

# **URBAN WATER MANAGEMENT PLAN**

**2005**



*East Bay Municipal Utility District*







December 16, 2005

TO: Interested Agencies, Organizations, and Individuals

SUBJECT: EBMUD's Urban Water Management Plan 2005

The East Bay Municipal Utility District (EBMUD) has completed its update of the Urban Water Management Plan (UWMP). A copy of the UWMP 2005 is enclosed for your records. This document is prepared in conformance with the requirements of the Urban Water Management Planning Act under the California Water Code.

The EBMUD is required by the California Water Code to update and adopt an UWMP. The UWMP is a long-range planning document that reports on the EBMUD's current and projected water usage, water supply programs, and conservation and recycling programs. The cities and counties within the EBMUD's service area rely on the UWMP to verify the adequacy of water supplies in their land use planning.

On November 22, 2005, the EBMUD Board of Directors adopted the UWMP 2005 after completing a period of public review, a public comment meeting, and a public hearing. As required by the Water Code, a copy of the UWMP 2005 must be filed with the Department of Water Resources and with the cities and two counties within EBMUD's service area within thirty days of adoption by the Board of Directors. This transmittal copy fulfills that requirement.

If you have any questions on the UWMP 2005, please contact Ms. Priyanka Jain at (510) 287-1153 or by email, [pjain@ebmud.com](mailto:pjain@ebmud.com). The UWMP 2005 is available through EBMUD's website, at [www.ebmud.com](http://www.ebmud.com) or can be provided in a CD mailing.

Sincerely,

A handwritten signature in black ink that reads 'Priyanka Jain'.

Priyanka K. Jain  
Senior Civil Engineer

Enclosure

PKJ:JGT:smc



# ***URBAN WATER MANAGEMENT PLAN 2005***

**T**his document brings together important information on water supply and usage, wastewater, recycled water and conservation programs at East Bay Municipal Utility District. This information represents East Bay Municipal Utility District's best efforts to promote efficient water use of available supplies consistent with the Urban Water Management Planning Act.



November 2005  
Water Resources Planning Division  
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### ***Cover Photos:***

Top left–San Pablo Reservoir, photographer unknown

Top right–East Bayshore Recycled Water Project, by Wardell Photography

Bottom left–Freeport Regional Water Project intake facility site, by Rich Turner

Bottom right–From the Award-winning “Plants and Landscapes for Summer-Dry Climates” published by EBMUD, by Saxon Holt.

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## CHAPTER 1. GENERAL INFORMATION

**T**he East Bay Municipal Utility District supplies water and provides wastewater treatment to parts of Alameda and Contra Costa counties. The Mokelumne River is the primary source of water used to serve the 1.3 million people in EBMUD's service area. The Mokelumne River water, fed by runoff from the Sierra Nevada, is collected in Pardee and Camanche Reservoirs and ultimately transported to the San Francisco East Bay Area. The Urban Water Management Plan is part of EBMUD's long-range planning to ensure the appropriate level of reliability in its water service. Every five years, EBMUD updates and revises the UWMP by evaluating water supply and demand, water recycling projects and demand management activities as required by the California Water Code Division 6, Part 2.6 (Urban Water Management Planning).

### URBAN WATER MANAGEMENT PLANNING ACT

An Urban Water Management Plan (UWMP or Plan) is required by the California Urban Water Management Planning Act (Act), which was sponsored by the East Bay Municipal Utility District (EBMUD) in the early 1980s. Section 10610.4 of the Act specifies that "urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies." The Act became part of the California Water Code with the passage of Assembly Bill 797 in 1983. Every urban water supplier providing more than 3,000 acre-feet of municipal water annually, or providing water to more than 3,000 customers, is required by the Act to prepare and adopt an UWMP. The Act has been amended by various Assembly and Senate bills which expanded the issues to be addressed in the UWMP. The State's policy, declared in the Act, is to achieve conservation and efficient use of urban water supplies to protect both the people of the State and their water resources. Appendix A contains the text of the Act and its amendments. Amendments to the Act passed since 2000 include:

- SB 610, Costa, 2001 (Senate bill relating to land and water use planning);
- AB 901, Daucher, 2001 (Assembly bill relating to water quality information);
- SB 672, Machado, 2001 (Senate bill relating to efforts made to minimize need to import water);
- SB 1348, Brulte, 2002 (Senate bill relating to Demand Management Measures implementation and evaluation of applications for grants and loans);
- SB 1384, Costa, 2002 (Senate bill relating to wholesale agency water supply information);
- SB 1518, Torlakson, 2002 (Senate bill relating to recycled water);
- AB 105 Wiggins, 2004 (Assembly bill requiring deposit of the UWMP in the California State Library); and
- SB 318, Alpert, 2004 (Senate bill relating to desalination).

The Legislature declares, as stated in the Act, that water is a limited and renewable resource subject to ever-increasing demands and that conservation and efficient use of urban water supplies is a statewide concern. The Act provides water utilities with an approach to assess their water resource needs and supplies at the local level, which may then serve as a building block for integrated regional water management planning. Recognizing the importance of coordination, collaboration and communication between Bay Area agencies,

EBMUD is making significant efforts towards incorporating integrated regional water management planning into its long-term water supply goals. EBMUD joined other Bay Area agencies in developing the San Francisco Bay Area Integrated Regional Water Management Plan (IRWMP). EBMUD is also a participant in the Central and South Sacramento County Regional Water Partnership, which is making a joint effort to develop an IRWMP. EBMUD has also agreed to participate as a partner with Amador Water Agency and Calaveras County Public Utilities in the development of their IRWMP.

### EBMUD'S URBAN WATER MANAGEMENT PLAN

On November 26, 1985, after a period of public review and a public hearing, EBMUD adopted its first UWMP. Since 1985, the plan has been revised and updated every five years. EBMUD's Board of Directors adopted a revised UWMP in 1991, 1996 and 2001. This UWMP is a revision and update of the UWMP 2000, adopted in 2001. This document is designed to satisfy the requirements of the Urban Water Management Planning Act and also to provide the public with a report on EBMUD's progress in implementing conservation and water recycling programs and securing supplemental water supply sources.

### PUBLIC PARTICIPATION AND ADOPTION OF PLAN

Section 10642 of the Act requires that urban water suppliers make their UWMP available for public review and hold a public hearing prior to adopting the Plan. EBMUD's Draft UWMP 2005 was distributed for review and comment beginning on September 23, 2005. A public comment meeting was held on October 19, 2005, and written comments were received through October 24, 2005. This UWMP was modified where appropriate, to incorporate comments received from the public, interested organizations and other agencies. Appendix C contains a summary of the comments received and EBMUD's responses to those comments.

The Act also requires that the UWMP is to be submitted to the California Department of Water Resources, the California State Library and any city and county within which the supplier provides water supplies no later than 30 days after adoption of the Plan. The UWMP 2005 was adopted by the EBMUD Board of Directors at its Regular Meeting on November 22, 2005 by Resolution No. 33508-05. A copy of the adoption resolution is presented in Appendix D.

EBMUD has actively encouraged community participation in its urban water management planning efforts throughout the update process. Notice of intent to update the UWMP was mailed to all cities and counties within EBMUD's service area, local community groups, and various local agencies, and on June 17, 2005 an announcement of the update was posted on EBMUD's website. Notice of the public meeting, the public hearing, the public comment period and intent to adopt was posted in local newspapers (see Appendix B) and was mailed to all cities and counties within the service area and other interested parties, and on September 23, 2005 was posted on EBMUD's website. The Draft UWMP 2005 in addition to the final UWMP 2005 was distributed to the city libraries in the EBMUD service area and the California State Library to encourage public participation.

## **EAST BAY MUNICIPAL UTILITY DISTRICT**

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### **FORMATION**

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East Bay Municipal Utility District (EBMUD), a public utility, was formed under the Municipal Utility District (MUD) Act, passed by the California Legislature in 1921. The MUD Act permits formation of multi-purpose government agencies to provide public services on a regional basis.

In accordance with the MUD Act's provisions, voters in the San Francisco East Bay Area created EBMUD in 1923 to provide water service. In 1929, EBMUD first began water deliveries from the Sierra Mountains to the East Bay when construction of Pardee Dam and the Mokelumne Aqueduct were completed.

The MUD Act was amended in 1941 to enable formation of special districts. In 1944, voters in six East Bay cities elected to form EBMUD's Special District No. 1 to treat wastewater released into the San Francisco Bay. Wastewater treatment for those cities began in 1951 and was expanded 20 years later to include Kensington, El Cerrito and part of Richmond.

### **BOARD OF DIRECTORS**

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EBMUD is governed by a seven-member Board of Directors, publicly elected to four-year terms from wards within EBMUD's service area. The Board determines overall policies, which are then implemented under the direction of the General Manager. Activities of EBMUD are guided by the following Mission Statement:

*To manage the natural resources with which the District is entrusted; to provide reliable, high quality water and wastewater services at fair and reasonable rates for the people of the East Bay; and to preserve and protect the environment for future generations.*

### **MOKELUMNE WATERSHED AND HYDROLOGY**

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Based on a historical average, about 90% of the water delivered to EBMUD's customers originates from the Mokelumne River watershed, and 10% originates as runoff from the protected watershed lands in the East Bay Area. The Mokelumne River watershed is relatively narrow and steep and is located northeast of the Sacramento-San Joaquin Delta on the western slope of the Sierra Nevada. The watershed, upstream of

Camanche Dam, covers an area of 627 square miles and extends from Highland Peak (elevation 10,934 feet above sea level) near the crest of the Sierra Mountains to Camanche Reservoir (elevation 235 feet above sea level) located in the lower western foothills near Clements.

Annual precipitation and streamflow in the Mokelumne River watershed are extremely variable from month to month and from year to year. Most precipitation normally falls between November and May and very little falls between late spring and late fall. Peak flows in the Mokelumne River normally occur during winter storms or during the spring snowmelt season from March through June. These flows decrease to a minimum in late summer or fall.

Snowmelt from parts of Alpine, Amador, and Calaveras counties contribute to the Mokelumne River runoff. The primary tributaries are the North, Middle and South Forks of the Mokelumne River, with the North Fork tributary draining over 80% of the Mokelumne watershed. Smaller tributaries include Summit Creek, Bear Creek, Cole Creek, Moore Creek, Blue Creek, Tiger Creek, Panther Creek, Forest Creek and Licking Fork. The Mokelumne River watershed runoff is collected in Pardee Reservoir. Inflow to Pardee Reservoir is recorded at the U.S. Geological Survey (USGS) Gauge No. 11319500 on the Mokelumne River near Mokelumne Hill. Figure 1-1 depicts the locations of USGS gauging stations within the Mokelumne River watershed. A portion of the water stored in Pardee Reservoir is conveyed to the EBMUD service area via the Mokelumne Aqueducts. The remainder of the water is released from Pardee Reservoir into Camanche Reservoir.

Most of the Mokelumne River watershed is protected and undeveloped, consisting of open space and forest land with small concentrations of residential/commercial development along the major highways, and large tracts of designated wilderness. Forest land, located chiefly within the El Dorado and Stanislaus National Forests, accounts for about 75% of the watershed land. There are small agriculture areas, mainly orchards and vineyards, and several areas of recreational developments (including winter sports facilities). There are minor industrial and commercial uses in the watershed, and logging is the major land use activity.

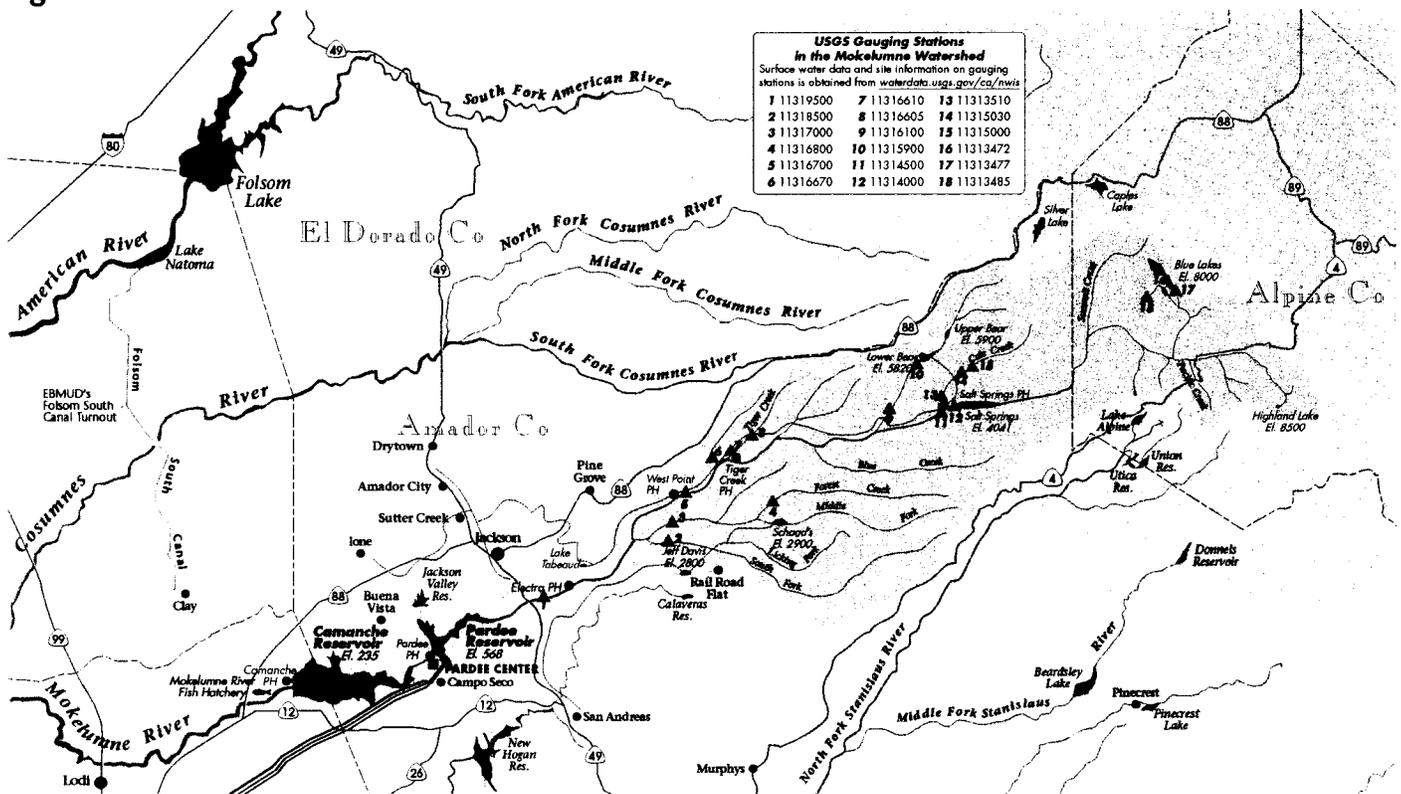
Various forms of recreational activities such as camping and water-related activities are allowed at Pardee Reservoir (no body contact allowed) and Camanche Reservoir (body contact allowed). There is also an extensive system of Mokelumne area trails in the Sierra foothills such as the Coast-to-Crest trail across EBMUD land.

### **EBMUD SERVICE AREA WATERSHED AND HYDROLOGY**

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EBMUD supplies water and provides wastewater treatment for parts of Alameda and Contra Costa counties. Approximately 1.3 million people are served by the EBMUD's water system in a 331-square-mile area extending from Crockett on the north, southward to San Lorenzo (encompassing the major cities of Oakland and Berkeley), eastward from San Francisco Bay to Walnut Creek, and south through the San Ramon Valley. The wastewater system serves approximately 642,000 people in an 88-square-mile area of Alameda and Contra Costa counties along the Bay's east shore, extending from Richmond on the north, southward to San Leandro.

Figure 1-1. Mokelumne River Watershed



EBMUD customers include residential, industrial, commercial, institutional and irrigation water users.

The EBMUD service area encompasses incorporated and unincorporated areas within Alameda and Contra Costa counties in which EBMUD has jurisdiction to provide water services. The current service area, illustrated in Figure 1-2, is the area that was established during EBMUD’s formation, as modified by annexation, detachment, or other change of organization thereafter. The Ultimate Service Boundary (USB) is a boundary established by EBMUD to define its limit of future annexation for extension of water service.

The Local Agency Formation Commissions (LAFCOs) of Alameda and Contra Costa counties have established a Sphere of Influence (SOI) for EBMUD. The SOI, illustrated in Figure 1-2, defines the probable and ultimate extent of the area to be served by EBMUD, as defined by LAFCO.

Within the EBMUD service area there are significant differences in geography, climate, and land use. These characteristics are important as they influence how water is used in various portions of the service area. These characteristics are also factors considered in future water demand projections.

Geographically, the western portion of the service area is characterized by a plain that extends from Richmond to Hayward and from the shore of the Bay inland to the base of the Oakland/Berkeley Hills that rise to about 1900 feet above sea level. East of the Oakland/Berkeley Hills the terrain is characterized by rolling hills as the land descends to about 100 feet above sea level near Walnut Creek. Much of the central, hilly portion of the service area is undeveloped and comprises the watershed lands of EBMUD’s local reservoirs. While these protected watershed lands are located within EBMUD’s USB, a

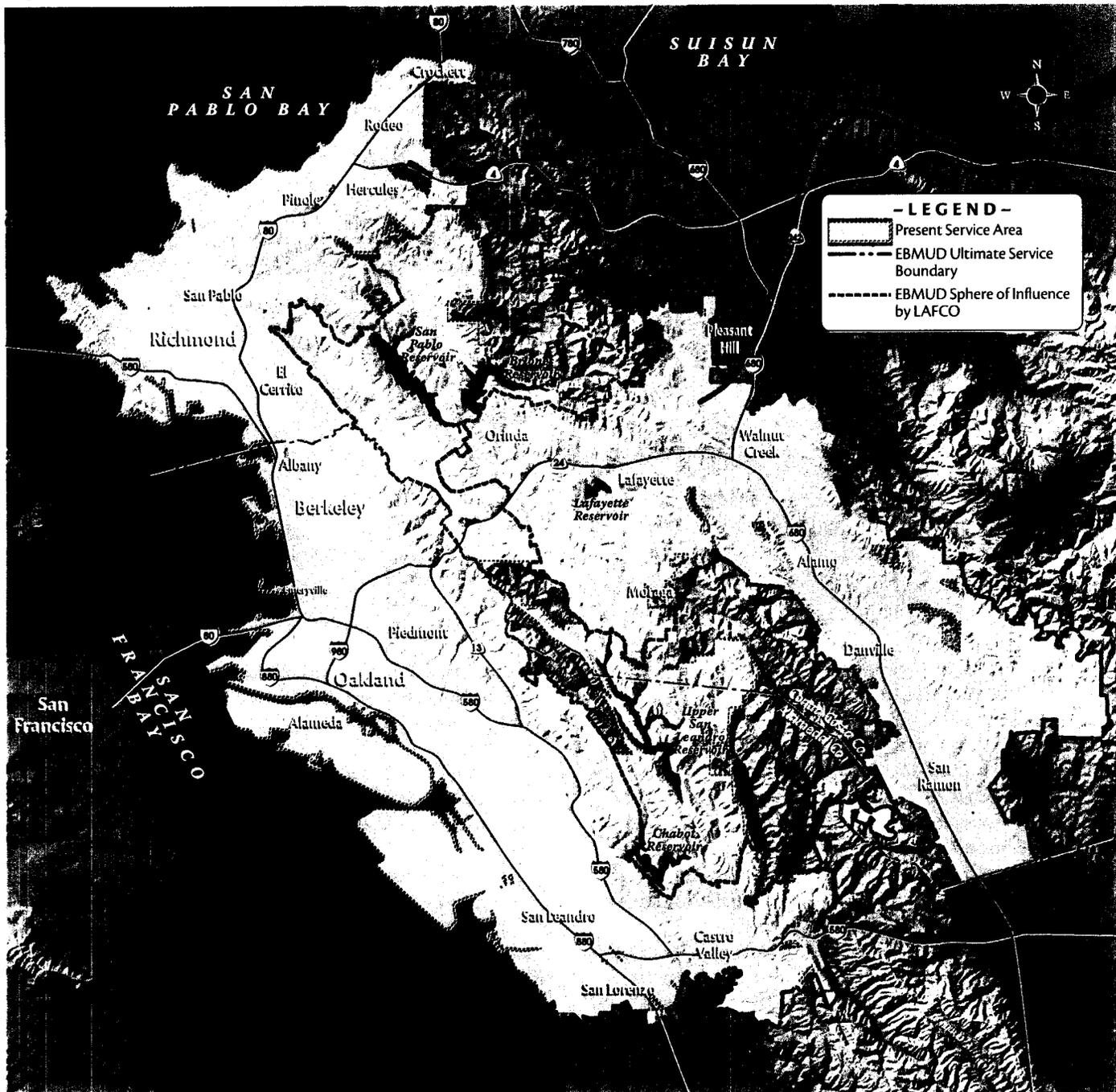
large part is not located within EBMUD’s service area. Areas near the Bay experience a moderate climate that is tempered by ocean and Bay waters. In contrast, inland areas such as Lafayette, Walnut Creek, and the San Ramon Valley, experience greater extremes in climate. These areas are cooler in the winter and hotter in the summer. Average historical climate characteristics for the EBMUD service area are illustrated in Table 1-1.

Urban land uses in the service area include residential (ranging from very low-density single-family lots to multi-family residences), commercial, light industrial and public facilities, such as libraries and schools. A majority of the high-density urban growth within EBMUD has occurred along the Bay plain and includes residential, commercial, institutional, and industrial developments. Other urban development areas include Walnut Creek, Pleasant Hill and the San Ramon Valley. Over the next twenty-five years, the increased water demand as projected under this Plan is mainly a result of in-fill-development within EBMUD’s existing boundary.

There are a number of land uses on EBMUD-owned lands. The predominant agricultural land use is livestock grazing. EBMUD also leases its watershed lands for other agricultural uses such as Christmas tree and red oat hay farming, a tool used to reduce the wildland fire danger at the urban interface.

EBMUD’s East Bay watershed provides extensive recreational opportunities. Three terminal reservoirs, Lafayette, San Pablo and Chabot, are open for recreation. Body contact recreational activities are restricted to protect public health and safety. In EBMUD’s undeveloped East Bay watershed, there is a 60-mile system of trails open for hiking and horse-back riding (permit required).

Figure 1-2. EBMUD Service Area



**POPULATION PROJECTIONS**

EBMUD’s service area encompasses parts of Alameda and Contra Costa counties. According to the 2000 U.S. Census, Alameda and Contra Costa counties were among the top three most populous counties in the Bay Area. Both counties are also projected to be among the top three counties to add the highest number of households to the region through 2030.

According to the Association of Bay Area Governments’ (ABAG’s) Projections 2005, Alameda County alone is projected to add 67,500 new households between 2000 and 2015. Household growth will be even higher from 2015 to 2030 with 86,500 new households to be added in Alameda County.

Oakland is continuing to see revitalization of its downtown area and additional redevelopment is forecasted, with the city accounting for the largest share of the county’s household growth. Almost 45,000 households are projected to be added to Oakland between 2000 and 2030. Infill and redevelopment potential are inherently more difficult to quantify than the development potential associated with vacant land and can be underestimated.

Contra Costa County is projected to gain almost 113,800 additional households, a 33% increase between 2000 and 2030. Approximately 51% of this growth, or 57,500 households, is expected between 2000 and 2015. The pace will slow from 2015 through 2030, when 55,500 households, less than one

Table 1-1. EBMUD Climate Data

| Month  | EAST BAY AREA                               |  | MOKELUMNE BASIN                                  |   |  |
|--------|---|--|--|---|--|
|        | Average Rainfall <sup>(1)</sup><br>(Inches) | Average Temperature <sup>(2)</sup><br>(°F) | Average Precipitation <sup>(3)</sup><br>(Inches) | Average Snow Depth <sup>(4)</sup><br>(Inches) | Average Temperature <sup>(5)</sup><br>(°F) |
| JAN    | 5.53  | 49.9                                       | 8.93   | 58  | 27.5                                       |
| FEB    | 4.73  | 53.7                                       | 7.92   | 76  | 27.7                                       |
| MAR    | 3.78  | 55.3                                       | 7.08   | 73  | 28.8                                       |
| APR    | 1.92  | 57.9                                       | 4.10   | 51  | 33.6                                       |
| MAY    | 0.71  | 60.2                                       | 2.16   | 11  | 41.2                                       |
| JUN    | 0.16  | 62.8                                       | 0.80   | 0   | 49.7                                       |
| JUL    | 0.04  | 63.2                                       | 0.25   | 0   | 56.5                                       |
| AUG    | 0.08  | 64.0                                       | 0.29   | 0   | 56.5                                       |
| SEP    | 0.31  | 65.5                                       | 0.82   | 0   | 50.7                                       |
| OCT    | 1.40  | 62.8                                       | 2.50   | 1   | 43.0                                       |
| NOV    | 3.44  | 56.2                                       | 5.61   | 22  | 33.0                                       |
| DEC    | 4.73  | 50.2                                       | 7.87   | 44  | 28.2                                       |
| TOTALS | 26.83                                       | —  | 48.33  | —   | —  |

<sup>(1)</sup> East Bay rainfall is the average of Lafayette Reservoir and USL WTP stations from 1953-2004.

<sup>(2)</sup> East Bay temperatures from National Weather Service Richmond station, 1961-1990. (Climatological Data Annual Summary: California. NOAA, 2002.)

<sup>(3)</sup> Mokelumne precipitation is the EBMUD 4-station average from 1930-2004.

<sup>(4)</sup> Average end-of-month snow depth measured at Caples Lake, 1968-2004.

<sup>(5)</sup> Mokelumne temperature from National Weather Service Twin Lakes station, 1961-1990. (Climatological Data Annual Summary: California. NOAA, 2002.)

percent per year, will be added to the county. Unlike Alameda County, the most populous cities in Contra Costa County are not the cities expected to have the most household growth. While the largest cities in the county are Concord and Richmond, the cities with the highest household growth are expected to be San Ramon and Brentwood.

Table 1-2 shows population projections for the Bay Area and the EBMUD service area over the next twenty-five years. The population projection data are based on ABAG's *Projections 2005*.

## REPORT FORMAT

The UWMP 2005 brings together important information and updates on EBMUD's water supply planning projects and studies, and recycled water and conservation program activities undertaken since 2000. The UWMP 2005 also provides an update of the elements included in the 1993 Updated Water Supply Management Program (WSMP).

This report consists of the following chapters which satisfy the specific provisions of Section 10631 et al. of the Urban Water Management Planning Act:

- **Chapter 1 – General Information.** The chapter contains discussion on the Urban Water Management Planning Act, as well as an overview of the EBMUD service area;
- **Chapter 2 – Water Supply and Water Supply Planning.** The chapter contains an overview of EBMUD's water supply system; the reliability of the water supply; and future water supply planning for surface water and conjunctive use;
- **Chapter 3 – Water Supply Shortage.** The Drought Planning Sequence's derivation is explained, and the Drought Management Program and its elements are covered;

- **Chapter 4 – Water Usage.** Past, current and projected demand is discussed as well as comparisons of supply and demand for various scenarios as specified in the Act;
- **Chapter 5 – Wastewater and Recycled Water.** An overview of the wastewater system is given as well as description of the current recycled water projects and future recycled water projects; methods of encouraging recycled water use are listed; and the chapter also includes a description of other existing non-potable water projects; and
- **Chapter 6 – Water Conservation.** The chapter includes discussion on EBMUD's demand-side and supply-side conservation programs, Program Budget, existing and future conservation projects, and Best Management Practices.

The appendices and attachment provide reference documents:

- **Appendix A** includes the UWMP Act and its amendments;
- **Appendix B** includes the newspaper public notice that announced the public review period, time and place of a comment meeting and hearing, and a listing of those newspapers in which the notice was published with the dates of publication;
- **Appendix C** includes the comments received during the public review period, the public comment meeting and public hearing and responses to those comments;
- **Appendix D** includes the Board Resolution adopting this Plan and the Board Resolution adopting the Water Shortage Contingency Plan;
- **Appendix E** contains referenced governing EBMUD regulations, and the rate structures for water and wastewater services;

**Table 1-2. Population Estimates and Projections**

| REGION  | 2005      | 2010      | 2015      | 2020      | 2025      | 2030      |
|---|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>BAY AREA</b> <sup>(1)</sup>                                | 7,092,000 | 7,420,000 | 7,750,000 | 8,094,000 | 8,420,000 | 8,748,000 |
| <b>ALAMEDA COUNTY</b> <sup>(1)</sup>                          | 1,518,000 | 1,585,000 | 1,649,000 | 1,715,000 | 1,797,000 | 1,885,000 |
| <b>CONTRA COSTA COUNTY</b> <sup>(1)</sup>                     | 1,017,000 | 1,056,000 | 1,103,000 | 1,151,000 | 1,201,000 | 1,245,000 |
| <b>EBMUD SERVICE AREA</b> <sup>(2)</sup>                      | 1,338,000 | 1,380,000 | 1,427,000 | 1,475,000 | 1,536,000 | 1,598,000 |
| <b>SERVICE AREA WITHIN ALAMEDA COUNTY</b> <sup>(3)</sup>      |           |           |           |           |           |           |
| TOTAL   | 489,000   | 503,000   | 523,000   | 543,000   | 564,000   | 581,000   |
| UNINCORPORATED AREAS  | 38,000    | 38,000    | 39,000    | 40,000    | 40,000    | 41,000    |
| <b>SERVICE AREA WITHIN CONTRA COSTA COUNTY</b> <sup>(3)</sup> |           |           |           |           |           |           |
| TOTAL   | 849,000   | 877,000   | 904,000   | 932,000   | 972,000   | 1,017,000 |
| UNINCORPORATED AREAS  | 132,000   | 136,000   | 138,000   | 140,000   | 143,000   | 146,000   |

<sup>(1)</sup>Source: ABAG Projections 2005.

<sup>(2)</sup>Estimates & projections derived from ABAG Projections 2005. Total population projections for EBMUD service area derived from incorporated areas and unincorporated areas. The incorporated areas include the following: ALAMEDA COUNTY - incorporated cities of Alameda, Albany, Berkeley, Emeryville, Hayward, Oakland, Piedmont, and San Leandro; and CONTRA COSTA COUNTY- City Spheres of Influence of Danville, El Cerrito, Hercules, Lafayette, Moraga, Orinda, Pinole, Pleasant Hill, Richmond, San Pablo and Walnut Creek and the subregional study area of San Ramon. The unincorporated areas include the following: ALAMEDA COUNTY - Castro Valley, Cherryland-Fairview, Ashland, and San Lorenzo; and CONTRA COSTA COUNTY- Crockett-Rodeo and Blackhawk-Alamo. Other unincorporated areas fall under the City Spheres of Influence.

<sup>(3)</sup>Total population projections for EBMUD service area broken down by county. Projections for each county are further broken down by total projections within each county and unincorporated areas projections within each county

**NOTE:** Populations for Hayward, Pleasant Hill and Walnut Creek were weighted according to the percent of total area within the service area: Hayward (2.6%), Pleasant Hill (21.1%) and Walnut Creek (63.6%).

• **Appendix F** contains the 2003 and 2004 Annual Report of Best Management Practices submitted to the California Urban Water Conservation Council (CUWCC) in accordance with the “Memorandum of Understanding Regarding

Urban Water Conservation in California,” dated September 1991; and

• **Appendix G** contains a list of acronyms and abbreviations used in this Plan.

## CHAPTER 2. WATER SUPPLY AND WATER SUPPLY PLANNING

**E**BMUD's water supply system begins from the western slope of the Sierra Nevada that forms the Mokelumne River watershed and extends to the East Bay. The Mokelumne River water supply is sufficient during normal and wet years to meet the needs of EBMUD's customers; however, several factors affect the reliability of the water supply. The Freeport Regional Water Project will enable EBMUD to obtain water during dry years, helping to improve water supply reliability. EBMUD is pursuing additional supplemental options, including groundwater injection and extraction, and a regional desalination project to meet projected drought year water needs.

### WATER SUPPLY SYSTEM

The EBMUD water supply system collects, transmits, treats, and distributes high-quality water from its primary water source, the Mokelumne River in the Sierra Nevada, to its customers in Alameda and Contra Costa counties within the San Francisco East Bay Area (refer to Figure 2-1). The water supply system consists of a network of reservoirs, aqueducts, water treatment plants, pumping plants, and distribution facilities. Raw (untreated) water from Pardee Reservoir is transported approximately at most 91 miles through the Pardee Tunnel, the Mokelumne Aqueducts, and the Lafayette Aqueducts to the East Bay treatment plants and terminal reservoirs.

EBMUD operates five terminal reservoirs within the East Bay service area: Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro reservoirs. Briones, San Pablo, and Upper San Leandro reservoirs can supply water to EBMUD throughout the year, whereas Chabot and Lafayette reservoirs serve as emergency sources of supply. The terminal reservoirs serve multiple functions:

- (1) regulating EBMUD's Mokelumne River supply in winter and spring;
- (2) augmenting EBMUD's Mokelumne water supply with local runoff;
- (3) providing emergency sources of supply during extended drought or in the event of water supply facility outage; and
- (4) providing environmental and recreational benefits to the communities of the East Bay.

The terminal reservoirs are also operated to minimize flooding in local areas, consistent with EBMUD's primary water supply obligations.

The EBMUD water system serves 20 incorporated cities and 15 unincorporated communities in Alameda and Contra Costa Counties. The cities are Alameda, Albany, Berkeley, Danville, El Cerrito, Emeryville, part of Hayward, Hercules, Lafayette, Moraga, Oakland, Orinda, Piedmont, Pinole, part of Pleasant Hill, Richmond, San Leandro, San Pablo, San Ramon, and part of Walnut Creek. The unincorporated communities include Alamo, Ashland, Blackhawk, Castro Valley, Cherryland, Crockett, Diablo, El Sobrante, Fairview, Kensington, North Richmond, Oleum, Rodeo, San Lorenzo, and Selby.

### EXISTING WATER SUPPLY SOURCES

Since the 1920s, EBMUD's primary source of water has been the Mokelumne River. During drought periods, the

Mokelumne River can no longer meet EBMUD's projected customer demands, even with 25 percent rationing imposed on total customer demand under EBMUD's Board Policy 9.03 (see Appendix E). EBMUD's water supply showed signs of stress during the 1976-77 and the 1987-92 droughts. EBMUD's Sierra water supply is expected to be reduced as demands on the Mokelumne River increase from the growing needs in Amador, Calaveras, and San Joaquin counties and from entities with water rights senior to those of EBMUD; as EBMUD meets its commitment to protect the river environment by providing instream flow releases to improve fishery conditions in the lower Mokelumne River; and as customer demand increases beyond that which can be offset by conservation and recycled water programs.

The secondary source of water is runoff from local watersheds at EBMUD terminal reservoirs in the East Bay area, and much of this runoff is stored in these terminal reservoirs for system use. In dry years, evaporation and other reservoir losses can exceed the supply from local runoff.

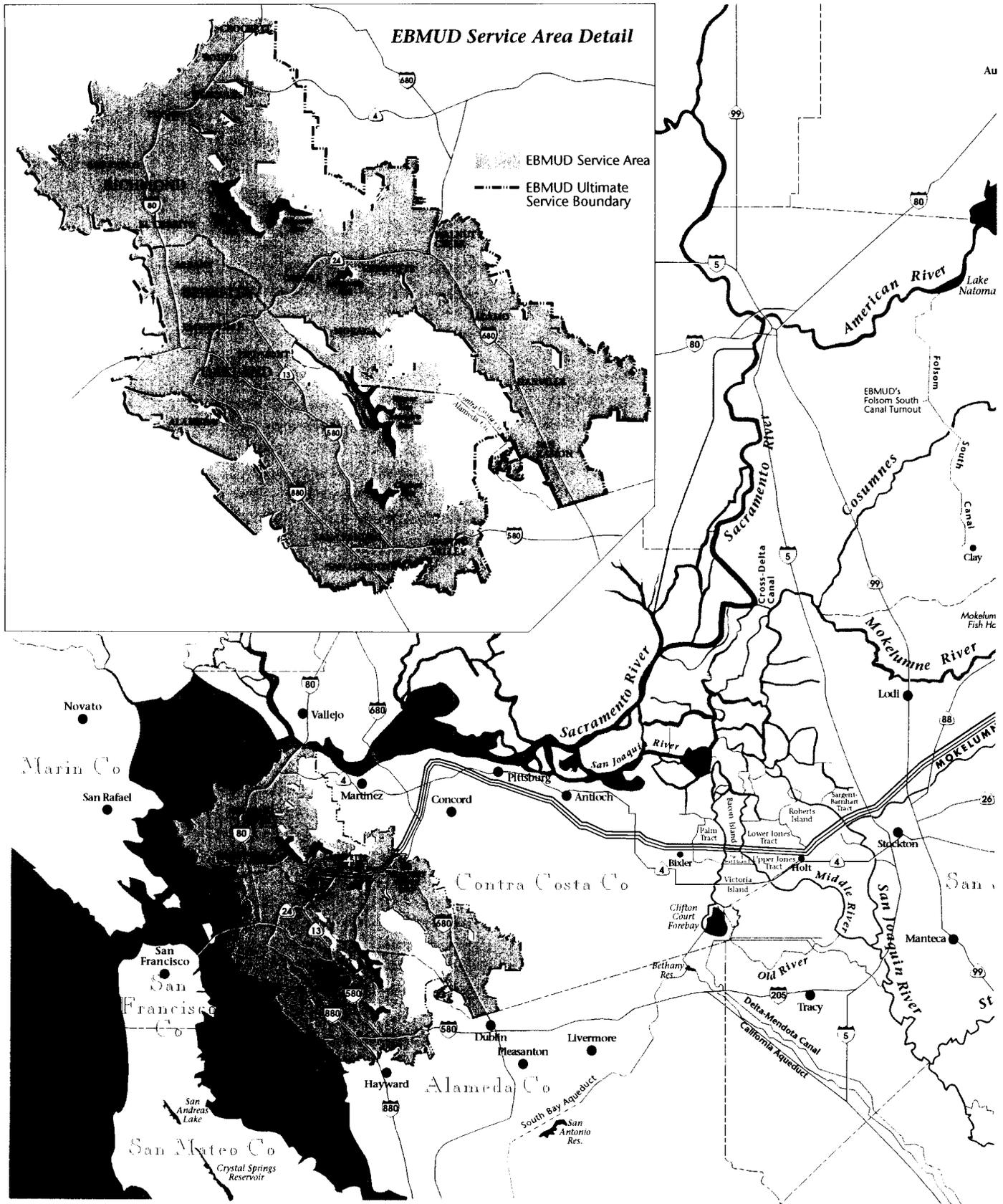
### MOKELUMNE RIVER

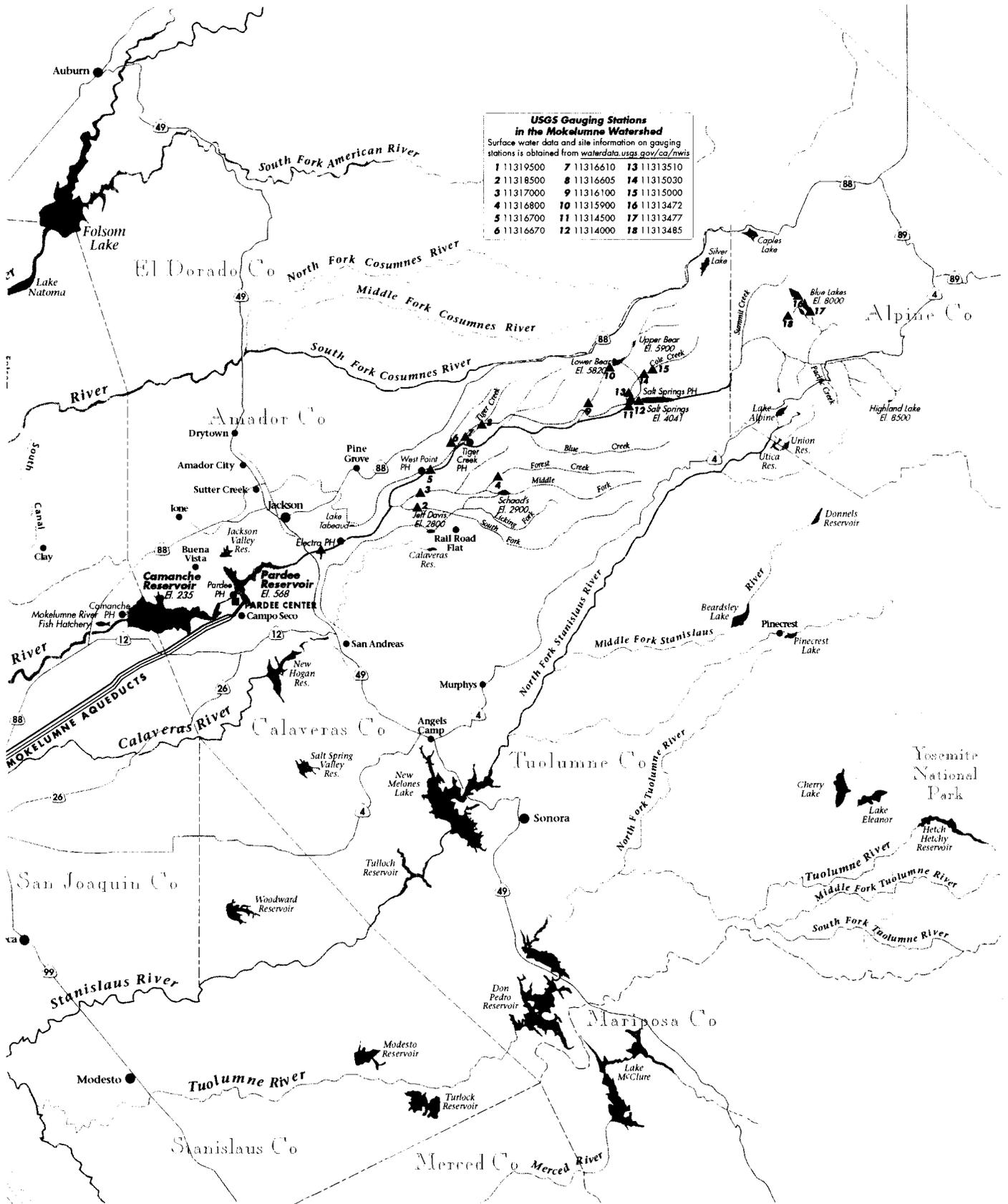
On an average annual basis, approximately 90 percent of the water used by EBMUD comes from the Mokelumne River watershed. EBMUD has water rights that allow for delivery of up to a maximum of 325 million gallons per day (MGD) from the Mokelumne River, subject to the availability of Mokelumne River runoff and senior water rights of other users. EBMUD's position in the hierarchy of Mokelumne water users is determined by a variety of agreements between Mokelumne water rights holders, the appropriate water rights permits and licenses which have been issued by the State, pre-1914 rights, and riparian rights. Figure 2-2 shows the flow commitments on the lower Mokelumne River. Conditions which restrict EBMUD's ability to use its full entitlement include:

- Upstream water use by prior right holders.
- Downstream water use by riparian and senior appropriators and other downstream obligations, including protection of public trust resources.
- Variability in rainfall and runoff.

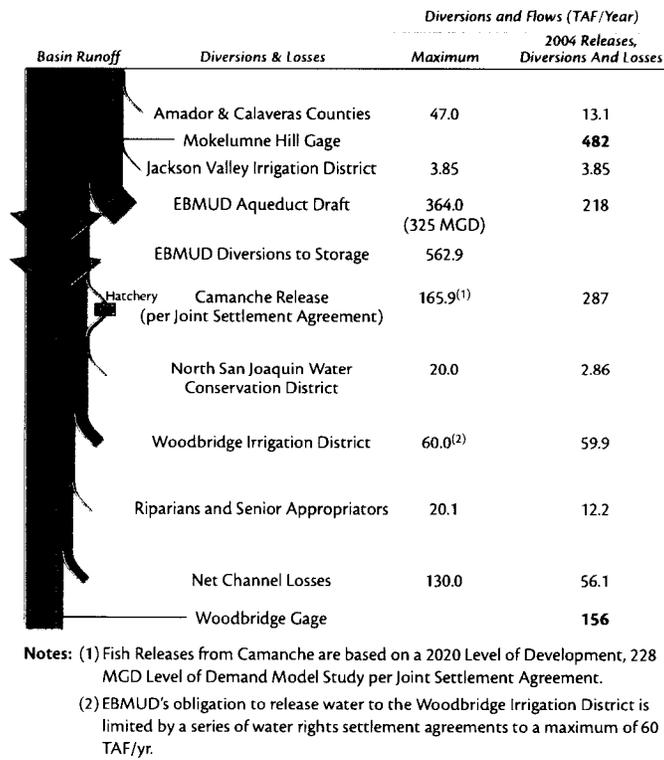
Fishery releases from EBMUD's Camanche Dam are based on the requirements of a 1998 Joint Settlement Agreement (JSA) between EBMUD, US Fish and Wildlife Service, and the California Department of Fish and Game. The Federal Energy Regulatory Commission incorporated the JSA into

Figure 2-1. EBMUD Water Supply System





**Figure 2-2. Runoff and Diversion Flows**



amine water resource management opportunities that would provide regional and mutual benefits, such as improvements in water supply reliability and water quality protection in the service areas of the parties. This collaborative process provides a forum to develop consensus among various interests to address and resolve long-term Mokelumne water resource problems. Under a 2005 Memorandum of Understanding between the State of California and the water purveyors in the forum, the Department of Water Resources (DWR) will fund facilitative services to assist stakeholders in developing regional water management options.

**LOCAL RUNOFF**

The availability of water from local runoff is dependent on two factors. First, hydrologic conditions determine the amount of runoff in the local watershed. In dry years, evaporation can exceed runoff, resulting in no net supply. Second, the amount of storage available for capturing local runoff is limited. Lower water levels in the reservoir would provide space for storing local runoff, if it were available. However, because the East Bay reservoirs (“terminal reservoirs”) also regulate EBMUD’s Mokelumne supply and provide emergency standby storage, limited space is available to develop a reliable supply from local runoff. Average local supply put to beneficial use is 15 - 25 MGD during normal hydrologic years and is near zero during drought conditions. Because of the variability of these factors, the supply from local runoff is not dependable. Table 2-1 illustrates the reservoir capacity and water sources of the five terminal reservoirs in the EBMUD service area.

**EXISTING WATER SUPPLY STRUCTURES**

EBMUD’s Mokelumne River supply facilities include Pardee Dam and Reservoir located near Valley Springs in the Sierra foothills, and Camanche Dam and Reservoir located 10 miles downstream. Pardee Reservoir is where EBMUD’s water supply begins its approximately 90-mile journey through the Mokelumne Aqueducts and the raw water system to the East Bay service area. The confluence of melting snows from Alpine, Amador and Calaveras counties form the Mokelumne River that flows into Pardee Dam and Reservoir, where it is stored to provide a water supply to EBMUD and to provide

the EBMUD hydropower license in 1998. The California State Water Resources Control Board (SWRCB) incorporated the flow provisions of the JSA into EBMUD’s Mokelumne River water rights in 2000 through the SWRCB’s Decision 1641.

EBMUD is an active participant in several collaborative efforts working towards improving water resources management in the Mokelumne Basin. In December 1993, EBMUD entered into an agreement with Amador Water Agency to share the cost of the Amador Canal Improvement Project to eliminate current substantial leakage from the Amador Canal by replacing it with a pipeline. The conserved water would be available to EBMUD for additional hydropower generation and as additional inflow to Pardee Reservoir. In 2002, EBMUD also participated in establishing the Mokelumne Water Forum, a collaboration among Mokelumne basin stakeholders to ex-

**Table 2-1. Terminal Reservoir Capacity and Water Sources**

| Reservoir         | Capacity            |                 | Water Sources   |
|-------------------|---------------------|-----------------|---|
|                   | Thousand Acre-Feet  | Billion Gallons |   |
| Briones           | 60.5                | 19.7            | Mokelumne Aqueducts, Bear Creek   |
| Chabot            | 10.4                | 3.4             | Mokelumne Aqueducts, San Leandro Creek, Upper San Leandro Reservoir, Miller Creek |
| Lafayette         | 4.3                 | 1.4             | Lafayette Creek <sup>(1)</sup>  |
| San Pablo         | 38.6 <sup>(2)</sup> | 12.6            | Mokelumne Aqueducts, San Pablo Creek, Bear Creek, Briones Reservoir               |
| Upper San Leandro | 38.0                | 12.4            | Mokelumne Aqueducts, San Leandro Creek and tributaries                            |

<sup>(1)</sup>The raw water line for the Mokelumne Aqueducts was disconnected from the reservoir in 1971.

<sup>(2)</sup>San Pablo Reservoir has been temporarily restricted to a maximum water surface elevation of 294 ft, corresponding to storage of 24.2 TAF (7.9 Billion Gallons).

recreational facilities to the public. Camanche Dam and Reservoir is operated in conjunction with Pardee Reservoir to meet the needs of downstream water rights holders (mostly farms) for flood control and irrigation; to provide water for fisheries and riparian (stream bank) plants and wildlife; to support hydropower generation, and also to provide recreational facilities to the public.

### **PARDEE DAM AND RESERVOIR**

Mokelumne River water is collected at Pardee Dam and Reservoir, located 38 miles northeast of Stockton near the town of Jackson. Pardee Reservoir was created when construction of Pardee Dam was completed in 1929. The 23.6-megawatt (nameplate capacity) Pardee Powerhouse at the base of the dam generates 140 million kilowatt hours of electrical energy during a year of average runoff. The reservoir has 37 miles of shoreline and a maximum surface area of 2,222 acres at a spillway crest elevation of 567.7-ft. The reservoir has a maximum capacity of 197,950-acre feet at spillway crest elevation. Pardee Reservoir is used principally for municipal water supply, for power generation, and also as a source of water for Jackson Valley Irrigation District. Pardee Reservoir is also operated to provide recreational facilities to the public and to manage water temperature in Camanche Reservoir. Raw water from Pardee Reservoir is transported at most approximately 91 miles to East Bay water treatment plants and terminal reservoirs through the Pardee Tunnel, the Mokelumne Aqueducts and the Lafayette Aqueducts. Water flowing by gravity from Pardee Reservoir takes 30 to 45 hours to reach the Bay Area.

### **CAMANACHE DAM AND RESERVOIR**

Camanche Dam is located 10 miles downstream from Pardee Dam on the Mokelumne River. A 10.8-megawatt (nameplate capacity) power plant at the base of the dam was placed in service in 1983. It generates 40 million kilowatt-hours of electrical energy during a year of average runoff. Camanche Reservoir was created when construction of the dam and dikes were completed in 1964. Camanche Reservoir has a surface area of 7,470 acres (about 12 square miles) and a 63-mile shoreline. Capacity at spillway crest elevation is 417,120 acre-feet. Camanche Reservoir is operated jointly with Pardee Reservoir to store water for irrigation and for stream-flow regulation, to provide flood protection, to provide water to meet the needs of downstream water rights holders, and water for fisheries and riparian habitat. Like Pardee Reservoir, Camanche Reservoir is operated to provide recreational facilities to the public.

### **MOKELUMNE AQUEDUCT SYSTEM**

Raw water from Pardee Reservoir moves through the Pardee Tunnel, a 2.2-mile 8-foot-high horseshoe structure completed in 1929, to the Mokelumne Aqueduct System near Valley Springs in Calaveras County. The Mokelumne Aqueducts are comprised of three steel pipelines and transport water about 81 miles from the Pardee Tunnel at Campo Seco to Walnut Creek at the east end of two Lafayette Aqueducts, completed in 1928 and 1963, which continue further about 7 miles to Orinda. Mokelumne Aqueduct No. 1 is 5 feet 5 inches

in diameter; Mokelumne Aqueduct No. 2 is 5 feet 7 inches; and Mokelumne Aqueduct No. 3 is 7 feet 3 inches. Mokelumne Aqueduct No. 1, No. 2, and No. 3 were completed in 1929, 1949, and 1963, respectively. These steel pipelines have a capacity to carry a total of 200 MGD by gravity flow and up to 325 MGD with pumping at the Walnut Creek pumping plants.

### **WATER SUPPLY AND SYSTEM RELIABILITY**

Many factors affect the reliability of EBMUD's water supply sources and the reliability of the system that delivers the supply to EBMUD customers. For instance, drought, a hydrologic condition, adversely affects the availability of EBMUD's Sierra water supply sources. In addition, a significant section of the Mokelumne Aqueducts is located in the Sacramento-San Joaquin Delta region, where the levees are vulnerable to failure, especially during earthquakes and flooding. Since the September 11, 2001 terrorist attacks on the United States, municipal water system operators have developed a heightened awareness of the potential for terrorist acts to compromise the integrity of the water supply system. Other factors that affect the availability of water supply include potential contamination of supplies or poor water quality events with high turbidity, which affects the water treatment system, earthquake damage to system components, terminal reservoir outages during repairs, shortfalls in distribution system capacity, widespread power outage, fires, and civil disturbance. To prepare for these adverse conditions, EBMUD implements programs and projects that improve the reliability of the system. Furthermore, EBMUD enters into transfer and exchange agreements with other Bay Area water systems, such as City of Hayward, San Francisco Public Utilities Commission (SFPUC), Dublin San Ramon Services District (DSRSD), and Contra Costa Water District (CCWD), to improve EBMUD's water supply reliability through regional interties. These agreements would provide for either mutual aid to the parties during emergencies or an alternative source of water during planned facility outages, or both. Chapter 4 of this Plan provides an assessment of the reliability of water service for EBMUD customers during normal, single and multiple dry years.

### **DROUGHT**

Repeated dry years have demonstrated that diminished supplies of water can recur in Northern California. In 1976-1977 and again from 1987-1992, EBMUD imposed drought management programs to reduce customer demands, thereby providing more carry-over storage for the next year if dry conditions had continued.

### **EFFECTS OF CLIMATE CHANGE**

Recent climate change studies generally conclude that the average temperature will increase in California. Higher temperatures will increase EBMUD's water demand by increasing urban water use and reduce supply by increasing evaporation and evapotranspiration. Higher temperatures will also decrease the natural storage in the watershed as a result of reduced snowpack and reduced runoff in late spring and early summer. However, the conclusion of these studies vary on whether climate change will lead to more intense or fre-

quent storms, droughts, or a combination of all, in California. Moreover, it is also uncertain whether the total annual precipitation would increase or decrease, for both in the average and in the extremes.

The supply that is available in drought years represents a key measure of water supply reliability for EBMUD. For planning purposes, over seventy years of historical hydrology in the Mokelumne watershed is used in simulations of system performance under different scenarios. Historical hydrology in the Mokelumne has been highly variable, and maximum and minimum annual unimpaired runoff differ by a factor of fourteen within the study period. In dry years, when annual runoff volume is less than the total reservoir capacity on the Mokelumne, the timing of snowmelt caused by climate change has a small effect on the water supply. As long as the system carryover storage is not reduced, EBMUD's water supply during droughts will not be adversely affected by climate change. This observation is consistent with modeling results, in which the timing of runoff is shifted to an earlier part of the season.

Despite recent progress in refining global and regional climate models, numerical climate models are unlikely to predict droughts and floods (timing, duration, and amount of runoff) in the Mokelumne system with reasonable certainty into the foreseeable future. In particular, changes in the magnitude and duration of extreme droughts and floods, which would seriously impact EBMUD's water supply reliability, will be difficult to quantify with confidence.

Historical records show that annual precipitation varies much more in the Mokelumne watershed than in the Sacramento Valley. Supplemental water supply projects, one of which is the Freeport Regional Water Project that EBMUD is implementing as discussed in this Plan, would provide EBMUD access to more reliable water sources and offer increased protection against natural variability, including that caused by climate change.

### REGULATORY OBLIGATIONS

EBMUD's existing Mokelumne River supply will continue to decrease in the future as diversions by senior water rights holders within upstream counties increase. Furthermore, EBMUD has been required to increase downstream releases for the protection of fish, wildlife, and riparian habitat as part of settlement agreements in regulatory proceedings. These two factors reduce the flexibility in EBMUD's operation to manage carry-over storage for multiple dry years.

### WATER SUPPLY QUALITY

EBMUD consistently provides the highest quality water possible. Statewide policies recognize that the highest quality water sources provide the safest end product. EBMUD's primary Mokelumne River water source requires only minimal treatment to meet health standards because it comes from the remote, mostly undeveloped watershed of the Mokelumne River, and is conveyed to EBMUD's service area in the East Bay in large diameter steel pipes (aqueducts). EBMUD further protects water quality at Pardee Reservoir through the purchase of conservation easements in areas with significant potential for residential development adjacent to Pardee

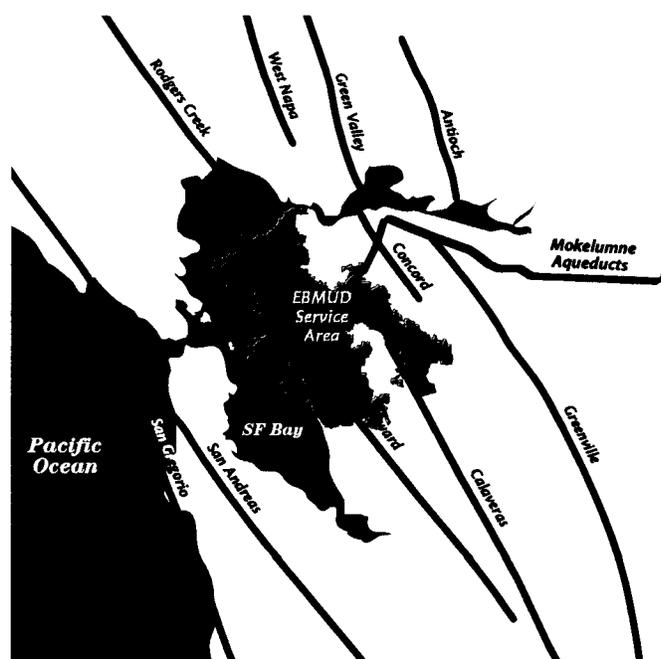
Reservoir. As a result, the raw water is not exposed to common sources of contaminants such as pesticides, agricultural or urban runoff, municipal sewage discharges or industrial toxics.

On rare occasions, the water supply in Pardee Reservoir is affected by short term events that may stir up sediments. High turbidity, for instance, caused by unusually heavy late winter storms and/or landslides into Pardee Reservoir, can create poor water quality events that briefly limit the supply available for use. In such cases, the Mokelumne Aqueducts supplying water to the EBMUD service area are shut down, or their flows are reduced until turbidity levels are reduced to allowable regulated limits. The longest recorded shutdown duration is 65 days in 1997 when heavy storms affected water quality in Pardee Reservoir. As performance regulations for treatment of drinking water become more stringent, recovery from poor water quality events are expected to take longer, resulting in longer aqueduct shutdowns or reduced flows.

If the aqueducts are shut down because of severe water quality events, EBMUD implements water management plans that are already in place and responds to these conditions. Because terminal reservoirs are normally operated to provide 180-days of standby storage, EBMUD meets its service area demands by relying on this supply when the Mokelumne supply is temporarily unavailable. After water quality has returned to acceptable levels, the terminal reservoirs are refilled as soon as practical to meet standby storage levels using the supply from the Mokelumne Aqueducts.

Current water treatment plants that process the water supplied by local terminal reservoirs are designed to handle high turbidity conditions encountered during severe local storm runoffs. Consequently, water quality variations do not limit the water supply available from terminal reservoirs.

Figure 2-3. Major Bay Area Faults



## EARTHQUAKE

The Loma Prieta earthquake (6.9 magnitude) that struck on October 17, 1989 caused severe damage and disruption to the Bay Area. On the basis of research conducted since the 1989 Loma Prieta earthquake, the U.S. Geological Survey (USGS) concludes that there is a 62 percent probability for one or more magnitude 6.7 or greater earthquakes striking the San Francisco Bay region before 2032 and causing widespread damage.

Several active faults, including the San Andreas, Hayward, Calaveras, Concord, Antioch, Greenville, and Coast Range-Central Valley, may affect the geographic area served by EBMUD and pose a significant threat to the delivery of water during future seismic events. EBMUD facilities located outside the service area are also subject to damage from other earthquakes. Within or near EBMUD's service area, several earthquake faults illustrated in Figure 2-3 pose varying degrees of risk. The most significant seismic threat comes from the Hayward Fault. In contrast, Pardee Dam, which is located within three miles of the Bear Mountain Fault zone, will not be adversely impacted due to a seismic event on the Bear Mountain Fault zone according to analyses completed in 1992.

### Seismic Improvement Program

EBMUD invested \$202 million in the Seismic Improvement Program (SIP) to strengthen its water system within its service area to withstand earthquakes and to improve post-earthquake firefighting capability. \$189 million was funded utilizing an SIP surcharge and bonds over the projected 10-year program, and \$13 million was set aside for immediate spending at the start of the program in 1995 for priority projects. Priority projects included key facility upgrades that would provide an immediate benefit to the District. The SIP improvements are designed to enable EBMUD's water system to supply minimum water service within one week following a major earthquake and a sustainable level of service within 30 days. The improvements provide the necessary tools for rapid response, repairs, and recovery following a major earthquake. The SIP safeguards the investments of EBMUD customers through upgrades to EBMUD facilities and structures and reduces long-term risks to the local economy, EBMUD facilities, and property owners. In 2005, EBMUD completed the tenth year of its program. EBMUD has completed 90 percent of its planned SIP upgrades and is on course to complete the entire program by 2007. EBMUD is the first water agency in the United States to retrofit its facilities on such a comprehensive scale and is internationally recognized for its proactive approach to minimizing seismic risk. The following are the SIP subprograms:

- **Southern Loop:** In 2002, EBMUD completed the 11-mile Southern Loop Pipeline, a major element of the SIP. This emergency bi-directional pipeline creates a loop at the southern ends of the water distribution system that runs from San Ramon to Castro Valley and provides operational redundancy to serve either side of the East Bay hills. The pipeline benefits customers by adding vital backup protection for water treatment and distribution systems and al-

lows greater flexibility and reliability in water operations if water lines are ruptured following a major earthquake on either the Hayward or the Calaveras Faults. In addition to preparing EBMUD for this seismic event disaster, the Southern Loop Pipeline provides increased safety and reliability on a routine basis to customers during emergencies, such as droughts, equipment failures, or firestorms.

- **Reservoir Upgrades:** EBMUD's service area contains 175 potable water reservoirs. These include above-ground concrete tanks, redwood tanks, steel tanks, and open cut reservoirs. Nearly half of EBMUD's reservoirs (excluding open-cut reservoirs) were identified to be vulnerable to earthquake damage and have undergone upgrades since 1995 under the Seismic Improvement Program. Upgrades included anchoring and reinforcing water storage reservoirs to make them more likely to survive a large earthquake. By December 2005, 70 of 74 reservoirs will have been upgraded, replaced, or decommissioned.
- **Transmission System and Fault Crossings:** Water distribution (localized service) pipes cross active earthquake faults at over 200 locations. To respond to earthquake damage and to speed system recovery, EBMUD crews installed flexible pipe connections, shutoff valves, and emergency hose connections at fault crossings and secured critical backbone pipes in areas vulnerable to landslide or liquefaction. All 125 connections are now complete. Using new technology such as flexible joints and flexible hoses, EBMUD enhances system reliability and ensures water can be rerouted around broken pipes. Following a major seismic event on the Hayward Fault, EBMUD's transmission (backbone) system is expected to be damaged. The Transmission System Upgrades Project provides large portable pumps placed at strategic locations to bypass damaged areas. The Transmission System and Fault Crossings Project will protect life safety and property, and will preserve the water supply for post-earthquake uses, including fighting fires.
- **Claremont Corridor:** The 3.4-mile Claremont Tunnel is a vital transmission facility delivering up to 175 million gallons of water a day from treatment facilities in Orinda to more than 800,000 business and residential customers west of the Oakland-Berkeley hills. This tunnel crosses the Hayward Fault and is vulnerable to fault movement. Loss of this transmission facility after a major earthquake would result in severe water rationing and reduced fire fighting capabilities for an extended period. As a result, an upgrade of this facility was identified as a critical effort for the Seismic Improvement Program. Upgrades include a new 1,500-foot bypass tunnel to replace the most vulnerable portion of the existing tunnel where it crosses the Hayward fault, and repairs and grout reinforcement to protect the remainder of the existing tunnel. This project assures survival of the tunnel and availability of adequate water supplies to EBMUD customers after a major earthquake. Construction of tunnel improvements began in May 2004 and is scheduled for completion in 2007. While the Claremont Tunnel is shut down for the seismic retrofit, EBMUD is still providing uninterrupted delivery of water through other water facilities. EBMUD can execute a rapid-response and repair plan

that is already in place for the Claremont Tunnel if a major earthquake occurs before all SIP upgrades are complete.

- **Pumping Plants:** Pumping plants move water through pipelines and fill storage reservoirs. EBMUD has upgraded one pumping plant structure per pressure zone to protect critical equipment and to increase the likelihood that these facilities remain functional after an earthquake.
- **Water Treatment Plants:** Seismic work at each plant includes strengthening buildings and anchoring pipelines and equipment to minimize damage and to improve EBMUD's ability to provide customers with treated water after an earthquake. Seismic improvements to all water treatment plants are now complete.
- **Building Upgrades and Equipment Anchorage:** This work prevents the loss of life resulting from failure of any EBMUD facilities during an earthquake and ensures that they remain functional after a disaster. Making these buildings safe allows EBMUD to respond more quickly to a post-earthquake emergency. This portion of the SIP was completed in 2005.

### Dam Safety Program

EBMUD's East Bay terminal reservoirs function as secondary water sources that store runoff from local watersheds for system use. Major structural components of these and of EBMUD's open-cut distribution reservoirs are the earthen dams that retain the drinking water for 1.3 million people. Reliability of this water supply is partially dependent on the structural integrity of these dams.

Requirements for earthquake and flood safety for the East Bay dams are imposed by the State of California Division of Safety of Dams (DSOD), which routinely inspects dams statewide. DSOD requires that embankments under its jurisdiction are safe to withstand the maximum credible earthquake without an uncontrolled release of reservoir water. The maximum credible earthquake represents the maximum earthquake expected to potentially strike a particular location.

In 2002, DSOD requested that EBMUD perform a detailed seismic evaluation of San Pablo Dam using current state-of-the-art methodology and requested in 2003 a stability evaluation of Chabot and a safety review of Lafayette Dams. Studies of Chabot and Lafayette Dams are in progress. EBMUD commissioned a report investigating the safety of San Pablo Reservoir's earthen dam, which was originally built in 1920 and retrofitted first in 1967 and again in 1979 after the reservoir was drained. The current study uses state-of-the-art field sampling methodology to identify liquefiable soils instead of relying solely on laboratory testing techniques used in the 1970s. The study concluded that if a major earthquake on the Hayward Fault strikes before mitigations are implemented, the embankment and foundation materials could liquefy, and the dam could slump, leading to an uncontrolled release of reservoir water. After the study had been concluded, EBMUD lowered the reservoir level by 20 feet to prevent an uncontrolled release of water that would potentially flood the downstream Sobrante Valley in the event of a major earthquake.

EBMUD is analyzing retrofit measures to strengthen the embankment and foundation materials against liquefaction and earthquake-induced deformations. One or more of the alternatives could require draining the reservoir during the

seismic retrofit construction that could take up to two years. The preferred retrofit alternative involves in-situ foundation improvements and construction of a buttress fill. This alternative allows construction to proceed while the reservoir is in service. Construction is likely to begin in 2007.

### Mokelumne Aqueduct Security and Mokelumne Aqueduct Seismic Upgrade

The three Mokelumne Aqueducts divert the Mokelumne River supply from Pardee Reservoir across the Sacramento-San Joaquin Delta to EBMUD's service area. They are buried for most of their length. At Delta river and slough crossings, they lay buried from 10 to 40 feet below the channel bottoms or levee crests. The remaining elevated portions are supported on timber, reinforced concrete or steel bents for approximately 10 miles as the aqueducts cross the islands in the Delta. These aqueducts, which also cross levees constructed in a non-engineered manner in the late 1800s, are vulnerable to damage induced by intense earthquake shaking. After the 6.9 (moment)/7.1 (surface wave) magnitude Loma Prieta earthquake on October 17, 1989, a field report noted an approximate three-inch displacement of one pile relative to its support at Mokelumne Aqueduct No. 1 as a result of structural deformation caused by the seismic event, although the epicenter was more than 100 miles away.

One of the key elements of the 1993 Updated Water Supply Management Program (WSMP) was the Mokelumne Aqueduct Security program, leading to the Mokelumne Aqueduct Seismic Upgrade Project. Strengthening the aqueduct system results in double protection: it mitigates earthquake damage and hazards associated with levee breaches. EBMUD improved the seismic performance and reliability of Aqueduct No. 3, the largest of the three aqueducts in the Sacramento-San Joaquin Delta region, by increasing the Aqueduct's chance of surviving a major earthquake so that the system potentially continues to deliver raw water to the EBMUD service area. The seismic upgrades mitigate the vulnerability of the elevated pipeline structures to damage or collapse as a result of flooding from levee failure, intense earthquake shaking, and breaches at levee crossings. Although some damage to the Aqueducts may occur and result in reduced flows to the East Bay, terminal reservoir storage would supplement the water supply. The last phase of construction to protect these lifelines was completed in 2005.

All low strength bolts were replaced with high strength bolts on elevated portions of Mokelumne Aqueducts No. 2 and 3 in 1994. Portions of the seismic upgrade of Mokelumne No. 3 Aqueduct that were completed in 1999 included strengthening of levees at aqueduct crossings and of pipe foundations at river crossings, and reinforcing all pipe joints on buried portions of the pipe. The pipe support structures on elevated portions of Mokelumne No. 3 Aqueduct were strengthened in 2005 with an award-winning design that used seismic isolation components to reduce earthquake forces on aqueduct foundations.

EBMUD developed an Aqueduct Section Emergency Plan that would be activated in the event of an aqueduct or levee failure. The type and magnitude of the failure will determine whether the EBMUD Emergency Operations Plan should

or should not be activated. If the water supply to the service area is impacted, the Water Shortage Contingency Plan (See Chapter 3) will also be activated.

### **DELTA FLOODS**

There is a long history of levee failures in the Delta, including the region where the Mokelumne Aqueducts cross. EBMUD experienced a near-catastrophic event in 1980 when Lower Jones Tract flooded and the railroad embankment adjacent to the aqueducts subsequently failed, allowing floodwater to flow into Upper Jones Tract. This event nearly undermined the Aqueduct supports in the area.

In June 2004, a structural failure in the levee at the Upper Jones Tract 1.5 miles south of the Mokelumne Aqueducts caused a levee breach. The flooding in the area temporarily halted the Mokelumne Aqueduct Seismic Upgrade Project construction on a section of the Aqueducts. The resulting flood submerged about 5.25 miles of the elevated Mokelumne Aqueducts for several months while the island was being drained. Nevertheless, the Aqueducts remained in full operation during the entire time. Subsequent investigation of the damage concluded that the Aqueducts and their supports were structurally sound, and the maintenance road and drainage systems for the Aqueducts sustained only minor damage.

### **TRANSFER OR EXCHANGE OPPORTUNITIES**

In August 2000, the joint federal-state coalition of agencies and stakeholders with management and regulatory responsibilities in the Bay-Delta, known as the California Water Policy Council and Federal Ecosystem Directorate (CALFED), issued a Record of Decision (ROD) describing a 30-year plan to improve water management and the health of the Bay-Delta. The transfer of water is identified as one of several components essential to improving the water-related problems associated with the region. This CALFED ROD also encourages exploration of opportunities to interconnect the water supply systems in the Bay Area.

EBMUD is exploring opportunities for transfers and exchanges at the regional and state level. EBMUD participates in the Bay Area Water Quality and Supply Reliability Program that supports the study in the CALFED Program ROD. Through its involvement in the Bay Area Water Agencies Coalition, EBMUD continues its efforts to formulate and to support a mutually agreeable set of actions to improve water quality and supply reliability, such as through interties, in the Bay Area. The SFPUC-Hayward-EBMUD Emergency Intertie Project (SFPUC-Hayward-EBMUD Intertie) is a result of this type of regional collaboration.

EBMUD currently also has active and executed agreements to provide facilities allowing for short-term limited water transfers during emergency situations with several agencies, including Dublin San Ramon Services District (1990), City of Hayward (1994)(2000), and Contra Costa Water District (2002). Transfer/ exchanges are made only on a short-term basis for a period of one year or less. Figure 2-4 illustrates the transfer/exchange locations in EBMUD's service areas and lists the quantities permitted for transfer/ exchange with water service agencies during emergencies and non-emergencies.

### **Agreement for Emergency Water Services with SFPUC-Hayward-EBMUD**

The EBMUD Board, the City of Hayward, and the SFPUC approved a Joint Exercise of Powers Agreement in April 2003 to develop the SFPUC-Hayward-EBMUD Intertie. Elements consist of a new pump station and 1.5 miles of pipeline within the City of Hayward, with minor improvements on the EBMUD and SFPUC systems. The City of Hayward will operate and maintain the joint facilities, and EBMUD has sole control of the valve connection to its own system. Construction of the SFPUC-Hayward-EBMUD Intertie facilities began in 2005 and is scheduled to be completed in summer 2006.

Water delivery reliability for customers is a top priority for EBMUD. The new SFPUC-Hayward-EBMUD Intertie will significantly increase the reliability of water services by providing an alternative water source during a natural disaster or a planned outage of critical facilities in either system on a short-term basis. The regional partnership will benefit the 3.7 million customers served by EBMUD, the SFPUC, and the City of Hayward. The SFPUC-Hayward-EBMUD Intertie connects the water systems and allows the partner agencies to provide the parties with mutual aid. In response to a failure in the SFPUC and Hayward Water System, the SFPUC-Hayward-EBMUD Intertie will provide City of Hayward and SFPUC with up to 30 MGD, of which 15 MGD could meet the City of Hayward's maximum day demand. Similarly, if the EBMUD system were to experience an emergency, up to 30 MGD from the SFPUC through the City of Hayward could be provided to EBMUD.

### **Agreement for Emergency Water Services with City of Hayward**

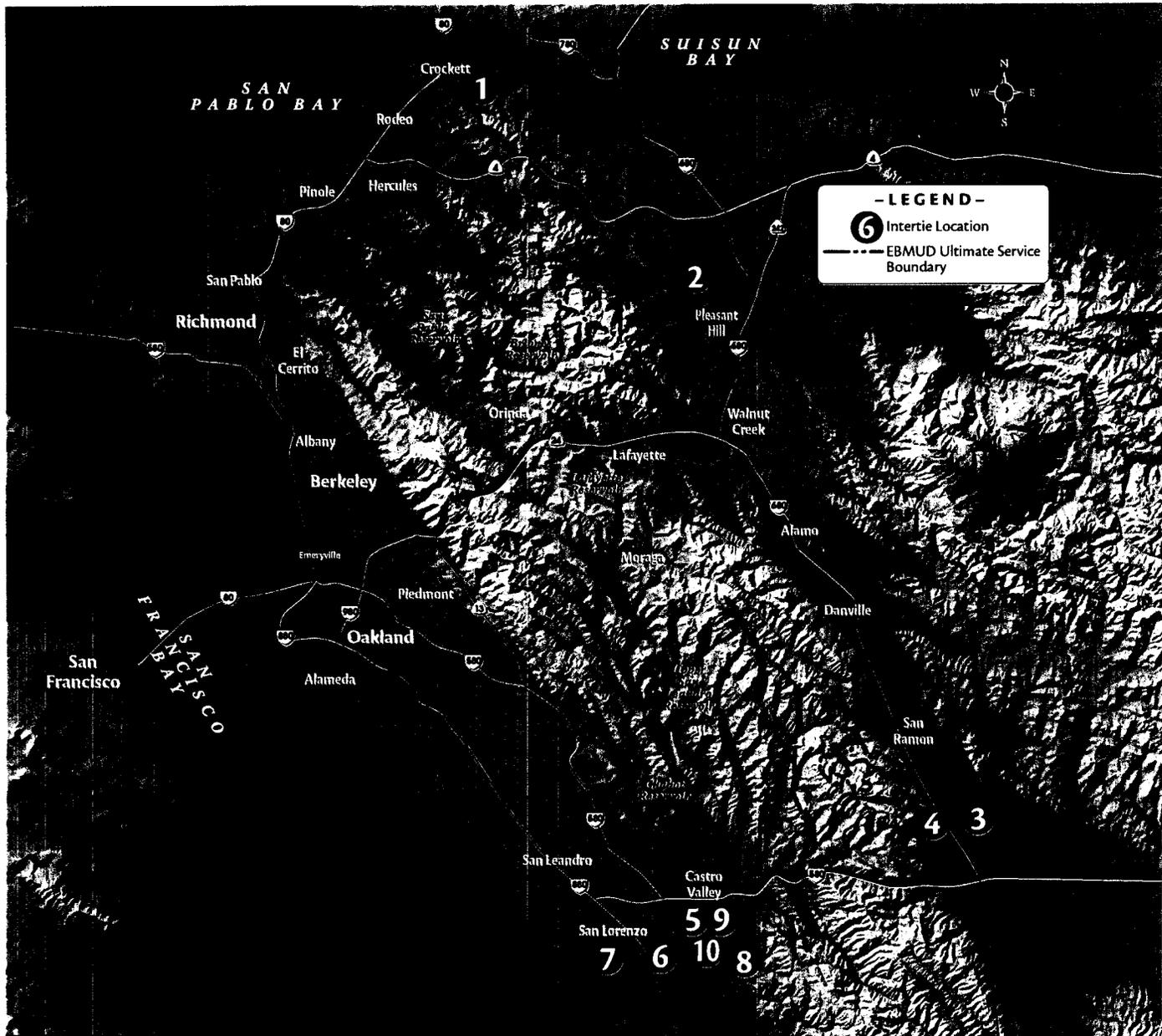
EBMUD currently has two locations earmarked for connecting smaller interties (2.8 and 5.7 MGD) with the City of Hayward water system under a 2000 agreement and has identified three additional intertie sites for treated water transfer through fire hydrants (2.1 MGD each) with the City of Hayward water system under a 1994 agreement. Interconnections are made on a short-term basis only by mutual consent and under emergency conditions and do not substitute for a standby or reserve source of water for normal operations. The connection of the systems would be made by Hayward and EBMUD forces at the time of the emergency as declared under the conditions outlined in the agreements. Supplied water would be metered, and expenses would be billed to each agency as outlined in the agreements.

### **Agreement for Emergency Services with DSRSD and CCWD**

In the 1990 agreement with DSRSD, two locations are available for establishing connections to transfer treated water between the two agencies at up to 1.4 MGD for one location and up to 0.7 MGD for the second. The process and billing are outlined in an agreement similar to that with City of Hayward.

In the 2002 agreement with CCWD, intertie locations can be added, deleted or modified as mutually agreed upon by each agency. Currently two intertie locations are identified. Water quantities are provided by one agency to the other in

Figure 2-4. Transfer and Exchange Locations



| <b>Intertie</b> | <b>Agency</b>                  | <b>Location</b> | <b>Maximum Transfer/Exchange Flow From/To EBMUD (MGD)</b> | <b>Duration</b>         |
|-----------------|--------------------------------|-----------------|---|-------------------------|
| 1               | CCWD                           | Crockett        | 1.0/0   | Short-Term Emergency    |
| 2               | CCWD                           | Pleasant Hill   | 10/8  | Short-Term Emergency    |
| 3               | DSRSD                          | San Ramon       | 1.4/1.4   | Short-Term Emergency    |
| 4               | DSRSD                          | San Ramon       | 0.7/0.7   | Short-Term Emergency    |
| 5               | City of Hayward                | Hayward         | 2.8/2.8   | Short-Term Emergency    |
| 6               | City of Hayward                | Hayward         | 5.7/5.7   | Short-Term Emergency    |
| 7               | SFPUC via City of Hayward      | Hayward         | 30/30   | Short-Term Emergency    |
| 8               | City of Hayward <sup>(1)</sup> | Hayward         | 2.1/2.1   | Short-Term Emergency    |
| 9               | City of Hayward <sup>(1)</sup> | Hayward         | 2.1/2.1   | Short-Term Emergency    |
| 10              | City of Hayward <sup>(1)</sup> | Hayward         | 2.1/2.1   | Short-Term Emergency    |
|                 | CCWD <sup>(2)</sup>            | Brentwood       | 100/0   | Long-Term Non-Emergency |

<sup>(1)</sup> Water Transfers/Exchanges to City of Hayward (8,9 & 10) are supplied through connections between fire hydrants instead of through dedicated constructed appurtenances.

<sup>(2)</sup> Water Transfer to CCWD is a result of negotiated settlement of the Freeport Regional Water Project (FRWP) EIR/EIS. Water is wheeled from FRWP facilities to CCWD, which is also the owner of the water. Interconnection between EBMUD Mokelumne Aqueduct and CCWD Los Vaqueros Pipeline is currently not constructed and anticipated for completion post-2005. Location of interconnection is beyond EBMUD service area and is not illustrated on the map.

amounts reasonably required during the emergency without endangering the supplying agency's system and overall supplies.

### **Agreement with CCWD**

In a 2004 agreement with CCWD, EBMUD agreed to "wheel" 3,200 acre-feet/year (AFY) of water to CCWD through the Freeport Regional Water Project (FRWP) facilities. Wheeling is the transmission of water owned, in this case, by CCWD, through facilities (the FRWP facilities, Reclamation's Folsom South Canal, and EBMUD's Mokelumne Aqueduct) and conveyed to CCWD's Los Vaqueros Reservoir via the Los Vaqueros Pipeline. CCWD water could be wheeled upon request by CCWD, unless there are unavoidable conditions that reduce the capacity of the system such that the Freeport Regional Water Authority (FRWA) and EBMUD are unable to wheel the water. The delivery rate of the wheeled water, capped at 155 cubic feet per second (cfs) (100 MGD) at the full capacity of the Folsom South Canal Connection, will be determined each year according to a wheeling schedule also developed each year. CCWD pays wheeling costs and will bear the cost of design and construction of interconnection facilities at the intersection of the Mokelumne Aqueducts and Los Vaqueros Pipeline in Brentwood, California. The interconnection will be designed and constructed to the full capacity of the FRWP, 155 cfs, and implemented under the responsibility of CCWD.

### **SECURITY**

Since the terrorist events of September 11, 2001, EBMUD has increased its focus on the security of its water resources, water and wastewater facilities and employees potentially vulnerable to similar events. According to terrorism experts, water and wastewater systems have a relatively low likelihood of experiencing terrorist acts. Nevertheless, the experts encourage each utility to review its security protocols and to make appropriate improvements. Working with law enforcement and utility industry security experts, EBMUD has increased security at its water and wastewater facilities to protect the public's water supply. Acting on the recommendations of the Federal Bureau of Investigation, the American Water Works Association, and the California Office of Emergency Services, EBMUD implemented actions to guard against intrusion, reviewed emergency response plans, and increased vigilance at its water and wastewater systems.

The "Bioterrorism Preparedness and Response Act, Public Law 107-188" enacted by Congress after the September 11th event requires all drinking water utilities serving 3,300 or more people to conduct and submit a security Vulnerability Assessment (VA) to the US Environmental Protection Agency (EPA). This VA is a comprehensive assessment of potential security vulnerabilities of EBMUD facilities. EBMUD submitted its VA to the EPA in March 2003. At the time, the VA was considered one of the most extensive in the nation for a public utility. Further security efforts included the establishment of an EBMUD Security Office, development and revision of a Security Plan based on the results of the VA, increased security at key facilities, acceleration of several capital projects, adoption of new security policies, and revision or drafting of EBMUD proce-

dures to address security issues raised in the VA process.

EBMUD implemented physical and operational security improvements based on the vulnerability assessment. Physical security improvements have been planned or implemented primarily at water treatment plants, dams, administration facilities, maintenance yards and key transmission and distribution facilities. Improvements are designed to improve EBMUD's ability to deter or at least delay criminal activity, to detect such activity, to assess alarm and potential security breach conditions, and to respond to security incidents promptly. Improvements include, but are not limited to, re-keying locks, fencing, access control systems, lighting, alarms (interior and exterior), motion detectors, cameras, video recorders and monitors and all related required appurtenances to complete the security systems. Operational improvements included updating the security response section of EBMUD's Emergency Operations Plan for submittal to the EPA in 2003. EBMUD also prepared a separate Emergency Action Plan for its major dams at Pardee and Camanche Reservoirs to comply with new Federal Energy Regulatory Commission (FERC) requirements. EBMUD will continue to adjust security measures as warranted to protect against potential terrorism.

Ensuring the safety of public water supplies is EBMUD's top priority. EBMUD uses a multi-barrier approach—with physical, chemical and operational controls—to safeguard the water provided to consumers. This multi-barrier approach is advocated by national industry experts and by homeland security experts. EBMUD works with federal, state and local law enforcement, and utility organizations to assess potential threats and minimize risks. In response to a situation for which the safety of the water supply is potentially compromised, EBMUD follows through with a systematic approach to investigate the source of the problem, to assess the event, and to exercise the appropriate actions that protect the system, including the option to temporarily suspend inflows from the water source. Meanwhile, EBMUD issues the appropriate public notices on developments of the situation.

EBMUD's Emergency Operations Team, which manages emergency responses, meets routinely and is ready to respond quickly and appropriately to any emergency with other public safety and first responder agencies. EBMUD's state-of-the-art laboratory works with experts from other area laboratories and the California Department of Health Services to protect water quality. EBMUD's Emergency Operations Team utilizes the California Standardized Emergency Management System (SEMS) and is integrating with other utilities, local, state and federal agencies, into the new National Incident Management System.

### **WALNUT CREEK–SAN RAMON VALLEY IMPROVEMENT PROJECT**

The \$177-million Walnut Creek–San Ramon Valley Improvement Project (WC-SRVIP) will increase reliability and capacity for existing and future customers in the eastern portions of the service area, improving water pressure and availability during prolonged seasonal hot periods while maintaining adequate reserves for fire flows. This project will result in maximized service quality with treatment and delivery of water in this area to meet existing customers' needs year-round.

These improvements will expand the treatment capacity of the Walnut Creek Water Treatment Plant (WCWTP) during peak water use periods. EBMUD previously responded by relying on distribution pumping and storage to meet system demands, drawing into emergency reserve levels of the distribution reservoirs in the area. However, operating in this manner reduces the reliability of the system and may increase operating costs because of extra pumping. In addition, the reserves are vital for fire-fighting purposes and for maintaining water pressure at customers' taps.

Project components, as illustrated in Figure 2-5, include capacity expansion and upgrades to the WCWTP, construction of 4.4 miles of large diameter transmission pipeline (including a one-mile tunnel) from Walnut Creek to Alamo, and expansion of the Danville Pumping Plant in Alamo. The WCWTP improvements include safer storage for water treatment chemicals, more treatment plant clearwell storage, and new and refurbished filters to increase treatment capacity and to meet stricter California water quality guidelines.

Completed elements of the project include Danville Pumping Plant placed in-service in spring 2004, which allows EBMUD to pump water more efficiently to customers south of the treatment plant in Walnut Creek, and a portion of the large transmission pipeline along the Iron Horse Trail. Construction at the WCWTP started in February 2002. Many of the improvements are in place, and additional work on other components at the site would have been completed by the fall of 2005. Construction on the northern section of the transmission pipeline was delayed numerous times, but completion is estimated to occur in mid-2006. Construction on the section of the transmission Pipeline along the South Broadway extension was delayed in November 2004 after an explosion at the jobsite.

**WATER TREATMENT AND TRANSMISSION IMPROVEMENTS PROGRAM**

The \$264-million Water Treatment and Transmission Improvements Program (WTTIP) will address regulatory issues, existing maintenance needs, and existing and future water treatment and transmission capacity needs of Lafayette, Moraga, Orinda, Walnut Creek, and parts of unincorporated Contra Costa County. The proposed project will reliably and efficiently meet current and projected 2030 water demands of the WTTIP area. It will also meet current and future drinking water and environmental regulations associated with treatment and distribution facilities. The proposed project includes improvements at the Lafayette, Orinda, Walnut Creek, Sobrante, and Upper San Leandro Water Treatment Plants, six new or upgraded storage tanks, nine new or upgraded pumping plants, and approximately seven miles of new pipeline.

The EIR process began with the Notice of Preparation in August 2005. The WTTIP EIR and recommended project is anticipated to be presented to the Board in the spring of 2006 with final approval scheduled for June 2006.

**SUPPLEMENTAL WATER RESOURCES**

Supplemental water supplies not only can reduce the frequency and magnitude of water rationing required of cus-

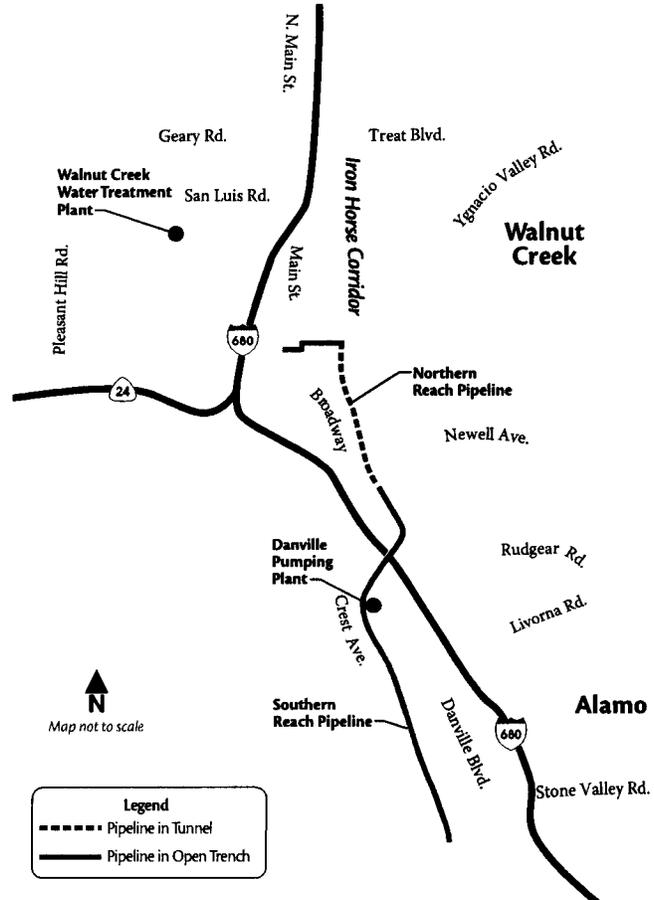
tomers during droughts, but also can provide EBMUD customers with greater assurance against other possible adverse situations, such as emergency water shortages. EBMUD will undertake several supplemental water supply initiatives during the five-year cycle of this Urban Water Management Plan (UWMP): the Freeport Regional Water Project, the Bayside Groundwater Project, and regional desalination projects.

Integrated water resource management strategies are employed to meet customer water demands. EBMUD's current efforts focus on maximizing resources through improved efficiencies in the delivery and transmission of available water supplies. In addition, recycled water projects (as discussed in Chapter 5 of this plan) and conservation efforts (as discussed in Chapter 6 of this plan) reduce demand on the potable water supply, thereby extending the existing water supply.

**WATER SUPPLY PROJECT IN DEVELOPMENT**

In October 1993, EBMUD adopted the WSMP as a long-term planning guide for providing a reliable high-quality water supply to the EBMUD service area through year 2020. The WSMP found that during severe droughts, EBMUD would be unable to meet its customers' water needs with its existing source of supply, the Mokelumne River, unless extreme rationing measures are imposed. It is the policy of EBMUD's Board (Policy 9.03 in Appendix E) to limit rationing to no more than 25 percent of total customer demand on an annual basis dur-

**Figure 2-5. Walnut Creek and San Ramon Valley Improvement Project**



ing a critical drought. The WSMP identified two principal options for meeting EBMUD’s projection for a supplemental water supply: development of new surface water sources; and additional storage capacity, either in groundwater aquifers or surface reservoirs. Since publication of the WSMP findings, EBMUD has been exploring additional supplemental supply projects that can provide dependable supplies that will adequately meet current and projected levels of customer demand through 2030.

**Freeport Regional Water Project**

The Freeport Regional Water Project (FRWP) is a regional water supply project that EBMUD has undertaken in partnership with the Sacramento County Water Agency (SCWA) and with the City of Sacramento as an associate partner. The project, as shown in Figure 2-6, enables delivery of water diverted from the Sacramento River near the town of Freeport to EBMUD customers during dry years and provides needed water for the Sacramento region as well. The FRWP will supplement EBMUD’s aggressive water conservation and recycling programs to reduce the potential for severe water rationing and associated economic losses during droughts.

**Background**

Stemming from its effort to identify additional sources of supply to meet its long-term water demand since the mid-1960s, EBMUD executed a contract in 1970 with the US Bureau of Reclamation (USBR) for delivery of Central Valley Project (CVP) water from the American River. Legal challenges to EBMUD’s entitlement to water from the American River began in 1972 and continued for many years. A 1990 court decision ultimately affirmed EBMUD’s right to take delivery of American River water under its 1970 CVP contract, but the court also imposed conditions for that delivery. EBMUD and USBR published the November 1997 DEIR/EIS for the Supplemental Water Supply Project, which evaluated American River water supply project alternatives. Subsequent to public review comments, EBMUD and USBR analyzed additional alternatives in a recirculated EIR/supplemental EIS (REIR/SEIS) published in October 2000. In December 2000, the *East Bay Municipal Utility District – Supplemental Water Supply Project Final Environmental Impact Report/Environmental Impact Statement* (Final EIR/EIS) was issued, providing the basis for amending EBMUD’s CVP water service contract.

On December 8, 2000, USBR, EBMUD, and Sacramento parties reached an agreement to develop a joint water supply from the Sacramento River, rather than from the American River. American River projects had been the focus in the *Supplemental Water Supply Project Draft Environmental Impact Report and Environmental Impact Statement* (1997 DEIR/EIS) and in the recirculated EIR/supplemental EIS (REIR/SEIS) published in October 2000. In February 2002, EBMUD and the SCWA (in association with the City of Sacramento and with support from USBR) formed the Freeport Regional Water Authority (FRWA), a joint powers authority, to oversee the joint development of the FRWP.

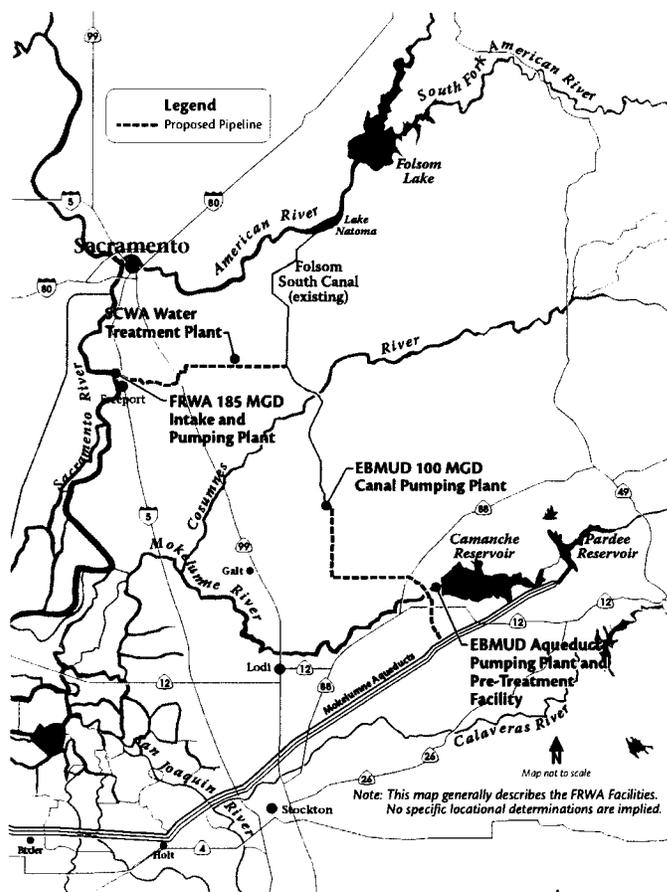
Subsequent to the June/July 2001 approval of EBMUD’s amendatory CVP water service contract, incorporating

the concept of the FRWP, and the signing of a Joint Powers Agreement forming the Freeport Regional Water Authority in February 2002, the DEIR/EIS for the FRWP was issued for public review in August 2003. The Final Environmental Impact Report, Freeport Regional Water Project and the Final Environmental Impact Statement, Freeport Regional Water Project were both published in March 2004. The FRWA Board certified the Environmental Impact Report (EIR) for the project in April 2004, and EBMUD certified the EIR in August 2004. Necessary Biological Opinions have been completed by the US Fish and Wildlife Service and NOAA Fisheries. The USBR issued a Record of Decision (ROD) for the EIS in January 2005.

**Project Overview**

The FRWP will have the ability to divert up to 185 million gallons per day (MGD) of water from the Sacramento River near the town of Freeport, delivering up to 100 MGD of water to EBMUD customers in dry years to reduce the need for rationing, and up to 85 MGD to SCWA in all years to help meet future drinking water needs in central Sacramento County. EBMUD’s water supply for the FRWP is based on its Amendatory Water Service Agreement with the USBR which provides for up to 133,000 acre-feet of water in a single dry year and up to 165,000 acre-feet of water during three consecutive dry years. Under terms of EBMUD’s agreement with USBR, the CVP supply is available to EBMUD only in years when the District’s stored water supply is low. Table 2-2 illustrates the

**Figure 2-6. Freeport Regional Water Project**



projected water supply quantities, which are available only as a supplemental drought supply, provided by FRWP.

As shown in Figure 2-6, the FRWP will divert water from the Sacramento River one mile north of the town of Freeport and will convey this water through new pipelines and through the existing Folsom South Canal to the Mokelumne Aqueducts near Camanche Reservoir. A turnout in the pipe within central Sacramento County will deliver water to the SCWA. Water will be delivered to EBMUD pursuant to EBMUD's Amendatory Contract with the USBR executed in 2000. The major project elements include the following:

- A new 185-MGD water intake and pumping plant (with state-of-the-art fish screens) on the Sacramento River near Freeport
- A new 66- to 84-inch diameter pipeline to transport water eastward from the Sacramento River to the existing Folsom South Canal
- A new water treatment plant in central Sacramento County, owned and operated by Sacramento County, to provide treated surface water supplies to portions of the Sacramento area
- A new 72-inch-diameter pipeline and two new pumping plants to transport water from the southern end of the Folsom South Canal to EBMUD's Mokelumne Aqueducts.

The unassigned wet and normal year capacity of the FRWP facilities can potentially be utilized to improve water quality for Bay Area water agencies, to assist with ecosystem restoration and protection, or to meet other regional water needs. Use of the project facilities for these purposes would require additional environmental documentation.

*Project Timeline*

EBMUD is actively developing the FRWP through the design, permitting, and construction phases to ensure its successful and timely completion. An agreement with the City of Sacramento has been approved, allowing the project to acquire land for the intake structure. Design began in January 2005 with permit acquisition, public outreach, and easement acquisition continuing. Completion of FRWA facilities design is anticipated in 2006, and completion of EBMUD facilities design is anticipated in late 2006. Construction of EBMUD and shared FRWP facilities needed to deliver water to EBMUD customers is targeted for completion by November 2009. Figure 2-7 illustrates the FRWP anticipated timeline schedule for implementation.

**PLANNED WATER SUPPLY PROJECT**

The District is also evaluating additional supplemental supply options through groundwater storage.

**Bayside Groundwater Project**

*Project Overview*

The Bayside Groundwater Project involves groundwater injection/extraction operations in the San Leandro/San Lorenzo area. Phase 1 involves the conversion of the existing demonstration well located on property adjacent to the Oro Loma Sanitary District Wastewater Treatment Plant at 2600 Grant Avenue in San Lorenzo to a groundwater injection/extraction well with associated treatment facilities. Treated water from EBMUD's distribution system would be injected through the single well into the South East Bay Plain Basin (SEBPB) in wet years for later recovery through extraction and use during a drought. Phase 1 provides for an annual 1 MGD injection into an existing well and a maximum annual 1 MGD (1,120 acre-feet) extraction capacity with a short-term extraction rate of up to 2 MGD operated for a portion of drought years. Based on the assumption that only Phase 1 is in operation, projected groundwater extraction quantities available only as a supplemental drought supply are illustrated in Table 2-2. Chloramination, pH control, fluoridation, and manganese removal will be applied to the extracted water at the well to meet Federal and State health rules before it is pumped into the existing distribution pipeline to EBMUD customers. Water quality, water levels and land subsidence will be extensively monitored.

Phase 2 is the potential future expansion of groundwater facilities with an annual capacity of between 1 and 10 MGD and with up to four additional wells. Potential well locations include an industrial zone in the westerly end of San Lorenzo, or a broader area including San Lorenzo, San Leandro, and the southern part of Oakland. No decision has been made to proceed with Phase 2. EBMUD would not proceed with Phase 2 until it defines the scope of this phase, and completes and certifies a new EIR.

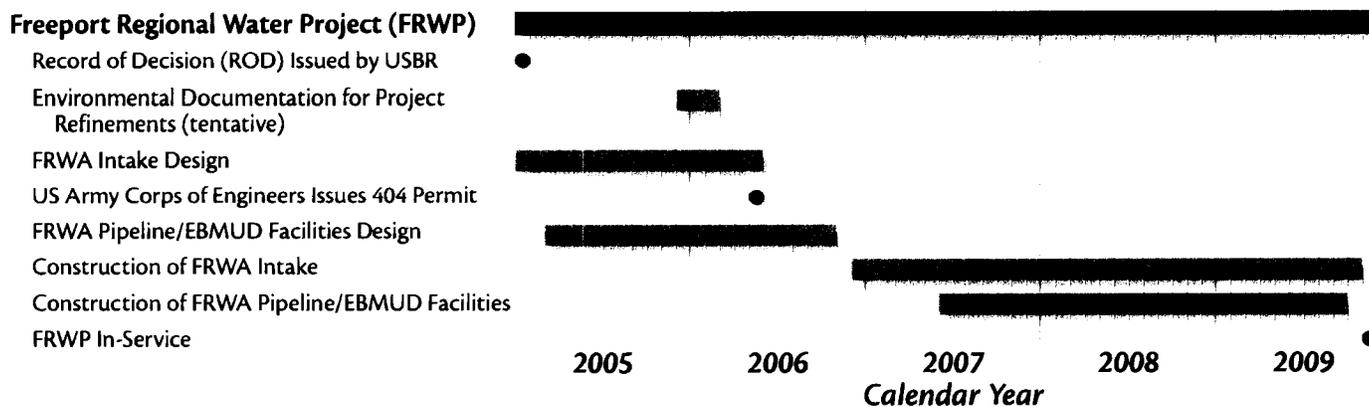
The project provides water for EBMUD customers during drought periods, making beneficial use of local resources, providing water that complies with state and federal drinking water standards, enhancing basin water quality, and enabling collection of groundwater hydrologic and water quality data.

**Table 2-2. Projected Future Water Supply Quantities**

| <b>Project Name</b>                  | <b>Normal-Year AF to EBMUD</b> | <b>Single-Dry Year AF to EBMUD</b> | <b>Multiple-Dry Years AF to EBMUD</b> |               |               |
|--------------------------------------|--------------------------------|------------------------------------|---------------------------------------|---------------|---------------|
|                                      |                                |                                    | <b>Year 1</b>                         | <b>Year 2</b> | <b>Year 3</b> |
| Freeport Regional Water Project      | 0                              | Up to 112,000 <sup>(1)</sup>       | 165,000 over three years              |               |               |
| Bayside Groundwater Project, Phase 1 | 0                              | 1,120                              | 1,120                                 | 1,120         | 1,120         |

<sup>(1)</sup> Contractual single-year limit of supply from USBR is 133,000 AF. For continuous operation at 100 MGD, EBMUD's allocation capacity in the Freeport Regional Water Project yields an annual delivery of 112,000 AF.

**Figure 2-7. Freeport Regional Water Project Anticipated Implementation Timeline**



**Groundwater Basin Overview**

In accordance with the Urban Water Management Planning Act under California Water Codes section 10631(b), this section of the Plan provides a comprehensive description of the East Bay Plain Basin where the Bayside Groundwater Project is located.

**Description**

The East Bay Plain Basin extends along the East Bay foothills to the Bay approximately from Richmond to Hayward as shown in Figure 2-8. Consisting of a portion of the East Bay Plain Basin, the SEBPB is bounded to the east by the Hayward Fault and extends beneath San Francisco Bay to the west. Because the precise location of the western boundary under the Bay is not known, the boundary is assumed to coincide with the edge of the Bay, consistent with the California Department of Water Resources' depiction of this boundary. The SEBPB thins out to the north and becomes an insignificant source of groundwater near Berkeley. The southern boundary is in the City of Hayward near the San Mateo Bridge. The Niles Cone Groundwater Basin (NCGWB) begins immediately south of the SEBPB, and extends from about Hayward to Milpitas.

**Hydrostratigraphic Units**

The SEBPB is comprised of four main aquifer systems. The units are named for their equivalent NCGWB units. Tests for hydraulic connection between the two basins indicated that a limited hydraulic response occurs across the boundary between the Deep Aquifers of both basins. The SEBPB aquifer systems include:

- The Newark Aquifer equivalent is at approximately 30 to 130 feet below ground surface (bgs). Aquifers of limited extent, comprising of a water table aquifer system with relatively low vertical permeability, occur at depths of less than 50 feet in this unit. This unit is separated from the underlying aquifers by an Old Bay Mud (also known as Yerba Buena Mud) aquitard that is about 50 feet thick and pinches out to the east towards the Hayward Fault.
- The Centerville Aquifer equivalent includes the upper marine portion of the Alameda Formation, which is comprised of estuarine muds separated by alluvial fan deposits. The aquifer is present at depths of about 130 to 220 feet bgs whereas

near the project site, it consists of individual gravel and sand lenses varying in thickness from 5 to 60 feet. Groundwater in this aquifer occurs under confined conditions.

- The Fremont Aquifer equivalent includes the lower marine portion of the Alameda Formation. It occurs between 250 and 375 feet bgs and is separated from the Centerville Aquifer equivalent by a thick aquitard. Groundwater in this aquifer occurs under confined conditions.
- The Deep Aquifer includes the upper 100 feet of the continental portion of the Alameda Formation and consists of alluvial fan deposits interfingered with water body deposits. This confined aquifer is to be used for injection and extraction of water during operation of the project. The Deep Aquifer is located over 400 feet bgs. It is thickest in the south, and thins and feathers out to the north; the unit is not substantially productive north of San Leandro. The aquifer is believed to extend toward the middle of the Bay. Fine-grained clays and silts exist below the Deep Aquifer.

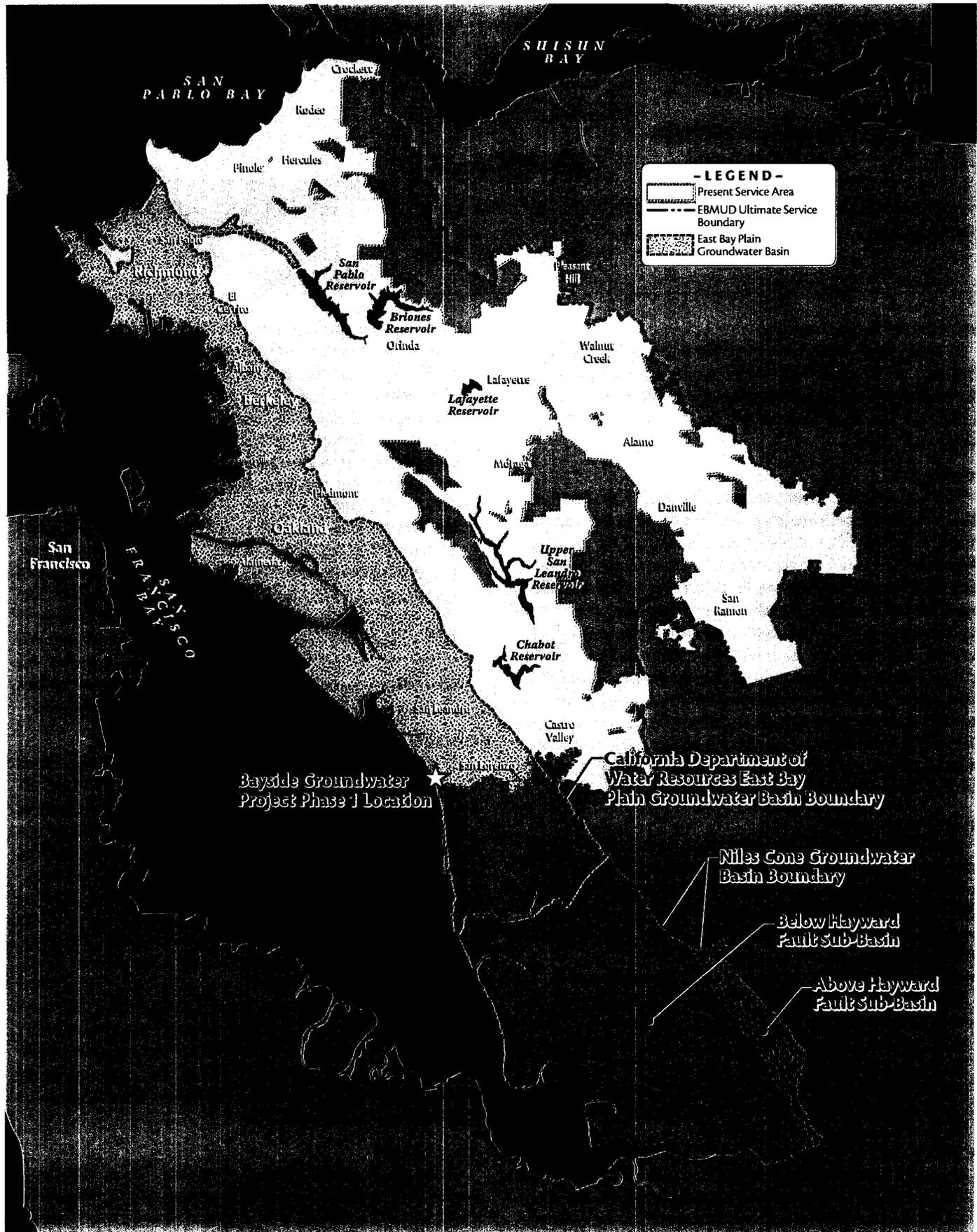
**Groundwater Basin Management**

EBMUD collaborates with the Alameda County Flood Control and Water Conservation District (ACFC/WCD), Alameda County Water District (ACWD), City of Hayward, and California Department of Water Resources (DWR) to coordinate initial regional groundwater management activities, such as sharing monitoring data from each basin and monitoring performance of the project. EBMUD shares acquired hydrologic data developed during operation of the potential Bayside Groundwater Project with ACWD, City of Hayward and other agencies, such as the USGS, with interest in the basin. In addition, the partners use a numeric groundwater flow model for the SEBPB and NCGWB, called the Niles Cone and South East Bay Plain Integrated Groundwater and Surface Water Model (NEBIGSM) developed cooperatively by EBMUD, ACWD and City of Hayward, to manage the NCGWB and to evaluate potential project impacts on groundwater levels in this area.

**Water Budget**

The basin is not in overdraft condition. The water balance results in net recharge of 1,300 acre-feet, which is reflected in rising water levels in the Deep Aquifer. Historic overpumping

Figure 2-8. East Bay Plain Basin and Niles Cone Groundwater Basin



and decline in water levels may have resulted in recharge from groundwater movement into the basin from the NCGWB. Discharge is estimated to have averaged about 7,100 acre-feet per year. Recharge to the basin is estimated to have averaged about 8,400 acre-feet per year in the mid-1990s.

#### *SEBPPB Groundwater Movement*

Currently, groundwater in the shallow units of the SEBPPB generally flows from east to west, from the Hayward Fault towards San Francisco Bay, with an average horizontal flow gradient of about 0.002. Average horizontal gradients in the Centerville and Fremont aquifer equivalents are also about 0.002. The horizontal flow gradient in the Deep Aquifer is about 0.001 with a northerly flow component, possibly indicating recharge from the NCGWB area.

Vertical downward gradients (i.e., the head in the upper unit is higher than that of the adjacent lower unit) are present throughout the SEBPPB where the Old Bay Mud is present. Vertical gradients are approximately 0.02 near the Bay margin (from both Newark Aquifer equivalent to Centerville and Fremont Aquifer equivalents, and from these units to the Deep Aquifer), and are very small near the foothills where the Old Bay Mud pinches out.

#### *Historic Water Levels*

Maximum drawdown in the SEBPPB occurred in the early 1960s. Water levels were at about -90 to -110 feet Mean Sea Level (MSL) at that time, with gradual recovery to the present.

#### *Groundwater Quality in the SEBPPB*

Groundwater of the Newark Aquifer equivalent (shallow aquifer), based on total depths less than 200 bgs, contains relatively high concentrations of total dissolved solids (TDS), chloride, nitrate, and sulfate, especially compared to deeper units, and is more susceptible to contamination from surface sources. Groundwater from some wells completed in this aquifer exceeds the maximum contaminant level (MCL) for nitrate and the secondary MCL for TDS, chloride, sulfate, iron, and manganese. Nitrate levels in groundwater are elevated in large parts of the San Leandro/San Lorenzo area. Iron concentrations in the Newark Aquifer equivalent are typically less than 0.05 parts per million. Groundwater from wells completed within the Centerville and Fremont Aquifer equivalents, based on total depths of 200 to 500 feet bgs, locally exceeded the secondary MCLs for TDS, chloride, iron, and manganese. High TDS values in at least some of these wells are probably related to shallow screen intervals. Iron and manganese data for this zone are sparse.

Wells completed within the Deep Aquifer, based on depths greater than 500 feet bgs, are located primarily in the southern portion of the SEBPPB. Groundwater from these wells is characterized by elevated concentrations of iron and manganese. Chloride, nitrate and sulfate concentrations are relatively low in this unit. Native groundwater extracted from wells screened in the Deep Aquifer near the project area meets all current primary (health-based) drinking water standards and, with the exception of manganese, all secondary (aesthetic) drinking water standards. High manganese content is common in groundwater and is removed through standard treatment methods.

#### *Change in Native Groundwater Quality*

Results of the Bayside Groundwater Project pilot well testing indicated that the recovered treated drinking water mixes with the native groundwater during storage. However, the degree of mixing depends upon the volume of treated water injected, with less mixing when greater volumes are injected. The results of the testing also indicated that there would be no adverse geochemical reaction between the native groundwater and the treated water.

The pilot well study indicated that chloramine disinfection residual from injected potable water remained relatively stable and that very low levels of disinfection by-products formed in groundwater (1 to 2 parts per billion (ppb) trihalomethanes (THM) and no haloacetic acid) compared to levels in surface water sources. This concentration of THM is well below the primary drinking water standard (maximum contaminant level) of 80 ppb. THM concentrations decreased with time in storage. The native groundwater mixed with injected potable drinking water would continue to meet all existing drinking water standards and would improve basin water quality overall.

#### *Drawdown and Drawup Effects*

Groundwater modeling was used to forecast the impacts of the proposed operation of the Bayside Groundwater Project on the SEBPPB and the NCGWB. An extraction rate of up to 2 MGD (maximum annual extraction of 1 MGD) from the confined deep aquifer would lower groundwater levels in the SEBPPB and the NCGWB. In the Deep Aquifer of the SEBPPB, a greater than 30 feet maximum drawdown in the vicinity of the project well is projected, with drawdown effects reaching as far as Oakland and Fremont. Pumping at an average annual rate of 1 MGD would lower Deep Aquifer groundwater levels in the vicinity of the Hayward emergency supply wells by a maximum of approximately 5 feet to 15 feet. Drawdown effects would be short-term in response to pumping and are expected to be reversed when pumping ceases and injection begins.

In response to the 1 MGD injection, the Deep Aquifer water levels are drawn up, and the area affected by water levels rising above the ground surface in the SEBPPB is larger than under No Project conditions. Under this situation, overflow could exist at additional active or improperly abandoned deep wells. The affected area lies at the edge of the San Francisco Bay on the western portion of San Leandro, San Lorenzo, Hayward, Union City, Fremont, and Newark in areas primarily used as salt ponds that are not likely to include deep wells. An active deep well identification and retrofit program will be implemented. A maximum draw up of 3 to 10 feet (above current water levels) in the vicinity of the Hayward emergency supply wells would result in increased well capacity. In the NCGWB, the area affected by drawup where the water levels of the Deep Aquifer are projected above ground surface is similar to no project conditions.

The model results indicated the proposed operations would not result in new sea water intrusion in the NCGWB, would not hinder flushing salt from inland areas of the Newark Aquifer to the part of the Newark Aquifer beneath the bay or near shore areas, would not increase the spatial spreading

of existing salt plumes in the NCGWB, and would not cause drawdown patterns such that ACWD could face long-term increases in power costs.

*Saltwater Intrusion*

The Bayside Groundwater Project pumping effects on the water levels in the Newark Aquifer equivalent of the SEBPP would not change the overall groundwater flow gradient and direction. Modeling indicates that pumping would not cause a significant increase in salt transport from the Bay to the Deep Aquifer as a result of an increased vertical groundwater gradient. Likewise, the project would neither cause new saltwater intrusion nor interfere with progress to expel sea water plumes. The project would have a beneficial effect on saltwater intrusion in the NCGWB.

*Land Subsidence*

Inelastic land subsidence (permanent) is not expected since drawdowns modeled for the project are at least 25 to 50 feet above observed historic lows. The amount of elastic subsidence, which completely reverses following each groundwater pumping cycle as water levels recover, is expected to range from about a quarter inch at the project site (with water level drawdown of about 40 feet) to about a tenth of an inch several miles from the project site.

*Projected Implementation Timeline*

The Draft Environmental Impact Report, East Bay Municipal Utility District, Bayside Groundwater Project, March 2005 (Draft EIR) was circulated for public review and for comments from March 2005 to May 2005. A community meeting on the Draft EIR with the EBMUD Board of Directors was held in April 2005. The EBMUD Board certified the final EIR and approved the project in November 2005. Design of Phase 1 facilities would be complete by December 2006. Construction of Phase 1 would conclude by December 2007. Figure 2-9 illustrates the Bayside Groundwater Project Phase 1 anticipated timeline schedule for Phase 1 implementation.

**CONCEPTUAL WATER SUPPLY RESOURCES**

EBMUD is investigating long-range options for combined use of groundwater and surface water sources beyond the East Bay service area. Proposed groundwater storage would involve injecting surface water into a groundwater basin for subsequent recovery in drier years to supplement depleted surface water supplies. One option focuses on the East Contra Costa-Bixler Exploration to develop potential groundwater storage in partnership with local interests in the Bixler area

and with San Joaquin County interests. The second option is continuing work on the San Joaquin Conjunctive Use Alternative in partnership with San Joaquin County water interests toward the development of a groundwater recharge/extraction project. Because of overdrafted groundwater conditions and proximity to EBMUD's Mokelumne Aqueducts, potential joint projects in eastern Contra Costa County and in San Joaquin County present mutually beneficial opportunities. San Joaquin County has approved a Groundwater Management Plan which is being incorporated into an Integrated Regional Water Management Plan (IRWMP) process. Next steps will include development of basin management objectives, which will be critical in either limiting or enabling groundwater banking.

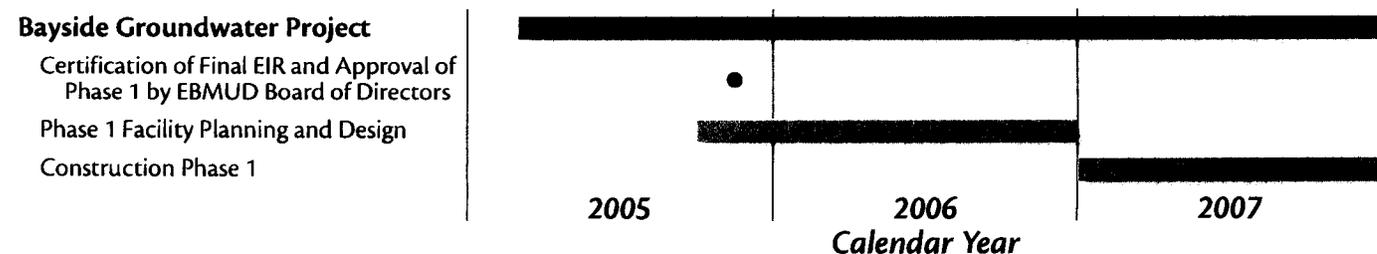
EBMUD is continuing efforts on special projects and studies pursuing other groundwater and collaborative investigations, including program or project proposals that may emerge from the CALFED Bay Area Water Quality and Supply Reliability initiative. Calaveras County and Sacramento County are beginning to evaluate groundwater-banking alternatives and have requested EBMUD participation in the development of their analysis. The scope of work on these promising concepts may include investigation, inter-agency relationship development, feasibility studies and possible pre-engineering studies. These additional efforts may ultimately contribute further to meet a portion of the WSMP Supplemental Supply needs.

EBMUD is also participating with other Bay Area agencies on a feasibility study of the Bay Area Regional Desalination Project. The purpose is to study regional desalination opportunities that would provide a shared supplemental water supply during droughts and emergencies and for future growth.

**East Contra Costa-Bixler Exploration**

EBMUD worked with local agencies and interests to identify potential regional partnerships in the Bixler area that could include an EBMUD dry-year yield. EBMUD explored conjunctive use with groundwater storage on EBMUD's Bixler property near Brentwood in east Contra Costa County. Feasibility depends on significant coordination with overlying and adjacent landowners and agencies and addressing potential impacts to local users and the Bay-Delta river system. EBMUD continues to seek partners to develop this study into a full-scale, locally supported project with regional benefits. No specific project was identified at the time when this UWMP was adopted. Development of conjunctive use would present an opportunity for a joint facility to improve

**Figure 2-9. Bayside Groundwater Project Phase 1 Anticipated Implementation Timeline**



groundwater quality and supply for the local community and a dry-year supply for EBMUD.

### San Joaquin County Conjunctive Use Alternative

EBMUD has been working with eastern San Joaquin County water agencies since 1988 to identify groundwater recharge and banking opportunities. In 1992, EBMUD began negotiating with San Joaquin County water interests for a groundwater banking and conjunctive-use program. The overdrafted groundwater conditions within the county, through which the Mokelumne River and EBMUD's Mokelumne Aqueducts cross, present an opportunity for a joint project of mutual benefit. A single-well pilot injection test in San Joaquin County recharged water from EBMUD's Mokelumne Aqueduct for ten months in 1998.

EBMUD continues to monitor activities of San Joaquin County agencies and stakeholders and with the Northeast San Joaquin County Groundwater Banking Authority. The underlying need in San Joaquin County is to develop broad community support for third-party (EBMUD) groundwater-banking and revise the current County groundwater export ordinance to support groundwater-banking projects. The Northeast San Joaquin County Groundwater Banking Authority is working to develop a more complete basin-wide groundwater management plan. Planning activities will continue for the foreseeable future, although a banking project is not likely in the next five years.

### Development of Desalinated Water

EBMUD, San Francisco Public Utilities Commission (SFPUC), Contra Costa Water District (CCWD), and Santa Clara Valley Water District (SCVWD) are jointly exploring the development of regional desalination facilities. Bay Area Regional Desalination would consist of one or more treatment plants to remove salt from seawater or other brackish water sources with a likely capacity of 20- 80 MGD of potable water. Desalination would provide a potential water supply for municipal and industrial use. Table 2-3 illustrates the source and amount of desalinated water potentially available from only one project. The facilities would provide the following:

- A supplemental supply during drought periods;
- A supplemental long-term supply;
- Additional source(s) of water during emergencies; and
- An alternative water supply that would allow major facilities to be taken out of service for an extended time for inspection, maintenance, or repairs.

In October 2003, a preliminary study of the Bay Area Regional Desalination Project identified three sites to potentially locate a regional desalination facility that processes ocean water or bay water influenced by the ocean and freshwater river sources. These sites include East Contra Costa County Pittsburg-Antioch area, Oakland near the foot of the Bay Bridge,

and San Francisco at Oceanside Water Pollution Control Plant. Figure 2-10 illustrates the potential desalination sites.

The likely water treatment process would be reverse osmosis, which removes salt using thin membranes. Salts are concentrated in a brine solution that must be treated or diluted and then returned to the ocean or Bay in compliance with regulations. Implementation of the Bay Area Regional Desalination Project would require a lengthy public review process because of the number of agencies that would be involved with discretionary permit review and the as-yet unidentified concerns of the affected public. Desalination is not reasonably expected to occur before 2010.

In addition to the regional study, EBMUD is evaluating a location near the C&H Sugar refinery in Crockett as a possible site for a desalination project. The project could provide 1.5 MGD of water for industrial use by C&H and free-up a corresponding amount of potable water for use by other EBMUD customers. C&H Sugar currently uses up to 2 MGD of potable water in its processing operations and more than 20 MGD of saline water for industrial cooling. Potentially, some of the saline water used for cooling could be desalinated for use as part of the C&H Sugar operations. This project has the potential to be the initial phase of a larger desalination project.

## PARTNERSHIPS IN REGIONAL MANAGEMENT PLANS

EBMUD is also partnering with other water agencies planning integrated water resources management strategies to develop programs that would supplement its existing water supply. One example of a Regional Water Efficiency Program is the WSMP that guides the development of a reliable high-quality water supply to the East Bay through the year 2020. A second example, as discussed in Chapter 5 of this Plan, is the San Ramon Valley Recycled Water Program (SRVRWP), which is a multi-phase joint project to supply recycled water to portions of the Dublin San Ramon Services District (DSRSD) and EBMUD service areas. EBMUD has initiated and participates in several consensus-based regional water management efforts with stakeholders in the Mokelumne River and American River Basins, as well as in the local watershed and S.F. Bay Region, to resolve regional and statewide water resource issues.

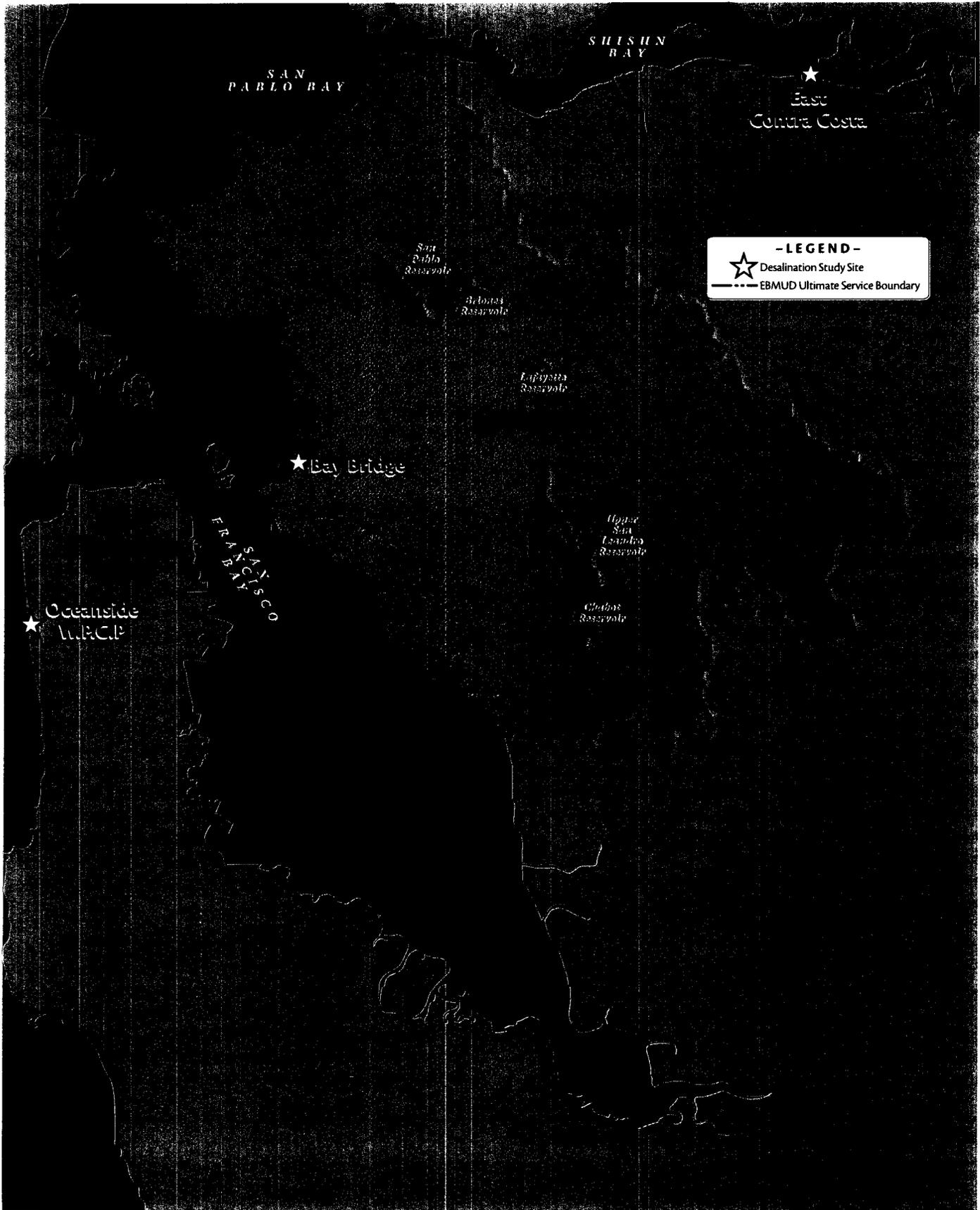
### SAN FRANCISCO BAY AREA REGIONAL PARTNERSHIPS

EBMUD, a member of the Bay Area Water Agencies Coalition (BAWAC), is working with local agencies under a Letter of Mutual Understanding to develop an Integrated Regional Water Management Plan (IRWMP) for the entire nine-county Bay Area. The goal of integrated water management planning is to systematically combine water supply reliability, water

**Table 2-3. Opportunities For Desalinated Water**

| <b>Sources of Water</b>  | <b>EBMUD Yield (AFY)</b> | <b>Start Date</b> | <b>Type of Use</b>   |
|--------------------------|--------------------------|-------------------|----------------------|
| Ocean/Bay/Brackish Water | 22,400                   | Beyond 2010       | Municipal            |
| Bay/Brackish Water       | 1,680                    | Beyond 2010       | Municipal/Industrial |

Figure 2-10. Bay Area Regional Desalination Project Study Sites



quality, storm water and wastewater management and environmental restoration planning. These efforts at integrating regional water management and planning can benefit the San Francisco Bay Area Region through facilitated implementation of innovative, cost-effective and efficient multi-objectives water management solutions. Through an integrated plan, the Bay Area Region would compete more effectively for funding from broader sources such as state bond funds or federal appropriations.

Through BAWAC, EBMUD partners with other local member agencies (Alameda County Water District, Bay Area Water Users Association, Contra Costa Water District (CCWD), Santa Clara Valley Water District (SCVWD), and San Francisco Public Utilities Commission (SFPUC)) to formulate and support a mutually agreeable set of actions to improve water quality and supply reliability in the Bay Area. Examples of such collaboration include: the ongoing study of the regional desalination project, in cooperation with the SFPUC, CCWD and SCVWD; construction of the SFPUC-Hayward-EBMUD Emergency Intertie Project between SFPUC, City of Hayward, and EBMUD; development of the Freeport Regional Water Project; publication of a brochure demonstrating the region's accomplishments in water conservation (2003); preparation of a draft integrated regional water management plan for water supply and water quality (2004-05); and preparation of regional grant proposals (2005) to implement a broad conservation program, several recycling projects, and additional regional planning work.

#### **MOKELUMNE RIVER BASIN PARTNERSHIPS**

In collaboration with the Upper Mokelumne River Watershed Authority (UMRWA) partners from Alpine, Amador, and Calaveras counties, EBMUD has received approximately \$1 million in grants to complete a watershed assessment and plan for the Upper (above Pardee Reservoir) Mokelumne watershed by 2008. The project will collect and assemble watershed data, conduct additional monitoring, develop a model for assessing changes in the watershed, and involve all stakeholders. Historically, watershed protection has been the most efficient and cost-effective mechanism for protecting drinking-water quality at the tap. By effectively managing its watershed lands, EBMUD can ensure that protection of the water supply is maximized, treatment costs are minimized, and natural resources are protected and sustained.

EBMUD is also participating in forming the Mokelumne River Forum, which is a collaborative partnership among Mokelumne watershed agencies that would bring stakeholders and water users of the Mokelumne River together to pursue water resource opportunities of mutual benefit. The Forum could help address the differing interests within the Mokelumne River basin and provide opportunities to improve water supply, reliability, and quality for all in an environmentally sensitive manner. Co-sponsors of the early effort include the City of Lodi, Stockton East Water District, Woodbridge Irrigation District, Jackson Valley Irrigation District, North San Joaquin Water Conservation District, Amador Water Agency, Calaveras County Water District, and San Joaquin County.

EBMUD entered into a Memorandum of Understanding (MOU) with the California Department of Water Resources (DWR) and with other Mokelumne River Basin stakeholders in June 2005 to facilitate formation of the Mokelumne River Forum. The MOU includes a statement of principles and objectives of the participants and identifies tasks the participants hope to accomplish over the next two years. Under the terms of the MOU, DWR will provide meeting facilitation services and technical assistance to further advance the Mokelumne River Forum process. DWR has agreed to provide partial funding for facilitation services, preparation of technical studies, and other support assistance as may be deemed appropriate.

EBMUD has also agreed to participate as a partner with Amador Water Agency and Calaveras County Public Utilities in their IRWMP preparation effort. EBMUD participates in that region's application for grant funds to prepare the IRWMP, which is anticipated to identify the water resource needs of a significant portion of the watershed of EBMUD's primary water supply reservoirs. Participation provides EBMUD with an opportunity to further solidify the regional relationships as well as contribute to its future water resource development plans. Participation, hopefully, will also provide EBMUD with an opportunity to identify projects and/or activities that would provide mutual benefit to EBMUD and its partners. Project opportunities could include groundwater banking or water transfer options.

#### **AMERICAN RIVER BASIN PARTNERSHIPS**

EBMUD is a participant in the Central and South Sacramento County Regional Water Partnership (CSSCRWP). This partnership, which includes agencies such as the Sacramento County Water Agency (SCWA), the Sacramento Regional County Sanitation District, the Sacramento Area Flood Control Agency, and the Nature Conservancy, is taking part in a joint effort to develop an IRWMP and an associated application for grant funding to finance a portion of select CSSCRWP project implementation efforts. The IRWMP represents another step forward in the relationship between EBMUD and Sacramento interests with the establishment of EBMUD as an equal partner in the region. A primary component of the plan includes the identification and preliminary development of future conjunctive use projects to potentially capitalize on the conveyance capability of the Freeport Regional Water Project and underground storage potential in the region.

Additionally, EBMUD's participation in the CSSCRWP's IRWMP development is consistent with provisions of a February 17, 2005 agreement between SCWA and EBMUD regarding the Eastern Sacramento County Replacement Water Supply Project. That agreement provides that SCWA and EBMUD evaluate the potential to develop additional water supplies for both agencies through conjunctive use of surface and groundwater in the area and to transfer and deliver surface water supplies to supplement EBMUD's existing dry-year supplies.



## CHAPTER 3. WATER SUPPLY SHORTAGE

**E**BMUD evaluates the availability and reliability of its supply each year in accordance with its Water Supply Availability and Deficiency Policy. During times of water shortages, EBMUD's regulations restrict customer water use to maintain system reliability. During non-drought conditions, water use efficiency measures are implemented to eliminate wasteful practices. EBMUD's water use restrictions are based on water supply conditions. During times of extreme conditions, often associated with a catastrophic interruption of water supply, EBMUD implements the Water Shortage Contingency Plan. EBMUD also coordinates with other water suppliers to procure and distribute potable water during an emergency through mutual aid.

### DROUGHT PLANNING SEQUENCE

During some historical dry periods, runoff from the Mokelumne River Basin was insufficient to meet service area demands. EBMUD relies on stored water in its reservoirs to meet most of customer water needs during dry periods. The worst drought event in EBMUD's history was the 1976-77 drought, when runoff was only 25 percent of average and total reservoir storage decreased to 39 percent of normal. In September 1977 at the end of the 1977 "water year", precipitation and runoff forecasts could not provide enough certainty that the following year would not be a dry year. Thus, EBMUD operators could not allow system storage to deplete at the end of 1977 in anticipation of plentiful water in the following year. Fortunately, the critically dry year of 1977 was followed by a very wet year (1978), allowing the system to recover rapidly. If EBMUD had operated differently, and if 1978 had turned out to be a third dry year, EBMUD would not have had sufficient water to meet customer needs or its downstream obligations.

Although 1976-77 was the worst drought on record, a similar or an extremely dry event could occur in the future where a very wet year like 1978 would not immediately follow two very dry years. To plan for the possibility of an event like this in the future, EBMUD uses a three-year "drought planning sequence" to assess adequacy of its water supply. This maximum credible drought event defines EBMUD's need for additional water in its integrated water resources planning, as reflected in the 1993 Updated Water Supply Management Program (WSMP). The first and second years of this drought planning sequence were modeled with the same runoff that had occurred in 1976 and 1977, the driest recorded two-year period. The runoff in the third year was assumed to be 185 TAF, which is an average of the runoff from 1976 and 1977. It was further assumed that such a severe drought would not continue beyond the third year of this sequence and that all accessible storage would be depleted during the third drought year.

Chapter 4 of this Plan provides a discussion of EBMUD's current and projected demand and supply during normal and drought periods.

### WATER SUPPLY AVAILABILITY AND DEFICIENCY POLICY

EBMUD Board of Directors evaluates the adequacy of its water supply each year in accordance with its Water Supply Availability and Deficiency Policy (Policy 9.03 in Appendix

E). As part of its policy, EBMUD limits the frequency and severity of rationing imposed on its customers to 25 percent of total customer demand on an annual basis. Ongoing water conservation and reclamation has reduced the flexibility of District customers to further reduce demand during droughts. EBMUD incorporates its rationing policy into its water supply reliability planning. Based on this criterion, EBMUD assesses the availability of stored water to meet customer water needs.

### WATER SHORTAGE CONTINGENCY PLAN

EBMUD's water shortage contingency planning anticipates for water supply interruptions due to droughts and potentially other catastrophes. The EBMUD water supply system is vulnerable to several potential disasters, including regional power outages, earthquakes, and water contamination. Furthermore, extreme water shortage events that could result from these disasters may compromise availability of water for fire fighting, drinking, and treating wastewater.

EBMUD's *Urban Water Shortage Contingency Plan*, adopted in 1992 by the EBMUD Board, plans for events that could include these specific situations. The resolution is included in Appendix D.

### DROUGHT MANAGEMENT PROGRAM

The storage capacity within the EBMUD system allows for continued though limited service to its customers during dry-year events. EBMUD determines the level of customer rationing based on the projected storage available by the end of September. By imposing moderate rationing in the early years of potentially prolonged drought periods, EBMUD operates its system to minimize the severity of rationing in subsequent years of the drought periods while continuing to meet its current and subsequent-year fishery flow release requirements and obligations to downstream agencies.

#### Stage of Action

EBMUD determines its water supply availability in April of each year (and as necessary during dry year periods) and initiates water reduction programs if the projected water supply is unable to fully meet customer needs. EBMUD's Drought Management Program (DMP) follows guidelines based on the projected storage criteria shown in Table 3-1. The DMP process is as follows:

- Based on water year runoff predicted in April, estimate storage available at end of water year (September 30).

**Table 3-1. Drought Management Program Guidelines**

| <b>Stage</b> | <b>If the Projected Storage<br/>(in Thousand Acre-Feet)<br/>on September 30 Forecasted in April is:</b> | <b>Percent of Maximum<br/>System Storage<sup>(1)</sup></b> | <b>Rationing<br/>Reduction Goal</b> |
|--------------|---|--|-------------------------------------|
|              | 500 TAF or more   | 65% and greater  | None                                |
| Moderate     | 500 - 450 TAF   | 65 to 59%  | 0 to 15%                            |
| Severe       | 450 - 300 TAF   | 59 to 39%  | 15 to 25%                           |
| Critical     | Less than 300 TAF   | 39% and below  | 25%                                 |

<sup>(1)</sup>Maximum system storage represents the maximum reservoir capacity of approximately 767 TAF.

- If storage is less than 500 thousand acre-feet (TAF), prepare a Drought Management Program.
- Adjust the Drought Management Program as conditions change during an extended dry period.

In February 1977, EBMUD responded to a severe drought of 1976-1977 by imposing a rationing program to cut water use by 25 percent of total customer demand, which was later increased to 35 percent as severity of the drought became clearer. EBMUD customers responded by cutting use by 39 percent. Since 1977, EBMUD has adopted Drought Management Programs that establish voluntary and mandatory water conservation goals for customers. Water use reduction measures become mandatory when EBMUD declares a water shortage emergency. These programs have enabled EBMUD to better manage its response to droughts and to limit water rationing to 25 percent or less of total customer demand on an annual basis even when the available supply from the Mokelumne River runoff was reduced by over 50 percent, such as during the 6-year extended drought of 1987-92.

Table 3-2 illustrates typical agency actions at each stage of a drought. EBMUD's response to the Critical Drought Stage is applicable even for system storage at less than 50 percent of maximum.

Required reductions in water use would vary across customer categories if rationing were to achieve a targeted 25 percent of total customer demand on an annual basis. Table 3-3 displays the customer category reductions. The actual savings from each customer category could vary due to several factors including methods of implementation and enforcement. The reduction targets would be set by the Board of Directors after a drought situation is declared.

### **Mandatory Provisions**

EBMUD's regulations and restrictions on water use are included in Appendix E. Section 29 (Prohibiting Wasteful Use of Water) in the Regulations Governing Water Service to Customers of EBMUD describes actions aimed at eliminating wasteful use. These are ongoing provisions and are augmented by actions taken under drought management programs.

Section 28 (Water Use During Water Shortage) in the Regulations Governing Water Service to Customers of EBMUD, provides for special restrictions on water use. These regulations are enforced with warnings, installation of flow restrictors and finally disconnection of service. Section 28 is adopted by the Board only during a water short-

age emergency as part of the implementation of the Drought Management Program. Previous mandatory prohibitions included activities for filling and operating decorative fountains, lakes, and ponds; washing vehicles by hose without a shutoff nozzle; washing hard-surfaced areas not necessarily for public health or safety; excessive wasteful run-off; flushing sewers, hydrants, or washing streets not for emergency or not for essential operations applicable to non-residential customers. Implementation of Section 28 has included a two-step drought rate setting process. The regulation is rescinded after the emergency is over. Currently no emergency situation exists, and Section 28 has been rescinded since April 1, 1993.

### **Consumption Limits**

Consumption is limited under EBMUD mandatory drought management plans by a combination of an inclining block rate structure, allotments and maximum use limitations tied to past use and customer categories, and restrictions on specific uses. Elements for various customer account categories under the plan currently in effect are inclining block rates for residential accounts, penalties and charges for excessive use, financial impact analysis and reduction monitoring.

#### **Single-Family Residential Accounts**

As part of the mandatory drought management program, EBMUD imposes an inclining block rate structure on customer water use above the basic allotment. The basic rate for single-family residential use remains unchanged from non-drought rates for the first block, which has been found to reflect average interior household use. This base allocation is adjusted for households exceeding four members and for medical needs and livestock. The next blocks of the rate structure are related to exterior water uses. Water use above the base allocation is billed at increasing rates by use blocks to encourage conservation. The last block is set at the highest rate to provide a strong incentive for conservation. The largest residential customers, whose water use fall within this last block, are provided an allotment limited to 80 percent of their pre-drought use during an implementation of the mandatory drought management program.

#### **Other Customer Accounts**

Historically, an inclining rate structure was imposed on customers not classified as single-family accounts for using water above a basic allotment based on pre-drought use.

**Table 3-2. Drought Management Program Elements**

| <b>DROUGHT STAGE</b>                    | <b>AGENCY ACTIONS</b>   |
|---|---|
| <b>Moderate</b> 0 to 15% Shortage       | <ul style="list-style-type: none"> <li>● Initiate public information campaign specifically addressing the drought situation. Explain other stages and forecast future actions.</li> <li>● Institute mandatory or voluntary water use goals and use restrictions (depending on available supplies for future years.)</li> <li>● Institute rate changes to elicit conservation, if a mandatory program. Explain new rate schedules to customers. Explain further reductions planned for succeeding rationing stages.</li> <li>● Increase advertising of water-saving devices provided free to customers and other free conservation programs.</li> <li>● Increase efficiency of system water supplies, e.g.:<br/>Intensify enforcement of hydrant-opening regulations;<br/>Increase meter-reading efficiency and meter maintenance;<br/>Intensify leak detection and repair program.</li> <li>● Prepare and disseminate educational brochures, bill inserts, etc., specifically addressing the drought situation and ways in which customers can save water. Disseminate technical information to specific customer types on ways to save water.</li> <li>● Intensify and target media outreach program. Issue news releases to the media. Intensify advertising campaign to remind consumers of the need to save water.</li> </ul> |
| <b>Severe</b> 15 to 25% Shortage        | <ul style="list-style-type: none"> <li>● Intensify actions taken during the moderate stage. Institute mandatory water use reductions.</li> <li>● Declare a water shortage emergency (depending on available supplies for future years).</li> <li>● Seek and procure a supplemental water supply (depending on available supplies for future years).</li> <li>● Implement rate and water use restriction changes appropriate to shortage.</li> </ul>   |
| <b>Critical Shortage</b> of 25% or more | <ul style="list-style-type: none"> <li>● Intensify all of the Severe Stage steps.</li> </ul>  |

#### *Penalties and Charges for Excessive Use*

EBMUD's enforcement options include penalties for excessive or wasteful use and violations of the cap on single family residential use or other restrictions. The enforcement measures range from warnings using flow restrictions to discontinued service. Section 29 of Regulations Governing Water Service to Customers of EBMUD and Section 28 when adopted describe the range of enforcement measures used to control consumption.

#### *Financial Impact*

Water sales typically provide about 75% of EBMUD's operating revenues, the balance of which includes fees and charges, taxes, hydropower sales revenue, and interest. In addition, EBMUD sells bonds and maintains financial reserves. These funding sources affect EBMUD's annual operating budget and corresponding rate analysis for water sales. EBMUD's budget and related rates and charges are affected by two types of project costs that are related to disaster and drought related water shortages: the (1) multi-year large capital projects to mitigate disaster and drought related water shortages, and (2) annual project costs for projects in the drought management programs adopted under water shortage emergencies.

EBMUD prepares for disaster or drought related shortages by investing in major capital improvements that are funded

by a variety of revenue sources in order to minimize impacts on customers, and to distribute the costs equitably to both existing and future customers through water rates, fees and charges. For example, EBMUD's \$202 million Seismic Improvement Program and other major capital projects, such as the seismic strengthening of the Mokelumne Aqueducts, as well as development of EBMUD's supplemental water supply, are discussed in Chapter 2 of this Plan.

EBMUD assesses its water availability or deficiency, which is integrated into its financial planning and annual rate review for budget purposes. In the past, when mandatory water

**Table 3-3. Customer Drought Reduction Goals**

| <b>Customer Category</b>                    | <b>Reduction Goal (%)<sup>(1)</sup></b> |
|---|---|
| Single-Family Residential                   | 32                                      |
| Multi-Family Residential                    | 15                                      |
| Commercial/Institutional                    | 20                                      |
| Industrial                                  | 5                                       |
| Irrigation                                  | 45                                      |
| <b>Total Customer Demand Rationing Goal</b> | <b>25</b>                               |

<sup>(1)</sup>Reduction goals are based on the projected average minimum monthly demand for year 2020.

use reductions were implemented based on this assessment, an inclining block rate structure was adopted as part of the Drought Management Program that has been designed to encourage consumers to conserve water and to fully mitigate the revenue and expenditure impacts. The rates and charges associated with EBMUD's drought management programs are developed to distribute the financial impacts equitably to customer categories and to avoid long-term financial impacts to EBMUD. The reduction goals for customer categories and associated distribution of rate adjustments for revenue recovery are the result of analyzing consumption by customer categories in both normal years and under drought management programs.

In addition to offsetting the decrease in water sales, revenue recovery covers the extraordinary expenses of the Drought Management Program. As an example, budget items, totaling \$1.8 million, for the Program implemented during the drought in 1988 included:

- Additional staff and training to administer water-conserving rate structure .....\$116,000
- Additional field staff to enforce restrictions on water waste .....\$171,000
- Public information program costs, including public relations firm.....\$1,185,500
- Water conservation kits.....\$50,000
- Moisture sensors.....\$125,000
- Additional staff for water audits and irrigation workshops .....\$117,000
- Additional staff for hydrant meter monitoring...\$37,000
- Bay Area public relations campaign .....\$20,000

Although the above costs for program elements were adjusted during the course of the Program and in following drought years, they are illustrative of the nature of these costs.

*Reduction Monitoring*

EBMUD individual accounts are metered, and overall EBMUD water production and supply is continuously monitored. EBMUD sets allocations and monitors individual accounts through the customer account system. Customers track their success in meeting their reduction goals with their bills. With water production facility data, EBMUD evaluates on a daily basis its overall success in meeting reduction goals and assesses the impact on remaining and projected water supply.

EBMUD's base year of 1986 is used to monitor consumption reduction during the programs adopted from 1987 through 1992. EBMUD considers 1986 as the last year when consumption was not significantly influenced by dry weather or a drought management program. This benchmark at that time served as the basis for customer allocations as well as the measure by which achievements of conservation goals are monitored. The 1986 consumption has been adjusted to reflect growth in the number of customer accounts.

The monitoring of customers is reviewed on a continual basis by customer category, monthly use, and relation to water production. Monitoring enables EBMUD to evaluate the success of a current drought management program, and it serves as a foundation for future programs.

**EMERGENCY PREPAREDNESS PROGRAM**

When a disaster strikes, in accordance with Emergency Preparedness (Policy 7.03 in Appendix E), the General Manager in consultation with the Board of Directors can declare a "District Emergency." This proclamation will put into effect EBMUD's Emergency Operations Plan (EOP). EBMUD maintains an active emergency preparedness program and coordinates the emergency responses with other public and private organizations.

During a declared emergency, a team of personnel forms the Emergency Operations Team (EOT) to carry out the five Standardized Emergency Management System (SEMS) functions (Management, Operations, Planning/Intelligence, Logistics, Finance/Administration). Operating under the EOP, the Operations Section Chief of the EOT establishes response priorities based on the nature of the emergency, established EBMUD priorities, and system status information available at the time. Furthermore, the Operations Section of the EOT will determine the need for mutual aid/assistance resources.

EBMUD assigns priorities in restoring water service for the following starting with the most urgent:

- firefighting efforts
- critical facilities, including hospitals
- other utilities, including power, communications, and transportation agencies
- mass care shelters and schools
- residences and businesses

These priorities may shift during response to the emergency depending on the situation.

**EMERGENCY AID PARTNERSHIPS**

Coordination with state and local agencies can be critical in responding to a catastrophic event. EBMUD is one of the eight major water suppliers in the San Francisco Bay Area that has established and maintains the Emergency Response Directory (ERD).

EBMUD is also a member of the Water Agency Response Network (WARN), which is an Omnibus Mutual Aid/Assistance Agreement with water agencies throughout the state. The signatories may be called upon during an emergency to provide resources if they are available.

The State Office of Emergency Services (OES) regulates the SEMS, which was created by Government Code 8607 following the East Bay Hills Firestorm of 1991. To ensure reimbursement for claims filed after a disaster, all EBMUD emergency plans, procedures, and training follow the SEMS regulations, and coordinate with EBMUD's EOP. In 2005, the Department of Homeland Security published the National Response Plan (NRP) and National Incident Management System (NIMS). EBMUD's EOP will comply with the mandates of both NIMS and the NRP.

In 1995, EBMUD partnered with 14 federal, state, and public agencies to develop procedures for obtaining potable water in an emergency. This California Potable Water Task Force published its report, *Multi-Agency Emergency Response Procedures for Potable Water Procurement and Distribution*, in January 1996. These procedures were designed to facilitate acquisition and distribution of alternative potable water to

populations in California during a state or local emergency. The report includes specific activities that each level of an Emergency Operation Center considers when evaluating emergency situations for the procurement and distribution of potable water to critical locations.

The procedures are based on SEMS and are to be used in conjunction with *SEMS Guidelines* and *OES Guidance for*

*California's Mutual Aid System*. EBMUD follows those procedures and implements the organizational structure through its Security and Emergency Preparedness (SEP) Section. The SEP coordinates and publishes EBMUD's EOP, which details the internal organizational structure used in the response to any type of emergency.



## CHAPTER 4. WATER DEMAND

**W**ater consumption within the EBMUD service area has remained relatively level in recent years in spite of continuing account growth. Although adequate in normal years, EBMUD's reliable water supply is currently not sufficient to meet customer demand during multiple-year droughts. Increased requirements for releases from storage for the environment and increasing water demand by other water rights holders will result in a further reduction of the water supply available to EBMUD customers. During droughts, even with the additional dry-year supply of the Freeport Regional Water Project, EBMUD will face water supply shortages. However the additional supplemental supply will reduce the frequency and severity of customer rationing during drought periods.

### PAST AND CURRENT DEMAND

Historical record of water use within the EBMUD service area is illustrated in Figure 4-1. The figure depicts the relative decrease in water consumption compared with the increase in the number of water service accounts (or service connections). The largest reductions in water use occurred in the late 1970s and late 1980s and reflect the impacts of droughts in 1976-77 and 1987-92, respectively.

Since 1970, despite an addition of over 78,000 new water service accounts (a 26% increase) the total customer demand has remained the same. Many factors have contributed to the reduction in water use from the amount of water use that would otherwise be anticipated including: water restrictions imposed during the 1976-77 and the 1987-92 drought periods; EBMUD's aggressive conservation activities; EBMUD customer's efforts; shift in economic emphasis towards lower-water-using service industries; and legislative changes including new plumbing efficiency standards, landscape ordinances and the 1992 Federal Energy Policy Act.

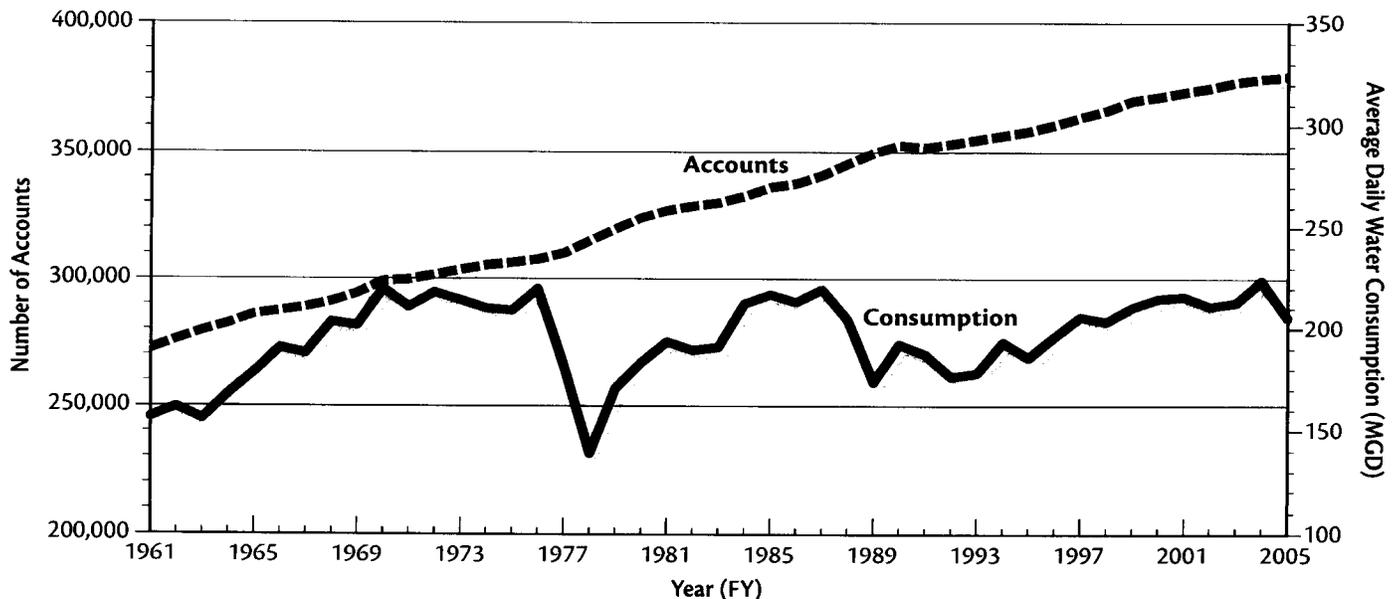
Historical record of water use of each EBMUD customer category is presented in Figure 4-2. The number of accounts and water consumption data are presented for commercial,

industrial, institutional, irrigation, multi-family residential and single-family residential customer categories.

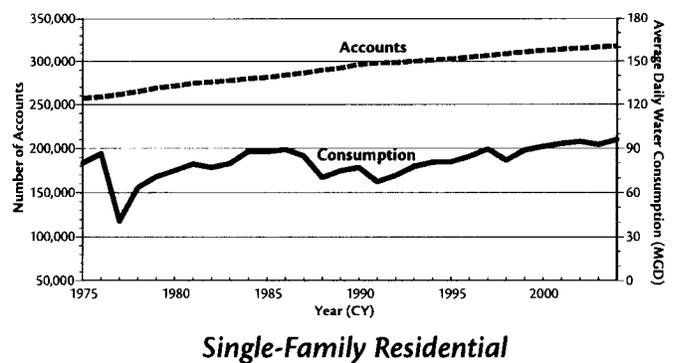
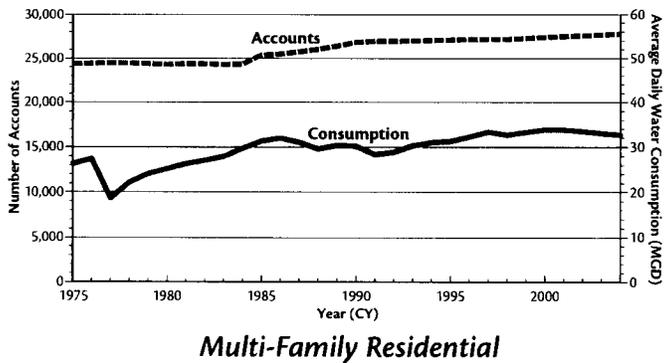
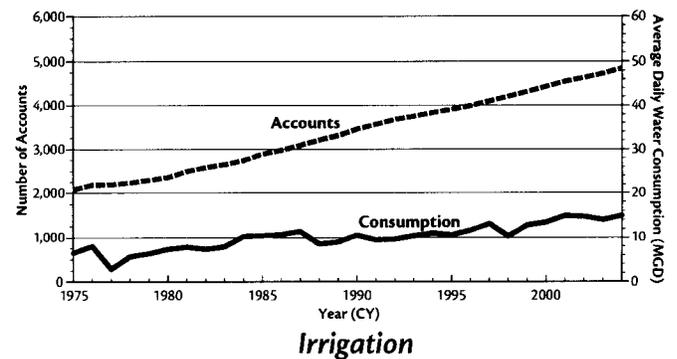
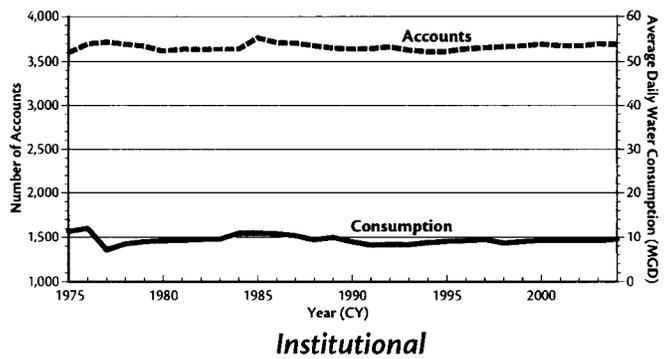
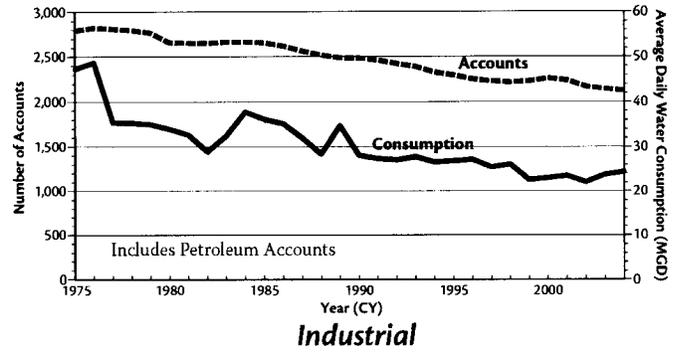
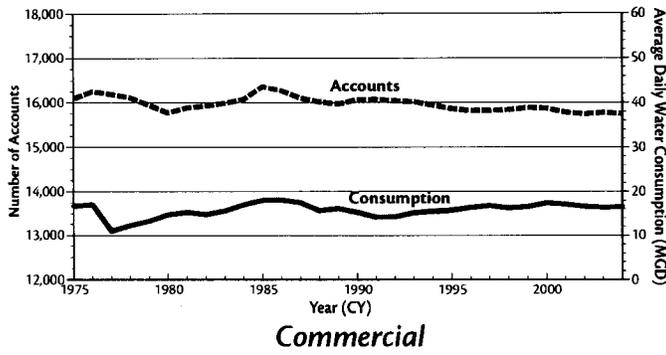
Other characteristics of historical water use are illustrated in Figures 4-3 through 4-5. Water consumption is differentiated between accounts situated east and west of the Oakland-Berkeley Hills for each customer category in Figure 4-3. In Figure 4-4 water use during the winter season is compared to summer water use for each customer category. Figure 4-5 displays the distribution of total metered water consumption by customer category. Single-family residential customer category is the largest water use category followed by multi-family dwelling units, commercial, industrial, institutional and irrigation users. Approximately 63% of total water consumption, based on a historical average, is delivered to EBMUD's residential customers.

Residential water use characteristics are illustrated in Figures 4-6 and 4-7. In 2004, indoor residential water use averaged 68% of the total residential water use, and outdoor residential use averaged 32% as shown in Figure 4-7. Single-family residential indoor water use is broken down by specific use categories in Figure 4-6.

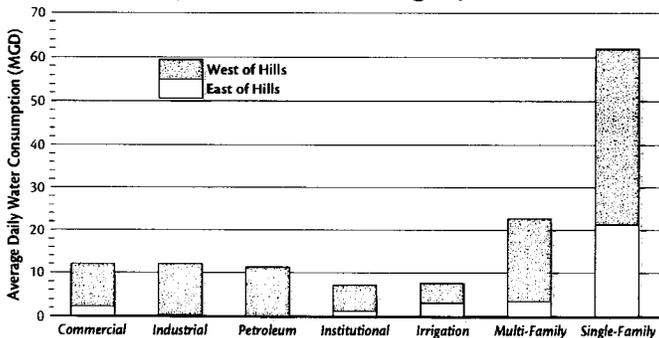
**Figure 4-1. EBMUD Water Accounts and Consumption**



**Figure 4-2. EBMUD Water Accounts and Consumption by Customer Category**

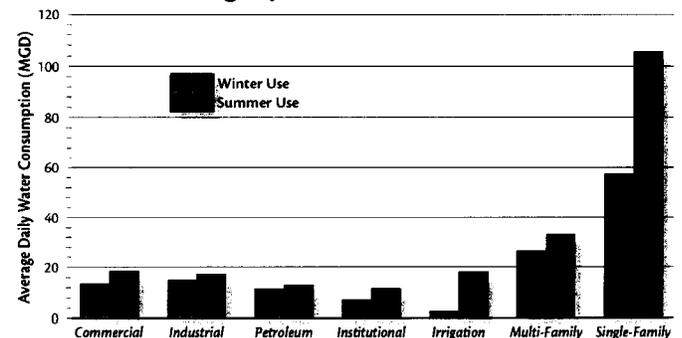


**Figure 4-3. East-of-Hills and West-of-Hills Water Use by Customer Category**



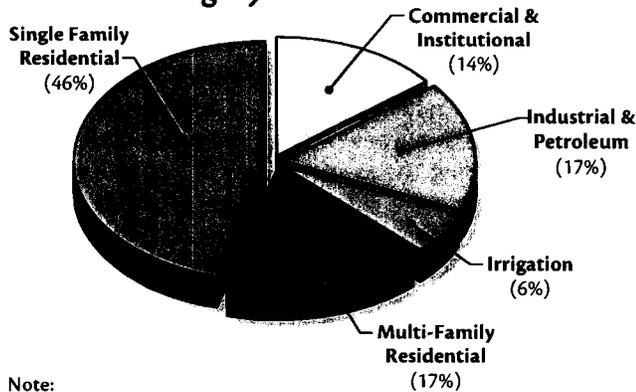
**Note:**  
Based on CY 1975-2004 metered historical consumption data.

**Figure 4-4. Winter and Summer Water Use by Customer Category**



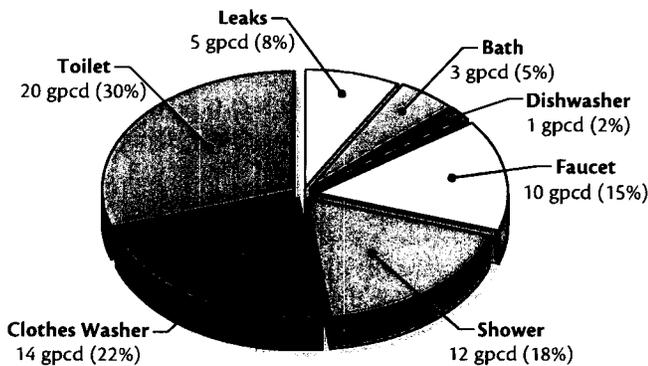
**Notes:**  
Based on CY 1975-2004 metered historical consumption data.  
Summer Use based on July, August and September historical consumption data.  
Winter Use based on January, February and March historical consumption data.

**Figure 4-5. Distribution of Water Use by Customer Category**



**Note:**  
Based on CY 1975-2004 metered historical consumption data.

**Figure 4-6. Single-Family Residential Indoor Per Capita Water Use**



| Inside Use Category | Gallons/Capita/Day | Percent    |
|---------------------|--------------------|------------|
| Leaks               | 5                  | 8          |
| Bath                | 3                  | 5          |
| Dishwasher          | 1                  | 2          |
| Faucet              | 10                 | 15         |
| Shower              | 12                 | 18         |
| Clothes Washer      | 14                 | 22         |
| Toilet              | 20                 | 30         |
| <b>Total</b>        | <b>65</b>          | <b>100</b> |

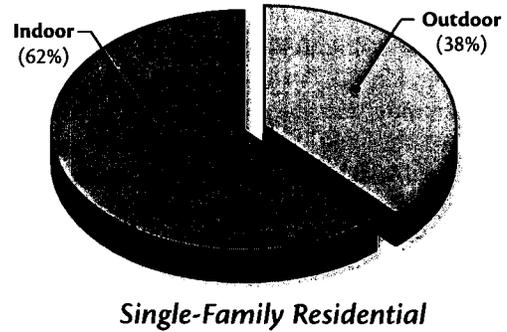
**Note:**  
Based on CY 2004 consumption data.

**PROJECTED WATER DEMAND**

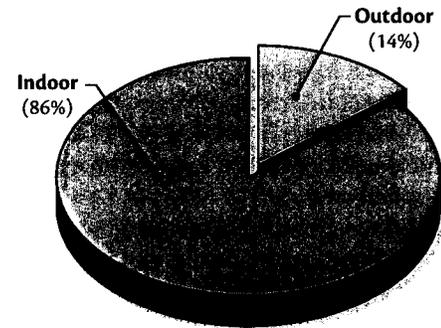
EBMUD's current water demand projections are based on a study conducted in 2000, entitled *Districtwide Update of Water Demand Projections* (2000 Demand Study). The 2000 Demand Study uses a land use-based method to forecast water demands.

The land use-based approach provides a methodology to evaluate water demands by integrating Geographic Information System (GIS) technology with a land use data management system. This application uses historical water consumption data to develop water use factors (Land Use Unit Demands) for each land use category. These Land Use Unit Demands are then applied to various land use categories and future changes in land use categories to develop water demand projections. Demands are projected based on 17 different land use categories - five residential and twelve non-residential.

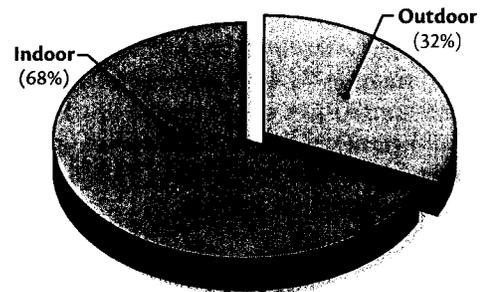
**Figure 4-7. Indoor and Outdoor Residential Water Use**



**Single-Family Residential**



**Multi-Family Residential**



**Total Residential**

**Note:**  
Based on CY 2004 consumption data.

Through the land use-based approach demands are developed at a fine level of detail, down to individual pressure zones, (Pressure zones are typically 200-foot-elevation belts that have been defined in the service area to efficiently manage water service throughout an area of varying topography.) and are then aggregated and used for system-wide projections.

The 2000 Demand Study also reflects future land uses as designated by adopted general and specific plans. Adopted general plans and specific plans of all the cities and counties within EBMUD's service area were compiled in 1998. Meetings were held with the city and county planners to determine the location and type of each land use category for 1996 and future years. EBMUD then developed a land use coverage database for the 1996 development and for future years through 2030. Future updates of the Demand Study will reflect up-

dates of the general and specific plans of the cities and counties within the EBMUD service area.

The 2000 Demand Study forecasts a customer demand of 281 million gallons per day (MGD) for the year 2030, which is then adjusted to take into account projected savings to be achieved through EBMUD’s conservation and recycled water programs. Assuming that the projected savings of 35 MGD can be achieved through conservation efforts and the projected savings of 14 MGD can be achieved through recycled water programs, the 2030 planning level of demand forecast (as adjusted by these factors) is 232 MGD. The ultimate conservation savings of 35 MGD assumes full completion of cost-effective conservation programs, completion of natural replacement of fixtures including non-conserving toilets and landscape equipment, as well as a limitation on the increase of EBMUD service area. The ultimate recycled water program savings of 14 MGD also assumes full completion of cost-effective and publicly acceptable recycled water projects. Please refer to Chapters 5 and 6 of this Plan for further discussion on projected recycled water and conservation savings goals, respectively.

Water demand projections for each customer category (or water use sector) including single- and multi-family, commercial, industrial, institutional and irrigation users are shown in Table 4-1.

**SUPPLY-DEMAND COMPARISONS**

In FY04, EBMUD’s average daily water consumption was about 224 MGD. Based on a historical average, approximately 90% of this supply can be attributed to Mokelumne River watershed runoff, collected in Pardee Reservoir. EBMUD’s ability to utilize its Mokelumne River entitlement of up to 325 MGD is limited by river hydrology, diversions by senior water rights holders, and reservoir releases to the lower Mokelumne River for instream and Bay-Delta resource needs.

In order to meet its customers’ water needs now and in the future, EBMUD has to balance water supply and customer demand. Both supply and demand vary seasonally and become critical during drought periods which can span several years. At present, EBMUD’s current supply is insufficient to meet customer needs during multiple-year droughts despite EBMUD’s aggressive water conservation and recycled water programs. During the most recent 1987-1992 drought, EBMUD customers were subject to water use restrictions each year. Through the Freeport Regional Water Project (FRWP), EBMUD is developing a dry-year water supply on the Sacramento River to improve water supply reliability and to reduce customer rationing during drought periods. The FRWP, developed in partnership with the Sacramento County Water Agency (SCWA), allows EBMUD to make use of its contract with the United States Bureau of Reclamation (USBR) for a supplemental dry-year supply of Central Valley Project (CVP) water. The contract is limited in that it provides EBMUD water only in dry years when there is not sufficient Mokelumne River water under EBMUD’s rights to meet EBMUD’s customers’ needs. Even with the use of supplemental supply of the FRWP water, EBMUD will again face shortages as early as 2010 and will be unable to hold rationing levels to less than 25% of customer demand under critical drought conditions.

**PAST AND CURRENT SUPPLY-DEMAND**

EBMUD experienced a rapid increase in water use through the early 1970s, with water demand ranging from 200-220 MGD in non-drought years after 1970. Sharp reductions in demand occurred as a result of cutbacks during the two most recent droughts in 1976-1977 and 1987-1992. Lower demand levels in wetter years immediately following these droughts reflect changes in customer water use, success in implementing conservation practices and response time for customers to rebound from droughts.

**Table 4-1. Water Demand Projections For Each Water Use Sector**

| YEAR | WATER USE SECTORS | SINGLE-FAMILY | MULTI-FAMILY | COMMERCIAL | INDUSTRIAL | INSTITUTIONAL | IRRIGATION | TOTAL   |
|------|-------------------|---------------|--------------|------------|------------|---------------|------------|---------|
| 2005 | No. of accounts   | 335,330       | 28,650       | 17,231     | 2,578      | 3,892         | 3,535      | 391,216 |
|      | Demand (MGD)      | 116           | 38           | 19         | 26         | 10            | 12         | 222     |
| 2010 | No. of accounts   | 344,361       | 28,577       | 17,804     | 2,606      | 4,055         | 3,580      | 400,983 |
|      | Demand (MGD)      | 122           | 38           | 16         | 25         | 11            | 11         | 224     |
| 2015 | No. of accounts   | 367,058       | 28,850       | 18,146     | 2,641      | 4,139         | 3,687      | 424,521 |
|      | Demand (MGD)      | 124           | 38           | 17         | 26         | 11            | 11         | 226     |
| 2020 | No. of accounts   | 389,755       | 29,123       | 18,487     | 2,676      | 4,224         | 3,794      | 448,059 |
|      | Demand (MGD)      | 126           | 38           | 17         | 26         | 11            | 10         | 228     |
| 2025 | No. of accounts   | 391,075       | 29,203       | 18,767     | 2,713      | 4,286         | 3,830      | 449,874 |
|      | Demand (MGD)      | 126           | 38           | 17         | 26         | 12            | 10         | 230     |
| 2030 | No. of accounts   | 392,396       | 29,283       | 19,047     | 2,749      | 4,348         | 3,866      | 451,689 |
|      | Demand (MGD)      | 127           | 38           | 17         | 27         | 12            | 11         | 232     |

**NOTES:**

Data presented is based on projections. Actual data for 2005 may vary from projected values.

Demand depicted represents the Planning Level of Demand (after conservation and recycled water savings reductions have been applied).

Water Use Sector demands may differ from Total demands due to rounding.

## PROJECTED SUPPLY-DEMAND

The 2000 Demand Study projects higher growth rates in customer demand through 2020, with a gradual increase thereafter, and a 2030 planning level of demand of 232 MGD (after reductions due to conservation and recycled water savings are applied).

A summary of EBMUD's demand and supply projections over the next twenty five years, in five-year increments is provided in Table 4-2. The demand data is based on EBMUD's 2000 Demand Study (refer to Projected Water Demand section of this chapter), and the supply data is derived from EBMUD's water supply system Simulation Model (EBMUDSIM).

The increase in customer demand between 2005 and 2010 reflects a timeframe during which many of the cities in the EBMUD service area anticipate intense development activity. However, implementation of conservation and recycled water programs during this timeframe will decrease the impacts of this development activity on the growth of EBMUD's planning level of demand. The continued but slower increase in customer demand between 2010 and 2020 reflects a more built-out environment with land use changes resulting in higher densities of existing land uses. Beyond 2020 a more gradual increase in customer demand is projected.

EBMUD evaluates and forecasts water supply availability for any calendar year by evaluating the forecast runoff and the existing storage levels in the reservoirs. A "Normal Water Year" is a year that EBMUD does not need to implement a Drought Management Program. In a Normal year, the April projection of the total system storage at the end of September would be 500 TAF (thousand acre feet) or greater (as show in Table 3-1). EBMUD can meet customer demands through the year 2030 during Normal year conditions; therefore the available supply is considered equal to or greater than demand. It is important, however, to note that unless water supply improvements are developed and as EBMUD's Mokelumne River supply continues to decrease (as discussed in Chapter 2), the frequency of Normal years will decrease in the future, and the years where rationing will need to be implemented will increase in frequency.

In its evaluation of water supply availability, EBMUD takes into account the diversions of both upstream and downstream water right holders and fishery releases. The available water supply shown in Table 4-2 in years 1, 2 and 3 of a multiple-year drought is derived from EBMUDSIM analyses with the following assumptions:

- EBMUD's drought planning sequence is used for 1976, 1977, and 1978 (as discussed in Chapter 3);
- Total system storage is depleted by the end of the third year of the drought;
- EBMUD will implement its Drought Management Program when necessary (as described in Chapter 3);
- The diversions by Amador and Calaveras counties upstream of Pardee Reservoir increase over time;
- Releases are made to meet the requirements of senior downstream water right holders and fishery releases are made according to the 1998 Joint Settlement Agreement; and
- Dry-year supply of CVP water, through the FRWP, is available beginning in 2010.

In Table 4-2, "Single Dry Water Year" (or Year 1 of "Multiple Dry Water Years") is determined to be a year that EBMUD would implement Drought Management Program elements at the "moderate" stage with the goal of achieving a reduction between 0 to 15% in customer demand (as shown in Table 3-1). Through the FRWP, the supplemental dry-year supply of CVP water will be used to reduce the rationing goal to 5% during the first year of a drought.

Year 2 of "Multiple Dry Water Years" is determined as a year that EBMUD would implement Drought Management Program elements at the "severe" stage with the goal of achieving between 15 to 25% reduction in customer demand (as shown in Table 3-1). Beginning in 2010, the FRWP water supply, in addition to EBMUD's aggressive conservation and recycling programs, will be used to limit rationing to 25% of the customer demand during Year 2 of a three-year drought.

In Table 4-2, Year 3 of "Multiple Dry Water Years" is determined as a year that EBMUD would implement Drought Management Program elements at the "critical" stage. Under current conditions (2005), prior to the completion of the FRWP, EBMUD customers could experience deficiencies of up to 56% during Year 3 of a three-year drought (without implementation of the FRWP by 2010, rationing during Year 3 of a three-year drought would approach 68% by 2020). After the completion of the FRWP, forecasted potential supply deficiencies range from about 26% increasing to about 37% by 2030 during Year 3 of a three-year drought.

In Table 4-2, supplemental supply needed is the additional amount of water that is necessary to limit customer rationing to 25% in a multiple-year drought while continuing to meet the requirements of senior downstream water right holders and the provisions of the 1998 Joint Settlement Agreement. EBMUD will experience shortages, despite the supplemental dry-year supply of CVP water, provided through the FRWP, as early as 2010.

The supplemental supply, beyond the FRWP, can be met from the projects described in Chapter 2 under Supplemental Water Resources. Additional sources may be explored in the future including additional water recycling programs, and the development of additional desalinated water and groundwater sources. Chapter 3 discusses how EBMUD would manage a water supply shortage.

Figure 4-8 is a graphical representation of the projected water supply that will be available to EBMUD by 2030. In a Normal year, conservation and recycled water programs will play an important role in future reliability of EBMUD's supply. It is expected that in a Normal year, 35 MGD (13%) of the needed supply will be offset by conservation and 14 MGD (5%) will be offset by recycled water programs.

In an average drought year of a three-year drought sequence, by 2030, conservation and recycled water projects will account for 18% of the needed supply. The remaining supply during an average drought year of a three-year drought sequence will be provided by:

- Mokelumne and Local EBMUD Runoff Supply, 131 MGD (47%);
- FRWP Supply, 49 MGD (17%);
- Projected Shortfall, to be met by developing new water supply sources, 9 MGD (3%); and

• Customer Rationing, 43 MGD (15%).

Fifteen percent of total water supply needs will be met by customer rationing in 2030 during an average drought year, as depicted in Figure 4-8. The expected rationing levels are based on an average of 5% rationing during the first year and 25% rationing during the second and third years

of the three-year drought as applied to the planning level of demand.

The shortage of water during droughts will only increase in the future as the number of customers in the EBMUD service area increases, and senior water right holders on the lower Mokelumne River increase their diversions.

**Table 4-2. EBMUD Demand and Supply Projections**

|  | 2005               | 2010           | 2015           | 2020           | 2025           | 2030           |
|--|--------------------|----------------|----------------|----------------|----------------|----------------|
| <b>PROJECTED DEMAND (MGD)</b>  |                    |                |                |                |                |                |
| <b>Customer Demand<sup>(1)</sup></b>   | 241                | 258            | 267            | 277            | 279            | 281            |
| Adjusted for Conservation <sup>(2)</sup>   | (13)               | (21)           | (27)           | (35)           | (35)           | (35)           |
| Adjusted for Recycled Water <sup>(2)</sup>   | (6)                | (12)           | (14)           | (14)           | (14)           | (14)           |
| <b>Planning Level of Demand</b>  | <b>222</b>         | <b>225</b>     | <b>226</b>     | <b>228</b>     | <b>230</b>     | <b>232</b>     |
| <b>PROJECTED AVAILABLE SUPPLY &amp; NEED FOR SUPPLEMENTAL SUPPLY (MGD)<sup>(3)</sup></b> |                    |                |                |                |                |                |
| <b>Normal Water Year</b>   | <b>&gt;222</b>     | <b>&gt;225</b> | <b>&gt;226</b> | <b>&gt;228</b> | <b>&gt;230</b> | <b>&gt;232</b> |
| Supplemental Supply Need   | 0                  | 0              | 0              | 0              | 0              | 0              |
| <b>Single Dry Water Year (Multiple Dry Years – Year 1)</b>                               |                    |                |                |                |                |                |
| Available Supply   | 211                | 213            | 215            | 217            | 219            | 220            |
| Deficiency (Goal is 5% maximum <sup>(4)</sup> )  | 5% <sup>(5)</sup>  | 5%             | 5%             | 5%             | 5%             | 5%             |
| Supplemental Supply Need <sup>(6)</sup>  | 69                 | 0              | 0              | 0              | 0              | 0              |
| <b>Multiple Dry Water Years – Year 2</b>   |                    |                |                |                |                |                |
| Available Supply   | 167                | 168            | 170            | 171            | 173            | 174            |
| Deficiency (Goal is 25% maximum <sup>(7)</sup> )   | 25%                | 25%            | 25%            | 25%            | 25%            | 25%            |
| Supplemental Supply Need <sup>(6)</sup>  | 40                 | 0              | 0              | 0              | 0              | 0              |
| <b>Multiple Dry Water Years – Year 3</b>   |                    |                |                |                |                |                |
| Available Supply   | 43                 | 167            | 166            | 153            | 151            | 147            |
| Deficiency (Goal is 25% maximum <sup>(7)</sup> )   | 56%                | 26%            | 27%            | 33%            | 34%            | 37%            |
| Supplemental Supply Need (To limit deficiency to 25% <sup>(6)</sup> )                    | 15                 | 1              | 4              | 18             | 22             | 27             |
| <b>Three-Year Drought</b>  |                    |                |                |                |                |                |
| Total Supplemental Supply Need (To limit deficiency to 25% <sup>(6)</sup> )              | 124 <sup>(8)</sup> | 1              | 4              | 18             | 22             | 27             |

<sup>(1)</sup>Projected Demand derived from the 2000 Demand Study, which projects water demand based on land use in EBMUD's service area.

<sup>(2)</sup>Conservation and recycled water program savings reported are based on the 1993 Updated Water Supply Management Plan (WSMP). WSMP set a conservation program savings goal of 33 MGD and a recycled water program savings goal of 14 MGD for the year 2020. Since the adoption of the WSMP the conservation savings goal has increased to 35 MGD to offset demand from anticipated annexations to EBMUD's service area. Conservation and recycled water savings goals are to be upheld through 2030. Reference Chapter 5 and Chapter 6 for details.

<sup>(3)</sup>Projected Supply data includes dry-year supply deliveries from the Freeport Regional Water Project (FRWP) beginning in 2010. Without the FRWP supply 2020 deficiencies could be as high as 67%, as discussed in the UWMP 2000.

<sup>(4)</sup>Per 2003 FRWP EIR, rationing goal is set to 5% during the first year of a drought.

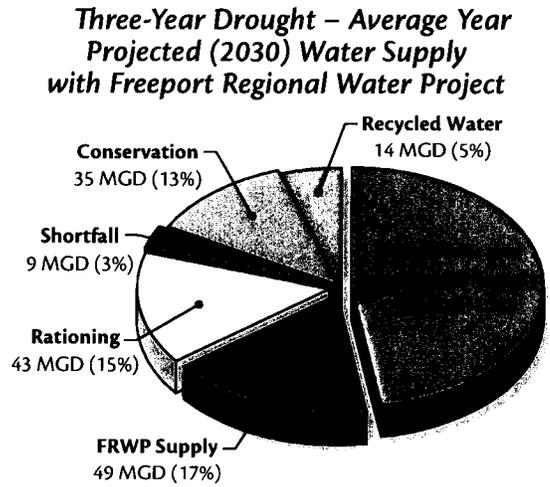
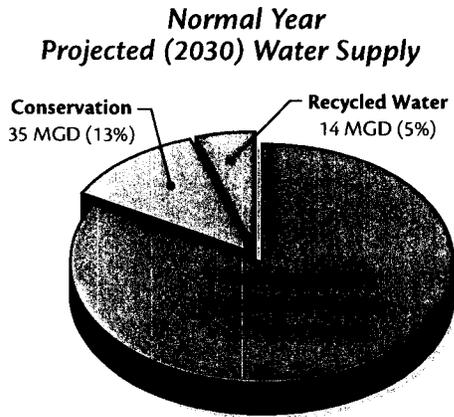
<sup>(5)</sup>In 2005 and prior to the completion of the FRWP, EBMUD's water supply system is inadequate to supply 95% of demand, and may impose customer rationing up to 15% during the first year of a drought, resulting in a need for additional water.

<sup>(6)</sup>The supplemental supply need is based on EBMUDSIM model results. It is the amount of water needed based upon EBMUD's Demand Management Program, the provisions of the 1998 Joint Settlement Agreement and the offsetting of additional water supply system losses created by a supplemental supply. The actual need will be dependent on antecedent conditions and the severity of the actual drought. Supplemental supply stored during the initial years of the drought is later released, diminishing supplemental supply needs.

<sup>(7)</sup>Assumed drought conditions, per Table 3-1 (Chapter 3).

<sup>(8)</sup>An additional 15 MGD is needed in the third year if a supplemental supply is obtained in year 1 and year 2. If a supplemental supply is not available during years 1 and 2 of the drought, total system storage could be drawn down to meet 95% of demand in the first year and 75% in the second year, creating a greater storage deficit and a greater supplemental supply need in the third year.

**Figure 4-8. Projected (2030) Water Supply – 281 MGD**





## CHAPTER 5. WASTEWATER AND RECYCLED WATER

**E**BMUD and several other wastewater utilities collect and treat wastewater in the EBMUD water service area. Currently three wastewater treatment facilities provide recycled water to EBMUD. Recycled water use reduces the demand for EBMUD's potable water supplies. Since the early 1970s, EBMUD has been recycling water for landscape irrigation and for in-plant processes at its main wastewater treatment facility. EBMUD offers a number of incentives to encourage the use of recycled water. Successful partnerships with the public, recycled water users, water and wastewater utilities, and state and federal agencies that provide funds to support resource conservation projects continue to help advance EBMUD's water recycling projects.

### INTRODUCTION

EBMUD recognizes the importance of using recycled water, which is integrated into EBMUD's water supply management policies. Highlights of EBMUD's recycled water program are chronicled in Table 5-1. Recycled water use that meets a portion of water supply demands increases the availability and reliability of the EBMUD potable water supply and lessens the effect of extreme rationing induced by a prolonged, severe drought. This stretches EBMUD's limited, high-quality drinking water supply, especially in years of scarce rain and snowfall, and reduces the demand for additional potable water supplies. Recycled water use delays or eliminates the need for more potable water facilities, sustains the economy with increased water supply reliability, protects San Francisco Bay by reducing treated wastewater discharge, safeguards community and private investments in parks and landscaping with a drought-proof or drought-resistant water supply, and

contributes to a green and healthy environment, which benefits our quality of life. EBMUD's Board of Directors adopted the Non-potable Water Policy No. 8.01 (amended September 28, 2004, see Appendix E). Stressing the importance of recycled water as part of the overall water supply picture, this policy requires that customers of EBMUD use non-potable water (recycled water and other non-potable water sources) for non-domestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health, and not injurious to plant life, fish and wildlife. It is EBMUD's current practice to promote recycled water to its customers for appropriate non-potable uses.

Recycled water, as defined in the California Water Code, is water which, as a result of treatment of wastewater, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource. An end product derived from the wastewater treat-

**Table 5-1. EBMUD's Recycled Water Program Historical Highlights**

#### 1970s

**1971** First use of recycled water at EBMUD'S Main Wastewater Treatment Plant

#### 1980s

**1984** First commercial recycled water customer - the Richmond Country Club

**1987** EBMUD nonpotable water policy mandates the use of nonpotable water

**1988** Office of Water Recycling is formed

#### 1990s

**1993** EBMUD Water Supply Management Program incorporates water recycling goals

**1995** Joint Powers Authority (DERWA) is formed in order to create the San Ramon Valley Recycled Water Program

**1996** North Richmond Water Reclamation Plant provides recycled water to the Chevron Refinery for use in cooling towers

**1999** Federal Water Resource Development Act of 1999 authorizes \$15 million for the San Ramon Valley Recycled Water Program

#### 2000s

**2002** Award winning recycled water customer training videos and manual created  
U.S. Army Corps of Engineers and DERWA partner to design some San Ramon Valley Recycled Water Program facilities

**2003** Pipeline construction begins for the East Bayshore and San Ramon Valley recycled water projects  
Research begins on potential Demonstration Satellite Recycled Water Treatment Facility

**2004** EBMUD Board of Directors improves financial incentives for using recycled water  
California State Water Resources Control Board increases grants and low-interest loan funding for EBMUD recycled water projects to \$44.3 million

**2005** Study begins to investigate feasibility of providing high-purity recycled water for boiler feedwater application at the Chevron Refinery

ment process, recycled water is stringently regulated by Title 22 of the California Code of Regulations that dictates the level of treatment and use of recycled water in California. The intent of using recycled water is to supplement existing water sources in order to assist in meeting the future water demands of California.

A section of the California Water Code known as the Porter-Cologne Water Quality Control Act requires the State Department of Health Services to establish water recycling criteria as specified in the following California Water Code sections:

Section 13520. As used in this article "recycling criteria" are the levels of constituents of recycled water, and means for assurance of reliability under the design concept which will result in recycled water safe from the standpoint of public health, for the uses to be made.

Section 13521. The State Department of Health Services shall establish uniform statewide recycling criteria for each varying type of use of recycled water where the use involves the protection of public health.

The California Department of Health Services (CDHS) has the authority and responsibility under California law to establish health-related standards for water recycling and reuse. The California Water Code provides for the nine California Regional Water Quality Control Boards (RWQCBs) to establish water quality standards, to prescribe and enforce waste discharge requirements, and, in consultation with the CDHS, to prescribe and enforce water recycling requirements. Thus, the regional boards enforce CDHS's water recycling criteria, and each water recycling project must have a permit from the appropriate RWQCB conforming to CDHS criteria. As is the case in many states, local health agencies have independent authority and may, if they deem necessary, impose requirements more stringent than those specified by CDHS or RWQCB. All EBMUD recycled water projects must comply with California's recycled water regulations, which are considered to be some of the strictest in the nation.

EBMUD initiated water recycling programs that reduce demand on drinking water supplies. EBMUD has been recycling water for landscape irrigation and in-plant processes at its main wastewater treatment plant since 1971. EBMUD began its first golf course recycled water irrigation project in 1984.

To centralize and expand water recycling, EBMUD's Board of Directors approved the formation of the Office of Water Recycling (OWR) in 1988 within the Wastewater Department. The initial goal of the OWR was to expedite recycled water projects in response to the second year of an extended drought that lasted from 1987 until 1992. The goal of the OWR continues to be the development and implementation of recycled water projects throughout EBMUD's service area in order to reduce the demand on high-quality drinking water supplies. During calendar year 2004, EBMUD provided more than 8 million gallons a day (MGD) of recycled water for non-residential landscape irrigation and industrial uses including reuse at its main wastewater treatment plant. In the 1993 Updated Water Supply Management Program (WSMP), EBMUD set a goal to recycle 14 MGD (15,680 acre-feet per

year (AFY)) by 2020. EBMUD will continue to uphold this goal through this Plan's planning horizon.

## **WASTEWATER SYSTEM DESCRIPTION**

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### ***EBMUD's WASTEWATER COLLECTION SYSTEM***

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EBMUD's wastewater service district (known as Special District No. 1, or SD-1) was established as a separate wastewater district within EBMUD's water service district. Established in 1944, it is governed by EBMUD's Board of Directors and is administered by EBMUD's Wastewater Department.

SD-1 treats domestic, commercial and industrial wastewater for the cities of Alameda, Albany, Berkeley, Emeryville, Oakland and Piedmont, and for the Stege Sanitary District, which includes El Cerrito, Kensington and parts of Richmond. Each of these communities operates sewer collection systems that discharge into one of five EBMUD sewer interceptors (Adeline, Alameda, North, South, and South Foothill) as illustrated in Figure 5-1.

The District's collection facilities are comprised of the interceptor system and collection system pumping stations. The interceptors consist of 29 miles of reinforced concrete pipes ranging from 12 inches to 9 feet in diameter. They collect wastewater from approximately 1,400 miles of sewers owned and operated by the communities in the SD-1 service area. Fifteen collection system pumping stations, ranging in capacity from 0.5 to 54.7 MGD, lift wastewater throughout the interceptors as it travels to the Wastewater Treatment Plant.

### ***EBMUD's WASTEWATER TREATMENT SYSTEM***

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Wastewater collected by the interceptors flows to EBMUD's Wastewater Treatment Plant, which is located in Oakland near the entrance of the San Francisco-Oakland Bay Bridge. The plant provides secondary treatment for a maximum flow of 168 MGD. Primary treatment can be provided for up to a peak flow of 320 MGD. The average annual daily flow is approximately 80 MGD.

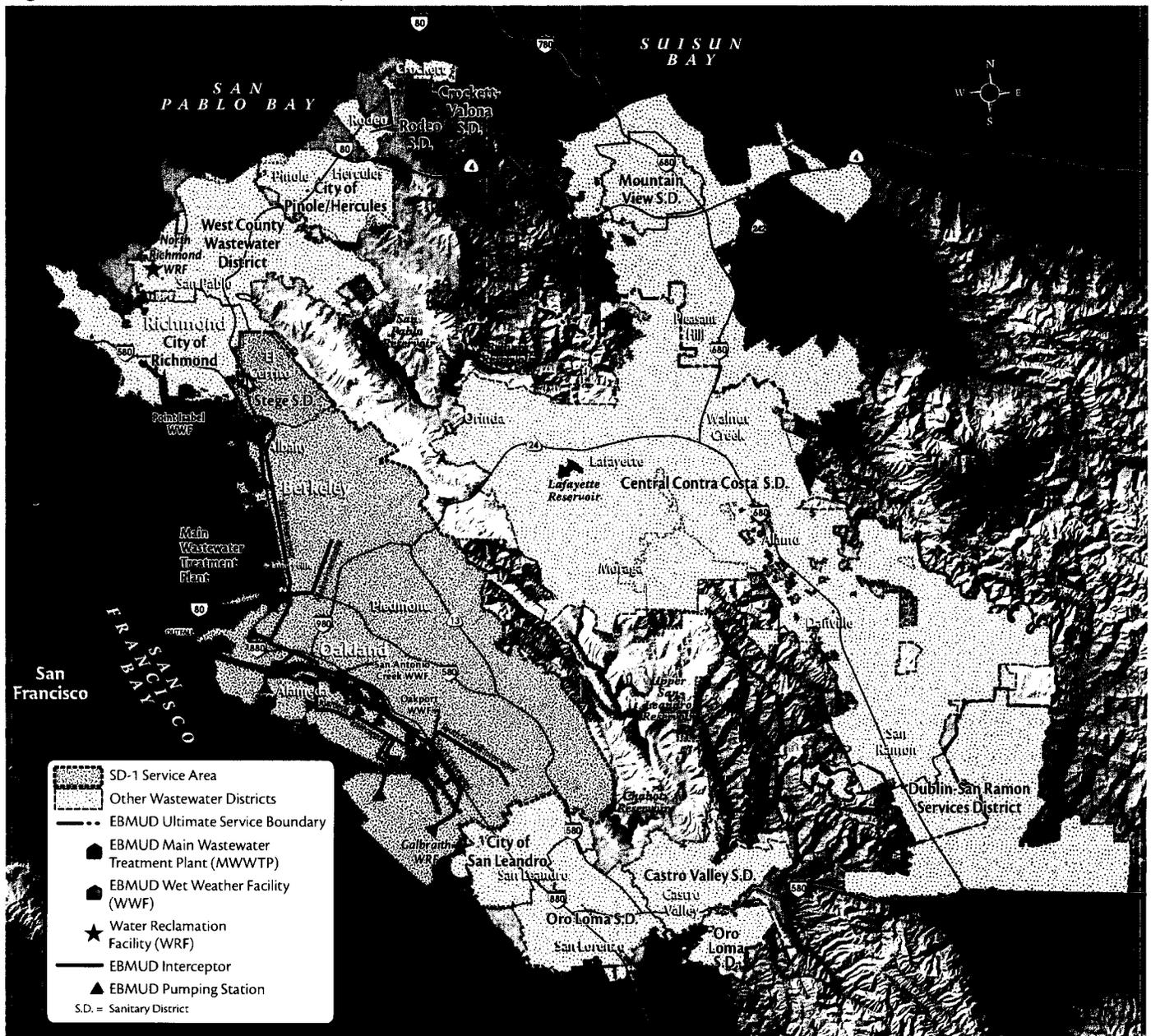
Primary treatment removes floating materials, oils and greases, sand and silt and organic solids heavy enough to settle in water. Secondary treatment biologically removes most of the suspended and dissolved organic and chemical impurities that would rob life-giving oxygen from the waters of the Bay if allowed to decompose naturally. The treatment steps are pre-chlorination (for odor control), screening (to remove large objects), grit removal, primary sedimentation, secondary treatment using high-purity oxygen-activated sludge, final clarification, sludge digestion, and dewatering. The treated effluent is then disinfected, dechlorinated and discharged through a deep-water outfall one mile off the East Bay shore into San Francisco Bay.

## **WASTEWATER GENERATION, COLLECTION AND TREATMENT**

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Approximately 1.3 million people are served by EBMUD's water system in a 331-square-mile area extending from Crockett in the north, southward to San Lorenzo (encompassing the major cities of Oakland and Berkeley), eastward from San

Figure 5-1. Wastewater Utility Districts Within EBMUD's Water Service Area



Francisco Bay to Walnut Creek, and south through the San Ramon Valley. Within this service area as shown in Figure 5-1, there are several wastewater utilities operating in addition to EBMUD's SD-1. SD-1 serves approximately 642,000 people in an 88 square-mile area of Alameda and Contra Costa counties along the east shore of the San Francisco Bay, extending from Richmond in the north to San Leandro in the south. Table 5-2 lists wastewater utilities shown on Figure 5-1 with their capacities and wastewater average dry weather flow projections from 2005-2030. Some of these districts, such as Dublin San Ramon Services District (DSRSD) and Oro Loma Sanitary District, are similar to SD-1 because they operate and maintain intercepting sewers that receive and transport wastewater from collection systems, which are owned and operated by communities within these districts. The cities of San Leandro, Pinole, Richmond, Rodeo and Hercules own

and maintain both the collection systems and the interceptor systems within their respective utility districts.

## WASTEWATER DISPOSAL AND RECYCLED WATER USES

### METHODS OF WASTEWATER DISCHARGE

Treated wastewater produced by the wastewater treatment plants within the EBMUD water service area is discharged through pipelines or outfalls to San Francisco Bay, Suisun Bay, or to San Pablo Bay and also provides a supply for recycled water programs. The utilities with recycled water programs identified in Table 5-2 serve recycled water projects off-site. Table 5-3 illustrates characteristics of treated wastewater and the projected average dry weather flows of the portion of treated wastewater, which is non-recyclable, that are discharged from each wastewater treatment plant within

**Table 5-2. Collected and Treated Wastewater Flows Generated In EBMUD Service Area<sup>(1)</sup>**

| Agency  | Wastewater Treatment Plant Characteristics |                | Current Treated Wastewater Disposal Method | Collected and Treated Wastewater Flows (MGD) <sup>(2)</sup> |              |              |              |              |              |
|---|--|----------------|--|---|--------------|--------------|--------------|--------------|--------------|
|   | Location (City)                            | Capacity (MGD) |  | 2005  | 2010         | 2015         | 2020         | 2025         | 2030         |
| EBMUD Special District No.1                       | Oakland                                    | 168.0          | Discharged and Recycled <sup>(3)</sup>     | 77.0  | 77.0         | 77.0         | 77.0         | 77.0         | 77.0         |
| City of San Leandro                               | San Leandro                                | 9.7            | Discharged and Recycled                    | 6.3   | 7.0          | 7.5          | 8.0          | 8.5          | 9.0          |
| Dublin San Ramon Services District <sup>(4)</sup> | Pleasanton                                 | 11.5           | Discharged and Recycled                    | 1.9   | 2.0          | 2.1          | 2.2          | 2.2          | 2.2          |
| Central Contra Costa Sanitary District            | Martinez                                   | 70.0           | Discharged and Recycled                    | 44.4  | 45.8         | 47.3         | 48.7         | 50.1         | 51.5         |
| City of Pinole/Hercules                           | Pinole                                     | 4.06           | Discharged and Recycled <sup>(5)</sup>     | 3.6   | 3.6          | 4.0          | 4.0          | 4.0          | 4.0          |
| City of Richmond                                  | Richmond                                   | 16.0           | Discharged                                 | 8.5   | 8.5          | 8.5          | 8.5          | 8.5          | 8.5          |
| West County Wastewater District                   | Richmond                                   | 12.5           | Discharged and Recycled                    | 9.5   | 9.5          | 9.5          | 9.5          | 9.5          | 9.5          |
| Rodeo Sanitary District                           | Rodeo                                      | 1.14           | Discharged and Recycled <sup>(5)</sup>     | 0.75  | 0.75         | 0.75         | 0.75         | 0.75         | 0.75         |
| Oro Loma Sanitary District <sup>(6)</sup>         | San Lorenzo                                | 20.0           | Discharged and Recycled                    | 13.0  | 13.5         | 14.0         | 14.5         | 15.0         | 17.0         |
| Crockett-Valona Sanitary District <sup>(7)</sup>  | Crockett                                   | 1.78           | Discharged                                 | 0.8   | 0.8          | 0.8          | 0.8          | 0.8          | 0.8          |
| <b>TOTAL</b>                                      |  |                |  | <b>165.8</b>  | <b>168.5</b> | <b>171.5</b> | <b>174.0</b> | <b>176.4</b> | <b>180.3</b> |

<sup>(1)</sup> Data obtained through personal communication with staff in each of the Districts.

<sup>(2)</sup> Collected and treated wastewater flows represent average dry weather flows.

<sup>(3)</sup> Off-site recycled water is anticipated post-2005.

<sup>(4)</sup> Flows indicated are from EBMUD customers only within DSRSD's wastewater service area.

<sup>(5)</sup> The Rodeo Sanitary District and City of Pinole/Hercules utilize a joint outfall. Recycled water use from this joint outfall is anticipated post-2005.

<sup>(6)</sup> Wastewater flows for Oro Loma Sanitary District includes flows generated in Castro Valley Sanitary District, which operates a sewer collection system and does not operate a wastewater treatment system.

<sup>(7)</sup> Crockett-Valona Sanitary District includes flows from C & H Sugar.

EBMUD's water service area. Many of these treatment plants recycle water for washing down filters and for other in-plant operations.

**POTENTIAL WATER RECYCLING USES**

EBMUD has the goal to recycle a total of 14 MGD (15,680 AFY) by 2020 and will continue to uphold this goal, saving enough of the high-quality water supply to meet the annual potable water needs of approximately 85,000 people. The basis of this effort came from the long-term WSMP adopted in October 1993 to guide the provision of a reliable, high-quality water supply through the year 2020. EBMUD's comprehensive water conservation and water recycling efforts help to ensure that adequate and reliable water supplies will meet East Bay water needs well into the 21st century.

EBMUD provides recycled water for landscape, commercial and industrial purposes. EBMUD also conserves resources in its own operations by using recycled water for landscape irrigation and in-plant processes at its main wastewater treatment plant. Current and potential uses include irrigation for parks, common areas within homeowner asso-

ciations, greenbelts, roadway medians, schools, golf courses, and office parks. Industrial and commercial applications include use in cooling towers, boiler feedwater systems, other industrial processes, and toilet flushing in commercial buildings. Recycled water can also potentially be used for racetrack spray down and wetlands restoration. There is a potential to use disposed treated wastewater generated from within the EBMUD water service area for recycled water applications provided that it receives further treatment to meet recycled water standards.

EBMUD is identifying and implementing a combination of cost-effective recycled water projects throughout the District's service area to achieve the 14 MGD water recycling goal by the year 2020 in order to reduce the potable water demand by 14 MGD in 2020 and beyond. EBMUD currently provides recycled water to five customer sites for non-residential landscape irrigation and industrial uses. Seven water recycling projects, including possible expansions, are planned to year 2020.

Other wastewater agencies that overlap EBMUD's service area recycle water for various uses. However, the application of the recycled water falls outside EBMUD's service area so

recycled water use in these areas does not offset EBMUD's potable demands. The Oro Loma Sanitary District recycles approximately 0.26 MGD for a golf course irrigation project in Hayward. The Central Contra Costa Sanitary District recycles approximately 0.55 MGD. This recycled water is distributed to irrigation and light industrial customers. The Dublin San Ramon Services District (DSRSD) recycles a portion of its flow for landscape irrigation purposes. DSRSD plans to provide up to 3.3 MGD of recycled water to its customers over the next several years.

**AGENCY COORDINATION ON RECYCLED WATER USE**

EBMUD develops regional partnerships with other utilities and resource management agencies. Successful partnerships with the public, recycled water users, water and wastewater utilities, and state and federal agencies (who help fund projects supporting resource conservation) have helped to advance EBMUD's water recycling program. EBMUD continuously conducts outreach programs to educate potential

customers, surrounding communities, construction neighbors and elected officials. EBMUD represents itself and other urban water utilities on the California Water Policy Council and Federal Ecosystem Directorate (CALFED) Water Use Efficiency Subcommittee to advance urban water conservation and recycling initiatives identified in the CALFED Record of Decision.

**EBMUD'S EXISTING RECYCLED WATER PROJECTS**

EBMUD's Water Recycling Program has grown significantly since EBMUD began producing and using recycled water at its Main Wastewater Treatment Plant (MWWTP) in 1971. Table 5-4 lists the characteristics of EBMUD's six existing recycled water projects with their quantity of recycled water use from 2004-2030. In 2004, these recycled water projects used an average of 8.5 MGD of recycled water, of which approximately 2.6 MGD of recycled water was used by all five of EBMUD's recycled water customers. Recycled water for these projects is used for various industrial purposes and

**Table 5-3. Characteristics and Projected Flows Of (Non-Recyclable) Wastewater Treated in EBMUD Service Area and Disposed Of<sup>(1)(2)</sup>**

| Agency  | Current Disposal Method  | Current Level of Treatment for Disposed Wastewater <sup>(3)</sup> | Projected Flows of (Non-Recyclable) Treated Wastewater Disposed of (MGD) <sup>(2)</sup> |              |              |              |              |              |
|---|--|---|---|--------------|--------------|--------------|--------------|--------------|
|   |  |   | 2005  | 2010         | 2015         | 2020         | 2025         | 2030         |
| EBMUD Special District No.1                       | Discharged to San Francisco Bay                                    | Secondary   | 77.0  | 73.0         | 71.1         | 71.1         | 71.1         | 71.1         |
| City of San Leandro                               | Discharged through EBDA pipelines to San Francisco Bay             | Secondary   | 5.92  | 5.39         | 5.89         | 6.39         | 6.89         | 7.39         |
| Dublin San Ramon Services District <sup>(4)</sup> | Discharged through LAVWMA/ EDBA pipelines to San Francisco Bay     | Secondary   | 1.7   | 1.3          | 0.16         | 0.45         | 0.45         | 0.45         |
| Central Contra Costa Sanitary District            | Discharged to Suisun Bay   | Secondary   | 43.85   | 44.97        | 46.19        | 47.39        | 48.79        | 50.19        |
| City of Pinole/ Hercules <sup>(5)</sup>           | Discharged to Pinole/Hercules/ Rodeo Outfall then to San Pablo Bay | Secondary   | 3.6   | 1.6          | 2.0          | 2.0          | 2.0          | 2.0          |
| City of Richmond                                  | Discharged to San Francisco Bay                                    | Secondary   | 8.5   | 8.5          | 8.5          | 8.5          | 8.5          | 8.5          |
| West County Wastewater District                   | Discharged through City of Richmond to San Francisco Bay           | Secondary   | 0.0   | 0.0          | 0.0          | 0.0          | 0.0          | 0.0          |
| Rodeo Sanitary District <sup>(5)</sup>            | Discharged to Pinole/Hercules/ Rodeo Outfall then to San Pablo Bay | Secondary   | 0.75  | 0.75         | 0.75         | 0.75         | 0.75         | 0.75         |
| Oro Loma Sanitary District                        | Discharged through EBDA pipelines to San Francisco Bay             | Secondary   | 12.74   | 13.24        | 13.74        | 14.24        | 14.74        | 16.74        |
| Crockett-Valona Sanitary District                 | Discharged to Carquinez Strait                                     | Secondary   | 0.8   | 0.8          | 0.8          | 0.8          | 0.8          | 0.8          |
| <b>Total</b>                                      |  |   | <b>154.9</b>  | <b>149.6</b> | <b>149.1</b> | <b>151.6</b> | <b>154.0</b> | <b>157.9</b> |

<sup>(1)</sup> Data obtained through personal communication with staff in each of the Districts.

<sup>(2)</sup> Assumes that non-recyclable flow discharged is the difference between the average dry-weather flow of the wastewater and the maximum-day demand for the recycled water.

<sup>(3)</sup> There is a potential to directly use disposed of treated wastewater for recycled water applications provided that it receives further treatment to meet recycled water standards.

<sup>(4)</sup> Flows indicated are from EBMUD customers only within DSRSD's wastewater service area.

<sup>(5)</sup> The Rodeo Sanitary District and City of Pinole/Hercules utilize a joint outfall. Recycled water use from this joint outfall is anticipated post-2005. For this table, the recycled water demand from the outfall is attributed to City of Pinole/Hercules only.

**Table 5-4. Quantities of Recycled Water Served for EBMUD Recycled Water Projects**

| <i>Project and Location</i>  | <i>Type of Use</i>  | <i>Begin Recycled Water Use</i> |
|--|---|---------------------------------|
| <b>EXISTING PROJECTS</b>   |   |                                 |
| Richmond Country Club [Richmond]   | Golf Course Irrigation  | 1984                            |
| Metropolitan Golf Links (formerly Galbraith) [Oakland]   | Golf Course Irrigation  | 1988                            |
| Chuck Corica Golf Complex (formerly Alameda Golf Complex) [Alameda]  | Golf Course Irrigation  | 1991                            |
| Harbor Bay Parkway [Alameda]   | Landscape Irrigation  | 1991                            |
| Chevron Refinery [Richmond]  | Cooling Tower Water (Industrial)  | 1996                            |
| <b>TOTAL EXISTING CUSTOMER USE/REDUCTION OF POTABLE WATER</b>  |   |                                 |
| EBMUD Wastewater Treatment Plant (In-Plant Uses) [Oakland] <sup>(3)</sup>  | Plant Processes (Industrial) and Landscape Irrigation   | 1971                            |
| <b>TOTAL EXISTING RECYCLED WATER USE<sup>(3)</sup></b>   |   |                                 |
| <b>PLANNED UNDER CONSTRUCTION</b>  |   |                                 |
| San Ramon Valley Recycled Water Program [Contra Costa County]  | Landscape Irrigation  | Fall 2005 (Phase 1)             |
| East Bayshore Recycled Water Project [Alameda County]  | Landscape Irrigation, Industrial, Toilet Flushing in Commercial Buildings, Potential Wetlands Restoration | Summer/Fall 2006 (Phase 1A)     |
| <b>TOTAL PLANNED UNDER CONSTRUCTION</b>  |   |                                 |
| <b>ADDITIONAL PLANNED</b>  |   |                                 |
| Richmond Advanced Recycled Expansion (RARE) Water Project [Contra Costa County]  | Industrial  | 2008                            |
| Demonstration Satellite Recycled Water Treatment Plant Project [Berkeley/ Alameda County]  | Landscape Irrigation  | 2007                            |
| San Leandro Water Reclamation Facility Expansion Project [Alameda County] <sup>(4)</sup>   | Landscape Irrigation  | 2010                            |
| Lamorinda/ Satellite Recycled Water Project [Contra Costa County]  | Landscape Irrigation  | 2020                            |
| Rodeo Recycled Water Project [Contra Costa County]   | Industrial  | 2010<br>(To Be Confirmed)       |
| <b>TOTAL ADDITIONAL PLANNED</b>  |   |                                 |
| <b>TOTAL OF ALL PROJECTS (Rounded)</b><br>(Excluding recycled water use at EBMUD Main Wastewater Treatment Plant) <sup>(3)</sup> |   |                                 |

<sup>(1)</sup> The 2005 recycled water use amount shown in this table includes the projected increase in recycled water use by Chevron's cooling towers and the initial phases of the San Ramon Valley and East Bayshore recycled water projects. The projected increase in recycled water use by Chevron's cooling towers is anticipated by 2007. The initial phases of the San Ramon Valley and East Bayshore recycled water projects are anticipated to be online starting in 2005 and 2006, respectively.

<sup>(2)</sup> EBMUD will implement the most cost-effective of these recycled water projects in order to meet the recycled water goal of 14 MGD by 2020 and beyond.

<sup>(3)</sup> Recycled water use at the EBMUD Main WWTP is not factored into the EBMUD recycled water goal of 14 MGD. Historically, in-plant uses at the EBMUD Main WWTP had not used potable water for processes and irrigation. Consequently, current recycled water use does not displace potable water demand at the EBMUD Main WWTP.

<sup>(4)</sup> Capital cost amount only includes the cost of EBMUD's project. Recycled water use amounts include both EBMUD and the City of San Leandro's project.

**Table 5-4. Quantities of Recycled Water Served for EBMUD Recycled Water Projects (continued)**

| Wastewater Supply Source                            | EBMUD's<br>Capital Cost<br>in FY 2005<br>(\$ millions) | Average Daily Recycled Water Use (MGD) |                     |             |             |                     |             |             |
|---|--|--|---------------------|-------------|-------------|---------------------|-------------|-------------|
|   |  | 2004                                   | 2005 <sup>(1)</sup> | 2010        | 2015        | 2020 <sup>(2)</sup> | 2025        | 2030        |
| West County Wastewater District WWTP                | –  | 0.18                                   | 0.18                | 0.18        | 0.18        | 0.18                | 0.18        | 0.18        |
| City of San Leandro WPCP                            | –  | 0.01                                   | 0.01                | 0.01        | 0.01        | 0.01                | 0.01        | 0.01        |
| City of San Leandro WPCP                            | –  | 0.37                                   | 0.37                | 0.37        | 0.37        | 0.37                | 0.37        | 0.37        |
| City of San Leandro WPCP                            | –  | 0.02                                   | 0.02                | 0.02        | 0.02        | 0.02                | 0.02        | 0.02        |
| West County Wastewater District WWTP                | –  | 2.0                                    | 4.0                 | 4.0         | 4.0         | 4.0                 | 4.0         | 4.0         |
|   |  | <b>2.6</b>                             | <b>4.6</b>          | <b>4.6</b>  | <b>4.6</b>  | <b>4.6</b>          | <b>4.6</b>  | <b>4.6</b>  |
| EBMUD Main WWTP                                     | –  | 5.9                                    | 5.9                 | 5.9         | 5.9         | 5.9                 | 5.9         | 5.9         |
|   |  | <b>8.5</b>                             | <b>10.5</b>         | <b>10.5</b> | <b>10.5</b> | <b>10.5</b>         | <b>10.5</b> | <b>10.5</b> |
| DSRSD WWTP  | \$80   | –                                      | 0.7                 | 1.5         | 2.4         | 2.4                 | 2.4         | 2.4         |
| EBMUD Main WWTP                                     | \$68   | –                                      | 0.7                 | 0.7         | 2.2         | 2.2                 | 2.2         | 2.2         |
|   |  |  | <b>1.4</b>          | <b>2.2</b>  | <b>4.6</b>  | <b>4.6</b>          | <b>4.6</b>  | <b>4.6</b>  |
| West County Wastewater District WWTP                | Not Yet Determined                                     | –                                      | 0.0                 | 3.0         | 3.0         | 3.0                 | 3.0         | 3.0         |
| Satellite Facility                                  | \$2.0  | –                                      | 0.0                 | 0.01        | 0.0         | 0.0                 | 0.0         | 0.0         |
| City of San Leandro WPCP                            | \$0.7  | –                                      | 0.00                | 0.13        | 0.13        | 0.13                | 0.13        | 0.13        |
| Satellite Facility                                  | \$8  | –                                      | 0.0                 | 0.0         | 0.0         | 0.2                 | 0.2         | 0.2         |
| Pinole/Hercules/Rodeo WWTPs<br>(combined discharge) | Not Yet Determined                                     | –                                      | 0.0                 | 2.0         | 2.0         | 2.0                 | 2.0         | 2.0         |
|   |  |  | <b>0.00</b>         | <b>5.14</b> | <b>5.13</b> | <b>5.33</b>         | <b>5.33</b> | <b>5.33</b> |
|   |  | <b>2.6</b>                             | <b>6.0</b>          | <b>11.9</b> | <b>14.3</b> | <b>14.5</b>         | <b>14.5</b> | <b>14.5</b> |

for irrigating landscape. Wastewater supplies for these projects come from three wastewater treatment facilities owned and operated by three different agencies. The majority of the wastewater for EBMUD's existing recycling projects is supplied through external partnerships with the West County Wastewater District (WCWD) and City of San Leandro. Figure 5-2 depicts water recycling sites within the EBMUD service area and their types of uses.

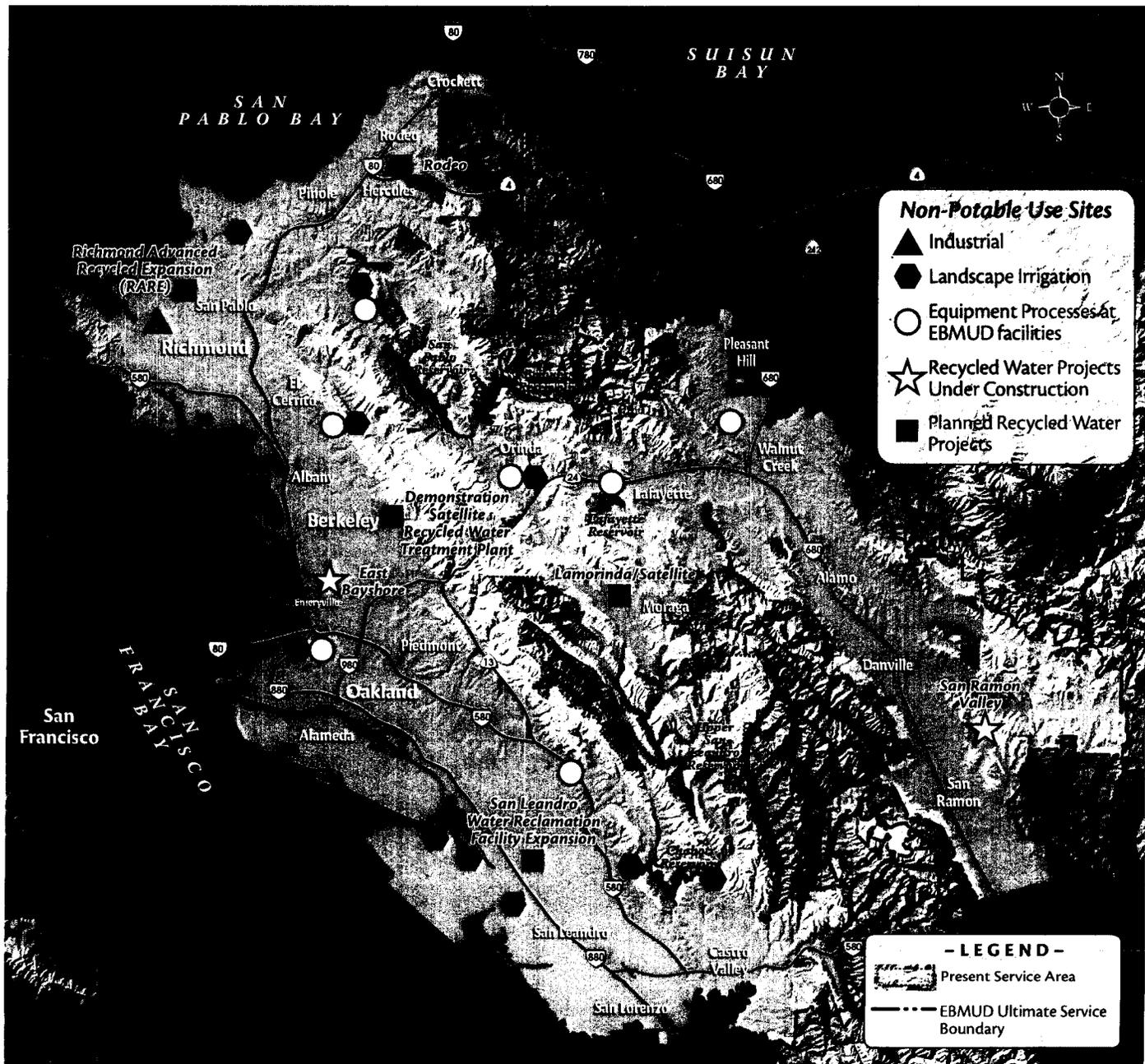
EBMUD's existing recycled water projects were selected based on economic benefits. EBMUD priced recycled water for its existing customers so that project capital, operation and maintenance costs are repaid over an extended period of time. Prices were established separately for each project, and were set as a percentage of the potable water rate. In the

end, the lower cost of recycled water provided the user with an economic incentive to convert from potable to recycled water. A backup potable water supply is available for emergencies when recycled water may be temporarily interrupted. The remaining sections of this Plan further discuss details of each project.

**RICHMOND COUNTRY CLUB**

In 1984, EBMUD began operating its first golf course irrigation project at the Richmond Country Club using recycled water supplied from the WCWD's wastewater treatment plant. One hundred fifty acres is irrigated. The WCWD treatment plant provides pretreatment, primary clarification, activated sludge secondary treatment, and chlorination. It

**Figure 5-2. EBMUD Recycled and Non-Potable Water Projects**



produces a secondary effluent which meets Title 22 standards for restricted golf course irrigation. In 2004, Richmond Country Club used an average of 0.18 MGD of recycled water. EBMUD contracts out the maintenance and operation of the pump station to WCWD. The Richmond Country Club owns the pump station, transmission pipeline, and a 3-acre storage pond on the site.

### **SAN LEANDRO RECLAMATION FACILITY**

In 1988, EBMUD constructed the San Leandro Reclamation Facility (SLRF) to serve EBMUD's recycled water customers with treated wastewater produced by the City of San Leandro's Water Pollution Control Plant (WPCP). Dual media filtration followed by disinfection with sodium hypochlorite is used to meet Title 22 standards for restricted irrigation applications. The water recycling treatment facilities include a high head pumping station, chlorination and dechlorination facilities, and surge control systems. Customers currently served by the SLRF include:

#### **Metropolitan Golf Links**

In 1988, EBMUD began serving the Metropolitan Golf Links (formerly Galbraith Golf Course). The SLRF delivered an average of 0.01 MGD of disinfected secondary effluent to the golf course in 2004. It should be noted that this customer blends its recycled water supply with groundwater for irrigation purposes.

#### **Chuck Corica Golf Complex**

In 1991, EBMUD extended the SLRF to include the Chuck Corica Golf Complex (formerly Alameda Golf Complex). Expansion of the facilities included minor control modifications to the City of San Leandro's WPCP and installation of more than three miles of pipeline. The project delivered an average of 0.37 MGD to the Golf Complex in 2004.

#### **Harbor Bay Parkway**

As part of the SLRF expansion, EBMUD added piping in 1991 to serve the nearby Harbor Bay Parkway. The average delivery was 0.02 MGD for roadway greenbelt irrigation in 2004.

### **CHEVRON REFINERY**

In 1996, EBMUD began supplying recycled water from WCWD's wastewater treatment plant to Chevron Refinery for the operation of recirculating water cooling towers. The Chevron Refinery is the largest single user of recycled water in EBMUD's service area. Facilities include a tertiary treatment plant (the North Richmond Water Reclamation Plant) and approximately 5 miles of supply pipeline. Nitrified secondary effluent from WCWD is clarified in reactor clarifiers to remove calcium, phosphorus and magnesium using caustic soda softening technology. The water is then neutralized with sulfuric acid and passed through a sand filter to remove any remaining particles. The recycled water is disinfected with sodium hypochlorite to meet tertiary treatment levels for use in Chevron's cooling towers. The average recycled water use was 2 MGD in 2004. Historical recycled water use has averaged approximately 3 MGD. EBMUD and Chevron have been

working together to implement improvements to recycled water service to Chevron. It is expected that Chevron will increase its average recycled water use to 4 MGD by 2007.

### **EBMUD'S MAIN WASTEWATER TREATMENT PLANT WATER RECYCLING**

In 1971, EBMUD constructed treatment facilities (Process Water Plant) to maximize water recycling for wastewater plant processes and landscape irrigation uses at EBMUD's MWWTP. In addition, recycled water used for equipment wash down and for construction projects was made available at the plant in the 1970s and during the drought of 1987-92. EBMUD continues to use recycled water for in-plant processes and landscape irrigation. In 2004, the average in-plant recycled water use was 5.9 MGD. Recycled water use at the EBMUD MWWTP is not factored into the EBMUD recycled water goal of 14 MGD. Historically, in-plant uses at the EBMUD Main WWTP had not used potable water for processes and irrigation. Consequently, current recycled water use does not displace potable water demand at the EBMUD Main WWTP.

### **EBMUD'S FUTURE RECYCLED WATER PROJECTS**

As part of the 1993 Updated Water Supply Management Program (WSMP), seven geographical areas called Water Reuse Zones were established within EBMUD's ultimate water service boundary. Water Reuse Zones were established based on proximity of recycled water supply sources to distribution facilities (i.e., wastewater treatment and conveyance facilities) and concentration of demand. These zones are depicted in Figure 5-3. The wastewater treatment plants identified as feasible sources of supply for each Water Reuse Zone are listed in Table 5-5.

Seven major EBMUD water recycling projects are currently planned to help EBMUD ultimately meet its goal of recycling 14 MGD (15,680 AFY). All projects will produce recycled water treated to the highest level (tertiary), which allows for unrestricted reuse. The project objectives include maximizing delivered volumes of recycled water to meet customer demands for non-residential irrigation, commercial, and industrial uses, thereby reducing potable demand while maintaining economic feasibility. Two of the seven planned recycled water projects currently under construction are:

- San Ramon Valley Recycled Water Program (SRVRWP), and
- East Bayshore Recycled Water Project (EBRWP).

The five remaining planned projects are:

- Richmond Advanced Recycled Expansion (RARE) Water Project,
- Demonstration Satellite Recycled Water Treatment Plant Project,
- San Leandro Reclamation Facility Expansion Project,
- Lamorinda/Satellite Recycled Water Project, and
- Rodeo Recycled Water Project.

The initial phases of the SRVRWP and EBRWP are anticipated to be implemented by 2006. The remaining projects are anticipated to be implemented by 2020. The seven planned projects are illustrated in Figure 5-2.

Figure 5-3. EBMUD Water Reuse Zones

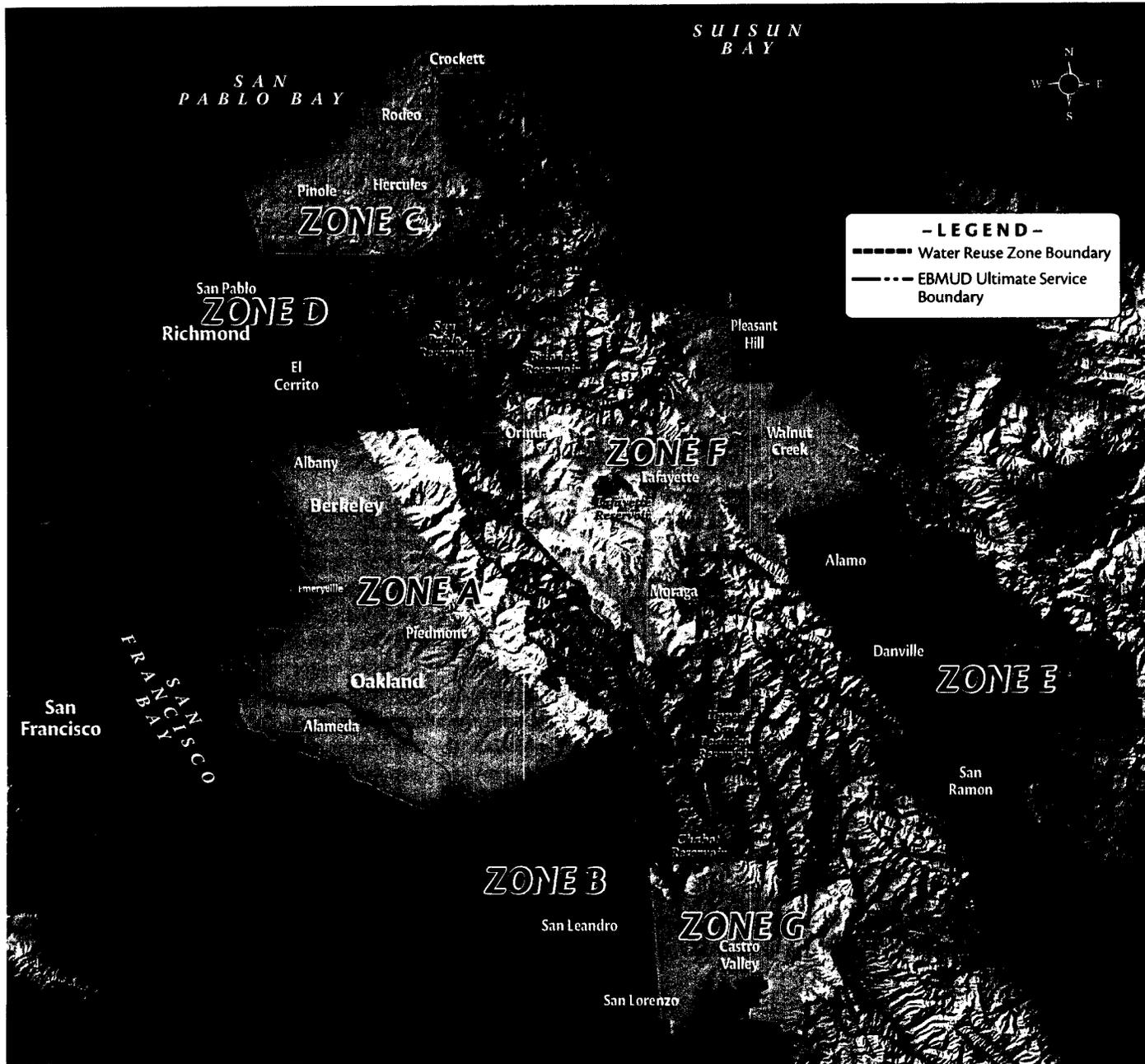


Table 5-5. Supply Source For Each Water Reuse Zone

| Water Reuse Zone Designation | Water Reuse Zone      | Recycled Water Supply Source   |
|------------------------------|-----------------------|--|
| A                            | Oakland/Berkeley      | District's Main Wastewater Treatment Plant   |
| B                            | San Leandro/Alameda   | San Leandro Water Pollution Control Plant  |
| C                            | Hercules/Pinole/Rodeo | Rodeo/Hercules/Pinole Joint Outfall (combined discharge)   |
| D                            | Richmond              | Richmond Wastewater Treatment Plant and West County Wastewater District Wastewater Treatment Plant |
| E                            | San Ramon Valley      | Dublin San Ramon Services District Wastewater Treatment Plant                                      |
| F                            | Central Contra Costa  | Central Contra Costa Sanitary District Wastewater Treatment Plant                                  |
| G                            | Castro Valley         | LAVWMA Export Facilities   |

The Water Recycling Program identifies, funds, and implements projects in the most cost-effective manner. The scope and implementation schedules of the project elements are subject to ongoing modification and prioritization in order to provide the most cost-effective recycled water supply needed to meet the 14 MGD (15,680 AFY) goal. The FY06-07 Capital Improvement Program (CIP) that projects appropriations for FY06-FY10 includes new capital appropriations of \$83 million to support new recycled water projects.

### **PLANNED PROJECTS UNDER CONSTRUCTION**

EBMUD recently completed construction of the initial phase of the SRVRWP, which is anticipated to begin deliveries in Fall 2005. EBMUD is currently constructing treatment facilities and distribution systems for the EBRWP, which is anticipated to begin deliveries in Summer/Fall 2006. The projected water savings for these two projects for EBMUD is 4.6 MGD (5,153 AFY) by 2020. Due to these projects, District recycled water customers are expected to increase from an existing five to more than one hundred over the next few years. Table 5-4 summarizes these projects' features and the quantity of recycled water use for each identified recycled water project from 2005-2030. The remaining sections of this Plan provide a brief summary of each of these projects.

#### **San Ramon Valley Recycled Water Program**

The SRVRWP is a multi-phase, joint regional project between EBMUD and the Dublin San Ramon Services District (DSRSD) to serve recycled water to their customers within portions of the Blackhawk, Danville, Dublin, and San Ramon areas. The two agencies formed a Joint Powers Authority in 1995 called the DSRSD-EBMUD Recycled Water Authority (DERWA) to implement the program. DERWA's mission is to provide a safe, reliable, and consistent supply of recycled water, and to maximize the amount of recycled water delivered.

The project will provide 5.7 MGD of recycled water from a tertiary-treatment facility constructed at the DSRSD Wastewater Treatment Plant. DSRSD customers will receive up to 3.3 MGD (3,696 acre-feet per year), and EBMUD customers will receive up to 2.4 MGD (2,688 acre-feet per year). EBMUD's initial Phase 1 delivery of approximately 0.7 MGD is anticipated for existing landscape irrigation customers located in San Ramon. Large users in parts of Blackhawk, Danville, Dublin, and San Ramon include golf courses, parks, common planted areas within homeowner associations, roadway medians and greenbelts, schools, and office complexes.

Treated wastewater from the DSRSD WWTP is processed at the new DERWA recycled water facilities, which delivers the "disinfected tertiary recycled water" as defined in Title 22. Tertiary treatment includes filtration and additional disinfection, which uses intense ultraviolet light disinfection in addition to chemical disinfection.

DERWA and its member agencies developed policies regarding specific responsibilities for and identification of facilities and recycled water ownership. Since the project is located in both EBMUD's and DSRSD's water service areas, each of DERWA's member agencies is responsible for designing and constructing the recycled water infrastructure within each respective service area and marketing recycled water to

its respective customers. DERWA's role is to design, build, and operate the recycled water treatment facilities, as well as the main backbone transmission system. DERWA partnered with the U.S. Army Corps of Engineers in 2002 to design some backbone facilities for the second phase of the SRVRWP.

SRVRWP has received state and federal funding. The federal Water Resource Development Act of 1999 authorized \$15 million for the SRVRWP. To date, Congress has appropriated start-up funds totaling \$1,925,000 in order to provide design assistance through the U.S. Army Corps of Engineers. The State Water Resources Control Board (SWRCB) approved a \$5 million grant and a \$24.8 million low-interest loan for the first phase of the SRVRWP.

Pre-design for the joint DERWA facilities began in June 2000. Phase 1 design was completed in 2003, and Phase 1 construction is scheduled for completion with first deliveries of recycled water to EBMUD customers projected for Fall 2005. DERWA's Phase 2 design is anticipated for completion in FY06, and EBMUD's Phase 2 design for the SRVRWP is anticipated to begin in FY06-FY07, pending outside funding assistance.

#### **East Bayshore Recycled Water Project**

The EBRWP is a multi-phased project that will provide up to 2.2 MGD (2,464 AFY) of recycled water from EBMUD's MWWTP to customers in parts of Alameda, Albany, Berkeley, Emeryville, and Oakland. A new 4.4-mile long recycled water transmission pipeline along the Eastshore Freeway and up to 24 miles of distribution pipelines, separate from the drinking water system, will distribute the recycled water to customers. Two new pump stations will transmit water through pipes, and seven million gallons of recycled water storage will be constructed at the MWWTP.

The recycled water will be used for landscape irrigation of parks, common planted areas within homeowner associations, greenbelts, roadway medians, schools, a race track, and a golf course. Several industrial and commercial users will be served with recycled water for cooling towers and toilet flushing in office buildings. Wetlands restoration is another potential use of recycled water from this project. The initial Phase 1A is anticipated to provide approximately 0.7 MGD of recycled water to customers in portions of Albany, Berkeley, Emeryville, and Oakland.

New recycled water tertiary treatment facilities, when completed in summer 2006, at the MWWTP in Oakland will filter and disinfect the treated wastewater before it is used as recycled water. Tertiary treatment of secondary effluent includes microfiltration followed by disinfection with sodium hypochlorite to produce recycled water that meets California Department of Health Services standards for "disinfected tertiary recycled water" as defined in Title 22.

EBRWP has received state funding from the SWRCB, which approved a \$5 million grant for the first phase. In addition, EBMUD has received approval for a \$13.4 million in low interest loans from the SWRCB to help fund design and construction costs of the first phase of the project.

EBMUD began and completed construction of Phase 1A distribution pipeline in the West Oakland area in 2003. Transmission pipeline construction was completed in 2005.

Additional distribution pipeline installation commenced in Oakland in 2005 and is expected to be completed by Fall 2006. After construction is completed for Phase 1A distribution systems, treatment plant, and customer retrofits, the first delivery of recycled water is projected for Summer/Fall 2006. Design of Phase 1B is anticipated to begin in FY07, pending outside funding assistance.

#### **ADDITIONAL PLANNED PROJECTS**

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EBMUD has five additional planned recycled water projects that increase the potential for more recycled water deliveries. The projects include the following:

- Richmond Advanced Recycled Expansion Water Project,
- Demonstration Satellite Recycled Water Treatment Plant Project,
- San Leandro Water Reclamation Facility Expansion Project,
- Lamorinda/Satellite Recycled Water Project, and
- Rodeo Recycled Water Project.

The projects are scheduled for implementation by 2020 to meet EBMUD's water recycling goal. The projected water savings of these planned projects, excluding the Demonstration Satellite Recycled Water Treatment Plant Project, is 5.2 MGD (5,825 AFY) by 2020. Most projects will provide recycled water use for landscape irrigation and industrial purposes. Table 5-4 summarizes these projects' features and the quantity of recycled water use for each identified recycled water project from 2005-2030. The remaining sections of this Plan provide a brief summary of each of these projects.

##### **Richmond Advanced Recycled Expansion (RARE) Water Project**

EBMUD is conducting a study with Chevron to evaluate the feasibility of providing high-purity recycled water for Chevron's boiler feedwater system at Chevron's Richmond Refinery through the RARE Water Project. New advanced water recycling facilities would produce the high-purity recycled water using microfiltration and reverse osmosis that remove minerals and other constituents to prevent scaling and foaming problems in boilers. Nearby West County Wastewater District's treatment plant would provide secondary effluent that would be purified by the RARE Water project facilities. The proposed project also would include new pipes and pumps to convey the recycled water to Chevron. The RARE Water project proposes to deliver 3 to 4 MGD of high-purity recycled water to the refinery's boiler feedwater system to substitute for its potable water use. If this opportunity proves to be feasible, the project would be implemented by mid-2008 to serve the Chevron Richmond Refinery.

##### **Demonstration Satellite Recycled Water Treatment Plant Project**

EBMUD is working with University of California at Berkeley (UC Berkeley) to explore the possibility of constructing a small-scale demonstration satellite recycled water treatment plant on the university campus. A small scale skid-mounted membrane bioreactor demonstration facility (or package plant) is currently considered. UC Berkeley is one potential

customer among several identified that could benefit from a satellite plant. Successful demonstration may lead to larger scale satellite plants developed as appropriate throughout EBMUD's service area to increase recycling.

Satellite recycled water treatment plants, which take raw sewage from a sewer pipeline and treat it to meet the Title 22 tertiary recycled water quality requirements at the location of use, can cost-effectively serve large water users that are located a remote distance from a centralized treatment facility. Satellite treatment plants avoid the need for costly infrastructure required to move recycled water from a centralized treatment facility to distant customers.

After the project-level environmental documentation process is completed, design and construction of the facility is anticipated to be completed by the end of FY07.

##### **San Leandro Water Reclamation Facility Expansion Project**

This EBMUD project proposes to potentially expand recycled water delivery by 0.03 MGD from the San Leandro Reclamation Facility to roadway medians near the Oakland Airport. The current San Leandro Reclamation Facility provides approximately 0.4 MGD of secondary-treated and disinfected recycled water produced by the City of San Leandro's WPCP for irrigation at the Metropolitan Golf Links in Oakland, the Chuck Corica Golf Complex and Harbor Bay Parkway in Alameda. When expansion of the San Leandro Reclamation Facility is complete, the expanded delivery of recycled water is anticipated to begin by 2010.

In addition to EBMUD's project, the City of San Leandro may also potentially expand recycled water delivery to irrigate its public areas within EBMUD's water service area. If successfully implemented, the City's expansion project will offset approximately 0.1 MGD of EBMUD's potable water, which will help EBMUD reach its goal of recycling 14 MGD by 2020.

##### **Lamorinda/Satellite Recycled Water Project**

The Lamorinda/Satellite Recycled Water Project could potentially be a joint effort between EBMUD and the Central Contra Costa Sanitary District (CCCSD) to provide recycled water through a satellite facility to a potential new development in Moraga if the new development is approved. This project is currently in the conceptual stage and could potentially provide 0.2 MGD of recycled water for irrigation of a proposed golf course.

##### **Rodeo Recycled Water Project**

The Rodeo Recycled Water Project could potentially supply up to an average of about 2.0 MGD of recycled water to the ConocoPhillips Refinery in Rodeo. The recycled water for this project would come from the combined wastewater discharge of Pinole-Hercules and Rodeo wastewater treatment plants. This project is currently in the conceptual stage and new advanced tertiary treatment facilities are proposed. If determined to be cost-effective, this project could supply approximately 2.0 MGD of high-purity recycled water to the ConocoPhillips Refinery's boiler feedwater system.

**SUMMARY OF EXISTING AND FUTURE RECYCLED WATER PROJECTS**

Water recycling is a key element of EBMUD’s 1993 Updated Water Supply Management Program (WSMP). The WSMP established the goal of delivering an additional 8 MGD by 2020 over the then 1993 anticipated level of recycling. Since that time, EBMUD has defined a goal to recycle a total of at least 14 MGD by 2020 and beyond. Table 5-6 summarizes the quantity of recycled water use by specific type of use for 2005-2030. Projected quantities are based on average usage by existing projects and potential average delivery of planned recycled water projects. EBMUD’s goal is to identify and implement the most cost-effective recycled water projects in order to meet its recycled water goal.

Although the majority of the wastewater generated within EBMUD’s water service area is not recycled, it is anticipated that over the next twenty-five years there will be a steady increase in the use of recycled water. Industrial and landscape

irrigation applications will be the primary uses for the recycled water, as shown in Table 5-6, and it is anticipated that there will be some use of the recycled water for commercial applications. EBMUD continues to seek opportunities to use recycled water for wetlands and wildlife enhancement. At this time EBMUD does not anticipate recharging the existing groundwater supply with recycled water.

EBMUD’s goal is to identify and implement the most cost-effective recycled water projects as required to meet the recycled water goal of the WSMP. Table 5-7 compares recycled water use by type of use as projected in the 2000 Urban Water Management Plan with the best estimate of actual use for 2005 for projects operated by EBMUD. As EBMUD continues to explore opportunities for implementing recycled water projects, it is faced with a number of technical challenges which could impact the economic feasibility of the projects.

These technical challenges include the need for recycled water distribution systems that are separate from EBMUD’s

**Table 5-6. Recycled Water Use By Specific Type Of Use**

| Type of Use                          | Treatment Level        | Recycled Water Use (MGD) |             |             |             |             |             |
|--------------------------------------|------------------------|--------------------------|-------------|-------------|-------------|-------------|-------------|
|                                      |                        | 2005 <sup>(1)</sup>      | 2010        | 2015        | 2020        | 2025        | 2030        |
| Agriculture                          | –                      | –                        | –           | –           | –           | –           | –           |
| Landscape Irrigation                 | Secondary and Tertiary | 1.8                      | 2.7         | 5.1         | 5.3         | 5.3         | 5.3         |
| Wildlife Habitat                     | –                      | –                        | –           | –           | –           | –           | –           |
| Wetlands                             | –                      | –                        | –           | –           | –           | –           | –           |
| Industrial                           | Tertiary               | 4.2                      | 9.2         | 9.2         | 9.2         | 9.2         | 9.2         |
| Groundwater Recharge                 | –                      | –                        | –           | –           | –           | –           | –           |
| Commercial                           | Tertiary               | 0.01                     | 0.01        | 0.01        | 0.01        | 0.01        | 0.01        |
| <b>Total<sup>(2)</sup> (Rounded)</b> | –                      | <b>6.0</b>               | <b>11.9</b> | <b>14.3</b> | <b>14.5</b> | <b>14.5</b> | <b>14.5</b> |

<sup>(1)</sup> The 2005 recycled water use amount shown in this table includes the projected increase in recycled water use by Chevron’s cooling towers and the initial phases of the San Ramon Valley and East Bayshore recycled water projects. The projected increase in recycled water use by Chevron’s cooling towers is anticipated by 2007. The initial phases of the San Ramon Valley and East Bayshore recycled water projects are anticipated to be online starting in 2005 and 2006, respectively.

<sup>(2)</sup> Recycled water use at the EBMUD Main WWTP is not factored into the EBMUD recycled water goal of 14 MGD. Historically, in-plant uses at the EBMUD Main WWTP had not used potable water for processes and irrigation. Consequently, current recycled water use does not displace potable water demand at the EBMUD Main WWTP.

**Table 5-7. Comparison Of Recycled Water Uses: 2000 Projection vs. 2005 Actual<sup>(1)</sup>**

| Type of Use            | 2000 Projection for 2005 (MGD) | 2005 Actual Use (MGD) <sup>(1)(2)</sup> |
|------------------------|--------------------------------|---|
| Agriculture            | –                              | –                                       |
| Landscape Irrigation   | 3.48                           | 0.6                                     |
| Wildlife Habitat       | –                              | –                                       |
| Wetlands               | –                              | –                                       |
| Industrial             | 5.2                            | 7.9                                     |
| Groundwater Recharge   | –                              | –                                       |
| Commercial             | 0.05                           | 0.0                                     |
| <b>Total (Rounded)</b> | <b>8.7</b>                     | <b>8.5</b>                              |

<sup>(1)</sup> Recycled water use for 2005 is a best estimate of actual use as of the publication of this Plan.

<sup>(2)</sup> For the purpose of comparison between recycled water uses from 2000 projection for 2005 versus 2005 actual use, recycled water use at the EBMUD Main WWTP is included. However, recycled water use at the EBMUD Main WWTP is not factored into the EBMUD recycled water goal of 14 MGD. Historically, in-plant uses at the EBMUD Main WWTP had not used potable water for processes and irrigation. Consequently, current recycled water use does not displace potable water demand at the EBMUD Main WWTP. Future UWMP Plans will exclude recycled water use at EBMUD Main WWTP for comparisons between actual recycled water use and projected use as related to the 14 MGD goal by 2020.

potable water distribution systems. In order to help improve the economics of recycled water projects, EBMUD seeks opportunities to coordinate construction of distribution pipelines with other construction projects, such as street maintenance projects. EBMUD also considers re-use of pipelines, reservoirs and other facilities which are no longer needed by other utilities for distributing recycled water to customers. The need for separate plumbing at each customer location is another technical and economic challenge that is part of recycled water projects. It is more economical to install a separate plumbing system for a new project during the initial construction of the facility than it is to return at a later date to retrofit the project. In order to help minimize the costs of retrofits associated with separate plumbing systems, EBMUD reviews applications for new potable water service to assess the suitability of the projects to use recycled water.

Another technical challenge for recycled water projects is determining the level of treatment needed for the recycled water. California Department of Health Services (CDHS) standards require certain levels of treatment for protection of public health based on the application of the recycled water. In addition, specific customer needs may dictate a higher level of treatment than prescribed by CDHS. When a distribution system serves a number of customers with varying uses, a level of treatment must be selected that is appropriate for use by all customers within the system. In order to help reduce the cost of building new treatment facilities and the annual increased chemical costs attributed to a higher level treatment, EBMUD does consider the implementation of satellite treatment plants at specific customer locations. EBMUD constantly strives to find creative solutions to the technical challenges inherent in recycled water projects in order to improve the economic viability of its projects.

**EXISTING NON-POTABLE/RAW WATER PROJECTS**

EBMUD has a number of existing projects that utilize raw or non-potable water. Customer projects are illustrated in Figure 5-2. These projects do not use treated wastewater (i.e. recycled water). Instead, they use raw, untreated water for irrigation and other purposes that result in reduced demands on EBMUD’s potable water supply by almost 2 MGD. Table 5-8 lists the existing EBMUD non-potable/ raw water projects.

**WATER FILTER PLANT WASHWATER RECLAMATION**

Facilities for recycling filter backwash water from most of EBMUD’s water filter plants were constructed in the late 1970s in order to comply with federal discharge requirements. The National Pollutant Discharge Elimination System (NPDES) permit required the majority of suspended solids to be removed from the washwater prior to discharge into a receiving stream. Rather than discharge this wastewater, EBMUD treatment plants instead recycle it, resulting in a net gain in potable water supply. The treatment plants operate sedimentation facilities to collect solids from the washwater and recover the clarified overflow which is then recycled through the potable water treatment process. The operation of filter plant recycled water facilities saves EBMUD approximately 1.7 MGD.

The ability to treat and recycle about 5 MGD of washwater at the Orinda Filter Plant became available in 1988; however, because direct discharge of washwater to the San Pablo Creek replenishes the San Pablo Reservoir and becomes available for use at the Sobrante and San Pablo Filter Plants, no additional water savings would be realized. Facilities at Orinda allow recycled water to be used at the filter plant, although normal discharge will be to the creek.

**LAKE CHABOT GOLF COURSE**

This project, completed in 1991, provided an average of 0.13 MGD of water in 2004 to irrigate the City of Oakland’s Lake Chabot Golf Course. Facilities include a pump station, 9,500 feet of supply pipeline and a surge tank/storage reservoir. Since the water is drawn directly from Chabot Reservoir, which is a standby terminal reservoir of EBMUD not connected to the distribution system, demand is reduced from the potable water supply. In addition, by reducing the demand for potable water, this project eliminates the need to construct the proposed Peralta No. 2 potable water reservoir.

**WILLOW PARK GOLF COURSE**

This project, completed in 1991, withdrew an average of 0.08 MGD of water from Lake Chabot in 2004 to irrigate the Willow Park Golf Course in Castro Valley. Facilities include a submersible pump station and 8,500 feet of distribution pipeline. Like the Lake Chabot Golf Course project, raw water is

**Table 5-8. Existing EBMUD Non-Potable/Raw Water Projects**

| <i>User</i>                      | <i>Water Supply Source</i>                            | <i>Non-Potable/Raw Water Use</i> | <i>Average Daily 2004 Demand (MGD)</i> | <i>Total 2004 Demand (AFY)</i> | <i>Year Initiated</i> |
|----------------------------------|---|----------------------------------|--|--------------------------------|-----------------------|
| Water Treatment Plants           | Washwater Reclamation in EBMUD Water Treatment Plants | Recycle filter backwash          | 1.7                                    | 1,904                          | 1970s                 |
| Lake Chabot Golf Course          | Chabot Reservoir                                      | Golf Course Irrigation           | 0.13                                   | 146                            | 1991                  |
| Willow Park Golf Course          | Chabot Reservoir                                      | Golf Course Irrigation           | 0.08                                   | 90                             | 1991                  |
| Sunset View Landscape Irrigation | San Pablo Filter Plant                                | Cemetery Irrigation              | 0.07                                   | 78                             | 1998                  |

also taken from the Chabot Reservoir, reducing the demand from the potable water supply.

### **SUNSET VIEW CEMETERY LANDSCAPE IRRIGATION**

This project, completed in 1998, uses raw water from EBMUD's San Pablo Reservoir to irrigate the Sunset View Cemetery, which is adjacent to the EBMUD San Pablo Filter Plant, in Kensington. In 2004, the project used an average of 0.07 MGD of non-potable water.

## **ENCOURAGING RECYCLED WATER USE**

### **INCENTIVE PROGRAM**

A major incentive for customers to use recycled water is the reliability of the supply during a drought. During a drought, the recycled water supply should not be significantly impacted.

In addition, EBMUD provides a number of incentives to encourage the use of recycled water by customers within EBMUD's service area. These are primarily in the form of subsidized costs and reduced rates for recycled water. Often these incentives, either all or a combination of several, are needed to achieve the projected quantity of recycled water use as illustrated in Table 5-4.

### **SUBSIDIZED COSTS**

To help promote the use of recycled water, it is EBMUD's policy to fund cost-effective site retrofits required to accommodate the use of recycled water for existing customers. EBMUD also funds the training of customers' staff in the proper use of recycled water, and provides technical support for customers who receive recycled water.

### **RATE DISCOUNTS**

The connection fees charged to new customers for recycled water are lower than those charged to new customers who receive potable water. This is reflective of the fact that, unlike EBMUD's existing potable water distribution systems, the new recycled water distribution systems do not require upgrades and seismic retrofits. Current policy is to offer new recycled water customers a 20% volumetric rate discount for the recycled water as compared to the adopted potable water rate. For existing customers who have funded retrofits in the past and have individual contracts with EBMUD, EBMUD provides recycled water at a rate lower than the potable water rate. This lower rate is established through the individual contracts with these customers.

### **GRANTS AND LOW INTEREST LOANS**

In the past, EBMUD has provided low interest loans to customers who funded facility retrofits required to accommodate the use of recycled water. Current policy, however, dictates that EBMUD fund these retrofit costs if determined to be cost-effective. To help reduce the overall cost of recycled water projects, EBMUD actively pursues grant funding and low interest loans that are available for these types of projects. The grants are typically applied toward the planning, design and construction phases of the projects, whereas the low interest loans are typically used to help reduce the

overall cost of constructing the projects. Some of the sources of these monies include the State Water Bond Bill (Proposition 13 passed in March 2000), the Federal Water Resources Development Act (WRDA), the State Water Resources Control Board (SWRCB) Revolving Fund program, and the Water Reuse Financing Authority for low interest loans. In 1999, WRDA authorized up to \$15 million in grant funds for the San Ramon Valley Recycled Water Project. Grant funds from the SWRCB have been used in the planning, design, and construction phases of the EBRWP and the SRVRWP. The construction of EBMUD's North Richmond Recycled Water Plant was made possible through a low interest loan provided through the SWRCB's low interest loan program. EBMUD will continue to seek outside funding sources for recycled water projects in order to help reduce the overall cost of recycled water to District customers.

### **LONG-TERM CONTRACTS**

The majority of the recycled water distributed by EBMUD is recycled water from treatment plants which are owned and operated by other utilities. It is therefore very important for EBMUD to enter into long-term agreements with the utility districts that provide the treated effluent for use by EBMUD in order to ensure both the stability of the price of the recycled water and the reliability of the source of the recycled water. The District's Policy 8.01 requires, wherever possible, that agreements with other agencies have a term of 20 years or more. Policy 8.01 also states that the agreements should include provisions governing facilities operation and maintenance responsibilities. EBMUD has entered into long-term agreements for those existing projects that are dependent upon another agency as a source of the recycled water, and intends to maintain this policy for all future projects.

### **REGIONAL PLANNING**

As a member of the San Francisco Bay Region and of the Bay Area Water Agencies Coalition (BAWAC), EBMUD is currently participating in a regional effort to develop a Bay Area Integrated Regional Water Management Plan (IRWMP). This IRWMP will include EBMUD's water recycling program and provide a venue for maximizing water recycling in the Bay Area using a regional planning perspective. EBMUD has also been a partner and active participant in the San Francisco Bay Area Regional Water Recycling Program (BARWRP). BARWRP is a cooperative effort involving numerous Bay Area water and wastewater agencies and state and federal organizations. Its efforts have been directed at developing a long-range Regional Water Recycling Master Plan for five Bay Area counties, namely Alameda, Contra Costa, San Francisco, San Mateo and Santa Clara. A number of the near-term recycled water projects identified in the Master Plan are in EBMUD's service area. These projects involve EBMUD joining in partnership with other agencies, as well as one project where EBMUD will utilize its own recycled water supplies. Through its involvement with BARWRP, EBMUD is able to promote the use of recycled water to a broader constituent base.

In addition to participating in long-range planning efforts through BAWAC and BARWRP, EBMUD works with plan-

ning groups within other local planning agencies and utilities that are located in EBMUD's water service area in order to identify opportunities to implement recycled water projects.

#### **PUBLIC EDUCATION/INFORMATION**

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In order to encourage the use of recycled water, EBMUD is committed to educating and informing the public that recycled water is safe for the public and for the environment. Through presentations to community groups, coordinating workshops, holding meetings with potential customers, local planning agencies, and distributing educational materials, EBMUD is increasing public awareness of the benefits of using recycled water. EBMUD also provides information on recycled water and on EBMUD's recycled water program through its web site ([http://www.EBMUD.com/conserving\\_&\\_recycling/default.htm](http://www.EBMUD.com/conserving_&_recycling/default.htm)).

EBMUD developed an award-winning Recycled Water Irrigation Customer Training Program in order to provide training to irrigation customers on using recycled water. This program consists of a guidelines manual and two videos covering health and safety and best management practices in using recycled water. EBMUD intends to continue providing appropriate training and support to its recycled water customers.

#### **PROHIBIT SPECIFIC FRESH WATER USES**

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Consistent with the California Water Code, Section 13550, EBMUD's policy is to discourage "a waste or unreasonable use of (potable) water if recycled water is available which meets specific conditions."

#### **REQUIRE RECYCLED WATER USE**

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EBMUD's Policy 8.01 (consistent with California Water Code, Section 13550) allows EBMUD to require the use of recycled water for non-domestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant life, fish and wildlife. To date, however, EBMUD has been effective in providing incentives to use recycled water, rather

than mandating its use. Through creative partnering with its customers, and using all of the incentives identified above, EBMUD has been successful in encouraging customers to use recycled water.

EBMUD proactively utilized the Water Recycling in Landscaping Act to promote the use of recycled water by new development or redevelopment approved by local cities or counties. EBMUD was able to encourage a number of cities to adopt dual-plumbing ordinances that would require new development or redevelopment to separately plumb for appropriate recycled water uses if it is determined that EBMUD would be able to provide recycled water for these uses.

#### **RECYCLED WATER OPTIMIZATION PLAN**

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The District's goal is to maximize the cost-effectiveness of recycled water projects while maximizing the volume of water delivered. This requires detailed assessments of future recycled water customer needs. It also requires careful planning in order to develop cost-effective distribution systems that will maximize the quantity of recycled water delivered to customers. By encouraging local planning agencies to require separate recycled water plumbing during the permitting process, a customer base will be generated that will be ready to use recycled water as soon as the water is available in the area. By ensuring the installation of separate plumbing while the project is initially being designed and constructed, the cost and disruption associated with facility retrofitting can be minimized. Long-term contracts with other agencies will also be an important component of future recycled water projects. Additionally, continued public education and outreach programs will be essential to the success of EBMUD's recycled water program.

Over 170 MGD of wastewater is currently generated within EBMUD's service area, and that quantity is expected to increase to nearly 200 MGD by the year 2030. By tapping into this resource and working jointly with other agencies to make recycled water available to customers in EBMUD's water service area, EBMUD has the ability to greatly increase its water supply resources.

## CHAPTER 6. WATER CONSERVATION

*For more than 30 years, EBMUD has taken a leadership role in promoting dynamic water conservation efforts. To ensure that vital water conservation objectives are met, EBMUD continually monitors water demand, new technology, and changing consumer preferences; and works closely with other local, regional, state and national water utilities, organizations and researchers, to enhance the water conservation services offered to EBMUD customers. Conservation has become a major part of EBMUD's current and future programs to reduce demand and increase water supply reliability. EBMUD promotes demand-side conservation by working with the water customers and supply-side conservation by detecting and repairing leaks and improving efficiency of the distribution system.*

### INTRODUCTION

Since the 1970s demand management has been an important part of EBMUD's water practices and policies, designed to promote reasonable and efficient use of supplies. EBMUD's water conservation efforts and water conservation actions are chronicled in Table 6-1. Prior to adoption of the 1993 Updated Water Supply Management Program (WSMP), substantial reductions in per capita water use occurred as a result of these conservation activities and drought response. EBMUD has conserved a significant amount of its water supply due to these efforts. This chapter specifically discusses EBMUD's conservation efforts after the implementation of the Water Conservation Master Plan (WCMP) in 1994, designed to meet the long-range water conservation goals of EBMUD's WSMP and achieve cost-effective and sustained water savings, while maintaining high-quality saving resulting from previous EBMUD conservation efforts implemented since the 1970s.

EBMUD's water conservation programs address both supply-side and demand-side programs. Demand-side water conservation programs improve customer water use efficiency and include incentives for residential and non-residential customers, education and outreach activities, support activities and regulatory programs. Supply-side water conservation programs improve water use efficiency before or after use by the customer and include distribution system leak detection and repair programs and water recycling programs.

### DEMAND-SIDE WATER CONSERVATION

In October 1993, the EBMUD Board of Directors approved the Updated Water Supply Management Program (WSMP), which set a conservation goal of 33 MGD in the year 2020. The Board directed staff to prepare a Water Conservation Master Plan (WCMP) and to report annually on the status of the conservation program.

The EBMUD Board of Directors adopted the WCMP in May 1994. The Plan is designed to meet 2020 water savings goals through cost-effective conservation programs, while also maintaining EBMUD's long-standing emphasis on voluntary conservation by customers. Projected water savings are expected to derive from EBMUD water conservation programs including water-use surveys, water-saving device distribution, financial incentives, targeted education, outreach to EBMUD's customers and support activities. Additional savings are expected to result from "natural replacement."

Natural replacement occurs through market advancement in technology and water use practices such as the installation of increasingly efficient hardware such as toilets, showerheads, and faucets without participation in an EBMUD program.

Since the adoption of the WCMP the 2020 conservation savings goal has increased by 2 MGD to offset water demand resulting from unexpected annexations for development located outside of the long established EBMUD Ultimate Service Boundary. In order to mitigate the water supply impacts of these annexations, EBMUD developed and implemented a system of water demand mitigation fees (also referred to as water use or demand offset fees) designed to recover the cost of generating water savings that will entirely offset the new demand, through additional conservation efforts within EBMUD. The fees are charged to the developers of the newly annexed areas. The related conservation program results in no net impact to EBMUD customers overall, thereby ensuring no net increase in district-wide water demand. Water demand mitigation fees are currently in place to fund the 2.0 MGD of projected savings.

### ESTIMATED WATER SAVINGS AND PROGRAM BUDGET

Water savings from conservation programs, especially those that rely on customer behavioral changes, are assumed to diminish or "depreciate" over time. EBMUD recommendations may have only a temporary influence on customer behavior, and savings from hardware changes may degrade due to product wear. Incorporating depreciation into estimated water savings provides more realistic annual savings to better meet long-term conservation goals. EBMUD has incorporated this depreciation effect into EBMUD's projected water conservation savings and will continue to uphold the WCMP conservation goal of 35 MGD through 2030.

Water savings estimates are provided for programs associated with individual customer accounts, rather than providing customer class level estimates, to improve estimate accuracy. Methods of water savings estimates include: summing of site-specific savings calculations from implemented conservation measures, utilizing industry-applied values based on scientifically established savings rates for each fixture or appliance, and applying a percentage reduction in actual (average) pre-intervention consumption, based on previous EBMUD studies.

Estimated water savings since adoption of the WCMP in 1994 are shown in Table 6-2. An estimated savings of 13 MGD

**Table 6-1. Water Conservation Program Historical Highlights**

| <b>Pre-1970</b> |  |
|-----------------|--|
|                 | All EBMUD customers have always been metered.  |
| <b>1961</b>     | Distribution system leak detection and pipe replacement program begins.  |
| <b>1970s</b>    |  |
| <b>1971</b>     | Two recycled water projects at EBMUD facilities initiated, saving 8.9 mgd  |
| <b>1974</b>     | School education program begins. Over 1.5 million students have received material and training since 1974.   |
| <b>1976</b>     | Speakers bureau is formed.   |
| <b>1977</b>     | Drought response program. EBMUD achieves 39% annual reduction in use.  |
| <b>1978</b>     | Filter plant backwash is reclaimed.  |
| <b>1980s</b>    |  |
| <b>1982</b>     | First four in a series of water-conserving demonstration gardens are dedicated.  |
| <b>1983</b>     | EBMUD sponsors the Urban Water Management Planning Act (AB 797).   |
| <b>1984</b>     | First of five golf courses begins using recycled water.<br>Water Conservation Administrator is hired to implement broad-based conservation program.  |
| <b>1985</b>     | UWMP is adopted and implementation is initiated.   |
| <b>1986</b>     | EBMUD sponsors first Northern California Xeriscape Conference.<br>Water Conserving Plants and Landscapes for the Bay Area book is released.  |
| <b>1987</b>     | Residential site surveys and large landscape site surveys are offered.<br>Landscape plan reviews are offered.  |
| <b>1988</b>     | Office of Water Recycling is formed.<br>Landscape Advisory Committee is formed.<br>First weather station is installed with telephone hotline for landscape water requirement information.<br>Water service regulation Section 29 is adopted prohibiting wasteful water use practices.<br>Landscape video is developed with Sunset and 28 other agencies.<br>Community water conservation portable display program is initiated (40 sites). |
| <b>1989</b>     | Quarterly Landscape Advisory Newsletter is initiated.<br>Meter discount program initiated for public agencies installing water-conserving landscapes.  |
| <b>1990s</b>    |  |
| <b>1990</b>     | Irrigation rebate program offered to irrigation customers.<br>Conservation "Welcome" packet program for new homeowners offered at model home sites.  |
| <b>1991</b>     | Study is conducted on performance/savings of 1.6 gallon per flush toilets and water-saving showerheads.<br>Four landscape recycled water projects initiated, saving 0.65 mgd.  |
| <b>1992</b>     | Industrial, commercial, and institutional surveys are offered.<br>Project Firescape initiated with two demonstration gardens and a brochure promoting fire safety and water conservation.<br>Urban Water Shortage Contingency Plan adopted.  |
| <b>1993</b>     | Board adopts Water Supply Management Program.<br>Board directs staff to develop Water Conservation and Reclamation Master Plans.<br>District signs MOU regarding implementation of Best Management Practices.  |
| <b>1994</b>     | Board adopts Water Conservation Master Plan and Reclamation Implementation Plan.<br>Toilet rebate program is offered.<br>Water Conservation Baseline Study is conducted to establish monitoring and evaluation program.<br>Toilet rebate program offered to all but single family customers.   |
| <b>1995</b>     | Largest EBMUD water recycling project, saving 5.4 mgd of potable water, is completed.<br>Rate Study is completed and Board adopts new water-conserving rate structure.<br>Industrial, commercial, and institutional rebate program is offered.<br>Non-residential plan review program is initiated.  |
| <b>1996</b>     | Clotheswasher rebate program offered to single family customers.   |
| <b>1998</b>     | Landscape rebate program offered to single family customers (for irrigation and graywater systems, plant material)<br>Graywater Study is completed.<br>Market penetration study of toilets, showerhead and faucet aerators is conducted.   |
| <b>1999</b>     | Clotheswasher rebates offered to all customer groups.  |
| <b>2000s</b>    |  |
| <b>2000</b>     | EBMUD named to CUWCC Steering Committee.<br>EBMUD named to CALFED Water Use Efficiency Subcommittee.   |
| <b>2001</b>     | EBMUD sponsors successful passage of Senate Bill 221, linking water supply and land use planning.  |
| <b>2002</b>     | EBMUD re-elected to CUWCC Steering Committee.  |
| <b>2003</b>     | Launched WaterStar™ conservation certification and product labeling program.<br>Residential End Use Study Completed.<br>Initiated Strategic Marketing Plan for Conservation and Recycling.<br>Demand Management Advisory Committee Report Completed.   |
| <b>2004</b>     | New edition of EBMUD plant book published.<br>National submeter study completed.   |

**Table 6-2. Water Conservation Savings Summary**

| <b>Program</b>                          | <b>FY95–05 Total<br/>Non-Depreciated<br/>Savings (MGD)</b> | <b>FY95–04<br/>Accumulated<br/>Depreciation (MGD)<sup>(1)</sup></b> | <b>FY95–05<br/>Net Savings<br/>(MGD)</b> |
|---|--|---|--|
| <b>RESIDENTIAL</b>                      |  |   |  |
| Water Surveys <sup>(2)</sup>            | 1.53   | 0.78  | 0.75                                     |
| Single-Family                           | 0.59   | 0.29  | 0.30                                     |
| Self Survey Kits                        | 0.06   | 0.01  | 0.05                                     |
| Multi-Family                            | 0.88   | 0.48  | 0.40                                     |
| Rebates and Incentives <sup>(3)</sup>   | 2.26   | 0.18  | 2.08                                     |
| Res Landscape Rebates                   | 0.03   | 0.00  | 0.03                                     |
| Toilet Replacement Rebates              | 1.27   | 0.06  | 1.21                                     |
| Residential Clothes Washer Rebates      | 0.62   | 0.00  | 0.62                                     |
| Device Distribution                     | 0.20   | 0.01  | 0.19                                     |
| Water Wasted                            | 0.14   | 0.11  | 0.03                                     |
| <b>NON-RESIDENTIAL</b>                  |  |   |  |
| Water Surveys <sup>(2)</sup>            | 4.71   | 3.17  | 1.54                                     |
| Commercial                              | 0.74   | 0.54  | 0.20                                     |
| Industrial                              | 1.25   | 1.02  | 0.23                                     |
| Institutional                           | 0.87   | 0.70  | 0.17                                     |
| Large Landscape Irrigation              | 1.49   | 0.91  | 0.58                                     |
| Irrigation Reduction Information System | 0.36   | 0.00  | 0.36                                     |
| Rebates and Incentives <sup>(3)</sup>   | 2.38   | 0.79  | 1.59                                     |
| Direct Pre-Rinse Installation           | 0.25   | 0.00  | 0.25                                     |
| Direct Toilet Installation              | 0.02   | 0.00  | 0.02                                     |
| District Facility Retrofit              | 0.01   | 0.00  | 0.01                                     |
| Rebates for Business and Industry       | 0.22   | 0.03  | 0.19                                     |
| Irrigation Upgrade Rebates              | 0.81   | 0.13  | 0.68                                     |
| Commercial Clothes Washer Rebates       | 0.20   | 0.00  | 0.20                                     |
| Commercial Irrigation Workshops         | 0.03   | 0.01  | 0.02                                     |
| Water Waste <sup>(4)</sup>              | 0.84   | 0.62  | 0.22                                     |
| Subtotal                                | 10.88  | 4.92  | 5.96                                     |
| Natural Replacement                     | 7.11   | NA <sup>(5)</sup>   | 7.11                                     |
| <b>TOTAL</b>                            | <b>17.99</b>   | <b>4.92</b>   | <b>13.07</b>                             |

<sup>(1)</sup> No depreciation accumulated for FY03 savings.

<sup>(2)</sup> Roll-up of water survey programs, landscape workshops, and separately tracked savings from customers who participated in multiple programs during the FY95-FY98 pilot program.

<sup>(3)</sup> Includes fixed and customized rebate, direct installation, and device distribution.

<sup>(4)</sup> Includes savings from water waste and leak repair.

<sup>(5)</sup> Data not available to estimate depreciation of natural replacement savings.

(net savings) has been achieved since the adoption of the plan. In FY05, Water Conservation Program elements saved an estimated 1.1 MGD of water (non-depreciated savings).

Since the 1970s EBMUD has budgeted about \$45 million for implementation of customer targeted Water Conservation Program. EBMUD's WCMP five-year budgetary plan through FY09 includes an additional \$30 million for Water Conservation Program funding, as shown in Figure 6-1. By 2010, EBMUD will have invested nearly \$60 per capita on customer targeted conservation programs since 1970.

The FY05 budget for the Water Conservation Program was approximately \$5 million, of which \$3.9 million was allocated for capital programs and \$1.1 million allocated for operating expenditures. Distribution of the Conservation Program expenditures, by program element, is shown in Figure 6-2. Water Conservation Program expenditures do not include expenditures for additional EBMUD funded conservation-related activities such as distribution system leak detection,

meter testing and replacement, or other customer assistance and education efforts.

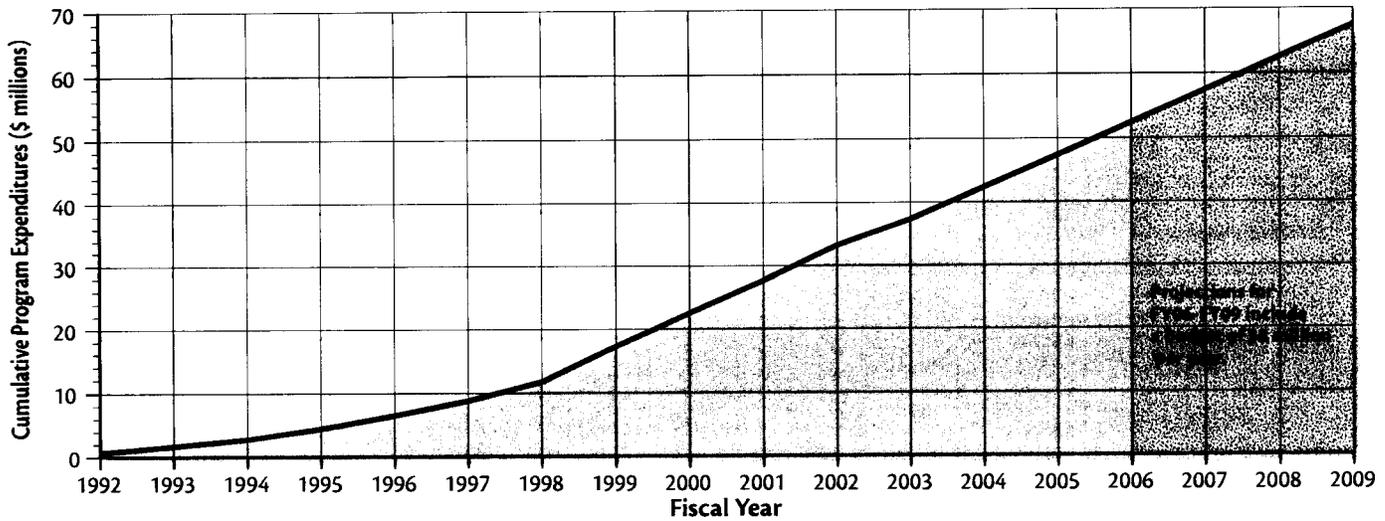
#### **RESIDENTIAL WATER CONSERVATION PROGRAMS**

EBMUD offers water conservation programs, rebates, and services for all customer categories, including single- and multi-family residential accounts. Programs and services include free indoor and outdoor surveys and water-savings devices, incentives for installing water-saving fixtures and equipment, as well as education and outreach programs.

#### **Water Conservation Survey Programs**

Free water use surveys are offered to all EBMUD customers. Single-family and multi-family residential water conservation surveys, designed to help customers use water more efficiently, range from self evaluations to on-site consultations of indoor use and outdoor use, targeting large residential landscape irrigators.

**Figure 6-1. EBMUD Cumulative Conservation Program Budget**



The indoor survey includes a test of showerhead and faucet flow rates, an estimate of toilet flush volumes and a test for leaks. Free showerheads and faucet aerators are offered if existing fixtures are not low-flow models. The outdoor survey includes a review of the irrigation system, including controller schedules. Customers also are provided with a set of recommendations for improving water use efficiency and a packet of educational materials that includes information on toilet, clothes washer, and landscape rebate programs.

EBMUD also distributes Waterwise Self-Survey Kits to residential users upon request, at community presentations, workshops, and festivals and through direct mailings. The kits help customers evaluate their water-use practices and detect leaks. For residential users of 1,000 gallons per day (GPD) or higher, on-site visits prove to be most beneficial for customers and cost effective for EBMUD.

To improve the effectiveness of the residential water survey programs, outreach efforts increasingly focus on the larger water user with greater potential water savings. The programs target customers whose consumption histories not only show high water use but also large differences between winter-time

and summer-time use. These customers typically have large landscapes with significant summer-time irrigation. Identifying water savings potential among residential customer accounts is primarily accomplished through queries of seasonal water consumption data. Direct mail remained the single most effective tool in enlisting customer participation in water surveys. Figure 6-3 depicts monthly water use by customer category, emphasizing the contribution of residential demand to total demand, and the difference in residential use during winter months versus summer months.

Targeting residential customers with high water use during summer months can produce greater than average water savings because landscape irrigation is often the most discretionary residential water use. Conservation in these sectors also helps to reduce peak demand in summer months, which can help to contain EBMUD costs for pumping and electricity.

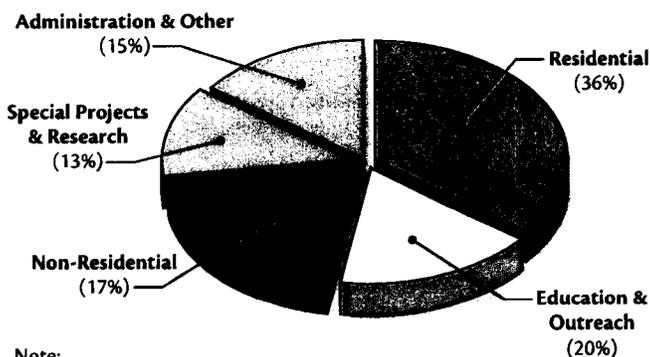
**Rebate & Incentive Programs**

Incentives and rebates are offered to residential customers for water-conserving equipment, fixtures, and appliances including irrigation controllers, landscape upgrades, clothes washers, and high efficiency toilets.

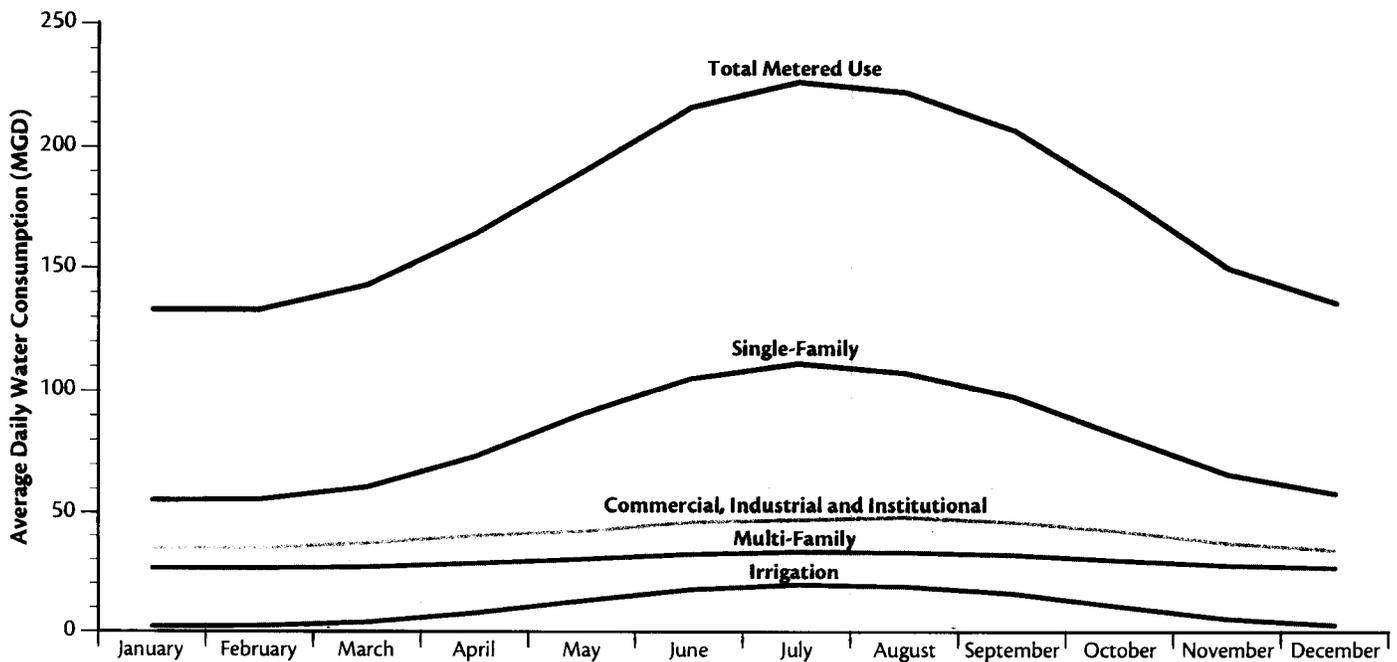
*Residential Landscape Rebate Program*

The Residential Landscape Program was implemented in February 1998 to promote outdoor water use efficiency in the single-family residential sector. This program teaches homeowners about water savings in the garden and suggests cost-effective implementation ideas. EBMUD offers rebates of up to \$1,000 to single-family homeowners who convert their high water-use gardens into water-conserving landscapes. There is a strong educational component to the program. In order to participate, customers must attend an introductory meeting where they learn the principles of water conservation for landscaping. Other topics include permeable “hardscape,” plant selection and turf replacement incentives. In 2005, EBMUD piloted a turf replacement program with rebates up to \$2,500.

**Figure 6-2. Distribution of Conservation Program Expenditures**



Note:  
Based on FY01-FY04 data.

**Figure 6-3. Monthly Water Use by Customer Category****Notes:**

- (1) Based on 1975-2004 historical consumption data.  
 (2) Total metered use includes water use by all customer categories.

**High-Efficiency Residential Clothes Washer Rebate Program**

EBMUD's Clothes Washer Rebate Program, one of the first such programs offered in the nation, has been available to EBMUD's residential customers since 1996. EBMUD continues to implement its Residential Clothes Washer Rebate Program and has partnered with Bay Area water agencies on a regional approach, branded as the Bay Area Water Agency Clothes Washer Rebate Program, to increase the visibility of the program among customers and appliance retailers throughout the region. As lead agency among its Bay Area partners, EBMUD coordinated the joint procurement of services and the execution of legal agreements required to obtain state-administered grant funding for the regional program.

EBMUD enhanced its own clothes washer rebate offer by being among the first water agencies to offer tiered rebates of \$50, \$75, and \$100 based on the water efficiency level of eligible clothes washer models. Tiered rebates are designed to influence consumers towards purchases that meet or exceed higher efficiency standards expected to take effect in the year 2007. Since the inception of the program in FY96, EBMUD has rebated nearly 32,500 residential clothes washer installations.

**Toilet Replacement Program**

Since 1995, EBMUD has provided rebates and/or free installations to its residential customers to support replacement of higher-volume toilets. The current WaterSmart™ Toilet Replacement Program is a two-tiered rebate program for the purchase of high-efficiency toilet (HET) models that exceed the 1.6 gallon per flush standard or selected standard efficiency models that have been tested for their water saving reliability. Twenty-two percent of the FY04 toilet installations

rebated were HETs, reflecting increasing market share and availability of models with greater water savings potential. Though the program is relatively low-volume, the production and distribution of water-efficient toilets has been influenced by EBMUD and other water agencies working directly with manufacturers, distributors, and retailers. In one year, the number of retailers and HET models offered in the marketplace has increased by 35% over FY03.

**Device Distribution Program**

EBMUD has been distributing free low-flow showerheads, faucet aerators, and other water-saving devices to customers since the 1980s. The devices are distributed primarily during audits, as well as direct mail and over the counter. A Market Penetration Study completed in FY02 found that EBMUD's service area was effectively "saturated" with low-flow showerheads and faucet aerators. Much of this high saturation can be attributed to EBMUD's ongoing free distribution program since the early 1980s.

**NON-RESIDENTIAL WATER CONSERVATION PROGRAMS**

EBMUD offers a variety of water conservation programs, rebates and services for commercial, industrial, institutional and landscape irrigation customers. Non-residential water conservation programs include free water surveys, water-saving device distribution, technical consultations, plan review, cost-benefits analyses, and financial incentives.

**Water Conservation Survey Programs****Commercial, Industrial and Institutional Surveys**

Commercial, Industrial, and Institutional (CII) surveys are designed to help businesses and institutional customers use

water more efficiently. The CII Surveys consist of a free on-site visit by staff, accompanied by a technical consultant for specific expertise as needed. Staff and consultants work with large-landscape irrigators and facility managers to identify opportunities for upgrading existing water systems. These upgrades increase water-use efficiency and achieve benefits in reduced energy use, wastewater discharge, and pollution prevention. If the auditor determines that existing devices are not efficient, free water efficient devices are provided which include: quick-closing toilet flapper valves, water conserving showerheads and low-flow faucet aerators.

Businesses with relatively simple end-uses of water have successfully used the self-survey kits. Small metering devices are available for loan to verify water use characteristics before implementing conservation measures. This approach allows the customer and EBMUD to recommend the most cost-effective measures. Surveys also serve as a means of identifying opportunities for water use efficiency improvements that may qualify for rebates.

#### *Irrigation Water Surveys*

EBMUD offers free surveys and incentives for business customers to improve irrigation efficiency. Irrigation audits include an evaluation of current and past water use, on-site inspection of irrigation systems, tests for sprinkler uniformity, training of landscape personnel in principles of efficient irrigation, and recommendations for increasing water use efficiency.

Irrigation water surveys are targeted at the some 5,000 EBMUD irrigation accounts where landscape irrigation comprises most, if not all, of the use at the site. Water budgets have been established for over 1,200 of the dedicated irrigation only accounts and are reported to the customer in their water bills. This allows the customer to compare actual usage to efficient or budgeted usage.

Homeowners associations (HOAs) continue to represent a large participant sector. Two strategies have proven successful in helping to secure customer participation in both the water use survey and irrigation system upgrade programs: targeted presentations by EBMUD staff and telephone contacts via high water consumption inquiries.

#### **Rebate & Incentive Programs**

EBMUD offers financial incentives for non-residential customers in the form of customized individual customer rebates, free water-efficient device giveaways, and fixed rebates for water efficient products.

#### *Irrigation Water Rebates*

Water auditors also evaluate the site's eligibility for the Irrigation Rebate Program, which provides rebates for irrigation equipment installed to increase water use efficiency. Through the Irrigation Rebate Program customers may qualify for a rebate of 50% to 100% of the costs of installing water-efficient irrigation equipment.

#### *Customized Rebates*

EBMUD offers customized rebates for industrial and commercial processes and equipment in order to improve water use efficiency. The availability of rebates serves as an incentive

for CII customers to participate in the audit program. Rebates offset a portion of the initial costs of installing equipment and systems that are expected to result in water savings, and they shorten the payback period for the customer's investment in equipment upgrades. Rebates are based on estimated water savings and may be up to 50% of the costs of implementing hardware or process changes that demonstrate improved water use efficiency. Incentives offered have covered multiple technologies and practices such as air-cooling, dishwashing, water treatment, cooling processes, wash down equipment and others.

#### *Device Distribution Program*

Since the early 1980s, EBMUD has distributed free low-flow showerheads, faucet aerators, high efficiency hose nozzles, "water brooms," and low-volume toilet flush valve retrofit kits. Devices are provided to customers primarily through water-use surveys. Some water-efficient hardware and devices are loaned to customers for testing in their business settings.

#### *Hardware and Appliance Incentives*

EBMUD offers a variety of hardware and appliance incentives to its non-residential customers. Currently EBMUD offers commercial dishwashing and pre-rinse spray valves installation used at dishwashing stations in restaurants and other food service operations. Six thousand acre-feet of water are estimated to be saved over five years from the program. Other non-residential incentives include rebates for commercial clothes washers, high efficiency toilets, x-ray machines, ice machines, steamers, cooling equipment, and dishwashers.

### **EDUCATION AND OUTREACH ACTIVITIES**

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Education and outreach activities support all other conservation programs and increase customer awareness and acceptance of EBMUD conservation efforts. EBMUD has a long history of providing customers with educational services including publications, school programs, public workshops, and demonstration projects. Outreach activities include general and targeted marketing, as well as community presentations and workshops.

#### **Education**

Publications are a valuable educational tool for promoting conservation practices. In 2004 EBMUD published *Plants and Landscapes for Summer-Dry Climates of the San Francisco Bay Region*. The book is a modern, updated reference of drought adaptive plants for Mediterranean climates and further establishes EBMUD as a leader in outdoor conservation education. The body of the book is devoted to the description of over 630 plants adapted to summer-dry climates and features over 540 stunning color photographs of plants and landscapes. There are charts for quick reference and lists of plants for special situations such as hot, dry sites, and dry shade. Articles contributed by notable horticulturists bring to life the weather, seasons, and design principles that shape the summer-dry landscape. The publication is both part of a growing awareness of climate compatible and resource-conserving landscaping and an educational tool to further the application of a cutting-edge garden aesthetic within and be-

yond EBMUD's communities.

EBMUD continues to support local school programs, recognizing its many educational benefits. Since 1974, EBMUD has provided water conservation curricula and supplemental materials to teachers and students as part of its Project WATER (Water Awareness Through Education and Research) school program. The program is free to public and private schools within the EBMUD service area and includes K-12 curricula, an assembly program for elementary schools and service learning on watershed lands with EBMUD Ranger/Naturalist. EBMUD also continues to participate in the School Garden Program, where EBMUD partners with the nonprofit Watershed Project, formerly Aquatic Outreach Institute (AOI) to support local Kids in Gardens projects. These projects were popularized by the California Department of Education's initiative to create "a garden in every school." Through workshops sponsored by EBMUD and other agencies, educators learn how to reduce water and pesticide use in the garden.

The Water Education Center at San Leandro Business Office, popular with elementary school teachers, who bring their students to the Center for guided tours, was closed at the end of the 2004 fiscal year. EBMUD staff began developing plans to relocate the educational exhibits and is exploring potential sites for design and construction of a larger and more comprehensive education center. At the Water Education Center students learn basic facts about the source and quality of EBMUD water supplies, the distribution system, and the many ways in which water is used, while gaining an understanding of the need to use it wisely.

### Outreach

EBMUD continues to market its water conservation programs in two overarching ways: general and specific. The "general" or broad-based marketing approach communicates the value of water and the importance of using it wisely. The "specific" approach includes interactions with individual customers or groups of customers and marketing tailored EBMUD conservation programs and services. Examples of marketing tools utilized by EBMUD include:

- Displays in EBMUD business offices;
- Bill inserts;
- Newspaper and magazine ads;
- Billboards;
- AC Transit posters;
- BART billboards;
- Promotional items at community events;
- Theater ads;
- Cable television;
- WaterSmart™ business registration; and
- WaterStar™ product labeling initiatives.

In 2003 EBMUD initiated a marketing plan for EBMUD's conservation and recycling programs. The Marketing Plan is a strategic long-term plan which enhances the branding and marketing of EBMUD's water conservation and recycling programs. The key purpose of the Marketing Plan is the ongoing development and focus group testing of a WaterSmart™ Certification Program. The WaterSmart™ and WaterStar™ programs, implemented in FY04, are designed to inform

customers and retailers of the best available technology and management practices to help EBMUD achieve its conservation goals. The WaterSmart™ Certification Program was developed specifically to:

- Improve branding of water-efficient EBMUD services;
- Promote water-efficient products and technologies through WaterStar™ product labeling, analogous to Environmental Protection Agency's ENERGY STAR program; and
- Register and recognize those businesses and customers that meet or exceed EBMUD demand management goals and objectives.

### Support of Landscape Standards

#### *Free Landscape Plan Review*

The California Department of Water Resources developed the Model Water Efficient Landscape Ordinance codified in Title 23 of the California Code of Regulations (Sections 490-492), as required by the Water Conservation in Landscaping Act (Government Code, Section 65591 et seq.). Under the model ordinance, effective January 1993, cities and counties must either have their own landscape water ordinance in place or the state model water ordinance is in effect. All public and private landscape projects that require a permit and all developer-installed landscaping must submit a landscape package that documents how water use efficiency will be achieved through the design. Assembly Bill 2717 (Laird, 2004) declared the Legislature's intent that the California Urban Water Conservation Council (CUWCC) convene a task force to evaluate and recommend proposals for improving the efficiency of water use in new and existing urban irrigated landscapes by December 31, 2005. EBMUD is represented on this task force.

EBMUD supports the landscape ordinances by offering free landscape plan review to all cities and counties in EBMUD water service area. Plans are reviewed for irrigation system efficiency and scheduling, if provided, as well as plant selection and planting design. Comments are returned to the jurisdiction submitting the plan for EBMUD review.

#### *Nonresidential Plan Review*

Since 1995 EBMUD has offered voluntary plan review for non-residential new construction projects at the time of request for new service connections. All projects with new service connections three inches or larger are encouraged to submit plans to Water Conservation for review and comment. The free service is available to all new customers but the emphasis is on larger commercial, industrial, and institutional water users.

### **SUPPORT ACTIVITIES**

Support activities are those that support the implementation of the water conservation program. These activities include database monitoring, studies/research, committee and association work, identification of funding sources, cooperative efforts, and the submittal of internal and external reports.

EBMUD continues to actively participate in regional and state wide conservation activities. EBMUD recognizes that partnerships broaden the visibility of conservation programs, create cost sharing opportunities and potential economies of

scale, and can expand customer benefits by addressing multiple conservation areas such as water, energy, wastewater, and solid waste. EBMUD is active in statewide water conservation venues and is represented in all significant industry-related discussions involving state and federal agencies, public interest groups, and professional associations. See Table 6-3 for more details on partnerships which EBMUD has participated in during the FY04.

#### **Demand Management Advisory Committee**

In mid-2001, EBMUD Board of Directors established the "Demand Management Advisory Committee" (DMAC). The committee's charge was to review the water conservation and recycling programs and assist staff in identifying cost-effective demand management approaches and partnerships. The DMAC was composed of seventeen members with broad representation from local government, the green industry, environmental interests and business community, taxpayer groups and nonprofit organizations. The DMAC reviewed EBMUD's current water conservation programs and generally concurred with its objectives and approach. Many of the DMAC recommendations are reflected in current and planned future incentives.

#### **National Multi-Family Residential Sub-Meter Study**

EBMUD actively supports research and technical studies to enhance understanding of water use patterns, conservation potential, and the impacts of conservation measures and programs. In June 2004, EBMUD completed the National Multi-Family Residential Sub-Meter Study. The study conceived, organized and administered by EMBUD, and developed in cooperation with nine other water utilities in seven states and two national apartment associations. The study represents a nationwide assessment of conservation potential and other policy issues associated with third-party billing conversions in the multi-family sector. Some of the study findings included the following: sub-metering saves 15% per dwelling unit (du) or about 8,000 gallons per du annually; allocation billing (Allocation billing represents a billing program whereby a tenant's water bill is based upon some allocation formula such as the number of bedrooms, amount of square feet, number of people, etc. in a dwelling unit and not on direct metering. Since allocation billing is not based on actual use but on some predetermined formula, there is no connection between consumption and the charges for water.) results in no or little savings; water conserving hardware saves approximately 20% or 11,000 gallons per du annually; there is little regulatory oversight with third party billing; and administrative standards are needed to protect the consumer. EBMUD, in FY05, plans to review the merits of a pilot program that involves sub-metering in the multi-family sector and tests new metering and AMR technology.

#### **Residential End-Use Study**

EBMUD completed the Residential End-Use Study in 2003. This study monitored water use at 33 single-family homes within EBMUD, assessed end uses of water, and mea-

sured the impacts of conservation retrofits. The study found that indoor per capita single-family use could be reduced approximately 20-25% to approximately 50 GPD. Study findings will be used to estimate water savings more accurately from incentives programs, to assist in marketing customer benefits from conservation measures and to prioritize EBMUD conservation budgeting. EBMUD continues to pursue additional end-use and metering technology studies to advance water use efficiency programs.

#### **Other Studies**

EBMUD has conducted market penetration studies at regular intervals in order to gain detailed knowledge of how customers use water. The 2001 Market Penetration Study, completed in 2002, was the third market penetration study conducted by EBMUD. The objectives of the 2001 study were to collect current data on water conservation attitudes and behavior, determine the types and saturation of water-conserving hardware, assess water conservation potential for identified market sectors, and relate the study findings to those of the previous studies.

Other major studies completed by EBMUD during the past five years include the Water Closet Performance Testing, Oakland Zoo Conservation and Recycling Feasibility Study, and the Irrigation Controller Pilot Study.

Table 6-4 lists research projects that EBMUD is currently pursuing.

#### **REGULATORY PROGRAMS**

EBMUD has regulations in place which are enforced even when there is no declaration of water shortage emergency. There are also regulations that are invoked when a water shortage emergency is declared by EBMUD Board of Directors.

#### **Water Waste Prohibition**

EBMUD has two regulations that prohibit water waste. Section 28 of the *Regulations Governing Water Use by Customers of the East Bay Municipal Utility District* is invoked only when a Water Shortage Emergency is declared by the Board. Provisions in that section are tailored to the severity of the water shortage and may include restrictions on annexations and new connections, allotments, drought rates, and prohibition of certain types of water use. Section 29 of the Regulations is in force at all times. This section prohibits wasteful use, but does not prohibit any specific type of water use.

When there is no Water Shortage Emergency, the provisions of Section 29, Prohibiting Wasteful Use of Water, are enforced primarily by customer education. Customer reports and field staff observations of water waste are investigated by Water Conservation personnel, who locate the customer of record for the site where waste is said to be occurring and inform them of the situation and provide recommendations on repairing leaks or using water more efficiently. If the customer cannot be located and the loss of water is significant, staff may turn off the water at the meter until the customer is contacted or the problem is resolved.

**Table 6-3. Water Conservation Partnerships****LANDSCAPE ADVISORY COMMITTEE**

Formed in 1988, the Landscape Advisory Committee (LAC) brings green industry professionals representing the landscape designers, contractors, nurseries, sod producers, educators & product manufacturers & distributors. Committee members assist staff in identifying best principles & practices for smart landscaping. In FY04, the LAC met to provide comments on District conservation programs, including an emerging weather-based irrigation controller incentive program WaterSmart™ workshop for new development.

**THE GREEN BUSINESS PROGRAM**

EBMUD contributes funding to both the Alameda County & the Contra Costa County Green Business Programs, & conducts water conservation surveys at local businesses interested in becoming a certified Green Business. The Program has targeted automobile repair shops, printing facilities & office buildings. In FY04, restaurants were targeted for certification & EBMUD helped certify over 60 businesses.

**THE STOP WASTE PROGRAM**

A project of the Alameda County Waste Management Authority, StopWaste targets larger industries for comprehensive assessments to help implement environmental solutions. EBMUD staff coordinates outreach and water-use surveys with the environmental assessments, and helps to provide customers with onestop shopping for waste management and resource conservation services. In FY04, EBMUD, Pacific Gas and Electric, and StopWaste co-hosted a workshop, "Making It Pay: Best Practices for your Company & the Environment." The workshop showcased successful businesses that had used agency programs to maximize resource management.

**THE FOOD SERVICE TECHNOLOGY CENTER (FSTC)**

The Center is a primary resource for food service operators, designers, consultants, vendors & manufacturers. It promotes efficient design & operation of food service facilities. EBMUD partnered with the FSTC to offer a workshop for food service providers & to develop performance specifications for water & energy-efficient spray valves used in dish-washing operations. EBMUD is partnering with FSTC & southern water purveyors to monitor & measure the water & energy savings potential of the new "connectionless" commercial food steamers. We continue to partner with FSTC on dual audits of large kitchen facilities.

**CALIFORNIA YOUTH ENERGY SERVICES**

EBMUD is partnering with local schools & community groups to support youth training projects that educate students about water resources & water conservation. EBMUD contributes financially & through in-kind services to California Youth Energy Services (CYES), a local non-profit, to provide students involved in job training projects with water conservation information, educational activities, & support for residential & business water conservation retrofit projects. These partnerships build communities of youth with passion for resource conservation & community service & the know-how to accomplish real water & energy savings.

**WATER AGENCIES**

Joint grant applications, primarily with water utility partners, improve the likelihood that proposals for conservation funding will be awarded. EBMUD acted as the lead agency in administering three separate grants funding regional programs for residential clothes washer rebates, weather-based irrigation controllers, & pre-rinse spray valve installation. EBMUD customers who participate in the grant funded programs directly benefit from the supplemental funding for rebates, installations, & on-going water savings. EBMUD continued to participate in meetings of the Bay Area Water Conservation Coordinators, an informal group of regional water utility water conservation practitioners that meets to share information about research & implementation, & to discuss emerging technologies & issues impacting water use efficiency.

**BAY AREA WATER AGENCIES COALITION (BAWAC)**

BAWAC represents a coalition of Bay Area water agencies for collaboration on comprehensive water management strategies & innovative approaches for securing a reliable, high quality Bay Area water supply. Shared efforts include, but are not limited to, water quality & treatment, demand management (conservation & recycling), & watershed protection.

**THE CALIFORNIA URBAN WATER AGENCIES**

CUWA is a non-profit corporation providing a forum for its member agencies to study & promote the need for a reliable, high quality water supply for the state's current & future urban water needs. EBMUD is active on a number of agency supported committees & worked closely with the CUWA Conservation Committee on a number of research projects to identify potential urban water conservation savings & implementation barriers toward achieving those savings

**CALIFORNIA URBAN WATER CONSERVATION COUNCIL (CUWCC)**

The Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California created & implemented a broadly supported agreement specifying 14 urban water conservation best management practices. CUWCC, a non-profit organization consisting of urban water suppliers, environmental organizations, & other interested parties, is charged with overseeing the best practices implementation process. In FY04, EBMUD staff served on committees & participated in quarterly Plenary sessions. EBMUD funded work performed by the CUWCC to develop & improve plumbing standards that impact water use efficiency. EBMUD's Water Conservation Program complies with all requirements of the MOU.

**CALFED BAY-DELTA PROGRAM**

In FY04, staff continued to participate in the CALFED Water-Use Efficiency (WUE) Program & associated committees to implement agricultural & urban conservation technical assistance & incentive programs. Key activities included input on the CALFED WUE Four-Year Evaluation Report & future financing plans to help meet the urban conservation objectives identified in the original CALFED Record of Decision passed in 2000. EBMUD staff will continue to actively participate in the many stakeholder discussions intended to help shape & implement Bay-Delta Program solutions.

**THE WATERSHED PROJECT**

The Watershed Project works to promote environmental responsibility and to preserve and protect the environment for future generations through education and outreach to teachers, students, and the community. EBMUD co-sponsored two Kids in Gardens workshops for educators within the East Bay and funded nine teacher-action grants for school projects that emphasize water conservation. The Kids in Gardens program promotes watershed stewardship by encouraging educators to create the use healthy, low-maintenance gardens to teach pesticides free gardening methods and the importance of water conservation and urban runoff pollution prevention. Staff continues to work with the Watershed Project to offer workshops for educators and award small grants to help fund water-conserving school gardens.

**Table 6-4. Water Conservation Research Activities****METER TECHNOLOGY STUDY**

EBMUD is investigating metering technologies to provide customers and conservation staff with instantaneous or "real-time" water consumption information. This technology could be used as a conservation tool by helping increase customer awareness of their water use patterns as well as allow for earlier leak detection for increased savings.

**WATER LOSS CONTROL PROGRAM**

EBMUD is developing an internal Water Loss Control Guidebook to document and consolidate all the state-of-art methods EBMUD uses to control and prevent water losses within its infrastructure and ensure that it properly accounts for all water delivered to its customers. This document will link other loss control programs into one comprehensive program to more effectively manage losses.

**SELF-CONTAINED FOOD STEAMERS**

With a grant from the U. S. Bureau of Reclamation, EBMUD is studying the water savings associated with replacing conventional food steamers with stand alone, connectionless models. The alternative steamers have no plumbing connections and use up to 80% less water and generate less wastewater, which can result in significant financial savings to businesses. The study, which is expected to be completed by January 2005, involves monitoring the water and energy use and wastewater discharge of five conventional steamers for four weeks and then repeating the process with connectionless steamers.

**CALIFORNIA URBAN WATER CONSERVATION COUNCIL**

EBMUD is cooperating with the California Urban Water Conservation Council (CUWCC) in a number of research studies, including: (1) Potential Best Management Practices (PBMPs): PBMPs are being studied to identify possible implementation as Best Management Practice (BMP) if they are economically reasonable. Over a three-year period, starting in FY04, three reports will be prepared in which a total of 13-14 PBMPs will be evaluated. The four PBMPs studied in FY04 included weather-based irrigation controllers, pre-rinse spray valves, X-ray film processors, and steam sterilizers; (2) Avoided Costs and Environmental Benefits: A study will begin in FY05 on developing a framework for determining the avoided costs, including the environmental benefits of saved water from both the agency and society perspective. The study is expected to be completed by December 2005. (3) BMP Costs and Savings: This study, conducted in FY04, resulted in a guide to data and methods for cost-effectiveness analysis of urban water conservation BMPs. The guide reports on estimated water savings for each BMP and the costs for program implementation to attain the estimated cost-effectiveness for 17 measures.

**SELF-ADJUSTING WEATHER-BASED IRRIGATION CONTROLLERS**

The California Department of Water Resources (DWR) awarded EBMUD, in cooperation with five other agencies, a \$1.6 million Proposition 13 grant for a Weather-Based Irrigation Controller Program to install 2,600 state-of-the-art controllers within six counties in Northern California. EBMUD's portion of the grant is \$925,000 for 1,300 controllers. Program implementation is expected to start in January 2005. Water savings over 10 years are estimated to be 30,000 acre-feet (9,775 million gallons) in a program targeting large irrigators.

**MULTI-FAMILY SUBMETERING**

EBMUD continues to explore water saving opportunities in the multi-family sector. An internal stakeholder committee will investigate the merits of requiring metering of new individual multi-family dwelling units. Surveys will also be conducted of external stakeholders to better assess community issues and perceptions associated with submetering at existing multi-family properties. A report will be issued in early 2006 with potential program implementation in July 2006. EBMUD was also awarded a Prop. 50 grant from the California Department of Water Resources to conduct pilot studies on both submetering incentive retrofit programs and on the merits of point-of-use meters in the multi-family sector.

**COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL (CII) PLAN REVIEW**

EBMUD was awarded a Prop. 50 grant from the California Department of Water Resources to develop a resource guidebook for reviewing plans of new CII developments for water use efficiency and to pilot a CII plan review program. The guidebook will present the technology associate with water efficient hardware and processes applicable to the CII sector.

**COMMERCIAL DISHWASHERS**

Included in an EBMUD Proposition 13 grant with the California Department of Water Resources for the installation of commercial pre-rinse spray valves is the installation and water savings evaluation of commercial dishwashers. A report on the calculated water savings for both pre-rinse spray valves and commercial dishwashers is expected in 2006.

**AMERICAN WATER WORKS ASSOCIATION FOUNDATION (AWWARF)**

EBMUD is currently partnering with the AWWARF in the following cooperative studies: (1) "Water Efficiently Programs for Integrated Water Management" (#2935) investigating avoided costs associated with water conservation programs and comparing those costs to other supply side options, (2) "Water Budgets and Rate Structures" (#3094) investigating the role of water budgets in rate setting, and (3) "Environmental Leadership" (#2854) investigating how management perceives their environmental leadership role.

**RESIDENTIAL END USE OF WATER**

EBMUD is participating in a DWR Proposition 50 grant to determine single family indoor and outdoor end uses of water and water use efficiency at 1200 homes in California. Water use for indoors and outdoors will be determined using dataloggers. Indoor water use efficiency will be evaluated by comparing use by fixture/appliance and outdoor water use efficiency will be determined by comparing the irrigated landscape area to the use.

## SUPPLY-SIDE CONSERVATION

### LEAK DETECTION

EBMUD's distribution system includes approximately 4,000 miles of pipe. Several techniques are used to locate leaks including visual inspections, sonic leak detection, and customer reports. EBMUD has crews equipped with electronic sound detection equipment. To date, this program has successfully maintained a low annual leak rate, with leaks averaging approximately 800 per year, or less than 20 leaks per 100 miles of pipe.

The difference between the volume of water produced at the treatment plants (also called System Input) and the sum of all billed and unbilled authorized consumption (also called Authorized Consumption) is termed Water Losses. Water Losses include all apparent losses (which include unauthorized consumption, and inaccuracies associated with production metering and customer metering) and all real losses from distribution system overflow and leakages. EBMUD's Water Losses are around 10% which compares to a national average water loss of around 12% among water utilities, as reported by the American Water Works Association's *2004 Water and Wastewater Rate Survey*.

### PIPE REPLACEMENT

Many conditions contribute to the deterioration of pipelines in the distribution system, including pipe type and size, soil conditions and ground movement. As a result of systematic replacement of the most troublesome pipes in the system, use of cathodic protection, and improved leak detection methods, the system has a relatively stable leak rate which indicates that the overall system rate of deterioration is not increasing with time. The Pipeline Replacement Program documents main failure through the maintenance and evaluation of leak records. The program focuses on renewal of those pipelines in need of replacement based on maintenance history. EBMUD's current goal is renewal rate of six to eight miles of pipeline per year.

### CORROSION CONTROL

EBMUD has had an active corrosion control program since its inception in 1923. The corrosion control program extends the useful life of EBMUD pipeline by installing and upgrading cathodic protection systems. The program encompasses the Mokelumne Aqueducts, distribution piping and facilities and has effectively reduced corrosion and related deterioration of EBMUD's infrastructure, resulting in substantial leak reduction and reduced loss of water. The Mokelumne Aqueduct pipelines have an extensive corrosion control system consisting of forty-three individual impressed current cathodic protection systems and approximately 650 test locations for monitoring the levels of corrosion control. The distribution system pipelines are protected from corrosion deterioration by 153 impressed current cathodic protection stations and over 2,300 galvanic anode stations. These systems are continually monitored to ensure proper operation. This program has resulted in a continual reduction in leaks on both cast iron and steel pipes. Internal corrosion on these pipelines is

controlled using lime additions to the water system to raise the pH levels. Designs are carefully reviewed to select proper coatings, materials, and other corrosion control measures for all structures to prevent corrosion and maximize the life of EBMUD facilities and pipelines.

### BEST MANAGEMENT PRACTICES (BMPS)

The California Urban Water Conservation Council (CUWCC) was formed as part of the "Memorandum of Understanding Regarding Urban Water Conservation in California" (MOU), dated September 1991, for the good faith implementation of water conservation techniques known as Best Management Practices (BMPs) to:

- Expedite implementation of reasonable water conservation measures in urban areas;
- Develop estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures;
- Develop estimates of reliable future water conservation savings for the State Water Resources Control Board's (SWRCB) use within the Bay Delta process water rights hearings phases; and
- Establish an initial standard for acceptable water conservation efforts that environmental organizations and water suppliers agree upon.

The California Urban Water Conservation Council is comprised of representatives of all signatories to the MOU and is charged with preparing a written annual report to the SWRCB on the program's effectiveness. EBMUD as a signatory to the MOU is making a good faith effort to implement all of the BMPs specified in the MOU. EBMUD's 2003 and 2004 Urban Water Conservation MOU Activity Reports submitted to the CUWCC are provided in Appendix F. Conservation practices which currently meet the definition of a BMP, as per the MOU are listed below (along with the page number where the particular BMP is discussed in this Plan) and include:

- Water Survey Programs for Single-Family and Multi-Family Residential Customers (page 6-3);
- Residential Plumbing Retrofit (page 6-5);
- System Water Audits, Leak Detection and Repair (page 6-11);
- Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections (All service connections within EBMUD service area are metered.);
- Large Landscape Conservation Programs and Incentives (pages 6-4, 6-6 and 6-7);
- High-Efficiency Clothes Washing Machine Financial Incentive Programs (page 6-5);
- Public Information Programs (page 6-7);
- School Education Programs (page 6-6);
- Conservation Programs for Commercial, Industrial and Institutional (CII) Accounts (page 6-5);
- Wholesale Agency Assistance Program (N/A);
- Conservation Pricing (EBMUD maintains rate structure consistent with BMP's definition of conservation pricing.);
- Conservation Coordinator (EBMUD staffs and maintains the position of water conservation coordinator.);

- Water Waste Prohibition (page 6-8); and
- Residential ULFT Replacement Programs (page 6-5).

### **CONSERVATION IN THE FUTURE**

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Water conservation is a central component of EBMUD's long-term water supply planning efforts and the WSMP, which seek to address issues that impact the reliability of EBMUD's water supply now and in the future. EBMUD is committed to continue investment in water conservation programs to meet EBMUD's water conservation goals and provide a reliable water supply.

When looking at water demand and supply projections, the contribution of conservation to water supply is evident. During drought years, conservation and water recycling are expected to account for 18% of projected demand not met by Mokelumne River supply and the Freeport Regional Water Project supply. In normal rainfall years, conservation will play an important role in future reliability of supply and reduce the frequency of shortages. It is expected that in normal years 13% of needed supply will be offset by conservation. For further discussion on projected water supply, please refer to Chapter 4 and Figure 4-8.

## **APPENDIX A. URBAN WATER MANAGEMENT PLANNING ACT**

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## **APPENDIX A. URBAN WATER MANAGEMENT PLANNING ACT**

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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.

### **Article 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. PUBLIC NOTICE**

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## APPENDIX B. PUBLIC NOTICE

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### \*\* LEGAL NOTICE \*\*

The East Bay Municipal Utility District's (EBMUD) Draft Urban Water Management Plan 2005 will be released for public review and comment beginning on September 23, 2005 and ending on October 24, 2005. A public comment meeting will be held on October 19, 2005 at 6:00 pm and a public hearing will be held during the regularly scheduled EBMUD Board meeting at 2:00 pm on November 22, 2005. Both will be held in the Board Room located in the EBMUD Administration Building, 375 Eleventh Street, Oakland, California.

The Urban Water Management Plan (UWMP) brings together important information about EBMUD's water supply and usage, recycled water and conservation programs. EBMUD is updating its UWMP 2000 to reflect current conditions and new information. The information presents EBMUD's best efforts to promote efficient water use consistent with the California Urban Water Management Planning Act as part of the California Water Code.

The October 19, 2005 public comment meeting and the November 22, 2005 public hearing will provide the public an opportunity to comment on the UWMP. EBMUD will review and consider all comments received at the public comment meeting, the public hearing and written comments received (or postmarked) by October 24, 2005, 4:30pm. All written comments should be sent to: EBMUD, Attn: Ms. Suzanne Corralejo, MS 901, PO BOX 24055, Oakland, California, 94623-1055.

Copies of the Draft UWMP 2005 are available at the public libraries located within the EBMUD service area, and at the California State Library. The Draft UWMP may also be downloaded from [www.ebmud.com](http://www.ebmud.com), or copies may be requested by contacting EBMUD by mail at: EBMUD, Attn: Ms. Suzanne Corralejo, MS 901, PO BOX 24055, Oakland, California 94623-1055; by telephone at 510-287-0109; or by email at [scorrale@ebmud.com](mailto:scorrale@ebmud.com).

The UWMP will be considered for adoption by the EBMUD Board of Directors during the regularly scheduled EBMUD Board meeting, on November 22, 2005, in the EBMUD Board Room located at 375 Eleventh Street in Oakland. The next revision to the UWMP will occur in 2010.

Dated: Sept. 15, 2005  
Lynelle M. Lewis  
Secretary of the District

\* \* \*

This legal notice was published in these newspapers on the dates as indicated below.

| Newspaper                          | 9/23/05 | 9/24/05 | 9/25/05 | 10/5/05 |
|------------------------------------|---------|---------|---------|---------|
| Alameda Journal                    | X       |         |         |         |
| Berkeley Voice/ El Cerrito Journal | X       |         |         |         |
| Montclairion                       | X       |         |         |         |
| Contra Costa Times                 | X       | X       | X       | X       |
| San Ramon Valley Times             | X       | X       | X       | X       |
| West County Times                  | X       | X       | X       | X       |
| Oakland Tribune                    | X       | X       | X       | X       |
| Alameda Times Star                 | X       | X       | X       | X       |
| Tri-Valley Herald                  | X       | X       | X       | X       |
| Daily Review                       | X       | X       | X       | X       |



## **APPENDIX C. COMMENTS AND RESPONSES**

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## APPENDIX C. COMMENTS AND RESPONSES

| <i>Dated:</i><br>October 11, 2005  | <i>Organization/Agency/Individual:</i><br>David K. Behrens, P.E., Principal Engineer, Dublin San Ramon Services District  |
|--|---|
| <i>Comments</i>  | <i>Responses</i>  |
| <p>1. Emergency Service Connections: On Pages 2-9 and 2-10, the UWMP states that there are two existing locations for establishing connections to transfer treated water between EBMUD and DSRSD during times of emergency. More specifically, these emergency interconnections are located on the border of the City of San Ramon and the City of Dublin at the intersection of Alcosta Blvd. and San Ramon Blvd., and at the intersection of Alcosta Blvd. and Davona Drive.</p> <p>It should be noted in EBMUD's 2005 UWMP Update that DSRSD has planned for an additional emergency interconnection between EBMUD and DSRSD (as DSRSD noted in its 2005 July Update). The future emergency interconnection is approximately 3,400 linear feet north of the most northerly intersection of Dougherty Road and Bollinger Canyon Road in the City of San Ramon. DSRSD has completed its emergency interconnection facility installation at this location, and is awaiting EBMUD to complete its installation, prior to entering into an emergency transfer agreement for this site (see attached schematic for exact location). To date EBMUD has not installed its emergency interconnect facilities at this location.</p> | <p>Comment on location of emergency interconnections noted.</p> <p>In the summer of 2003, EBMUD informed DSRSD staff that EBMUD was not going to install emergency connection due to the limited capacity and low benefit of this emergency intertie connection to EBMUD from EBMUD's perspective. Therefore, EBMUD does not have any current plans to install this emergency connection.</p> |
| <p>2. Table 5-2. Collected and Treated Wastewater Flows Generated in EBMUD Service Area: In Table 5-2, it lists DSRSD Wastewater Treatment Plant (WWTP), located in Pleasanton, as collecting and treating 11.5 to 20.7 MGD during the period of Year 2005 through Year 2030. These levels of treatment volumes include wastewater flows from the Cities of San Ramon, Dublin and Pleasanton. To be accurate when discussing collection and treatment of wastewater flows generated within EBMUD Service Area, the wastewater flows associated with DSRSD WWTP should only include those from the Southern portion of the City of San Ramon. The DSRSD 2005 Wastewater Collection System Master Plan indicates the existing average-day wastewater flows (ADWF) from South San Ramon to the DSRSD WWTP are approximately 1. MGD, and the future ADWF are approximately 2.2 MGD.</p>  | <p>Data is modified to reflect portion of flows attributed to EBMUD customers within DSRSD's wastewater service area.</p>   |
| <p>3. Table 5-3. Characteristic and Projected Flows of (Non-Recyclable) Wastewater Treated in EBMUD Service Area and Disposed of: This comment associated with the DSRSD wastewater flows in Table 5-3 is similar to the comment above associated with Table 5-2. The DSRSD WWTP treated wastewater flows that were generated within EBMUD service area should only include those attributable to the South San Ramon area. This would be consistent with the description and title of the Table 5-3.</p>  | <p>Data is modified to reflect portion of flows attributed to EBMUD customers within DSRSD's wastewater service area.</p>   |

|   |  |
|---|--|
| <p>4. Table 5-5. Supply Source for each Water Reuse Zone: Firstly, Table 5-5 is missing a Title and Table Number on page 5-7. Secondly, a capital cost of \$80M is listed as the cost of the DSRSD WWTP. It is unclear what this dollar amount represents, as this is not the total worth of the WWTP, nor is it the cost to construct the recycled water facilities (RWTF), located at the WWTP.</p>           | <p>The title "Table 5-5. Supply Source For Each Water Reuse Zone" is already assigned to Table 5-5, which is on page 5-10. The table on page 5-7 is a continuation of a two-page layout of Table 5-4. The title has been reformatted to better illustrate that the information on pages 5-6 and 5-7 are part of one table. The column heading on page 5-7 is revised to read "EBMUD's Capital Cost in FY 2005 (\$ millions)" to clarify that dollar amounts are related to the recycled water projects not the wastewater supply source.</p> |
| <p><b>Dated:</b><br/>October 19, 2005 (Public Comment Meeting for the Draft Urban Water Management Plan 2005 at 6 pm, EBMUD Administration Building, Oakland)</p>   | <p><b>Organization/Agency/Individual:</b><br/>Stephanie Komaru, Alameda League of Women Voters</p>   |
| <p><b>Comments</b></p>  | <p><b>Responses</b></p>  |
| <p>1. Ms. Komaru asked for clarification on whether another desalination facility is located in Hayward. She asked for clarification on what project is associated with Hayward.</p>  | <p>No desalination facility is located in the City of Hayward. However, an emergency intertie project involving EBMUD, City of Hayward, and San Francisco Public Utilities Commission exists in the City of Hayward. The project consists of a pumping plant at the City of Hayward Executive Airport and a pipeline that runs through parts of Hayward. Water is transmitted through San Leandro and into Oakland.</p>  |
| <p>2. Ms. Komaru commented that EBMUD's ability to meet the planning level of demand, which accounts for projected savings from conservation and recycling, is dependent on customers meeting the conservation and recycling goals successfully. She asked what EBMUD does to encourage conservation and recycling such that the goals are met on target and what the impacts are if the goals are not met.</p> | <p>EBMUD's conservation and recycling programs are managed by staff and are continuously monitored, evaluated, and adjusted to attain the goals. Conservation and recycling programs include numerous established activities. The amount of savings through conservation and recycling must be as high as the projections otherwise greater rationing would need to be imposed on customers unless additional water supplies are obtained.</p>   |
| <p>3. Ms. Komaru asked if there will be another drought.</p>  | <p>Another drought will occur. However, the timing is uncertain.</p>   |
| <p>4. Ms. Komaru asked what TAF and MGD stands for.</p>   | <p>TAF stands for thousand acre-feet. A thousand acre-feet provides enough water for one household of four people for a year. MGD stands for million gallons per day.</p>  |

## **APPENDIX D. EBMUD BOARD RESOLUTIONS**

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## APPENDIX D. EBMUD BOARD RESOLUTIONS

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Approved as to  
Form & Legality

*RB*  
General Counsel

### RESOLUTION NO. 32568

#### ADOPTING URBAN WATER SHORTAGE CONTINGENCY PLAN, A SUPPLEMENT TO THE EBMUD URBAN WATER MANAGEMENT PLAN

Introduced by Director Gioia ; Seconded by Director McKenney

WHEREAS in 1985 the Board of Directors of East Bay Municipal Utility District adopted an Urban Water Management Plan in accordance with the requirements of the California Urban Water Management Planning Act (Water Code Sections 10610 et seq.); and the Plan was updated in accordance with applicable law and adopted by the Board on March 12, 1991; and

WHEREAS recent legislation requires that the District add a Contingency Plan for periods of water shortage and file it with the California Department of Water Resources by January 31, 1992; and

WHEREAS a draft of the Contingency Plan was made available for public inspection in December, 1991 and all comments received from the public and from public agencies have been reviewed and considered; and a duly noticed public hearing was conducted by this Board of Directors on January 14, 1992, prior to adoption of the proposed revisions to the District's plan, all in accordance with the Urban Water Management Planning Act, as amended.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors does hereby adopt the Urban Water Shortage Contingency Plan Supplement to, the East Bay Municipal Utility District Urban Water Management Plan, and directs the Secretary to file a copy of the plan with the California Department of Water Resources by January 31, 1992. The Secretary is further directed to make the plan available for public review during normal District business hours.

ADOPTED this 28th day of January, 1992 by the following vote:

A Y E S: Directors Cohen, Coleman, Flashman, Gioia, McKenney and President Nadel.

NOES: None.

ABSENT: Director Simmons.

ABSTAIN: None.

Nancy J. Nadel

President

**ATTEST:**

Paula E. Malcom

Secretary

## **EBMUD BOARD RESOLUTION ADOPTING THE UWMP 2005**

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RESOLUTION NO. 33508-05

### **ADOPTING UPDATED EBMUD URBAN WATER MANAGEMENT PLAN**

Introduced by Director Richardson ; Seconded by Director Linney

WHEREAS, the California Urban Water Management Planning Act ("Act") (Water Code §§ 10610 et seq.) requires urban water suppliers to adopt urban water management plans; and

WHEREAS, the Act requires that an urban water management plan be periodically reviewed once every five years and that changes to the plan be made which are indicated by such review; and

WHEREAS, the East Bay Municipal Utility District ("District") last updated its Urban Water Management Plan in 2001; and

WHEREAS, the District commenced a review of its existing Urban Water Management Plan in 2005, and based upon such review has prepared a revised and updated District Urban Water Management Plan (Plan) for adoption in 2005; and

WHEREAS, a draft of the updated Urban Water Management Plan has been made available for public inspection and all comments received from the public and from public agencies have been reviewed and considered; and a duly noticed public hearing was conducted by this Board of Directors on November 22, 2005 prior to adoption of the proposed revisions to the District's Urban Water Management Plan, all in accordance with the Act.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the East Bay Municipal Utility District does hereby adopt the District Urban Water Management Plan dated November 2005, and directs the Secretary to file a copy of the Plan with the California Department of Water

Resources, and to distribute copies of the Plan to the cities and two counties within the District's service area, within thirty (30) days of this action. The Secretary is further directed to make the Plan available for public review during normal District business hours.

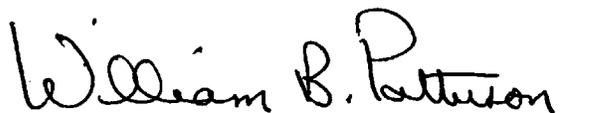
ADOPTED this 22<sup>nd</sup> day of November, 2005 by the following vote:

AYES: Directors Coleman, Foulkes, Linney, McIntosh, Mellon, Richardson, and President Patterson.

NOES: None.

ABSENT: None.

ABSTAIN: None.

  
\_\_\_\_\_  
President

ATTEST:

  
\_\_\_\_\_  
Secretary

APPROVED AS TO FORM AND PROCEDURE:

  
\_\_\_\_\_  
General Counsel



## **APPENDIX E. EBMUD POLICIES AND RATES**

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## APPENDIX E. EBMUD POLICIES AND RATES

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# Policy 7.03

EFFECTIVE 08 FEB 05

SUPERSEDES 24 SEP 02

### EMERGENCY PREPAREDNESS

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IT IS THE POLICY OF EAST BAY MUNICIPAL UTILITY DISTRICT TO:

Create and maintain an active Emergency Preparedness Program that includes an Emergency Operations Plan (EOP) to help manage the District's critical functions during any emergency and protect the safety of staff. The District will coordinate the EOP function and response with those responders from other public and private entities and organizations charged with emergency duties.

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#### **Emergency**

Emergency means the actual or threatened existence of conditions of disaster or of extreme peril to the provision of critical District functions and the health and safety of staff or the public, caused by such conditions as fire, severe storm, riot, hazardous materials release, earthquake, power outage, dam failure, freeze, water supply contamination, national security incident, and other conditions which may be beyond the capability of the services, personnel, equipment and facilities of this District, and may require the combined forces of other political subdivisions to help respond.

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#### **Emergency Preparedness Program**

The Board of Directors has authorized, with this policy, the establishment of an Emergency Preparedness Program, which consists of the nationally recognized four phases of emergency management: mitigation, preparedness/planning, response and recovery. District actions will include developing and maintaining a District-wide EOP identifying and training District staff to activate and use the plan, appointing District staff to critical positions identified in the EOP, and appointing staff to represent the District in negotiations or consultations with public and private agencies on matters pertaining to response to the emergency and recovery of damaged systems and financial costs incurred during the emergency. The Regulatory Compliance Office will facilitate progress on this program.

---

#### **Standardized Emergency Management System**

The State Office of Emergency Services regulates the Standardized Emergency Management System (SEMS), which was created by Government Code § 8607 following the 1991 East Bay Hills Firestorm. To ensure reimbursement for claims filed after a disaster, all District emergency plans, procedures, and training will follow the SEMS regulations, and coordinate with the District-wide EOP.

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#### **Authorization During District Emergencies**

When an emergency condition arises necessitating immediate action to minimize damage and inconvenience resulting from such condition, the General Manager or successor, in consultation with the President of the Board of Directors, is authorized to enter into emergency contracts not to exceed \$350,000, per contract, without bids or notice.

At the next regular or special meeting of the Board of Directors following such emergency, a report shall be made to the Board summarizing all expenditures made and contracts entered in response to said emergency.

Following a Presidential Declaration of an emergency, the federal government historically deploys personnel, equipment and financial resources to support the recovery effort. The Emergency Operations Director (EOD) or designee is authorized to take all necessary action to complete the application procedures to access the incoming resources and to represent the District in negotiating for the needed resources.

**Emergency Preparedness**

NUMBER 7.03

PAGE NO.: 2

EFFECTIVE DATE 08 FEB 05

**Emergency Operations Director**

The District EOP will identify a District manager to serve as the EOD who will have the authority for developing plans, training staff and activating the EOP. In consultations with the General Manager, the EOD will identify staff to fulfill the planning and response duties listed in the emergency plan. As the need arises, the EOD may direct all human or material resources owned by the District to combat the effects of a threatened or actual emergency.

**Mutual Aid/ Assistance**

The California Master Mutual Aid Agreement (Government Code §§8561, 8615 and 8617) allows for the implementation of mutual aid during threatened, actual, or declared emergencies. The General Manager, EOD, and their successors, in accordance with the EOP, may request mutual aid/assistance from other local government and public agencies, or commit District resources to other agencies requesting aid. The General Manager may sign appropriate documents to implement mutual aid/assistance, emergency intertie, and other emergency response agreements.

**Continuity of Management**

The District's EOP will list at least three successors to critical staff identified in the plan, including the General Manager. In the event the primary person is unable to respond to an emergency, each successor, in order, may assume all the duties and powers of the primary staff.

**Business Continuity**

As important as its response to an emergency, the District must be able to ensure its ability to maintain its business practices, return to business as quickly as possible following an emergency or disaster, and respond to customer concerns. To meet this demand, each department will maintain a Business Continuity Plan (BCP) that outlines the critical functions that must be performed before, during and after a disaster, the personnel responsible for completing the necessary actions, and the records, equipment and systems required to accomplish the identified tasks. The departments are responsible to ensure that the BCPs are maintained, employees trained, and the vital records necessary to maintain operations are available. Vital information and records include all information and records whose loss would place significant financial, operational or legal restrictions on the continuance of District services.

**Status Reports**

The General Manager will provide Emergency Preparedness Program progress reports to the Board of Directors as part of the Regulatory Compliance Office's semi-annual reports. Additional reports, as necessary, will be given to the Board on the effectiveness of the plan and District response to a declared District Emergency.

**Authority**

Resolution No. 33014-96, November 12, 1996  
 As amended by Resolution No. 32403, October 23, 1990  
 As amended by Resolution No. 33027-02, September 24, 2002  
 As amended by Resolution No. 33460-05, February 8, 2005  
 Resolution No. 32874-94 on Records Security (formerly Policy 35)  
 MUD Act §12753

**Emergency Preparedness**

NUMBER 7.03

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EFFECTIVE DATE 08 FEB 05

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**References**

- District Emergency Operations Plan (EOP)
  - Procedure 122 - Emergency Purchases
  - Policy 7.13 – Security
  - MUD Act
  - California Master Mutual Aid Agreement
  - Standardized Emergency Management System
-



# Policy 8.01

EFFECTIVE 28 SEP 04

SUPERSEDES 09 APR 96

## NONPOTABLE WATER

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IT IS THE POLICY OF EAST BAY MUNICIPAL UTILITY DISTRICT TO:

Require that customers of the East Bay Municipal Utility District (“EBMUD” or “District”) use nonpotable water for nondomestic purposes when it is of adequate quality and quantity, available at reasonable cost, not detrimental to public health and not injurious to plant life, fish and wildlife. When nonpotable water satisfying these conditions is made available to the customer, the use of potable water for nondomestic purposes may constitute a waste and unreasonable use of water within the meaning of Section 2 of Article X of the California Constitution and is prohibited.

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### Findings Related To Use Of Nonpotable Water

In its Updated Water Supply Management Program the Board of Directors of EBMUD determined that existing water supplies will not adequately accommodate existing and future demand within the District’s Ultimate Service Boundary. Nonpotable water resources, including the wastewater discharged to the San Francisco Bay from EBMUD and other Bay Area treatment plants, could provide a safe and effective water supply alternative for certain nonpotable purposes, increase the availability of the limited water supplies of the District, assure nonpotable water customers of a more reliable water supply during periods of drought, reduce wastewater discharges to the Bay, and provide EBMUD with greater flexibility to meet instream needs in the Mokelumne River. The State Legislature has also determined that the use of potable domestic water for certain nonpotable uses may constitute a waste or unreasonable use of water if recycled water is available which meets specified conditions. (Water Code section 13550 et seq.)

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### Definitions

Nonpotable Water. All reclaimed, recycled, reused, or untreated water supplies that meet the conditions set forth in the California Water Code, Section 13550 and are determined by the District to be suitable for non-domestic purposes and feasible for the particular intended use.

Nondomestic Uses. For purposes of this policy, “nondomestic uses” shall mean all applications except drinking, culinary purposes and the processing of products intended for direct human consumption.

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### Mandated Uses Of Nonpotable Water

Customers may be required to use nonpotable water for their nondomestic needs which may include, but are not limited to, the following:

- irrigation of cemeteries, golf courses, playing fields, parks, and residential and nonresidential landscaped areas;
  - commercial and industrial process uses; and
  - toilet and urinal flushing in nonresidential buildings.
-

**Nonpotable Water**

NUMBER 8.01

PAGE NO.: 2

EFFECTIVE DATE

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|   |   |
|---|---|
| <b>Determination Of Feasibility Of Nonpotable Water</b> | <p>In determining whether nonpotable water is feasible for a particular nondomestic use, the District shall consider the following factors:</p> <ul style="list-style-type: none"> <li>• Whether the nonpotable water may be furnished for the intended use at a reasonable cost to the customer and the District.</li> <li>• Whether the nonpotable water is of adequate quality for the intended use and does not require significant additional on-site treatment beyond that required for potable water.</li> <li>• Whether the use of nonpotable water is consistent with all applicable federal, state, and local laws and regulations.</li> <li>• Whether the use of nonpotable water will not be detrimental to the public health and will not adversely affect plant life, fish and wildlife.</li> </ul> |
| <hr/>   |   |
| <b>Regulations Governing Nonpotable Service</b>         | <p>The regulations governing nonpotable water service and the rates therefore shall be determined by the Board of Directors and published in the Regulations Governing Water Service and Schedule of Rates and Charges for Customers of East Bay Municipal Utility District.</p>  |
| <hr/>   |   |
| <b>Water Reuse Zones</b>                                | <p>The District designates Water Reuse Zones within the District's service area where nonpotable water service has been determined to be reasonably available.</p>  |
| <hr/>   |   |
| <b>Nonpotable Water Service Agreements</b>              | <p>Where implementation of the Policy requires agreements, such agreements shall, wherever possible, have a term of 20 or more years and shall include provisions governing facilities operation and maintenance responsibilities. Upon termination or expiration of an agreement, customers receiving nonpotable water service pursuant to that agreement shall be governed by the nonpotable water service regulations and rate schedule, unless a new agreement is entered into.</p>   |
| <hr/>   |   |
| <b>Authority</b>  | <p>Resolution No. 32981-96, April 9, 1996<br/>Amended by Resolution No. 33443-04, September 28, 2004</p>  |
| <hr/>   |   |
| <b>References</b>                                       | <p>Regulations Governing Water Service and Schedule of Rates and Charges for customers of East Bay Municipal Utility District</p>   |
| <hr/>   |   |



# Policy 9.03

EFFECTIVE 09 NOV 99

SUPERSEDES 09 MAY 89

## WATER SUPPLY AVAILABILITY AND DEFICIENCY

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IT IS THE POLICY OF THE EAST BAY MUNICIPAL UTILITY DISTRICT TO:

Evaluate the availability of the District's water supplies (supplies of the same or similar quality to that of the Mokelumne River supply) and determine the acceptable maximum level of average annual demand for the District's service area based on limiting the water supply deficiency to a maximum of 25% during an occurrence of the drought planning sequence described in the Final Environmental Impact Report for the Updated Water Supply Management Program, September 1993.

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**Annual Water Supplies Report** A review and report to the Board of Directors shall be made on the current and long-term adequacy of the District's water supplies on or about April 15 of each year. The report shall include an evaluation of the adequacy of the District's water supplies to satisfy customer demand for the immediate water year and through the year 2020. The report shall also include an estimate of any surplus in supplies over and above projected needs in the current year.

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**Projections** Projections shall be made of average annual demand for evaluating the adequacy of water supplies assuming:

- Water service will be provided in accordance with the District's Regulations Governing Water Service to Customers.
- Water conservation and reclamation programs will be implemented as provided in the District's September 1993 Updated Water Supply Management Program.

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**Supplemental Supplies** The District shall consider appropriate demand management measures and/or implementation of supplemental supplies if existing supplies are found to be inadequate either for the current year or through the year 2020.

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**Authority** Resolution No. 33175-99, November 9, 1999,  
Amended by Resolution No. 32,204, May 9, 1989  
Amended by Resolution 31,246, May 14, 1985.

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**References** Policy 3.01 - Annexations  
Policy 3.05 - Effects of Extension of Water Beyond the Ultimate Service Boundary  
Policy 3.07 - Responsibility to Serve Water Customers  
Policy 9.02 - Interruptible Sale of Surplus Water

Final Environmental Impact Report for the Updated Water Supply Management Program  
Volume 1, September 14, 1993

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**SECTION 29****PROHIBITING WASTEFUL USE OF WATER****A. REGULATIONS AND RESTRICTIONS ON WATER USE**

It is hereby declared by the Board of Directors that in order to conserve the District's water supply for the greatest public benefit, and to reduce the quantity of water used by the District's customers, that wasteful use of water should be eliminated. Customers of the District shall observe the following regulations and restrictions on water use:

1. Residential Customers shall:
  - a. Use water for lawn or gardening watering, or any other irrigation, in a manner which does not result in excessive flooding or runoff in gutters or other waterways, patios, driveways, walks or streets;
  - b. Use water for washing sidewalks, walkways, driveways, patios, parking lots, tennis courts or other hard-surfaced areas in a manner which does not result in excessive runoff or waste;
  - c. Use water for washing cars, boats, trailers or other vehicles and machinery, preferably from a hose equipped with a shutoff nozzle, in a manner which does not result in excessive runoff or waste;
  - d. Reduce other interior or exterior uses of water to minimize or eliminate excessive runoff or waste; and
  - e. Repair leaks wherever feasible.
2. Nonresidential Customers shall:
  - a. Use systems which recycle water where feasible; Single pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains shall be prohibited;
  - b. Use water for lawn or garden watering, or any other irrigation, in a manner which does not result in excessive flooding or runoff in gutters or other waterways, patios, driveways, walks or streets;
  - c. Use water for washing sidewalks, walkways, driveways, patios, parking lots, tennis courts or other hard-surfaced areas in a manner which does not result in excessive runoff or waste;
  - d. Limit sewer flushing or street washing with District water as much as possible, consistent with public health and safety needs; and



**PROHIBITING WASTEFUL USE OF WATER  
(Continued)**

- 2. Nonresidential Customers shall (Continued):
  - e. Reduce other interior or exterior water uses to minimize or eliminate excessive runoffs or waste; and
  - f. Repair leaks wherever feasible.

**B. EXCEPTIONS**

Consideration of written applications for exceptions regarding regulations and restrictions on water use set forth in this Section shall be as follows:

- 1. Written applications for exceptions shall be accepted, and may be granted, by the Manager of the Customer Service Division.
- 2. Denials of applications may be appealed in writing to the General Manager;
- 3. Grounds for granting such applications are:
  - a. Failure to do so would cause an unnecessary and undue hardship to the Applicant, including, but not limited to, adverse economic impacts, such as loss of production or jobs; or
  - b. Failure to do so would cause a condition affecting the health, sanitation, fire protection or safety of the Applicant or the public.

**C. ENFORCEMENT**

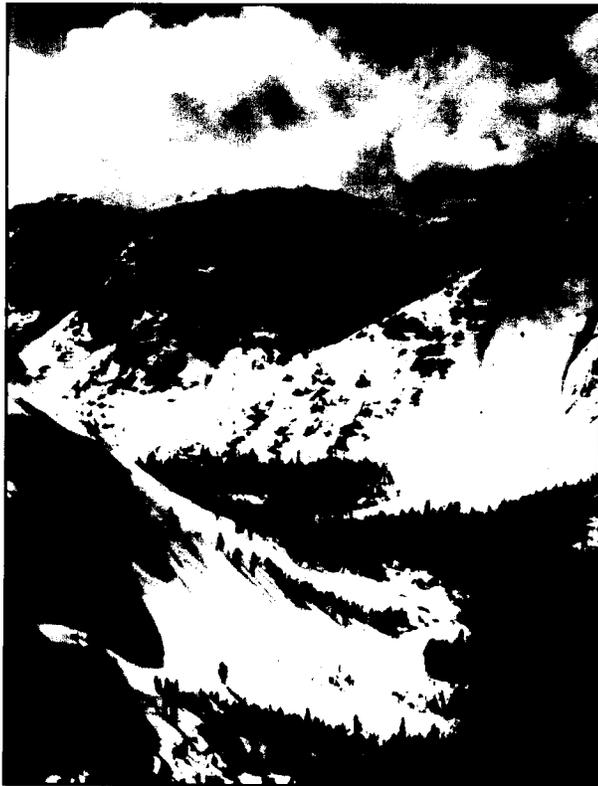
- 1. The District may, after one written warning, order that a special meter reading or readings be made in order to ascertain whether wasteful use of water is occurring. Charges for such a meter reading or readings or for follow-up visits by District staff shall be fixed by the Board from time to time and shall be paid by the customer.
- 2. In the event that the District observes that apparently excessive water use is occurring at a customer's premises, the General Manager or the Manager of Administration may, after a written warning to the customer, authorize installation of a flow-restricting device on the service line for any customer observed by District personnel to be willfully violating any of the regulations and restrictions on water use set forth in this section.
- 3. In the event that a further willful violation is observed by District personnel, the District may discontinue service. Charges for installation of flow-restricting devices or for restoring service may be fixed by the Board from time to time.

# EBMUD WATER RATES



## East Bay Municipal Utility District Water Rates

Effective July 1, 2005



*The East Bay Municipal Utility District water rates reflect the costs to support the District's Seismic Improvement Program to strengthen your water delivery system against the likely effects of a major earthquake on the Hayward Fault, which may occur some time within the next 30 years.*

### EAST BAY MUNICIPAL UTILITY DISTRICT WATER RATES Effective July 1, 2005

For billing periods beginning on or after July 1, 2005.

Bills for all metered services, except for Private Fire Services, consist of four elements: a Service Charge and a Seismic Improvement Program (SIP) Surcharge based on the size of a standard meter, a SIP surcharge for each Single Family Residential or Multiple Family Residential account, a Charge for Water Delivered and an Elevation Surcharge. The SIP Surcharge is effective on each water bill through February 28, 2025.

#### ONE-MONTH BILLING

FIRST — A Service Charge based on the size of the water meter.

| Meter Size (Inches) Charge | Service Charge Amount | + | Seismic Improvement Surcharge | = | Total    |
|----------------------------|-----------------------|---|-------------------------------|---|----------|
| 5/8 or 3/4 (homes)         | \$ 8.34               |   | \$ .80                        |   | \$ 9.14  |
| 1                          | 12.93                 |   | 2.00                          |   | 14.93    |
| 1-1/2                      | 20.37                 |   | 4.00                          |   | 24.37    |
| 2                          | 29.38                 |   | 6.40                          |   | 35.78    |
| 3                          | 50.42                 |   | 12.00                         |   | 62.42    |
| 4                          | 80.52                 |   | 20.00                         |   | 100.52   |
| 6                          | 155.69                |   | 40.00                         |   | 195.69   |
| 8                          | 245.90                |   | 64.00                         |   | 309.90   |
| 10                         | 351.13                |   | 92.00                         |   | 443.13   |
| 12                         | 486.45                |   | 128.00                        |   | 614.45   |
| 14                         | 621.77                |   | 164.00                        |   | 785.77   |
| 16                         | 787.15                |   | 208.00                        |   | 995.15   |
| 18                         | 952.55                |   | 252.00                        |   | 1,204.55 |

#### TWO-MONTH BILLING

| Meter Size (Inches) Charge | Service Charge Amount | + | Seismic Improvement Surcharge | = | Total    |
|----------------------------|-----------------------|---|-------------------------------|---|----------|
| 5/8 or 3/4 (homes)         | \$ 16.68              |   | \$ 1.60                       |   | \$ 18.28 |
| 1                          | 25.86                 |   | 4.00                          |   | 29.86    |
| 1-1/2                      | 40.74                 |   | 8.00                          |   | 48.74    |
| 2                          | 58.76                 |   | 12.80                         |   | 71.56    |
| 3                          | 100.84                |   | 24.00                         |   | 124.84   |
| 4                          | 161.04                |   | 40.00                         |   | 201.04   |
| 6                          | 311.38                |   | 80.00                         |   | 391.38   |
| 8                          | 491.80                |   | 128.00                        |   | 619.80   |
| 10                         | 702.26                |   | 184.00                        |   | 886.26   |
| 12                         | 972.90                |   | 256.00                        |   | 1,228.90 |
| 14                         | 1,243.54              |   | 328.00                        |   | 1,571.54 |
| 16                         | 1,574.30              |   | 416.00                        |   | 1,990.30 |
| 18                         | 1,905.10              |   | 504.00                        |   | 2,409.10 |

When a meter larger than 4 inches is required for a single-family residential customer in order to maintain adequate water pressure, the maximum service charge amount and seismic improvement surcharge shall be set at the 4-inch meter level.

The Service Charge and Seismic Improvement Program Surcharge for a special type of meter or for a battery of meters installed on one service in lieu of one meter will be based on the size of a single standard meter of equivalent capacity as determined by the District.

**SECOND - An additional flat Seismic Improvement Program Surcharge for each Single Family Residential or Multiple Family Residential account.**

**SEISMIC IMPROVEMENT PROGRAM SURCHARGE**  
(per bimonthly billing)

|  |        |
|--|--------|
| Single Family Residential Accounts.....    | \$1.60 |
| Multiple Family Residential Accounts ..... | \$7.52 |

**THIRD — Charges for Units of Water Delivered for both monthly and bimonthly billing. (One unit is 100 cubic feet, or 748 gallons.)**

**RATES FOR SINGLE FAMILY RESIDENTIAL ACCOUNTS**  
(per 100 cubic feet)

|   | Total Charge |
|---|--------------|
| First 172 gallons per day .....               | \$1.59       |
| 172 gpd up to 393 gpd .....                   | \$1.98       |
| For all water used in excess of 393 gpd ..... | \$2.42       |

**RATES FOR MULTIFAMILY RESIDENTIAL ACCOUNTS**  
(per 100 cubic feet)

|               |        |
|---------------|--------|
| All use ..... | \$2.06 |
|---------------|--------|

**ALL OTHER ACCOUNTS**  
(per 100 cubic feet)

|               | Charge | SIP Volume Surcharge | Total Charge |
|---------------|--------|----------------------|--------------|
| All use ..... | \$2.20 | \$0.08               | \$2.28       |

**NONPOTABLE WATER**  
(per 100 cubic feet)

|                          |        |
|--------------------------|--------|
| For all water used ..... | \$1.82 |
|--------------------------|--------|

**FOURTH — An Elevation Surcharge based on the energy costs of providing water. Applies to both monthly and bimonthly bills.**

| Elevation Band | Amount Per 100 Cu. Ft. |
|----------------|------------------------|
| 1 .....        | \$.00                  |
| 2 .....        | .30                    |
| 3 .....        | .64                    |

The Elevation Surcharge is determined by the pressure zone in which the service connection is located.

The Elevation Surcharge is determined by the pressure zone from which the service connection is served. Pressure zones are identified by designations which include elevation.

- Band 1 Pressure Zones serving elevations 0 through 200 feet (approximate). Pressure Zones served solely by gravity flow and no pumping required.
- Band 2 Pressure Zones serving elevations 200 through 600 feet (approximate). Pressure Zones require pumping.
- Band 3 Pressure Zones serving elevations above 600 feet. (approximate). Pressure Zones require considerable pumping.

**PRIVATE FIRE SERVICES**

Private Fire Services are charged a monthly or bimonthly service charge based on the size of the meter. When a meter larger than 4 inches is required for a single-family residential customer in order to maintain adequate water pressure, the maximum service charge amount and seismic improvement surcharge shall be set at the 4-inch meter level.

| Fire Service Charges - Monthly Meter Size (Inches) | Service Charge Amount | + Seismic Improvement Surcharge | = Total Charge |
|--|-----------------------|---------------------------------|----------------|
| 5/8 or 3/4 (homes) .....                           | \$ 6.81               | \$ .80                          | \$ 7.61        |
| 1 .....  | 9.88                  | 2.00                            | 11.88          |
| 1-1/2 .....  | 14.85                 | 4.00                            | 18.85          |
| 2 .....  | 20.88                 | 6.40                            | 27.28          |
| 3 .....  | 34.95                 | 12.00                           | 46.95          |
| 4 .....  | 55.07                 | 20.00                           | 75.07          |
| 6 .....  | 105.36                | 40.00                           | 145.36         |
| 8 .....  | 165.69                | 64.00                           | 229.69         |
| 10 .....   | 236.07                | 92.00                           | 328.07         |
| 12 .....   | 326.57                | 128.00                          | 454.57         |
| 14 .....   | 417.06                | 164.00                          | 581.06         |
| 16 .....   | 527.69                | 208.00                          | 735.69         |
| 18 .....   | 638.31                | 252.00                          | 890.31         |

There is no charge for water used through fire services in extinguishing accidental fires, but any water lost through leakage or used in violation of EBMUD regulations shall be paid for at double the usual rate.

**ADDITIONAL INFORMATION**

Most customers are billed every two months. Meter reading and billing occur once a month for large commercial and industrial accounts. (NOTE: customers outside District boundaries pay double water delivery rates.)

For low-income families, EBMUD has a Customer Assistance Program (CAP) administered by the Salvation Army. To apply for CAP or to get more information, call (510) 268-0647.

For questions or problems concerning your water bill, water service, water pressure, or water quality, please call the EBMUD business office.

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# EBMUD WASTEWATER RATES



## EAST BAY MUNICIPAL UTILITY DISTRICT WASTEWATER RATES AND SERVICE CHARGES Effective July 1, 2005

Customers of EBMUD's Wastewater System have a charge on their bills for "EBMUD Wastewater Treatment."

### TREATMENT RATES

Each customer account is assigned a Business Classification Code (BCC) number. The BCC category and the rates charged are based on the typical strength and volume of wastes discharged from the type of account. The majority of accounts are residential. Strength is determined by extensive sampling and laboratory testing.

#### SINGLE FAMILY MONTHLY CHARGES (BCC 8800)

- A. **Service charge**..... \$4.54
- B. **SF Bay Residential Pollution Prevention Fee**..... 0.07
- C. **Strength charge**..... 4.39
- D. **Flow charge** of 47.2 cents per unit of flow up to a maximum of 10 units of wastewater discharge per month.  
(One unit = 100 cu. ft or 748 gallons)  
Maximum Flow Charge ..... 4.72
- E. **Total Single Family Charge (A+B+C+D)**  
Maximum Monthly Charge ..... 13.72

#### MULTIPLE DWELLING (2-4 units) MONTHLY CHARGES (BCC 6514)

- A. **Service charge** (per account) ..... \$4.54
- B. **SF Bay Residential Pollution Prevention Fee**  
(per dwelling unit) ..... 0.07
- C. **Strength charge** (per dwelling unit) ..... 4.39
- D. **Flow charge** of 47.2 cents per unit of flow per month up to a maximum of 10 units per dwelling unit.  
Maximum Flow Charge (Duplex) ..... 9.44  
Maximum Flow Charge (Triplex) ..... 14.16  
Maximum Flow Charge (Fourplex) ..... 18.88
- E. **Total Multiple Dwelling Charge (A+B+C+D)**  
Maximum Monthly Charge (Duplex) ..... 22.90  
Maximum Monthly Charge (Triplex) ..... 32.08  
Maximum Monthly Charge (Fourplex) ..... 41.26

**NON-RESIDENTIAL CHARGES**--Bills for the following business classifications are based on metered water consumption multiplied by a unit treatment charge.

- A. **Monthly service charge per meter** ..... \$4.54
- B. **Monthly SF Bay Commercial Pollution Prevention Fee** ... 4.63  
(Monthly Pollution Prevention Fee for BCC 6513 is \$0.35)

| C. BCC Business Classification                            | Treatment Charge<br>Per Unit |
|---|------------------------------|
| <b>Minimum monthly treatment charge</b> (except BCC 6513) | <b>\$4.39</b>                |
| 2010 Meat Products .....                                  | \$3.70                       |
| 2011 Slaughterhouses .....                                | 3.89                         |
| 2020 Dairy Product Processing .....                       | 2.91                         |
| 2030 Fruit and Vegetable Canning .....                    | 2.36                         |
| 2040 Grain Mills .....                                    | 2.49                         |
| 2050 Bakeries (including pastries) .....                  | 4.28                         |
| 2060 Sugar Processing .....                               | 2.20                         |
| 2077 Rendering Tallow .....                               | 7.96                         |

| BCC Business Classification                     | Treatment Charge<br>Per Unit |
|---|------------------------------|
| 2080 Beverage Manufacturing and Bottling .....  | 1.70                         |
| 2090 Specialty Foods Manufacturing .....        | 7.70                         |
| 2600 Pulp and Paper Products .....              | 2.12                         |
| 2810 Inorganic Chemicals Manufacturing .....    | 2.94                         |
| 2820 Synthetic Material Manufacturing .....     | 0.55                         |
| 2830 Drug Manufacturing .....                   | 1.24                         |
| 2840 Cleaning and Sanitation Products .....     | 2.65                         |
| 2850 Paint Manufacturing .....                  | 5.36                         |
| 2893 Ink and Pigment Manufacturing .....        | 1.76                         |
| 3110 Leather Tanning and Finishing .....        | 7.33                         |
| 3200 Earthenware Manufacturing .....            | 1.53                         |
| 3300 Primary Metals Manufacturing .....         | 1.18                         |
| 3400 Metal Products Fabricating .....           | 0.61                         |
| 3410 Drum and Barrel Manufacturing .....        | 7.35                         |
| 3470 Metal Coating .....                        | 0.67                         |
| 4500 Air Transportation .....                   | 0.90                         |
| 5812 Restaurants .....                          | 2.65                         |
| 6513 Apartment Buildings (5 or more units)..... | 1.13                         |
| \$21.95 minimum monthly treatment charge        |                              |
| 7000 Hotels, Motels with Food Service .....     | 1.89                         |
| 7210 Commercial Laundries .....                 | 1.59                         |
| 7215 Coin-operated Laundromats .....            | 1.17                         |
| 7218 Industrial Laundries .....                 | 4.55                         |
| 7300 Laboratories .....                         | 0.81                         |
| 7542 Automobile Washing and Polishing .....     | 1.11                         |
| 8060 Hospitals .....                            | 1.10                         |
| 8200 Schools .....                              | 0.75                         |
| All other BCCs .....                            | 1.13                         |

#### D. Total Non-Residential Charge = A+B+C

### PERMIT PROGRAM

**Discharge Estimation Permits** are available to customers who discharge more than 20 percent of their metered water consumption by means other than the sanitary sewer, or whose wastewater strength is not within normal ranges of wastewater strength for the customer's BCC.

**Discharge Minimization Permits** establish compliance reporting requirements, site-specific discharge limitations and industry self-monitoring requirements, and include provisions required by the EPA and State for unique wastewater strengths and flows.

**Discharge Prevention Permits** may be required of certain commercial customers who are subject to special regulation or source control.

Customers issued permits are required to pay applicable permit, monitoring and testing fees. For more information about the Permit Program and charges, call the Wastewater Department at (510) 287-1651.

If you have a question about or a problem concerning your bill, water or wastewater services, water pressure or water quality, please call the East Bay Municipal Utility District business office.

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B-046B • 6/05



**EAST BAY MUNICIPAL UTILITY DISTRICT  
WASTEWATER RATES AND SERVICE CHARGES for:**  
**State Agencies**                      **Public School Districts**  
**County Office of Education**      **Community College District**  
**California State University**      **University of California**  
**Effective July 1, 2005**

Customers of EBMUD's Wastewater System have a charge on their bills for "EBMUD Wastewater Treatment."

**TREATMENT RATES**

Each customer account is assigned a Business Classification Code (BCC) number. The BCC category and the rates charged are based on the typical strength and volume of wastes discharged from the type of account. The majority of accounts are residential. Strength is determined by extensive sampling and laboratory testing.

**SINGLE FAMILY MONTHLY CHARGES (BCC 8800)**

- A. **Service charge**..... \$4.30
- B. **SF Bay Residential Pollution Prevention Fee**.....0.07
- C. **Strength charge**..... 4.05
- D. **Flow charge** of 45.0 cents per unit of flow up to a maximum of 10 units of wastewater discharge per month.  
(One unit = 100 cu. ft or 748 gallons)  
Maximum Flow Charge ..... 4.50
- E. **Total Single Family Charge (A+B+C+D)**  
Maximum Monthly Charge ..... 12.92

**MULTIPLE DWELLING (2-4 units) MONTHLY CHARGES (BCC 6514)**

- A. **Service charge** (per account) ..... \$4.30
- B. **SF Bay Residential Pollution Prevention Fee**  
(per dwelling unit)..... 0.07
- C. **Strength charge** (per dwelling unit) ..... 4.05
- D. **Flow charge** of 45.0 cents per unit of flow per month up to a maximum of 10 units per dwelling unit.  
Maximum Flow Charge (Duplex)..... 9.00  
Maximum Flow Charge (Triplex)..... 13.50  
Maximum Flow Charge (Fourplex)..... 18.00
- D. **Total Multiple Dwelling Charge (A+B+C+D)**  
Maximum Monthly Charge (Duplex)..... 21.54  
Maximum Monthly Charge (Triplex) ..... 30.16  
Maximum Monthly Charge (Fourplex)..... 38.78

**NON-RESIDENTIAL CHARGES**-Bills for the following business classifications are based on metered water consumption multiplied by a unit treatment charge.

- A. **Monthly service charge per meter**..... \$4.30
- B. **Monthly SF Bay Commercial Pollution Prevention Fee**..... 4.63  
(Monthly Pollution Prevention Fee for BCC 6513 is \$0.35)

| C. BCC Business Classification                            | Treatment Charge<br>Per Unit |
|---|------------------------------|
| <b>Minimum monthly treatment charge</b> (except BCC 6513) | <b>\$4.05</b>                |
| 2010 Meat Products .....                                  | \$3.44                       |
| 2011 Slaughterhouses .....                                | 3.60                         |
| 2020 Dairy Product Processing.....                        | 2.71                         |
| 2030 Fruit and Vegetable Canning .....                    | 2.19                         |
| 2040 Grain Mills.....                                     | 2.31                         |
| 2050 Bakeries (including pastries) .....                  | 3.97                         |
| 2060 Sugar Processing .....                               | 2.05                         |
| 2077 Rendering Tallow .....                               | 7.35                         |

| BCC Business Classification                     | Treatment Charge<br>Per Unit |
|---|------------------------------|
| 2080 Beverage Manufacturing and Bottling .....  | 1.59                         |
| 2090 Specialty Foods Manufacturing .....        | 7.14                         |
| 2600 Pulp and Paper Products .....              | 1.97                         |
| 2810 Inorganic Chemicals Manufacturing .....    | 2.72                         |
| 2820 Synthetic Material Manufacturing .....     | 0.53                         |
| 2830 Drug Manufacturing.....                    | 1.16                         |
| 2840 Cleaning and Sanitation Products.....      | 2.47                         |
| 2850 Paint Manufacturing .....                  | 4.96                         |
| 2893 Ink and Pigment Manufacturing.....         | 1.65                         |
| 3110 Leather Tanning and Finishing .....        | 6.79                         |
| 3200 Earthenware Manufacturing .....            | 1.42                         |
| 3300 Primary Metals Manufacturing .....         | 1.10                         |
| 3400 Metal Products Fabricating.....            | 0.57                         |
| 3410 Drum and Barrel Manufacturing .....        | 6.81                         |
| 3470 Metal Coating.....                         | 0.64                         |
| 4500 Air Transportation .....                   | 0.85                         |
| 5812 Restaurants.....                           | 2.46                         |
| 6513 Apartment Buildings (5 or more units)..... | 1.05                         |
| \$20.25 minimum monthly treatment charge        |                              |
| 7000 Hotels, Motels with Food Service .....     | 1.76                         |
| 7210 Commercial Laundries .....                 | 1.49                         |
| 7215 Coin-operated Laundromats .....            | 1.10                         |
| 7218 Industrial Laundries.....                  | 4.23                         |
| 7300 Laboratories .....                         | 0.76                         |
| 7542 Automobile Washing and Polishing .....     | 1.04                         |
| 8060 Hospitals .....                            | 1.03                         |
| 8200 Schools .....                              | 0.71                         |
| All other BCCs.....                             | 1.05                         |

**D. Total Non-Residential Charge = A+B+C**

**PERMIT PROGRAM**

**Discharge Estimation Permits** are available to customers who discharge more than 20 percent of their metered water consumption by means other than the sanitary sewer, or whose wastewater strength is not within normal ranges of wastewater strength for the customer's BCC.

**Discharge Minimization Permits** establish compliance reporting requirements, site-specific discharge limitations and industry self-monitoring requirements, and include provisions required by the EPA and State for unique wastewater strengths and flows.

**Discharge Prevention Permits** may be required of certain commercial customers who are subject to special regulation or source control.

Customers issued permits are required to pay applicable permit, monitoring and testing fees. For more information about the Permit Program and charges, call the Wastewater Department at (510) 287-1651.

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## **APPENDIX F. 2003 AND 2004 CUWCC ANNUAL REPORTS**

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## APPENDIX F. 2003 AND 2004 CUWCC ANNUAL REPORTS

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### Base Year Data

Reporting Unit:  
**East Bay Municipal Utility District (EBMUD)**

Submitted to  
**CUWCC**  
 12/03/2000

1. Your **BASE YEAR is 1997.**

NOTE: Many calculations in determining credit history and coverage requirements are contingent on your BASE YEAR, which is calculated based on the following criteria. If a Signatory signed the MOU in 1997 or earlier, then the Base Year is 1997. If a Signatory signed the MOU after 1997, then the Base Year is the year the MOU was signed. The same holds true for USBR Contractors, except the date their Base Year is calculated from is the date that their Plan was noticed in the Federal Register.

#### **BMP 1**

|  |        |
|--|--------|
| 2. Number of single-family customers in 1997 | 300046 |
| 3. Number of multi-family units in 1997      | 185000 |

#### **BMPs 2 and 14**

|  |        |
|--|--------|
| 4. Number of single-family housing units constructed prior to 1992 | 280750 |
| 5. Number of multi-family units prior to 1992                      | 164062 |

#### **BMP 4**

|   |   |
|---|---|
| 6. Number of unmetered accounts in 1997 | 0 |
|---|---|

#### **BMPs 5 and 9**

|   |       |
|---|-------|
| 7. Number of commercial accounts in 1997  | 15139 |
| 8. Number of industrial accounts in 1997  | 2223  |
| 9. Number of institutional accounts in 1997   | 3566  |
| 10. Total water use (AF) by commercial, industrial and institutional accounts in 1997 | 60355 |

#### **BMP 14**

|   |      |
|---|------|
| 11. Average number of toilets per single-family household     | 2.1  |
| 12. Average number of toilets per multi-family household      | 1.4  |
| 13. Five-year average resale rate of single-family households | 13   |
| 14. Five-year average resale rate of multi-family households  | 28.5 |
| 15. Average persons per single-family household               | 2.7  |
| 16. Average persons per multi-family household                | 1.8  |

**Water Supply & Reuse**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** Year: **2003**

| Supply Source Name | Quantity (AF) Supplied | Supply Type     |
|--------------------|------------------------|-----------------|
| Mokelumne          | 212508                 | Imported        |
| local storage      | 26265                  | Local Watershed |

**Total AF: 238773**

**Accounts & Water Use**

Reporting Unit Name: **East Bay Municipal Utility District (EBMUD)** Submitted to CUWCC: **05/29/2004** Year: **2003**

**A. Service Area Population Information:**

1. Total service area population 1300000

**B. Number of Accounts and Water Deliveries (AF)**

| Type                    | Metered         |                       | Unmetered       |                       |
|-------------------------|-----------------|-----------------------|-----------------|-----------------------|
|                         | No. of Accounts | Water Deliveries (AF) | No. of Accounts | Water Deliveries (AF) |
| 1. Single-Family        | 318796          | 102638                | 0               | 0                     |
| 2. Multi-Family         | 27726           | 36816                 | 0               | 0                     |
| 3. Commercial           | 18595           | 21363                 | 0               | 0                     |
| 4. Industrial           | 2027            | 25084                 | 0               | 0                     |
| 5. Institutional        | 1290            | 6726                  | 0               | 0                     |
| 6. Dedicated Irrigation | 5044            | 15964                 | 0               | 0                     |
| 7. Recycled Water       | 6               | 6720                  | 0               | 0                     |
| 8. Other                | 0               | 0                     | 0               | 0                     |
| 9. Unaccounted          | NA              | 14214                 | NA              | 0                     |
| <b>Total</b>            | <b>373484</b>   | <b>229525</b>         | <b>0</b>        | <b>0</b>              |

**Metered Unmetered**

Reported as of 8/30/05

**BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2003**

**A. Implementation**

- Based on your signed MOU date, 02/28/1994, your Agency STRATEGY DUE DATE is: 02/28/1996
- Has your agency developed and implemented a targeting/marketing strategy for SINGLE-FAMILY residential water use surveys? **yes**
  - If YES, when was it implemented? 7/1/1989
- Has your agency developed and implemented a targeting/marketing strategy for MULTI-FAMILY residential water use surveys? **yes**
  - If YES, when was it implemented? 7/1/1989

**B. Water Survey Data**

| Survey Counts:                  | Single Family Accounts | Multi-Family Units |
|---------------------------------|------------------------|--------------------|
| 1. Number of surveys offered:   | 318796                 | 27726              |
| 2. Number of surveys completed: | 6058                   | 3960               |

**Indoor Survey:**

- Check for leaks, including toilets, faucets and meter checks **yes yes**
- Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary **yes yes**
- Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary **yes yes**

**Outdoor Survey:**

- Check irrigation system and timers **yes yes**
- Review or develop customer irrigation schedule **yes yes**
- Measure landscaped area (Recommended but not required for surveys) **yes yes**
- Measure total irrigable area (Recommended but not required for surveys) **yes yes**
- Which measurement method is typically used (Recommended but not required for surveys) **Pacing**
- Were customers provided with information packets that included evaluation results and water savings recommendations? **yes yes**
- Have the number of surveys offered and completed, survey results, and survey costs been tracked? **yes yes**

- If yes, in what form are surveys tracked? **database**
- Describe how your agency tracks this information.

The District's Oracle Enterprise Database with the adjunct conservation and GIS databases provide the necessary information to track and evaluate the water conservation program

**C. Water Survey Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 275000    | 275000    |
| 2. Actual Expenditures   | 361253    |           |

**D. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? **No**
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

District total water conservation budget of \$5.2 million is moved among the different programs

**BMP 02: Residential Plumbing Retrofit**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

- 1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? yes
  - a. If YES, list local jurisdictions in your service area and code or ordinance in each:
 

City and County Uniform Plumbing Code
- 2. Has your agency satisfied the 75% saturation requirement for single-family housing units? yes
- 3. Estimated percent of single-family households with low-flow showerheads: 75%
- 4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? yes
- 5. Estimated percent of multi-family households with low-flow showerheads: 73%
- 6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

District conducted market penetration study in 2001. Flow rate was determined by actual measurements. The saturation of showerheads rated at 2.5 gpm or less may actually be higher.

**B. Low-Flow Device Distribution Information**

- 1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes
  - a. If YES, when did your agency begin implementing this strategy? 7/1/1988
  - b. Describe your targeting/ marketing strategy.

Distribute devices through residential water audits, through the District's direct install toilet program, at community events, and at District business offices.

| Low-Flow Devices Distributed/ Installed   | SF Accounts | MF Units |
|---|-------------|----------|
| 2. Number of low-flow showerheads distributed:  | 1618        | 1460     |
| 3. Number of toilet-displacement devices distributed:   | 532         | 62       |
| 4. Number of toilet flappers distributed:   | 181         | 143      |
| 5. Number of faucet aerators distributed:   | 2662        | 2875     |
| 6. Does your agency track the distribution and cost of low-flow devices? <span style="float: right;">yes</span> |             |          |

- a. If YES, in what format are low-flow devices tracked? Database
- b. If yes, describe your tracking and distribution system :

The District's Oracle Enterprise Database with the adjunct Conservation

and GIS databases provide the necessary information to track and evaluate the water conservation program

**C. Low-Flow Device Distribution Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 50000     | 50000     |
| 2. Actual Expenditures   | 40546     |           |

**D. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

District annual water conservation budget of \$5.2 million is allocated among programs during the year

**BMP 03: System Water Audits, Leak Detection and Repair**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

- 1. Has your agency completed a pre-screening system audit for this reporting year? yes
- 2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:
  - a. Determine metered sales (AF) 208592
  - b. Determine other system verifiable uses (AF) 11500
  - c. Determine total supply into the system (AF) 238773
  - d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.92
- 3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? yes
- 4. Did your agency complete a full-scale audit during this report year? no
- 5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? yes
- 6. Does your agency operate a system leak detection program? yes
  - a. If yes, describe the leak detection program:

The District maintains a leak detection vehicle and a two person crew to find leaks. There are monthly and quarterly audit reports.

**B. Survey Data**

- 1. Total number of miles of distribution system line. 4032
- 2. Number of miles of distribution system line surveyed. 400

**C. System Audit / Leak Detection Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 150000    | 175000    |
| 2. Actual Expenditures   | 175000    |           |

**D. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

The distribution system leak detection budget is separate from the water conservation budget and does not include annual repair costs of several million dollars.

**BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

- 1. Does your agency require meters for all new connections and bill by volume-of-use? yes
- 2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use? no
  - a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?
  - b. Describe the program:
- 3. Number of previously unmetered accounts fitted with meters during report year. 0

**B. Feasibility Study**

- 1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? no
  - a. If YES, when was the feasibility study conducted? (mm/dd/yy)
  - b. Describe the feasibility study:
- 2. Number of CII accounts with mixed-use meters. 20000
- 3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. 0

**C. Meter Retrofit Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 50000     |
| 2. Actual Expenditures   | 0         |           |

**D. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

The District has a program to replace old and faulty meters. That budget is not presented here.

**BMP 05: Large Landscape Conservation Programs and Incentives**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Water Use Budgets**

1. Number of Dedicated Irrigation Meter Accounts: 4000

2. Number of Dedicated Irrigation Meter Accounts with Water Budgets: 4000

3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF): 562

4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF): 371

5. Does your agency provide water use notices to accounts with budgets each billing cycle? yes

**B. Landscape Surveys**

1. Has your agency developed a marketing / targeting strategy for landscape surveys? yes

a. If YES, when did your agency begin implementing this strategy? 7/1/1991

b. Description of marketing / targeting strategy:

Direct mailings to top users, presentations to homeowner associations and public agencies, bill inserts, brochures in irrigation supply centers and distribution at community events, workshops for landscape professionals and large irrigators. Water budget program in progress with planned billing notification.

2. Number of Surveys Offered. 4000

3. Number of Surveys Completed. 229

4. Indicate which of the following Landscape Elements are part of your survey:

a. Irrigation System Check yes

b. Distribution Uniformity Analysis yes

c. Review / Develop Irrigation Schedules yes

d. Measure Landscape Area yes

e. Measure Total Irrigable Area yes

f. Provide Customer Report / Information yes

5. Do you track survey offers and results? yes

6. Does your agency provide follow-up surveys for previously completed surveys? yes

a. If YES, describe below:

**C. Other BMP 5 Actions**

1. An agency can provide mixed-use accounts with ETO-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets? no

2. Number of CII mixed-use accounts with landscape budgets. 0

3. Do you offer landscape irrigation training? yes

4. Does your agency offer financial incentives to improve landscape water use efficiency? yes

| Type of Financial Incentive: | Budget (Dollars/Year) | Number Awarded to Customers | Total Amount Awarded |
|------------------------------|-----------------------|-----------------------------|----------------------|
| a. Rebates                   | 50000                 | 59                          | 42953                |
| b. Loans                     | 0                     | 0                           | 0                    |
| c. Grants                    | 0                     | 0                           | 0                    |

5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes

a. If YES, describe below:

6. Do you have irrigated landscaping at your facilities? yes

a. If yes, is it water-efficient? yes

b. If yes, does it have dedicated irrigation metering? yes

7. Do you provide customer notices at the start of the irrigation season? yes

8. Do you provide customer notices at the end of the irrigation season? yes

**D. Landscape Conservation Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 200000    | 200000    |
| 2. Actual Expenditures   | 225000    |           |

**E. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**F. Comments**

District annual water conservation budget of \$5.2 million is moved around among program during the year.

Reported as of 8/30/05

Reported as of 8/30/05

**BMP 06: High-Efficiency Washing Machine Rebate Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

The District partners with other bay area water utilities and runs programs concurrent with PG&E programs.

2. Does your agency offer rebates for high-efficiency washers? yes

3. What is the level of the rebate? 150

4. Number of rebates awarded. 7285

**B. Rebate Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 900000    | 1000000   |
| 2. Actual Expenditures   | 920000    |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

**BMP 07: Public Information Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

The Water Conservation Division coordinates activities with the Public Information Office in promoting the public education program.

2. Indicate which and how many of the following activities are included in your public information program.

| Public Information Program Activity  | Yes/No | Number of Events |
|--|--------|------------------|
| a. Paid Advertising  | yes    | 20               |
| b. Public Service Announcement   | no     |                  |
| c. Bill Inserts / Newsletters / Brochures  | yes    | 20               |
| d. Bill showing water usage in comparison to previous year's usage                                     | yes    |                  |
| e. Demonstration Gardens   | yes    | 13               |
| f. Special Events, Media Events  | yes    | 23               |
| g. Speaker's Bureau  | yes    | 19               |
| h. Program to coordinate with other government agencies, industry and public interest groups and media | yes    |                  |

**B. Conservation Information Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5200000   | 5200000   |
| 2. Actual Expenditures   | 175000    |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

The District's annual budget of \$5.2 million is moved around among the different programs during the year.

**BMP 08: School Education Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2003**

**A. Implementation**

- Has your agency implemented a school information program to promote water conservation? yes
- Please provide information on your school programs (by grade level):

| Grade          | Are grade-appropriate materials distributed? | No. of class presentations | No. of students reached | No. of teachers' workshops |
|----------------|--|----------------------------|-------------------------|----------------------------|
| Grades K-3rd   | yes  | 0                          | 21000                   | 3                          |
| Grades 4th-6th | yes  | 0                          | 22000                   | 3                          |
| Grades 7th-8th | no   | 0                          | 0                       | 3                          |
| High School    | no   | 0                          | 0                       | 3                          |

- Did your Agency's materials meet state education framework requirements? yes
- When did your Agency begin implementing this program? 7/1/1989

**B. School Education Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 245000    | 250000    |
| 2. Actual Expenditures   | 240000    |           |

**C. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Education expenditure does not include water conservation education and outreach activities of \$700,000

**BMP 09: Conservation Programs for CII Accounts**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2003**

**A. Implementation**

- Has your agency identified and ranked COMMERCIAL customers according to use? yes
- Has your agency identified and ranked INDUSTRIAL customers according to use? yes
- Has your agency identified and ranked INSTITUTIONAL customers according to use? yes

**Option A: CII Water Use Survey and Customer Incentives Program**

- Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? yes

| CII Surveys   | Commercial Accounts | Industrial Accounts | Institutional Accounts |
|---|---------------------|---------------------|------------------------|
| a. Number of New Surveys Offered                                | 15500               | 2600                | 4000                   |
| b. Number of New Surveys Completed                              | 421                 | 10                  | 43                     |
| c. Number of Site Follow-ups of Previous Surveys (within 1 yr)  | 5                   | 5                   | 4                      |
| d. Number of Phone Follow-ups of Previous Surveys (within 1 yr) | 5                   | 5                   | 5                      |

| CII Survey Components  | Commercial Accounts | Industrial Accounts | Institutional Accounts |
|--|---------------------|---------------------|------------------------|
| e. Site Visit  | yes                 | yes                 | yes                    |
| f. Evaluation of all water-using apparatus and processes                                       | yes                 | yes                 | yes                    |
| g. Customer report identifying recommended efficiency measures, paybacks and agency incentives | yes                 | yes                 | yes                    |

| Agency CII Customer Incentives | Budget (\$/Year) | No. Awarded to Customers | Total \$ Amount Awarded |
|--------------------------------|------------------|--------------------------|-------------------------|
| h. Rebates                     | 185000           | 1                        | 7197                    |
| i. Loans                       | 0                | 0                        | 0                       |
| j. Grants                      | 0                | 0                        | 0                       |
| k. Others                      | 0                | 0                        | 0                       |

**Option B: CII Conservation Program Targets**

- Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option? yes
- Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? yes
- Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991. 500
- Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991. 2780

**B. Conservation Program Expenditures for CII Accounts**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5.2       | 5.2       |
| 2. Actual Expenditures   | 565000    |           |

**C. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

District annual water conservation budget of \$5.2 million is moved around among the different programs during the year.

**BMP 09a: CII ULFT Water Savings**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2003**

- Did your agency implement a CII ULFT replacement program in the reporting year? Yes  
If No, please explain why on Line B. 10.

**A. Targeting and Marketing**

- What basis does your agency use to target customers for participation in this program? Consumption ranking  
Potential savings  
CII ULFT Study subsector targeting  
Check all that apply.
  - Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.  
  
CII non-profit sector was the most effective overall and per dollar expended.
- How does your agency advertise this program? Check all that apply. Direct letter  
Bill message  
Telephone  
Trade shows and events
  - Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.  
  
Cold calling to word of mouth for churches was the most effective overall and in dollars expended.

**B. Implementation**

- Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.) Yes
- Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency? Yes
- What is the total number of customer accounts participating in the program during the last year? 21

| CII Subsector         | Number of Toilets Replaced |              |                   |                  |
|-----------------------|----------------------------|--------------|-------------------|------------------|
|                       | Standard Gravity Tank      | Air Assisted | Valve Floor Mount | Valve Wall Mount |
| 4. a. Offices         | 0                          | 0            | 0                 | 0                |
| b. Retail / Wholesale | 1                          | 0            | 0                 | 0                |
| c. Hotels             | 18                         | 0            | 0                 | 0                |
| d. Health             | 1                          | 0            | 0                 | 0                |
| e. Industrial         | 0                          | 0            | 0                 | 0                |
| f. Schools: K to 12   | 5                          | 0            | 0                 | 0                |
| g. Eating             | 2                          | 0            | 0                 | 0                |

|               |     |   |   |    |
|---------------|-----|---|---|----|
| h. Government | 0   | 0 | 0 | 0  |
| i. Churches   | 137 | 0 | 0 | 41 |
| j. Other      | 45  | 0 | 0 | 0  |

5. Program design.

|  |                     |
|--|---------------------|
|  | Rebate or voucher   |
|  | Direct installation |

6. Does your agency use outside services to implement this program? Yes

a. If yes, check all that apply.

|  |                                   |
|--|-----------------------------------|
|  | Plumbing contractors/subcontracts |
|  | Site Visit                        |

7. Participant tracking and follow-up.

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

|                                     |   |
|-------------------------------------|---|
| a. Disruption to business           | 2 |
| b. Inadequate payback               | 5 |
| c. Inadequate ULFT performance      | 1 |
| d. Lack of funding                  | 3 |
| e. American's with Disabilities Act | 1 |
| f. Permitting                       | 4 |
| g. Other. Please describe in B. 9.  | 0 |

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

Supervising the contract plumber's was problematic.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

Program objectives were achieved. Program costs were not cost effective.

**C. Conservation Program Expenditures for CII ULFT**

1. CII ULFT Program: Annual Budget & Expenditure Data

|                              | Budgeted | Actual Expenditure |
|------------------------------|----------|--------------------|
| a. Labor                     | 0        | 8513               |
| b. Materials                 | 0        | 0                  |
| c. Marketing & Advertising   | 0        | 276                |
| d. Administration & Overhead | 0        | 3150               |
| e. Outside Services          | 0        | 7924               |
| f. Total                     | 0        | 19863              |

2. CII ULFT Program: Annual Cost Sharing

|                                  |   |
|----------------------------------|---|
| a. Wholesale agency contribution | 0 |
| b. State agency contribution     | 0 |
| c. Federal agency contribution   | 0 |
| d. Other contribution            | 0 |
| e. Total                         | 0 |

**D. Comments**

**BMP 11: Conservation Pricing**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**

BMP Form Status: **100% Complete** Year: **2003**

**A. Implementation**

Rate Structure Data Volumetric Rates for Water Service by Customer Class

|  |                  |
|--|------------------|
| <b>1. Residential</b>  |                  |
| a. Water Rate Structure  | Increasing Block |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$112266000      |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$26334000       |
| <b>2. Commercial</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$15309000       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$359100         |
| <b>3. Industrial</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$25515000       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$5985000        |
| <b>4. Institutional / Government</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$8505000        |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$1995000        |
| <b>5. Irrigation</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$5805000        |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$1995000        |
| <b>6. Other</b>  |                  |
| a. Water Rate Structure  | Uniform          |

|  |         |
|--|---------|
| b. Sewer Rate Structure  | Uniform |
| c. Total Revenue from Volumetric Rates                                       | \$0     |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$0     |

**B. Conservation Pricing Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 0         |
| 2. Actual Expenditures   | 0         |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Volume charge is 80% of water revenue, service charge is 15% and elevation charge 5% of revenue.

Reported as of 8/30/05

Reported as of 8/30/05

**BMP 12: Conservation Coordinator**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

1. Does your Agency have a conservation coordinator? yes
2. Is this a full-time position? yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program? no
4. Partner agency's name:
5. If your agency supplies the conservation coordinator:
  - a. What percent is this conservation coordinator's position? 100%
  - b. Coordinator's Name Richard Harris
  - c. Coordinator's Title Water Conservation Manager
  - d. Coordinator's Experience and Number of Years 4 years in water conservation and 13 years in water and wastewater fields
  - e. Date Coordinator's position was created (mm/dd/yyyy) 4/1/1989
6. Number of conservation staff, including Conservation Coordinator: 21

**B. Conservation Staff Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5000000   | 5000000   |
| 2. Actual Expenditures   | 48        |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

**BMP 13: Water Waste Prohibition**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Requirements for Documenting BMP Implementation**

1. Is a water waste prohibition ordinance in effect in your service area? yes
  - a. If YES, describe the ordinance:
 

Section 29 of District regulations prohibit wasteful practices
2. Is a copy of the most current ordinance(s) on file with CUWCC? yes
  - a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box.
 

Alameda Section 29

**B. Implementation**

1. Indicate which of the water uses listed below are prohibited by your agency or service area:
    - a. Gutter flooding yes
    - b. Single-pass cooling systems for new connections yes
    - c. Non-recirculating systems in all new conveyor or car wash systems yes
    - d. Non-recirculating systems in all new commercial laundry systems yes
    - e. Non-recirculating systems in all new decorative fountains yes
    - f. Other, please name no
  2. Describe measures that prohibit water uses listed above.
 

Warnings and termination of service
- Water Softeners:**
3. Indicate which of the following measure your agency has supported in developing state law:
    - a. Allow the sale of more efficient, demand-initiated regenerating DIR models. yes
    - b. Develop minimum appliance efficiency standards that:
      - i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used. yes
      - ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. yes
    - c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. yes
  4. Does your agency include water softener checks in home water audit programs? no
  5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less

efficient timer models?

**C. Water Waste Prohibition Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 0         |
| 2. Actual Expenditures   | 0         |           |

**D. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

Water softeners not needed in EBMUD service area.

**BMP 14: Residential ULFT Replacement Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2003**

**A. Implementation**

| Replacement Method  | Number of Toilets Replaced by Agency Program During Report Year |                    |
|---|---|--------------------|
|   | SF Accounts   | Multi-Family Units |
| 1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets? <span style="float: right;">yes</span> | yes   | yes                |
| 2. Rebate   | 245   | 29                 |
| 3. Direct Install   | 0   | 0                  |
| 4. CBO Distribution   | 0   | 0                  |
| 5. Other  | 0   | 0                  |
| <b>Total</b>  | <b>245</b>  | <b>29</b>          |

6. Describe your agency's ULFT program for single-family residences.
 

Offered \$100 rebate for high efficiency toilets and \$25 rebate for 1.6 toilets
7. Describe your agency's ULFT program for multi-family residences.
 

Offered \$100 rebate for high efficiency toilets and \$50 for 1.6 toilets.
8. Is a toilet retrofit on resale ordinance in effect for your service area? no
9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

**B. Residential ULFT Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 150000    | 150000    |
| 2. Actual Expenditures   | 148000    |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

**Water Supply & Reuse**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** Year: **2004**  
**Water Supply Source Information**  

| Supply Source Name | Quantity (AF) Supplied | Supply Type     |
|--------------------|------------------------|-----------------|
| Mokelumne          | 220910                 | Imported        |
| Local storage      | 31010                  | Local Watershed |
| Sd-1               | 9640                   | Recycled        |

**Total AF: 261560**

**Accounts & Water Use**

Reporting Unit Name: **East Bay Municipal Utility District (EBMUD)** Submitted to CUWCC: **03/28/2005** Year: **2004**

**A. Service Area Population Information:**

1. Total service area population 1325000

**B. Number of Accounts and Water Deliveries (AF)**

| Type                    | Metered         |                       | Unmetered       |                       |
|-------------------------|-----------------|-----------------------|-----------------|-----------------------|
|                         | No. of Accounts | Water Deliveries (AF) | No. of Accounts | Water Deliveries (AF) |
| 1. Single-Family        | 321342          | 103560                | 0               | 0                     |
| 2. Multi-Family         | 27989           | 36873                 | 0               | 0                     |
| 3. Commercial           | 19578           | 18277                 | 0               | 0                     |
| 4. Industrial           | 2016            | 26471                 | 0               | 0                     |
| 5. Institutional        | 1290            | 10165                 | 0               | 0                     |
| 6. Dedicated Irrigation | 5097            | 15555                 | 0               | 0                     |
| 7. Recycled Water       | 6               | 9640                  | 0               | 0                     |
| 8. Other                | 0               | 6490                  | 0               | 0                     |
| 9. Unaccounted          | NA              | 34529                 | NA              | 0                     |
| <b>Total</b>            | <b>377318</b>   | <b>261560</b>         | <b>0</b>        | <b>0</b>              |

**Metered Unmetered**  
 Reported as of 11/22/05

**BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2004**

**A. Implementation**

- Based on your signed MOU date, 02/28/1994, your Agency STRATEGY DUE DATE is: 02/28/1996
- Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys? **yes**
  - If YES, when was it implemented? 07/01/1989
- Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys? **yes**
  - If YES, when was it implemented? 07/01/1989

**B. Water Survey Data**

**Survey Counts:**

|                                 | Single Family Accounts | Multi-Family Units |
|---------------------------------|------------------------|--------------------|
| 1. Number of surveys offered:   | 318796                 | 27726              |
| 2. Number of surveys completed: | 4398                   | 4156               |

**Indoor Survey:**

- Check for leaks, including toilets, faucets and meter checks **yes yes**
- Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary **yes yes**
- Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary **yes yes**

**Outdoor Survey:**

- Check irrigation system and timers **yes yes**
- Review or develop customer irrigation schedule **yes yes**
- Measure landscaped area (Recommended but not required for surveys) **no no**
- Measure total irrigable area (Recommended but not required for surveys) **no no**
- Which measurement method is typically used (Recommended but not required for surveys) **None**
- Were customers provided with information packets that included evaluation results and water savings recommendations? **no no**
- Have the number of surveys offered and completed, survey results, and survey costs been tracked? **yes yes**

- If yes, in what form are surveys tracked? **database**
- Describe how your agency tracks this information.

The District's Oracle Enterprise Database with the adjunct conservation and GIS databases provide the necessary information to track and evaluate the water conservation program

**C. Water Survey Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 275000    | 275000    |
| 2. Actual Expenditures   | 240000    |           |

**D. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? **No**
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

District total water conservation budget of \$5 million is moved among the different programs

**BMP 02: Residential Plumbing Retrofit**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Implementation**

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? yes
  - a. If YES, list local jurisdictions in your service area and code or ordinance in each:
 

City and County Uniform Plumbing Code
2. Has your agency satisfied the 75% saturation requirement for single-family housing units? yes
3. Estimated percent of single-family households with low-flow showerheads: 80%
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? yes
5. Estimated percent of multi-family households with low-flow showerheads: 75%
6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

District conducted market penetration study in 2001. Flow rate was determined by actual measurements. The saturation of showerheads rated at 2.5 gpm or less may actually be higher.

**B. Low-Flow Device Distribution Information**

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes
  - a. If YES, when did your agency begin implementing this strategy? 07/01/1988
  - b. Describe your targeting/ marketing strategy.

Devices distributed through residential surveys, direct install programs, at community events, and at District business offices.

| Low-Flow Devices Distributed/ Installed               | SF Accounts | MF Units |
|---|-------------|----------|
| 2. Number of low-flow showerheads distributed:        | 1221        | 874      |
| 3. Number of toilet-displacement devices distributed: | 236         | 87       |
| 4. Number of toilet flappers distributed:             | 218         | 49       |
| 5. Number of faucet aerators distributed:             | 823         | 875      |

The District's Oracle Enterprise Database with the adjunct conservation and GIS database provide the necessary information to track and evaluate

the water conservation program  
**C. Low-Flow Device Distribution Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 50000     | 50000     |
| 2. Actual Expenditures   | 51000     |           |

**D. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

District annual budget of \$5 million is allocated among programs during the year

**BMP 03: System Water Audits, Leak Detection and Repair**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Implementation**

1. Has your agency completed a pre-screening system audit for this reporting year? yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:
  - a. Determine metered sales (AF) 220541
  - b. Determine other system verifiable uses (AF) 6490
  - c. Determine total supply into the system (AF) 261560
  - d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.87
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? yes
4. Did your agency complete a full-scale audit during this report year? no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? yes
6. Does your agency operate a system leak detection program? yes
  - a. If yes, describe the leak detection program.

The District maintains a leak detection vehicle and a two person crew to find leaks. There are monthly and quarterly audit reports.

**B. Survey Data**

1. Total number of miles of distribution system line. 4033
2. Number of miles of distribution system line surveyed. 400

**C. System Audit / Leak Detection Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 160000    | 175000    |
| 2. Actual Expenditures   | 161000    |           |

**D. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

The distribution system leak detection budget is separate from the water conservation program budget and does not include annual repair costs estimated at \$2-\$3 million annually.

**BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Implementation**

1. Does your agency require meters for all new connections and bill by volume-of-use? yes
2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use? no
  - a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?
  - b. Describe the program.
3. Number of previously unmetered accounts fitted with meters during report year. 0

**B. Feasibility Study**

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? no
  - a. If YES, when was the feasibility study conducted? (mm/dd/yy)
  - b. Describe the feasibility study.
2. Number of CII accounts with mixed-use meters. 20000
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period. 0

**C. Meter Retrofit Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 0         |
| 2. Actual Expenditures   | 0         |           |

**D. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

The District has a program to replace old and faulty meters. That budget is not presented here. Also the District has not yet implemented a program to replace mixed-use meters with dedicated meters due to cost-effectiveness issues.

**BMP 05: Large Landscape Conservation Programs and Incentives**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**  
 BMP Form Status: **100% Complete**  
 Year: **2004**

**A. Water Use Budgets**

- 1. Number of Dedicated Irrigation Meter Accounts: 4750
- 2. Number of Dedicated Irrigation Meter Accounts with Water Budgets: 4750
- 3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF): 8446
- 4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF): 7479
- 5. Does your agency provide water use notices to accounts with budgets each billing cycle? yes

**B. Landscape Surveys**

- 1. Has your agency developed a marketing / targeting strategy for landscape surveys? yes
  - a. If YES, when did your agency begin implementing this strategy? 07/01/1991
  - b. Description of marketing / targeting strategy:

Direct mailings to top users, presentations to homeowner associations and public agencies, bill inserts, brochures in irrigation supply centers and distribution at community events, workshops for landscape professionals and large irrigators. Water budget program in progress with planned billing notification.

- 2. Number of Surveys Offered: 4750
- 3. Number of Surveys Completed: 342
- 4. Indicate which of the following Landscape Elements are part of your survey:
  - a. Irrigation System Check: yes
  - b. Distribution Uniformity Analysis: yes
  - c. Review / Develop Irrigation Schedules: yes
  - d. Measure Landscape Area: yes
  - e. Measure Total Irrigable Area: yes
  - f. Provide Customer Report / Information: yes
- 5. Do you track survey offers and results? yes
- 6. Does your agency provide follow-up surveys for previously completed surveys? yes
  - a. If YES, describe below:

**C. Other BMP 5 Actions**

- 1. An agency can provide mixed-use accounts with ETO-based landscape budgets in lieu of a large landscape survey program. yes

- Does your agency provide mixed-use accounts with landscape budgets? 49
- 2. Number of CIL mixed-use accounts with landscape budgets. yes
- 3. Do you offer landscape irrigation training? yes
- 4. Does your agency offer financial incentives to improve landscape water use efficiency? yes

| Type of Financial Incentive: | Budget (Dollars/Year) | Number Awarded to Customers | Total Amount Awarded |
|------------------------------|-----------------------|-----------------------------|----------------------|
| a. Rebates                   | 50000                 | 67                          | 48864                |
| b. Loans                     | 0                     | 0                           | 0                    |
| c. Grants                    | 0                     | 0                           | 0                    |

- 5. Do you provide landscape water use efficiency information to new customers and customers changing services? yes
  - a. If YES, describe below:

We offer conservation services through new business office and model home sale sites

- 6. Do you have irrigated landscaping at your facilities? yes
  - a. If yes, is it water-efficient? yes
  - b. If yes, does it have dedicated irrigation metering? yes
- 7. Do you provide customer notices at the start of the irrigation season? yes
- 8. Do you provide customer notices at the end of the irrigation season? yes

**D. Landscape Conservation Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 200000    | 250000    |
| 2. Actual Expenditures   | 259651    |           |

**E. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**F. Comments**

District annual budget of \$5 million is moved around among programs during the year

**BMP 06: High-Efficiency Washing Machine Rebate Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**  
 BMP Form Status: **100% Complete**  
 Year: **2004**

**A. Implementation**

- 1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes
  - a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

PG&E offers rebates from \$25 to \$125. The District partners with other bay area water utilities and runs programs concurrent with PG&E programs.
- 2. Does your agency offer rebates for high-efficiency washers? yes
- 3. What is the level of the rebate? 87
- 4. Number of rebates awarded: 6973

**B. Rebate Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 1000000   | 1000000   |
| 2. Actual Expenditures   | 936000    |           |

**C. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of the BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Number of clotheswashers includes 584 installations in the non-residential sector.

**BMP 07: Public Information Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**  
 BMP Form Status: **100% Complete**  
 Year: **2004**

**A. Implementation**

- 1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes
  - a. If YES, describe the program and how it's organized.

The Water Conservation Division coordinates activities with the Public Information Office in promoting the public education program

- 2. Indicate which and how many of the following activities are included in your public information program.

| Public Information Program Activity  | Yes/No | Number of Events |
|--|--------|------------------|
| a. Paid Advertising  | yes    | 20               |
| b. Public Service Announcement   | no     |                  |
| c. Bill Inserts / Newsletters / Brochures  | yes    | 20               |
| d. Bill showing water usage in comparison to previous year's usage                                     | yes    |                  |
| e. Demonstration Gardens   | yes    | 14               |
| f. Special Events, Media Events  | yes    | 35               |
| g. Speaker's Bureau  | yes    | 25               |
| h. Program to coordinate with other government agencies, industry and public interest groups and media | yes    |                  |

**B. Conservation Information Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5200000   | 5200000   |
| 2. Actual Expenditures   | 250000    |           |

**C. "At Least As Effective As"**

- 1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

The District's annual budget of \$5.2 million is moved around among the different programs during the year.

**BMP 08: School Education Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2004**

**A. Implementation**

- Has your agency implemented a school information program to promote water conservation? **yes**
- Please provide information on your school programs (by grade level):
 

| Grade          | Are grade-appropriate materials distributed? | No. of class presentations | No. of students reached | No. of teachers' workshops |
|----------------|--|----------------------------|-------------------------|----------------------------|
| Grades K-3rd   | yes  | 0                          | 22000                   | 3                          |
| Grades 4th-6th | yes  | 0                          | 23000                   | 3                          |
| Grades 7th-8th | no   | 0                          | 0                       | 0                          |
| High School    | no   | 0                          | 0                       | 0                          |
- Did your Agency's materials meet state education framework requirements? **yes**
- When did your Agency begin implementing this program? **07/01/1989**

**B. School Education Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 250000    | 255000    |
| 2. Actual Expenditures   | 248000    |           |

**C. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? **No**
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Education expenditure does not include water conservation education and outreach activities of \$1,126,000

**BMP 09: Conservation Programs for CII Accounts**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2004**

**A. Implementation**

- Has your agency identified and ranked **COMMERCIAL** customers according to use? **yes**
- Has your agency identified and ranked **INDUSTRIAL** customers according to use? **yes**
- Has your agency identified and ranked **INSTITUTIONAL** customers according to use? **yes**

**Option A: CII Water Use Survey and Customer Incentives Program**

- Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? **yes**

| CII Surveys  | Commercial Accounts | Industrial Accounts      | Institutional Accounts  |
|--|---------------------|--------------------------|-------------------------|
| a. Number of New Surveys Offered   | 15500               | 2600                     | 4000                    |
| b. Number of New Surveys Completed   | 1145                | 14                       | 24                      |
| c. Number of Site Follow-ups of Previous Surveys (within 1 yr)                                 | 229                 | 14                       | 5                       |
| d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)                                | 23                  | 14                       | 24                      |
| CII Survey Components  | Commercial Accounts | Industrial Accounts      | Institutional Accounts  |
| e. Site Visit  | yes                 | yes                      | yes                     |
| f. Evaluation of all water-using apparatus and processes                                       | yes                 | yes                      | yes                     |
| g. Customer report identifying recommended efficiency measures, paybacks and agency incentives | yes                 | yes                      | yes                     |
| Agency CII Customer Incentives   | Budget (\$/Year)    | No. Awarded to Customers | Total \$ Amount Awarded |
| h. Rebates   | 185000              | 0                        | 0                       |
| i. Loans   | 0                   | 0                        | 0                       |
| j. Grants  | 121000              | 930                      | 121000                  |
| k. Others  | 0                   | 0                        | 0                       |

**Option B: CII Conservation Program Targets**

- Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option? **yes**
- Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? **yes**
- Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991. **3488**
- Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991. **2917**

**B. Conservation Program Expenditures for CII Accounts**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5.2       | 5.2       |
| 2. Actual Expenditures   | 1.4       |           |

**C. "At Least As Effective As"**

- Is your AGENCY implementing an "at least as effective as" variant of this BMP? **No**
  - If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Calculated annual AF was derived from the total annual savings from CII audits and pre-rinse nozzle audits that were not accounted for by CII audit totals. Estimated annual savings from non-site verified actions taken by agency was derived by adding 5% to the previous total. 1.4M is the expenditure for the CII budget section 000895.

**BMP 09a: CII ULFT Water Savings**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)** BMP Form Status: **100% Complete** Year: **2004**

- Did your agency implement a CII ULFT replacement program in the reporting year? **Yes**  
If No, please explain why on Line B.

**A. Targeting and Marketing**

- What basis does your agency use to target customers for participation in this program? Check all that apply.
 

| Consumption ranking   | Potential savings   |
|---|---|
| CII Sector or subsector that apply.   |   |
| a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.  |   |
| The most effective in terms of numbers of toilets installed is the direct installation. It was not utilized this year because it is not cost-effective. Natural replacement is the most cost-effective method for standard ULFTs. We are focusing our current program towards increased customer awareness and installation of the higher efficiency toilets that best code requirements. |   |
| 2. How does your agency advertise this program? Check all that apply.   | Direct letter<br>Bill insert<br>Bill message<br>Newsletter<br>Telephone<br>Trade shows and events |
| a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.  |   |
| Cold calling and word of mouth  |   |

**B. Implementation**

- Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.) **Yes**
- Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency? **Yes**
- What is the total number of customer accounts participating in the program during the last year? **15**

| CII Subsector | Number of Toilets Replaced |
|---------------|----------------------------|
|               |                            |

| 4.                    | Standard Gravity Tank | Air Assisted | Valve Floor Mount | Valve Wall Mount | Type Not Specified |
|-----------------------|-----------------------|--------------|-------------------|------------------|--------------------|
| a. Offices            | 0                     | 0            | 0                 | 0                | 0                  |
| b. Retail / Wholesale | 1                     | 0            | 0                 | 0                | 0                  |
| c. Hotels             | 0                     | 0            | 0                 | 0                | 0                  |
| d. Health             | 0                     | 0            | 0                 | 0                | 0                  |
| e. Industrial         | 1                     | 0            | 0                 | 0                | 0                  |
| f. Schools K to 12    | 0                     | 0            | 0                 | 0                | 0                  |
| g. Eating             | 0                     | 0            | 0                 | 0                | 0                  |
| h. Government         | 0                     | 0            | 0                 | 0                | 0                  |
| i. Churches           | 0                     | 0            | 0                 | 0                | 0                  |
| j. Other              | 13                    | 0            | 0                 | 0                | 0                  |

5. Program design Rebate or voucher No

6. Does your agency use outside services to implement this program? No

a. If yes, check all that apply.

7. Participant tracking and follow-up Telephone Site Visit

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

|                                     |   |
|-------------------------------------|---|
| a. Disruption to business           | 2 |
| b. Inadequate payback               | 4 |
| c. Inadequate ULFT performance      | 5 |
| d. Lack of funding                  | 3 |
| e. American's with Disabilities Act | 1 |
| f. Permitting                       | 1 |
| g. Other Please describe in B. 9    | 0 |

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

Many small businesses do not want to change out their toilets as it leaves them open to ADD Act. Many very small entities balk at the cost the toilets and installation. They can sometimes be convinced to repair badly functioning toilets, but not replace them.

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

There will be a marked increase in CII toilet installation in 2005. Retrofits started in 2004 will complete in the current year and be reported then. As in any conservation installation, implementation of measures often spans multiple reporting periods.

**C. Conservation Program Expenditures for CII ULFT**

1. CII ULFT Program: Annual Budget & Expenditure Data

|                              | Budgeted | Actual Expenditure |
|------------------------------|----------|--------------------|
| a. Labor                     | 0        | 863                |
| b. Materials                 | 0        | 0                  |
| c. Marketing & Advertising   | 0        | 0                  |
| d. Administration & Overhead | 0        | 332                |
| e. Outside Services          | 0        | 1523               |
| f. Total                     | 0        | 2718               |

2. CII ULFT Program: Annual Cost Sharing

|                                  |   |
|----------------------------------|---|
| a. Wholesale agency contribution | 0 |
| b. State agency contribution     | 0 |
| c. Federal agency contribution   | 0 |
| d. Other contribution            | 0 |
| e. Total                         | 0 |

**D. Comments**

CII toilet retrofits are usually handled under our customized financial incentives program. This report covers only the customer initiated small scale installations, that are under the general toilet rebate program for all customer groups.

**BMP 11: Conservation Pricing**

Reporting Unit: BMP Form Status: Year: East Bay Municipal Utility District (EBMUD) 100% Complete 2004

**A. Implementation**

Rate Structure Data Volumetric Rates for Water Service by Customer Class

|  |                  |
|--|------------------|
| <b>1. Residential</b>  |                  |
| a. Water Rate Structure  | Increasing Block |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$139031640      |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$28476360       |
| <b>2. Commercial</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$18958860       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$3883140        |
| <b>3. Industrial</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$31598100       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$6471900        |
| <b>4. Institutional / Government</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$10532700       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$2157300        |
| <b>5. Irrigation</b>   |                  |
| a. Water Rate Structure  | Uniform          |
| b. Sewer Rate Structure  | Uniform          |
| c. Total Revenue from Volumetric Rates                                       | \$10532700       |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$2157300        |
| <b>6. Other</b>  |                  |
| a. Water Rate Structure  | Uniform          |

|  |         |
|--|---------|
| b. Sewer Rate Structure  | Uniform |
| c. Total Revenue from Volumetric Rates                                       | \$0     |
| d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources | \$0     |

**B. Conservation Pricing Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 0         |
| 2. Actual Expenditures   | 0         |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Volume charge is 83% of water revenue, service charge is 13% and elevation charge is 8% of revenue.

**BMP 12: Conservation Coordinator**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Implementation**

1. Does your Agency have a conservation coordinator? yes
2. Is this a full-time position? yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program? no
4. Partner agency's name:
5. If your agency supplies the conservation coordinator:
  - a. What percent is this conservation coordinator's position? 100%
  - b. Coordinator's Name Richard Harris
  - c. Coordinator's Title Manager of Water Conservation
  - d. Coordinator's Experience and Number of Years 5 years in water conservation and 14 years in water and wastewater fields
  - e. Date Coordinator's position was created (mm/dd/yyyy) 04/01/1989
6. Number of conservation staff, including Conservation Coordinator. 21

**B. Conservation Staff Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 5000000   | 5000000   |
| 2. Actual Expenditures   | 4560000   |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

District hired a full-time water conservation staff person in 1984

**BMP 13: Water Waste Prohibition**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Requirements for Documenting BMP Implementation**

1. Is a water waste prohibition ordinance in effect in your service area? yes
  - a. If YES, describe the ordinance.

Section 29 of District regulations prohibit wasteful practices

2. Is a copy of the most current ordinance(s) on file with CUWCC? yes
  - a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:  
Alameda Section 29

**B. Implementation**

1. Indicate which of the water uses listed below are prohibited by your agency or service area:
  - a. Gutter flooding yes
  - b. Single-pass cooling systems for new connections yes
  - c. Non-recirculating systems in all new conveyor or car wash systems yes
  - d. Non-recirculating systems in all new commercial laundry systems yes
  - e. Non-recirculating systems in all new decorative fountains yes
  - f. Other, please name no
2. Describe measures that prohibit water uses listed above:
 

Warnings and termination of water service

**Water Softeners:**

3. Indicate which of the following measures your agency has supported in developing state law:
  - a. Allow the sale of more efficient, demand-initiated regenerating DIR models. yes
  - b. Develop minimum appliance efficiency standards that:
    - i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used. yes
    - ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. yes
  - c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. yes
4. Does your agency include water softener checks in home water audit programs? no
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less no

efficient timer models?

**C. Water Waste Prohibition Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 0         | 0         |
| 2. Actual Expenditures   | 0         |           |

**D. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**E. Comments**

Water softeners not needed in EBMUD service area.

**BMP 14: Residential ULFT Replacement Programs**

Reporting Unit: **East Bay Municipal Utility District (EBMUD)**      BMP Form Status: **100% Complete**      Year: **2004**

**A. Implementation**

| Replacement Method  | Number of Toilets Replaced by Agency Program During Report Year |                    |
|---------------------|---|--------------------|
|                     | SF Accounts   | Multi-Family Units |
| 1. Rebate           | 620   | 560                |
| 2. Direct Install   | 0   | 0                  |
| 3. CBO Distribution | 0   | 0                  |
| 4. Other            | 0   | 0                  |
| <b>Total</b>        | <b>620</b>  | <b>560</b>         |

6. Describe your agency's ULFT program for single-family residences.
 

Reference the L.A. purchase specs for product eligibility criteria
7. Describe your agency's ULFT program for multi-family residences.
 

Same as SF.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no
9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

**B. Residential ULFT Program Expenditures**

|                          | This Year | Next Year |
|--------------------------|-----------|-----------|
| 1. Budgeted Expenditures | 150000    | 125000    |
| 2. Actual Expenditures   | 119000    |           |

**C. "At Least As Effective As"**

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
  - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

**D. Comments**

Intend to move toward high-efficiency toilet rebates and eliminate standard ulfts from eligibility



## **APPENDIX G. ACRONYMS AND ABBREVIATIONS**

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## APPENDIX G. ACRONYMS AND ABBREVIATIONS

|                   |  |          |  |
|-------------------|--|----------|--|
| °F                | degrees Fahrenheit   | DSOD     | California Division of Safety of Dams  |
| 2000 Demand Study | Districtwide Update of Water Demand Projections                      | DSRSD    | Dublin San Ramon Services District   |
| ABAG              | Association of Bay Area Governments                                  | du       | dwelling unit  |
| ACFCWCD           | Alameda County Flood Control and Water Conservation District         | DWR      | Department of Water Resources  |
| Act               | California Urban Water Management Planning Act                       | EBDA     | East Bay Dischargers Authority   |
| ACWD              | Alameda County Water District  | EBMUD    | East Bay Municipal Utility District  |
| AF                | acre-feet  | EBMUDSIM | EBMUD's water supply system Simulation Model                                       |
| AFY               | acre-feet per year   | EBRWP    | East Bayshore Recycled Water Project   |
| AOI               | Aquatic Outreach Institute   | EIR      | Environmental Impact Report  |
| BARWRP            | Bay Area Regional Water Recycling Program                            | EOP      | Emergency Operations Plan  |
| BAWAC             | Bay Area Water Agencies Coalition                                    | EOT      | Emergency Operations Team  |
| bgs               | below ground surface   | EPA      | US Environmental Protection Agency   |
| BMP               | Best Management Practice   | ERD      | Emergency Response Directory   |
| CALFED            | California Water Policy Council and Federal Ecosystem Directorate    | FERC     | Federal Energy Regulatory Commission   |
| CCCSD             | Central Contra Costa Sanitary District                               | FRWA     | Freeport Regional Water Authority  |
| CCWD              | Contra Costa Water District  | FRWP     | Freeport Regional Water Project  |
| CDHS              | California Department of Health Services                             | FY       | Fiscal Year  |
| cfs               | cubic feet per second  | GIS      | Geographic Information System  |
| CII               | Commercial, Industrial, and Institutional                            | GPD      | gallons per day  |
| CIP               | Capital Improvement Program  | HET      | high-efficiency toilet   |
| CSSCRWP           | Central and South Sacramento County Regional Water Partnership       | HOA      | Homeowners association   |
| CUWCC             | California Urban Water Conservation Council                          | IRWMP    | Integrated Regional Water Management Plan  |
| CVP               | Central Valley Project   | JSA      | Joint Settlement Agreement   |
| CY                | Calendar Year  | LAFCO    | Local Agency Formation Commission  |
| DEIR/EIS          | Draft Environmental Impact Report and Environmental Impact Statement | LAVWMA   | Livermore-Amador Valley Wastewater Management Agency                               |
| DERWA             | DSRSD-EBMUD Recycled Water Authority                                 | MCL      | maximum contaminant level  |
| DMAC              | Demand Management Advisory Committee                                 | MGD      | million gallons per day  |
| DMP               | Drought Management Program   | MOU      | Memorandum of Understanding  |
|                   |  | MSL      | Mean Sea Level   |
|                   |  | MUD      | Municipal Utility District   |
|                   |  | MWWTP    | Main Wastewater Treatment Plant  |
|                   |  | NCGWB    | Niles Cone Groundwater Basin   |
|                   |  | NEBIGSM  | Niles Cone and South East Bay Plain Integrated Groundwater and Surface Water Model |

UWMP 2005: Appendix G. Acronyms and Abbreviations

|                      |   |                     |   |
|----------------------|---|---------------------|---|
| <b>NIMS</b>          | National Incident Management System             | <b>SWRCB</b>        | State Water Resources Control Board                   |
| <b>NPDES</b>         | National Pollutant Discharge Elimination System | <b>TAF</b>          | thousand acre feet                                    |
| <b>NRP</b>           | National Response Plan                          | <b>TDS</b>          | total dissolved solids                                |
| <b>OES</b>           | Office of Emergency Services                    | <b>THM</b>          | trihalomethanes                                       |
| <b>OWR</b>           | Office of Water Recycling                       | <b>UC Berkeley</b>  | University of California at Berkeley                  |
| <b>ppb</b>           | parts per billion                               | <b>UMRWA</b>        | Upper Mokelumne River Watershed Authority             |
| <b>Project WATER</b> | Water Awareness Through Education and Research  | <b>USB</b>          | Ultimate Service Boundary                             |
| <b>RARE</b>          | Richmond Advanced Recycled Expansion            | <b>USBR</b>         | United States Bureau of Reclamation                   |
| <b>REIR/SEIS</b>     | recirculated EIR/supplemental EIS               | <b>USGS</b>         | U.S. Geological Survey                                |
| <b>ROD</b>           | Record of Decision                              | <b>USL WTP</b>      | Upper San Leandro Water Treatment Plant               |
| <b>RWQCB</b>         | Regional Water Quality Control Boards           | <b>UWMP or Plan</b> | Urban Water Management Plan                           |
| <b>SCVWD</b>         | Santa Clara Valley Water District               | <b>VA</b>           | Vulnerability Assessment                              |
| <b>SCWA</b>          | Sacramento County Water Agency                  | <b>WARN</b>         | Water Agency Response Network                         |
| <b>SCWA</b>          | Sacramento County Water Agency                  | <b>WCMP</b>         | Water Conservation Master Plan                        |
| <b>SEBPB</b>         | South East Bay Plain Basin                      | <b>WC-SRVIP</b>     | Walnut Creek – San Ramon Valley Improvement Project   |
| <b>SEMS</b>          | Standardized Emergency Management System        | <b>WCWD</b>         | West County Wastewater District                       |
| <b>SEP</b>           | Security and Emergency Preparedness             | <b>WCWTP</b>        | Walnut Creek Water Treatment Plant                    |
| <b>SFPUC</b>         | San Francisco Public Utilities Commission       | <b>WPCP</b>         | Water Pollution Control Plant                         |
| <b>SIP</b>           | Seismic Improvement Program                     | <b>WRDA</b>         | Federal Water Resources Development Act               |
| <b>SLRF</b>          | San Leandro Reclamation Facility                | <b>WSMP</b>         | 1993 Updated Water Supply Management Program          |
| <b>SOI</b>           | Sphere of Influence                             | <b>WTTIP</b>        | Water Treatment and Transmission Improvements Program |
| <b>SRVRWP</b>        | San Ramon Valley Recycled Water Program         | <b>WWTP</b>         | Wastewater Treatment Plant                            |