f) (4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.*

The City does not currently implement a formal program for tracking the effectiveness of the individual BMPs on water use savings within the City. Potential methods for quantifying the water saved by BMPs that the City implements could include

development of a database that would allow the City to track those accounts that had retrofitted their plumbing fixtures as part of a BMP (e.g., water-efficient clothes washers and other low-flow fixtures), and comparing water use at those accounts pre- and post-retrofit. The City may consider such an analysis in future years, although compensating for climatic, land use or other changes at an individual account may make such determination of BMP-specific water savings imperfect.

## 9.6. EVALUATION OF DEMAND MANAGEMENT MEASURES NOT IMPLEMENTED

*10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*

*10631 (g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:*

*(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.*

*(2) Include a cost-benefit analysis, identifying total benefits and total costs.*

*(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.*

*(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.*

San Bruno currently implements or has scheduled for implementation 9 of the 13 applicable BMPs listed in the UWMP Act.[32] As mentioned above, the City is currently in the process of hiring a Water Conservation Coordinator and other key Public Works officials. Implementation of the remaining BMPs (residential retrofits, ultra low flow toilets, school education, and CII conservation) is contingent upon filling these positions and will be scheduled upon completion of the hiring process.

[32] BMP 11, the Wholesaler Incentives, does not apply to San Bruno because the City is not a water wholesaler.

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# 10. WATER SHORTAGE CONTINGENCY PLAN

SBMC §10.16 authorizes the city council to declare a water supply emergency and impose mandatory water conservation measures and/or water rationing as they see fit during times of drought. The following section describes the components of San Bruno's Water Shortage Contingency Plan, including staged reductions in the City's water demand in response to supply cutbacks, emergency response plans to catastrophic supply interruption, and water use prohibitions and enforcement mechanisms.

## 10.1. STAGES OF ACTION

> *10632. The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.*

San Bruno has four Stages of Action ("Stages") to be followed during a water shortage contingency. These Stages were developed as part of San Bruno's 2001 UWMP (BC, 2001b) to meet water supply cutbacks ranging from 5% to 50% and are consistent San Bruno's Water Conservation Plan, codified in §10.16 of the SBMC. Each of the four Stages describes actions to be taken by the City to achieve the stated cutback for that particular Stage. All of the Stages allow for adequate water to protect public health and to safety and to satisfy the fire protection needs of the City.

Each of the four Stages corresponds to a specific City-wide water demand reduction goal-10%, 20%, 35%, and 50%. These water demand reduction goals are based on San Bruno's potential supply cutbacks during times of drought, with up to a 50% water supply reduction as mandated by the UWMP Act. The four Stages and their associated cutbacks are described in Table 23.

The first Stage, Stage I, aims at reducing San Bruno's water demand by 10% in response to a reduction in supply ranging from 5% to 10% Stage I reflects a scenario, such as that described in Section 5.4, where SFPUC is forced to reduce wholesale water deliveries to customers of the Regional Water System by 10%. Stage I includes voluntary water conservation measures that are promoted through a public information campaign aimed at increasing awareness through the distribution of literature and bill inserts, newspaper advertisements, and educational speakers for schools and other groups.

The actions outlined in Stage II are to be implemented when the City requires a 20% reduction in water demand. As described in Section 5.4.3, San Bruno may be faced with such cutbacks during multiple dry year periods when the Regional Water System experiences a 20% reduction in water supply. Stage II calls for mandatory conservation measures as determined necessary by the City Council and the Director of Public Works, an aggressive public information campaign, and voluntary water allocations. Conservation measures may include the nonessential water uses listed in SBMC §10.16

(Table 24, Section 10.4), or any additional measured deemed necessary to meet the target demand reduction.

Stage III water conservation and rationing measures are geared toward a 35% reduction in City-wide water demand. The steps to achieve a Stage III reduction include all of the steps outlined in Stage II, as well as mandatory water allotments for all accounts, increased monitoring of water use, and increased rates and penalties for excess water use.

Stage IV identifies mechanisms by which the City could reduce total water demand by up to 50%, as required by the UWMP Act. To achieve a reduction in water demand of 50%, the City would adjust mandatory allotments and reductions from Stage III as necessary to reach a City-wide water demand reduction of 50%. If necessary, San Bruno may prohibit all water use except as required for public health and safety (50 gallons per capita per day). Increased enforcement mechanisms would likely be instituted to enforce the Stage IV cutbacks.

## 10.2. ESTIMATE OF MINIMUM SUPPLY FOR NEXT THREE YEARS

*10632 (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.*

Based on SFPUC's Water Supply Reliability Model and San Bruno's groundwater management strategy as described in Section 5.3, it is estimated that San Bruno's minimum supply for the next three years will be 3.87 MGD if there is a single dry year (equal to 10% reduction in supply) or 3.44 MGD if there is a multiyear drought (20% reduction in supply). Table 25 shows San Bruno's estimated minimum supply for wholesale water purchased from SFPUC and groundwater produced by the City's wells for the next three years.

## 10.3. CATASTROPHIC SUPPLY INTERRUPTION PLAN

*10632(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

In response to a catastrophic supply interruption, the response procedures that San Bruno would follow are described in the City's Water System Emergency Response Plan ("ERP") and in SFPUC's Suburban Customer Water Supply Emergency Operations and Notification Plan ("SFPUC EOP") (OCC, 2002). Actions described in these plans focus on maintaining flow within the regional and local water system pipelines. In the event that this water is unsafe for consumption (e.g., only available for fire flow), San Bruno plans to distribute potable water to residents at emergency distribution centers. The following sections summarize the information presented in the aforementioned plans, including measures to be taken to ensure the reliability of the water supply.

### 10.3.1 San Bruno's Emergency Response Plan

In response to the requirements of the Public Health, Security and Bioterrorism Preparedness and Response Act of 2002 ("Bioterrorism Act"), Section 1433 amendment to the Safe Drinking water Act, San Bruno prepared a Water System ERP, completed in 2004 and updated in 2005. The City's ERP provides a framework for emergency response by the City's Public Works Department ("Department") and:

- Describes the Department's emergency management organization;
- Outlines the roles and responsibilities the Department and its staff during emergency response and recover;
- Compiles and organizes water system emergency response protocols and procedures; and
- Identifies contingency plans to be implemented in the event that one or more of San Bruno's water supplies were to become unusable.

San Bruno's ERP also includes procedures for emergency chloramination at the City's five groundwater supply wells, a plan for distributing emergency water quality information, and a drinking water contamination response plan. These components provide guidance in response to disasters and attacks, both natural and man-made.

#### 10.3.1.1 SFPUC Service Interruption

In the event that service is interrupted from any of San Bruno's SFPUC metered connections, personnel are instructed to shut down the effected connection and reroute water from the remaining connections where possible, as described for each particular connection in the ERP Contingency Plan. If necessary, groundwater may be routed to higher pressure zones via booster stations and then back-fed through pressure reducing valves from the higher to lower zones within the distribution system.

#### 10.3.1.2 Emergency Inter-ties to Adjacent Distribution Systems

Emergency inter-ties with NCCWD, the City of Millbrae, and Cal Water – South San Francisco have also been established to provide additional options for emergency water supplies in the event that neighboring agencies SFPUC connections remain intact. San Bruno maintains two interties with NCCWD, one with the City of Millbrae, and two with Cal Water – South San Francisco.

### 10.3.2 SFPUC Emergency Operations Plan

In accordance with California Government Code §8607.2, SFPUC has established a Suburban Customer Water Supply Emergency Operations and Notification Plan ("EOP") to accommodate the Suburban Purchasers in the event of an emergency. The SFPUC EOP was initially completed in June 1996, and has since undergone five major revisions, the most current one in April 2002. SFPUC is presently in the process of completing a sixth revision to the SFPUC EOP, which is scheduled for completion later this year.

The purpose of the SFPUC EOP is to provide procedures and guidelines to be implemented by SFPUC's Water Supply & Treatment Division, Water Quality Bureau, SFPUC's Suburban Purchasers, and the City Distribution Division. The SFPUC EOP states that SFPUC will make every attempt to ensure that the regional water system does not run out of water to maintain system pressure and fire protection capabilities (even if an emergency water use reduction alert, boil water notice, or unsafe water alert is needed).

The SFPUC EOP also evaluates potential actions to be taken by SFPUC and the other above named entities in the event of several different types of emergencies, including:

- Earthquake
- Dam Failure
- Fires
- Sewage Spill
- Contamination of Water Supplies
- Hazardous Spills or Leaks
- Severe Storms or Leaks
- Aqueduct, Pipeline or Reservoir Failure
- Environmental Response
- Civil Unrest
- National Security Emergency
- Widespread Power Outage
- Process/Plant Failures
- Terrorist Threat/Event

To best respond to the variety of potential emergencies, the SFPUC EOP defines four emergency response categories (i.e., Advisory, Alert, Emergency, and Major Emergency) and seven emergency planning scenarios to be implemented in the case of a water supply emergency. A complete description of these seven scenarios is included as Appendix H. SFPUC's response to a particular emergency will depend on the severity of the event, the supplies impacted, the customers impacted, and the system demand at the time of the emergency. For each emergency, the impact may be a reduction or change in the supply available to customers in one or more areas of the system, a change to an auxiliary supply, or both.

For example, in the event of contamination of a source of supply, SFPUC may choose to eliminate that source from the system, which would result in either a reduced supply or changes in the supply source (e.g., if the Hetch Hetchy supply were impacted, SFPUC would increase production at the Harry Tracy Water Treatment Plant, and/or the Sunol Valley Water Treatment Plant), until the quality and reliability of the contaminated source is restored (See Appendix H).

## 10.4. PROHIBITIONS, PENALTIES, AND CONSUMPTION REDUCTION METHODS

*10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable.*

SBMC §10.16 authorizes the City Council to impose water conservation and rationing measures described in the municipal code (or elsewhere appropriate) in order to reduce water consumption during a water shortage emergency. Conservation measures include, among other things, the prohibition of:

- excess landscape watering,
- daytime watering (when evapo-transpiration rates are highest),
- unattended leaks or breaks,
- washing vehicles with any hose not having an automatic shut-off devise,
- the use of a hose for cleaning buildings, sidewalks, or other surfaces,
- the operation of a car wash unless the used water is recycled,
- use of water from a fire hydrant unless specifically authorized,
- the filling of decorative lakes, fountains, or swimming pools,
- service of water in restaurants unless requested by the customer,
- fire hydrant or main flushing unless determined necessary by the public works director,
- the indiscriminate running of water resulting in runoff,
- substantial planting or replanting of new landscaping,
- the use of potable water for dust control or soil compaction unless reclaimed water is not available,
- and any other use of domestic water as deemed to be wasteful by the director of public works.

A more complete explanation of these prohibitions is included in Table 24.

To help ensure compliance with conservation measures during a water shortage, SBMC §10.16 also includes enforcement and penalty measures, including the installation of water flow restriction device, disconnection of water service, or the removal of water service connection. Violation of any provision under SBMC §10.16 is subject to an infraction punishable by a fine, not to exceed $50 for the first offense, $100 for the second violation within the same year, and $250 for each additional violation within one year. Additionally, each day that any such violation is committed constitutes a separate offense and is punishable as such ($250). If necessary, violations may even be

prosecuted by criminal complaint, filed by San Bruno's city attorney, or by citation from the police department, or neighborhood improvement representative.

## 10.5. ANALYSIS OF REVENUE IMPACTS OF REDUCED SALES DURING SHORTAGES

*10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*

Because San Bruno bills its customers per unit volume of water consumed, the City would experience a reduction in revenue upon implementation of the water conservation and/or rationing plan. As described in Section 9.2.11, to compensate for the expected revenue reduction cause by water conservation, the City Council reserves the authority to adopt a temporary rate increase and institute an excess water surcharge (SBMC §10.16.140). Such rate increases would be based on a variety of components (including the change in quantity of sales, and fiscal impacts to the City and to customers) and evaluated at the time of drought.

## 10.6. WATER USE MONITORING PROCEDURE AND ORDINANCE

*10632 (h) A draft water shortage contingency resolution or ordinance.*

*10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

San Bruno's Water Shortage Contingency Plan as described in the above sections is codified in the "Water Conservation" Chapter 10.16 of the SBMC (see Appendix I). In order to determine the actual reduction in water use during water shortage periods, the City plans to increase the frequency at which it conducts meter readings to ensure that customers are conserving water. By frequently monitoring water use at its residential and CII accounts, the City will ensure compliance with water shortage rationing and be able to impose penalties on those who are not complying with the directed mandatory water conservation measures or water allocations. Non-compliance with the required water conservation will result in the penalties described in Section 10.4, potentially including fines, flow restriction devices, and termination of service.

# 11. ADOPTION AND IMPLEMENTATION OF UWMP

> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code.. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

As described in Section 1.3, the City informed the public and the appropriate agencies of (1) its intent to prepare a UWMP, (2) when and where the UWMP was available for public review, and (3) when the public hearing regarding the UWMP would be held. All notifications were completed in compliance with the stipulations of Section 6066 of the Government Code.

This UWMP was adopted by Resolution No. 2007-12 by the City Council during its 23 January 2007 City Council meeting (Appendix J).

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URS, 2005. United Research Center, SFPUC 2030 Purchase Estimates Technical Memorandum, February 2005.

Yates, 2003a. Westside Basin Unified Groundwater Model.

Yates, 2003b. Correspondence with Mr. Gus Yates, Fall 2003.

**Table 1**
**Coordination with Appropriate Agencies and the Public**
City of San Bruno, California

| Action | SFPUC | SFPD | BAWSCA | BAWSCA Member Agencies | San Mateo County | Public |
|---|---|---|---|---|---|---|
| Sent notice of intention to prepare UWMP (a) | 8/10/2005 | 8/10/2005 | 8/10/2005 | 8/10/2005 | 8/10/2005 | 6/4/2005 |
| Participated in UWMP development | -- | -- | -- | -- | -- | -- |
| Notice of Public Review Period (b) | 11/28/2006 | 11/28/2006 | 11/28/2006 | 11/28/2006 | 11/28/2006 | 12/2 & 12/9/06 |
| Received copy of draft UWMP | 12/15/2006 | -- (c) | 12/15/2006 | -- (c) | -- (c) | -- (c) |
| Commented on the draft UWMP | -- | -- | -- | -- | -- | -- |
| Sent notice of public hearing for UWMP (d) | 11/28/2006 | 11/28/2006 | 11/28/2006 | 11/28/2006 | 11/28/2006 | 12/2 & 12/9/06 |
| Attended public meetings | -- | -- | -- | -- | -- | 1/23/06 |
| Received copy of adopted UWMP | yes | yes | yes | -- (e) | yes | -- (e) |

**Abbreviations:**
BAWSCA = Bay Area Water Supply and Conservation Agency
SFPUC = San Francisco Public Utilities Commission
SFPD = San Francisco Planning Department
TBD = To be determined
UWMP = Urban Water Management Plan

**Notes:**
(a) Notice of intention to prepare the UWMP was sent to agencies on 10 August, 2005. Public notice was published in the Independent on 4 June, 2005.
(b) Notice of public review was sent to agencies on 28 November 2006. Public notice was published in the San Mateo County Times on 2 and 9 December 2006.
(c) A copy of the draft UWMP was made available to the Public at City Hall and the San Bruno Public Library from 15 December 2006 to 23 January 2007.
(d) Notice of the time, date, and location of the public hearing was sent to agencies on 28 November 2006. Public notice was published in the San Mateo County Times on 2 and 9 December 2006 and in the San Mateo Daily Journal on 13 and 20 January 2007.
(e) A copy of the adopted UWMP is available to the Public at City Hall.

**Table 2**
**Service Area Population and Employment Estimates**
City of San Bruno, California

| Source | Year | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1950 | 1960 | 1970 | 1980 | 1990 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
| **Population Estimates** | | | | | | | | | | | | |
| Draft General Plan (2006) (a) | 12,478 | 29,063 | 36,254 | 35,417 | 38,961 | 40,165 | 41,700 | -- | -- | -- | 43,973 | -- |
| ABAG Subregional (2005) (b) | -- | -- | -- | -- | -- | -- | 41,700 | 42,700 | 44,900 | 47,700 | 49,300 | 50,700 |
| Adjusted Draft General Plan (2001) (c) | -- | -- | -- | -- | -- | -- | 42,546 | 44,820 | 45,672 | 46,524 | 47,377 | 48,229 |
| **Employment Estimates (Total Number of Jobs)** | | | | | | | | | | | | |
| Draft General Plan (2006) (d) | -- | -- | -- | 10,030 | 15,330 | -- | -- | -- | -- | -- | -- | -- |
| ABAG Subregional (2005) (e) | -- | -- | -- | -- | -- | 17,180 | 13,910 | 15,110 | 18,630 | 22,250 | 25,790 | 28,400 |
| Adjusted Draft General Plan (2001) (f) | -- | -- | -- | -- | -- | -- | 17,359 | 18,280 | 20,153 | 22,025 | 23,897 | 25,770 |

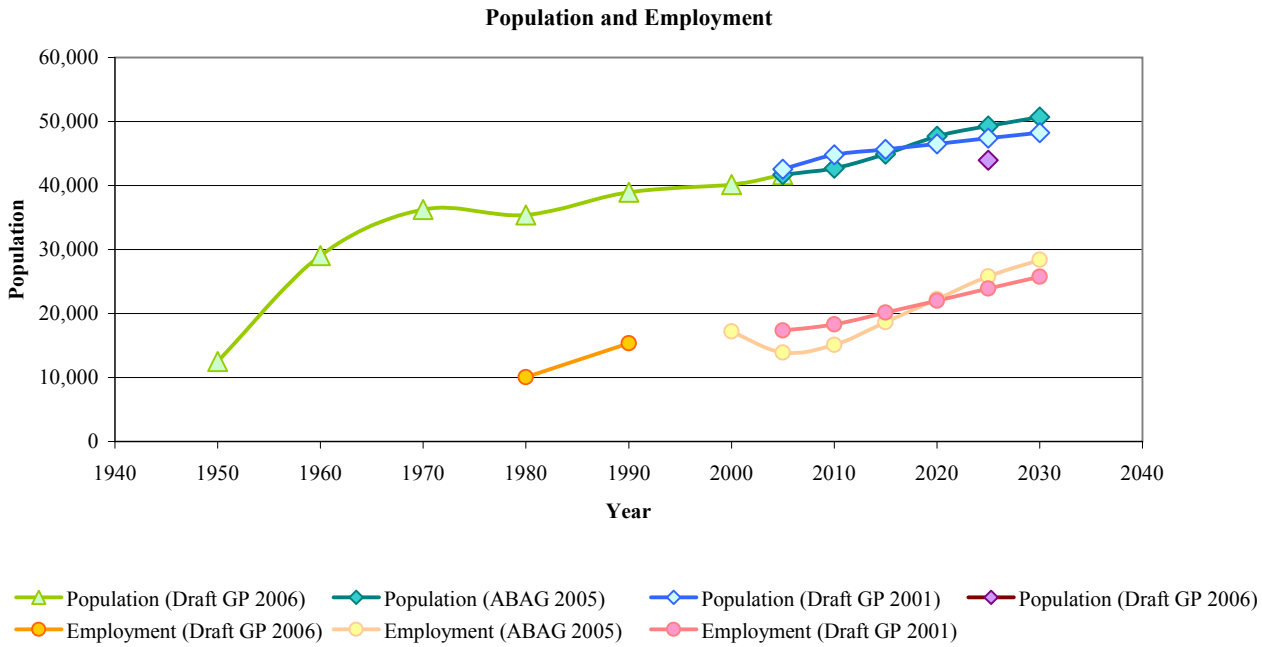


**Table 2**
**Service Area Population and Employment Estimates**
City of San Bruno, California

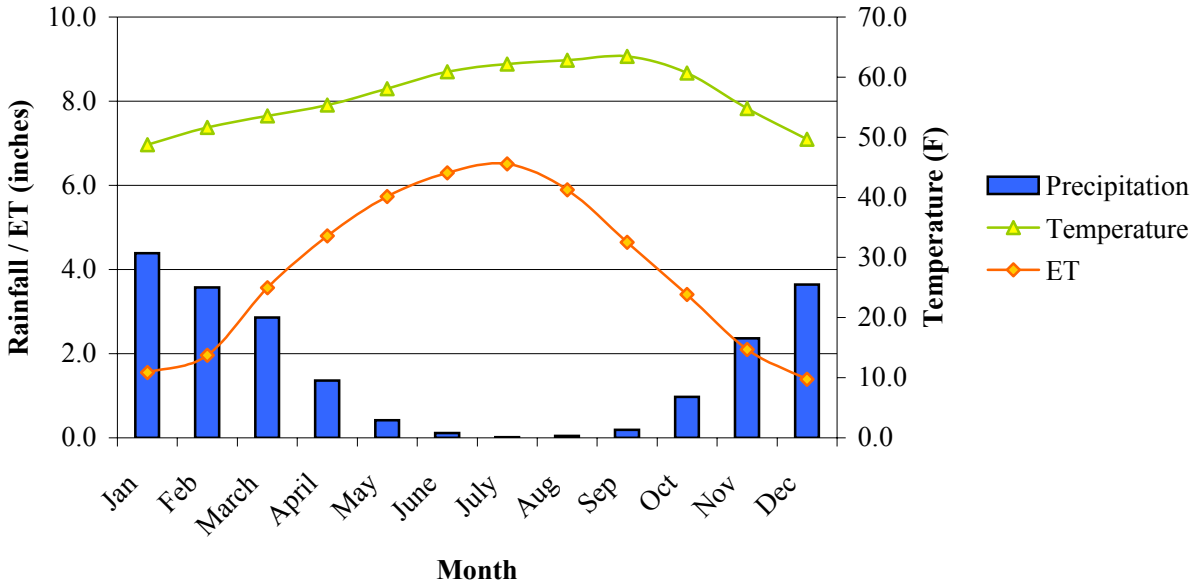
**Abbreviations**
-- = Data were not available
GP = General Plan

**Notes:**
(a) Population estimates are from the City of San Bruno Draft General Plan, 2006. Future population projections are based on planned and approved development projects within the City of San Bruno service area.
(b) Population projections are from *Projections 2005, Forecast for the San Francisco Bay Area to the Year 2030,* Association of Bay Area Governments, December 2005. ABAG projections were developed independent of the City based on regional information and are shown for comparative purposes.
(c) Adjusted Draft General Plan 2001 population projections are from *SFPUC Wholesale Customer Water Demand Projections* (URS, 2004). Projections are based on the City's 2001 Draft General Plan but adjusted for the U.S. Census estimates and extended forward to 2030 with an average annual growth of 0.8%.
(d) Estimates for San Bruno's employment rate (total number of jobs) in 1980 and 1990 are from the City of San Bruno Draft General Plan, 2006.
(e) Employment estimates for from 2000 through 2030 are from *Projections 2005, Forecast for the San Francisco Bay Area to the Year 2030,* Association of Bay Area Governments, December 2005.
(f) Adjusted 2001 Draft General Plan employment projections are from *SFPUC Wholesale Customer Water Demand Projections* (URS, 2004). Projections are based on the Draft General Plan but adjusted for the U.S. Census estimates and extended forward to 2030 using an average annual growth of 1.10%.

**Table 3**
**Average Monthly Climate Data**
City of San Bruno, California

| | Jan | Feb | March | April | May | June | July | Aug | Sep | Oct | Nov | Dec | Annual |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ET (in) (a) | 1.6 | 2.0 | 3.6 | 4.8 | 5.7 | 6.3 | 6.5 | 5.9 | 4.7 | 3.4 | 2.1 | 1.4 | **47.9** |
| Precipitation (in) (b) | 4.4 | 3.6 | 2.9 | 1.4 | 0.4 | 0.1 | 0.0 | 0.0 | 0.2 | 1.0 | 2.4 | 3.6 | **20.0** |
| Temp (F) | 48.8 | 51.6 | 53.5 | 55.4 | 58.1 | 60.9 | 62.2 | 62.8 | 63.5 | 60.7 | 54.8 | 49.7 | -- (c) |
| $Temp_{Max}$ (F) | 55.9 | 59.0 | 61.3 | 63.6 | 66.3 | 69.7 | 70.9 | 71.5 | 73.1 | 70.1 | 63.1 | 56.7 | -- (c) |
| $Temp_{Min}$ (F) | 41.9 | 44.3 | 45.8 | 47.3 | 49.8 | 52.2 | 53.5 | 54.2 | 54.1 | 51.4 | 46.7 | 42.9 | -- (c) |

**Abbreviations:**
ET = Average Evapotranspiration
F = Degrees Fahrenheit
in = inches
Temp = Average temperature
$Temp_{Max}$ = Average maximum temperature
$Temp_{Min}$ = Average minimum temperature




**Notes:**
(a) Evapotranspiration data are from the Department of Water Resources, California Irrigation Management Information System.
(b) Precipitation and temperature data are from the Department of Water Resources, California State Climatologist for the San Francisco Airport (Station E70) and from the California Irrigation Management Information System.
(c) Data not applicable and/or available.

**Table 4**
**Pressure Zone Elevations and Water Supply Sources**
City of San Bruno, California

| Pressure Zone | Elevation (ft msl) (a) | | Water Supply Source (b) |
|---|---|---|---|
| | Minimum | Maximum | |
| 1/4 | 5 | 90 | Tank 1, Wells 16, 17, 18, 20 (b) |
| 2 | 85 | 250 | Tank 4 |
| 3/5 | 45 | 335 | Bayhill Line, Rollingwood Line, and Well 15 |
| 6 | 240 | 465 | Tank 3 |
| 7 | 460 | 555 | Zone 12 via RS 9 |
| 8 | 250 | 555 | Zone 10 via RS 6 |
| 9 | 480 | 520 | Zone 10 via RS 4 and RS 5 |
| 10 | 505 | 615 | Tanks 6 and 6A |
| 11 | 595 | 745 | Tanks 9 and 10 |
| 12 | 600 | 800 | Tank 7 via RS 2 |
| 13 | 400 | 500 | NCCWD via RS 1 |

**Abbreviations:**
ft msl = feet above mean sea level
NCCWD = North Coast County Water District
RS = Regulating Station
SFPUC = San Francisco Public Utilities Commission

**Notes:**
(a) Elevations and supply sources of pressure zones from *City of San Bruno Water System Master Plan Update* , Brown & Caldwell, July 2001 and from personal communication with Martin Cardone, March 2006. See Figure 3 for zone locations.
(b) Pressure Zone 1/4 was previously served by San Bruno's "Tanforan" connection to the Sunset Supply pipeline from the SFPUC Regional System. This connection has recently been equipped with a regulator to provide for fireflow of 100 gallons per minute. The line is no longer used to provide water to Zone 1/4 on a regular basis.

# Table 5
## Active Groundwater Supply Wells (a)
City of San Bruno, California

| Supply Well | DHS Well Number | TOC Elevation (ft msl) | Well Age (years) | Depth to Bottom of Casing (ft) | Screened Interval (ft msl) | Average Extraction Rate (b) (gpm) | Horsepower |
|---|---|---|---|---|---|---|---|
| Well 15 - Commodore (c) | 4110023-001 | 85 | 22 | 511 | -200 to -434 | 250 to 300 | 60 |
| Well 16 - Forest Lane | 4110023-010 | 40 | 14 | 580 | -295 to -555 | 440 | 100 |
| Well 17 - Corporate Yard | 4110023-007 | 15 | 12 | 420 | -290 to -505 | 220 | 40 |
| Well 18 - Cypress (c) | 4110023-008 | 50 | 10 | 480 | -205 to -440 | 250 to 300 | 50 |
| Well 20 - Lions Field | 4110023-023 | 12 | 2 | 640 | -300 to -504 | 610 | 125 |

**Abbreviations:**

-- = Data were not available
Ave = Average
DHS = Department of Health Services
ft msl = feet above mean sea level
gpm = gallons per minute
psi = pounds per square inch
TOC = top of casing

**Notes:**

(a) Groundwater supply well information from the City of San Bruno *Water System Master Plan Update* , Brown & Caldwell, July 2001; the *Emergency Response Plan - City of San Bruno Proposed Water System Modification* , *Addition of Chloramines to City Well Water Engineer's Report,* Updated October 2005, *City of San Bruno Final Well Report for New Water Well #20,* Brown & Caldwell, 2003, and personal communication with Martin Cardone, March 2006. See Figure 2 for well locations.

(b) The average extraction rates represent the actual average pumping rate of each well from January 2000 through December 2005, with the exception of Wells #15 and 18, which are temporarily out of service (see below).

(c) Wells 15 and 18 are temporarily out of service while new motors are installed on the pumps. These wells should be back online in the near future with an estimated capacity of 250 to 300 gpm each.

**Table 6**
**Booster Pump Station Information (a) (b)**
City of San Bruno, California

| Pump Station | Elevation (ft msl) | Number of pumps | Nominal Pump Capacity (gpm) (c) | Total Dynamic Head (ft) | Horsepower |
|---|---|---|---|---|---|
| 1 - Sneath Lane | 295 | 3 | 570 / 750 / 750 | 345 / 500 / 500 | 75 / 125 / 125 |
| 2 - Lake Drive | 770 | 2 | 600 | 580 | 100 |
| 3 - Whitman Way | 330 | 2 | (d) | (d) | 30 |
| 4 - Pacific Heights / College | 560 | 2 | 600 | 100 | 30 |
| 5 - Maple Avenue | 95 | 2 | 300 | 165 | 20 |
| 6 - Corporation Yard | 10 | 3 | 500 / 500 / (d) | 277 / 277 / (d) | 50 / 50 / 60 |
| 7 - San Bruno Avenue (e) | 330 | 2 | 700 | 269 | 60 |
| 8 - Glenview Drive (f) | 530 | 2 | 700 | 269 | 60 |

**Abbreviations:**
gpm = gallons per minute
ft = feet
ft msl = feet above mean sea level

**Notes:**
(a) Pump station information from City of San Bruno Water System Master Plan Update, Brown & Caldwell, 2001, and from personal communication with Martin Cardone, March 2006.
(b) Data presented that are separated by a slash (e.g. 570/750) indicate the individual characteristics of different pumps within the pump station.
(c) Nominal pump capacity is as listed on pumps. Actual capacity may be less due to wear (Brown & Caldwell, 2001).
(d) Nameplate painted over; illegible.
(e) San Bruno Avenue Pump Station is equipped with a diesel 75 horsepower auxiliary pump.
(f) Glenview Drive Pump Station is also equipped with two 5 horsepower pumps and one diesel 75 horsepower auxiliary pump.

**Table 7**
**Storage Tank Information (a)**
City of San Bruno, California

| Storage Tank | Elevation (ft msl) (b) | Height (ft) (c) | Capacity (MG) (d) | | |
|---|---|---|---|---|---|
| | | | Total | Minimum | Maximum |
| 1 - Cunningham Drive | 250 | 32 | 2.50 | 0.94 | 1.95 |
| 3 - Glenview Drive | 530 | 30 | 2.00 | 0.83 | 1.10 |
| 4 - San Bruno Avenue | 330 | 32 | 1.00 | 0.63 | 0.84 |
| 6 - Lake Drive South | 780 | 32 | 0.40 | 0.25 | 0.34 |
| 6A - Lake Drive North | 780 | 32 | 1.00 | 0.63 | 0.84 |
| 7 - Sweeney Ridge | 1250 | 32 | 0.40 | 0.25 | 0.34 |
| 9 - Skyline West | 825 | 40 | 0.50 | 0.28 | 0.46 |
| 10 - Skyline East | 825 | 40 | 0.50 | 0.28 | 0.46 |
| **Total Capacity** | (e) | (e) | **8.3** | **4.1** | **6.3** |

**Abbreviations:**
ft = feet
ft msl = feet above mean sea level
MG = millions of gallons

**Notes:**
(a) Storage tank information from *City of San Bruno Water Wystem Master Plan Update* , Brown & Caldwell, July 2001, and personal communication with City Staff, 2006. See Figure 2 for tank locations.
(b) Elevations approximated from U.S. Geological Survey 7 1/2 minute quadrangle topographic maps, reported in feet above mean sea level (Brown and Caldwell, 2001).
(c) Height measured to tank overflow.
(d) Minimum and maximum tank capacities were calculated from operational water levels, provided by Mark Reinhardt, 20 March 2006.
(e) Not applicable.

**Table 8**
**Turnouts to Regional Water System (a)**
City of San Bruno, California

| Connection | Turnout Location | SFPUC Account Number | Pipeline | Water Source (b) | Pressure (psi) |
|---|---|---|---|---|---|
| Whitman | 2001 Whitman Way | 010023-01-8 | San Andreas | Harry Tracy | 86 |
| Tanforan | 900 Sneath Lane | 010024-01-6 | Sunset Supply | Hetch Hetchy | 83 |
| Bayhill | 1204 Sneath Lane | 010025-01-3 | San Andreas | Harry Tracy | 142 |
| Rollingwood | 1206 Sneath Lane | 010026-01-1 | San Andreas | Harry Tracy | 142 |
| Crystal Springs | NCCWD Connection | -- (c) | -- (c) | Harry Tracy | 84 (d) |

**Abbreviations:**
-- = Data were not available
NCCWD = North Coast County Water District
psi = pounds per square inch

**Notes:**
(a) Turnout information from *San Francisco Turnout Meter Reading Data,* provided by Mark Reinhart, personal communication, January 2006; from *City of San Bruno Water System Master Plan Update* , Brown & Caldwell, July 2001; and from personal communication with Martin Cardone, March 2006. See Figure 2 for turnout locations.
(b) Sunset Supply pipeline carries water from the Hetch Hetchy System. The San Andreas pipeline connects to the Harry P. Tracy Filtration Plant in San Mateo County.
(c) Data not applicable and/or available.
(d) Crystal Springs turnout has the capacity of 140 psi but is regulated down to 80 to 86 psi.

**Table 9**
**Number of Accounts and Water Consumption by**
**Customer Sector (Fiscal Year 2004-2005)**
City of San Bruno, California

| Customer Sector | | Metered Accounts | | Water Consumption (a) | |
|---|---|---|---|---|---|
| | | # of Accounts | % of Total | Consumption (MGD) | % of Total |
| Residential | Residential Single-Family | 10,283 | 83% | 1.96 | 54% |
| | Residential Multi-Family | 1,296 | 10% | 0.82 | 23% |
| | *Subtotal Residential* | *11,579* | 93% | *2.78* | *77%* |
| CII | Commercial | 625 | 5% | 0.46 | 13% |
| | Industrial | 3 | < 0.1% | < 0.01 | 0.1% |
| | Institutional | 60 | 0.5% | 0.06 | 2% |
| | *Subtotal CII* | *688* | 6% | *0.52* | *14%* |
| **Other (b)** | | *148* | 1% | *0.32* | 9% |
| **Total** | | **12,415** | **100%** | **3.61** | **100%** |

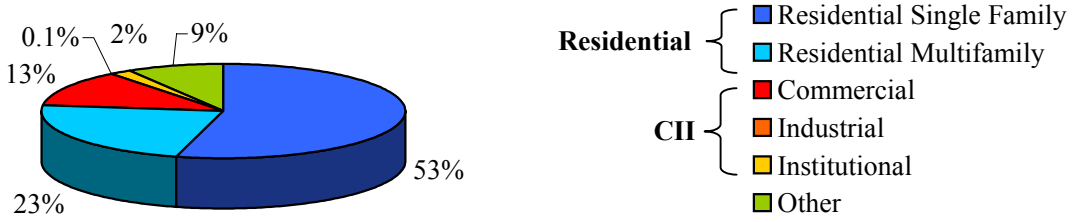
**Abbreviations:**
CII = Commercial, Industrial, and Institutional Customers
MGD = Millions of gallons per day

**Notes:**
(a) Water use and accounts were provided by the City's Financial Department.
(b) Accounts grouped into the "Other" sector include dedicated irrigation meters for commercial and institutional customers, as well as temporary meters, and water main flushing.

**Table 10**
**Current and Historical Water Demands**
City of San Bruno, California

| | Customer Sector | Annual Water Demands (MGD) (a) | | | | |
|---|---|---|---|---|---|---|
| | | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 |
| Residential | Residential Single Family | 2.12 | 2.09 | 2.07 | 2.11 | 1.96 |
| | Residential Multifamily | 0.88 | 0.84 | 0.82 | 0.82 | 0.82 |
| | *Total Residential* | *3.00* | *2.94* | *2.89* | *2.92* | *2.78* |
| CII | Commercial | 0.55 | 0.47 | 0.45 | 0.44 | 0.46 |
| | Industrial | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 |
| | Institutional | 0.08 | 0.09 | 0.07 | 0.07 | 0.06 |
| | *Total CII* | *0.64* | *0.57* | *0.52* | *0.52* | *0.52* |
| **Other** | | 0.36 | 0.32 | 0.31 | 0.39 | 0.32 |
| *Subtotal (b)* | | *4.00* | *3.83* | *3.73* | *3.83* | *3.61* |
| Unaccounted for water (c) | | 5% | 8% | 8% | 8% | 4% |
| **Total Water Demand (d)** | | 4.22 | 4.15 | 4.07 | 4.14 | 3.76 |

**Distribution of Water Consumption (FY 2004-05)**



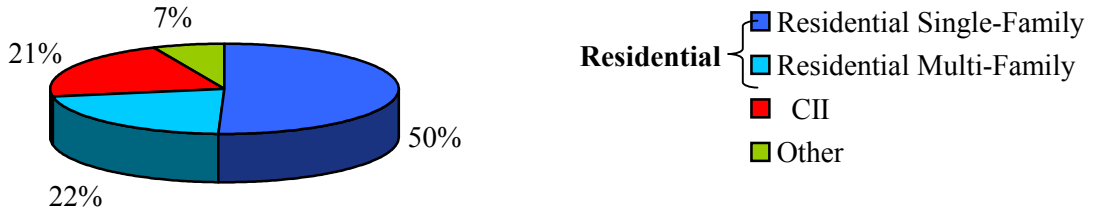

**Abbreviations:**
FY = Fiscal year
CII = Commercial, Industrial, and Institutional
MGD = Millions of gallons per day

**Notes:**
(a) Except where noted, demand values are reported in average millions of gallons per day for the fiscal years 2000-2001 through 2004-2005.
(b) Water use is recorded on a fiscal year basis by the City's Finance Department.
(c) Unaccounted for water is the quantity of water purchased less the known quantity of water used. Reported as a percent of the total water purchased.
(d) Total Water Demand is the sum of water consumed by customer accounts and the City's unaccounted for water. Total Water Demand is equal to the quantity of water purchased from San Francisco Public Utilities Commission and the North Coast County Water District, plus the quantity of groundwater extracted from City wells.

**Table 11**
**Future Water Demand Projections (a)**
City of San Bruno, California

| Customer Sector | | Projected Future Annual Water Demands (MGD) (b) | | | | |
|---|---|---|---|---|---|---|
| | | 2010 | 2015 | 2020 | 2025 | 2030 |
| Residential | Residential Single-Family | 2.12 | 2.10 | 2.08 | 2.07 | 2.07 |
| | Residential Multi-Family | 0.93 | 0.91 | 0.90 | 0.90 | 0.90 |
| | *Total Residential* | *3.05* | *3.01* | *2.98* | *2.97* | *2.97* |
| **CII** | | 0.66 | 0.71 | 0.76 | 0.81 | 0.86 |
| **Other** | | 0.25 | 0.26 | 0.26 | 0.27 | 0.27 |
| *Subtotal* | | *3.96* | *3.98* | *4.01* | *4.05* | *4.11* |
| Unaccounted for water (c) | | 8.6% | 8.5% | 8.5% | 8.5% | 8.5% |
| **Total Water Demand (d)** | | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |

**Distribution of Water Consumption (2030)**




**Abbreviations:**
CII = Commercial, Industrial, and Institutional
MGD = Millions of gallons per day

**Notes:**
(a) Projected water demands were estimated using the Decision Support System Model, developed for San Francisoc Public Utilities Commission's Water System Improvement Program (URS, 2005).
(b) Except where noted, demand values are reported in average millions of gallons per day for the years 2010 through 2030.
(c) Unaccounted for water is the quantity of water purchased less the known quantity of water used. Reported as a percent of the total water purchased.
(d) Total Water Demand is the sum of water consumed by customer accounts and the City's unaccounted for water. Total Water Demand is equal to the quantity of potable water purchased from San Francisco Public Utilities Commission and the North Coast County Water District, plus the quantity of groundwater extracted by City wells.

**Table 12**
**Current and Historical Water Supply**
City of San Bruno, California

| Measured Annual Water Supply (MGD) | | | | | | |
|---|---|---|---|---|---|---|
| | **Supply Source** | **2000 - 01** | **2001 - 02** | **2002 - 03** | **2003 - 04** | **2004 - 05** |
| **SFPUC (a)** | Tanforan (#010024-01-6) | 0.15 | 0.14 | 0.21 | 0.17 | 0.21 |
| | Rollingwood (#010026-01-1) | 0.97 | 0.75 | 0.62 | 0.68 | 0.65 |
| | Bayhill (#010025-01-3) | 0.24 | 0.44 | 0.74 | 0.82 | 0.67 |
| | Whitman (#010023-01-8) | 1.14 | 1.33 | 1.70 | 1.78 | 1.40 |
| | *Subtotal SFPUC Supply* | *2.50* | *2.66* | *3.27* | *3.44* | *2.94* |
| | *Supplemental Purchase(b)* | *0.00* | *0.00* | *0.94* | *1.22* | *1.38* |
| | **Normalized SFPUC Supply (b)** | 2.50 | 2.66 | 2.33 | 2.23 | 1.56 |
| **Groundwater (c)** | Well #15 | 0.45 | 0.35 | 0.17 | 0.12 | 0.02 |
| | Well #16 | 0.49 | 0.54 | 0.05 | 0.23 | 0.07 |
| | Well #17 | 0.11 | 0.26 | 0.14 | 0.10 | 0.09 |
| | Well #18 | 0.63 | 0.29 | 0.39 | 0.19 | 0.00 |
| | Well #20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.58 |
| | *Subtotal Groundwater* | *1.68* | *1.45* | *0.75* | *0.65* | *0.77* |
| | *Supplemental Purchase(b)* | *0.00* | *0.00* | *0.94* | *1.22* | *1.38* |
| | **Normalized Groundwater Supply (b)** | 1.68 | 1.45 | 1.70 | 1.86 | 2.15 |
| **NCCWD (Crystal Terrace)** | | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 |
| **Total Water Supply** | | 4.22 | 4.15 | 4.07 | 4.14 | 3.76 |

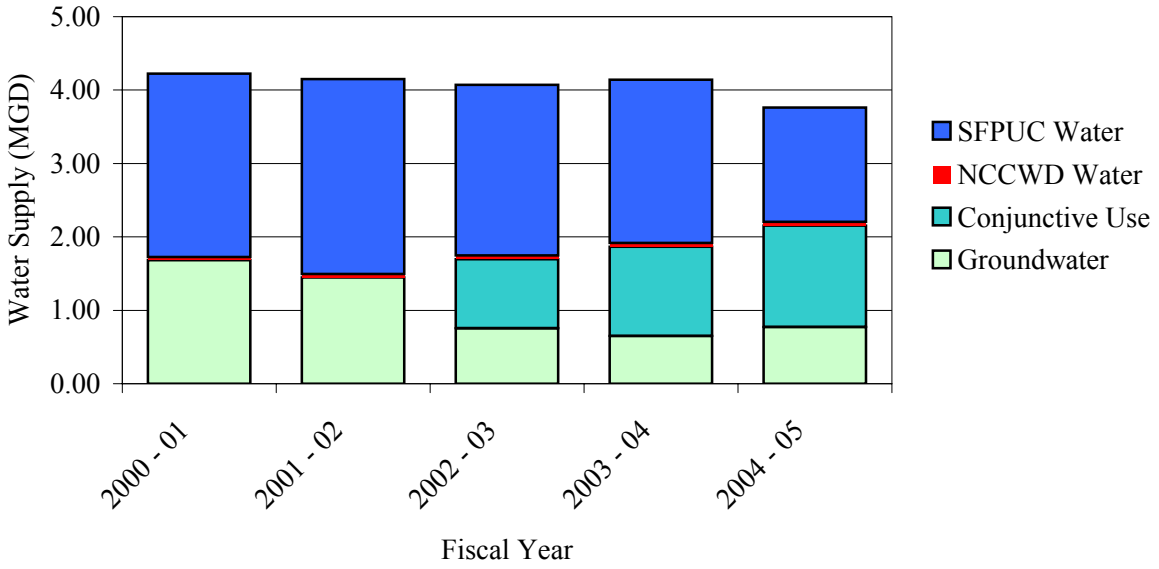


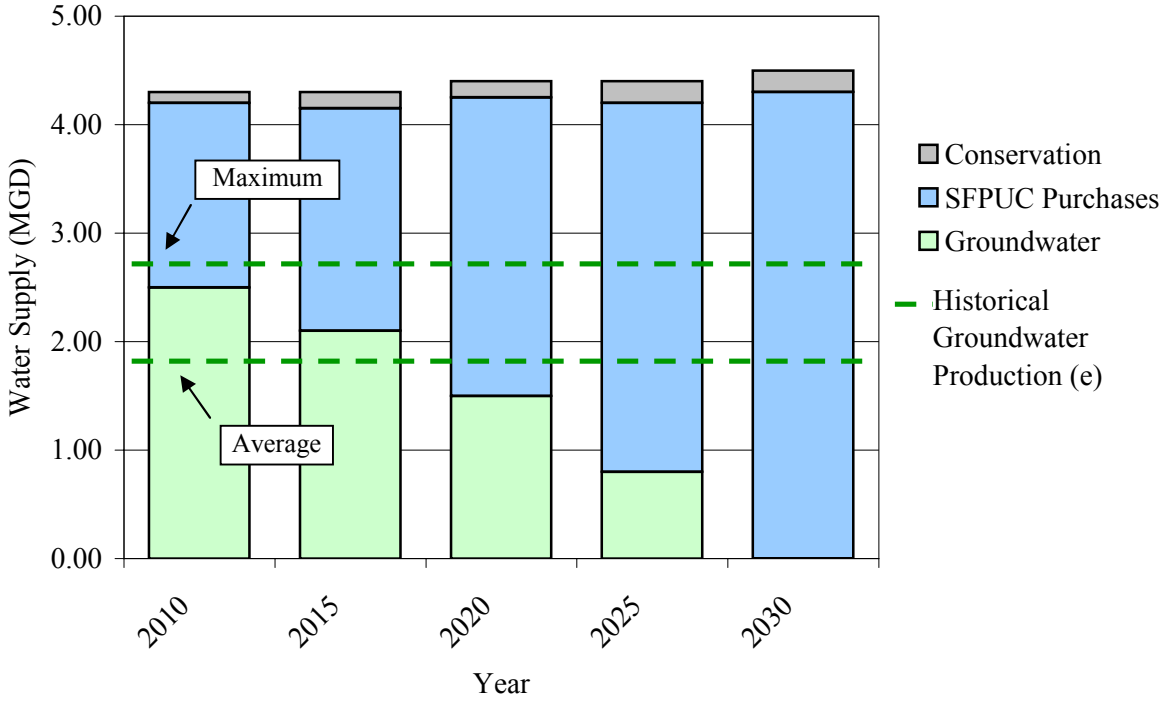
**Table 12**
**Current and Historical Water Supply**
City of San Bruno, California

**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
SFPUC = San Francisco Public Utilities Commision

**Notes:**
(a) SFPUC water supply data were provided by Mark Reinhardt from the City of San Bruno Public Works Department, January 2006.
(b) As part of the regional Conjunctive Use Pilot Program, San Bruno purchased "supplemental" surface water from SFPUC, above and beyond its normal purchases, during fiscal year ("FY") 2002-03 through FY 2004-05. In the absence of the Conjunctive Use Pilot Project this water would have been supplied by San Bruno's groundwater wells and not by SFPUC. Therefore, this table presents "normalized" SFPUC and Groundwater Supply estimates that include the City's supplemental SFPUC purchases as a groundwater supply rather than part of the SFPUC supply.
(c) Annual groundwater production is based on the average flow recorded daily at each well by the San Bruno Public Works Department.

**Table 13**
**Projected Future Water Supply**
City of San Bruno, California

| Supply Source | Projected Annual Water Supply (MGD) | | | | |
|---|---|---|---|---|---|
| | 2010 | 2015 | 2020 | 2025 | 2030 |
| SFPUC Purchases (a) (b) | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 |
| Groundwater Production (c) | 2.50 | 2.10 | 1.50 | 0.80 | 0.00 |
| *Subtotal Water Supply* | *4.20* | *4.15* | *4.25* | *4.20* | *4.30* |
| Conservation Savings (d) | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply** | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
SFPUC = San Francisco Public Utilities Commision

**Table 13**
**Projected Future Water Supply**
City of San Bruno, California

**Notes:**

(a) SFPUC purchase projections are equal to the quantity of wholesale water projected to be available to San Bruno in the future, as noted in SFPUC's letter to San Bruno, dated 1 June 2005 (Appendix C). The City does not anticipate purchasing all of its water from SFPUC in the future, however since SFPUC has indicated that these supplies will be available, they are shown here for planning purposes.

(b) Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

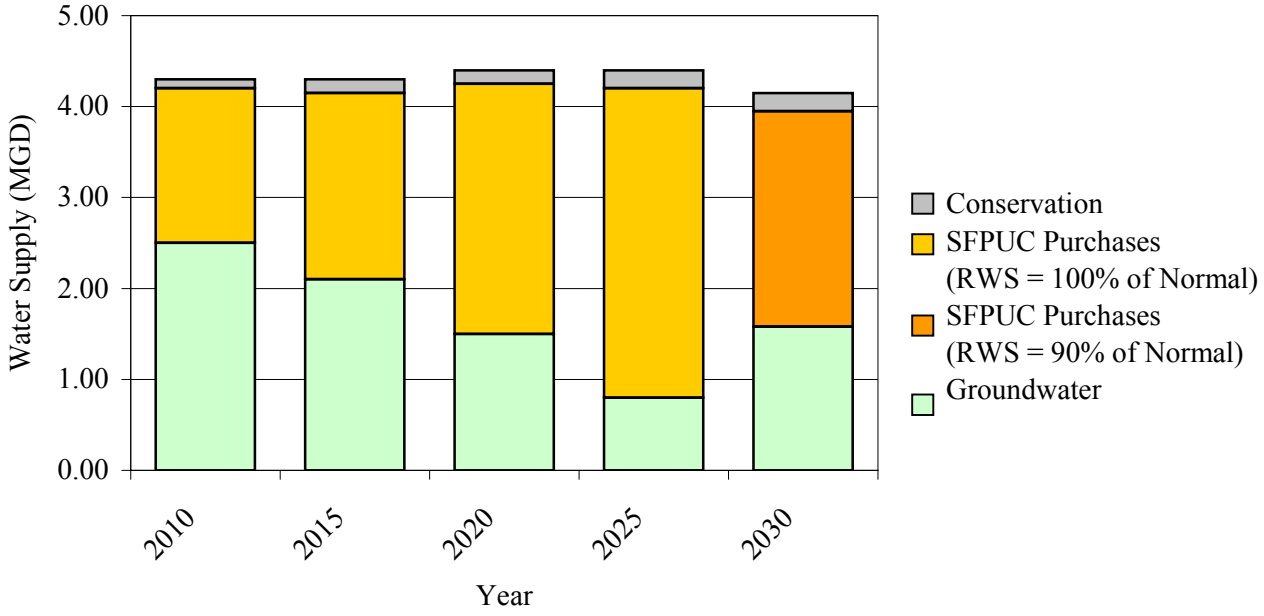
(c) For planning purposes, a total cessation of groundwater by 2030 is shown above. These are the same projections used in SFPUC's Water System Reliability Model and are based on information provided by San Bruno on 18 April 2005. Despite the apparent cessation of groundwater production, San Bruno plans on maintaining its groundwater production capacity and utilizing groundwater supplies in the future and retains the right to extract groundwater equal to the City's historical baseline quantity.

(d) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

(e) The Historical Groundwater Production represents the City's average and maximum groundwater production from 1949 through 2005 (2.7 MGD and 1.8 MGD, respectively). This average includes water purchased as part of the Conjunctive Use Pilot Program.

**Table 14**
**Projected Single Dry Year Water Supply (a)**
City of San Bruno, California

| Supply Source | Projected Annual Water Supply (MGD) | | | | |
|---|---|---|---|---|---|
| | **2010** | **2015** | **2020** | **2025** | **2030** |
| SFPUC Purchases (b) (c) | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 |
| Groundwater Production (d) | 2.50 | 2.10 | 1.50 | 0.80 | 1.58 |
| *Subtotal Water Supply* | *4.20* | *4.15* | *4.25* | *4.20* | *3.95* |
| Conservation Savings (e) | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply** | 4.3 | 4.3 | 4.4 | 4.4 | 4.1 |




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
RWS = Regional Water System
SFPUC = San Francisco Public Utilities Commision

**Table 14**
**Projected Single Dry Year Water Supply (a)**
City of San Bruno, California

**Notes:**

(a) A single dry year is defined herein as any year in which precipitation is equal to precipitation in 1987, the design single dry year based on the historical rainfall record from 1920 through 2002.

(b) SFPUC purchases are equal to the quantity of wholesale water available to San Bruno, as projected by SFPUC in their 1 June 2005 letter to San Bruno regarding water supply reliability. Projections are based on SFPUC's Water System Reliability Model and the assumed renewal of the Interim Water Shortage Allocation Plan, which is set to expire in 2009.

(c) NCCWD's 2005 Urban Water Management Plan estimates a single dry year supply reduction of 6.6% (NCCWD, 2005). Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

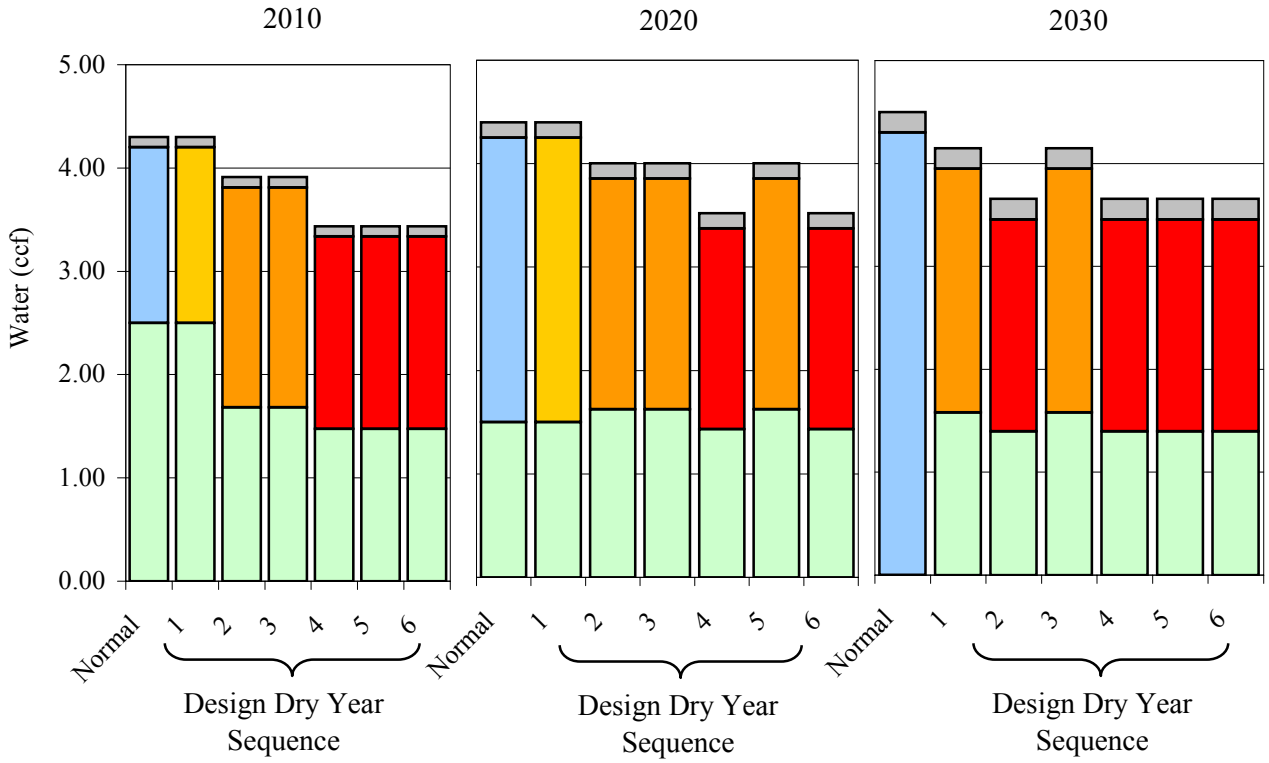
(d) The projected quantity of groundwater extracted by San Bruno in a single dry year is estimated based on SFPUC's projection of the availability of wholesale water and San Bruno's projected total demand. The City's groundwater production in any given year is projected such that San Bruno's total water supply cutbacks are equal to the total cutbacks to the Regional Water System (up to 10% in 2030). The City retains the right to extract groundwater equal to the historical baseline quantity.

(e) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

**Table 15**
**Projected Multiple Dry Year Water Supply (a)**
City of San Bruno, California

| Design Drought Year | SFPUC Purchases (MGD) (b) (c) | | | | |
|---|---|---|---|---|---|
| | 2010 (d) | 2015 (d) | 2020 | 2025 | 2030 |
| Normal | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 |
| 1 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 |
| 2 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 |
| 3 | 2.13 | 2.16 | 2.23 | 2.30 | 2.37 |
| 4 | 1.86 | 2.16 | 1.94 | 2.00 | 2.06 |
| 5 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 |
| 6 | 1.86 | 1.88 | 1.94 | 2.00 | 2.06 |
| **Groundwater Production (MGD) (e)** | | | | | |
| Normal | 2.50 | 2.10 | 1.50 | 0.80 | 0.00 |
| 1 | 2.50 | 2.10 | 1.50 | 0.80 | 1.58 |
| 2 | 1.68 | 1.66 | 1.62 | 1.60 | 1.40 |
| 3 | 1.68 | 1.66 | 1.62 | 1.60 | 1.58 |
| 4 | 1.48 | 1.66 | 1.43 | 1.41 | 1.40 |
| 5 | 1.48 | 1.66 | 1.62 | 1.41 | 1.40 |
| 6 | 1.48 | 1.47 | 1.43 | 1.41 | 1.40 |
| **Conservation Savings (MGD) (f)** | | | | | |
| All Years | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply (MGD)** | | | | | |
| Normal | 4.2 | 4.2 | 4.3 | 4.2 | 4.3 |
| 1 | 4.2 | 4.2 | 4.3 | 4.2 | 3.9 |
| 2 | 3.8 | 3.8 | 3.9 | 3.9 | 3.5 |
| 3 | 3.8 | 3.8 | 3.9 | 3.9 | 3.9 |
| 4 | 3.3 | 3.8 | 3.4 | 3.4 | 3.5 |
| 5 | 3.3 | 3.8 | 3.9 | 3.4 | 3.5 |
| 6 | 3.3 | 3.3 | 3.4 | 3.4 | 3.5 |

**Table 15**
**Projected Multiple Dry Year Water Supply (a)**
City of San Bruno, California




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
RWS = Regional Water System
SFPUC = San Francisco Public Utilities Commision

- Conservation
- SFPUC Purchases - Normal Year
- SFPUC Purchases - Dry Year (RWS = 100% of Normal)
- SFPUC Purchases - Dry Year (RWS = 90% of Normal)
- SFPUC Purchases - Dry Year (RWS = 80% of Normal)
- Groundwater

**Notes:**
(a) A multiple dry year period is defined herein as any consecutive years where precipitation is equal to precipitation in 1987 through 1992, the design multiple year drought based on the historical rainfall record from 1920 through 2002.
(b) SFPUC purchases are equal to the quantity of wholesale water available to San Bruno, as projected by SFPUC in their 1 June 2005 letter to San Bruno regarding water supply reliability. Projections are based on SFPUC's Water System Reliability Model and the assumed renewal of the Interim Water Shortage Allocation Plan, which is set to expire in 2009.

**Table 15**
**Projected Multiple Dry Year Water Supply (a)**
City of San Bruno, California

**Notes Continued:**

(c) NCCWD's 2005 Urban Water Management Plan estimates multiple dry year supply cutbacks of 6.6% to 18.8% (NCCWD, 2005). Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

(d) Because San Bruno currently utilizes only a portion of its HHSA (an average of 70% in the last five years), SFPUC's Water Reliability Model allocates San Bruno a greater quantity of water during certain dry years (10% cutback in total Regional System supplies for 2010 and 2015) than the City's projected normal year supply. The City retains the right to extract groundwater equal to the historical baseline quantity.

(e) The projected quantity of groundwater extracted by San Bruno in a single dry year is estimated based on SFPUC's projection of the availability of wholesale water and San Bruno's projected total demand. The City's groundwater production in any given year is projected such that San Bruno's total water supply cutbacks are equal to the total cutbacks to the Regional Water System (up to 20% in 2030).

(f) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

## Table 16

## Recycled Water Uses Allowed in California under California Code of Regulations, Title 22, Division 4, Chapter 3 (a)

City of San Bruno, California

| | Treatment Level | | | | |
|---|---|---|---|---|---|
| | Disinfected Tertiary Recycled Water | Disinfected Secondary-2.2 Recycled Water | Disinfected Secondary-23 Recycled Water | Undisinfected Secondary Recycled Water | Other |
| **IRRIGATION** | | | | | |
| • Food crops where recycled water contacts the edible portion of the crop, including all root crops<br>• Parks and playgrounds<br>• School yards<br>• Residential landscaping<br>• Unrestricted access golf courses<br>• Any other irrigation uses not prohibited by other provisions of the California Code of Regulations | Allowed | Not allowed | Not allowed | Not allowed | Coagulation unnecessary provided filter effluent turbidity ≤ 2 NTU, turbidity of influent is continuously measured, influent turbidity > 5 NTU for ≤ 15 min and never > 10 NTU, and that there is capability to automatically activate chemical addition or divert the wastewater if the filter influent turbidity > 5 NTU for > 15 min. |
| • Food crops where edible portion is produced above-ground and not contacted by recycled water | Allowed | Allowed | Not allowed | Not allowed | -- |
| • Cemeteries<br>• Freeway landscaping<br>• Restricted access golf courses<br>• Ornamental nursery stock and sod farms where access by general public is not restricted<br>• Pasture for animals producing milk for human consumption<br>• Nonedible vegetation with access control to prevent use as a park, playground or school yard | Allowed | Allowed | Allowed | Not allowed | -- |
| • Orchards with no contact between edible portion and recycled water<br>• Vineyards with no contact between edible portion and recycled water | Allowed | Allowed | Allowed | Allowed | -- |

## Table 16

## Recycled Water Uses Allowed in California under California Code of Regulations, Title 22, Division 4, Chapter 3 (a)

City of San Bruno, California

| | Treatment Level | | | | |
|---|---|---|---|---|---|
| | Disinfected Tertiary Recycled Water | Disinfected Secondary-2.2 Recycled Water | Disinfected Secondary-23 Recycled Water | Undisinfected Secondary Recycled Water | Other |
| **IRRIGATION (continued)** | | | | | |
| • Non food-bearing trees, including Christmas tree farms not irrigated less than 14 days before harvest and restricting access to the public<br>• Fodder and fiber crops and pasture for animals not producing milk for human consumption<br>• Seed crops not eaten by humans<br>• Food crops that undergo commercial pathogen-destroying processing before consumption by humans<br>• Ornamental nursery stock and sod farms not irrigated less than 14 days before harvest, retail sale, or allowing access by the general public | Allowed | Allowed | Allowed | Allowed | -- |
| **COOLING AND AIR CONDITIONING** | | | | | |
| • Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist | Allowed (c) | Not allowed | Not allowed | Not allowed | If the cooling system uses a cooling tower or otherwise creates a mist that could come into contact with employees or the public, it shall also comply with the following:<br>a) a drift eliminator shall be used whenever the cooling system is in operation.<br>b) a chlorine, or other biocide, shall be used to treat the cooling system recirculating water. |
| • Industrial or commercial cooling or air conditioning not involving a cooling tower, evaporative condenser, or spraying that creates a mist | Allowed | Allowed | Allowed | Not allowed | -- |

## Table 16

## Recycled Water Uses Allowed in California under California Code of Regulations, Title 22, Division 4, Chapter 3 (a)

City of San Bruno, California

| | Treatment Level | | | | |
|---|---|---|---|---|---|
| | Disinfected Tertiary Recycled Water | Disinfected Secondary-2.2 Recycled Water | Disinfected Secondary-23 Recycled Water | Undisinfected Secondary Recycled Water | Other |
| **IMPOUNDMENT** | | | | | |
| • Non-restricted recreational impoundments, with supplemental monitoring for pathogenic organisms | Allowed (b) | Not allowed | Not allowed | Not allowed | 1) Total coliform bacteria, measured at a point between the disinfection process and the point of entry to use impoundment must have a:<br>a) median concentration ≤ MPN of 2.2 per 100 mL over last 7 days; AND<br>b) total ≤ 23 per 100 mL in all but one sample in a 30-day period.<br>2) a) Conventional tertiary treatment OR<br>b) Monitored for presence of pathogenic organisms in accordance with the following:<br>1) Sampled and analyzed monthly for Giardia, enteric viruses, and Cryptosporidium during first 12 months of operation and use.<br>Sampled and analyzed quarterly thereafter. Sampling may be discontinued after two years.<br>2) Samples shall be taken at a point following disinfection and prior to the point where the recycled water enters the use impoundment. Results shall be submitted quarterly to the regulatory agency. |
| • Restricted recreational impoundments and publicly accessible fish hatcheries | Allowed | Allowed | Not allowed | Not allowed | -- |
| • Landscape impoundments without decorative fountains | Allowed | Allowed | Allowed | Not allowed | -- |

## Table 16

## Recycled Water Uses Allowed in California under California Code of Regulations, Title 22, Division 4, Chapter 3 (a)

City of San Bruno, California

| | Treatment Level | | | | |
|---|---|---|---|---|---|
| | Disinfected Tertiary Recycled Water | Disinfected Secondary-2.2 Recycled Water | Disinfected Secondary-23 Recycled Water | Undisinfected Secondary Recycled Water | Other |
| **OTHER USES** | | | | | |
| • Groundwater recharge | Allowed under special case-by-case permits by RWQCBs (d) | | | | |
| • Flushing toilets and urinals<br>• Priming drain traps<br>• Industrial process water that may contact workers<br>• Structural firefighting<br>• Decorative fountains<br>• Commercial laundries<br>• Consolidation of backfill around potable water pipelines<br>• Artificial snow making for commercial outdoor use<br>• Commercial car washes, including hand washes if the recycled water is not heated, where the general public is excluded from the washing process. | Allowed | Not allowed | Not allowed | Not allowed | Coagulation unnecessary provided filter effluent turbidity < 2 NTU, turbidity of influent is continuously measured, influent turbidity > 5 NTU for < 15 min and never > 10 NTU, and that there is capability to automatically activate chemical addition or divert the wastewater if the filter influent turbidity > 5 NTU for > 15 min. |
| • Industrial boiler feed<br>• Nonstructural fire fighting<br>• Backfill consolidation around non-potable piping<br>• Soil compaction<br>• Mixing concrete<br>• Dust control on roads and streets<br>• Cleaning roads, sidewalks and outdoor work areas<br>• Industrial process water that will not come into contact with workers | Allowed | Allowed | Allowed | Not allowed | -- |
| • Flushing sanitary sewers | Allowed | Allowed | Allowed | Allowed | -- |

**Table 16**

**Recycled Water Uses Allowed in California under California Code of Regulations, Title 22, Division 4, Chapter 3 (a)**

City of San Bruno, California

**Abbreviations:**

-- Data not available or not applicable
min = Minutes
mL = Milliliters
MPN = Most probable number
NTU = Nephelometric turbidity units
RWQCB = Regional Water Quality Control Board

**Notes:**

(a) Summary from the Title-22 California Water Recycling Criteria (June 2001).
(b) With "conventional tertiary treatment" additional monitoring for two years or more is necessary with direct filtration.
(c) Drift Eliminators and/or biocides are required if public or employees can be exposed to mist.
(d) Refer to Draft Groundwater Recharge Reuse Guidelines, California Department of Health Services (December 2004).

## Table 17
## Historical, Current, and Projected Wastewater Flows
City of San Bruno, California

| | Wastewater Flows (MGD) (a) (b) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2010** | **2015** | **2020** | **2025** | **2030** |
| Dry Weather Flows (MGD) (c) | 2.98 | 2.68 | 2.84 | 2.79 | 2.85 | 2.91 | 3.27 | 3.27 | 3.34 | 3.34 | 3.42 |
| COD (lbs/day) | 12,098 | 12,195 | 14,815 | 11,992 | 11,593 | 11,745 | -- | -- | -- | -- | -- |
| Solids (lbs/day) | 6,554 | 6,254 | 8,173 | 6,369 | 6,343 | 6,663 | -- | -- | -- | -- | -- |

**Abbreviations:**

COD = Chemical oxygen demand
MGD = millions of gallons per day
lbs/day = pounds per day
-- = Data not available and/or applicable

**Notes:**

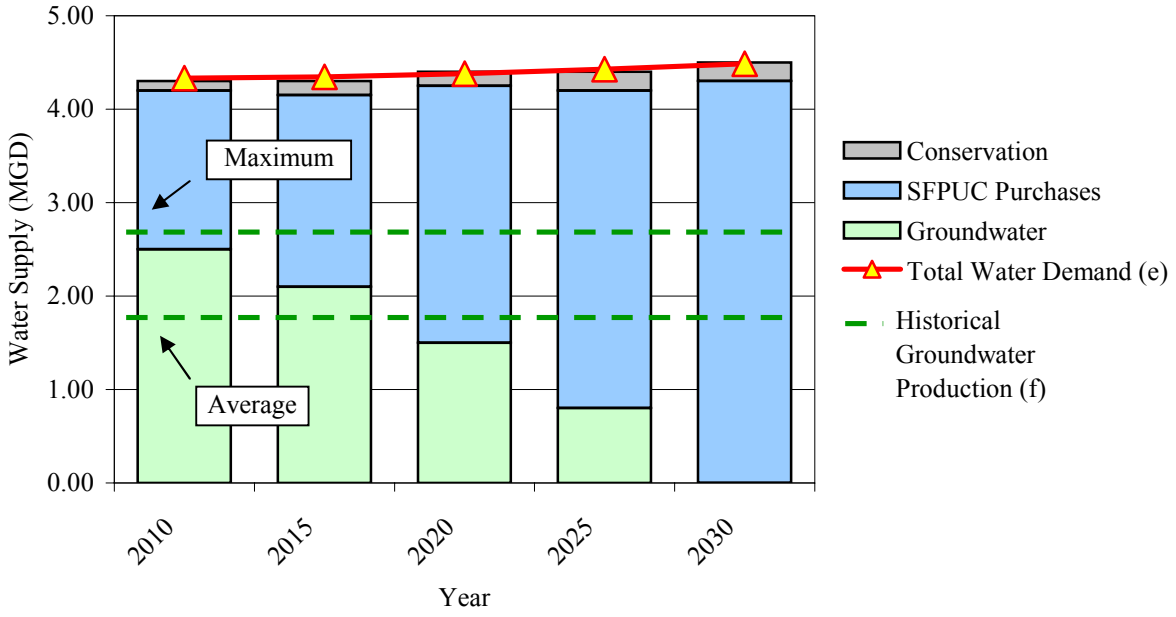
(a) Wastewater data from 2000 through 2005 were provided by the South San Francisco-San Bruno Water Quality Control Plant Superintendent, Dave Castagnola. On average, dry weather flows between 1996 and 2005 were equal to 76% of the total water consumption for that same year. Projected dry weather flows from 2010 through 2030 are equal to 76% of San Bruno's total projected water demand (see Table 11).

(b) San Bruno currently owns capacity rights to an average dry weather flow of 3.8 MGD at the South San Francisco-San Bruno Water Quality Control Plant. Based on the historical relationship between the City's wastewater flows and water consumption, San Bruno does not expect to exceed its capacity rights by the year 2030.

(c) Average daily dry weather flow is from June 1 through October 31 of each year.

**Table 18**
**Projected Normal Year Water Supply Versus Demand**
City of San Bruno, California

| Supply Source | Projected Annual Water Supply and Demand (MGD) | | | | |
|---|---|---|---|---|---|
| | **2010** | **2015** | **2020** | **2025** | **2030** |
| SFPUC Purchases (a) (b) | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 |
| Groundwater Production (c) | 2.50 | 2.10 | 1.50 | 0.80 | 0.00 |
| *Subtotal Water Supply* | *4.20* | *4.15* | *4.25* | *4.20* | *4.30* |
| Conservation Savings (d) | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply** | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |
| **Total Water Demand (e)** | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
SFPUC = San Francisco Public Utilities Commision

**Table 18**
**Projected Normal Year Water Supply Versus Demand**
City of San Bruno, California

**Notes:**

(a) SFPUC purchase projections are equal to the quantity of wholesale water projected to be available to San Bruno in the future, as noted in SFPUC's letter to San Bruno, dated 1 June 2005 (Appendix C). The City does not anticipate purchasing all of its water from SFPUC in the future, however since SFPUC has indicated that these supplies will be available, they are shown here for planning purposes.

(b) Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

(c) For planning purposes, a total cessation of groundwater by 2030 is shown above. These are the same projections used in SFPUC's Water System Reliability Model and are based on information provided by San Bruno on 18 April 2005. Despite the apparent cessation of groundwater production, San Bruno plans on maintaining its groundwater production capacity and utilizing groundwater supplies in the future and retains the right to extract groundwater equal to the City's historical baseline quantity.

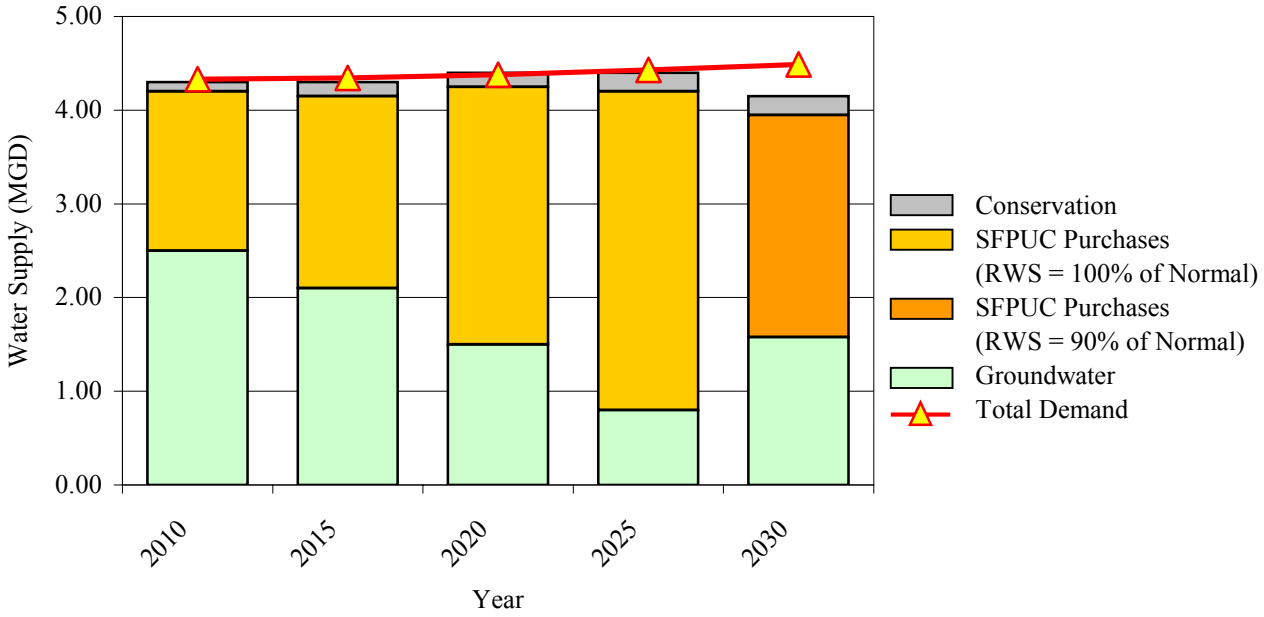
(d) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

(e) Total water demand is described in Table 11.

(f) The Historical Groundwater Production represents the City's average and maximum groundwater production from 1949 through 2005 (2.7 MGD and 1.8 MGD, respectively). This average includes water purchased as part of the Conjunctive Use Pilot Program.

**Table 19**
**Projected Single Dry Year Water Supply Versus Demand (a)**
City of San Bruno, California

| Supply Source | Projected Annual Water Supply and Demand (MGD) | | | | |
|---|---|---|---|---|---|
| | **2010** | **2015** | **2020** | **2025** | **2030** |
| SFPUC Purchases (b) (c) | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 |
| Groundwater Production (d) | 2.50 | 2.10 | 1.50 | 0.80 | 1.58 |
| *Subtotal Water Supply* | *4.20* | *4.15* | *4.25* | *4.20* | *3.95* |
| Conservation Savings (e) | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply** | 4.3 | 4.3 | 4.4 | 4.4 | 4.1 |
| **Total Water Demand (f)** | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |




**Abbreviations:**

MGD = Millions of gallons per day
NCCWD = North Coast County Water District
RWS = Regional Water System
SFPUC = San Francisco Public Utilities Commision

**Table 19**
**Projected Single Dry Year Water Supply Versus Demand (a)**
City of San Bruno, California

**Notes:**

(a) A single dry year is defined herein as any year in which precipitation is equal to precipitation in 1987, the design single dry year based on the historical rainfall record from 1920 through 2002.

(b) SFPUC purchases are equal to the quantity of wholesale water available to San Bruno, as projected by SFPUC in their 1 June 2005 letter to San Bruno regarding water supply reliability. Projections are based on SFPUC's Water System Reliability Model and the assumed renewal of the Interim Water Shortage Allocation Plan, which is set to expire in 2009.

(c) NCCWD's 2005 Urban Water Management Plan estimates a single dry year supply reduction of 6.6% (NCCWD, 2005). Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

(d) The projected quantity of groundwater extracted by San Bruno is based on the availability of wholesale water and San Bruno's total demand, such that local supply cutbacks are equal to the total cutbacks to the Regional Water System (up to 10% in 2030). The City retains the right to extract groundwater equal to the historical baseline quantity.

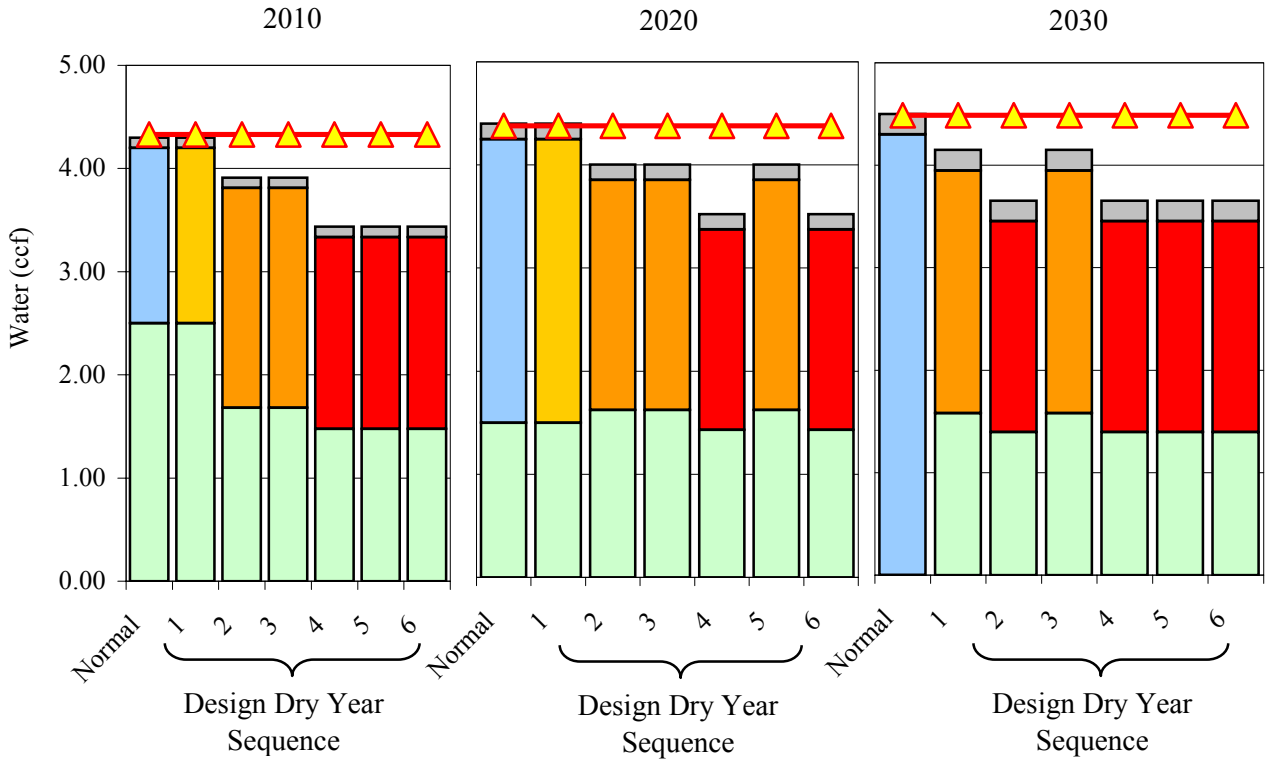
(e) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

(f) Total water demand is described in Table 11.

**Table 20**
**Projected Multiple Dry Year Water Supply Versus Demand (a)**
City of San Bruno, California

| Design Drought Year | SFPUC Purchases (MGD) (b) (c) | | | | |
|---|---|---|---|---|---|
| | 2010 (d) | 2015 (d) | 2020 | 2025 | 2030 |
| Normal | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 |
| 1 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 |
| 2 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 |
| 3 | 2.13 | 2.16 | 2.23 | 2.30 | 2.37 |
| 4 | 1.86 | 2.16 | 1.94 | 2.00 | 2.06 |
| 5 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 |
| 6 | 1.86 | 1.88 | 1.94 | 2.00 | 2.06 |
| **Groundwater Production (MGD) (e)** | | | | | |
| Normal | 2.50 | 2.10 | 1.50 | 0.80 | 0.00 |
| 1 | 2.50 | 2.10 | 1.50 | 0.80 | 1.58 |
| 2 | 1.68 | 1.66 | 1.62 | 1.60 | 1.40 |
| 3 | 1.68 | 1.66 | 1.62 | 1.60 | 1.58 |
| 4 | 1.48 | 1.66 | 1.43 | 1.41 | 1.40 |
| 5 | 1.48 | 1.66 | 1.62 | 1.41 | 1.40 |
| 6 | 1.48 | 1.47 | 1.43 | 1.41 | 1.40 |
| **Conservation Saving (MGD) (f)** | | | | | |
| All Years | 0.10 | 0.15 | 0.15 | 0.20 | 0.20 |
| **Total Water Supply (MGD)** | | | | | |
| Normal | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |
| 1 | 4.3 | 4.3 | 4.4 | 4.4 | 4.1 |
| 2 | 3.9 | 4.0 | 4.0 | 4.1 | 3.7 |
| 3 | 3.9 | 4.0 | 4.0 | 4.1 | 4.1 |
| 4 | 3.4 | 4.0 | 3.5 | 3.6 | 3.7 |
| 5 | 3.4 | 4.0 | 4.0 | 3.6 | 3.7 |
| 6 | 3.4 | 3.5 | 3.5 | 3.6 | 3.7 |
| **Total Water Demand (MGD) (g)** | | | | | |
| Normal | 4.3 | 4.3 | 4.4 | 4.4 | 4.5 |

**Table 20**
**Projected Multiple Dry Year Water Supply Versus Demand (a)**
City of San Bruno, California




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
RWS = Regional Water System
SFPUC = San Francisco Public Utilities Commision

- Conservation
- SFPUC Purchases - Normal Year
- SFPUC Purchases - Dry Year (RWS = 100% of Normal)
- SFPUC Purchases - Dry Year (RWS = 90% of Normal)
- SFPUC Purchases - Dry Year (RWS = 80% of Normal)
- Groundwater

**Notes:**
(a) A multiple dry year period is defined herein as any consecutive years where precipitation is equal to precipitation in 1987 through 1992, the design multiple year drought based on the historical rainfall record from 1920 through 2002.
(b) SFPUC purchases are equal to the quantity of wholesale water available to San Bruno, as projected by SFPUC in their 1 June 2005 letter to San Bruno regarding water supply reliability. Projections are based on SFPUC's Water System Reliability Model and the assumed renewal of the Interim Water Shortage Allocation Plan, which is set to expire in 2009.

**Table 20**
**Projected Multiple Dry Year Water Supply Versus Demand (a)**
City of San Bruno, California

**Notes Continued:**

(c) NCCWD's 2005 Urban Water Management Plan estimates multiple dry year supply cutbacks of 6.6% to 18.8% (NCCWD, 2005). Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

(d) Because San Bruno currently utilizes only a portion of its HHSA (an average of 70% in the last five years), SFPUC's Water Reliability Model allocates San Bruno a greater quantity of water during certain dry years (10% cutback in total Regional System supplies for 2010 and 2015) than the City's projected normal year supply. The City retains the right to extract groundwater equal to the historical baseline quantity.

(e) The projected quantity of groundwater extracted by San Bruno is based on the availability of wholesale water and San Bruno's total demand, such that local supply cutbacks are equal to the total cutbacks to the total cutbacks to the Regional Water System (up to 20%).

(f) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

(g) Total water demand is described in Table 11.

**Table 21**
**Monthly Water Rates and Service Charges**
City of San Bruno, California

| | Customer Type | Fiscal Year | | | | |
|---|---|---|---|---|---|---|
| | | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 |
| Rates (a) | CII / RMF - Base | $2.26 | $2.44 | $2.54 | $2.67 | $2.92 |
| | RSF - Base | -- | $2.32 | $2.43 | $2.55 | $2.75 |
| | RSF - Excess | -- | $2.98 | $3.08 | $3.21 | $3.72 |
| | **Meter Size (in)** | | | | | |
| Service Charges | 3/4" | $6.66 | $7.10 | $7.24 | $7.45 | $7.90 |
| | 1" | $11.12 | $11.12 | $11.12 | $11.12 | $11.12 |
| | 1.5" | $22.25 | $22.25 | $22.25 | $22.25 | $22.25 |
| | 2" | $35.59 | $35.59 | $35.59 | $35.59 | $35.59 |
| | 4" | $71.19 | $71.19 | $71.19 | $71.19 | $76.10 |
| | 6" | $222.46 | $126.29 | $131.98 | $138.70 | $148.66 |
| | 8" | $400.43 | $224.60 | $234.86 | $246.95 | $264.75 |
| | 10" | $488.46 | $359.77 | $376.32 | $395.80 | $395.80 |
| | 12" | $272.94 | $0.00 | $0.00 | $0.00 | $0.00 |

**Abbreviations:**
-- = Data not available and/or applicable
in = inches
CII = Commercial, Industrial, and Institutional accounts
RMF = Residential: Multi-family accounts
RSF = Residential: Single-family accounts

**Notes:**
(a) Rates are per 100 cubic feet of water used.

**Table 22**
**High Efficiency Clothes Washer Rebates**
City of San Bruno, California

| Clothes Washer Rebates (a) | Fiscal Year | | Total |
|---|---|---|---|
| | 2004 - 05 | 2006 - 07 (b) | |
| *Level 1(c)* | | | |
| No. of Washers | 48 | 10 | 58 |
| Washer Rebate Cost (d) | $3,600 | $1,000 | $4,600 |
| *Level 2 (c)* | | | |
| No. of Washers | 119 | 74 | 193 |
| Washer Rebate Cost (e) | $17,850 | $14,800 | $32,650 |
| **Total Cost of Rebates** | **$21,450** | **$15,800** | **$37,250** |
| **Cost to San Bruno** | **$10,725** | **$7,900** | **$18,625** |

**Abbreviations**
No. = Number

**Notes:**
(a) Based on data from the Bay Area Water Service and Conservation Agency (March 2006).
(b) Rebates given as of March 2006.
(c) Qualified clothes washers are included in Appendix G.
(d) Level 1 machines received $75 rebates for 2004-05 and $100 rebates for 2006-07, limited to one machine per household.
(e) Level 2 machines received $150 rebates for 2004-05 and $200 rebates for 2006-07, limited to one machine per household.

**Table 23**
**Water Shortage Contingency Plan Stages of Action (a)**
City of San Bruno, California

| Stage of Action | Supply Reduction | Demand Reduction Goal | Reduction Methods |
|---|---|---|---|
| **Stage I** | 5% - 10% (b) | 10% | • Voluntary Stage<br>○ Declare water alert conditions<br>○ Encourage voluntary conservation<br>○ Launch public information campaign (e.g., literature, speakers, bill inserts, newspaper messages, school educations programs, and a toll-free conservation "hotline".) |
| **Stage II** | 10% - 20% (b) | 20% | • Mandatory Conservation Stage<br>○ Continue aggressive public information campaign<br>○ Voluntary allotments of 10% to 20% reduction per user<br>○ City Council pass mandatory conservation ordinance<br>○ Mandatory conservation measures implemented |
| **Stage III** | 20%- 35% (c) | 35% | • Rationing Stage<br>○ Mandatory conservation measures continued<br>○ Rate changes implemented to penalize excess use<br>○ Mandatory allotments and reductions implemented<br>○ Monitor water use for compliance |
| **Stage IV** | 35% - 50% (d) | 50% | • Intense Rationing Stage<br>○ Mandated allotments and reductions<br>○ Mandatory conservation measures aggresively enforced |

**Abbreviations:**
BAWSCA = Bay Area Water Supply and Conservation Agency

**Notes:**
(a) Stages of Action are summarized from the *City of San Bruno Urban Water Management Plan 2001 Update,* Brown& Caldwell, 2001.
(b) SFPUC anticipates a system-wide supply reduction of 10% during a single dry year period or in the first year of a multiple dry year period, which is equal to a 12% reduction in BAWSCA's total supply.
(c) SFPUC anticipates a system-wide supply reduction of 20% during the latter years of a multiple dry year period, which is equal to a 23% reduction in BAWSCA's total supply.
(d) The Urban Water Management Plan Act mandates that the City consider a 50% supply reduction.

**Table 24**
**Mandatory Conservation Policy - Summary of Nonessential Uses (a)**
City of San Bruno, California

| | |
|---|---|
| A | The watering of grass, lawn, groundcover, shrubbery, open ground crops and trees, in a manner that results in runoff into sidewalks, gutters and streets; |
| B | The watering of grass, lawn, groundcover, shrubbery, and trees, between 7:00 am to 7:00 pm; |
| C | The escape of water through leaks, breaks, or malfunction within the water user's plumbing or distribution system for any period of time within which such break or leak should reasonably have been discovered and corrected; (b) |
| D | The use of hoses not having automatic shut-off devices for the washing of cars, boats, trailers or other vehicles; |
| E | The use of water from a hose for the cleaning of buildings, structures, walkways, sidewalks, driveways, patios, parking lots or hard-surfaced areas; |
| F | The operation of a car wash using water from the City's domestic water system, unless water for such use is recycled; |
| G | The use of water from any fire hydrant unless specifically authorized by permit from the Director of Public Works except by regularly constituted fire protection agencies for fire suppression purposes; |
| H | The use of water to fill, clean or maintain artificial or decorative lakes, fountains or ponds with a capacity of one thousand gallons or more; |
| I | The filling of any swimming pool; (c) |
| J | The service of water in restaurants except upon request by the customer; |
| K | The use of any city water for the flushing of fire hydrants and/or fire related drills, and water mains unless there is an emergency as determined by the director of public works, the San Bruno fire chief or the San Bruno city manager; |
| L | The indiscriminate running of water or washing with water than results in flooding or runoff in or on sidewalks, gutters and streets not otherwise prohibited above; |
| M | Substantial planting or replanting of new landscaping which is not drought tolerant will be prohibited until such time the San Bruno City Council has determined that the emergency has passed. For new developments in which water dependent landscaping is required as a use permit condition, the City shall require a cash bond or other form of security; (d) |
| N | Using potable water from whatever source, in construction for dust control, or soil compaction unless reclaimed (or "nonpotable") water is not available; |
| O | Any other use of domestic water as deemed to be wasteful by the director of public works; |

**Table 24**
**Mandatory Conservation Policy - Summary of Nonessential Uses (a)**
City of San Bruno, California

**Notes:**

(a) Summarized from §10.16.050 of San Bruno's Municipal Code.

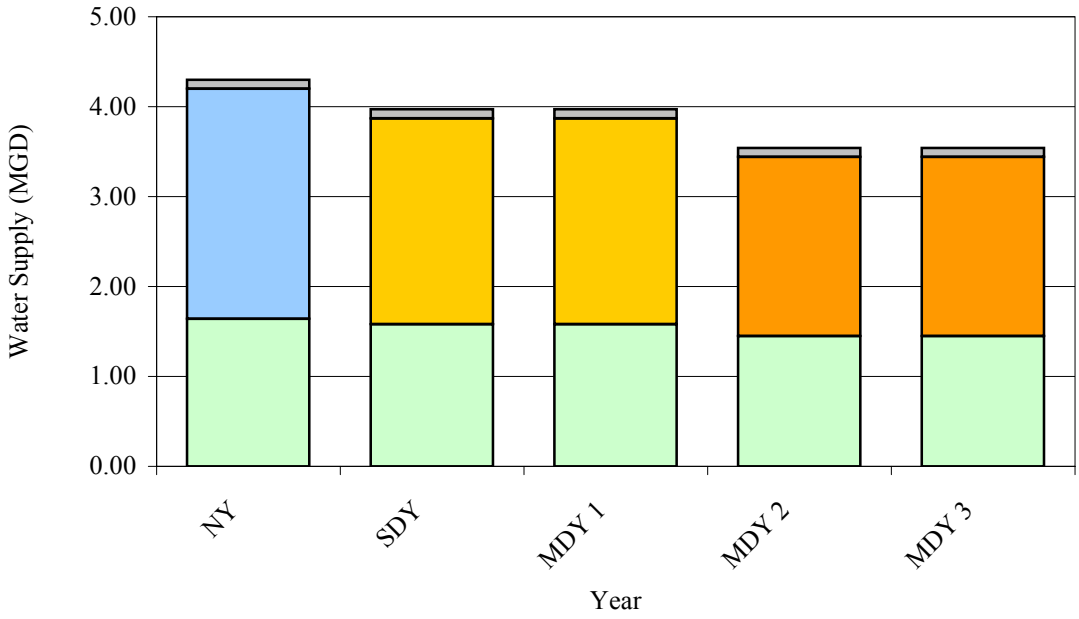
(b) A period of ten days after the water user discovers such break, leak, or malfunction, or receives notice from the City of such condition is considered a reasonable time within which to correct such condition or to make arrangement for correction.

(c) Unless there are extenuating circumstances as determined by the director of public works or his/her designee.

(d) Substantial planting or replanting is hereby defined as planting or replanting in excess of ten percent of the total planted area of the development, parcel, site or lot.

**Table 25**
**Estimated Minimum Three Year Supply**
City of San Bruno, California

| Supply Source | Normal Year | Single Dry Year (a) | Multiple Dry Years (b) | | |
|---|---|---|---|---|---|
| | | | 1 | 2 | 3 |
| SFPUC Purchases (c) (d) | 2.56 | 2.29 | 2.29 | 1.99 | 1.99 |
| Groundwater Production (e) | 1.64 | 1.58 | 1.58 | 1.45 | 1.45 |
| *Subtotal Water Supply* | *4.20* | *3.87* | *3.87* | *3.44* | *3.44* |
| Conservation Savings (f) | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| **Total Water Supply** | 4.3 | 3.9 | 3.9 | 3.4 | 3.4 |




**Abbreviations:**
MGD = Millions of gallons per day
NCCWD = North Coast County Water District
RWS = Regional Water System
SFPUC = San Francisco Public Utilities Commision

- Conservation
- SFPUC Purchases - Normal Year
- SFPUC Purchases - Dry Year (RWS = 100% of Normal)
- SFPUC Purchases - Dry Year (RWS = 90% of Normal)
- Groundwater

**Table 25**
**Estimated Minimum Three Year Supply**
City of San Bruno, California

**Notes:**

(a) A single dry year is defined herein as any year in which precipitation is equal to precipitation in 1987, the design single dry year based on the historical rainfall record from 1920 through 2002.

(b) A multiple dry year period is defined herein as any consecutive years where precipitation is equal to precipitation in 1987 through 1992, the design multiple year drought based on the historical rainfall record from 1920 through 2002.

(c) SFPUC purchases are equal to the quantity of wholesale water available to San Bruno, as projected by SFPUC in their 1 June 2005 letter to San Bruno regarding water supply reliability. Projections are based on SFPUC's Water System Reliability Model and the assumed renewal of on a 2005 total water demand of 4.2 MGD; San Bruno's actual demand in 2005 was 3.76 MGD.

(d) NCCWD's 2005 Urban Water Management Plan estimates multiple dry year supply cutbacks of 6.6% to 18.8% (NCCWD, 2005). Since San Bruno's NCCWD supplies are from the SFPUC Regional System, for the purposes of this UWMP they are included in the SFPUC Purchase estimates and expected to have the same reliability.

(e) The projected quantity of groundwater extracted by San Bruno is based on the availability of wholesale water and San Bruno's total demand, such that local supply cutbacks are equal to the total cutbacks to the Regional Water System (up to 20%).

(f) "Conservation Savings" were estimated as part of the SFPUC Water System Improvement Program. Estimates were submitted to SFPUC in San Bruno's 18 April 2005 letter.

## Notes:

1. All locations are approximate.
2. U.S.G.S. 1:100,000 Series Topographic Map, San Francisco Quadrangle, California, 1978.

N

0 2 4

(Approximate Scale in Miles)

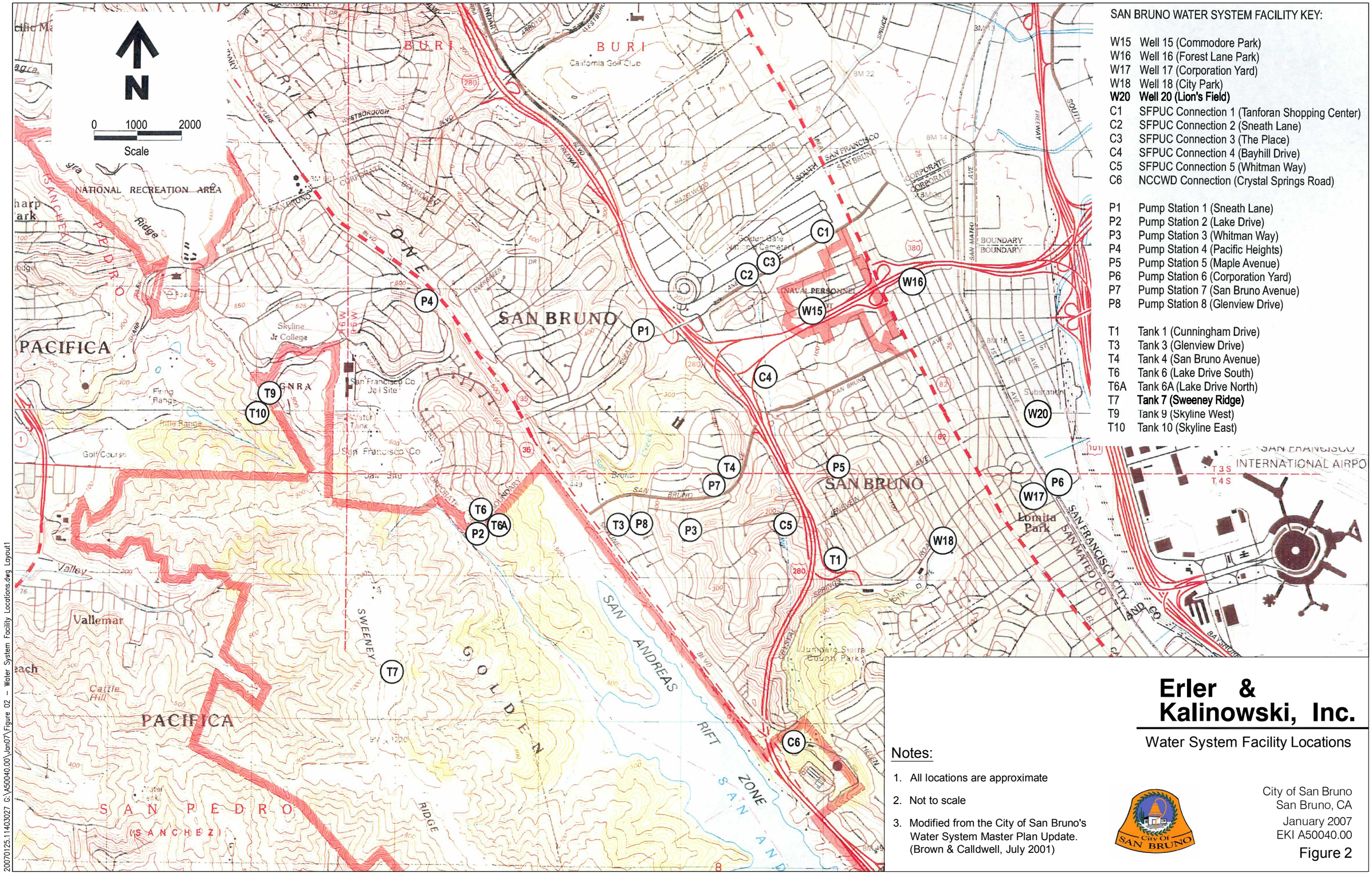
# Erler & Kalinowski, Inc.

Site Vicinity Map

City of San Bruno
San Bruno, CA
January 2007
EKI A50040.00

Figure 1

20070125.1141416 G:\A50040.00\Jan07\Figure 01 – Site Vicinity Map.dwg Model




# Erler & Kalinowski, Inc.

Water System Facility Locations

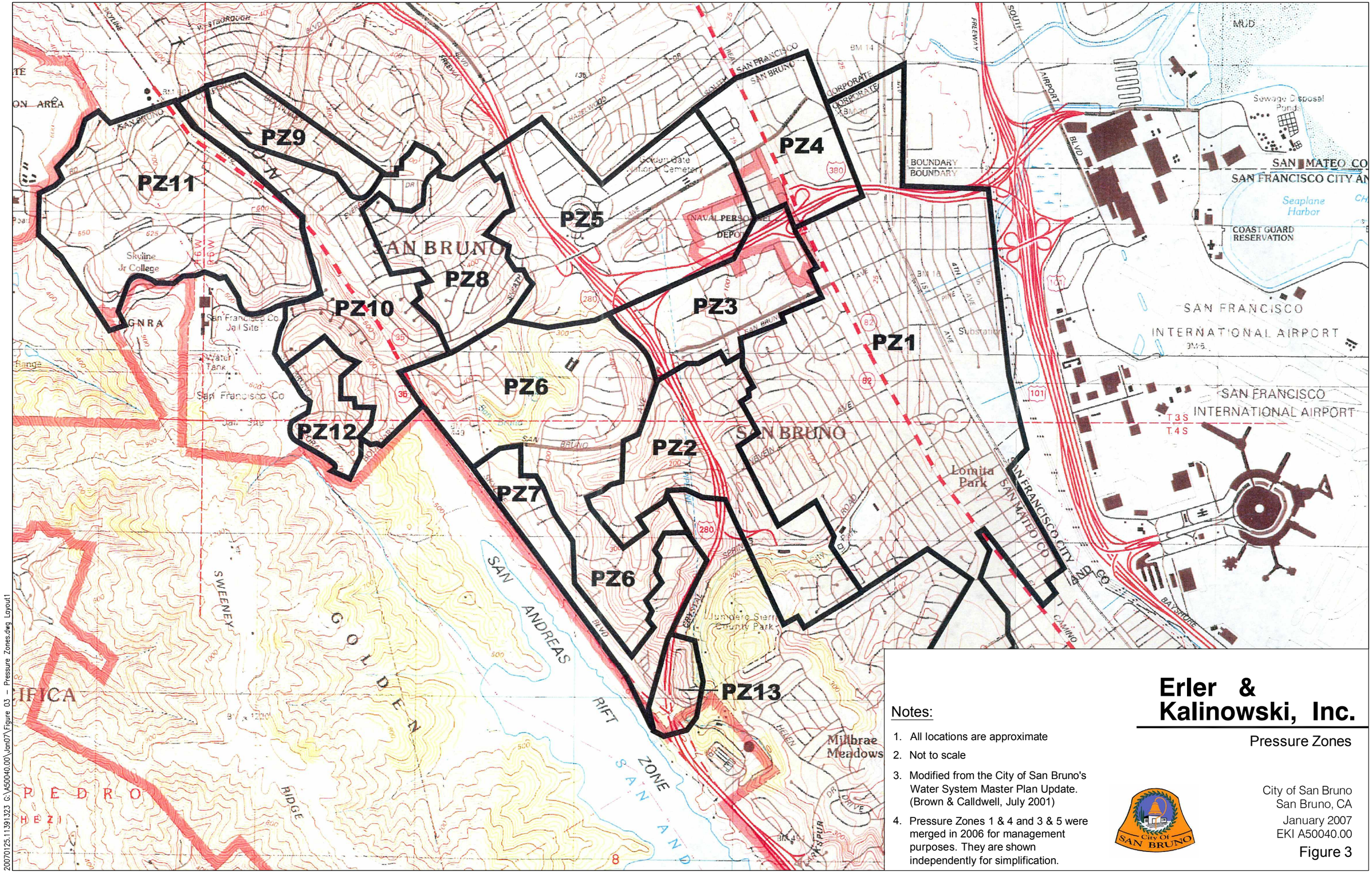
Notes:

1. All locations are approximate
2. Not to scale
3. Modified from the City of San Bruno's Water System Master Plan Update. (Brown & Calldwell, July 2001)

City of San Bruno
San Bruno, CA
January 2007
EKI A50040.00

Figure 2

20070125.11403027 G:\A50040.00\Jan07\Figure 02 – Water System Facility Locations.dwg Layout1




Notes:

1. All locations are approximate
2. Not to scale
3. Modified from the City of San Bruno's Water System Master Plan Update. (Brown & Calldwell, July 2001)
4. Pressure Zones 1 & 4 and 3 & 5 were merged in 2006 for management purposes. They are shown independently for simplification.

**Erler & Kalinowski, Inc.**

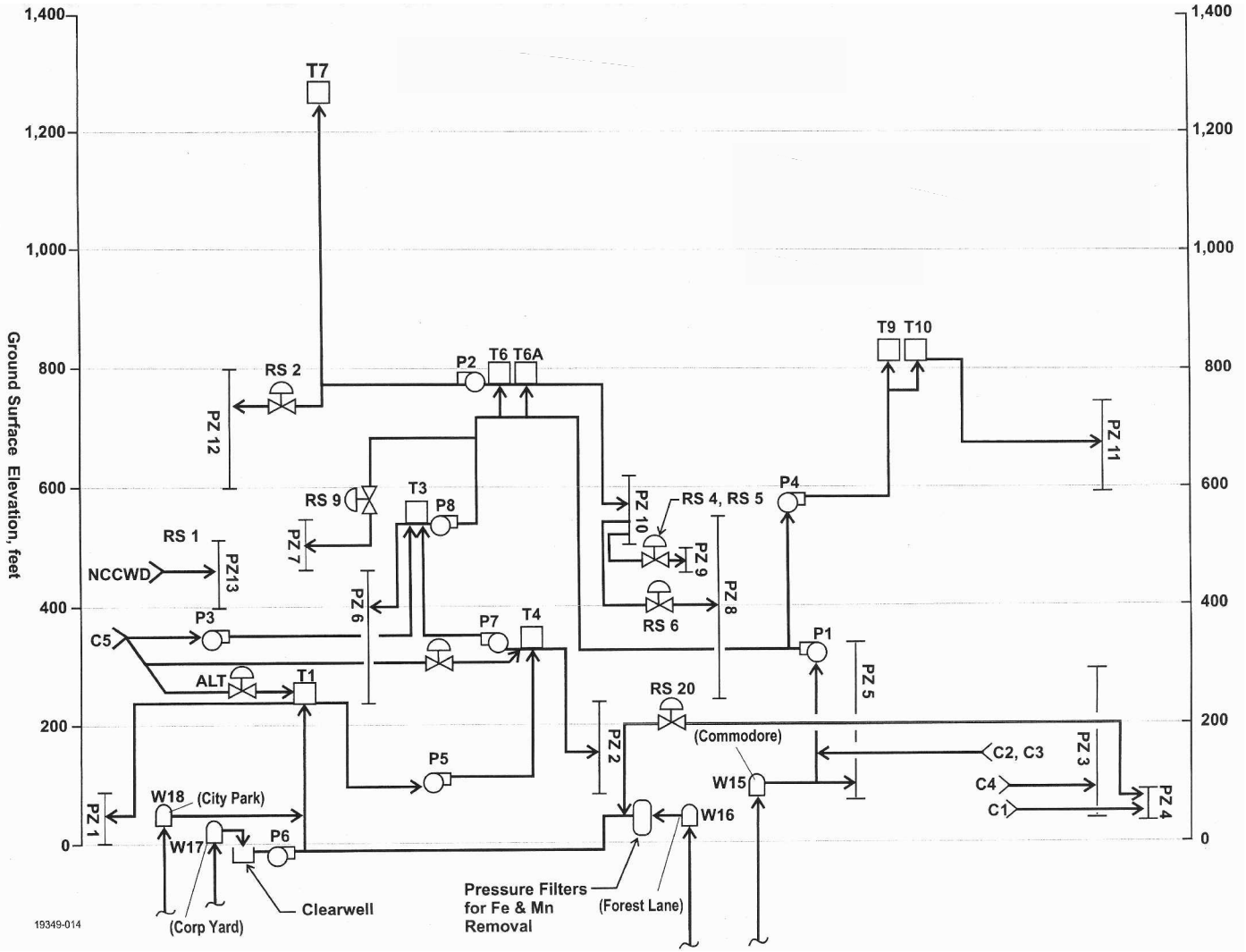
Pressure Zones

City of San Bruno
San Bruno, CA

January 2007
EKI A50040.00

Figure 3

20070125.11391323 G:\A50040.00\Jan07\Figure 03 – Pressure Zones.dwg Layout1




## Notes:

1. All locations are approximate
2. Not to scale
3. Modified from the City of San Bruno's Water System Master Plan Update (Brown & Calldwell, July 2001).
4. For Facility designations, refer to key on Figure 2.
5. Well 20, Lion's Field (not included above) also supplies Pressure Zone 1 with groundwater.

## Abbreviations:

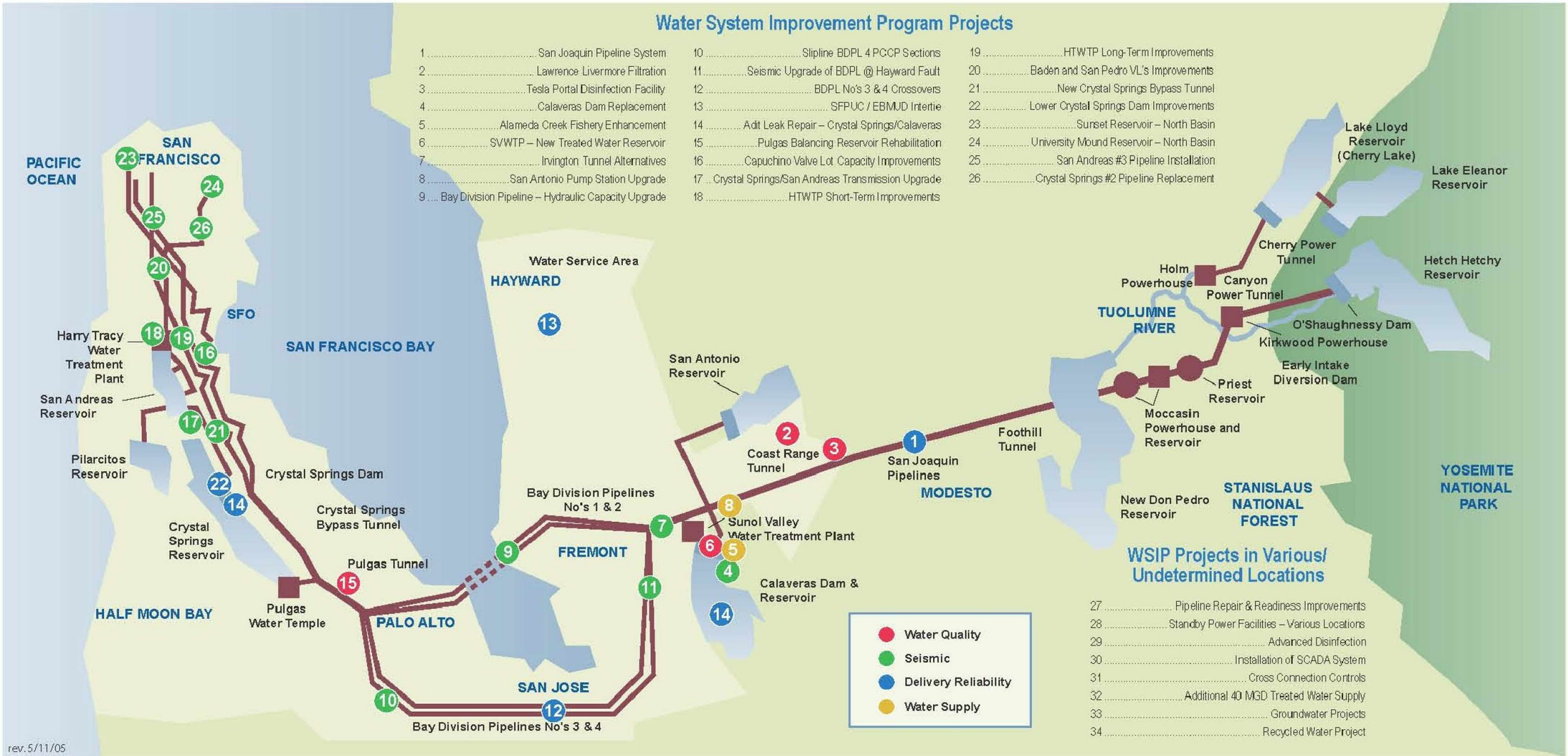
| | |
|---|---|
| ALT | = Altitude Valve |
| PZ | = Pressure Zone |
| RS | = Regulating System |
| T | = Water Storage Tank |
| W | = Groundwater Extraction Well |

**Erler & Kalinowski, Inc.**

Water Supply System Flow Chart

City of San Bruno
San Bruno, CA
January 2007
EKI A50040.00

Figure 4




Source: San Francisco Public Utilities Commission, August 18, 2005

## Abbreviations:

| | |
|---|---|
| BDPL | = Bay Division Pipeline |
| EBMUD | = East Bay Municipal Utility District |
| HTWTP | = Henry Tracy Water Treatment Plant |
| MGD | = Millions of Gallons per Day |
| PCCP | = Prestressed Concrete Cylinder Pipe |
| SCADA | = Supervisory Control and Data |
| SFO | = San Francisco Airport |
| SFPUC | = San Francisco Public Utilities Commission |
| SVWTP | = Sunol Valley Water Treatment Plant |
| WSIP | = Water System Infrastructure Implementation Plan |

## Notes:

1. All locations are approximate.
2. Not to scale

**Erler & Kalinowski, Inc.**

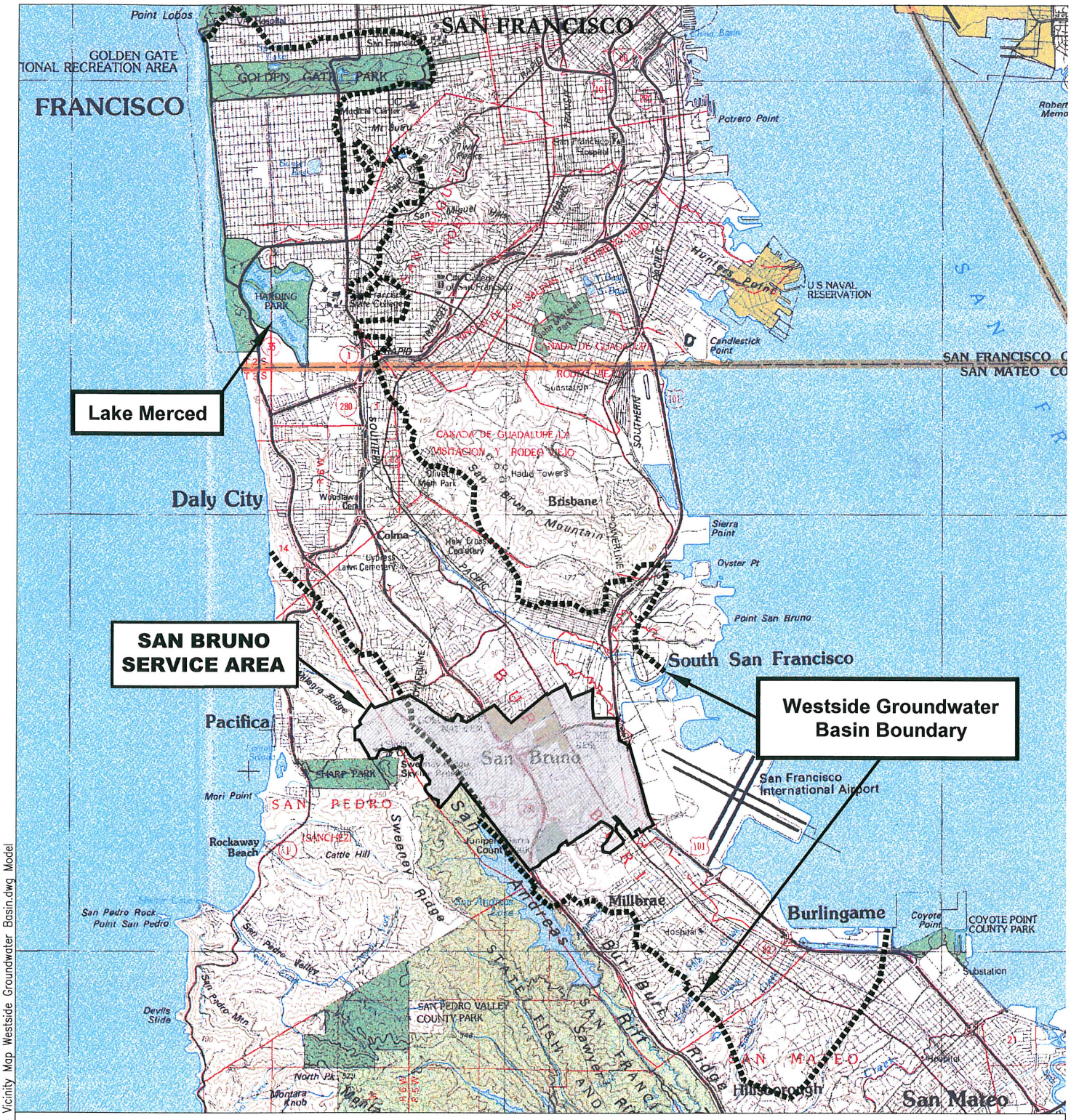
SFPUC Water System Improvement Program Projects

City of San Bruno
San Bruno, CA

January 2007
EKI A50040.00

Figure 5

20070125.11372549 G:\A50040.00\Jan07\Figure 05 – SFUPC Water System Improvement Program Projects.dwg Layout1




## Notes:

1. All locations are approximate.
2. U.S.G.S. 1:100,000 Series Topographic Map, San Francisco Quadrangle, California, 1978.

N

0 2 4

(Approximate Scale in Miles)

# Erler & Kalinowski, Inc.

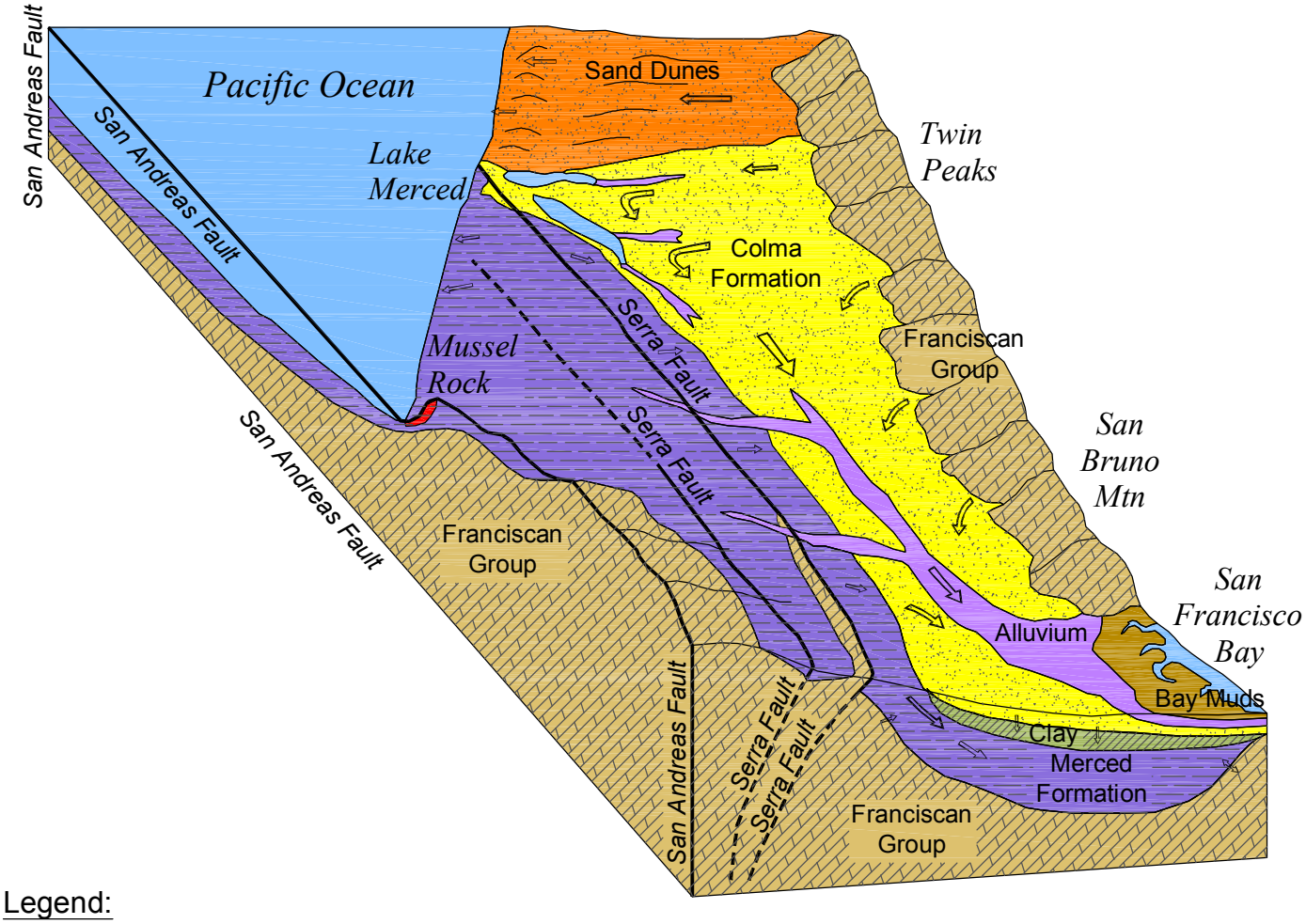
Westside Groundwater Basin
Site Vicinity Map

City of San Bruno
San Bruno, CA

January 2007
EKI A50040.00

Figure 6

20070125.11364088 G:\A50040.00\Jan07\Figure 06 – Site Vicinity Map Westside Groundwater Basin.dwg Model




## Legend:

- Colma Formation - sand and silty sand with interbedded silt, gravel, and clay layers
- Merced Formation - sand with thin interbedded silt and clay layers
- Bedrock - Franciscan Formation
- Clay Aquitard

## Notes:

1. All locations are approximate.
2. This figure presents a conceptual model of the Westside Groundwater Basin showing the different geologic formations within the Basin. The arrows show generalized groundwater flow directions within the Basin.
3. Source: Rogge, 2003, *Dimensions of the Westside Groundwater Basin, San Francisco and San Mateo Counties, California,* Masters Thesis at San Francisco State University.

**Erler & Kalinowski, Inc.**

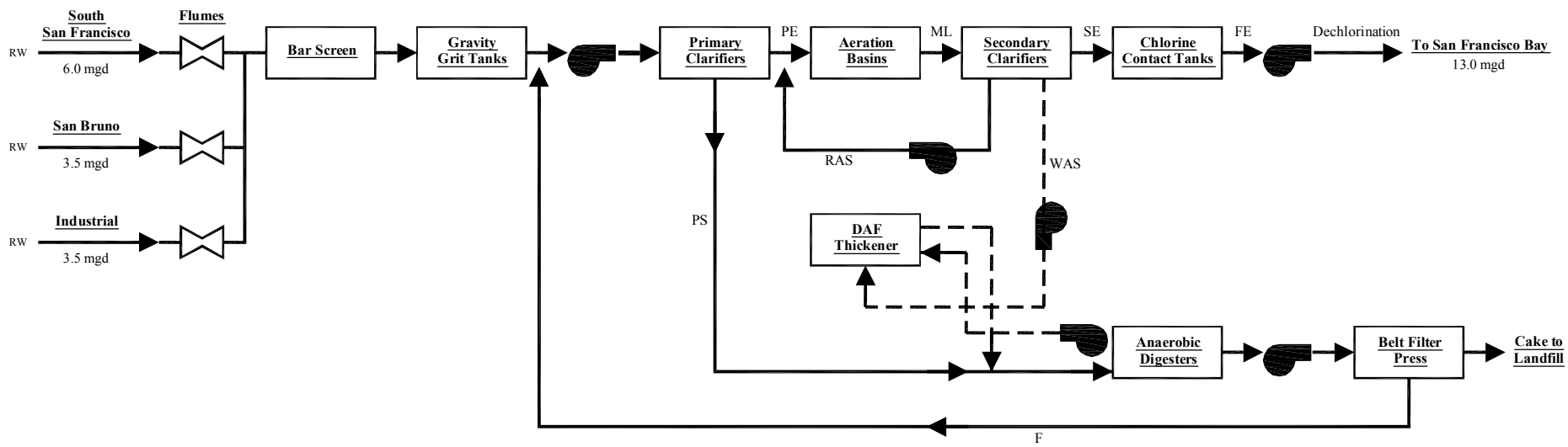
Conceptual Model of the Westside Groundwater Basin

City of San Bruno
San Bruno, CA

January 2007
EKI A50040.00

Figure 7

20070125.11344839 G:\A50040.00\Jan07\Figure 07 – Conceptual Model of the Westside Groundwater Basin.dwg Model




Legend:

| | |
|---|---|
| ——— | Liquid Stream |
| - - - | Solids Stream |
| RW | Raw Wastewater |
| PE | Primary Effluent |
| ML | Mixed Liquor |
| SE | Secondary Effluent |
| FE | Final Effluent |
| PS | Primary Sludge |
| OF | Overflow |
| F | Filtrate |
| TS | Thickened Sludge |
| WAS | Waste Activated Sludge |
| RAS | Return Activated Sludge |
| DF | Digester Foam |

Notes:

1. Figure adapted from Carollo, 1997.

**Erler & Kalinowski, Inc.**

Process Flow Diagram of the South San Francisco/San Bruno Water Quality Control Plant

City of San Bruno
San Bruno, CA

January 2007
EKI A50040.00

Figure 8

20070125.11335747 G:\A50040.00\Jan07\Figure 08 – Process Flow Diagram.dwg Model

# Appendix A

*California Urban Water Management Planning Act*
California Water Code, Division 6, Part 2.6, July 2005

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**Established:** AB 797, Klehs, 1983
**Amended:** AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004

# CALIFORNIA WATER CODE DIVISION 6
# PART 2.6. URBAN WATER MANAGEMENT PLANNING

## CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in

its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

## CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

## CHAPTER 3. URBAN WATER MANAGEMENT PLANS
### Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

## Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council

in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier’s plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including,

but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

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

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

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

## Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

## Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the

plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

## CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

# Appendix B

Urban Water Management Plan Notification Letters

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CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

May 24, 2005 **PWD-2005-022**

Ms. Paula Kehoe
SF Public Utilities Commission
1145 Market Street, 4th Floor
San Francisco, CA 94103

Ms. Nicole Sandkulla
Bay Area Water Supply and Conservation Agency
165 Bovet Road, Suite 302
San Mateo, CA 94402

Mr. David Castagnola
SSF Water Quality Control Plant
195 Belle Aire Road
South San Francisco, CA 94080

Mr. David Holbrook
County of San Mateo
Building and Planning Department
455 County Center, 2nd Floor
Redwood City, CA 94063

SUBJECT: **Notice of Preparation of Urban Water Management Plan**

The Urban Water Management Plan Act (Water Code Section 10610 -10657) requires all urban water suppliers to update their Urban Water Management Plans (UWMPs) by December 31, 2005. The City of San Bruno is reviewing its current UWMP, which was last updated in 2000, and will be considering revisions to the plan. We invite your agency's participation in this process.

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

567 El Camino Real, San Bruno, CA 94066-4299
Voice: (650) 616-7065 • Fax: (650) 794-1443
http://publicworks.sanbruno.ca.gov

Wing Wong, Associate Engineer
City of San Bruno
567 El Camino Real
San Bruno, CA 94066
Tel: (650) 616-7065
Fax: (650) 794-1443
Email: wwong@ci.sanbruno.ca.us

Sincerely,

Scott T. Munns, P.E.
Director of Public Works

cc:
Merrill Buck, Deputy Public Works Director
Wing Wong, Associate Engineer
file

CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

Published in San Bruno Independent
June 4, 2005

**CITY OF SAN BRUNO**

**2005 URBAN WATER MANAGEMENT PLAN UPDATE**

In order to ensure the efficient use of available water supplies, the City of San Bruno will be reviewing and updating its Urban Water Management Plan during 2005. This plan was last updated in 2000. We encourage all of our customers to participate in this review process. We will make any proposed revisions to the current plan available for public review and will hold a public hearing later this year. In the meantime, if you would like to learn more about the current Plan, the schedule for considering changes to it, or how to participate in the process, please contact:

Wing Wong, Associate Engineer
City of San Bruno
567 El Camino Real
San Bruno, CA 94066
Tel: (650) 616-7065
Fax: (650) 794-1443
Email: wwong@ci.sanbruno.ca.us

CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

August 10, 2005

BAWSCA AGENCIES

SUBJECT: **Notice of Preparation of Urban Water Management Plan**

The Urban Water Management Plan Act (Water Code Section 10610 -10657) requires all urban water suppliers to update their Urban Water Management Plans (UWMPs) by December 31, 2005. The City of San Bruno is reviewing its current UWMP, which was last updated in 2000, and will be considering revisions to the plan. We invite your agency's participation in this process.

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

Wing Wong
City of San Bruno
567 El Camino Real
San Bruno, CA 94066
Tel: (650) 616-7065
Fax: (650) 794-1443
Email: wwong@ci.sanbruno.ca.us

Sincerely,

Scott T. Munns, P.E.
Director of Public Works

cc:
Nicole Sandkulla, BAWSCA
Merrill Buck, Deputy Public Works Director, A&E
Wing Wong, Associate Engineer
file

CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

November 28, 2006

Ms. Paula Kehoe
SF Public Utilities Commission
1145 Market St, Ste 401
San Francisco, CA 94103

Ms. Leslie Moulton
Director, Water and Wastewater Services
ESA Consultants
225 Bush Street, Suite 1700
SF, CA 94101

Ms. Nicole Sandkulla
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

Mr. David Castagnola
SSF Water Quality Control Plant
195 Belle Aire Road
South San Francisco, CA 94080

Mr. Steve Hartsell
San Mateo County Building and Planning Department
455 County Center, 2nd Floor
Redwood City, CA 94063

**NOTICE OF AVAILABILITY FOR PUBLIC REVIEW OF DRAFT URBAN WATER MANAGEMENT PLAN - 2005 UPDATE**

In compliance with the California Water Code, Urban Water Management Planning Act, urban water suppliers that serve 3,000 or more customers, or that provide over 3,000 acre-feet of water annually are required every five years to prepare, update and adopt a management plan for providing a reliable water supply to their service area.

The City of San Bruno (City) has prepared a draft update of its Urban Water Management Plan (UWMP) that was prepared in 2001. The draft UWMP will be made available for public review on December 15, 2006 at the San Bruno Main Library located at 701 Angus

567 El Camino Real, San Bruno, CA 94066-4299
Voice: (650) 616-7065 • Fax: (650) 794-1443
http://publicworks.sanbruno.ca.gov

Avenue West, San Bruno, and at the City Hall, Public Works Department located at 567 El Camino Real, San Bruno.

Comments on the draft UWMP plan should be submitted in writing to Mr. Wing Wong at the address below, or made in person at the public hearing currently scheduled as part of the January 23, 2007 City Council meeting at the San Bruno Senior Center located at 1555 Crystal Springs Avenue, San Bruno. If you have any questions regarding the draft UWMP, please contact:

Wing Wong, P.E.
City of San Bruno
Public Works Department
567 El Camino Real
San Bruno, CA 94066
(650) 616-7065
wwong@sanbruno.ca.gov

Sincerely,

Steven Davis, P.E.
City Engineer

CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

November 28, 2006

BAWSCA AGENCIES

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Wing Wong, P.E.
City of San Bruno
Public Works Department
567 El Camino Real
San Bruno, CA 94066
(650) 616-7065
wwong@sanbruno.ca.gov

Sincerely,

Steven Davis, P.E.
City Engineer

Copy: Nicole Sandkulla, BAWSCA

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CITY OF SAN BRUNO
PUBLIC WORKS – ADMINISTRATION AND ENGINEERING

Published in San Mateo Times
Saturday December 2, 2006 and Saturday December 9, 2006

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Wing Wong, P.E.
City of San Bruno
Public Works Department
567 El Camino Real
San Bruno, CA 94066
(650) 616-7065
wwong@sanbruno.ca.gov

The following text is for a standard Legal Ad, please place it in the Public Notice Legal Ad section of the San Mateo Daily Journal, please publish this ad for **two consecutive** Saturdays, on January 13th and 20th, 2007.

**NOTICE OF PUBLIC HEARING**

**San Bruno City Council**

**January 23, 2007**

**NOTICE IS HEREBY GIVEN** that the City Council of the City of San Bruno, California (the "City") at its regular meeting on, Tuesday, January 23, 2007, at the Senior Center starting at 7:00 p.m., 1555 Crystal Springs Road, San Bruno, will hold a Public Hearing to introduce and adopt the following item:

In compliance with the California Water Code, Urban Water Management Planning Act, urban water suppliers that serve 3,000 or more customers, or that provide over 3,000 acre-feet of water annually, are required to update and adopt an Urban Water Management Plan (UWMP) and submit a complete UWMP to the California Department of Water Resources (DWR) every five years.

In accordance with the UWMP Act, the City of San Bruno (City) has prepared a draft UWMP Update to the City's 2001 UWMP. The draft UWMP Update must be adopted by the City Council following a public notification and hearing process. The draft UWMP Update was made available for public review on December 15, 2006 for the general public and the applicable agencies.

The City's Consultant, Erler and Kalinowski (EKI) will be providing a short presentation of the UWMP Update at this meeting and respond to public comments and questions. If you have any questions regarding the UWMP and the public hearing, please contact the City's Public Works Department at (650) 616-7065.

The public is invited to attend and comment. For more information call the City Clerk's Office at (650) 616-7058.

**Certification and Posting:**

A certified copy of the full text of the proposed resolution is posted in the City Clerk's Office, 567 El Camino Real, in San Bruno, California.

**/s/ Carol Bonner,**
**San Bruno City Clerk**
January 11, 2007

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# Appendix C

San Francisco Public Utilities Commission Water Supply Purchase Projections

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SFPUC

WATER
HETCH HETCHY
WATER & POWER
CLEAN WATER

**SAN FRANCISCO PUBLIC UTILITIES COMMISSION**
PLANNING BUREAU
1145 Market Street, Suite 401 San Francisco, CA 94103 • Tel. (415) 934-5700• Fax (415) 934-5751

**GAVIN NEWSOM**
MAYOR

**RICHARD SKLAR**
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**ADAM WERBACH**
**RYAN L. BROOKS**

**SUSAN LEAL**
GENERAL MANAGER

RECEIVED
MAY 31 2005
City of San Bruno
Dept. of Public Works

May 27, 2005

City of San Bruno
Scott Munns
567 El Camino Real
San Bruno, CA 94066

Dear Mr. Munns:

Thank you for providing us with your agency purchase estimate from the San Francisco Public Utilities Commission (SFPUC) for the years 2010, 2015, 2020 2025 and 2030. With the information you provided, the SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected Single dry-year supply for 2005;
- Projected Multiple dry-year supply beginning 2005; and
- Projected supply reliability for years 2010, 2015, 2020, 2025 and 2030.

Table 1 summarizes your agency's deliveries for projected single dry-year supply for 2005 and projected multiple dry-year supply beginning 2005.

With regards to future demands, the SFPUC will expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by year through 2030. This expanded supply portfolio is consistent with the SFPUC's adopted Water Supply Master Plan (2000), adopted Capital Improvement Program (2002) and Water Supply Improvement Program.

Concerning allocation of supply during dry years, the Interim Water Shortage Allocation Plan (IWSAP) was utilized to allocate shortages (1) between the SFPUC and BAWSCA agencies as a whole and (2) among BAWSCA agencies. The IWSAP was adopted in 2000 after a multi-year process of development involving a steering committee representative of all wholesale agencies. While the IWSAP is scheduled to expire in 2009, along with the Master Contract, it represents the most reasonable basis for estimating the impacts of a 20% system-wide shortage.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages given projected demands and system configurations for the period 2010 through 2030. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrological period 1920 through 2002. Again, this hydrological analysis is consistent with the planning efforts that have been adopted to date by the Commission and that are currently ongoing with the development of the Water System Improvement Program. The results of that analysis are summarized in Table 3 for years 2010, 2015, 2020, 2025 and 2030.

If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe
Manager of Water Resources Planning

cc: Nicole Sandkulla

# Attachment A-3 Sample Calculation

## 23.6% Average Suburban Reduction from FY 03-04 Purchases

*(Units in million gallons per day unless otherwise noted)*

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Allocation Basis | | | | Unadjusted Allocations | | | | | Allocations Adj. for Santa Clara & San José | | | | |
| Suburban Purchasers | First Fixed Component | Second Fixed Component | Variable Component | Average | Allocation Factors | Initial Shortage Allocation | FY 03-04 Purchases | Initial Purchase Cutback | | Subtotal Allocation Factors | Adjusted Shortage Allocation | Adjusted Purchase Cutback | | Final Individual Share |
| ACWD | 13.76 | 11.95 | 12.25 | 12.65 | 7.10% | 9.65 | 12.31 | -2.66 | -21.63% | 7.47% | 9.76 | -2.55 | -20.72% | 7.18% |
| Belmont | 3.89 | 3.26 | 3.44 | 3.53 | 1.98% | 2.69 | 3.52 | -0.82 | -23.43% | 2.08% | 2.72 | -0.79 | -22.55% | 2.00% |
| Brisbane | 0.46 | 0.30 | 0.39 | 0.38 | 0.22% | 0.29 | 0.39 | -0.10 | -25.03% | 0.23% | 0.30 | -0.09 | -24.16% | 0.22% |
| Burlingame | 5.23 | 4.68 | 4.72 | 4.88 | 2.74% | 3.72 | 4.77 | -1.05 | -22.07% | 2.88% | 3.76 | -1.01 | -21.17% | 2.77% |
| Coastside | 2.18 | 1.35 | 1.78 | 1.77 | 0.99% | 1.35 | 1.89 | -0.54 | -28.70% | 1.04% | 1.36 | -0.53 | -27.87% | 1.00% |
| Cordilleras | 0.01 | 0.01 | 0.00 | 0.01 | 0.00% | 0.00 | 0.01 | 0.00 | -24.99% | 0.00% | 0.00 | 0.00 | -24.12% | 0.00% |
| CWS Total | 35.50 | 33.51 | 36.21 | 35.07 | 19.68% | 26.74 | 38.25 | -11.51 | -30.08% | 20.70% | 27.05 | -11.20 | -29.27% | 19.90% |
| Daly City | 4.49 | 4.49 | 4.72 | 4.57 | 2.56% | 3.48 | 4.94 | -1.46 | -29.53% | 2.70% | 3.52 | -1.42 | -28.71% | 2.59% |
| East Palo Alto | 2.18 | 2.10 | 2.09 | 2.12 | 1.19% | 1.62 | 2.19 | -0.58 | -26.22% | 1.25% | 1.64 | -0.56 | -25.37% | 1.20% |
| Estero | 7.23 | 5.45 | 5.49 | 6.06 | 3.40% | 4.62 | 5.58 | -0.96 | -17.17% | 3.58% | 4.67 | -0.90 | -16.21% | 3.44% |
| Guadalupe | 0.52 | 0.27 | 0.33 | 0.38 | 0.21% | 0.29 | 0.33 | -0.04 | -13.01% | 0.22% | 0.29 | -0.04 | -12.00% | 0.21% |
| Hayward | 24.00 | 17.56 | 18.30 | 19.95 | 11.19% | 15.22 | 19.59 | -4.38 | -22.35% | 11.78% | 15.39 | -4.20 | -21.45% | 11.32% |
| Hillsborough | 4.09 | 3.60 | 3.78 | 3.82 | 2.14% | 2.92 | 3.91 | -1.00 | -25.53% | 2.26% | 2.95 | -0.97 | -24.67% | 2.17% |
| Los Trancos* | | | | | | | | | | | | | | 0.00% |
| Menlo Park | 4.24 | 3.43 | 3.58 | 3.75 | 2.10% | 2.86 | 3.84 | -0.98 | -25.56% | 2.21% | 2.89 | -0.95 | -24.69% | 2.13% |
| Millbrae | 3.15 | 2.64 | 2.39 | 2.73 | 1.53% | 2.08 | 2.58 | -0.50 | -19.25% | 1.61% | 2.11 | -0.47 | -18.31% | 1.55% |
| Milpitas | 9.23 | 6.80 | 6.94 | 7.66 | 4.30% | 5.84 | 7.10 | -1.27 | -17.83% | 4.52% | 5.91 | -1.20 | -16.87% | 4.34% |
| Mountain View | 13.46 | 10.36 | 10.91 | 11.58 | 6.50% | 8.83 | 10.96 | -2.13 | -19.42% | 6.83% | 8.93 | -2.03 | -18.49% | 6.57% |
| North Coast | 3.84 | 3.29 | 3.48 | 3.54 | 1.98% | 2.70 | 3.59 | -0.89 | -24.81% | 2.09% | 2.73 | -0.86 | -23.94% | 2.01% |
| Palo Alto | 17.07 | 12.96 | 13.06 | 14.37 | 8.06% | 10.95 | 13.33 | -2.38 | -17.85% | 8.48% | 11.08 | -2.25 | -16.90% | 8.15% |
| Purissima Hills | 1.85 | 1.85 | 2.19 | 1.96 | 1.10% | 1.49 | 2.31 | -0.81 | -35.22% | 1.16% | 1.51 | -0.79 | -34.47% | 1.11% |
| Redwood City | 10.93 | 10.92 | 11.73 | 11.19 | 6.28% | 8.53 | 12.16 | -3.63 | -29.82% | 6.61% | 8.63 | -3.53 | -29.00% | 6.35% |
| San Bruno | 3.25 | 2.01 | 2.43 | 2.56 | 1.44% | 1.95 | 2.41 | -0.46 | -18.97% | 1.51% | 1.97 | -0.43 | -18.03% | 1.45% |
| Skyline | 0.18 | 0.16 | 0.17 | 0.17 | 0.10% | 0.13 | 0.18 | -0.05 | -28.57% | 0.10% | 0.13 | -0.05 | -27.74% | 0.10% |
| Stanford | 3.03 | 2.58 | 2.43 | 2.68 | 1.50% | 2.04 | 2.51 | -0.47 | -18.78% | 1.58% | 2.07 | -0.45 | -17.83% | 1.52% |
| Sunnyvale | 12.58 | 10.73 | 9.56 | 10.95 | 6.14% | 8.35 | 9.84 | -1.49 | -15.15% | 6.46% | 8.45 | -1.39 | -14.17% | 6.22% |
| Westborough | 1.32 | 0.98 | 1.01 | 1.10 | 0.62% | 0.84 | 0.97 | -0.13 | -12.98% | 0.65% | 0.85 | -0.12 | -11.97% | 0.63% |
| Subtotal | 187.67 | 157.23 | 163.38 | 169.43 | | 129.20 | 169.48 | -40.28 | -23.77% | 100.00% | 130.70 | -38.78 | -22.88% | |
| San José | 2.68 | 4.10 | 4.65 | 3.81 | 2.14% | 2.91 | 4.84 | -1.94 | -40.03% | | 2.91 | -1.94 | -40.03% | 2.14% |
| Santa Clara | 6.57 | 4.72 | 3.77 | 5.02 | 2.82% | 3.83 | 3.59 | 0.23 | 6.51% | | 2.33 | -1.27 | -35.22% | 1.71% |
| Total | 196.92 | 166.06 | 171.80 | 178.26 | 100.00% | 135.93 | 177.92 | -41.99 | -23.60% | | 135.93 | -41.99 | -23.60% | 100.00% |

**Derivation of the Santa Clara/San José adjustment:**

| | | |
|---|---|---|
| 1. | Largest permanent customer cutback: | -35.22% |
| 2a. | Adjusted Santa Clara shortage allocation: | 2.33 (Applying largest permanent customer cutback) |
| 2b. | Santa Clara adjustment: | -1.50 (Difference between initial and adjusted alloc.) |
| 3a. | Adjusted San José shortage allocation: | 3.14 (Applying largest permanent customer cutback) |
| 3b. | San José adjustment: | 0.00 (Difference between initial and adjusted alloc.) |
| 4. | Total Adjustment: | -1.50 (2b + 3b) |

*All values associated with Los Trancos County Water District have been included within Cal Water value

## *Assumptions and Column Notes*

Avg. Shortage for the Suburban Purchasers = 23.6%
Water available to the Suburban Purchasers = 135.93 mgd

**Column notes:**

Allocation Basis. The Allocation Basis is used for calculating Allocation Factors and is the average of the following three components:

1. First Fixed Component: The greater of either the Supply Assurance values or the three-year average of SFPUC purchases for FYs 1996-97, 1997-98, and 1998-99, with certain exceptions.
   a. Daly City's and Purissima Hill's values are based on their three-year averages, which is greater than their Supply Assurance values.
   b. Hayward's and Estero's values are based on their 2010-11 projected purchases, as reported in the BAWUA 1997-98 Annual Survey.
   c. San José's and Santa Clara's values are based on the water supply caps in their individual water supply contracts with the SFPUC.
2. Second Fixed Component: The average of SFPUC purchases for FYs 1996-97, 1997-98, and 1998-99.
3. Variable Component: The rolling three-year average, updated annually, beginning with FYs 1996-97, 1997-98, and 1998-99.
4. Average: The average of columns 1, 2, and 3.

Unadjusted Allocations. The initial shortage allocations in column 6 are adjusted for Santa Clara and San José in columns 10 through 13.

5. Allocation Factors: The ratio of each Suburban Purchaser's column 4 average to the column 4 total.
6. Initial Shortage Allocation: The product of each Suburban Purchaser's column 5 Allocation Factor times the column 6 total, which represents the assumed available water supply.
7. FY 2003-04 Purchases: The most recent year's purchases to which the Shortage Allocation can be compared to determine the effective cutback.
8. Purchase Cutback: Column 6 minus column 7, in mgd.
9. Purchase Cutback: The ratio of column 8 to column 7, in percent.

Allocations Adjusted for Santa Clara and San José. This adjustment is made so that Santa Clara's and San José's cutbacks are at least as great as the highest cutback by the permanent customers. In this example, there is no adjustment required for San José because the formula results in an unadjusted cutback that is already greater than the highest cutback by a permanent customer.

10. Subtotal Allocation Factors: The ratio of each permanent Suburban Purchaser's column 4 average to the column 4 subtotal.
11. Adjusted Shortage Allocation: The product of each Suburban Purchaser's column 10 Subtotal Allocation Factor times the Column 11 subtotal.
    a. The column 11 subtotal is the sum of the column 6 subtotal plus the Santa Clara adjustment.
    b. The Santa Clara adjustment is the difference between its column 6 Initial Shortage Allocation and its Adjusted Shortage Allocation.
    c. Santa Clara's Adjusted Shortage Allocation is the product of its column 4 average and the largest Purchase Cutback received by the permanent Suburban Purchasers.
12. Adjusted Purchase Cutback: Column 11 minus column 7, in mgd.
13. Adjusted Purchase Cutback: The ratio of column 12 to column 7, in percent.

**Table 1**

Projected San Bruno, City of Deliveries for Three Multiple Dry Years Given Year 2005 Purchase Request

| | Purchase Request Year 2005 mgd | One Critical Dry Year | Current Deliveries during Multiple Dry Years in mgd | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| System-Wide Shortage in Percent | 0% | 10% | 10% | 20% | 20% |
| BAWSCA Allocation mgd | 177.9 | 157.4 | 157.4 | 136.8 | 136.8 |
| San Bruno, City of | 2.41 | 2.29 | 2.29 | 1.99 | 1.99 |

**Table 2**

**UWMP Studies: Water Supply Reliability**

**Water Supply Options for Years 2010 through 2030**

| | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| Crystal Springs Reservoir (22bg) | x | x | x | x | x |
| Westside Basin Groundwater afa | 4,500 | 7,000 | 8,100 | 8,100 | 8,100 |
| Calaveras Reservoir Recov. (31.5 bg) | | x | x | x | x |
| Districts' Transfer afa | 23,200 | 23,200 | 29,000 | 29,000 | 29,000 |

**Table 3**

| Allocation | SFPUC Purchase: San Bruno, City of mgd | | | | | SFPUC Purchase: All Wholesale Customers mgd | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Delivery for Year beginning July 1 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| | Projected Delivery in mgd | | | | | Projected System-wide Delivery in mgd | | | | |
| | 2010 | 2015 | 2020 | 2025 | 2030 | 2010 | 2015 | 2020 | 2025 | 2030 |
| 1920 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1921 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1922 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1923 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1924 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1925 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1926 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1927 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1928 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1929 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1930 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1931 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 | 167.3 | 169.7 | 175.0 | 180.5 | 161.9 |
| 1932 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1933 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1934 | 2.13 | 2.05 | 2.75 | 3.40 | 2.37 | 167.3 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1935 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1936 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1937 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1938 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1939 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1940 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1941 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1942 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1943 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1944 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1945 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1946 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1947 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1948 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1949 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1950 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1951 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1952 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1953 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1954 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1955 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1956 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1957 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1958 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1959 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1960 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1961 | 2.13 | 2.16 | 2.23 | 2.00 | 2.06 | 167.3 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1962 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1963 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1964 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1965 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1966 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1967 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1968 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1969 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1970 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1971 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1972 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1973 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1974 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1975 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1976 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1977 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 | 145.6 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1978 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1979 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1980 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1981 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1982 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1983 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1984 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1985 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1986 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1987 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1988 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 | 167.3 | 169.7 | 175.0 | 180.5 | 161.9 |
| 1989 | 2.13 | 2.16 | 2.23 | 2.30 | 2.37 | 167.3 | 169.7 | 175.0 | 180.5 | 185.7 |
| 1990 | 1.86 | 2.16 | 1.94 | 2.00 | 2.06 | 145.6 | 169.7 | 152.5 | 157.4 | 161.9 |
| 1991 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 | 145.6 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1992 | 1.86 | 1.88 | 1.94 | 2.00 | 2.06 | 145.6 | 147.8 | 152.5 | 157.4 | 161.9 |
| 1993 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1994 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1995 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1996 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1997 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1998 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1999 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2000 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2001 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2002 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |

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SAN FRANCISCO PUBLIC UTILITIES COMMISSION
PLANNING BUREAU
1145 Market Street, Suite 401 San Francisco, CA 94103 • Tel. (415) 934-5700• Fax (415) 934-5751

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SUSAN LEAL
GENERAL MANAGER

June 1, 2005

RECEIVED
JUN 2 2005
City of San Bruno
Public Works

COPY

City of San Bruno
Scott Munns
567 El Camino Real
San Bruno, CA 94066

Dear Mr. Munns:

On May 27, 2005, the San Francisco Public Utilities Commission (SFPUC) sent you a letter with information pertaining to the SFPUC's water supply reliability to assist you with the development of your Urban Water Management Plan.

Upon review of the 2005 wholesale purchase projections used in the analysis, it was determined that there was a miscommunication on the figures used for the 2005 water purchase projections. The SFPUC used the average purchase estimate rather than the FY 03-04 purchase estimate shown in BAWSCA's *Attachment A-3 Sample Calculation.* Enclosed is the revised projection of FY 03-04 and is reflected in Table 1.

We apologize for any inconvenience this may have caused. Please do not hesitate to contact me if you have any questions or comments. I can be reached at (415) 554-0792.

Sincerely,

Paula Kehoe/tm
Manager of Water Resources Planning

cc: Nicole Sandkulla

**Table 1**

Projected San Bruno, City of Deliveries for Three Multiple Dry Years Given Year 2005 Purchase Request

| | Purchase Request Year 2005 mgd | One Critical Dry Year | Current Deliveries during Multiple Dry Years in mgd | | |
|---|---|---|---|---|---|
| | | | Year 1 | Year 2 | Year 3 |
| System-Wide Shortage in Percent | 0% | 10% | 10% | 20% | 20% |
| BAWSCA Allocation mgd | 177.9 | 157.4 | 157.4 | 136.8 | 136.8 |
| San Bruno, City of | 2.41 | 2.29 | 2.29 | 1.99 | 1.99 |

**Table 2**

**UWMP Studies: Water Supply Reliability**

**Water Supply Options for Years 2010 through 2030**

| | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|
| Crystal Springs Reservoir (22bg) | x | x | x | x | x |
| Westside Basin Groundwater afa | 4,500 | 7,000 | 8,100 | 8,100 | 8,100 |
| Calaveras Reservoir Recov. (31.5 bg) | | x | x | x | x |
| Districts' Transfer afa | 23,200 | 23,200 | 29,000 | 29,000 | 29,000 |

**Table 3**

| Allocation | SFPUC Purchase: San Bruno, City of mgd | | | | | SFPUC Purchase: All Wholesale Customers mgd | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Delivery for Year beginning July 1 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| | Projected Delivery in mgd | | | | | Projected System-wide Delivery in mgd | | | | |
| | 2010 | 2015 | 2020 | 2025 | 2030 | 2010 | 2015 | 2020 | 2025 | 2030 |
| 1920 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1921 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1922 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1923 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1924 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1925 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1926 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1927 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1928 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1929 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1930 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1931 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 | 167.3 | 169.7 | 175.0 | 180.5 | 161.9 |
| 1932 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1933 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1934 | 2.13 | 2.05 | 2.75 | 3.40 | 2.37 | 167.3 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1935 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1936 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1937 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1938 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1939 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1940 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1941 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1942 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1943 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1944 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1945 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1946 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1947 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1948 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1949 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1950 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1951 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1952 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1953 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1954 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1955 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1956 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1957 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1958 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1959 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1960 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1961 | 2.13 | 2.16 | 2.23 | 2.00 | 2.06 | 167.3 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1962 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1963 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1964 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1965 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1966 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1967 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1968 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1969 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1970 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1971 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1972 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1973 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1974 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1975 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1976 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1977 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 | 145.6 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1978 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1979 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1980 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1981 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1982 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1983 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1984 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1985 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1986 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1987 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1988 | 2.13 | 2.16 | 2.23 | 2.30 | 2.06 | 167.3 | 169.7 | 175.0 | 180.5 | 161.9 |
| 1989 | 2.13 | 2.16 | 2.23 | 2.30 | 2.37 | 167.3 | 169.7 | 175.0 | 180.5 | 185.7 |
| 1990 | 1.86 | 2.16 | 1.94 | 2.00 | 2.06 | 145.6 | 169.7 | 152.5 | 157.4 | 161.9 |
| 1991 | 1.86 | 2.16 | 2.23 | 2.00 | 2.06 | 145.6 | 169.7 | 175.0 | 157.4 | 161.9 |
| 1992 | 1.86 | 1.88 | 1.94 | 2.00 | 2.06 | 145.6 | 147.8 | 152.5 | 157.4 | 161.9 |
| 1993 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1994 | 1.70 | 2.05 | 2.75 | 3.40 | 2.37 | 188.9 | 191.6 | 197.5 | 203.6 | 185.7 |
| 1995 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1996 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1997 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1998 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 1999 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2000 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2001 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |
| 2002 | 1.70 | 2.05 | 2.75 | 3.40 | 4.30 | 188.9 | 191.6 | 197.5 | 203.6 | 209.4 |

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**Appendix D**

*Westside Basin Proposed Groundwater Management Plan,* March 1999

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# WESTSIDE BASIN PROPOSED GROUNDWATER MANAGEMENT PLAN

PREPARED FOR

## WESTSIDE BASIN PARTNERS

PREPARED BY


BOOKMAN-EDMONSTON
ENGINEERING, INC.

AND

HYDROFOCUS, INC.

IN ASSOCIATION WITH

PUBLIC AFFAIRS MANAGEMENT


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# WESTSIDE BASIN PROPOSED GROUNDWATER MANAGEMENT PLAN

PREPARED FOR

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## BOOKMAN-EDMONSTON ENGINEERING, INC.

AND

## HYDROFOCUS, INC.

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## PUBLIC AFFAIRS MANAGEMENT


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APPENDIX C Basin-wide Monitoring Program

# EXECUTIVE SUMMARY

The Westside Groundwater Basin (Westside Basin), which extends from Golden Gate Park southeastward to the San Francisco Airport, provides essential water supply to several municipalities and numerous private water users. Working in partnership, the cities of Daly City and San Bruno, the San Francisco Public Utilities Commission (SFPUC), and the California Water Service Company have developed this plan for managing groundwater resources in the Westside Basin, following guidelines set forth in the Groundwater Management Act of 1992 (California Water Code Section 10750 et seq.). The goals of the plan are to protect water quality and to enhance water supply reliability in the Westside Basin. Five plan elements, consistent with existing law, have been developed for meeting these management goals:

## GROUNDWATER STORAGE AND QUALITY MONITORING

Changes in the quantity and quality of groundwater will be measured using a basin-wide monitoring program. The key implementation activities include (1) data collection, compilation and storage, (2) data analysis, and (3) data reporting and public dissemination.

## SALINE WATER INTRUSION

Basin-wide groundwater storage and quality monitoring will be used to indicate any occurrence of saltwater intrusion into the groundwater basin from the Pacific Ocean or San Francisco Bay. Monitoring data will provide the technical information needed to develop the appropriate management response if intrusion is occurring.

## CONJUNCTIVE USE

Conjunctive use of surface water and groundwater supplies provides an approach to increase the reliability of water supply, particularly during droughts. Conjunctive use activities will be most effective with cooperation among many water users in the basin. The key implementation efforts in the plan include (1) development of a model conjunctive use agreement among cooperating agencies, (2) development of plans for joint facilities needed to implement the conjunctive use agreement, and (3) implementation of the groundwater-monitoring program.

## RECYCLED WATER

Wastewater that is currently discharged to the ocean or the bay provides an opportunity for a recycled water program where wastewater would be treated and recycled for turf and

landscape irrigation and other non-potable uses. By providing a substitute for water that is otherwise consumed by non-potable uses, a recycled water program will increase the availability of potable supplies and enhance supply reliability for the entire region. The key implementation activities include development of (1) a model recycled water agreement, (2) market mechanisms to encourage golf courses and cemeteries to participate in a recycled water program, and (3) plans for the facilities and infrastructure needed to implement the program.

## SOURCE WATER AND WELLHEAD PROTECTION

A wellhead protection program will protect the quality of groundwater sources in the basin from potential contamination by methyl tertiary butyl ether (MTBE) and other contaminants. A key implementation activity is the completion of a source water assessment for the Westside Basin using statewide source water assessment methodologies, modified to account for specific hydrologic conditions in the basin.

## TIERED IMPLEMENTATION

The plan elements are structured in a tiered approach. Tier I activities are those that can be implemented individually by local agencies at moderate or no cost. Tier I activities will, however, require agreements among participating agencies on consistent methods, protocols, and reporting. Examples of Tier I components include data collection, data analysis, preparation of summary reports, and public education programs to build support for the management plan. Agencies that coordinate and combine their individual efforts will minimize implementation costs and prevent the duplication of work. Implementation of Tier I activities will provide a basis for more challenging and longer-term efforts.

The Tier II activities of each plan element are long-term planning and implementation efforts that require more financial and institutional resources to execute. These activities require collaboration between local, county, state, and federal agencies and stakeholders to achieve successful implementation. The Tier II elements require higher levels of commitment in both time and funding. Examples of Tier II elements include constructing new wells for monitoring basin-wide groundwater-storage and quality, reconnaissance and mapping of contamination sites, developing a joint approach for market mechanisms to implement water recycling programs, and developing agreements for the storage, extraction, and marketing of surface water in the basin as part of a conjunctive use program.

# INTRODUCTION

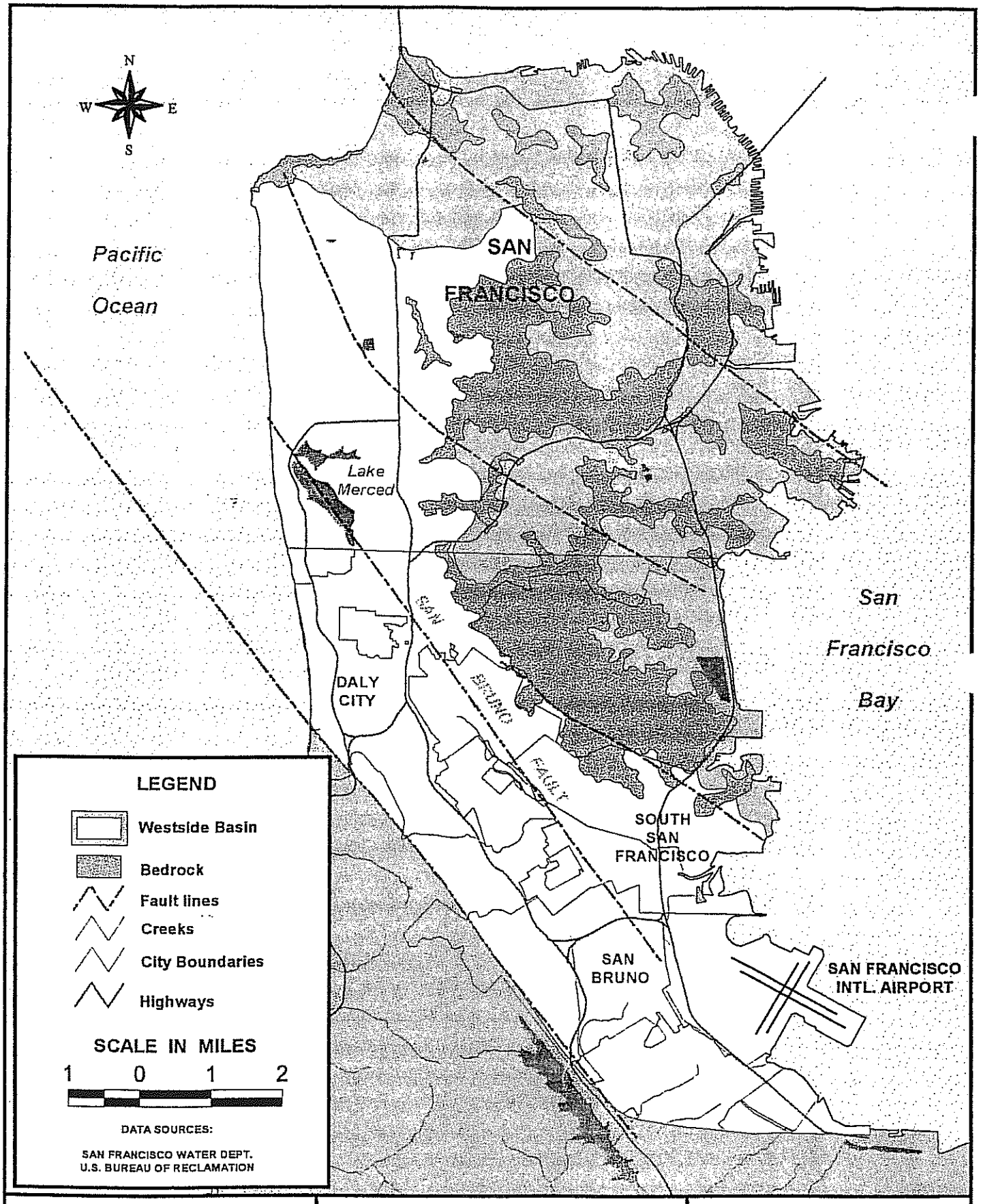
The Westside Basin has provided a reliable source of water for municipal and irrigation uses for more than a century. The Westside Basin underlies parts of San Francisco and northern San Mateo Counties and extends from Golden Gate Park in the north and past the San Francisco International Airport in the south (Figure 1). The cities of San Francisco, Daly City, South San Francisco, Colma, San Bruno, and Millbrae and parts of Burlingame and Hillsborough lie on top of the basin.

Groundwater is a valuable natural resource and should be managed to ensure both its safe production and its quality. Stakeholders and the basin itself will benefit from monitoring to track groundwater storage, protect groundwater quality, and improve the overall supply and reliability of water resources in the Westside Basin. The cities of Daly City and San Bruno, the San Francisco Public Utilities Commission (SFPUC), and the California Water Service Company have developed this plan for managing groundwater resources in the Westside Basin, following guidelines set forth in the Groundwater Management Act of 1992 (California Water Code Section 10750 et seq.), commonly referred to as AB 3030. The Groundwater Management Act authorizes local agencies and water service providers to adopt and implement by ordinance or resolution a groundwater management plan.

The primary goals of this plan are to protect water quality and ensure water supply reliability. Of the 12 potential plan elements described in the law, five plan elements were identified for meeting these management goals:

- Monitoring of groundwater storage and groundwater quality;
- Identification of saline water intrusion;
- Conjunctive use of surface and groundwater supplies;
- Recycled water projects; and,
- Identification and management of wellhead protection areas.

These five plan elements provide the framework for coordinating management efforts in the Westside Basin. Stakeholder interviews, workshops, and hydrogeological analyses completed during plan development identified the public and technical opportunities and constraints associated with each plan element. The purposes of this document are to briefly summarize the key findings from the Public Outreach and Technical Analysis and to provide a scoped work plan of activities for implementing a groundwater management plan. The activities are structured in tiered approach based on the level of effort and cost required to successfully implement each plan element.

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ENGINEERING, INC.

WESTSIDE BASIN
GROUNDWATER MANAGEMENT PLAN

LOCATION OF WESTSIDE BASIN

WESTSIDE BASIN PARTNERS

FIGURE 1

A key component of the Westside Basin Groundwater Management Plan is the involvement of area elected officials, stakeholders, municipalities, and other interested parties. A public outreach effort was conducted during plan development to identify stakeholders and their key issues and to determine opportunities and constraints associated with each of the five plan elements. The public outreach effort included interviews with representatives of Daly City, the City of San Bruno, California Water Service Company, and the SFPUC, and other stakeholders in the basin. The public outreach effort also included five public workshops. A detailed description of the stakeholder interviews and the first workshop is reported in Technical Memorandum No. 1, *Westside Basin Groundwater Management Plan: Stakeholder Issues of Concern,* which is attached as Appendix A to this document.

The public outreach effort identified nine areas of concern for consideration in the plan. Most of these concerns are general and do not exclusively fall under any single plan element. Rather, there is considerable overlap between the areas of concern and two or more of the plan elements. The areas of concern identified for consideration in the management plan are summarized in alphabetical order below.

## ADJUDICATION

In adjudicated basins, the landowners or other parties turn to the courts to allocate how much groundwater each party can rightfully extract. This is not a course of action the partners or the public wish to engage in. It is recognized, however, that some of the procedural actions within adjudicated basins may be useful for application within the AB 3030 Management Plan for the Westside Basin. As part of this effort, the actions that take place in an adjudicated basin were examined to determine their viability and applicability.

## CONJUNCTIVE USE

The coordinated use of surface and groundwater (conjunctive use) is a strategy for using water efficiently. Concerns were expressed about the feasibility and economics of storing surface water in the basin for extraction during dry years. There is also the need for assurances that water stored in the basin will be available when needed, so that local investments are protected and benefits derived.

## COST OF WATER

All parties want to ensure that water remains affordable and that management costs are apportioned among users according to the benefits derived.

## ENVIRONMENT AND NATURAL SYSTEMS

Some stakeholders were concerned that environmental issues are not addressed adequately in the five plan elements. There was concern that how the plan interacts with natural systems (e.g., lakes, parks) within the basin's boundaries is not sufficiently emphasized, or that an environmental representative was afforded an opportunity to directly participate in the management structure of the project.

## GENERAL WATER SUPPLY INFORMATION AND EDUCATION

Stakeholders requested more information about the local water supply, including the yield of the SFPUC system, the responsibility for treating drinking water, and the opportunities and constraints affecting future water supply and use. The general public lacks education on how the groundwater system works and how it interacts with other natural and engineered water systems.

## COMPREHENSIVE GROUNDWATER DATA

Routine, basin-wide data collection and analysis are also needed. Stakeholders need more information about the Westside Basin hydrology including its operational yield, storage volume, groundwater levels, and water quality. Easily understandable, fact-based information is needed that assesses the effect of groundwater pumping on groundwater storage and surface water bodies such as Lake Merced. Basin-wide data will also be needed to judge the effectiveness of future management actions.

## GROUNDWATER RIGHTS AND MANAGEMENT

There is a concern that a groundwater management plan may affect stakeholders' ability to extract and use groundwater. There are questions regarding who pays and shares in the benefits of managing the basin. There was also concern about the possible land use and development implications of wellhead and recharge area protection.

## LAKE MERCED

Stakeholders expressed concern over water level declines in Lake Merced. The partners agree on the need for a regional commitment to data collection and monitoring efforts to manage the basin, identify changes in groundwater quality, and clarify the relationship between deep well pumping and water levels in Lake Merced. Stakeholders also asked whether recycled water is a potential source of additional recharge to Lake Merced.

## RECYCLED WATER

Stakeholders are familiar with the use of recycled water in southern California and many are interested in exploring the possibilities of using recycled water to supplement Bay Area water supplies. However, some potential users have concerns about its quality, particularly about high sodium levels and the public perception of recycled water representing a human health hazard. Other concerns are the expense to treat and deliver recycled water, which may limit its current marketability.

## WATER QUALITY

Stakeholders want to protect groundwater quality and recognize that saltwater and other contaminants represent potential water quality problems in the basin.

Continued public outreach and educational efforts can address most of the concerns expressed by the stakeholders and summarized above. A work plan for continuing these efforts is included as public outreach activities in each element of the Groundwater Management Plan.

A technical analysis was conducted that merged the issues of concern identified by the Public Outreach effort with the technical considerations of each plan element. An important aspect of this analysis was the identification of gaps in the available data and the uncertainties these data limitations impose on water management decisions. A detailed description of these efforts and their results is reported in Technical Memorandum No. 2, *Westside Basin Groundwater Management Plan: Hydrologic Conditions in the Westside Basin Relating to Stakeholder Issues of Concern,* which is attached as Appendix B to this document.

## MONITORING OF GROUNDWATER STORAGE AND GROUNDWATER QUALITY

A considerable amount of data is collected, compiled, and analyzed for public supply wells in the Westside Basin. Data are lacking, however, for upslope portions of the basin that can be important locations of groundwater recharge, for areas served by private wells (or where wells are currently absent), and for critical boundaries like the Pacific Ocean and south San Francisco Bay. Data limitations can be addressed with the addition of new monitoring locations, improved coordination between data collection agencies, and uniform and accessible data storage and reporting protocols. A basin-wide monitoring program is needed and can be implemented by integrating local data collection activities and expanding efforts to improve the distribution of data points across the basin. This information is needed to understand groundwater flow rates and directions, the sources of water extracted by pumping wells, and changes in groundwater storage and groundwater quality over time.

## IDENTIFICATION OF SALTWATER INTRUSION

Saltwater intrusion is a potential concern in the Westside Basin because the Pacific Ocean and south San Francisco Bay are located at the western and southeastern boundaries of the basin. Chemical data for samples from most municipal supply wells in the Westside Basin do not show clear trends indicating saltwater contamination. Because groundwater moves slowly in the basin, decades may be required for salt-affected groundwater to reach pumping wells in the Westside Basin. Continued monitoring of groundwater levels and groundwater quality is needed to ensure that saltwater intrusion does not become a problem in the future.

## CONJUNCTIVE USE OF SURFACE AND GROUNDWATER SUPPLIES

Physical conditions in the Westside Basin provide opportunities for conjunctive use, which is the coordinated use of surface water and groundwater to ensure a reliable water supply.

For example, during wet years, when surface supplies are plentiful, surface water would be delivered to water users that otherwise rely on groundwater, allowing the aquifers to naturally recharge. During dry years, when runoff is reduced and surface water supplies are scarce, greater reliance would be placed on groundwater storage.

The aquifers within the Westside Basin represent a potential means for storing imported surface water and, therefore, could be used to increase the reliability of water supply within the basin. Conjunctive use can also be used to increase the long-term yield of the SFPUC system. Groundwater storage monitoring must be continued, yield analyses conducted, cooperative agreements established, and facilities developed for resource storage, recovery, and delivery.

## RECYCLED WATER

Under a water recycling program, water that is otherwise discharged to the Pacific Ocean or south San Francisco Bay would be used for turf and landscape irrigation and other non-potable uses. The groundwater that would have been used to irrigate these areas would become available for municipal and industrial use or remain within the basin for future use. Recycled water thereby would become an additional supply of water that would enhance the long-term water reliability for the basin. The potential supply of recycled water from just four cities (Daly City, City of San Bruno, City of South San Francisco and Colma) could be used as a substitute for the annual groundwater pumpage used to irrigate parks, golf courses, schools, and cemeteries in the Westside Basin. The necessary hydrologic conditions, therefore, exist to develop a recycled water program in the basin. To implement and use this potential source of water, specific projects must be identified, market mechanisms developed, and project facilities designed and constructed.

## SOURCE WATER ASSESSMENT AND WELLHEAD PROTECTION

Wellhead protection programs are designed to reduce or eliminate contamination, provide for alternative sources of emergency drinking water, and plan for new wells and their protection areas. Changes in land use may be necessary to minimize the risk of contamination to water supply wells in the basin. Public education is needed to communicate the results of these analyses and explain the implications for land use decisions and drinking water quality. A wellhead protection program will, therefore, require both public support and technical input. Components of a program may include a source water assessment, determination of recharge areas and groundwater flow paths to extraction wells, and continuation of efforts to identify and map potential contaminant sources.

MTBE (methyl tertiary-butyl ether) is an oxygenate added to gasoline with the intent of reducing air pollution. Of concern is the impact of MTBE on groundwater supplies where its contamination has forced cities to shut down impacted water supply wells. At this writing, Cal EPA is holding two public hearings on research conducted by the University of California to study the health and environmental effects of MTBE. After completion of the public hearings, the Governor must issue a written certification as to the human health and environmental risks of using MTBE as a gasoline additive in California.

The plan elements are structured in a tiered approach. The two tiers are labeled Tier I and Tier II.

Plan elements that can be completed individually by local agencies are designated as Tier I plan elements. The agencies are encouraged to coordinate and combine their individual efforts to minimize implementation costs and prevent the duplication of work. In general, the Tier I elements can be readily implemented at moderate cost, but will require agreements on consistent methods, protocols, and reporting. Examples of Tier I components include data collection, data analysis, preparation of summary reports, and public education programs to build support for the management plan. Implementation of the Tier I components provides a basis for more challenging and longer-term efforts.

The Tier II elements are long-term planning and implementation efforts that require more financial and institutional resources to execute. These elements require collaboration between local, county, state, and federal agencies and stakeholders to achieve successful implementation. The Tier II elements require higher levels of commitment in both time and funding. Examples of Tier II elements include constructing new wells for monitoring basin-wide groundwater storage and quality, reconnaissance and mapping of contamination sites, developing a joint approach for financial incentives to implement water recycling programs, and developing agreements for the storage, extraction, and marketing of surface water in the basin as part of a conjunctive use program.

This section summarizes the objectives and goals of the five plan elements and describes their proposed Tier I and Tier II implementation activities. The implementation activities provide the work plan for decision-makers, municipalities, and other stakeholders to manage groundwater resources in the Westside Basin. The implementation actions are separated into Tier I and Tier II levels for both Public Outreach and Technical categories, and include potential work tasks, possible timeframes, and estimated costs.

## GROUNDWATER STORAGE AND QUALITY MONITORING

Changes in the quantity and quality of groundwater stored within the Westside Basin will be tracked using a basin-wide monitoring program, as set forth in Appendix C. The monitoring program will record changes in water levels in wells, dissolved constituents in well water, weather conditions, and water use. The program can be implemented at the Tier I level by coordinating existing data collection activities; existing gaps in the location and types of data being collected can be addressed by expanding data collection activities as part of the Tier II implementation activities. Public outreach activities are, therefore, recommended to educate water users in the basin on the need for monitoring and soliciting their cooperation and support for a basin-wide data collection program.

Daly City, City of San Bruno, and California Water Service Company routinely measure water levels in production wells to estimate changes in groundwater storage, collect water samples from wells for the analysis of chemical constituents in the groundwater, and record groundwater production and water use information. The SFPUC Groundwater Master Plan has preliminary plans to collect similar data in the portion of the Westside Basin located within the City and County of San Francisco, and the draft Lake Merced Comprehensive Management Plan recommends the installation of lake level gages to further the understanding of the relationship between Lake Merced and the Westside Basin. Coordinating these existing and planned data collection activities will provide information for a substantial portion of the Westside Basin. Additional data will be needed from areas where existing data collection activities do not exist. These include areas where private wells are located or other key areas where data are needed but wells are currently absent. Public outreach activities will be needed to obtain the participation of private well owners and develop support for constructing monitoring wells in areas where wells currently do not exist.

## TIER I ACTIVITIES

### Technical

Semiannual groundwater storage and quality monitoring will be conducted. The implementation activities include (1) data collection, compilation and storage, (2) data analysis, and (3) data reporting. The Tier 1 activities will coordinate existing monitoring activities. A significant effort will be needed initially, but in the long run, this approach should be the most efficient and cost-effective means of collecting basin-wide data.

#### *Data Collection, Compilation, and Storage*

Summarized below are key data needs and a brief description of data collection and archiving protocols. Additional information can be found in Groundwater Monitoring Plan for the Westside Basin – Draft Annotated Outline (attached as Appendix C to this planning document) and several other useful references:

- City and County of San Francisco Groundwater Monitoring Program - Technical Memorandum 19 for the San Francisco Groundwater Master Plan.
- Guidelines and Techniques for Obtaining Water Samples that Accurately Represent the Water Chemistry of an Aquifer (U.S. Geological Survey Open-File Report 82-1024).

The key data needs and archiving protocols are as follows:

- Monthly deliveries of surface water and groundwater pumping will be reported to provide semiannual inflow and outflow data for the basin. Groundwater pumping rates will be measured or estimated for public wells and accessible private wells. Monthly outflows from wastewater treatment plants will also be reported. These data are already collected by various entities and, therefore, are available for no new net cost. Some staff time will be necessary initially to identify the sources of these data, develop protocols for obtaining it, and routinely compile the collected data.
- A groundwater monitoring well network will be established. The network will use existing shallow (less than 100 feet deep) and deeper wells (greater than 200 feet deep); additional wells will be needed to improve the geographic distribution of data points in the Westside Groundwater Basin and are discussed in the Tier II implementation activities. The existing wells that are monitored will be located using a Global Positioning System (GPS), and a map will be produced that shows the well identification number and responsible reporting agency. Some of this work has already been completed by San Francisco State University, and most of the

mapping information is available electronically from the SFPUC Groundwater Master Plan, the U.S. Geological Survey, San Mateo County, and various state agencies.

- Static water levels will be collected semiannually. The water level measurements should be collected by the participating agencies on the same day and will require temporary shutdown of all production wells before measurement. The effort will be coordinated between the SFPUC, Daly City, San Bruno, and California Water Service Company. A standard field sheet and reporting protocol will be used by all agencies. Example field sheets and data collection protocols can be found in Technical Memorandum 19 for the San Francisco Groundwater Master Plan, *City and County of San Francisco Groundwater Monitoring Program*. Some effort will be needed coordinating activities and ensuring uniform protocols, but the collection of semiannual water levels should result in no significant new costs because most of the participating agencies already collect the data.

- Monitoring wells will be sampled semiannually, and at a minimum, the water samples will be analyzed for pH, dissolved solids, alkalinity, chloride, sulfate, calcium, magnesium, sodium, iodide, bromide, nitrate, iron, and manganese. Standardized data collection procedures, laboratory methods, and reporting protocols will be used. Example field sheets and data collection protocols can be found in Technical Memorandum 19 for the San Francisco Groundwater Master Plan, *City and County of San Francisco Groundwater Monitoring Program*. Well-water samples are generally collected and analyzed for most of these constituents by the participating agencies on an annual basis. The collection of this data semiannually should approximately double current agency costs.

- Monitoring activities will be integrated with data collection efforts to preserve the integrity of Lake Merced and understand its relationship with the underlying shallow aquifer. This includes support for the installation of lake level gages on North and Impound Lakes and monitoring of groundwater conditions in the shallow and deeper aquifers in areas next to Lake Merced. This data will be included in the analysis and reporting of basin-wide conditions.

- Participating agencies will organize and archive their own data. Water use, groundwater level, and analytical results will be stored using commercially available software. Some effort will be needed to develop a system for efficiently archiving the data that is easily accommodated by all the participating agencies. After the format of the system has been completed, the data entry, quality assurance, and quality control efforts should not result in significant new costs.

Portions of the data collection, compilation, and storage activities will result in a significant work effort that will be distributed between participating agencies. The total combined increase in effort is approximately 0.5 FTE the first year and 0.3 FTE in subsequent years.

*Data Analysis*

The data should be collated and summarized as follows:

- Compile and compute monthly water inflows and outflows to and from the basin (precipitation, surface water deliveries, pumping, potential evapotranspiration, measured and estimated runoff in creeks, and wastewater discharge).
- Time-series plots showing historical water levels in wells.
- Maps showing lines of equal groundwater elevations in the water table and deep aquifer system.
- Maps showing the change in groundwater elevations from the previous monitoring event.
- Time-series plot showing historical changes in groundwater storage and pumpage.
- Time-series plots showing historical chloride ion concentrations in well-water samples.
- Maps showing chloride ion concentrations in well-water samples in the water table and deep aquifer system.
- Time-series plots showing historical chloride-to-boron and chloride-to-bromide ratios in well-water samples.

Completing the above analysis will result in a significant new work effort by the participating agencies. It would be most efficient to have one entity assume the responsibility of acquiring the data from each agency and compiling it for a basin-wide analysis. A staff member from one of the participating agencies, a staff member for San Mateo County, or a private contractor could perform the work. The estimated cost for staff time to conduct this analysis twice a year is approximately 0.15 FTE the first year and 0.10 FTE during subsequent years.

*Reporting*

Understandable text and graphics that describe the above analysis will be needed and made available to all stakeholders in the basin. Copies of this report should be distributed

semiannually to all of the participating agencies, local libraries, San Mateo County, and other interested stakeholders. The effort to complete the reports and coordinate their distribution twice a year is approximately equivalent to 0.20 FTE. The production and mailing costs for 60 reports per annum (30 reports for each semiannual event) is about $1,000 per year.

### Public Outreach

The recommended action steps in Tier I include two main components: (1) communication with the private well owners derived from permits on file with San Francisco and San Mateo Counties and (2) development of a presentation package and a coordinated speaker's bureau schedule. The primary objective of this outreach effort is to educate well owners on the need to monitor all wells to ensure a clean reliable supply of water. This work can be done internally by existing city or agency staff and should be coordinated by the partners. Alternatively, a regional agency like San Mateo County could act as the lead or a contractor could be retained to assist in coordinating these efforts.

#### *Communication with Private Well Owners*

Soliciting the participation of private well owners is important to the ultimate success of a monitoring program. The partners will conduct a joint basin-wide education effort to explain the need to routinely collect data from wells. The education efforts will also help solicit the participation of private well owners in the monitoring program. Activities will include:

- Development of a database listing all private well owners within the basin. This can be accomplished by working with the respective planning departments and San Mateo County.

- Development of a mailer for distribution to well owners alerting them of the importance and need to monitor wells. The material available to develop the mailer includes the Westside Basin Groundwater Management Plan fact sheet and information gathered during the five Westside Basin workshops.

- Telephone calls and/or visits depending on the size and/or annual water usage of the well owner may be conducted to follow up on potential measures and actions to ensure proper management and monitoring. There are more than 25 known active private wells in the basin and a similar number of privately owned wells believed to be currently inactive.

- A second mailer may be prepared discussing some of the positive measures various well owners have taken or are taking to influence those who are not participating.

*Presentation Package and Speaker's Bureau Coordination*

Developing a joint-use presentation package for local talks on the basin will help obtain stakeholder input. The package would include information on the hydrology of the basin and the need for a monitoring program. Representatives of the participating agencies will conduct presentations on a regular basis.

- Provide education on the basin hydrology, including its relationship to water bodies.
- Integrate with existing City and agency speaker's bureau programs and maintain a rotating schedule of presentations on the basin.
- Use existing mailer text for publication in City and local agency newsletters to explain the basin and the groundwater storage and monitoring program.
- Include an insert to water bills that reports the relative quantity of groundwater and surface water comprising the local drinking water supply.

*Costs*

The cost to complete the Tier I education program is approximately 0.20 full-time equivalent (FTE) of mid-level staff time and approximately $4,000 in mailing, telephone, printing, and design costs. The time commitment includes developing the database, designing and writing the mailer and newsletter articles, developing a presentation package, and coordinating speaking engagements.

## TIER II ACTIVITIES

### Technical

The Tier II implementation activities are designed to expand monitoring into areas having private wells and key areas where data are needed but wells are currently absent. Tier II activities will also include a groundwater investigation with the objective of developing a better understanding of groundwater flow directions, sources and rates of groundwater recharge, and the sources of water extracted by wells using specialized analyses of well-water samples. The installation of new wells for monitoring purposes will require a significant capital investment, and the expansion of data collection activities into new areas will increase work levels for each participating agency proportional to the number of new monitoring sites they undertake. The groundwater investigation will require a one-time investment in time and resources to collect the samples, contract with a specialized laboratory to conduct the analyses, and analyze and interpret the results.

*Expand Monitoring Activities*

- Identify specific locations and install dedicated wells in key areas of the Westside Basin to monitor groundwater levels and groundwater quality where wells and data are currently lacking. Initial target areas are near the Pacific Ocean and south San Francisco Bay, near upland areas next to the surrounding foothills, and in other general areas where data are lacking. A combination of shallow (less than 100 feet) and deep (greater than 200 feet) wells are needed. Approximately 10 new monitoring wells are recommended for the Daly City area (7 shallow and 3 deep), five new monitoring wells are recommended for the San Bruno area (3 shallow and 2 deep), and four monitoring wells are recommended in California Water Service Company service area (1 shallow and 3 deep). The typical capital investment for new wells of this type are approximately $6,500 for each shallow well and about $18,000 for each deep well.

- Establish a formal program and protocol for the monitoring of private wells and inclusion in the semiannual analysis and reports.

*Groundwater Investigation*

Production and monitoring wells will be sampled and the water used for specialized isotopic and age-dating analyses. The results will be evaluated to characterize recharge rates, map recharge areas, and estimate the sources of water produced by pumping wells in the basin. Sampling costs will be about 0.10 FTE of technician time. The laboratory analyses will cost from $15,000 to $20,000. Analysis and interpretation of the results and completing a summary report will be equivalent to about 0.15 FTE of senior-level staff time. The sampling can be completed by agency staff members and analyses conducted by a contracted laboratory that provides these types of specialized analyses. The analysis and interpretation of the data will most likely need to be completed by a trained individual at a government agency, college, or university or by a private consultant.

**Public Outreach**

The Tier II implementation activities are designed to increase cooperation from private well owners and solicit their participation in the monitoring program. The Tier II activities are also designed to educate elected officials, business leaders, and voters on the need for investing resources in the expansion of the monitoring program.

*Private Well Owner Cooperation*

A task force of domestic and business well owners could be established to act as a liaison between the participating agencies and private well owners in the basin. The task force

could assume the lead for collecting data for private wells. Alternatively, the task force could provide education to well owners on data collection protocols, provide instrumentation and training for collecting data, and integrate data collection activities into the regional monitoring program. At a minimum, the task force would help the participating agencies obtain access to private wells for inclusion in their monitoring efforts. This activity would include the following:

- Use the existing private well owner database to hold a targeted briefing to identify stakeholders and develop the well owner's task force. This could include a centrally located meeting to discuss the need and value of a well owner task force to establish a leadership role in monitoring private wells. Well owner task force members should include representatives from cemeteries, nurseries, and golf courses.

- Meet with communities like Colma (cemeteries) and South San Francisco (nurseries) to obtain support for the program.

- The task force could assume responsibility for collecting and compiling water level, water quality, and well production data for inclusion in the semiannual reports.

*Education on the Need and Value of a Monitoring Program*

Gaining consensus from public agencies, the business community, and voters is necessary to obtain the needed resources for expanding data collection and reporting efforts. This could include:

- Writing and disseminating feature articles that target the need and value of the monitoring program by sharing successful efforts in other parts of the basin. This could include efforts to obtain press coverage and sample stories.

- Providing educational mailers for City and agency water bills.

- Targeting speaking engagements to educate constituents and obtain feedback for an expanded monitoring program.

## CONTROL OF SALTWATER INTRUSION

Saltwater intrusion is a potential concern in the Westside Basin because the Pacific Ocean and San Francisco Bay are located at the western and southeastern boundaries of the basin. Saltwater intrusion can increase the salinity of water produced by pumping wells. Historical data suggest landward flow from beneath the ocean and bay, but most pumping wells do not show substantial increases in the salinity of the well water. Basin-wide groundwater storage and quality monitoring are needed to identify saltwater intrusion and provide the technical information needed to develop the appropriate response if intrusion is occurring.

### TIER I ACTIVITIES

#### Technical

The Tier I implementation activities are related to groundwater storage and quality monitoring:

- Establish a groundwater storage and quality-monitoring network.
- Prepare semiannual summary reports for the basin.
- Determine sites needed for salt-water monitoring wells.

These activities will not create significant new costs other than those identified as part of the groundwater storage and quality monitoring planning element.

### TIER II ACTIVITIES

#### Technical

The Tier II implementation activities are related to groundwater storage and quality monitoring:

- Install dedicated monitoring wells in key areas near the Pacific Ocean and south San Francisco Bay where data are needed and wells are currently absent.
- Include private wells into the monitoring network.

If monitoring activities identify a saltwater intrusion problem, efforts will be needed to identify the problem scope and alternative responses.

## Public Outreach

Communication on monitoring efforts to detect saltwater intrusion is useful information but not a high priority. It becomes a priority and a required action when and if an actual saltwater intrusion problem occurs. At that time, the following actions may occur.

- Compile research on saltwater intrusion monitoring efforts in the basin and other saltwater intrusion problems within the state.
- Communicate directly with large property well owners on the potential for problems and the importance of proactive management.
- Develop newsletter articles and press contingency statements outlining the monitoring efforts, previous and current remediation work in the state and the efforts currently under way to remediate problems in the basin.
- Develop a media relations plan to work with press during remediation efforts.

## CONJUNCTIVE USE

Conjunctive use is a water management technique that is gaining recognition throughout California as a cost-effective alternative for increasing reliability of the water supply, particularly during droughts. Conjunctive use in the Westside Basin can provide water supply benefits to all users in the basin who participate in an agreement to coordinate the use of groundwater and surface water supplies.

While the operational details have yet to be developed by the participating parties, the principles of a conjunctive use plan can be stated here. During wet years, imported water and local runoff can be stored in the Westside Basin using passive methods to increase groundwater replenishment. Passive groundwater replenishment, or "in-lieu recharge," occurs when increased surface water use replaces groundwater extraction. Reduced pumpage and greater deep percolation of imported surface water causes groundwater storage to increase.

The water stored in the groundwater basin is then available for use during dry years, when imported water and local runoff are reduced. Increased reliance on groundwater during droughts reduces demand on the available surface water supply, which can be redistributed to users with limited access to groundwater facilities. All users enjoy higher supply reliability during droughts.

Approximately 30 percent of total water use in the basin is currently from local groundwater. Therefore, in-lieu recharge can be used to store 30 percent of annual water demand in the basin, although facility upgrades may be needed to integrate this storage into an operational conjunctive use system. In addition, since groundwater must be blended with a minimum amount of surface water to meet water quality criteria for municipal treatment systems, the practical rate of in-lieu recharge will be somewhat less than 30 percent of annual water use. Nevertheless, the potential for conjunctive use to increase water supply reliability during droughts is substantial. The following activities are designed to transform that potential into a reality.

### TIER I ACTIVITIES

#### Technical

The following activities will comprise Tier I.

- Develop a model conjunctive use agreement. A model agreement will describe operational concepts, including the voluntary nature of the agreement, identification of participants, recharge and extraction mechanisms, and the distribution of water supply benefits. Numerical values, such as caps on water use

and cost sharing for new facilities, will be negotiated among the participants outside of the model agreement.

- Pursue agreements with participating agencies and other groundwater users to enhance in-lieu recharge. Examples include routing of storm water into Lake Merced and water conservation efforts that enhance recharge from deep percolation and seepage from creeks.

- Implement the groundwater storage and quality monitoring element in this plan.

- Using data from the monitoring program, conduct an analysis to determine the operational storage capacity of the Westside Basin.

### Public Outreach

Public outreach for conjunctive use includes developing a public education and outreach program that targets messages to policy makers, public agencies, and the public. This task would include education to familiarize all audiences with conjunctive use efforts currently under way and its value to preserve existing water resources. The education and outreach task include the following:

- Meet with other potential partners (jurisdictions) to discuss opportunities (Burlingame, Colma, Millbrae, and South San Francisco).

- Develop educational materials that focus on the need to protect the water supply through conjunctive use. Materials may include a quarterly newsletter, a speaker's bureau presentation (adult and children), and educational posters.

- Explore the availability of funds to implement or supplement public outreach programs on conjunctive use.

## TIER II ACTIVITIES

### Technical

The following activities will comprise Tier II.

- Complete a conjunctive use agreement. The agreement will include establishment of a joint cooperative venture that qualifies for funding from outside sources.

- Explore funding sources for joint collaborative projects. Potential sources include CalFed and individual federal and state programs.

- Develop joint facilities needed to implement the conjunctive use agreement.
- Develop a system for an ongoing audit of storage and yield of the basin.

### Public Outreach

Tier II public outreach activities include a targeted outreach program to promote the value of a joint collaborative conjunctive use program among the partners. This work includes the following:

- Developing talking points and issues papers outlining the value to jurisdictions of a joint collaborative program. These tools will be used to obtain support from elected officials and policy makers for a collaborative conjunctive use program.
- Continue outreach and education on the costs and benefits of a conjunctive use program given a possible bond measure or water user rate increase for elected officials, policy makers, and the public. This can include one-on-one meetings with policy makers, continued presentations to businesses and community groups, media briefings, and question and answer sheets on the topic.

## RECYCLED WATER

Recycled water is another water management technique for increasing the reliability of the regional water supply. Like conjunctive use, recycled water can provide water supply benefits to all users in the basin who participate in an agreement to integrate recycled water into the regional water supply.

Under a recycled water program, wastewater from one or more of the treatment plants in the Westside Basin would undergo tertiary treatment and then be distributed for turf and landscape irrigation. The groundwater that would have otherwise been used for irrigation becomes available for municipal and industrial use or can be stored in the groundwater basin for future droughts. By utilizing water that otherwise would be discharged to the Pacific Ocean or San Francisco Bay, a recycled water program would create a new supply that enhances water supply reliability for the region.

### TIER I ACTIVITIES

#### Technical

The following activities will comprise Tier I.

- Develop a model recycled water agreement. The model agreement will describe operational and financial concepts, but will not specify numerical values on water usage or prices.

- Develop financial incentives to encourage golf courses and cemeteries to participate in a recycled water program. Potential financial incentives will include funding from the U.S. Bureau of Reclamation, the California State Water Resources Control Board, and the CalFed program for the Bay-Delta. The incentives will recognize that a diversification of financing sources (e.g., loans and grants, recycled water sales revenues, fixed revenues such as standby charges) is the key to developing a fiscally sound recycled water project.

- Develop a model agreement for the use of recycled water in Lake Merced.

- Upon completion of the draft plan for the Bay Area Regional Recycling Program, identify opportunities for integration with recycled water projects in the Westside Basin.

### Public Outreach

Developing a public education and outreach program that targets messages to policy makers, public agencies, and the general public is key to acceptance of a recycled water program. The Tier I tasks include educating audiences on recycled water use to help preserve existing water sources. This effort will include:

- Education on the value of a recycled use program, existing programs, and possible uses of recycled water.
- Targeted messages for policy makers, elected officials, public agencies, and the general public are recommended. The messages should address concerns about health and safety, the need to replenish existing sources, and future projected water shortfalls.
- Education on the need for a recycled use program given the projected future shortfalls and the need to manage the Westside Basin.
- Investigations into the availability of funds to implement public outreach programs and piggyback on existing outreach efforts.

## TIER II ACTIVITIES

### Technical

The following activities will comprise Tier II.

- Complete a water recycling agreement. The agreement will include establishment of a joint cooperative venture that qualifies for funding from outside sources.
- Develop facilities and infrastructure needed to implement the program described in the agreement.

### Public Outreach

The public outreach efforts in Tier II include a targeted outreach program to promote the value of a joint collaborative recycled water program. This includes continued outreach and education on the costs and water supply gains of a recycled use program, given a possible bond measure or water rate increase.

## SOURCE WATER PROTECTION

Stakeholders have expressed concern about potential contamination of the groundwater supply by methyl tertiary butyl ether (MTBE). Wellhead protection programs can reduce potential groundwater contamination by MTBE as well as other constituents of concern in the Westside Basin.

### TIER I ACTIVITIES

#### Technical

The following activities will comprise Tier I.

- Complete a source water assessment for the Westside Basin using statewide source water assessment methodologies, modified to account for specific hydrologic conditions in the basin. The modifications will include explicit recognition of the depth to well screens and the associated vertical travel times for potential contaminants. The assessment will include identification of potential contamination sites and determination of recharge areas and approximate groundwater-flow paths to the well screens.

- Establish protocols for remediation efforts in conjunction with County offices.

- Develop an agreement with the San Mateo County Department of Health to maintain source water assessment data.

#### Public Outreach

Public outreach at the Tier I level includes collaboration with other agencies moving toward the start of source water protection education and outreach program. This includes:

- Targeted education and outreach on the need for a program and the potential impacts on businesses and individuals because of land use and zoning restrictions. Targeted education can include information dissemination through existing city and county storm water programs.

- Collaborative education efforts with existing storm water and hazardous waste protection programs. This includes collaboration with existing programs in each city and with County efforts.

- Work with statewide source water assessment program to provide education and outreach.

## TIER II ACTIVITIES

### Technical

The following activities will comprise Tier II.

- Complete a one-time sampling and analysis of water samples from monitoring and production wells using age-dating and isotopic techniques. The information will be used to determine recharge rates and potential contaminant travel times to production wells.

- Implement a source water protection program. The program will include developing land use and zoning recommendations for various planning authorities, and establishing mitigation programs to protect source water sites.

### Public Outreach

Tier II work tasks include starting a source water education program. It could begin up to one year before the start of a source water protection program. It can include:

- Posters on source water protection for distribution at public sites within the basin (schools, offices)

- Public service announcements explaining the value and need for source water protection programs.

- Targeted outreach to decision makers and business leaders on the need for a source water program. This includes developing talking points and presentations for individual presentations.

- Develop outreach program that includes speaker's bureau presentations outlining the need for the program and its potential affects on businesses and individual in the source water protection zones.

The following list summarizes the Tier I tasks for each plan element.

## TECHNICAL TASKS

### GROUNDWATER STORAGE AND QUALITY MONITORING

- Data Collection
  - Collect data on monthly deliveries of surface water and groundwater.
  - Establish a groundwater monitoring well network, using existing shallow and deep wells.
  - Collect static water levels semiannually, using a standard field sheet and data collection protocols.
  - Sample monitoring wells semiannually for pH, dissolved solids, alkalinity, chloride, sulfate, calcium, magnesium, sodium, iodide, bromide, nitrate, iron, and manganese.
  - Integrate monitoring activities with data collection efforts to preserve the integrity of Lake Merced and understand its relationship with the underlying shallow aquifer. Support the installation of lake level gauges on North and Impound Lakes and monitoring of groundwater conditions in the shallow and deeper aquifers in areas next to Lake Merced.
- Data Analysis
  - Compile and compute monthly water inflows and outflows to and from the basin (precipitation, surface water deliveries, pumping, potential evapotranspiration, measured and estimate runoff in creeks, and wastewater discharge).
  - Construct time-series plots showing historical water levels in wells.
  - Develop maps showing lines of equal groundwater elevations in the water table and deep aquifer system.
  - Develop maps showing the change in groundwater elevations from the previous monitoring event.

- Construct time-series plot showing historical changes in groundwater storage and pumpage.
- Construct time-series plots showing historical chloride ion concentrations in well-water samples.
- Develop maps showing chloride ion concentrations in well-water samples in the water table and deep aquifer system.
- Construct time-series plots showing historical chloride-to-boron and chloride-to-bromide ratios in well-water samples.

- Data Reporting
  - Develop brief data reports in the form of understandable text and graphics that describe the above analysis.
  - Distribute report copies semiannually to all of the participating agencies, local libraries, San Mateo County, and other interested stakeholders.

SALINE WATER INTRUSION

- Establish a groundwater storage and quality monitoring network.
- Prepare semiannual summary reports for the basin.
- Determine sites needed for saltwater monitoring wells.

CONJUNCTIVE USE

- Develop a model conjunctive use agreement.
- Pursue agreements with participating agencies and other groundwater users to enhance in-lieu recharge.
- Implement the groundwater storage and quality monitoring element in this plan.
- Using data from the monitoring program, conduct an analysis to determine the operational storage capacity of the Westside Basin.

RECYCLED WATER

- Develop a model recycled water agreement.

- Develop financial incentives to encourage golf courses and cemeteries to participate in a recycled water program.
- Develop a model agreement for the use of recycled water in Lake Merced.
- Upon completion of the draft plan for the Bay Area Regional Recycling Program, identify opportunities for integration with recycled water projects in the Westside Basin.

### SOURCE WATER PROTECTION

- Complete a source water assessment for the Westside Basin using statewide source water assessment methodologies, modified to account for specific hydrologic conditions in the basin.
- Establish protocols for remediation efforts in conjunction with County offices.
- Develop an agreement with the San Mateo County Department of Health to maintain source water assessment data.

## PUBLIC OUTREACH TASKS

### GROUNDWATER STORAGE AND QUALITY MONITORING

- Communicate with private well owners
- Develop a database listing of all private well owners within the basin.
- Develop a mailer for distribution to well owners, alerting them of the importance and need to monitor wells.
- Conduct telephone calls or visits, depending on the water usage of the well owner to follow up on potential monitoring activities.
- Prepare a second mailer that discusses some of the positive measures various well owners have taken or are taking to influence those who are not participating.
- Develop presentation package for speakers bureau.
- Provide education on hydrology of the basin, including its relationship to surface water bodies and the need for monitoring.

- Integrate with existing agency speaker's bureau programs and actively maintain a rotating schedule of presentations.

- Use existing mailer text for publication in local agency newsletters to explain the basin and the groundwater storage and monitoring program.

- Include an insert to water bills that reports the relative quantity of groundwater and surface water comprising the local drinking water supply.

CONJUNCTIVE USE

- Meet with other potential partners (jurisdictions) to discuss opportunities (Burlingame, Colma, Millbrae and South San Francisco).

- Conduct an education effort on the value of a conjunctive use program and actions currently in progress.

- Explore the availability of funds to implement or supplement public outreach programs on conjunctive use.

RECYCLED WATER

- Develop educational materials, such as a newsletter, a speaker's bureau presentation, and educational posters, on the value of a recycled use program. Borrow information from the statewide WateReuse program and other successful efforts in southern California and in Santa Clara County.

- Explore the availability of funds to implement public outreach programs and piggyback on existing outreach efforts.

SOURCE WATER PROTECTION

- Develop targeted education and outreach on the need for a program and the potential impacts on businesses and individuals because of land-use and zoning restrictions. Targeted education can include information dissemination through existing city and county storm water programs.

- Collaborate education efforts with existing storm water and hazardous waste protection programs. This includes collaboration with existing programs in each city and with County efforts.

- Work with statewide source water assessment program to provide education and outreach.

The following list summarizes the Tier II tasks for each plan element.

## TECHNICAL TASKS

### GROUNDWATER STORAGE AND QUALITY MONITORING

- Expand Monitoring Activities
  - Install new monitoring wells.
  - Establish program and protocol for monitoring private wells.
- Groundwater Investigation
  - Sample monitoring wells for isotopic and age-dating analysis
  - Characterize recharge rates and sources.

### SALINE WATER INTRUSION

- Install dedicated monitoring wells in key areas.
- Include private wells into monitoring network.

### CONJUNCTIVE USE

- Complete a conjunctive use agreement.
- Explore funding sources for joint projects.
- Develop joint facilities needed for conjunctive use.
- Develop an ongoing audit system.

### RECYCLED WATER

- Complete a recycled water agreement.
- Develop facilities and infrastructure.

### SOURCE WATER PROTECTION

- Complete a one-time sampling of monitoring wells to determine potential contaminant travel times to production wells.
- Implement a source water protection program, including recommendations for land use and zoning.

## PUBLIC OUTREACH TASKS

### GROUNDWATER STORAGE AND QUALITY MONITORING

- Establish a task force to coordinate activities with private well owners.
  - Use private well owner database to develop task force.
  - Meet with affected communities.
  - Evaluate responsibilities of task force.
- Develop educational materials on monitoring program.
  - Write feature articles.
  - Provide educational mailers for water bills.
  - Arrange for speaking engagements.

### SALINE WATER INTRUSION

- If saltwater intrusion is detected by the monitoring program, develop informational materials for public determination.

### CONJUNCTIVE USE

- Develop talking points and issue papers on joint collaboration efforts.
- Continue outreach and education.

### RECYCLED WATER

- Continue outreach and education collaborative efforts.

## SOURCE WATER PROTECTION

- Develop a source water education program, including posters, public service announcements, and public presentations.

The following table provides estimates of staff resources and monetary costs needed to implement the Tier I and Tier II tasks for groundwater storage and quality monitoring. Estimates are preliminary at this time.

| Resources Needed to Implement Groundwater Storage and Quality Monitoring | | | |
|---|---|---|---|
| | Full-Time Equivalent Staff | | Direct Costs ($) |
| | Year 1 | Subsequent Years | |
| **Tier I** | | | |
| Technical | | | |
| Data Collection | 0.50 | 0.30 | |
| Data Analysis | 0.15 | 0.10 | |
| Semi-Annual Reporting | 0.20 | 0.20 | 1,000 |
| Public Outreach | 0.20 | 0.20 | 4,000 |
| Subtotal | 1.05 | 0.80 | 5,000 |
| **Tier II** | | | |
| Technical | | | |
| New Wells for Expanded Monitoring | N/A | N/A | 216,000 |
| Groundwater Investigation | 0.25 | N/A | 20,000 |
| Public Outreach | 0.25 | 0.10 | 2,000 |
| Subtotal | 0.50 | 0.10 | 238,000 |

# TECHNICAL MEMORANDUM NO. 2

## HYDROLOGIC CONDITIONS IN THE WESTSIDE BASIN RELATING TO STAKEHOLDER ISSUES OF CONCERN

PREPARED FOR

**WESTSIDE BASIN PARTNERS**

PREPARED BY

**BOOKMAN-EDMONSTON**
ENGINEERING, INC.

AND

**HYDROFOCUS, INC.**

IN ASSOCIATION WITH

**PUBLIC AFFAIRS MANAGEMENT**

November 1998

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# SECTION 1 INTRODUCTION

In July 1996, the cities of Daly City and San Bruno, the San Francisco Public Utilities Commission, and the California Water Service Company agreed to develop a groundwater management plan for the Westside Groundwater Basin following AB 3030 guidelines. The partnership agreed that groundwater users in the basin would benefit from a management plan aimed at protecting water quality and improving water supply reliability. Consultants were hired to assist in the development of the plan by conducting two simultaneous processes: public involvement to identify stakeholder concerns and technical analysis of the physical conditions in the Westside Groundwater Basin (herein referred to as the "Westside Basin"). This memorandum describes the results of the technical analysis.

The analysis merges the results of the public involvement effort and the available technical information for the Westside Basin. Results are presented that address important stakeholder concerns and provide the technical information needed on key elements of the groundwater management plan. The memorandum also identifies gaps in the available technical data and the associated uncertainties created for water management decisions. Strategies for filling the data gaps and increasing our understanding of physical conditions in the basin will be key elements of the groundwater management plan.

The plan document will incorporate information and analyses presented in this memorandum and will contain recommendations for implementing each element of the groundwater management plan. Recommendations will be based, in part, on the technical information presented here.

The information summarized in this memorandum is based on existing data and reports that have been developed as part of other on-going activities in the basin. A complete bibliography of the sources of data, electronic databases, published and unpublished reports, and maps used for this analysis is provided at the end of this memorandum.

# SECTION 2 HYDROLOGY OF THE WESTSIDE BASIN

The Westside Basin underlies parts of San Francisco and northern San Mateo counties (Figure 2.1). The basin extends from Golden Gate Park in the north and past the San Francisco International Airport in the south. The basin extends to the west beneath the Pacific Ocean at least as far as the San Andreas fault and to the east an unknown distance beneath south San Francisco Bay. The cities of San Francisco, Daly City, South San Francisco, Colma, San Bruno, Millbrae, and parts of Burlingame and Hillsborough lie on top of the basin.

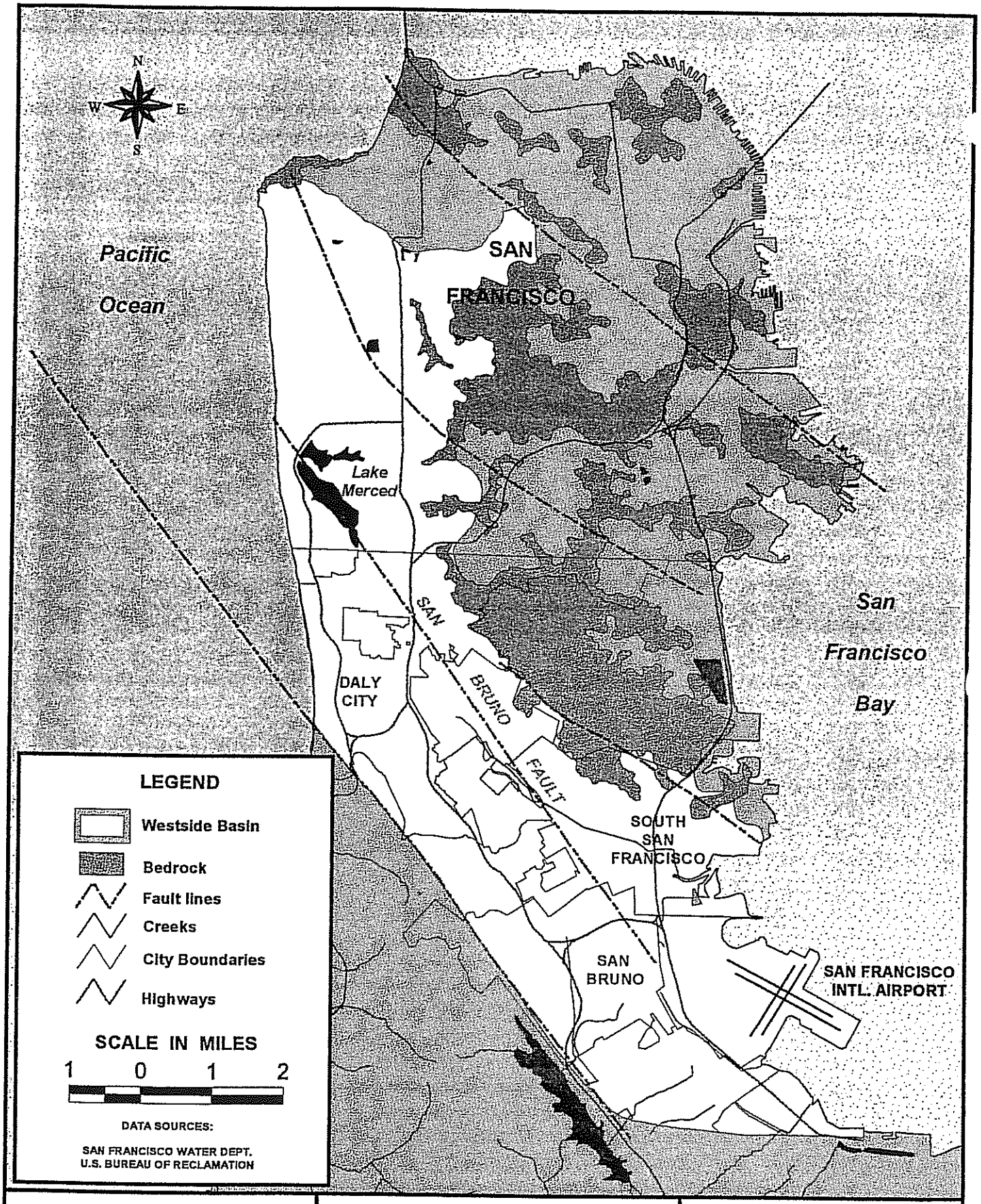
The Westside Basin can be conceptualized as a buried valley, where the walls and floor of the valley are formed by rock. This rock-bordered valley is filled with a mixture of coarse- and fine-grained sediments that can be as much as 3,700 feet thick in parts of the basin. The coarse-grained sediments consist of sand and gravel, and the fine-grained sediments consist of silt and clay. Sand and gravel can transmit substantial quantities of water to wells; whereas, silt and clay impede the movement of groundwater. Where silt and clay deposits form semi-continuous beds, they can effectively isolate the water table from underlying aquifers. Groundwater in the shallow water table aquifer is referred to as "unconfined", and the underlying aquifers separated from the water table by continuous and semi-continuous fine-grained beds is referred to as "confined." Both unconfined and confined conditions are found in the Westside Basin.

## WATER USE

Groundwater pumping in the Westside Basin has provided a reliable water supply for municipal and irrigation uses for more than a century. Approximately 30 percent of the total water use in the basin is currently met by groundwater pumping (Table 2.1). Most of the pumpage in the basin occurs in San Mateo County (Figure 2.2), where groundwater is used to meet municipal demands for water. Pumped groundwater can supply as much as 50 percent of the drinking water to residents of some cities in the basin.

## VOLUMETRIC GROUNDWATER BUDGET

A volumetric groundwater budget is an accounting of water additions and subtractions to the groundwater basin. The difference between the water added and subtracted is balanced by a change in groundwater storage. CH2M Hill (1997) estimated the water inflows, outflows, and storage changes in the Westside Basin during the period 1976-1995. The primary sources of inflow were precipitation and irrigation water moving downwards from the land surface into the groundwater system. Precipitation and irrigation contributed an average recharge of 8,600 and 4,300 acre-feet per year (ac-ft/yr), respectively. Additional sources of water added to the basin include leakage from Lake Merced and small lakes, streams, pipes, sewers, and subsurface inflows from upslope areas and the Pacific Ocean.

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WESTSIDE BASIN
GROUNDWATER MANAGEMENT PLAN

LOCATION OF WESTSIDE BASIN

WESTSIDE BASIN PARTNERS

FIGURE 2.1

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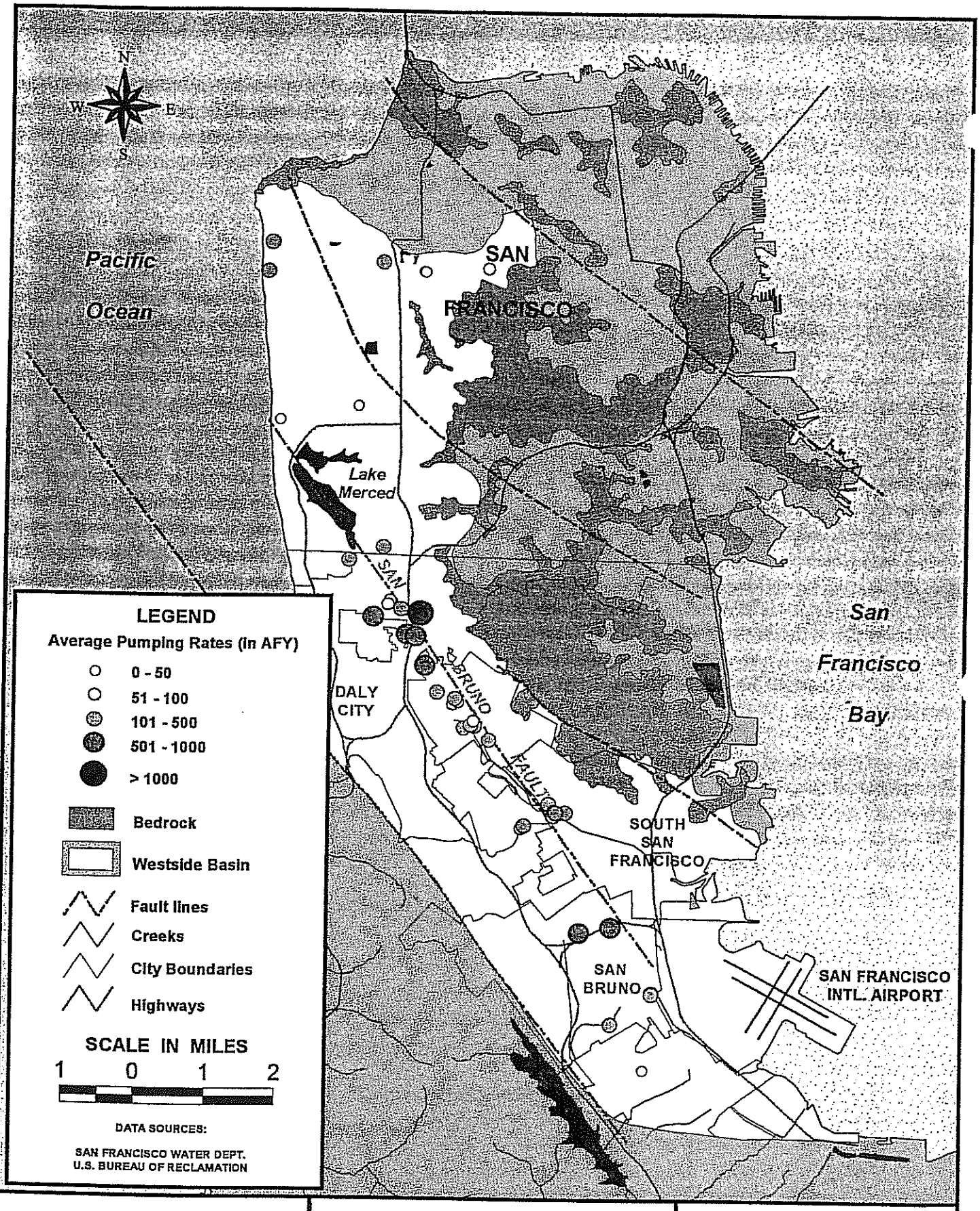
Table 2.1
Annual Water Use in the Westside Basin (1991-95)
(Acre-Feet per Year)

| Well Owner | Groundwater | Surface Water | Total |
|---|---|---|---|
| **Municipal** | | | |
| California Water Service Company | 1,375 | 6,270 | 7,645 |
| Daly City | 4,045 | 3,977 | 8,022 |
| San Bruno | 1,914 | 2,253 | 4,167 |
| San Francisco | | 15,065 | 15,065 |
| **Subtotal** | **7,334** | **27,565** | **34,899** |
| **Irrigation and Parks** | | | |
| Alvord Park | 70 | | 70 |
| California Golf Club | 264 | | 264 |
| Cypress Lawn | 316 | | 316 |
| Edgewood School | 10 | | 10 |
| Elk Glen | 365 | | 365 |
| Eternal Home | 90 | | 90 |
| Golden Gate Park | 881 | | 881 |
| Green Hills | 48 | | 48 |
| Hills of Eternity | 115 | | 115 |
| Holy Cross | 268 | | 268 |
| Home of Peace | 96 | | 96 |
| Italian Cem. | 76 | | 76 |
| Lake Merced Golf Club | 454 | | 454 |
| Olivet | 191 | | 191 |
| Olympic Club | 401 | | 401 |
| Fleishacker Zoo | 18 | | 18 |
| San Francisco Golf Club | 192 | | 192 |
| Woodlawn | 182 | | 182 |
| **Subtotal** | **4,036** | | **4,036** |
| **TOTAL** | **11,370** | **27,565** | **38,935** |

Sources: San Francisco Water Department (1996); California Water Service Company, Daly City, and City of San Bruno (written communication).

Pumpage is the primary outflow from the Westside Basin, averaging 11,100 ac-ft/yr during the period 1976-1995. Water subtractions also include seepage to lakes and streams and subsurface outflow to the Pacific Ocean and south San Francisco Bay.

The difference between water inflows and outflows is balanced by a change in the amount of water stored in the basin. Similar to a reservoir or lake, if more water is added than is subtracted the amount of water in the lake increases. Conversely, if more water is subtracted than is added the amount of water in the lake decreases. During the period 1976-1995, groundwater storage in the Westside Basin increased in some years and

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WESTSIDE BASIN
GROUNDWATER MANAGEMENT PLAN
AVERAGE ANNUAL
PUMPING RATES, 1991-1995
WESTSIDE BASIN PARTNERS

FIGURE 2.2

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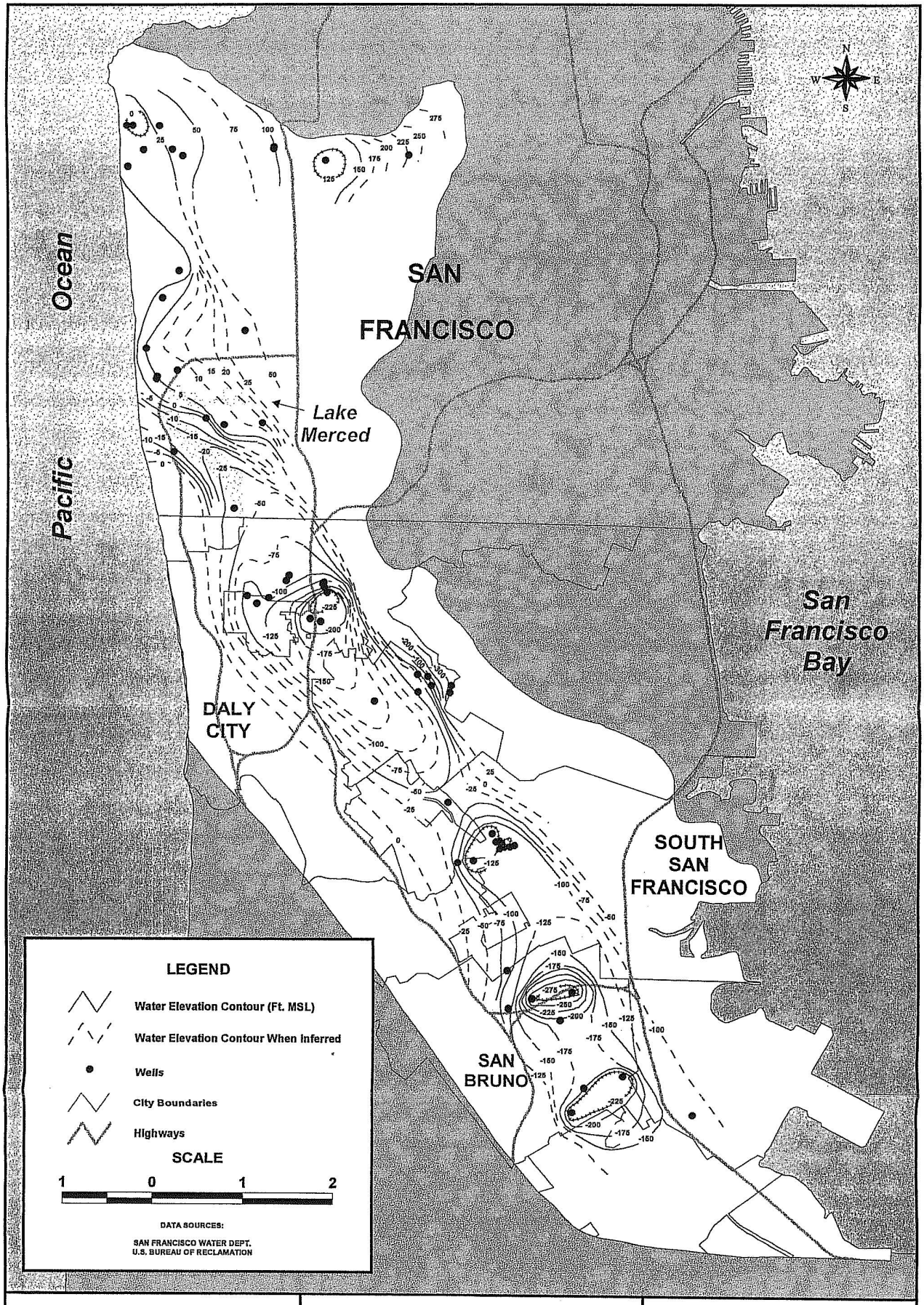
decreased in others. On the average, storage decreased by about 250 ac-ft/yr, equal to a cumulative net storage decrease of 5,000 acre-feet over the 20-year period. CH2M Hill (1997) estimated total groundwater storage in the Westside Basin at about one million acre-feet. Thus, the cumulative net decrease in groundwater storage during the 1976-1995 period is about 0.5 percent of total storage in the basin.

## GROUNDWATER LEVELS IN WELLS

Groundwater levels in wells are used to determine groundwater flow directions and storage volumes. A change in water level from one location to another will generally induce groundwater movement from areas of high groundwater levels towards areas of lower groundwater levels. A change in groundwater levels over time is an indication of a change in groundwater storage. Increasing groundwater levels indicate increasing storage, while decreasing levels indicate decreasing storage.

Water levels measured in wells in the Westside Basin show the patterns of groundwater movement in the deep parts of the basin (Figure 2.3). In the north, groundwater moves from east to west, and most of the water added to the basin discharges to the Pacific Ocean. In the south, groundwater moves toward pumping centers within Daly City, San Bruno, and South San Francisco. The water levels also suggest that groundwater beneath the Pacific Ocean and South San Francisco Bay is moving in a landward direction. Landward flows from beneath these saltwater bodies suggest saltwater intrusion may be occurring within the Westside Basin. Chloride data from municipal supply wells, however, do not indicate any significant impact from intrusion on groundwater supply, as described in Section 3 of this report.

Water levels in the deep aquifer have been fairly steady since 1965 (Figure 2.4). The annual and seasonal variations in water levels parallel the annual and seasonal variations in weather. For example, Phillips and others (1993) reported declining trends in water levels in the City of San Francisco and the Lake Merced area during the period 1987-92. They attributed the decline in water levels to reduced groundwater recharge during the concurrent drought. Seasonal variations in water levels also reflect seasonal changes in pumping.

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BOOKMAN-EDMONSTON ENGINEERING, INC.

WESTSIDE BASIN GROUNDWATER MANAGEMENT PLAN

LINES OF EQUAL GROUNDWATER ELEVATIONS, SPRING 1996

WESTSIDE BASIN PARTNERS

FIGURE 2.3

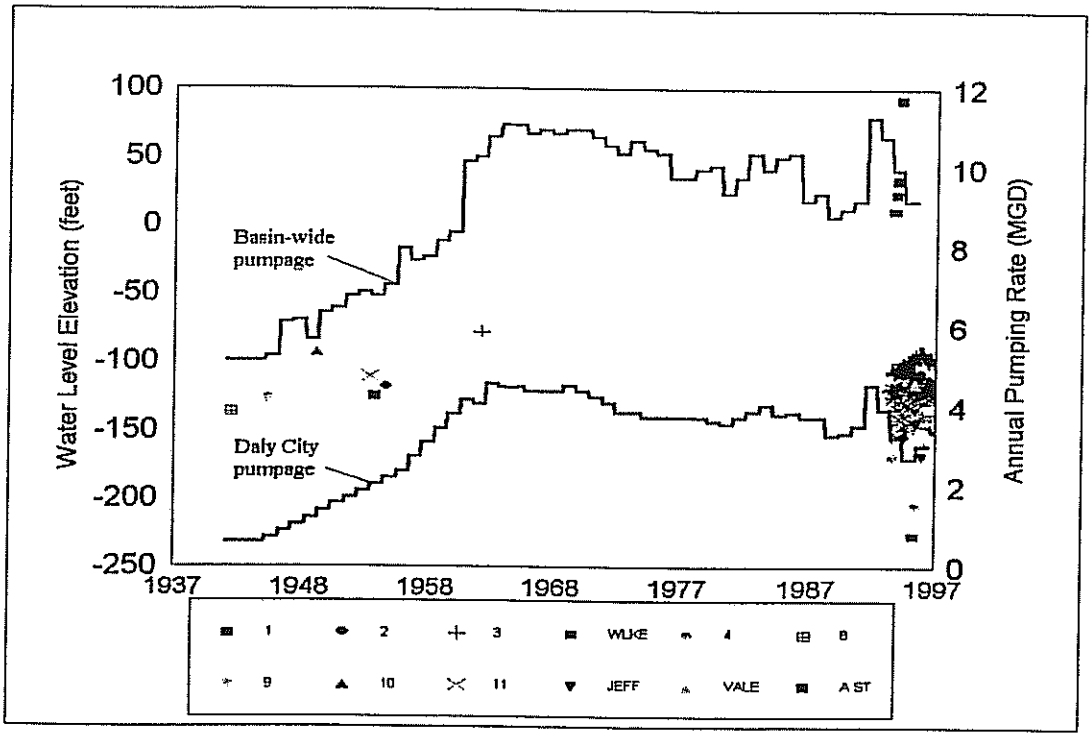



Figure 2.4a Groundwater Levels in Deep Wells Located in Daly City (1937-1997)

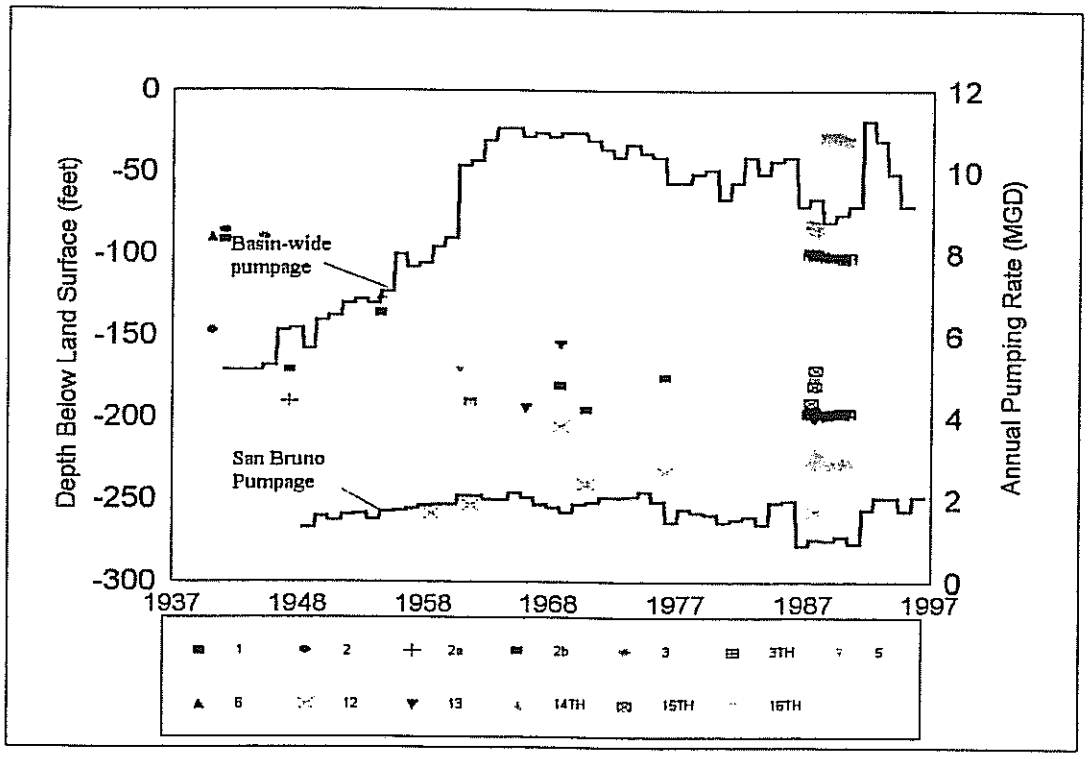



Figure 2.4b Groundwater Levels in Deep Wells Located in San Bruno (1937-1997)

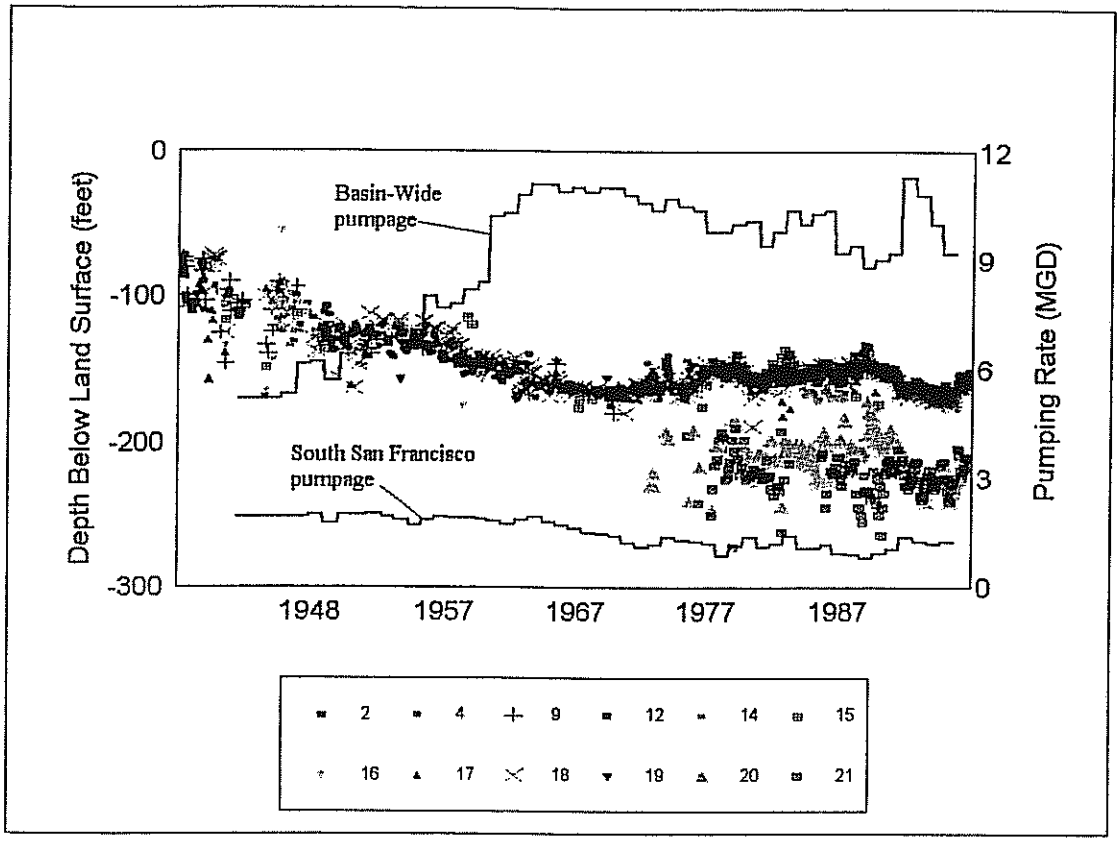



**Figure 2.4c Static Depth to Water in Deep Wells Located in South San Francisco (California Water Service Company) (1937-1997)**

# SECTION 3 PUMPING EFFECTS ON THE HYDROLOGY OF THE WESTSIDE BASIN

## GENERAL PRINCIPLES

Initially, the water in any well is in equilibrium with the groundwater in the adjacent aquifer. When the well pump is activated, water is removed from the well and the water level within the well declines. The lower water level induces the inflow of water from the adjacent aquifer, causing a reduction of water levels within the aquifer. The lowering of water levels in the well and aquifer is referred to as the cone of depression (Figure 3.1). The cone of depression can extend from a few feet to several thousand feet from the well, depending upon the pumping rate and the hydrogeologic properties of the aquifer. Where multiple wells are pumping, their pumping effects on groundwater levels are additive (Figure 3.2).

Pumping from a well perforated in an unconfined water table aquifer results in a lowering of the water table. The water extracted by the well comes from the dewatering of the aquifer (Figure 3.1a), where the void space between solid aquifer particles empties of water and fills with air. Because the pumping results in a direct lowering of the water table, wells perforated in the water table aquifer have a direct impact on the water table.

In contrast, pumping from a well perforated in a confined aquifer does not normally cause a dewatering of the aquifer (Figure 3.1b). Pumping decreases the hydraulic pressures within the aquifer near the well, inducing groundwater movement into the well. Most of the water extracted by the well is from groundwater moving horizontally toward the well. The effects of de-pressuring spread throughout the groundwater system, where the direction and the rate of the effects depend upon the pumping rate and the hydrogeologic properties of the aquifer. The effects are generally greatest in horizontal directions and smallest in vertical directions. Additionally, the effects on an overlying water table aquifer will be attenuated by the fine-grained sediments that separate the aquifers. Because the pumping does not result in a direct lowering of the water table, wells perforated in a confined aquifer have an indirect impact on the shallow water table.

In San Mateo County, groundwater elevations measured in wells show large cones of depression as a result of decades of pumping from numerous municipal and private wells (Figure 2.3). These wells are pumping from deep aquifers, which are separated from the overlying water table by beds of silt and clay. Pumping from these deep wells can increase downward leakage from the water table, but most of the extracted water comes from horizontal movement within the deep aquifers. Hence, pumping from most wells in the Westside Basin has an indirect impact on the water table.

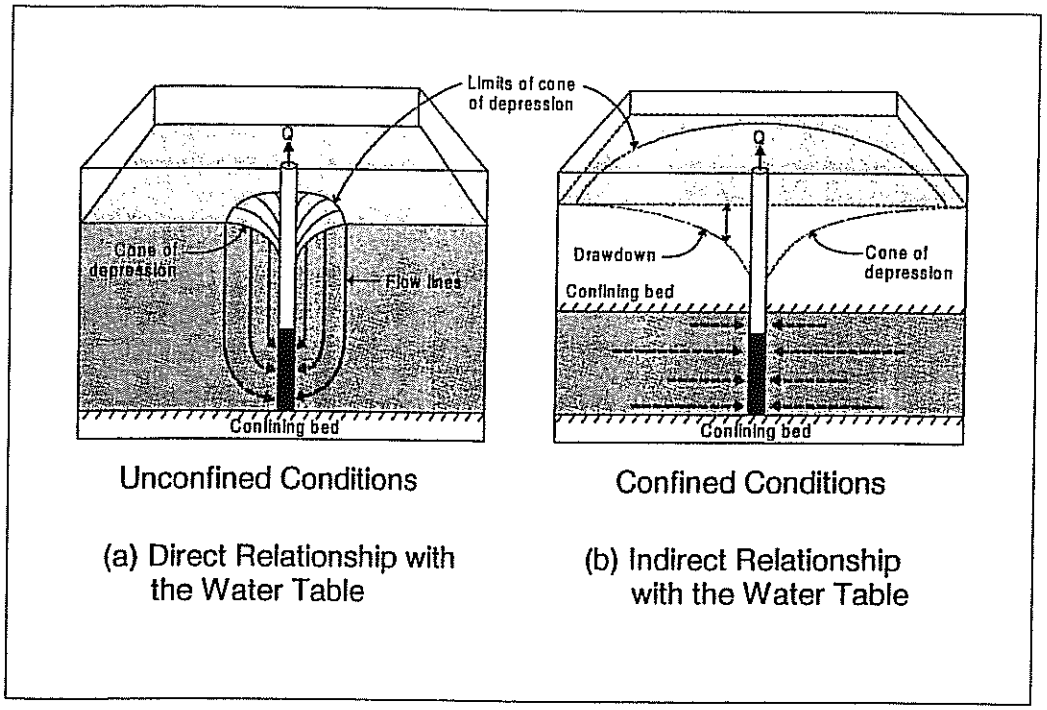



**Figure 3.1 Sources of Water to a Pumping Well Under Unconfined and Confined Conditions**

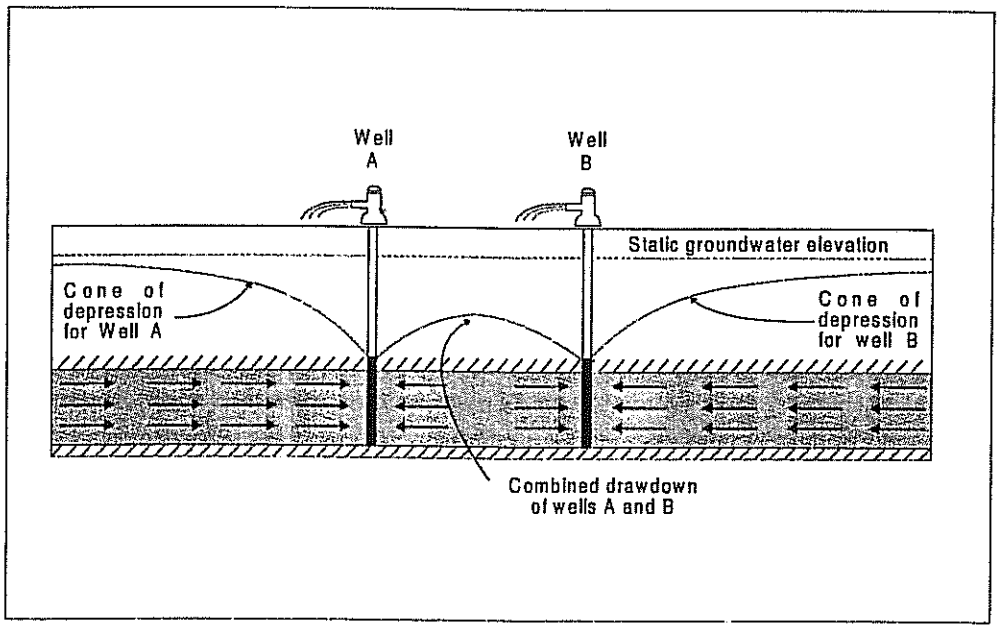



**Figure 3.2 Hydraulic Interference Between Pumping Wells**

## LAKE MERCED

Lake Merced was originally developed as a potable water supply for San Francisco in the 1870s by the Spring Valley Water Company. Since 1950, under a memorandum of understanding between the San Francisco Public Utilities Commission and the San Francisco Recreation and Parks Department, the lake has been developed for beneficial recreational uses and has maintained its status as an emergency water supply (Geo/Resources Consultants, Inc., 1993). Lake Merced is hydraulically connected to the shallow water table system. Historically, the natural movement of groundwater in the Lake Merced area was westward and toward the Pacific Ocean (Bartel, 1913). Groundwater seeped into the lake from the east and leaked out from the west and into the Pacific Ocean.

Seasonal and annual water levels in Lake Merced have shown a net decline and recovery of about seven feet during the last decade (Figure 3.3). Long-term declines in lake levels have coincided with several droughts, the most severe occurring during 1977-78 and 1987-92 (San Francisco Water Department, 1996). Reduced surface water inflows from precipitation and diversion of stormwater runoff that formerly entered the lake have contributed to the net decline in lake levels. In contrast, during the wet period 1994-1997, greater rainfall and approximately 400 acre-feet of surface water added to the lake contributed to a net increase of more than 6 feet in lake levels (San Francisco Water Department, 1996).

Figure 3.3 shows that lake levels respond consistently to changes in precipitation and that lake levels exhibit a weak or zero response to changes in pumpage. Figure 3.3a compares lake levels to the annual precipitation change from the long-term annual average. The zero line and a wet year plots above. Figure 3.3b shows annual basin-wide pumpage and surface water additions to the lake. Lake levels declined about six feet during the period 1987-1991, when precipitation was very low. In contrast, pumpage was about average during this period. Lake levels increased during 1994-1997, when precipitation was high and pumpage was slightly above average. During 1992-1993, the lake level went up and then down, consistent with precipitation. Pumpage was high during this period.

The effect of pumping from deep wells on water levels in Lake Merced is determined by the magnitude of two distinct hydraulic connections: the connection between the deep aquifer and the shallow water table, and the connection between the water table and Lake Merced. Like water flowing through a pipe with two valves, the relationship between pumping and Lake Merced is controlled by the two distinct connections. The connection between the deep aquifer and the water table is known to be indirect, while the connection between the water table and Lake Merced is uncertain. The uncertainty derives from insufficient data. Whatever the degree of connection between the water table and Lake Merced, the effect of pumping from deep wells on water levels in Lake Merced is indirect.

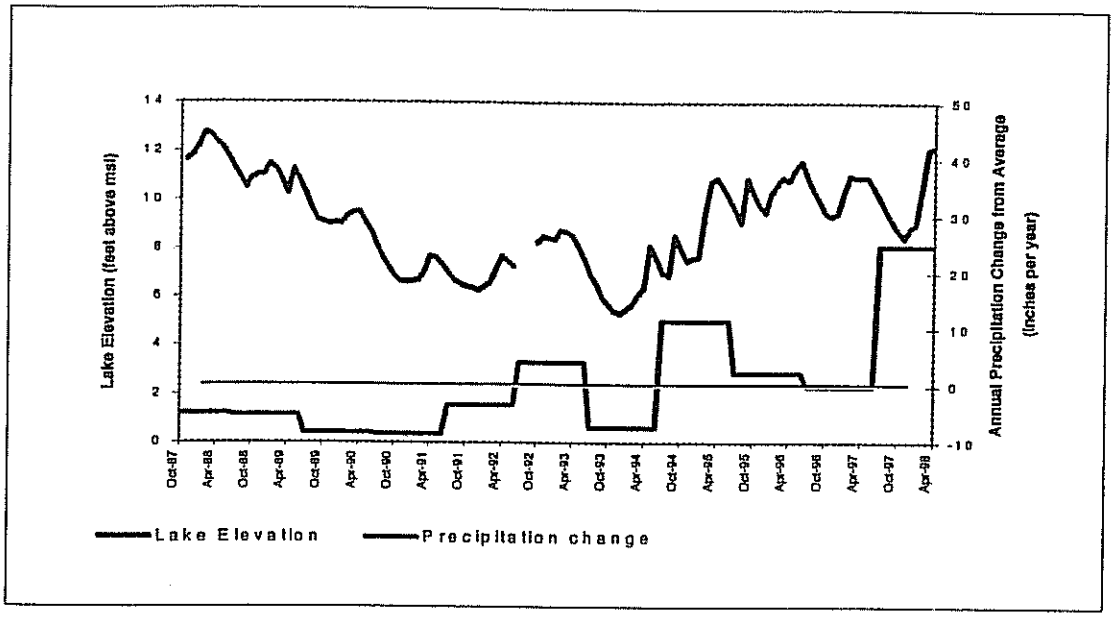



Figure 3.3a Lake Merced Water Levels and Annual Precipitation (1987-1998)

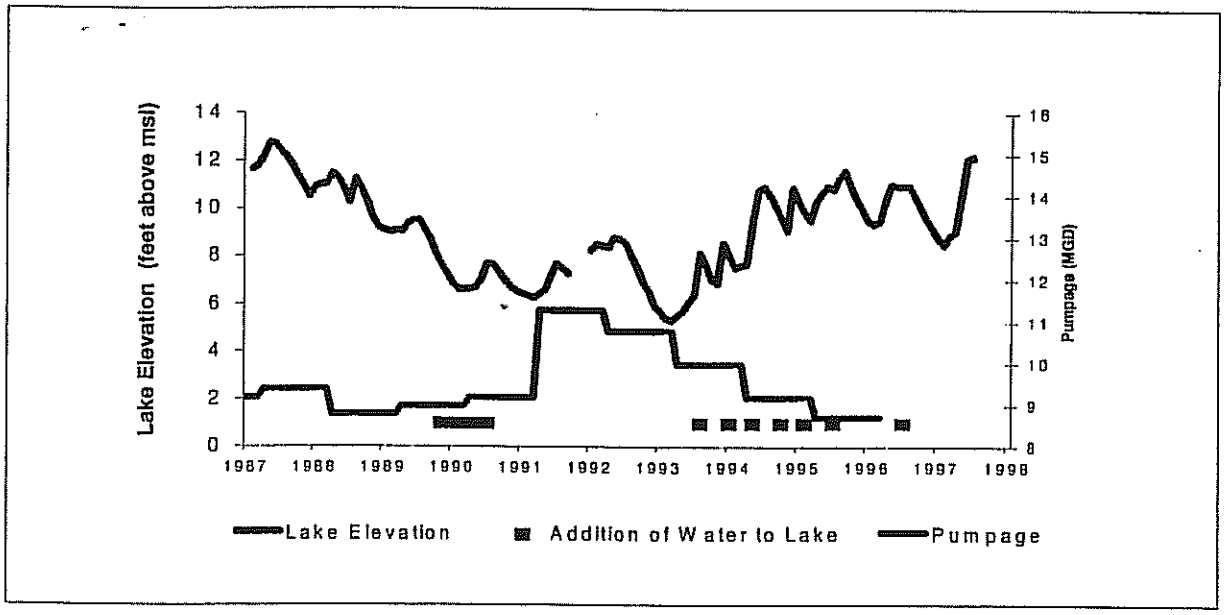



Figure 3.3b Water Levels, Annual Basin-Wide Pumpage, and Surface Water Additions to Lake Merced (1987-1998)

The indirect relationship between deep pumping wells and Lake Merced explains why leakage rates from the lake are small relative to pumpage in the Westside Basin. For example, previous studies by the U.S. Geological Survey (Yates and others, 1990) and CH2M Hill (1997) suggest that leakage from Lake Merced represents 0.2 to 3.8 percent of the pumpage in the Westside Basin. Volumetric water budgets calculated for Lake Merced conclude that evaporation is the primary water subtraction from the lake, comprising between 49 and 85 percent of the total lake outflows (Yates and others, 1990; CH2M Hill, 1997). Accordingly, increasing surface water inflows is a more effective strategy for increasing and managing lake levels than is curtailing pumpage in the Westside Basin (Geo/Resource Consultants, Inc., 1993).

## SALTWATER INTRUSION

Saltwater intrusion is a potential concern in the Westside Basin because the Pacific Ocean and south San Francisco Bay are located at the western and southeastern boundaries of the basin. Drawdowns from pumping can induce the movement of saltwater into the aquifer and increase the salinity of water produced by wells. The potential for saltwater intrusion can be identified from maps showing lines of equal groundwater levels. Groundwater levels measured in wells tapping the deep aquifer suggest that groundwater beneath the Pacific Ocean is moving inland (Figure 2.3). For example, CH2M Hill (1997) reported modeling results indicating that approximately 1,300 ac-ft/yr of subsurface inflow to the basin originates in the Pacific Ocean. Similarly, groundwater levels in the deep aquifer near the San Francisco International Airport were more than 40 feet below mean sea level (Guidetti and Schaefer, 1995), suggesting that bay water is moving downward and toward inland pumping centers located northwest of the bay.

Because groundwater moves slowly, decades may be required for salt-affected groundwater to reach pumping wells in the Westside Basin. For example, Guidetti and Schaefer (1995) reported tritium data for well water samples from nine wells located in the cities of San Bruno and South San Francisco. The tritium data indicated that the water pumped by these wells entered the groundwater system more than 40 years ago. Tritium data from a deep well located at the San Francisco International Airport also indicated that the groundwater was "old" water. Trends of increasing salinity in groundwater could be gradual over time and therefore difficult to detect without relatively long-term records.

Chloride is the major anion in ocean and bay waters, and increasing chloride ion concentrations in groundwater may be the first indication of saltwater contamination. Chemical data for samples from most municipal supply wells in the Westside Basin do not show clear trends or substantial increases in chloride ion concentrations (Figure 3.4). In some wells, however, chloride ion concentrations have been increasing gradually. For example, several wells in Daly City indicate an average increase in chloride of between 0.5 and 1.0 milligrams per liter (mg/L) per year (Figure 3.4a). For example, chloride concentrations in well number 4 have increased approximately 15 mg/L over a 20-year period. Similarly, chloride ion concentrations in water produced by California Water

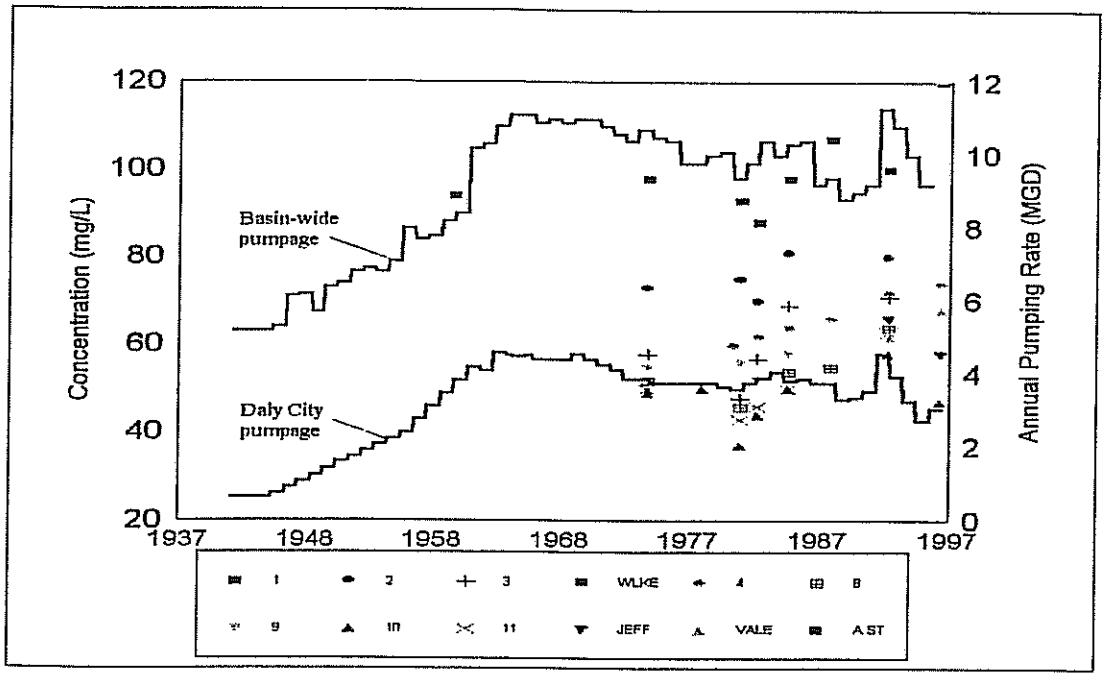



**Figure 3.4a Chloride Ion Concentrations in Samples from Water Supply Wells in Daly City**

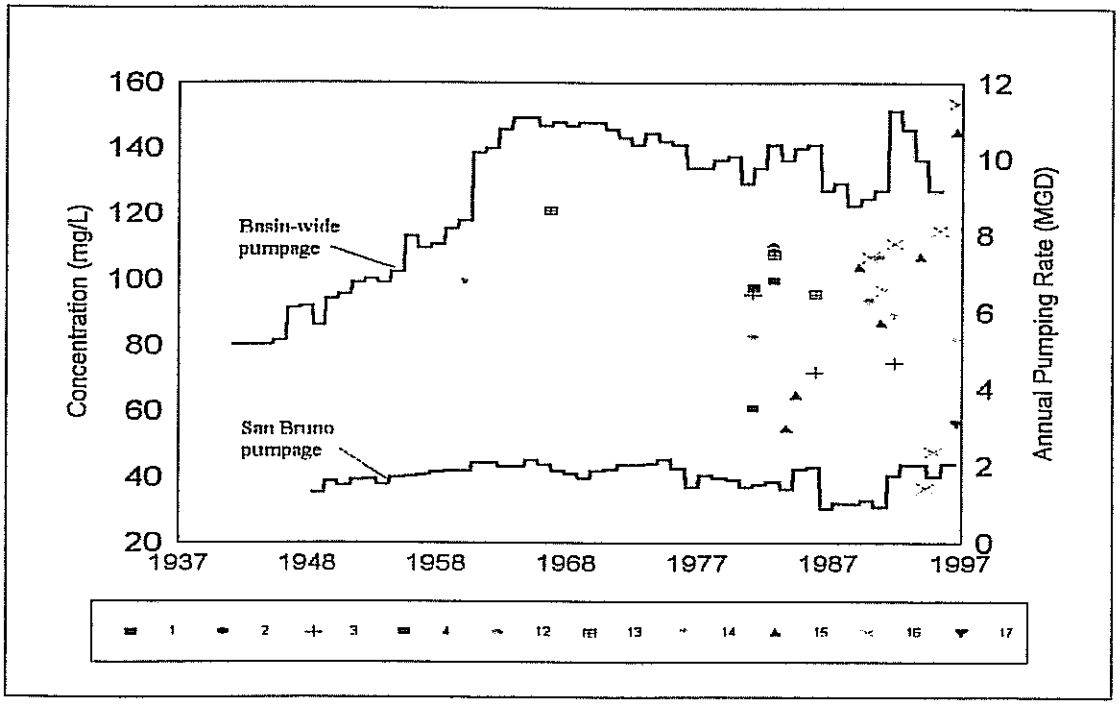



**Figure 3.4b Chloride Ion Concentrations in Samples from Water Supply Wells in San Bruno**

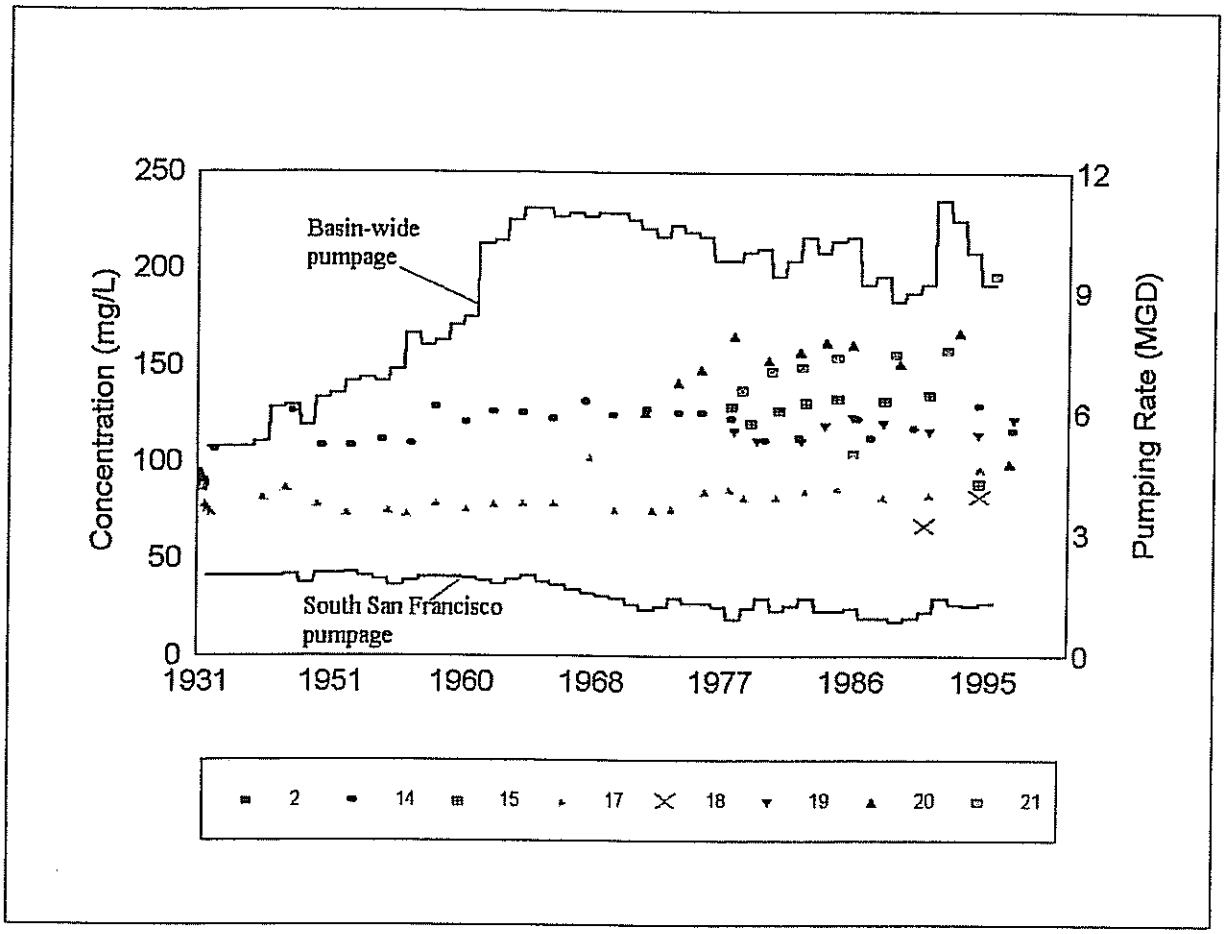



**Figure 3.4c Chloride Ion Concentrations in Samples from Water Supply Wells in South San Francisco (California Water Service Company)**

Service Company wells 20 and 21 have been increasing on the average by 1 to almost 3 mg/L per year (Figure 3.4c). The relatively modest increases in chloride ion in the Daly City wells could be the consequence of seawater intrusion if the forward edge of the seawater wedge was gradually mixing with relatively fresh groundwater. In south San Francisco, however, wells owned by the California Water Service Company located closer to south San Francisco Bay than wells 20 and 21 produce water with relatively constant concentrations of chloride ion. If direct intrusion of bay water were the source of chloride ion in wells 20 and 21, one would expect similar trends in the other nearby wells.

The upward movement of older, briny groundwater from underlying clays is also a plausible explanation for the increasing chloride ion concentrations in the Daly City and California Water Service Company wells (Applied Consultants, 1991; Phillips and others, 1993). The depth of these wells range from 500 to almost 600 feet beneath the land surface, and their well screens are separated from the water table and shallow aquifers beneath the ocean and bay by silt and clay deposits. These deposits impede the movement of salts and water from the shallow water table to the deep aquifers tapped by the pumping wells. Additional water level and water chemistry data are needed to identify the source of increasing chloride ion concentrations in the Westside Basin and its long-term implications for the quality of groundwater produced by pumping wells.

## WELLHEAD PROTECTION

Stakeholders have expressed concern about potential contamination of the groundwater supply by methyl tertiary butyl ether (MTBE). MTBE is a chemical added to gasoline that is very soluble in water and extremely slow to biodegrade. MTBE in groundwater can originate directly from leaking underground fuel storage tanks or indirectly in percolating rainfall and stormwater runoff. Rainfall can "wash out" MTBE from the atmosphere, and runoff can gather MTBE residue from roads and parking lots. MTBE is a concern as a risk to human health and as a cause of poor odor and taste in drinking water. Due to its chemical properties, MTBE can be smelled and tasted at levels below the federal and state health advisory levels.

MTBE is less dense than water and under ideal conditions will "float" on the water table. Once it is introduced into an aquifer, MTBE can move to deeper parts of the system in response to pumping from nearby wells and recharge from water infiltrating past the soil surface. Accordingly, the potential introduction of MTBE within the regional recharge and discharge patterns shown in Figure 2.3 can impact the quality of the drinking water supply in the Westside Basin. Wellhead protection programs can reduce potential groundwater contamination by MTBE, as well as other constituents of concern in the Westside Basin.

Wellhead protection programs are designed to meet three objectives:

1. *Reduce or eliminate contamination.* Strategies can include public education, acquisition of lands, monitoring, promoting best management practices, zoning ordinances, subdivision controls, well permitting, and health regulations.

2. *Provide for alternative sources of emergency drinking water.* In the Westside Basin, potential water sources include groundwater, local runoff, and imported surface water.

3. *Plan for new wells and their protection areas.* Planning accounts for the amount and types of development surrounding potential future well sites, groundwater gradient and aquifer characteristics beneath the sites, and existing water quality in the aquifer.

In the Westside Basin, wellhead protection areas reflect the major pumping centers. Protection areas can be identified by the regional recharge and discharge patterns shown in Figure 2.3, and by the groundwater flow patterns near individual pumping wells.

The most appropriate means for delineating wellhead protection areas include a combination of hydrogeologic mapping and numerical modeling of groundwater flow and contaminant transport. An inventory of potential and confirmed soil and groundwater contamination sites located within the protection area is then completed to assess the risk of contamination to groundwater produced by the well. Previous studies have estimated the protection areas and contamination risk of municipal supply wells in Daly City and the greater San Bruno area using existing hydrogeologic data and analytical methods (Lee, 1993; Guidetti and Schaefer, 1995). These studies concluded that the areas contributing groundwater to pumping wells ranged from about 1,000 feet to more than one mile in diameter. Leaking Underground Fuel Tank (LUFT) sites within these areas were considered to represent the most serious threat to the groundwater supply because of the confirmed existence of soil and/or groundwater contamination. For example, Lee (1993) concluded that at the time of her study there were seven contamination sites within the protection areas of Daly City drinking water wells. Similarly, more than 20 LUFT sites were identified in the wellhead protection areas mapped in the greater San Bruno area by Guidetti and Schaefer (1995).

These studies confirm that land use activities within the Westside Basin can potentially impact drinking water quality produced by wells. Changes in land use may be necessary to minimize the risk of contamination to water supply wells in the basin. Implementing a wellhead protection program will therefore require both political support and technical input. Because restrictions on land use are a concern of stakeholders in the basin, reliable technical information is needed to support local and site-specific land use decisions. Additional analyses will therefore be needed to accurately represent groundwater movement to wells and quantify the relationship between contaminant mass and concentration to the magnitude and timing of impacts at the well. Public education will be needed to communicate the results of these analyses and explain their implications for land use decisions and drinking water quality.

# SECTION 4 RECYCLED WATER

Recycled water is a major component of regional water use in other parts of California, particularly southern California where there are over 50 projects delivering recycled water. Use of recycled water is supported by regulatory and planning agencies and provides economic benefits to voluntary participants within a regional setting. Under a water recycling program, water that is otherwise discharged to the Pacific Ocean or San Francisco Bay would be used primarily to irrigate turf and landscaping. The groundwater that would have been used to irrigate these areas becomes available for municipal and industrial use or remains within the basin for future use. Recycled water thereby becomes a new supply of water and enhances the long-term water reliability for the basin.

Treated wastewater in the basin is discharged from the Oceanside Water Pollution Control Plant, the Daly City Water Quality Control Plant, and the South San Francisco-San Bruno Water Quality Control Plant. The Oceanside Water Pollution Control Plant was brought online in 1994 and serves the west side of the City of San Francisco. The wastewater treatment plant in Daly City serves the North San Mateo County Sanitation District comprised primarily of Daly City and the Westborough Water District. The South San Francisco–San Bruno wastewater treatment plant serves the cities of South San Francisco and San Bruno, but also discharges treated wastewater from Burlingame, Millbrae, and the San Francisco International Airport as parts of the North Bayside System Unit.

Discharge through the two plants in San Mateo County from Daly City, City of San Bruno, and City of South San Francisco is approximately 16,600 ac-ft/yr. On the average, annual wastewater discharge from the two plants represents more than 80 percent of the total municipal water supply to these three cities (Figure 4.1). More than half of the average annual discharge occurs during the months of May through November (10,600 ac-ft/yr). The potential supply of recycled water from these three cities is more than double the annual groundwater pumpage for irrigation of parks, golf courses, schools, and cemeteries in the Westside Basin (approximately 4,000 acre-ft/year). Therefore, while the necessary hydrologic conditions exist to develop a recycled water program, it will most likely require creative and innovative approaches to secure users willing to voluntarily accept this potential supply.

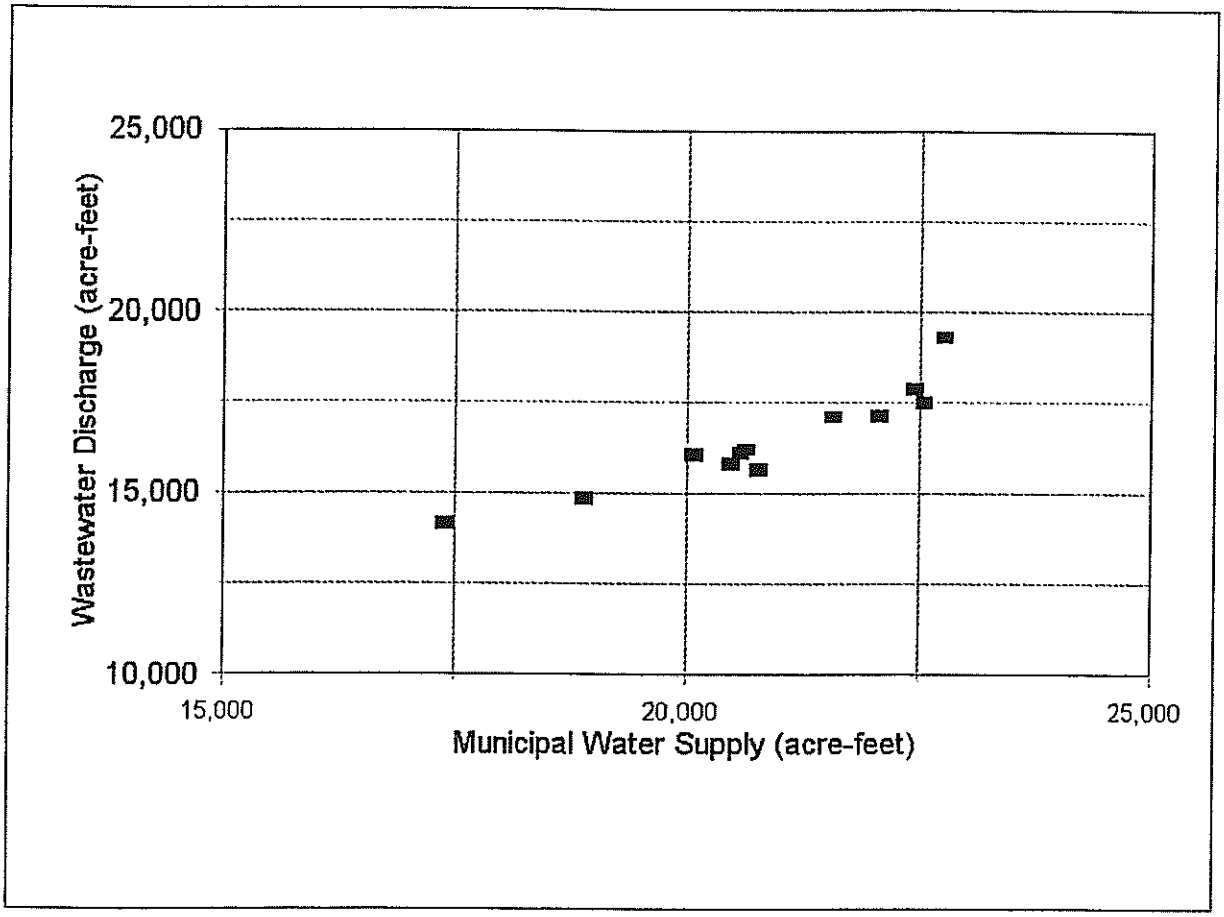



**Figure 4-1 Annual Wastewater Discharge and Water Deliveries for Daly City, San Bruno, and South San Francisco (1986-1995)**

# SECTION 5 CONJUNCTIVE USE

Conjunctive use is the coordinated use of surface water and groundwater to ensure a reliable water supply. During wet years when surface supplies are plentiful, surface water is delivered to water users that otherwise rely on groundwater, allowing the underground reservoirs to fill with water. During dry years when runoff is reduced and surface water supplies are scarce, greater reliance is placed on groundwater storage. Conjunctive use requires a source of imported water, an underground reservoir for storing water, and a mechanism for getting the water into the ground. All of these requirements exist in the Westside Basin.

Imported surface water is delivered to retailers in the Westside Basin through the San Francisco Public Utilities Systems (PUC) system. Bookman-Edmonston (1993) conducted a study for the San Francisco Water Department that concluded additional capacity exists in the San Francisco PUC system to deliver water to the Bay Area. During years of average runoff, the system could deliver an additional 30 to 40 million gallons per day (mgd) during the winter months and an additional 20 mgd during the summer months. During dry years, the system could deliver an additional 30 mgd in several winter months and about 5 mgd during most summer months. The demand pattern and the available storage facilities restrict the capability of the San Francisco PUC system to deliver this additional water, and additional storage facilities are needed to take advantage of this extra potential yield.

The aquifers within the Westside Basin represent a potential means for storing imported surface water and therefore could be used to increase the long-term yield of the San Francisco PUC system. The basin has been used for more than a century, and wells in the basin currently provide a substantial proportion of the municipal water supply to the communities of Daly City, San Bruno, and South San Francisco. These communities rely on 75 to 90 percent of their total pumping capacity to meet between 30 to 50 percent of their municipal supply (Table 5.1).

Imported water and local runoff can be stored in the basin using either active or passive methods. Examples of active groundwater replenishment include recharge ponds, injection wells, and temporary or permanent retention facilities on local creeks. Active groundwater replenishment has been conducted in Alameda and Santa Clara Counties for decades, and their efforts have consisted of increased conservation of natural runoff and storing imported water in local aquifers. Passive groundwater replenishment, or "in-lieu recharge," increases surface water use during periods of adequate runoff. The greater use of surface water allows groundwater storage to increase as a result of reduced pumpage and greater deep percolation of imported surface water. The water stored in the groundwater basin is then available for use during periods of reduced runoff.

While many of the hydrologic and infrastructure elements of a successful conjunctive use program are already in place, complex institutional and economic issues remain to be resolved. Wet year deliveries may be currently restricted by hydropower demands on the

Hetch Hetchy system and by agreements between the San Francisco PUC and other water users in the Tuolumne Basin. Agreements between the PUC and the Bay Area Water Users Association may also require amendments to implement conjunctive use.

**Table 5.1**
**Total Water Demand, Groundwater Use, and Reported Pumping Capacity in 1996**
**(MGD)**

| Well Owner | Total Demand (1996) | Demand Met By Groundwater | Capacity to Produce Groundwater |
|---|---|---|---|
| **Municipal** | | | |
| California Water Service Company | 7.5 | 1.3 | 1.7 |
| Daly City | 7.9 | 3.1 | 4.0 |
| San Bruno | 4.3 | 2.1 | 2.4 |
| San Francisco | 15.1 | 2.0 | 2.0 |
| **Total** | **34.8** | **8.5** | **10.1** |

**Notes:**
1995 data is used for "Demand Met By Groundwater" for Californa Water Service Company.
Capacity to produce groundwater by San Francisco reported as estimated pumping rate.

# SECTION 6 DATA LIMITATIONS

Evaluating basin-wide groundwater flow and storage is challenging because the resource is located beneath land surface and is therefore difficult to measure. Engineers and scientists conducting an assessment of the resource rely in part on the ability to extrapolate limited data over relative large areas. Figures 6.1 and 6.2 show the locations of wells where water level and water quality data have been recently collected in the Westside Basin. A considerable amount of data has been collected, compiled, and analyzed for primarily public supply wells in the Westside Basin. Consequently, data are lacking from substantial portions and key areas of the basin. These include upslope portions of the basin that can be important locations of groundwater recharge, areas served by private wells (or where wells are currently absent), and near critical boundaries like the Pacific Ocean and south San Francisco Bay.

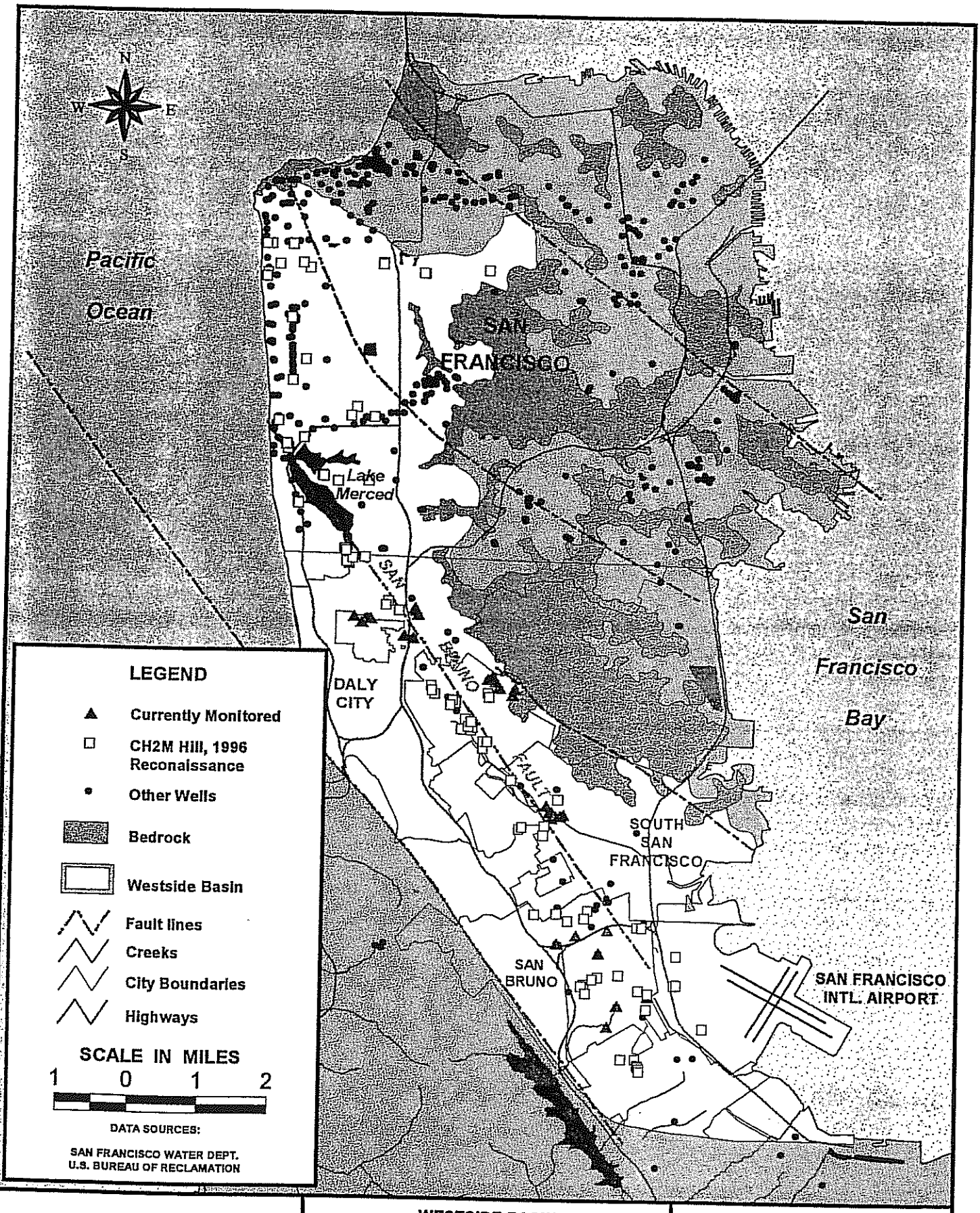
Data limitations can be addressed with the addition of new monitoring locations, improved coordination between data collection agencies, and uniform and accessible data storage and reporting protocols. A basin-wide monitoring program can be achieved by integrating local data collection activities and expanding efforts to improve the distribution of data points across the basin. This information is needed to understand groundwater flow rates and directions, sources of water to pumping wells, and changes in groundwater storage and quality over time. Additional geologic and geophysical information from boreholes, water levels from wells, and chemical, isotopic and age-dating information from well water samples are needed to help answer the following questions, which have been raised by stakeholders and will affect water management decisions in the Westside Basin.

*Are there barriers to groundwater flow in the Westside Basin?*

The layering of aquifers and confining beds, folding of geologic formations and faulting can create barriers to groundwater flow. These barriers can impact measured water levels and the sources of water produced by pumping wells in the Westside Basin. For example, previous studies could not confirm or refute the possibility of clay barriers between the ocean and inland pumping wells. If such barriers exist, it reduces the risk of saltwater contamination in the Daly City area. Similarly, the San Bruno Fault extends northwestward from south San Francisco Bay and passes through Lake Merced. Fine-grained materials associated with fault zones can impede the lateral movement of groundwater, and affect the vertical movement of water between shallow and deep groundwater. Pumping wells in the basin are located east and west of the San Bruno Fault, and the connection between groundwater on either side of the fault is not understood. If the fault were a partial barrier to flow, it would affect the sources of water produced by pumping wells.

*What are groundwater flow directions and storage volumes in the Westside Basin?*

Most of the water level data for the Westside Basin are from active production wells that pump water from the deep aquifer. Consequently, most of the water levels and resulting

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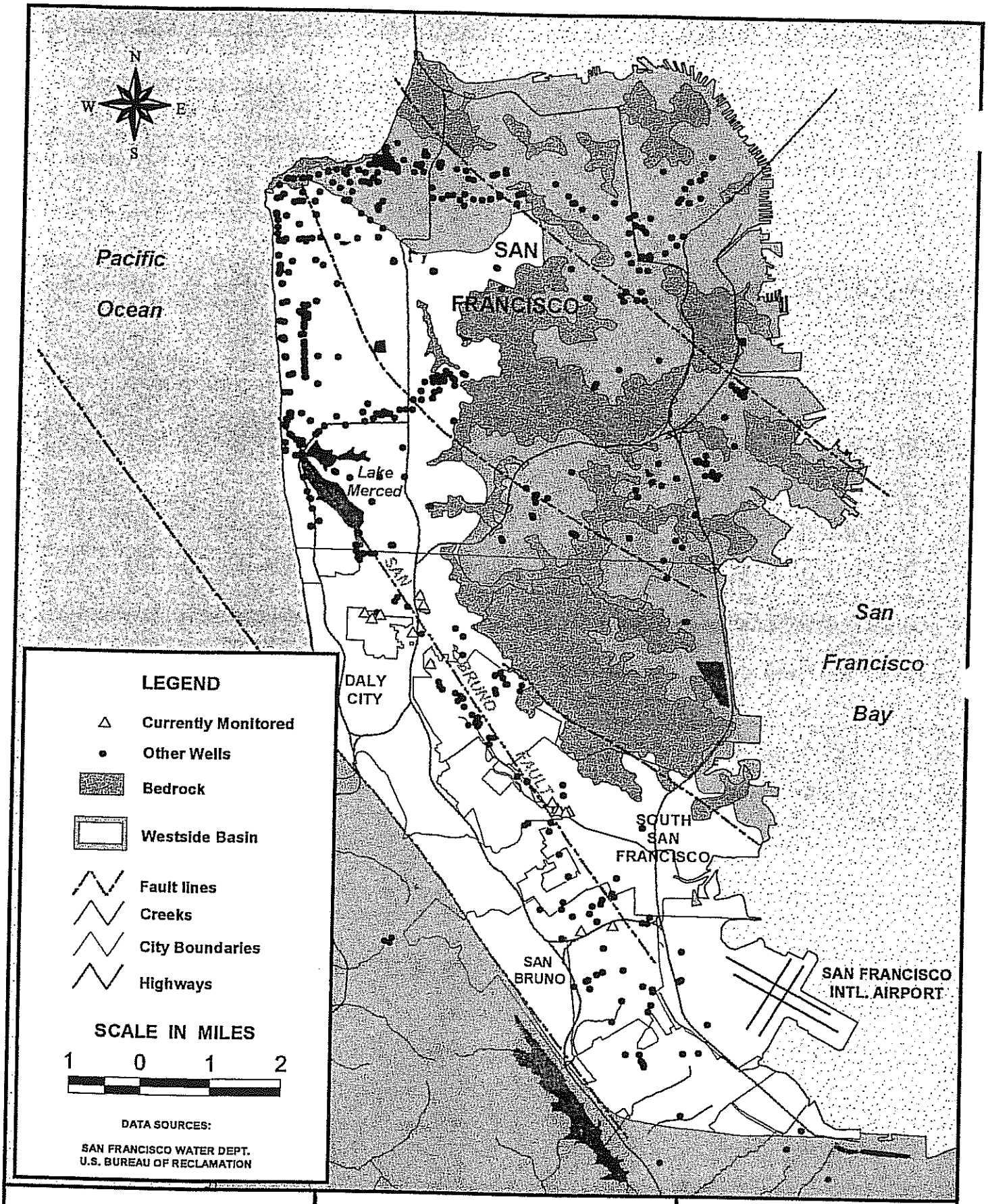
ENGINEERING, INC.

WESTSIDE BASIN
GROUNDWATER MANAGEMENT PLAN

**WELLS USED TO MEASURE GROUNDWATER LEVELS**

WESTSIDE BASIN PARTNERS

**FIGURE 6.1**

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BOOKMAN-EDMONSTON
ENGINEERING, INC.

WESTSIDE BASIN
GROUNDWATER MANAGEMENT PLAN

**WELLS USED TO MEASURE GROUNDWATER QUALITY**

WESTSIDE BASIN PARTNERS

**FIGURE 6.2**

estimates of groundwater flow and storage are for deep parts of the system and are biased toward conditions near pumping wells. Water level data are needed from wells perforated in the overlying water table, in upland areas that are important for groundwater recharge, and near the Pacific Ocean and south San Francisco Bay. This additional information can be integrated with the data already being collected from production wells to develop a more reliable estimate of flow directions and storage in the entire basin.

*If most wells pump from the deep aquifer, what benefits are there for measuring water levels in shallow wells?*

Data from shallow wells are needed to map the configuration of the water table and improve our understanding of the relationship between percolating recharge and leakage to the deeper aquifers. The relationship between the water table and deep aquifers is important to designing conjunctive use operations, and when evaluating the timing and magnitude for contaminants introduced at the water table to reach pumping wells in the basin.

*Where does the water in my well come from?*

Precipitation and irrigation on the hilly areas east of Lake Merced, San Bruno Mountain, and the areas east of the San Andreas Fault can recharge the basin as subsurface inflow. This water moves horizontally toward pumping centers in the valley lowlands. Leakage from the overlying water table also recharges the deep aquifer. The primary sources of recharge to the water table are deep percolation of precipitation and applied water. Groundwater data from upland areas and the valley lowlands are needed from both shallow and deep wells to determine the sources of water to pumping wells in all areas of the basin.

*What chemical indicators of saltwater intrusion should be sampled for?*

Chloride ion is the major anion in seawater, and increasing chloride ion concentrations in groundwater may be the first indication of saltwater contamination. Chloride ion concentrations alone, however, are not reliable indicators of saltwater intrusion. Additional information is needed to supplement the chloride data. For example, ratios of conservative ions like chloride-to-boron and chloride-to-bromide can be used to help identify saltwater contamination. Additional chemical and isotopic data combined with water level data can be used to confirm saltwater intrusion.

*How much water is pumped from the basin?*

Pumping is the primary groundwater outflow from the basin, yet more than one-third of the estimated pumpage is not recorded. Uncertainty exists in the quantity and distribution of pumping in the basin. Private wells typically do not record groundwater use.

# SECTION 7 REPORTS, MAPS, AND DATA CONSIDERED IN THIS MEMORANDUM


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# Appendix E

City of San Bruno Monthly Groundwater Production, 1997 through 2005

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# Appendix E
## City of San Bruno Monthly Groundwater Production, 1997 through 2005
City of San Bruno, California

| Year | Month | City of San Bruno Monthly Groundwater Production (ccf) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Well #15 | Well #16 | Well #17 | Well #18 | Well #20 | Total |
| 1997 | Jan | 34,685 | 29,023 | 14,769 | 27,350 | - | 105,827 |
| | Feb | 31,707 | - | 12,520 | 25,360 | - | 69,587 |
| | Mar | 35,520 | - | 14,347 | 27,953 | - | 77,820 |
| | Apr | 34,190 | 27,914 | 13,796 | 27,166 | - | 103,066 |
| | May | 34,877 | - | 14,370 | 28,428 | - | 77,676 |
| | Jun | 32,623 | - | 13,960 | 26,401 | - | 72,984 |
| | Jul | 34,236 | - | 14,268 | 28,261 | - | 76,765 |
| | Aug | 35,522 | 28,478 | 14,095 | 23,038 | - | 101,134 |
| | Sep | 31,680 | - | 13,308 | 26,232 | - | 71,219 |
| | Oct | 34,633 | - | 14,022 | 27,085 | - | 75,739 |
| | Nov | 33,437 | - | 13,429 | 26,307 | - | 73,173 |
| | Dec | 34,278 | - | 13,773 | 26,838 | - | 74,890 |
| 1998 | Jan | 33,641 | 25,160 | 13,962 | 27,000 | - | 99,763 |
| | Feb | 29,220 | - | 12,538 | 23,893 | - | 65,650 |
| | Mar | 32,552 | - | 13,833 | 27,456 | - | 73,841 |
| | Apr | 31,426 | 17,258 | 13,257 | 26,731 | - | 88,671 |
| | May | 32,765 | - | 13,681 | 27,943 | - | 74,390 |
| | Jun | 31,268 | - | 12,792 | 26,055 | - | 70,114 |
| | Jul | 32,178 | - | 13,619 | 27,839 | - | 73,637 |
| | Aug | 32,434 | - | 13,631 | 28,203 | - | 74,268 |
| | Sep | 31,216 | 27,901 | 13,009 | 27,331 | - | 99,457 |
| | Oct | 31,888 | 29,545 | 13,306 | 28,332 | - | 103,070 |
| | Nov | 29,620 | 28,455 | 13,161 | 27,252 | - | 98,489 |
| | Dec | 10,104 | 29,508 | 13,202 | 26,636 | - | 79,451 |
| 1999 | Jan | - | 29,439 | 12,923 | 26,009 | - | 68,370 |
| | Feb | - | 26,482 | 11,261 | 22,486 | - | 60,229 |
| | Mar | - | 29,462 | 12,349 | 24,659 | - | 66,470 |
| | Apr | - | 27,377 | 11,814 | 23,826 | - | 63,017 |
| | May | - | 29,335 | 12,008 | 24,725 | - | 66,068 |
| | Jun | - | 28,271 | 11,640 | 24,001 | - | 63,912 |
| | Jul | - | 29,135 | 11,991 | 24,806 | - | 65,931 |
| | Aug | - | 29,037 | 11,937 | 24,576 | - | 65,550 |
| | Sep | 28,165 | 28,084 | 11,417 | 23,780 | - | 91,445 |
| | Oct | 16,819 | 28,840 | 11,912 | 24,935 | - | 82,506 |
| | Nov | - | 27,845 | 8,765 | 24,388 | - | 60,997 |
| | Dec | - | 28,848 | 12,129 | 25,046 | - | 66,024 |

## Appendix E
## City of San Bruno Monthly Groundwater Production, 1997 through 2005
City of San Bruno, California

| Year | Month | City of San Bruno Monthly Groundwater Production (ccf) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Well #15 | Well #16 | Well #17 | Well #18 | Well #20 | Total |
| 2000 | Jan | - | 28,744 | 11,898 | 25,198 | - | 65,841 |
| | Feb | - | 26,861 | 11,130 | 22,944 | - | 60,936 |
| | Mar | 16,794 | 28,413 | 11,916 | 24,496 | - | 81,618 |
| | Apr | 32,080 | 27,889 | 11,475 | 23,699 | - | 95,143 |
| | May | 34,119 | 28,771 | 11,927 | 24,284 | - | 99,101 |
| | Jun | 33,501 | 27,757 | 11,531 | 23,726 | - | 96,514 |
| | Jul | 34,028 | 28,263 | 6,391 | 24,960 | - | 93,642 |
| | Aug | 33,433 | 27,329 | - | 26,940 | - | 87,703 |
| | Sep | 33,122 | 26,613 | - | 26,170 | - | 85,905 |
| | Oct | 33,999 | 27,293 | - | 26,686 | - | 87,978 |
| | Nov | 32,446 | 25,897 | - | 25,757 | - | 84,099 |
| | Dec | 33,239 | 26,642 | - | 26,041 | - | 85,922 |
| 2001 | Jan | 9,854 | - | 8,518 | 26,482 | - | 44,854 |
| | Feb | - | - | 13,858 | 24,066 | - | 37,924 |
| | Mar | - | - | 14,809 | 25,543 | - | 40,352 |
| | Apr | 4,608 | 25,158 | 7,825 | 24,994 | - | 62,586 |
| | May | 7,182 | 25,920 | - | 26,045 | - | 59,148 |
| | Jun | - | 25,075 | - | 25,104 | - | 50,179 |
| | Jul | - | 25,812 | - | 24,754 | - | 50,566 |
| | Aug | - | 25,710 | 13,633 | 25,820 | - | 65,163 |
| | Sep | 15,161 | 24,775 | 13,115 | 25,010 | - | 78,061 |
| | Oct | 34,205 | 25,345 | - | 25,208 | - | 84,758 |
| | Nov | 30,394 | 24,190 | 13,130 | 24,449 | - | 92,163 |
| | Dec | 28,827 | 24,852 | 7,215 | 15,452 | - | 76,346 |
| 2002 | Jan | 26,646 | 23,764 | 14,183 | - | - | 64,593 |
| | Feb | 22,130 | 19,552 | 12,461 | - | - | 54,143 |
| | Mar | 14,287 | 22,068 | 13,802 | - | - | 50,158 |
| | Apr | - | 20,957 | 13,292 | - | - | 34,250 |
| | May | - | 16,197 | 13,875 | - | - | 30,072 |
| | Jun | - | 12,301 | 13,381 | - | - | 25,681 |
| | Jul | - | 8,740 | 13,681 | 23,498 | - | 45,919 |
| | Aug | - | - | - | 26,858 | - | 26,858 |
| | Sep | - | - | - | 26,321 | - | 26,321 |
| | Oct | 15,735 | - | 13,658 | 26,977 | - | 56,370 |
| | Nov | 21,593 | - | 13,394 | 26,005 | - | 60,992 |
| | Dec | 26,003 | - | 13,542 | 26,590 | - | 66,135 |

## Appendix E
## City of San Bruno Monthly Groundwater Production, 1997 through 2005
City of San Bruno, California

| Year | Month | City of San Bruno Monthly Groundwater Production (ccf) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Well #15 | Well #16 | Well #17 | Well #18 | Well #20 | Total |
| 2003 | Jan | 22,039 | - | 12,312 | 24,118 | - | 58,470 |
| | Feb | - | 4,697 | - | - | - | 4,697 |
| | Mar | - | 10,045 | 404 | 2,984 | - | 13,433 |
| | Apr | - | - | - | 2,291 | - | 2,291 |
| | May | - | - | 404 | 1,482 | - | 1,887 |
| | Jun | - | - | 1,617 | 2,945 | - | 4,562 |
| | Jul | - | 5,742 | 404 | 1,521 | - | 7,667 |
| | Aug | - | - | - | - | - | - |
| | Sep | - | 1,813 | 1,617 | 3,274 | - | 6,705 |
| | Oct | - | - | - | 789 | - | 789 |
| | Nov | 12,965 | 17,943 | 7,592 | 14,455 | - | 52,955 |
| | Dec | 22,336 | 29,054 | 13,608 | 22,696 | - | 87,693 |
| 2004 | Jan | 15,910 | 27,724 | 13,386 | 21,955 | - | 78,975 |
| | Feb | - | - | - | - | - | - |
| | Mar | 3,284 | 15,086 | 7,536 | 16,101 | - | 42,007 |
| | Apr | 1,935 | 14,977 | 6,739 | 11,267 | - | 34,918 |
| | May | 2,169 | - | - | - | - | 2,169 |
| | Jun | 2,071 | - | - | - | - | 2,071 |
| | Jul | 1,394 | - | - | - | - | 1,394 |
| | Aug | 1,419 | - | - | - | - | 1,419 |
| | Sep | 574 | - | - | - | - | 574 |
| | Oct | 1,336 | - | - | - | 11,929 | 13,265 |
| | Nov | 2,630 | - | - | - | 35,587 | 38,217 |
| | Dec | 433 | - | - | - | 23,932 | 24,365 |
| 2005 | Jan | 1,041 | - | - | - | 36,823 | 37,865 |
| | Feb | - | - | 10,614 | - | 33,227 | 43,842 |
| | Mar | 774 | 29,556 | 1,219 | - | 36,240 | 67,789 |
| | Apr | - | 6,824 | 12,420 | - | 34,253 | 53,498 |
| | May | - | - | 12,328 | - | 36,787 | 49,114 |
| | Jun | - | - | 9,327 | - | 35,730 | 45,057 |
| | Jul | - | 3,863 | 12,990 | - | 36,571 | 53,425 |
| | Aug | - | 26,544 | 12,784 | - | 35,118 | 74,446 |
| | Sep | - | 28,288 | 12,332 | - | 35,020 | 75,639 |
| | Oct | - | 28,944 | 12,551 | - | 32,613 | 74,109 |
| | Nov | - | 28,194 | 11,635 | - | 33,664 | 73,493 |
| | Dec | - | 28,867 | 12,168 | - | 35,322 | 76,357 |

**Notes:**
ccf = hundred cubic feet
Monthly Groundwater Production data are from the City of San Bruno, Department of Public Works, 2006.

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**Appendix F**

City of San Bruno Annual Water Quality Report, 2005

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2005

CONSUMER CONFIDENCE REPORT

CITY OF SAN BRUNO

# Annual Water Quality Report

**A public ervice provided by the City of San Bruno, the Penin ula City of choice in which to live, learn, work, hop and play.**

The City of San Bruno i proud to provide our cu tomer with the annual Con umer Confidence Report (CCR). Thi year' report i in compliance with new regulation of the 1998 Safe Drinking Water Act (SDWA) reauthorization, that charge the U.S. Environmental Protection Agency (U.S.EPA) with updating and trengthening the tap water regulatory program. Thi report pre ent water quality and upply information for 2005. During 2005, the City and the San Franci co Public Utilitie Commi ion (SFPUC) monitored the water quality of both ource and treated water upplie . The City of San Bruno want you, our cu tomer, to know that your water y tem ha met all water quality tandard e tabli hed by the U.S.EPA and the California Department of Health Service (DOHS).

## HOW CAN THE PUBLIC BE INVOLVED?

Meeting of the City of San Bruno City Council begin at 7:00 PM on the econd and fourth Tue day of each month and are open to the public. Meeting are held at the San Bruno Senior Center located at 1555 Cry tal Spring Road.

If you have any que tion or need further information, plea e feel free to contact the City of San Bruno Water Divi ion at (650) 616-7162, or by mail at City of San Bruno Water Divi ion, 567 El Camino Real, San Bruno, CA 94066-4247. A copy of the 2005 Con umer Confidence Report will al o be po ted on the City' web ite at www. anbruno.ca.gov.

Deci ion about SFPUC water quality i ue are made from time to time in public meeting held at San Franci co City Hall, 1 Doctor Carlton B. Goodlett Place, Room 400, San Franci co CA 94102. Inquirie about the e meeting may be directed to the Office of the Commi ion Secretary at (415) 554-3165. Additional information about the SFPUC water quality may be obtained by calling (877) 737-8297, or by going to their web ite at www. fwater.org.

**Thi report contain important information about your drinking water. Tran late it, or peak with omeone who under tand it.**

**E te informe contiene informaci n muy importante obre u agua potable. Trad zcalo o hable con alguien que lo entienda bien.**

**Mahalaga ang imporma yong ito. Mangyaring ipa alin ito.**

此份有关你的食水报告,内有重要资料和讯息,请找 他人为你翻译及解释清楚。

Throughout thi report cu tomer will be able to find u eful information pecifically related to the City of San Bruno water y tem, a well a information related to drinking water in general. The primary mi ion of thi report i to ummarize the pa t year' water quality data that are found in the table at the end of thi brochure. You will al o find valuable information about our current operation a well a future change or improvement to the water y tem. The City of San Bruno continue it commitment to provide you with afe, high quality drinking water.

## Source of Our Water

The upply of water for the City of San Bruno i derived from two primary ource , urface water and deep well . Groundwater from the City' five well i blended throughout the di tribution y tem with water purcha ed from the San Franci co Public Utilitie Commi ion (SFPUC). The SFPUC water upply come from three major ource : Hetch Hetchy water hed in the Sierra Nevada Mountain , and two other water hed in Alameda County and the San Franci co Penin ula.

Hetch Hetchy water hed, which i the large t in the SFPUC y tem, i located in Yo emite National Park. Thi water hed provided approximately 94 percent of the total SFPUC water upply in 2005. Spring nowmelt flow down the Tuolumne River and i tored in Hetch Hetchy Re ervoir. The high quality Hetch Hetchy water upply meet all federal and tate criteria for water hed protection, di infection treatment, bacteriological quality and operational tandard . A a re ult, the California Department of Health Service (DOHS) granted the Hetch Hetchy water ource a filtration exemption.

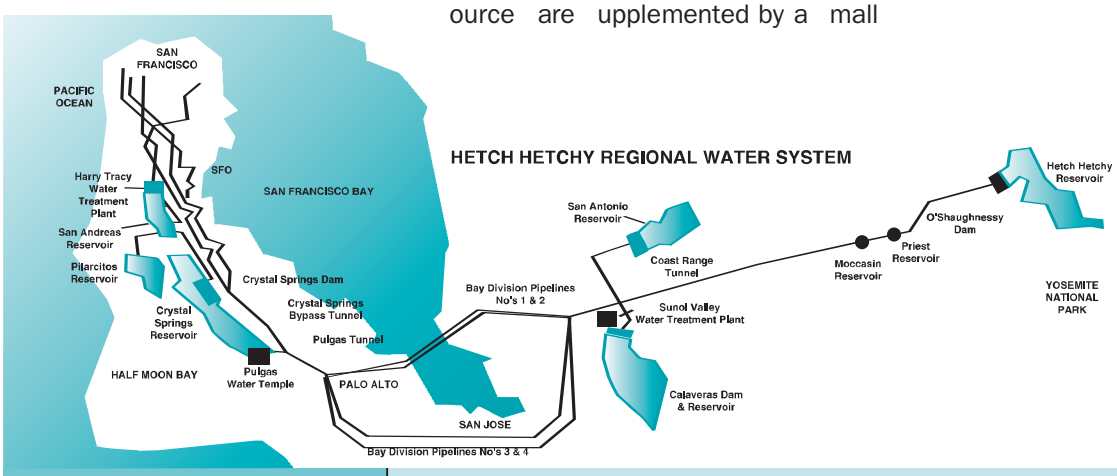
Together the Alameda and Penin ula watershed produced about ix percent of the total water upply in 2005. The Alameda water hed, located in Alameda and Santa Clara Countie , contribute urface water upplie by toring rainfall and runoff in Calavera and San Antonio Re ervoir . Rainfall and runoff captured in the Penin ula water hed in San Mateo County are tored a urface water upply in four re ervoir a) lower and upper Cry tal Spring , b) San Andrea , c) Pilarcito , and d) Stone Dam. The Alameda urface water ource are upplemented by a mall amount of groundwater collected by the Sunol Filter Gallerie near the Town of Sunol. Prior to delivery, water from the Alameda water hed and Sunol Filter Gallerie i treated at Sunol Valley Water Treatment Plant and water from the Penin ula water hed i treated at Harry Tracy Water Treatment Plant. San Bruno produced well water i obtained from five deep well located within the lower half of the City that are capable of producing approximately one-half of the City' annual water upply.

## Conjunctive U e Study

The City of San Bruno ha joined with other public water agencie that pump water from the We t ide Ba in Aquifer that lie under the northern San Franci co Penin ula to perform a tudy of the long-term effect that variou well pumping cenario would have on underground water level , the impact to Lake Merced water level and in the water level in the northern area . Conjunctive u e i a term applied to the practice of u ing the combined re ource of groundwater and urface water to meet the water upply need of our area.

A participant in the two to three year tudy, San Bruno, San Franci co, Daly City, and California Water Service have agreed to cea e pumping groundwater for up to three year during period when ample urface water upplie exi t in the Hetch Hetchy y tem. Thi topping of groundwater pumping will allow cienti t and engineer to begin to under tand how the aquifer re pond to reduction in pumping and whether it can ultimately be u ed to tore additional water upplie during wet year for u e in drought year . The City' well were hut down on April 2004 and remained off until March 2005.

The impact to water quality will be minimal with the po i-ble exception of the hardne of the water; well water i lightly "harder" than urface water. At the end of thi report, you will find a table of water quality data for 2005. For the period of the Conjunctive U e Study, the data for Hetch Hetchy wa applicable for the entire City.



Water Quality i extremely important to the taff of the City of San Bruno Public Work Department, DOHS rated San Bruno water y tem to be Water Treatment 2 and Di tribution 4 certified. Water Divi ion employee are State Health Department certified Grade 1 to 3 Water Treatment Operator . All employee have Grade 1 to 4 Di tribution Certification . The Water Divi ion maintain a laboratory and conduct or upervi e more than 1,000 analye of water ample each year. The taff ample daily from water ource , treatment facilitie , and di - tribution y tem throughout our ervice area. U ing tate of the art laboratory equipment capable of mea uring minute quantitie of contaminant in the part -per-million range, ample are analyzed on a routine ba i to in ure that water quality tandard are met and maintained. Additional ample are delivered to a contracted State certified independent laboratory for further analy i . You can be a ured that your drinking water con i tently meet or exceed e tabli hed water quality tandard .

## Safeguarding your water upply

Securing our water facilitie i a top priority. Re ident can be a ured that the City of San Bruno i taking every precaution to protect the public water upply again t a po ible terrori t attack. We are working with law enforcement agencie , public health official , other water utilitie , and the Department of Homeland Security to en ure our water upply i protected. We have rai ed our level of ecurity and have implemented additional ecurity mea ure a warranted. Some example of ecurity mea ure include fully enclo ed and alarmed water torage facilitie , 24 hour ecurity monitoring, an expanded y tem of alarm , and daily water quality ampling.

### SOURCE PROTECTION

Source protection i the primary barrier, the fir t line of defen e again t contamination of your drinking water at it ource. Hetch Hetchy Re ervoir, which i the large t re ervoir in the SFPUC y tem, i located in Yo emite National Park. Thi re ervoir provide approximately 85 percent of the total water upply. Spring nowmelt flow down the Tuolumne River and fill the re ervoir. The high quality Hetch Hetchy water upply meet all federal and tate criteria for water-hed protection, di infection treatment, bacteriological quality and operational tandard . The SFPUC trictly control activitie on the water hed land around their re ervoir , limiting activitie to tho e compatible with maximum protection of the water quality. A a re ult, the U.S. Environmental Protection Agency (U.S. EPA) and California Department of Health Service (DOHS) granted the Hetch Hetchy water ource a filtration exemption. Thi exemption i contingent upon the Hetch Hetchy water quality continuing to meet all filtration avoidance criteria.

### PROTECTING OUR WATERSHEDS

The SFPUC aggre ively protect the natural water re ource entru ted to it care. We continuou ly monitor our water hed ' weather condition , water turbidity level , microbial contaminant , and aqueduct di - infectant level . The SFPUC' 2005 annual update of the Water hed Control Program and Sanitary Survey de cribe the water- hed and water upply y tem, identifie potential ource of contamination in the water hed , di cu e the exi ting and recommended water hed management practice that protect water quality, and ummarize the water quality monitoring we conducted.

The SFPUC al o conduct a anitary urvey for local water hed every five year . The 2000 a e ment found that SFPUC water- hed have very low level of contaminant , and tho e contaminant are a ociated with wildlife and, to a limited extent, human recreational activity.

San Bruno' groundwater i drawn from a deep aquifer more than 200 feet below the urface. It i protected from contamination by impervi- ou layer of clay deep in the ground. The oil layer filter contaminant borne by urface water and hallow groundwater that may eventually reach the aquifer over everal centurie of time before it reache the well location . The well are con tructed to meet trict tandard impo ed by San Mateo County Environmental Health Divi ion to en ure that no urface water or hallow groundwater can enter the aquifer at tho e point . In cooperation with San Mateo County Environmental Health Divi ion, San Bruno participate in a well-head protection program e tabli hed to en ure the long-term protection of the quality of San Bruno' groundwater re ource .

Water treatment i the next layer of protection of our drinking water. Throughout 2005, our well water wa di infected with chloramine, a combination of chlorine and ammonia at the wellhead. Al o, our well water i ampled to en ure the health and afety of our conumer . In addition, our Lion Field Well and Fore t Lane Well are equipped with a filtering plant to remove iron and mangane e and adju t pH level prior to di tribution to our cu tomer . Thi i to en ure that water from thi particular well meet or exceed all Secondary Drinking Water Standard a et by the DOHS

## Water Sy tem Operation

Effective operation and maintenance of the di tribution y tem a ure that the water maintain it quality a it travel through the y tem to your tap. The di - infectant re idual in the water after treatment prevent the regrowth of microbial organi m during torage and tran mi - ion of water in the di tribution y tem. The flu hing of our water main and rotation of tored upplie al o keep the water fre h and limit the po - ibility for growth of uch organi m . San Bruno conduct mandatory weekly water quality te ting of the di tribution y - tem to en ure that the City' drinking water continue to be afe and healthy.

San Bruno al o maintain an active cro connection control program to prevent the intru- ion of potentially harmful material into the drinking water y tem. Cro connection control i done by i olating hazard uch a boiler , cooling tower , and fire prinkler from the drinking water upply by in talling approved backflow prevention device .

### FLUORIDE IN YOUR DRINKING WATER

Water upplied to San Bruno by the SFPUC ha been fluoridated ince 1965. SFPUC completed a new fluoridation facility in the Ea t Bay in September 2005; the SFPUC fluoridate the drinking water of it entire uburban whole ale ervice area to protect their cu tomer ' dental health. Thi new facility, which will replace the SFPUC' aged Polhemu Fluoride Station in San Mateo County, will not change the fluoride level in the water that San Bruno receive from the SFPUC. Becau e the SFPUC water upply that we purcha e i blended with out own well water upplie that are non-fluoridated, the water that you receive at your home may contain fluoride that i below the optimal level.

For more information about fluoride, contact your water ervice provider, or vi it the SFPUC web ite at fwater.org/fluoride.

Local county health department are al o a good ource of information about fluoride. Here are ome phone number you may call:

- SFPUC Fluoride Information Line (866) 668-6008
- San Mateo County Health Department (650) 372-8572
- County of Santa Clara Health Department (408) 885-3980

### SPECIAL HEALTH CONCERNS

Some people may be more vulnerable to contaminant in drinking water than the general population. Immuno-compromi ed per on uch a per on with cancer undergoing chemotherapy, per on who have undergone organ tran plant , people with HIV/AIDS or other immune y tem di - order , ome elderly, and infant can be particularly at ri k from infection . The e people hould eek advice about drinking water from their health care provider . U.S. EPA/Center for Di ea e Control guideline on appropriate mean to le en the ri k of infection by Crypto poridium and other microbial contaminant are available from the U.S. EPA Safe Drinking Water Hotline (800) 426-4791 or on U.S. EPA' Web ite epa.gov/ afewater.

The ource of drinking water include river , lake , tream , pond , re ervoir , pring , and well . A water travel over the urface of the land or through the ground, it di olve naturally occurring mineral and, in ome ca e , radioactive material, and can pick up ub tance re ulting from the pre ence of animal or from human activity. Although the pre ence of mall amount of the e ub tance doe not nece arily indicate that the water po e a health ri k, exten ive monitoring and te ting of the drinking water i done to a ure the afety of our cu tomer .

*Contaminant that may be pre ent in ource water include:*

- **Microbial Contaminant** , uch a viru - e and bacteria that may come from ewage treatment plant , eptic y - tem , agricultural live tock operation , and wildlife.
- **Inorganic Contaminant** , uch a alt and metal that can be naturally-occurring or re ult from urban tormwater runoff, indu trial or dome tic wa tewater di charge , oil and ga production, mining, or farming.
- **Pe ticide and Herbicide** , which may come from a variety of ource uch a agriculture, urban tormwater runoff, and re idential u e .
- **Organic Chemical Contaminant** , including ynthetic and volatile organic chemical , that are byproduct of indu trial proce e and petroleum production, and can al o come from ga tation , urban tormwater runoff, and eptic y tem .
- **Radioactive Contaminant** , which can be naturally-occurring or be the re ult of oil and ga production and mining activitie .

In order to en ure that tap water i afe to drink, the United State Environmental Protection Agency (U.S. EPA) and the DOHS pre cribe regulation that limit the amount of certain contaminant in water provided by public water y tem . DOHS regulation al o e tabli h limit for contaminant in bottled water that mu t provide the ame protection for public health.

**Unregulated Contaminant Monitoring** help the U.S. EPA and DOHS to determine where certain contaminant occur and whether the contaminant need to be regulated. During 2001, the SFPUC and the City of San Bruno monitored a many a twelve unregulated contaminant including MTBE, perchlorate, herbicide , and pe ticide . The e contaminant were not detected in any of SFPUC or City of San Bruno upplie .

In making ignificant modification to it di infectant proce e , the City integrated all of the di infection equipment into it Supervi ory Control and Date Acqui ition (SCADA) y tem, thereby adding another level of afety to drinking water quality. Other improvement include pipeline , regulating tation , and an additional well that will further provide the y tem' manager with more flexibility and capacity to operate the y tem to the be t advantage of the cu tomer.

## WHAT YOU SHOULD KNOW ABOUT CRYPTOSPORIDIUM & GIARDIA

Crypto poridium and Giardia are para itic microbe found in mo t urface water upplie and can po e a potential health threat. If inge ted, either may produce ymptom of diarrhea, tomach cramp , up et tomach, and light fever. The SFPUC te t regularly for Crypto poridium and Giardia in both ource and treated water upplie . Both were occa ionally found at very low level in the SFPUC' water in 2004.

Drinking water, including bottled water, may rea onably be expected to contain at lea t mall amount of ome contaminant , including Crypto poridium and Giardia. The pre ence of mall amount of contaminant doe not nece arily indicate that the water po e a health ri k. More information about contaminant and potential health effect may be obtained by calling the U.S. EPA Safe Drinking Water Hotline at (800) 426-4791.

## LEAD AND COPPER

Infant and young children are typically more vulnerable to lead in drinking water than the general population. It i po ible that lead level at your home may be higher than at other home in the community a a re ult of material u ed in your home' plumbing. If you are concerned about elevated lead level in your home' water, you may wi h to have your water te ted. It i al o recommended that homeowner who are concerned about elevated lead level run their tap 30 econd to two minute before u e. Additional information i available from the Safe Drinking water hotline (800) 426-4791 or at the US EPA' we ite www.epa.gov.

San Bruno ha te ted for lead and copper in the city upply ince 1992 a part of the Lead and Copper Rule monitoring program. During 2004 over 41 volunteer took ample at the tap in their home , which were then analyzed for lead and copper content a well a for the corro ive nature of the water. It hould be noted that the water San Bruno deliver to it cu tomer doe not contain lead, but it may acquire lead from older oldered pipe joint in hou e-hold plumbing.

## City of San Bruno Water Quality Data for Year 2005 [1]

| DETECTED CONTAMINANTS | Unit | MCL | PHG (MCLG) | SFPUC Range | SFPUC Average (Max) | San Bruno Range | San Bruno Average (Max) | Typical Sources in Drinking Water |
|---|---|---|---|---|---|---|---|---|
| **TURBIDITY [2]** | | | | | | | | |
| Unfiltered Hetch Hetchy Water, max 5 NTU | - | TT | NS | 0.25 - 1.00 [3] | (1.74) [4] | | | Soil run-off |
| Filtered Water - Harry Tracy WTP, max 1 NTU | - | TT | NS | - | (0.17) | | | Soil run-off |
| more than 95% of measurements < 0.3 NTU | - | TT | NS | 100% [5] | - | | | Soil run-off |
| Filtered Water - Sunol Valley WTP, max 1 NTU | - | TT | NS | - | (0.27) | | | Soil run-off |
| more than 95% of measurements < 0.3 NTU | - | TT | NS | 100% [5] | - | | | Soil run-off |
| **DISINFECTION BY-PRODUCTS** | | | | | | | | |
| Total Trihalomethanes (TTHMs) | ppb | 80 | NS | | | <0.5 - 47.5 | 22.2 [6] | By-product of drinking water chlorination |
| Total Haloacetic Acids (HAAs) | ppb | 60 | NS | | | <1 - 31.6 | 9.2 [6] | By-product of drinking water chlorination |
| Total Organic Carbon (TOC) [7] | ppm | NS | NS | 0.9 - 3.0 | 2.3 | NA | NA | Various natural and man-made sources |
| **INORGANIC CHEMICALS** | | | | | | | | |
| Aluminum | ppb | 1000 | 600 | 6 - 70 | 38 | ND | ND | Erosion of natural deposits |
| Fluoride [8] | ppm | 2.0 | 1.0 | 0.1 - 1.2 | 1.0 | ND | ND | Water additive that promotes strong teeth |
| Chlorine | ppm | MRDL = 4.0 | MRDLG = 4 | 1.8 - 2.4 | 2.0 | 1.4 - 2.4 | 2.4 [6] | Drinking water disinfectant added for treatment |

| CONSTITUENTS WITH SECONDARY STANDARDS | Unit | SMCL | PHG | Range | Average | Range | Average | Typical Sources in Drinking Water |
|---|---|---|---|---|---|---|---|---|
| Chloride | ppm | 500 | NS | < 3 - 25 | 9 | 29 - 107 | 75 | Runoff / leaching from natural deposits |
| Color | unit | 15 | NS | < 5 - 25 [9] | 12 | < 5 - 29 | 6 | Naturally-occurring organic materials |
| Specific Conductance | µS/cm | 1600 | NS | 25 - 435 | 155 | 25 - 435 | 155 | Substances that form ions when in water |
| Sulfate | ppm | 500 | NS | 1 - 42 | 19 | 20 - 75 | 49 | Runoff / leaching from natural deposits |
| Total Dissolved Solids | ppm | 1000 | NS | 20 - 210 | 116 | 250 - 464 | 370 | Runoff / leaching from natural deposits |
| Turbidity | NTU | 5 | NS | 0.09 - 0.49 | 0.24 | 0.89 - .11 | 0.24 | Soil runoff |
| Iron | ppm | 0.3 | NS | <0.05 | <0.05 | <0.05 | <0.05 | Leaching from natural deposits |
| Manganese | ppm | 0.05 | NS | <0.05 | 0.03 | <0.05 | 0.03 | Leaching from natural deposits |

| LEAD AND COPPER RULE STUDY | Unit | AL | PHG | Range | 90th Percentile | Range | 90th Percentile | Typical Sources in Drinking Water |
|---|---|---|---|---|---|---|---|---|
| Copper | ppb | 1300 | 170 | | | 2.9-231.1 | 79.4 [10] | Corrosion of household plumbing systems |
| Lead | ppb | 15 | 2 | | | .08-19.1 | 1.9 [11] | Corrosion of household plumbing systems |

| OTHER WATER QUALITY PARAMETERS | Unit | NL | | Range | Average | Range | Average |
|---|---|---|---|---|---|---|---|
| Alkalinity (as $CaCO_3$) | ppm | NS | | 6 - 150 | 54 | 128 - 186 | 156 |
| Boron | ppb | 1000 | | 16 - 168 | 73 | ND | ND |
| Calcium | ppm | NS | | 3 - 30 | 16 | 29 - 56 | 39 |
| Fluoride (source water) | ppm | NS | | < 0.1 - 0.2 | 0.1 | < 0.1 | 0.1 |
| Hardness (as $CaCO_3$) | ppm | NS | | 8 - 150 | 56 | 152 - 284 | 222 |
| Magnesium | ppm | NS | | < 0.5 - 12.3 | 6.6 | < 0.5 - 12.3 | 6.6 |
| pH | unit | NS | | 7.6 - 9.8 | 8.9 | 7.2 - 8.9 | 7.97 |
| Potassium | ppm | NS | | < 0.5 - 1.4 | 0.8 | 3.4 - 6.0 | 4.7 |
| Silica | ppm | NS | | 4.4 - 7.2 | 6.3 | 25 - 30 | 27.5 |
| Sodium | ppm | NS | | 3 - 26 | 15 | 36 -67.5 | 52 |

**KEY:**

< / ≤ = less than / less than or equal to
AL = Action Level
Max = Maximum
NA = Not applicable
ND = Non Detected
NL = Notification Level
NS = No Standard
NTU = Nephelometric Turbidity Unit
ppb = parts per billion
ppm = parts per million
TT = Treatment Technique
µS/cm = microSiemens / centimeter

(1) All results met State and Federal drinking water regulations.
(2) Turbidity is the water clarity indicator; it also indicates the quality of the water and the treatment system efficiency.
(3) Turbidity is measured every four hours. These are monthly average turbidity values.
(4) This is a single, maximum measuring result.
(5) This is the minimum percentage of time that the filtered water turbidity was less than 0.3 NTU.
(6) This is the highest quarterly running annual average value.
(7) TOC is a precursor for disinfection byproduct formation.
(8) Due to blending of water in the distribution system, fluoride concentration varies throughout the distribution system.
(9) The sample collected from Harry Tracy Water Treatment Plant effluent on 7/16/2005 had a color result above the SMCL. There is no health effect due to this exceedance.
(10) Latest round of Lead and Copper Rule monitoring was in 2004.
(11) Latest round of Lead and Copper Rule monitoring was in 2004. 1 out of 41 residences were over the lead Action Level at consumer taps.

Note: Additional water quality data may be obtained by calling the City of San Bruno Water Division at (650) 616-7162

# DEFINITIONS TO UNDERSTAND THIS REPORT

***The following definition are for each contaminant analyzed:***

**Public Health Goal (PHG)**
The level of a contaminant in drinking water below which there i no known or expected ri k to health. PHG are et by the California Environmental Protection Agency.

**Maximum Contaminant Level Goal (MCLG)**
The level of a contaminant in drinking water below which there i no known or expected ri k to health. MCLG are et by the U. S. Environmental Protection Agency (USEPA).

**Maximum Re idual Di infectant Level Goal (MRDLG)**
The level of a di infectant added for water treatment below which there i no known or expected ri k of health. MRDLG are et by the U.S. Environmental Protection Agency.

**Maximum Contaminant Level (MCL)**
The highe t level of a contaminant that i allowed in drinking water. Primary MCL are et a clo e to the PHG (or MCLG ) a i economically and technologically fea ible. Secondary MCL are et to protect the odor, ta te, and appearance of drinking water.

**Maximum Re idual Di infectant Level (MRDL)**
The level of a di infectant added for water treatment that may not be exceeded at the con umer' tap.

**Primary Drinking Water Standard or (PDWS)**
MCL and MRDL for contaminant that affect health along with their monitoring and reporting requirement , and water treatment requirement .

**Secondary Drinking Water Standard (SDWS)**
MCL for contaminant that affect ta te,odor,or appearance of the drinking water. Contamination with SDWS do not affect the health at the MCL level .

**Variance and Exemption**
Department permi ion to exceed an MCL or not comply with a treatment technique under certain condition .

**Treatment Technique (TT)**
A required proce intended to reduce the level of a contaminant in drinking water.

**Regulatory Action Level**
The concentration of a contaminant which, if exceeded, trigger treatment or other requirement which a water y tem mu t follow.

**Waiver**
State permi ion to decrea e the monitoring frequency for a particular contaminant.

**ND:** Not detectable at te ting limit.

**ppm:** part per million or milligram per liter (mg/L)

**ppb:** part per billion or microgram per liter (ug/L)

**pCi/L:** picocurie per liter (a mea ure of radiation)

**City of San Bruno**
**Public Work Department**
**Water Divi ion**
567 El Camino Real
San Bruno, CA 94066-4247

PRST STD
U.S. Po tage
P A I D
San Bruno, CA 94066
Permit #84

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# Appendix G

Water Conservation Documents

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# CITY OF SAN BRUNO

# WATER EFFICIENT

# LANDSCAPE AND IRRIGATION

# GUIDELINES

# WATER EFFICIENT LANDSCAPE AND IRRIGATION GUIDELINES

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# I. INTRODUCTION

## A. GENERAL

The efficient use of water has become a very important element in the management of water resources in the City of San Bruno and throughout the State of California. The recent dry periods, a rapidly growing population, and limited water supplies have put a tremendous demand on one of California's most precious resources. These factors have forced the State and local water agencies to adopt water conservation measures and legislation.

In 1990, State Legislators passed Assembly Bill No. 325: The Water Conservation and Landscaping Act. In response to AB 325, the City of San Bruno has prepared these *Water Efficient Landscape and Irrigation Guidelines* modeled after the state ordinance.

## B. PURPOSE

The purpose of these Water Efficient Landscape and Irrigation Guidelines is to effect efficient water use through proper landscape design and management.

## C. CLIMATIC CONDITIONS

San Bruno's climate is affected by both coastal and bayside weather influences. The coastal mountains partially protect San Bruno from coastal weather although the City's hilly neighborhoods experience seasonal fog and wind. The lower elevations generally have milder conditions with some maritime influences from the Bay. A temperature inversion, where warm dry air overrides cool marine air and traps air pollutants close to the ground, often occurs during late summer and fall.

San Bruno averages 290 sunny days a year. Temperatures range from 50 to 80 degrees F. in the summer and 36-65 degrees F. in. the winter. The average precipitation rate is 19.53 inches a year. The estimated evapotranspiration rate (ETo) is 38.25 inches a year.

## II. DEFINITIONS

The words used in these guidelines have the meaning set forth below:

**(a) "anti-drain valve" or "check valve"** means a valve located under a sprinkler head to hold water in the system so it minimizes drainage from the lower elevation sprinkler heads.

**(b)"application rate"** means the depth of water applied to a given area, usually measured in inches per hour.

**(c) "applied water"** means the portion of water supplied by the irrigation system to the landscape.

**(d) "automatic controller"** means a mechanical or solid state timer, capable of operating valve stations to set the days and length of time of a water application.

**(e)"backflow prevention device"** means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

**(f)"conversion factor (0.62)"** means a number that converts the maximum applied water allowance from acre-inches per acre per year to gallons per square foot per year. The conversion factor is calculated as follows:

(325,851 gallons/43,560 square feet)/12 inches = (0.62)
325,851 gallons = one acre foot
43,560 square feet = one acre
12 inches = one foot

To convert gallons per year to 100 cubic feet per year, another common billing unit for water, divide gallons per year by 748. (748 gallons = 100 cubic feet).

**(g)"ecological restoration project"** means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

**(h)"effective precipitation" or "usable rainfall"** mean the portion of total precipitation that is used by the plants. Precipitation is not a reliable source of water, but can contribute to some degree toward the water needs of the landscape.

**(i) "emitter"** means drip irrigation fittings that deliver water slowly from the system to the soil.

**(j)"established landscape"** means the point at which plants in the landscape have developed roots into the soil adjacent to the root ball.

**(k) "establishment period"** means the first year after installing the plant in the landscape.

**(l)"Estimated Applied Water Use"** means the portion of the Estimated Total Water Use that is derived from applied water. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance. The Estimated Applied Water Use may be the sum of the water recommended through the irrigation schedule, as referenced in Section III (c) (3).

**(m) "Estimated Total Water Use"** means the annual total amount of water estimated to be needed to keep the plants in the landscaped area healthy. It is based upon such factors as the local evapotranspiration rate, the size of the landscaped area, the types of plants, and the efficiency of the irrigation system, as described in Section III (c) (4).

**(n) "ET adjustment factor"** means a factor of 0.8, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor portion of this calculation. The irrigation efficiency for purposes of the ET Adjustment Factor is 0.625. Therefore, the ET Adjustment Factor (0.8) = (0.5/0.625).

**(o)"evapotranspiration"** means the quantity of water evaporated from adjacent soil surfaces and transpired by plants during a specific time.

**(p)"flow rate"** means the rate at which water flows through pipes and valves (gallons per minute or cubic feet per second).

**(q)"hydrozone"** means a portion of the landscaped area having plants with similar water needs that are served by a valve or set of valves with the same schedule. A hydrozone may be irrigated or nonirrigated. For example, a naturalized area

planted with native vegetation that will not need supplemental irrigation once established is a non-irrigated hydrozone.

**(r)"infiltration rate"** means the rate of water entry into the soil expressed as a depth of water per unit of time (inches per hour).

**(s)"irrigation efficiency"** means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum irrigation efficiency for purposes of these guidelines is 0.625. Greater irrigation efficiency can be expected from well designed and maintained systems.

**(t)"landscape irrigation audit"** means a process to perform site inspections, evaluate irrigation systems, and develop efficient irrigation schedules.

**(u) "landscaped area"** means the entire parcel less the building footprint, driveways, non-irrigated portions of parking lots, hardscapes - such as decks and patios, and other non-porous areas. Water features are included in the calculation of the landscaped area. Areas dedicated to edible plants, such as orchards or vegetable gardens are not included.

**(v)"lateral line"** means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

**(w)"main line"** means the pressurized pipeline that delivers water from the water source to the valve or outlet.

**(x)"Maximum Applied Water Allowance"** means, for design purposes, the upper limit of annual applied water for the established landscaped area as specified in Section III (c) (2). It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscaped area. The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance .

**(y)"mulch"** means any material such as leaves, bark, straw or other materials left loose and applied to the soil surface for the beneficial purpose of reducing evaporation.

**(z)"operating pressure"** means the pressure at which a system of sprinklers is designed to operate, usually indicated at the base of a sprinkler.

**(aa)"overhead sprinkler irrigation systems"** means those with high flow rates (pop-ups, impulse sprinklers, rotors, etc).

**(bb)"overspray"** means the water which is delivered beyond the landscaped area, wetting pavements, walks, structures; or other non-landscaped areas.

**(cc) "plant factor"** means a factor that when multiplied by reference evapotranspiration, estimates the amount of water used by plants.

For purposes of these guidelines, the average plant factor of low water using plants ranges from 0 to 0.3, for average water using plants the range is 0.4 to 0.6, and for high water using plants the range is 0.7 to 1.0.

**(dd)"rain sensing device"** means a device which automatically shuts off the irrigation system when it rains.

**(ee)"record drawing" or "as-builts"** means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

**(ff) "recreational area"** means areas of active play or recreation such as sports fields, school yards, picnic grounds, or other areas with intense foot traffic.

**(gg)"recycled water", "reclaimed water", or "treated sewage effluent water"** means treated or recycled waste water of a quality suitable for nonpotable uses such as landscape irrigation; not intended for human consumption.

**(hh)"reference evapotranspiration" or "ETo"** means a standard measurement of environmental parameters which affect the water use of plants. ETo is given in inches per day, month, or year as represented in Exhibit "D" and is an estimate of the evapotranspiration of a large field of four to seven inch tall, cool season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowances so that regional differences in climate can be accommodated. Reference evapotranspiration (ETo) for the City of San Bruno is estimated to be 38,25 inches per year. This figure is obtained by taking the average ETo value between Half Moon Bay and Redwood City as provided in Exhibit "D".

**(ii) "rehabilitated landscape"** means any relandscaping project that requires a permit from the City of San Bruno.

**(jj) "run off"** means water which is not absorbed by the soil or landscape to which it is applied and flows from the area. For example, run off may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a severe slope.

**(kk) "soil moisture sensing device"** means a device that measures the amount of water in the soil.

**(ll)"soil texture"** means the classification of soil based on the percentage of sand, silt, and clay in the soil.

**(mm)"sprinkler head"** means a device which sprays water through a nozzle.

**(nn)"static water pressure"** means the pipeline or municipal water supply pressure when water is not flowing.

**(oo)"station"** means an area served by one valve or by a set of valves that operate simultaneously.

**(pp)"turf"** means a surface layer of earth containing mowed grass with its roots. Annual bluegrass, Kentucky bluegrass, Perennial rye grass, Red fescue, and Tall fescue are cool season grasses. Bermuda grass, Kikuyu grass, Seashore paspalum, St. Augustine grass, zoysia grass, and Buffalo grass are warm-season grasses.

**(qq) "valve"** means a device used to control the flow of water in the irrigation system.

**(rr)"water conservation concept statement"** means a one page checklist and a narrative summary of the project as shown in Exhibit "A".

## III. PROVISIONS FOR NEW OR REHABILITATED LANDSCAPES

### A. APPLICABILITY

1. Except as provided in Section III. A.2. this section shall apply to:

(a) all new and rehabilitated landscaping for public agency projects and private development projects that require a permit from the City of San Bruno; and

(b) developer-installed landscaping in single family and multi-family townhome, condominium and apartment projects over four (4) dwelling units.

2. This section shall not apply to:

(a) homeowner provided landscaping at single family detached dwellings or multi family townhome, condominium, and apartment projects of four (4) dwelling units or less;

(b) cemeteries;

(c) registered historical sites;

(d) ecological restoration projects that do not require a permanent irrigation system;

(e) any project with a landscaped area less than 2,500 square feet;

(f) public school district properties.

### B. LANDSCAPE DOCUMENTATION PACKAGE

1. Three (3) copies of the landscape documentation package conforming to this section shall be submitted to the San Bruno Planning and Building Department. No landscaping shall be installed until the city reviews and approves the landscape documentation package.

2. Two (2) copies of the approved landscape documentation package shall be returned to the property owner/applicant.

3. Upon completion, a copy of the Certificate of Substantial Completion shall be sent by the property owner/applicant to the San Bruno Planning and Building Department.

4. Each landscape documentation package shall include the following elements, which are described in Section III.C.:

(a) Water Conservation Concept Statement
(b) Calculation of the Maximum Applied Water Allowance
(c) Calculation of the Estimated Applied Water Use
(d) Calculation of the Estimated Total Water use
(e) Landscape Design Plan
(f) Irrigation Design Plan
(g) Irrigation Schedules
(h) Grading Design Plan
(i) Soil Analysis
(j) Maintenance Schedule
(k) Effective Precipitation Disclosure Statement
(l) Landscape Irrigation Audit
(m) Certificate of Substantial Completion. (To be submitted after installation of the project).

**C. ELEMENTS OF LANDSCAPE DOCUMENTATION PACKAGE**

**1. Water Conservation Concept Statement**

Each landscape documentation package shall include a cover sheet, referred to as the Water Conservation Concept Statement similar to Exhibit "A" attached. It serves as a check list to verify that the elements of the landscape documentation package have been completed and as a narrative summary of the project.

**2. Maximum Applied Water Allowance**

(a) A project's Maximum Applied Water Allowance shall be calculated using the following formula:

MAWA =(ETo) (0.8) (LA) (0.62) where:

MAWA =Maximum Applied Water Allowance (gallons per year)

ETo =Reference Evapotranspiration (inches per year)

0.8 =ET Adjustment Factor

LA =Landscaped Area (square feet)

0.62 =conversion factor (to gallons per sq. ft.)

An example calculation of the Maximum Applied Water Allowance in the City of San Bruno is:

Landscaped area of 50,000 sq. ft. in San Bruno:

MAWA=(ETo) (.8) (LA) (.62)

=(38.25 inches) (.8) (50,000 square feet) (.62)

Maximum Applied Water Allowance = 948,600 gallons per year, or

(1,268 hundred cubic feet per year: 948,600/748 = 1,268)

(b) Portions of landscaped areas in public and private projects such as parks, playgrounds, sports fields, golf courses, or school yards where turf provides a playing surface or serves other recreational purposes are considered recreational areas and may require water in addition to the Maximum Applied Water Allowance. A statement shall be included with the landscape design plan, designating recreational areas to be used for such purposes and specifying any needed amount of additional water above the Maximum Applied Water Allowance.

(c) Other landscape areas requiring water in addition to the Maximum Applied Water Allowance may be considered by the City of San Bruno on a case-by-case basis for determining if additional water is warranted. A statement shall be included with the landscape design plan designating such areas and specifying any needed amount of additional water above the Maximum Applied Water Allowance.

**3. Estimated Applied Water Use**

(a) The Estimated Applied Water Use shall not exceed the Maximum Applied Water Allowance, unless exceptions are granted by the City of San Bruno.

(b) A calculation of the Estimated Applied Water Use shall be submitted with the Landscape Documentation Package. It may be calculated by summing the amount of water recommended in the irrigation schedule.

**4. Estimated Total Water Use**

(a) A calculation of the Estimated Total Water Use shall be submitted with the Landscape Documentation Package. The Estimated Total Water Use may be calculated by summing the amount of water recommended in the irrigation schedule and adding any amount of water expected from effective precipitation (not to exceed 25 percent of the local annual mean

precipitation) or may be calculated from a formula such as the following:

The Estimated Total Water Use for the entire landscaped area equals the sum of the Estimated Water use of all hydrozones in that landscaped area.

$$\text{EWU (hydrozone)} = \frac{(\text{ETo})\ (\text{PF})\ (\text{HA})\ (.62)}{(\text{IE})}$$

EWU (hydrozone) =(Estimated Water Use (gallons per year)

ETo =Reference Evapotranspiration (inches per year)

PF =plant factor

HA =hydrozone area (square feet)

(.62) =conversion factor

IE =irrigation efficiency

(b) - If the Estimated Total Water Use is greater than the Estimated Applied Water Use due to precipitation being included as a source of water, an Effective Precipitation Disclosure Statement similar to Exhibit "D" shall be included in the Landscape Documentation Package.

**5. Landscape Design Plan**

A landscape design plan meeting the following requirements shall be submitted as part of the landscape documentation package. NOTE: All applicable landscape provisions of the San Bruno Zoning Ordinance shall be complied with in the design of the landscape plan.

(a) Plant Selection and Grouping

(i) Any combination of plant species may be used in the landscape plan, providing the Estimated Applied Water Use recommended does not exceed the Maximum Applied Water Allowance and that the plants meet the specifications set forth in (ii), (iii), (iv), and (v). It is recommended that water conserving plant materials be utilized where appropriate. A source list of various publications pertaining to water conserving plants is attached as Exhibit "E".

(ii) Plants having similar water use shall be grouped together in distinct hydrozones.

(iii) Plants shall be selected appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the site. Protection and preservation of native species and natural areas is a priority.

(iv) Plant species selection and placement shall be designated to avoid sight visibility obstruction within parking lots, at driveway entrances/exits, and on street corners.

(v) Fire prevention needs shall be addressed in areas that are fire prone. Information about fire prone areas and appropriate landscaping for fire safety is available from the San Bruno Fire Department or the California Department of Forestry.

(b) Water Features

(i) Recirculating water shall be used for decorative water features.

(ii) All water features shall be included in the calculation of landscaped areas, for the purposes of determining the maximum applied water allowance.

(iii)Pool and spa covers are strongly encouraged.

(c) Landscape Design Plan Specifications

The landscape design plan shall be drawn on project base sheets at a scale (appropriately chosen for the site size) that accurately and clearly identifies:

(i) Designation of hydrozones.

(ii) Landscape materials, trees, shrubs, groundcover, turf, and other vegetation. Planting symbols shall be clearly drawn and plants labeled by botanical name, common name, container size, spacing, and quantities of each group of plants indicated. A table containing this information shall be provided on the plans.

(iii) Property lines and street names.

(iv) Streets, driveways, walkways, and, other paved areas.

(v) Pools, ponds, water features, fences, and retaining walls.

(vi) Existing and proposed buildings and structures including elevations if applicable.

(vii) Natural features including but not limited to rock outcroppings, existing trees, shrubs that will remain or are proposed to be removed.

(viii) Tree staking, plant installation, soil preparation details, and any other applicable planting and installation details.

(ix) A calculation of the total landscaped area by hydrozones.

(x) Designation of recreational areas.

(xi) Location of all utility lines (electrical, gas, phone, cable, water, and sewer), utility boxes and meters, and fire hydrants.

**6. Irrigation Design Plan**

An irrigation design plan meeting the following conditions shall be submitted as part of the Landscape Documentation Package.

(a) Irrigation Design Criteria

(i) Runoff and Overspray. Soil types and infiltration rate shall be considered when designing irrigation systems. All irrigation systems shall be designed to avoid runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, or structures. Proper irrigation equipment and schedules, including features such as repeat cycles, shall be used to closely match application rates to infiltration rates therefore minimizing runoff.

Special attention shall be given to avoid runoff on slopes and to avoid overspray in planting areas with a width less than ten feet, and in median strips.

Overhead sprinkler irrigation systems should be avoided in median strips less than ten feet wide.

(ii) Irrigation Efficiency. For the purpose of determining the maximum applied water allowance, irrigation efficiency is assumed to be 0.625. Irrigation systems shall be designed, maintained, and managed to meet or exceed 0.625 efficiency.

(iii) Equipment.

*Water meters*. Separate landscape water meters shall be installed for all projects except for single family homes or any project with a landscaped area of less than 5,000 square feet.

*Controllers*. Automatic control systems shall be required for all irrigation systems and must be able to accommodate all aspects of the design.

*Valves*. Plants which require different amounts of water shall be irrigated by separate valves. If one valve is used for a given area, only plants with similar water use shall be used in that area. Anti-drain (check) valves shall be installed in strategic points to minimize or prevent low-head drainage.

*Sprinkler heads*. Heads and emitters shall have consistent application rates within each control valve circuit. Sprinkler heads shall be selected for proper area coverage, application rate, operating pressure, adjustment capability, and ease of maintenance.

*Rain Sensing Override Devices*. Rain sensing override devices for irrigation systems are recommended for landscape areas over 5,000 square feet in area.

*Soil Moisture Sensing Devices*. Soil moisture sensing devices for irrigation systems are recommended for landscape areas over 5,000 square feet in area.

(b) <u>Recycled Water</u>

(i) If in the future recycled water meeting all health standards is made readily available in San Bruno, irrigation systems may be designed to make use of recycled water in accordance with all local and state codes.

(c) Irrigation Design Plan Specifications

Irrigation systems shall be designed to be consistent with hydrozones.

The irrigation design plan shall be drawn on project base sheets. It shall be separate from, but use the same format as, the landscape design plan. The scale shall be the same as that used for the landscape design plan.

The irrigation design plan shall accurately and clearly identify:

(i) Location and size of separate water meters for the landscape.

(ii) Location, type, and size of all components of the irrigation system, including automatic controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, and backflow prevention devices.

(iii) Static water pressure at the point of connection to the public water supply.

(iv) Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (psi) for each station.

**7. Irrigation Schedules**

Irrigation schedules satisfying the following conditions shall be submitted as part of the Landscape Documentation Package.

(a) An annual irrigation program with monthly irrigation schedules shall be required for the plant establishment period, for the established landscape, and for any temporarily irrigated areas.

(b) The irrigation schedule shall:

(i) include run time (in minutes per cycle), suggested number of cycles per day, and frequency of irrigation for each station; and

(ii) provide the amount of applied water (in hundred cubic feet and gallons) recommended on a monthly and annual basis.

(c) The total amount of water for the project shall include water designated in the Estimated Total Water Use calculation plus water needed for any water features, which shall be considered as a high water using hydrozone.

(d) Recreational areas designated in the landscape design plan shall be highlighted and the irrigation schedule shall indicate whether any additional water is needed above the Maximum Applied Water Allowance because of high plant factors (but not due to irrigation inefficiency).

(e) Irrigation scheduling should incorporate the use of evapotranspiration data from the California Irrigation Management Information System (CIMIS) weather stations to apply the appropriate levels of water for different months of the year.

(f) Landscape irrigation should be scheduled between 2:00 A.M. and 10:00. A.M.. to avoid irrigating during times of high wind or high temperature.

**8. Grading Design Plan**

Grading design plans satisfying the following conditions shall be submitted as part of the Landscape Documentation Package.

(a) A grading design plan shall be drawn on separate project base sheets or incorporated into the landscape design plan. If drawn separate it shall use the same format as the landscape design plan.

(b) The grading design plan shall indicate finished configurations and elevations of the landscaped area, including the height of graded slopes, drainage patterns, pad elevations, and finish grade.

**9. Soils Analysis**

(a) A soil analysis satisfying the following conditions shall be submitted as part of the Landscape Documentation Package.

(i) Determination of soil texture, indicating the percentage of organic matter.

(ii) An approximate soil infiltration rate (either measured or derived from soil texture/ infiltration rate tables). A range of infiltration rates shall be noted where appropriate.

(iii) Measure of pH, and total soluble salts.

(b) A mulch of up to three inches deep should be applied to all planting areas except turf.

**10. Maintenance Schedules**

A regular maintenance schedule satisfying the following conditions shall be submitted as part of the Landscape Documentation Package.

(a) Landscapes shall be maintained to ensure water efficiency. A regular maintenance schedule shall include but not be limited to checking, adjusting and repairing irrigation equipment; resetting the automatic controller; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning, and weeding in all landscaped areas.

(b) Whenever possible, repair of irrigation equipment shall be done with the originally specified materials or their equivalents.

**11. Effective Precipitation Disclosure statement**

If effective precipitation is included in the calculation of the Estimated total Water Use, an Effective Precipitation Disclosure Statement shall be completed, signed, and submitted with the Landscape Documentation Package. A sample Effective Precipitation disclosure Statement is attached as Exhibit "B". No more than 25 percent of the local annual mean precipitation shall be considered effective precipitation in the calculation of the Estimated Total Water Use. The Effective Precipitation rate for San Bruno shall be 4.88 inches, which is 25% of 19.53 inches per year.

**12. Landscape Irrigation Audit**

(a) A landscape irrigation audit shall be completed for all projects except single family residences and multi-family townhome, condominium, and apartment projects of four (4) units or less.

(b) Audits shall follow the State of California Landscape Water Management Program as described in the Landscape

Irrigation Auditor Handbook, the entire document, which is hereby incorporated by reference. (See Landscape Irrigation Auditor Handbook (June 1990) version 5.5 (formerly Master Auditor Training).

(c) A landscape irrigation audit shall be conducted by a certified landscape irrigation auditor upon completion of installation of the landscaping and the irrigation system.

**13. Certification of Substantial Completion**

(a) Upon completing the installation of the landscaping and the irrigation system, an irrigation audit shall be conducted by a certified landscape irrigation auditor prior to the final field observation.

(b) A licensed landscape architect or contractor, certified irrigation designer, or other licensed or certified professional in a related field shall conduct a final field observation and shall submit a Certificate of Substantial Completion to the San Bruno Planning and Building Department. The certificate shall specifically indicate that plants were installed as specified, that the irrigation system was installed as designed, and that an irrigation audit has been performed, along with a list of any observed deficiencies. A sample Certificate of Substantial Completion form is attached as Exhibit "C".

## IV. PROVISIONS FOR EXISTING LANDSCAPES

With the exception to any new or rehabilitated landscaping and irrigation systems (as described in Section III. A.), these Water Efficient Landscape and Irrigation Guidelines shall not be applicable to existing project landscaping and irrigation systems in the City of San Bruno.

## V. PUBLIC INFORMATION

Attached as Exhibit "E" is a Source List of various books, publications and articles pertaining to landscaping, water conserving plants and irrigation systems. Some of these publications are available in the San Bruno Public Library, while others may be purchased directly from the publishers.

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# List of Qualifying Clothes Washers

## 2006 Clothes Washer Rebate Program

## $50 to $250

### Effective as of March 22, 2006

**Models listed may change often. Visit www.conservationrebates.com for the most up-to-date list.**

***High Efficiency - Level 1 (Includes washers in Tiers 2 & 3A of the CEE list)***

****** Models in Tier 1 don't qualify for 2006 Bay Area Water Agencies Clothes Washer Rebates ******

***Participating Water Agencies*** [1]

| | | |
|---|---|---|
| **ACWD Funds Depleted** | **BAWSCA $50-$150** | **CCWD - $50** |
| **COD - $100** | **EBMUD - $50** | **MMWD - $75** |
| **SCVWD - $100** | **SCWA - $100** | **ZONE 7 - $50** |

**Level 1 Clothes Washers (Tiers 2 & 3A of the CEE list only)**

| Brand | Model | Brand | Model | Brand | Model |
|---|---|---|---|---|---|
| Ariston | AW122 | Frigidaire | GSTF7200D | Maytag | MLE2000*** |
| Ariston | AW125 | Frigidaire | LTF2140E | Maytag | MLG2000*** |
| Ariston | AWD 121 NA | Frigidaire | LTF530D | Miele | W1918 |
| Asko | W6021 | General Electric | WPGT9360E*** | Miele | W1926 |
| Asko | W6441 | Kenmore | 2206*10+ | Miele | W1930 |
| Asko | W6461 | Kenmore | 2208*10+ | Miele | W1966 |
| Asko | W6641 | Kenmore | 2408*20+ | Miele | W1986 |
| Asko | W6661 | Kenmore | 2506*50+ | Simplicity | SWM5500W-1 |
| Asko | W6761 | Kenmore | 2508*50+ | Softline | XQG 65-11 |
| Asko | WCAM1812 | Kenmore | 2706*60+ | Speed Queen | ATS90*** |
| Bosch | WFL2060UC | Kenmore | 2707*60+ | Speed Queen | ATS95*** |
| Bosch | WFR2460UC | Kenmore | 2708*60+ | Speed Queen | CTS90*** |
| Crosley | CAH4205 | Kenmore | 2709*60+ | Speed Queen | CTS97*** |
| Danby Designer | DWM5500W-1 | Kenmore | 4283* | Speed Queen | CTS99*** |
| Equator | EW 510 | Kenmore | 4293* | Splendide | WD 2000S |
| Equator | EZ 1710 V | Kenmore | 4390* | Splendide | WD 2000S NA |
| Equator | EZ 3710 CEE | Kenmore | 4404* | Splendide | WD 2050S |
| Equator | EZ2512CEE | Kenmore | 4407* | Splendide | WD 2150 |
| Eurotech | EWC177 | Kenmore | 4414* | Splendide | WDC 5200 |
| Eurotech | EWF272EL | Kitchen Aid | KHWS01P*+ | Staber | HXW2304 |
| Fisher & Paykel | GWL10 | Lg Electronics | WD-327*RHD | Staber | HXW2404 |
| Fisher & Paykel | GWL11 | Lg Electronics | WM1811C* | Staber | HXW2504 |
| Frigidaire | FTF2140E | Maytag | FAV6800*** | Summit | SPW-1102 |
| Frigidaire | FTF530E | Maytag | FAV9800*** | Thor | XQG 65-11 |
| Frigidaire | FTFB4000E | Maytag | MAH2400 | Whirlpool | GHW9100L* |
| Frigidaire | FWFB9100E | Maytag | MAH5500B** | Whirlpool | GHW9200L |
| Frigidaire | FWTBB30D | Maytag | MAH55FLB** | Whirlpool | GVW9959K |
| Frigidaire | GLTF2070D | Maytag | MAH6500A** | Whirlpool | LHW0050P |
| Frigidaire | GLTF530D | Maytag | MAH7500* | | |

* One or more astericks after a model number signifies that any number or letter may follow the model number.

**Notes**: Not all High-Efficiency models qualify for a rebate. Offer good on purchases made between January 1, 2006 - March 31,2006, or until funds are depleted, whichever comes first.

Models listed may change often. Visit www.conservationrebates.com for the most up-to-date list.

## *Highest Efficiency - Level 2 (Includes only washers in Tier 3B of the CEE list)*

| *Participating Water Agencies* [1] | | |
|---|---|---|
| **ACWD Funds Depleted** | **BAWSCA $75-$250** | **CCWD - $100** |
| **COD - $150** | **EBMUD - $125** | **MMWD - $100** |
| **SCVWD - $150** | **SCWA - $150** | **ZONE 7 - $100** |

**Level 2 Clothes Washers (Tier 3B of the CEE list only)**

| Brand | Model | Brand | Model | Brand | Model |
|---|---|---|---|---|---|
| Ariston | AW120 | Kenmore | 4483*30 | Lg Electronics | WM244#H* |
| Ariston | AWD120 | Kenmore | 4492*30 | Lg Electronics | WM2677H* |
| Bosch | WFMC2100UC | Kenmore | 4493*20 | Lg Electronics | WM268#H** |
| Bosch | WFMC3200UC | Kenmore | 4493*30 | Lg Electronics | WM3431H* |
| Bosch | WFMC4300UC | Kenmore | 4508*40+ | Lg Electronics | WM3611H* |
| Bosch | WFMC640 SUC | Kenmore | 4509*40+ | Lg Electronics | WM3632H* |
| Bosch | WFMC6400UC | Kenmore | 4586* | Lg Electronics | WM3677H* |
| Equator | EZ1612VCEE | Kenmore | 4587* | Maytag | MAH6700 |
| Equator | EZ3612CEE | Kenmore | 4596* | Maytag | MAH8700 |
| Frigidaire | ATF6000E | Kenmore | 4597* | Maytag | MAH9700 |
| Frigidaire | ATF7000E | Kenmore | 4598* | Miele | W1113 |
| Frigidaire | ATFB6000E | Kenmore | 4599* | Miele | W1119 |
| Frigidaire | ATFB7000E | Kenmore | 4646*50+ | Miele | W1203 |
| Frigidaire | FWFB9200E | Kenmore | 4647*50+ | Miele | W1213 |
| Frigidaire | GLTF2940E | Kitchen Aid | KHWS02R*+ | Miele | W1215 |
| Frigidaire | LTF2940E | Lg Electronics | W0532H* | Samsung | WF306BHW |
| Frigidaire | LTF6000E | Lg Electronics | WD-1274FHB | Samsung | WF306LAW |
| Frigidaire | LTF7000E | Lg Electronics | WD-324*RHD | Samsung | WF316*** |
| General Electric | GBVH6260FWW | Lg Electronics | WM0532H* | Samsung | WF326LAS |
| General Electric | GCVH6260FWW | Lg Electronics | WM064#H* | Samsung | WF326LAW |
| General Electric | WBVH6240F | Lg Electronics | WM1812C* | Siemens | WFXD5200UC |
| General Electric | WCVH6260F | Lg Electronics | WM1814C* | Siemens | WFXD840 AUC |
| General Electric | WHDVH626F | Lg Electronics | WM1815C* | Siemens | WFXD8400UC |
| Kenmore | 4282*20 | Lg Electronics | WM1832C* | Splendide | WD2100 |
| Kenmore | 4292*20 | Lg Electronics | WM2011H* | Splendide | WDC 6200CEE |
| Kenmore | 4405* | Lg Electronics | WM2032H* | Whirlpool | GHW9150P* |
| Kenmore | 4408* | Lg Electronics | WM204#C** | Whirlpool | GHW9160P* |
| Kenmore | 4409* | Lg Electronics | WM207#C* | Whirlpool | GHW9250M* |
| Kenmore | 4415* | Lg Electronics | WM2177H* | Whirlpool | GHW9300P*+ |
| Kenmore | 4425* | Lg Electronics | WM2277H* | Whirlpool | GHW9400P* |
| Kenmore | 4482*30 | Lg Electronics | WM2411H* | Whirlpool | GHW9460P* |
| Kenmore | 4483*20 | Lg Electronics | WM2432H* | Whirlpool | WFW8300S*+ |

## [1] Participating Water Agencies and Communities Served

Bay Area Water Supply and Conservation Agency (BAWSCA): Atherton, Belmont, Brisbane, Colma, Daly City, East Palo Alto, El Granada, Foster City, Half Moon Bay, Hayward (parts), Hillsborough, Menlo Park (parts), Millbrae, Miramar, Pacifica, Portola Valley, Princeton, Princeton By The Sea, Redwood City, San Bruno, San Carlos, San Mateo, South San Francisco and Woodside

Contra Costa Water District (CCWD): Antioch, Bay Point, Brentwood (parts), Concord, Clayton, Clyde, Martinez, Oakley, Pacheco, Pittsburg, Pleasant Hill (parts), and Walnut Creek (parts)

City of Davis (COD): Davis, El Macero

East Bay Municipal Water District (EBMUD): Alameda, Alamo, Albany, Ashland, Berkeley, Blackhawk, Castro Valley, Crockett, Danville, Diablo, El Cerrito, El Sobrante, Emeryville, Hayward (parts), Hercules, Kensington, Lafayette, Moraga, North Richmond, Oakland, Orinda, Piedmont, Pinole, Pleasant Hill (parts), Richmond, San Leandro, San Lorenzo, San Pablo, San Ramon (parts) and Walnut Creek (par

Marin Municipal Water District (MMWD): Belvedere, Corte Madera, Fairfax, Forest Knolls, Greenbrae, Kentfield, Lagunitas, Larkspur, Marin City, Mill Valley, Ross, San Anselmo, San Geronimo, San Quentin, San Rafael, Sausalito, Tiburon and Wooda

Santa Clara Valley Water District (SCVWD): Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, San Martin, Santa Clara, Saratoga, Stanford University, Sunnyvale and Unincorporated S.C. County

Sonoma County Water Agency (SCWA) & North Marin Water District (NMWD): Cotati, Forestville, Inverness Park, Novato, Olema, Paradise Ranch Estates, Petaluma, Point Reyes Station, Rohnert Park, Santa Rosa and Sonoma Vall

Zone 7 Water District (Zone 7): Dublin, Livermore, Pleasanton and San Ramon (parts)

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# The City of San Bruno

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*Invites Applications for*

# *Water Resources Manager*

City Of SAN BRUNO

***$7,850 to $9,634 Monthly***
***Depending on Qualifications***

The City of San Bruno supports workforce diversity and is an Equal Opportunity Employer (EOE) and as such does not discriminate on the basis of age, race, color, sex, religion, ancestry, physical or mental disability, marital status, sexual orientation, or national origin, in its employment actions, decisions, policies and practices. The City of San Bruno complies with the employment provisions of the Americans with Disabilities Act (ADA). Contact us at (650) 616-7055 to discuss your needs.

*City of San Bruno*
*Human Resources*
*567 El Camino Real*
*San Bruno, CA 94066*

*Phone:(650) 616-7055*

***Final Filing Date***
***Friday, January 20, 2006***

## The City

San Bruno is "the Peninsula City with a Heart". Located in San Mateo County, San Bruno is twelve miles south of San Francisco and adjacent to the San Francisco International Airport. An ethnically and culturally rich city, San Bruno has an established single-family residential population of 40,165 in a community that is characterized by a small-town atmosphere within a large metropolitan area.

Located along Highway 101 and Interstate 280, the City enjoys easy access to the vast cultural, educational and recreational opportunities of the San Francisco Bay Area. Cultural opportunities include numerous museums, galleries, theaters and the San Francisco symphony. For the sports enthusiast, the San Francisco Forty-Niners and Giants play nearby; the Golden Gate National Recreation Area is minutes away and access to the San Francisco Bay is just a short drive away. Educational opportunities include numerous community college, as well as Stanford University, University of San Francisco, UC San Francisco and CSU San Francisco. Numerous regional shopping centers abound. The San Bruno BART and CalTrain stations make it easy to use public transportation to access the Peninsula, San Francisco and beyond.

San Bruno has a total on 6.4 miles of hilly terrain that varies in elevation from 12 feet to 875 feet. Mild winters and warm summers characterize San Bruno's excellent costal weather making it possible to enjoy the natural beauty of the area on a year round basis.

## The Position

The Water Resources Manager will provide highly responsible and complex technical support to the Public Works Director. This position is responsible for managing and integrating a wide variety of functions and programs in identifying and planning for future water resource requirements for the City. These activities are accomplished in compliance with all applicable regulatory operational, procedural and budget guidelines.

## Duties & Responsibilities

- Develops and directs the implementation of water resource goals, objectives, policies, and procedures.
- Manages, develops and implements all Water Resource Management programs and activities; oversees the formulation of the Water Resources Plan, Urban Water Management Plan and other water and environmental resources documents, and manage the City's water conservation program.
- Plans and directs project management activities involving water resource planning and evaluation including recommendation for construction and capital improvement projects, including the preparation of specifications and consultant service agreements.
- Prepares memoranda and reports documenting the results of complex technical analysis.
- Makes presentations to technical and non-technical audiences to explain and summarize the significance of studies in support of City management decision processes regarding strategic water system initiatives.
- Responds to and resolves difficult and sensitive citizen inquiries and complaints; advocates the City's position at meetings and hearings with members of the public and local, state and federal officials.
- Leads projects and provides expert technical consultation and support to the Director in assessing water supply and water quality impacts resulting from water facility capital projects and water operations.
- Oversees the management, maintenance and quality assurance of the City's reporting responsibilities and water resource databases.
- Plans and coordinates major projects, and directs assigned staff and consultants, involving other cities and water agencies, and the SFPUC.

## *Minimum Qualifications*

**Education and Experience:**

Any combination of experience and training that would provide the required knowledge and abilities is qualifying.

Equivalent to a bachelor's degree from an accredited college or university with major course work in natural or physical sciences, economics, natural resources management, urban or regional planning, civil or environmental engineering or a closely related field.

Five (5) years of increasingly responsible management experience involving water resources with at least two (2) years in a responsible management or supervisory level position. Previous public sector experience is preferred but not required.

**Knowledge of:**

- Contemporary methods, techniques, principles and practices of water resource planning, public administration and local government operations related to water resources.
- Principles and practices of budget, and financial management; project management systems; purchasing procedures.
- Principles and procedures of emergency response preparedness; safety practices and procedures including occupational hazards and safety precautions; safe driving principles and practices; well design and maintenance techniques.
- Research techniques, methods and procedures and report presentation; computer use and techniques.
- Proper interpretation and decision making in accordance with laws, rules and policies; principles and application of Best Management Practices, bench marking, performance measures, and customer surveys.

**Ability to:**

- Implement principles, practices, and terminology associated with water resources management issues including but not limited to hydrology, hydraulics, fluid mechanics, groundwater treatment and flow, and water quality and mixing processes.
- Environmental impact analysis principles and techniques.
- Analyze engineering data and make decisions accordingly; interpret and coordinate complex, interdisciplinary information from within the City or outside public and private sources.
- Establish and maintain effective quality control of water resource activities.
- Prepare, maintain and interpret records and reports, recommend and implement efficiency and productivity improvements.

## *Application & Selection Process*

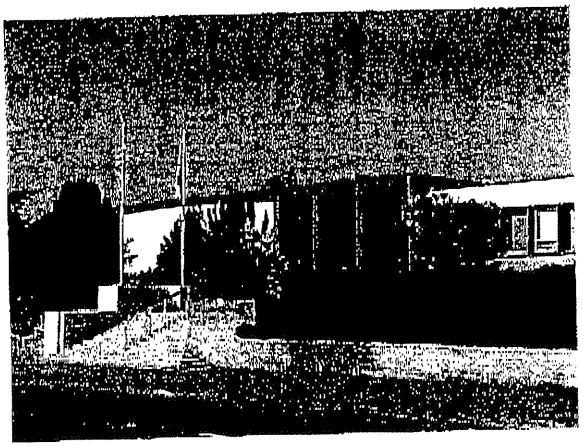
**Application Process:**

Apply on-line at http://www.sanbruno.ca.gov or request an application by contacting Human Resources at (650) 616-7055. **The deadline for a completed application is Friday, January 20, 2006 at 5:00 p.m. No faxes or postmarks will be accepted.**

**Selection Process:**

After an initial screening of applications only those applicants that meet the position's minimum qualifications and, appear to best meet the Department's ideal candidate description will be invited to participate further in the process.

Examinations for this position may include written exercises and interviews.



## *Benefits*

### *Retirement*

The City and employee both contribute to the Public Employees' Retirement System (PERS) 2.7% at 55 plan. Employees pay PERS contribution of 8%and do not pay Social Security. Employees are not covered by Social Security. Under the Social Security law, there are two ways your Social Security benefit amount earned under previous employers may be affected, "Windfall Elimination Provision" and Govemment Pension offset Provision. "For more information, please visit www.socialsecurity.gov. You may also call 1-800-772-1213 or for the deaf or hard of hearing, call the TTY number 1-800-325-0778, or you may contact your local Social Security Office.

### *Insurance*

The City currently contributes $800 per month towards the cost of Medical/Dental and Vision for employee and dependent coverage (including domestic partner). Employee cost of $186.80 per month is paid on a tax deferred basis and is subject to adjustment by the plan provider annually.

Life Insurance equal to one year's annual salary and Long Term Disability (LTD) coverage is provided at no cost to the employee.

### *Leave*

Includes 10 - 23 days vacation per year depending on length of service, 12 days annual sick leave, and 14.5 paid holidays, and 60 hours of management leave per year.

### *Other Benefits*

- Home Loan Assistance Program
- 2.5% Bilingual Incentive
- Credit union membership
- Section 125 Flexible Benefit Plan
- Tuition reimbursement

## *Mission Statement*

The City of San Bruno exists to provide exemplary services for our community that enhance and protect the quality of life.

## *Vision Statement*

San Bruno will be the Peninsula City of choice in which to live, learn, work, shop and play.

## *The City of San Bruno's Core Values*

- Integrity
- Protecting guarding and shepherding public resources and interests
- Teamwork
- Exemplary service to the community
- Competent, well-trained employees
- Friendliness and commitment to the community

**Join the City of San Bruno**
**The Peninsula City**
**with a Heart**

**NOTE:** This job announcement is designed as an informative guide and is subject to change. It does not constitute an expressed or implied contract.

# Appendix H

Excerpts from: *SFPUC Suburban Customer Water Supply Emergency Operations and Notification Plan,* Revision 5, April 2002

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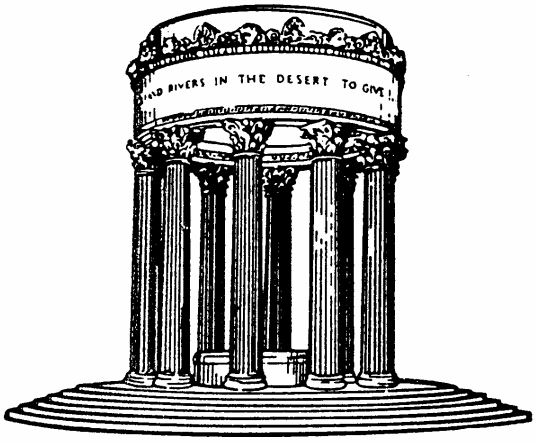
# SFPUC - Suburban Customer Water Supply Emergency Operations and Notification Plan

## April 2002
## Revision 5




Prepared for
San Francisco Public Utilities Commission

Prepared by
Olivia Chen Consultants, Inc.
& Barbara Foster Associates

# ATTACHMENT A:
# EMERGENCY PLANNING SCENARIOS

**Scenario A.1**

**Loss of Harry Tracy WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS |
|---|---|---|
| Hetch Hetchy | 155 MGD | 155 MGD |
| Sunol WTP | 40 MGD | 40 MGD |
| Harry Tracy WTP | 40 MGD | 0 MGD |
| Total | 235 MGD | 195 MGD |

*INITIAL SHORTAGE = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss or impending loss. Give information on expected system water quality without Harry Tracy WTP.

2. Start Baden Pump Station.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demand, track Balancing Reservoir storage. If demand increases significantly and storage drops, INCREASE SUNOL VALLEY WTP RATE TO 87 MGD using conventional treatment, notify customers of expected change in water quality.

**Scenario A.2**

**Loss of Harry Tracy WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 230 MGD | 230 MGD |
| Sunol WTP | 40 MGD | 40 MGD | 110 MGD |
| Harry Tracy WTP | 50 MGD | 0 MGD | 0 MGD |
| Total | 320 MGD | 270 MGD | 340 MGD |

*INITIAL SHORTAGE =325-270= 55 MGD.*
*SHORTAGE AFTER 8 HOURS = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. Give information on expected water quality without Harry Tracy WTP and with increase rate at Sunol WTP.

2. INCREASE SUNOL VALLEY WTP to 110 MGD using direct filtration. Notify DOHS.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

Storage Needed = up to 18 million gallons in first 8 hours.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demands and treated water storage closely. If demand increases significantly and storage drops, INCREASE HETCH HETCHY RATE TO 300 MGD.

**Scenario B.1**

**Loss of Sunol Valley WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS |
|---|---|---|
| Hetch Hetchy | 155 MGD | 155 MGD |
| Sunol WTP | 40 MGD | 0 MGD |
| Harry Tracy WTP | 40 MGD | 40 MGD |
| Total | 235 MGD | 195 MGD |

*INITIAL SHORTAGE = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss or impending loss. Give information on expected system water quality without Sunol Valley WTP.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

2. Observe system demand, track Balancing Reservoir storage. If demand increases significantly and storage drops, INCREASE HARRY TRACY WTP RATE AS NEEDED.

**Scenario B.2**

**Loss of Sunol Valley WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 230 MGD | 230 MGD |
| Sunol WTP | 40 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 50 MGD | 50 MGD | 140 MGD |
| Total | 320 MGD | 280 MGD | 370 MGD |

*INITIAL SHORTAGE =325-280= 45 MGD.*
*SHORTAGE AFTER 8 HOURS = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. Give information on expected water quality without Sunol Valley WTP.

2. INCREASE HARRY TRACY WTP RATE TO 100 MGD.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

Storage Needed = up to 15 million gallons in first 8 hours.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demands and treated water storage closely. If demand increases and storage drops, INCREASE HARRY TRACY WTP AS NEEDED.

**Scenario C.1**

**Loss of Harry Tracy WTP and Sunol Valley WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 155 MGD | 155 MGD | 230 MGD |
| Sunol WTP | 40 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 40 MGD | 0 MGD | 0 MGD |
| Total | 235 MGD | 155 MGD | 230 MGD |

*INITIAL SHORTAGE =184-155= 29 MGD.*
*SHORTAGE AFTER 8 HOURS = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. Give information on expected water quality without Harry Tracy WTP and Sunol Valley WTP.

2. INCREASE HETCH HETCHY RATE TO 230 MGD. Start Baden Pump Station.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

Storage Needed = up to 10 million gallons in first 8 hours.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demand, track total system storage. If demand increases significantly and storage drops, INCREASE HETCH HETCHY RATE TO 240 OR 300 MGD.

**Scenario C.2**

**Loss of Harry Tracy WTP and Sunol Valley WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 230 MGD | 300 MGD |
| Sunol WTP | 40 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 50 MGD | 0 MGD | 0 MGD |
| Total | 320 MGD | 230 MGD | 300 MGD |

*INITIAL SHORTAGE =325-230= 95 MGD.*
*SHORTAGE AFTER 8 HOURS = 25 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss, REQUEST DRAWDOWN OF CUSTOMER STORAGE AND ACTIVATION OF ALTERNATE SUPPLIES. Give information on expected water quality from Sunol WTP.

2. INCREASE HETCH HETCHY RATE TO 300 MGD.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

Storage Needed = up to 32 million gallons in first 8 hours.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demand, track total system storage. If demand increases significantly and storage drops, ISSUE PRESS RELEASE asking for conservative use of water.

**Scenario D.1**

**Loss of Hetch Hetchy Supply Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 155 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 40 MGD | 87 MGD |
| Harry Tracy WTP | 40 MGD | 40 MGD | 140 MGD |
| Total | 235 MGD | 80 MGD | 227 MGD |

*INITIAL SHORTAGE =184-80= 104 MGD.*
*SHORTAGE AFTER 8 HOURS = 0 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. Give information on expected water quality without Hetch Hetchy supply.

2. INCREASE PLANT RATE AT SUNOL WTP TO 87 MGD using Conventional Filtration. Notify DOHS. INCREASE PLANT RATE AT HARRY TRACY WTP TO AT LEAST 110 MGD. Open Capuchino PRV.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 0 MGD.*

Storage Needed = 35 million gallons in first 8 hours.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

3. Observe system demand, track total system storage. If demand increases significantly and storage drops, INCREASE HARRY TRACY WTP RATE UP TO 140 MGD AS NEEDED.

**Scenario D.2**

**Loss of Hetch Hetchy Supply Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 40 MGD | 110 MGD |
| Harry Tracy WTP | 50 MGD | 50 MGD | 140 MGD |
| Total | 320 MGD | 90 MGD | 250 MGD |

*INITIAL SHORTAGE =325-90= 235 MGD.*
*SHORTAGE AFTER 8 HOURS = 75 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST CUSTOMERS TO ACTIVATTE AUXILIARY SUPPLIES. If time permits before effect of loss reaches Tesla Portal, have customers fill up storage. Give information on expected water quality when Hetch Hetchy is shut down.

2. INCREASE PLANT RATE AT SUNOL WTP to 110 MGD using Direct Filtration. Notify DOHS, INCREASE PLANT RATE AT HARRY TRACY WTP to 140 MGD. Open Capuchino PRV full. If time permits before effect of loss reaches Tesla Portal, fill CDD Reservoirs and Balancing Reservoir.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 =*
*325-45-250 = 30 MGD.*

3. Notify Customers when effect of loss reaches Tesla Portal. REQUEST DRAWDOWN OF CUSTOMER STORAGE. Shut off Lake Merced Pump Station, draw down storage in Sunset Reservoir and University Mound Reservoir.

4. Watch system demands and treated water storage closely. If storage may not last until Hetch Hetchy supply can be restored, ISSUE PRESS RELEASE asking for a 10 percent reduction in water use. Repeat press releases as necessary.

*EXPECTED SHORTAGE AFTER PRESS RELEASE = 0 MGD.*

Storage Needed = up to 78 million gallons in first 8 hrs if loss is immediate.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

**Scenario E.1**

**Loss of Hetch Hetchy and Harry Tracy WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 155 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 40 MGD | 87 MGD |
| Harry Tracy WTP | 40 MGD | 0 MGD | 0 MGD |
| Total | 235 MGD | 40 MGD | 87 MGD |

*INITIAL SHORTAGE =184-40= 144 MGD.*
*SHORTAGE AFTER 8 HOURS = 97 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. If time permits before effect of Hetch Hetchy loss reaches Tesla Portal, have customers fill up storage. Give information on expected water quality from Sunol Valley WTP.

2. INCREASE PLANT RATE AT SUNOL VALLEY WTP to 87 MGD using Conventional Filtration. Notify DOHS. If time permits before effects of Hetch Hetchy loss reach Tesla Portal, fill Balancing Reservoir and CDD reservoirs.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 = 184-45-87 = 52 MGD.*

3. Notify customers when effects of Hetch Hetchy loss reach Tesla Portal. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE.

4. Observe system demand, track total system storage. If storage may not last until one of the supplies is restored, ISSUE PRESS RELEASE calling for 30% emergency rationing.

*EXPECTED SHORTAGE AFTER EMERGENCY RATIONING = O MGD.*

Storage Needed = up to 48 million gallons in first 8 hours if loss is immediate. Up to 113 million gallons if rationing take 24 hours to implement.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

**Scenario E.2**

**Loss of Hetch Hetchy and Harry Tracy WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 40 MGD | 110 MGD |
| Harry Tracy WTP | 50 MGD | 0 MGD | 0 MGD |
| Total | 320 MGD | 40 MGD | 110 MGD |

*INITIAL SHORTAGE =325-40= 285 MGD.*
*SHORTAGE AFTER 8 HOURS = 215 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. If time permits before effects of Hetch Hetchy loss reach Tesla Portal, have customers fill up storage. Give information on expected water quality from Sunol WTP.

2. INCREASE PLANT RATE AT SUNOL VALLEY WTP to 110 MGD using Direct Filtration. Notify DOHS. If time permits, fill Balancing Reservoir and CDD storage.

*ADJUSTED SHORTAGE AFTER ACTIONS 1 AND 2 =*
*325-45-110 = 170 MGD.*

3. Notify customers when effects of Hetch Hetchy loss reach Tesla Portal. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE.

4. ISSUE PRESS RELEASE calling for 50% emergency rationing.

*EXPECTED SHORTAGE AFTER EMERGENCY RATIONING = O MGD.*

Storage Needed = up to 95 million gallons in first 8 hours if loss is immediate. Up to 239 million gallons if rationing takes 24 hours to implement.

*NO FURTHER ACTION IS EXPECTED TO BE NEEDED.*

5. Observe system demand, track total system storage. If demand continues to exceed supply, issue further press releases informing customers of additional rationing needed.

**Scenario F.1**

**Loss of Hetch Hetchy and Sunol Valley WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 155 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 40 MGD | 40 MGD | 140 MGD |
| Total | 235 MGD | 40 MGD | 140 MGD |

*INITIAL SHORTAGE =184-40= 144 MGD.*
*SHORTAGE AFTER 8 HOURS = 44 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. If time permits before effects of Hetch Hetchy loss reach Tesla Portal, have customers fill up storage. Give information on expected water quality from Harry Tracy WTP. Activate SFWD's EOC to monitor conditions, handle communications, and direct and coordinate corrective action. Notify DOHS.

2. INCREASE PLANT RATE AT HARRY TRACY WTP to 140 MGD. Fill up Balancing Reservoir and CDD storage, if time is available, to prepare for emergency.

3. Notify customers when effects of Hetch Hetchy loss reach Tesla Portal. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE.

*EXPECTED SHORTAGE AFTER ABOVE ACTIONS = 0 MGD.*

Storage Needed = up to 48 million gallons if loss is immediate. Up to 77 million gallons if it takes 24 hours to activate auxiliary supplies.

*NO FURTHER ACTION IS LIKELY.*

4. Observe system demand, track total system storage. If demand increases significantly and storage in expected to run out before supply can be restored, ISSUE PRESS RELEASE requesting conservative use of water.

**Scenario F.2**

**Loss of Hetch Hetchy and Sunol Valley WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 50 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 50 MGD | 50 MGD | 160 MGD |
| Total | 330 MGD | 50 MGD | 160 MGD |

*INITIAL SHORTAGE =325-50= 275 MGD.*
*SHORTAGE AFTER 8 HOURS = 165 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. If time permits before effects of Hetch Hetchy loss reach Tesla Portal, have customers fill up storage. Give information on expected water quality from Harry Tracy WTP. Activate SFWD's EOC to monitor conditions, handle communications, and direct and coordinate corrective actions. Notify DOHS.

2. INCREASE PLANT RATE AT HARRY TRACY WTP to 160 MGD. Open Capuchino PRV full. Open T58K, T63R and T64M as needed to utilize 160 MGD from Harry Tracy WTP. Fill up Balancing Reservoir and CDD storage, if time is available.

3. Notify customers when effects of Hetch Hetchy loss reach Tesla Portal. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE.

*ADJUSTED SHORTAGE AFTER ABOVE ACTIONS = 325-160-25 =140 MGD*

4. ISSUE PRESS RELEASE calling for 45% emergency rationing.

*EXPECTED SHORTAGE AFTER EMERGENCY RATIONING = O MGD.*

Storage Needed = up to 92 million gallons in first 8 hours if loss is immediate. Up to 202 million gallons if rationing takes 24 hours to implement.

*NO FURTHER ACTION IS LIKELY.*

5. Observe system demand, track total system storage. If demand continues to exceed supply, issue further press releases informing customers of additional rationing needed.

**Scenario G.1**

**Loss of Hetch Hetchy, Harry Tracy WTP and Sunol Valley WTP Under Winter Demand Conditions**

SYSTEM DEMAND = 184 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 155 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 40 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 40 MGD | 0 MGD | 0 MGD |
| Total | 235 MGD | 0 MGD | 0 MGD |

*INITIAL SHORTAGE =184 MGD.*
*SHORTAGE AFTER 8 HOURS = 184 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. Activate SFWD's EOC to monitor conditions, handle communications, and direct and coordinate corrective action. Notify DOHS.

2. ISSUE PRESS RELEASE calling for emergency rationing to essential use only (75%).

*EXPECTED SHORTAGE AFTER EMERGENCY RATIONING = 184-138 = 46 MGD.*

Storage Needed = up to 184 million gallons if it take 24 hours to implement rationing. Storage loss will continue at 46 MGD after 24 hours, if 75% rationing is successful, until supply is restored.

3. Observe system demand, track total system storage. If demand cannot be reduced enough and storage drops to 200 million gallons or less than 2.5 days storage, ISSUE BOIL WATER ORDER with support of DOHS and notify press that raw water will be released with just chlorine treatment if demand cannot be reduced further.

4. If demand is not reduced further and storage continues to be used up, RELEASE RAW WATER with chlorination from local reservoirs when total storage drops to 100 million gallons or 1.5 days storage.

**Scenario G.2**

**Loss of Hetch Hetchy, Sunol Valley WTP, and Harry Tracy WTP Under Summer Demand Conditions**

SYSTEM DEMAND = 325 MGD

| SYSTEM SUPPLY | BEFORE LOSS | AFTER LOSS | AFTER 8 HOURS |
|---|---|---|---|
| Hetch Hetchy | 230 MGD | 0 MGD | 0 MGD |
| Sunol WTP | 50 MGD | 0 MGD | 0 MGD |
| Harry Tracy WTP | 50 MGD | 0 MGD | 0 MGD |
| Total | 330 MGD | 0 MGD | 0 MGD |

*INITIAL SHORTAGE = 325 MGD.*
*SHORTAGE AFTER 8 HOURS = 325 MGD.*

**PROPOSED CORRECTIVE ACTION**

1. Notify Customers of loss. REQUEST DRAWDOWN OF CUSTOMER AND CDD STORAGE TO PRESERVE BALANCING RESERVOIR STORAGE AND MAINTAIN SYSTEM PRESSURE. REQUEST CUSTOMERS TO ACTIVATE AUXILIARY SUPPLIES. Activate SFWD's EOC to monitor conditions, handle communications, and direct and coordinate corrective actions. Notify DOHS.

2. ISSUE PRESS RELEASE calling for emergency rationing to essential use only (75%).

*EXPECTED SHORTAGE AFTER EMERGENCY RATIONING = 325-243 = 82 MGD.*

Storage Needed = up to 325 million gallons in 24 hours if loss is immediate at all sources. Storage loss will continue at 82 MGD, thereafter, if 75% rationing is successful, until one or more supplies are restored.

3. Observe system demand, track total system storage. If demand cannot be reduced enough and storage drops to 200 million gallons or less than 2.5 days storage, ISSUE BOIL WATER ORDER with support of DOHS and notify press that raw water will be released with just chlorine treatment if demand cannot be reduced further.

4. RELEASE CHLORINATED RAW WATER FROM LOCAL RESERVOIRS TO SYSTEM when storage drops to 100 million gallons or 1.5 days storage.

# Appendix I

Excerpts fro*m: City of San Bruno Municipal Code*

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# Chapter 10.16 WATER CONSERVATION

## Article I. General

### 10.16.010 Definitions.

A. "Appeals board" is a subcommittee of the San Bruno water conservation committee, a committee appointed by the San Bruno city council and of staff of the city of San Bruno.

B. "City council" means the city council of the city of San Bruno, California.

C. "Customer" means any person, whether within or without the geographic boundaries of the city of San Bruno who uses water supplied by the city of San Bruno department of public works, water division.

D. "Director" means the director of public works of the city of San Bruno.

E. "Period of precipitation" means during rainfall and not any generalized or specific season or period of the year.

F. "Person" means any person, firm, partnership, association, corporation, company, organization or governmental entity.

G. "Swimming pool" is defined to include any indoor or outdoor constructed swimming or bathing pool or spa that can hold one thousand gallons of water, or more.

H. "Unit of water" is one hundred cubic feet of water.

I. "Water emergency" means any condition related to water supply which may have a negative effect or the disability to supply a normal amount of water to city customers. (Ord. 1522 § 3 (part), 1990)

### 10.16.020 Declaration of water emergency.

Upon a declaration of a state of water emergency, the city council may declare a need for mandatory water conservation (pursuant to Article II of this chapter) and/or water rationing (pursuant to Article III of this chapter) which shall remain in effect until the city council determines a state of water emergency no longer exists. (Ord. 1522 § 3 (part), 1990)

## Article II. Water Conservation Regulations

### 10.16.030 Mandatory conservation policy.

For water conservation purposes, it is the policy of the city to prohibit certain uses of water from the city's water supply system, or misuse of water in the city of San Bruno from whatever source, and prescribing penalties for violation. (Ord. 1522 § 3 (part), 1990)

### 10.16.040 Prohibition of nonessential uses of the mandatory conservation policy.

The provisions of this chapter shall apply to all persons using water within the city of San Bruno. Notwithstanding other code provisions inconsistent with this chapter, the provisions of this chapter shall remain in effect until such time the San Bruno city council declares the emergency over. (Ord. 1522 § 3 (part), 1990)

### 10.16.050 Nonessential uses of the mandatory conservation policy defined.

It is unlawful for any person to use water, from whatever source, for any of the following:

A. The watering of grass, lawn, groundcover, shrubbery, open ground crops and trees, in a manner that results in runoff into sidewalks, gutters and streets or during periods of precipitation, or to an extent which allows excess water to run to waste.

B. The watering of grass, lawn, groundcover, shrubbery, and trees, between the hours of nine a.m. and four p.m.

C. The escape of water through leaks, breaks, or malfunction within the water user's plumbing or distribution system for any period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of ten days after the water user discovers such break, leak, or malfunction, or receives notice from the city of such condition, whichever occurs first, is a reasonable time within which to correct such condition or to make arrangement for correction.

D. The use of hoses not having automatic shut-off devices for the washing of cars, boats, trailers or other vehicles.

E. The use of water from a hose for the cleaning of buildings, structures, walkways, sidewalks, driveways, patios, parking lots or hard-surfaced areas. The washing of windows or structures with a bucket and squeegee is not prohibited by this chapter.

F. The operation of a car wash using water from the city's domestic water system, unless water for such use is recycled.

G. The use of water from any fire hydrant unless specifically authorized by permit from the director of public works except by regularly constituted fire protection agencies for fire suppression purposes.

H. The use of water to fill, clean or maintain artificial or decorative lakes, fountains or ponds with a capacity of one thousand gallons or more.

I. The filling of any swimming pool unless there are extenuating circumstances as determined by the director of public works or his/her designee.

J. The service of water in restaurants except upon request by the customer.

K. The use of any city water for the flushing of fire hydrants and/or fire related drills, and water mains unless there is an emergency as determined by the director of public works, the San Bruno fire chief or the San Bruno city manager.

L. The indiscriminate running of water or washing with water than results in flooding or runoff in or on sidewalks, gutters and streets not otherwise prohibited above.

M. Substantial planting or replanting of new landscaping which is not drought tolerant will be prohibited until such time the San Bruno city council has determined that the emergency has passed. For new developments in which water dependent (not drought tolerant) landscaping is required as a use permit condition, the city shall require a cash bond or other form of security subject to approval of the city from the developer in an amount specified which will be placed in an account in which the interest shall accrue to the developer. "Substantial" planting or replanting is hereby defined as planting or replanting in excess of ten percent of the total planted area of the development, parcel, site or lot.

N. Using potable water from whatever source, in construction for dust control, or soil compaction unless reclaimed (or "nonpotable") water is not available. Vehicles hauling and spraying such water must have standardized signs indicating "reclaimed" or "nonpotable" water.

O. Any other use of domestic water as deemed to be wasteful as determined by the director of public works. (Ord. 1533 § 2, 1991; Ord. 1522 § 3 (part), 1990)

## 10.16.060 Water restriction, disconnection or removal.

Any person in violation of the provisions of Sections 10.16.040 or 10.16.050 who fails to take corrective action after the first notification of the violation shall be subject to water flow restriction, or disconnection of water service, or removal of water service connection. Upon restriction, disconnection, or removal of water service, a written notice shall be served upon the violator, or conspicuously posted at the entrance to the violator's premises, and shall state the time, place and general description of the violation and the method by which reconnection or non-restriction can be accomplished. (Ord. 1522 § 3 (part), 1990)

### 10.16.070 Appeal.

Any person who feels that the activity or condition which resulted in the restriction, removal, or disconnection of water service pursuant to this chapter did not constitute a violation of this chapter may appeal to an appeals board that is a subcommittee of the San Bruno water conservation committee, a committee appointed by the San Bruno city council and of members of San Bruno city staff. If the appeals board finds that the activity or conduct did not constitute a violation of this chapter, the reconnection charge will be refunded. (Ord. 1522 § 3 (part), 1990)

### 10.16.080 Reconnection.

Where water service is disconnected, restricted or removed as authorized above, it shall be reconnected, restored or restriction removed upon the correction of the condition or activity. A reconnection charge of one hundred dollars shall be collected before water service can be continued. (Ord. 1522 § 3 (part), 1990)

### 10.16.090 Enforcement.

The director of public works, or his/her designee is responsible for enforcing the provisions of this part. Enforcement and/or penalties of Sections 10.16.160 and 10.16.170 may be used to secure compliance with the above water conservation regulations. (Ord. 1522 § 3 (part), 1990)

## Article III. Water Conservation Regulations

### 10.16.100 Water rationing.

At the direction of the city council, and upon adoption of a resolution implementing water rationing, a mandatory water rationing program shall be implemented, as set forth in Sections 10.16.110 through 10.16.150, below. (Ord. 1522 § 3 (part), 1990)

### 10.16.110 Prohibition of nonessential uses of water.

Upon the institution of water rationing by the San Bruno city council, it is unlawful for any person, firm, partnership, association, corporation or political entity to use water for nonessential uses, as defined below. (Ord. 1522 § 3 (part), 1990)

### 10.16.120 Nonessential uses defined, water rationing.

Upon the institution of water rationing by the San Bruno city council, the following uses of water are determined to be nonessential, except as further provided in this chapter:

A. All uses identified as nonessential in Section 10.16.050 of "Article II—Water Conservation Regulations" of this chapter.

B. Use of water in excess of the following allocations:

1. Residential customers: as specified by resolution of the San Bruno city council.

2. Industrial customers: as specified by resolution of the San Bruno city council.

3. Commercial, institutional and governmental customers: as specified by resolution of the San Bruno city council.

4. Irrigation and outside water usage customers: as specified by resolution of the San Bruno city council. (Ord. 1522 § 3 (part), 1990)

### 10.16.130 Exceptions.

Written application for an exception or adjustment may be made to the water conservation appeals board. The appeals board may:

A. Grant permits for the use of water otherwise prohibited; or

B. Adjust the allocations in Section 10.16.120 (B), if it finds that:

1. Failure to do so would cause an emergency condition adversely affecting the health, sanitation, fire protection or safety of the customer, water user, or the public, and

2. The customer or water user has adopted all practicable water-conservation measures;

The appeals board may, upon written application, grant permits for the use of water otherwise prohibited or adjust the allotments in Section 10.16.120 (B), if it finds that failure to do so would cause unnecessary and undue hardship to the customer, water user, or the public. (Ord. 1522 § 3 (part), 1990)

### 10.16.140 Excess water use charge.

An excess use charge as determined by resolution of the San Bruno city council will be levied for water used in excess of the allocations specified by resolution of the San Bruno city council. Additional charges may be imposed to compensate for a loss of revenue or to pay an additional cost for the purchase or the provision of water. (Ord. 1522 § 3 (part), 1990)

### 10.16.150 Waiver of excess water use charge.

A. Upon written application to the appeals board, a customer or water user may appeal an excess water use charge.

B. The appeals board may waive a specific excess water use charge if it finds, based upon facts presented, that sufficient justification is present to allow such a waiver.

C. A waiver may be granted for one or more of the following reasons:

1. Water used in excess of allocation was for the protection of health and/or sanitation or for the protection of property in the case of fire.

2. Water used in excess of allocation was the results of a condition unknown to the customer or water user which has subsequently been corrected to the satisfaction of the city.

D. A waiver shall not be granted unless the customer or water user has adopted and has demonstrated all practicable water conservation measures, nor shall a waiver be granted on the basis of economic hardship. (Ord. 1522 § 3 (part), 1990)

## Article IV. Enforcement and Penalties

### 10.16.160 Enforcement of water conservation and water rationing—Civil.

A. If at any time a customer or water user has violated any provisions regarding “Article II—Water Conservation Regulations,” or “Articla III—Water Rationing Regulations,” including use of water in excess of the allotments sets forth in Section 10.16.120(B), the city may in lieu of, or in addition to the penalties provided for in Section 356 and Section 31029 of the California Water Code, install a flow-restricting device on the service line or disconnect or remove water service.

B. Charges for disconnection, or installation of flow-restricting devices and restoration of service or removal of restrictions shall be specified by resolution of the San Bruno city council.

C. Discontinuance of Water Service. The continued violation of water conservation regulations or water consumption in excess of the allocation will result in discontinuance of water service by the city of San Bruno. A charge of one hundred dollars shall be paid prior to reactivating the service.

D. Notices and/or warnings of any violation of this chapter, or of any notice required by this chapter or by state law, may validly be issued by any employee of: the San Bruno water division; the San Bruno police department; the San Bruno finance department; the neighborhood improvement representative; the city engineer; the director of public works; the city attorney; and/or the city manager.

E. In addition to any other enforcement provisions of this section, the city attorney may also seek civil penalties in an amount sufficient to deter such violation, but in no event greater than five thousand dollars for each such violation of this chapter. (Ord. 1522 § 3 (part), 1990)

## 10.16.170 Penalties—Criminal.

A. Violation of any provision of this chapter shall be an infraction punishable by a fine not to exceed fifty dollars for a first offense; one hundred dollars for a second violation of this chapter within one year; two hundred and fifty dollars for each additional violation of this chapter within one year.

B. Each day any such violation(s) of this chapter is committed or permitted to continue shall constitute a separate offense and shall be punishable as such hereunder.

C. Such violations may be prosecuted by a criminal complaint filed by the San Bruno city attorney, or by a notice to appear (citation) issued by the San Bruno police department, or by the San Bruno neighborhood improvement representative. (Ord. 1522 § 3 (part), 1990)

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**Appendix J**

*City of San Bruno Resolution 2007-12,*
Adoption of Urban Water Management Plan Update

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RESOLUTION NO. 2007- 12 **CERTIFIED COPY**

**RESOLUTION ADOPTING THE CITY OF SAN BRUNO URBAN WATER MANAGEMENT PLAN FORTHE PERIOD 2005-2010**

**WHEREAS**, the Urban Water Management Planning Act of the California Water Code requires urban water suppliers that serve over 3,000 customers, or that provide over 3,000 acre-feet of water annually, to update and adopt an Urban Water Management Plan (UWMP) and submit a complete UWMP to the State Department of Water Resources (DWR) every five years; and

**WHEREAS**, the UWMP Act is intended to provide assistance to water agencies in carrying out their long-term, resource planning responsibilities to ensure adequate water supplies to meet the needs of both existing customers and future demands for water accomplished at the local level; and

**WHEREAS**, an UWMP is required in order for a water supplier to be eligible for DWR administered State grants, loans, and drought assistance; and

**WERHEAS**, in accordance with the UWMP Act, the City has prepared a draft UWMP Update to the City's 2001 UWMP; and

**WHEREAS**, the draft UWMP Update must be adopted by the City Council following a public notification and hearing process; and

**WHEREAS**, the notice of availability for public review of the draft UWMP Update and the January 23, 2007 public hearing was maled to the Bay Area Water Supply and Conservation Agency (BAWSCA), the San Francisco Public Utilities Commission (SFPUC) and its designated consultant, ESA Consultants, the City of South San Francisco, the County of San Mateo, and the BAWSCA Technical Advisory Committee (TAC) members, and was also published in the San Mateo County Times on two consecutive Saturdays, December 2, and December 9, 2006; and

**WHEREAS**, the draft UWMP Update was made available for public review on December 15, 2006 at the San Bruno Public Library and at the City Hall, Public Works Department; and

**WHEREAS**, a public hearing on the UWMP Update was held at the January 23, 2007 City Council meeting.

**NOW, THEREFORE, BE IT RESOLVED**that the San Bruno City Council does hereby approve the City of San Bruno Urban Water Management Plan update.

---oOo---

I hereby certify that foregoing **Resolution No. 2007 - 12**
was introduced and adopted by the San Bruno City Council at a regular meeting on
January 23, 2007, by the following vote:

AYES: Councilmembers: Ibarra, O'Connell, Medina, Ruane, Mayor Franzella

NOES: Councilmembers: None

ABSENT: Councilmembers: None

Vicky S. Hasha

Vicky S. Hasha, Deputy City Clerk

**I hereby certify this to be a full, true and correct copy of the document it puports to be, the original of which is on file in my office.**

Dated: 1-24-07

Vicky S. Hasha Deputy City Clerk

City Clerk of the City of San Bruno

CITY OF SAN BRUNO INCORPORATED DEC. 23RD 1914 SAN MATEO CO CAL

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