

# Urban Water Management Plan 2010



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# Urban Water Management Plan 2010

THIS DOCUMENT PROVIDES AN OVERVIEW OF WATER SUPPLY AND USAGE, WASTEWATER, RECYCLED WATER, CONSERVATION AND WATER SUPPLY SHORTAGE CONTINGENCY PLAN 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 AND THE WATER CONSERVATION ACT OF 2009.



# EAST BAY MUNICIPAL UTILITY DISTRICT

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### COVER PHOTOS LEFT TO RIGHT

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■ RECYCLED WATER PIPES  
PHOTO BY MIKKI FERRILL

■ DELTA AREA  
PHOTO BY JIM KARAGEORGE

■ SUMMER-DRY CLIMATE LANDSCAPING  
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■ FREEPORT  
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■ UPPER MOKULUMNE RIVER, PARDEE  
RESERVOIR AREA  
PHOTO BY RICH TURNER

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## CHAPTER 1. GENERAL INFORMATION

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*East Bay Municipal Utility District (EBMUD) supplies water and treats wastewater for significant parts of Alameda and Contra Costa counties. Every five years, EBMUD updates its Urban Water Management Plan (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 Act).*

### URBAN WATER MANAGEMENT PLANNING ACT

---

EBMUD sponsored the Urban Water Management Planning Act (Act) that became part of the California Water Code with the passage of Assembly Bill 797 in 1983. As stated in the Act, water is a limited and renewable resource subject to ever-increasing demands. 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.” It is the State’s policy to achieve conservation and efficient use of urban water supplies to protect both the people of the State and their water resources. The Act provides water utilities with an approach to assess their water resource needs and supplies by requiring that each urban water supplier providing more than 3,000 acre-feet of municipal water or supplying water directly or indirectly to more than 3,000 customers annually, shall prepare, update, and adopt an UWMP at least once every five years. Since 1983, the Act has been amended by various Assembly and Senate bills (see Table 1-1) which expanded the issues that are to be addressed in the UWMP. Amendments to the Act since 2005 include:

- SB 1087, Florez, 2005 (Water use projections and lower income households),
- AB 1420, Laird, 2007 (Water demand management measures),
- SBx7-7, Steinberg, 2009 (Water conservation), and
- AB 2409, Nestande, 2010 (Water shortage contingency analysis).

Appendix A contains the text of the act and its amendments.

### EBMUD’S URBAN WATER MANAGEMENT PLAN

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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 updated and adopted by EBMUD’s Board of Directors every five years. This UWMP 2010, an update of the UWMP 2005, is designed to satisfy the

requirements of the Urban Water Management Planning Act, and to provide the public with a report on EBMUD’s progress in implementing conservation, water recycling programs, and securing supplemental water supply sources. In adopting its UWMP, the District commits to achieve conservation and efficient use of its water supplies to protect both its customers and its water resources by making every effort to ensure the appropriate level of water service reliability sufficient to meet various demands during normal, dry, and multiple dry years.

### PUBLIC PARTICIPATION AND ADOPTION OF PLAN

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EBMUD has actively encouraged the involvement of a diverse sector of the population in its urban water management planning efforts throughout the update process. EBMUD also made its UWMP available for public review and held a public hearing prior to adopting the UWMP 2010.

To encourage public involvement, EBMUD sent a notice of intent to update its UWMP to all cities and counties within its service area, local and neighboring water districts and agencies, and other relevant groups and organizations on January 14, 2011, more than 60 days prior to the public hearing. EBMUD also posted the notice of the intent to update on its website.

EBMUD’s Draft UWMP 2010 was first distributed for review and comment beginning on April 12, 2011. As a result of the de-certification of the Water Supply Management Plan 2040 EIR, EBMUD updated the draft plan and released a revised Draft UWMP 2010 on May 6, 2011 and extended the comment period to end on May 20, 2011. In response to a request from the public, the comment period was extended for a second time to end on May 31, 2011.

Notice of the public hearing and the public comment period and intent to adopt was posted in relevant newspapers between April 12 and May 22, 2011. Copies of the public notices and a list of newspapers with dates on which the notices were published are included in Appendix B. A notice of the hearing and the public

comment period was also mailed to all parties included in EBMUD’s UWMP 2010 mailing list on May 6, 2011, and was posted on EBMUD’s website. In addition to the public hearing EBMUD held a public comment meeting on the Draft UWMP 2010 on April 21, 2011 to further encourage public involvement.

The UWMP 2010 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.

At its meeting on June 28, 2011, the EBMUD Board of Directors adopted the UWMP 2010 and the 2010 Water Shortage Contingency Plan. A copy of the adoption resolution is included in Appendix D. By July 27, copies of the adopted UWMP 2010 were sent to the California Department of Water Resources (DWR), the California State Library, and cities and counties within EBMUD’s service area and posted on EBMUD’s website.

## EAST BAY MUNICIPAL UTILITY DISTRICT

### FORMATION

East Bay Municipal Utility District, 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 Nevada Mountains to the East Bay when construction of Pardee Dam and the first Mokelumne Aqueducts was 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 from their jurisdictions prior to it being released into the San Francisco Bay. Wastewater treatment for those cities began in 1951 and later expanded to annex the Stege Sanitary District, which includes Kensington, El Cerrito, and parts of Richmond.

### BOARD OF DIRECTORS

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 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.*

### SERVICE AREA

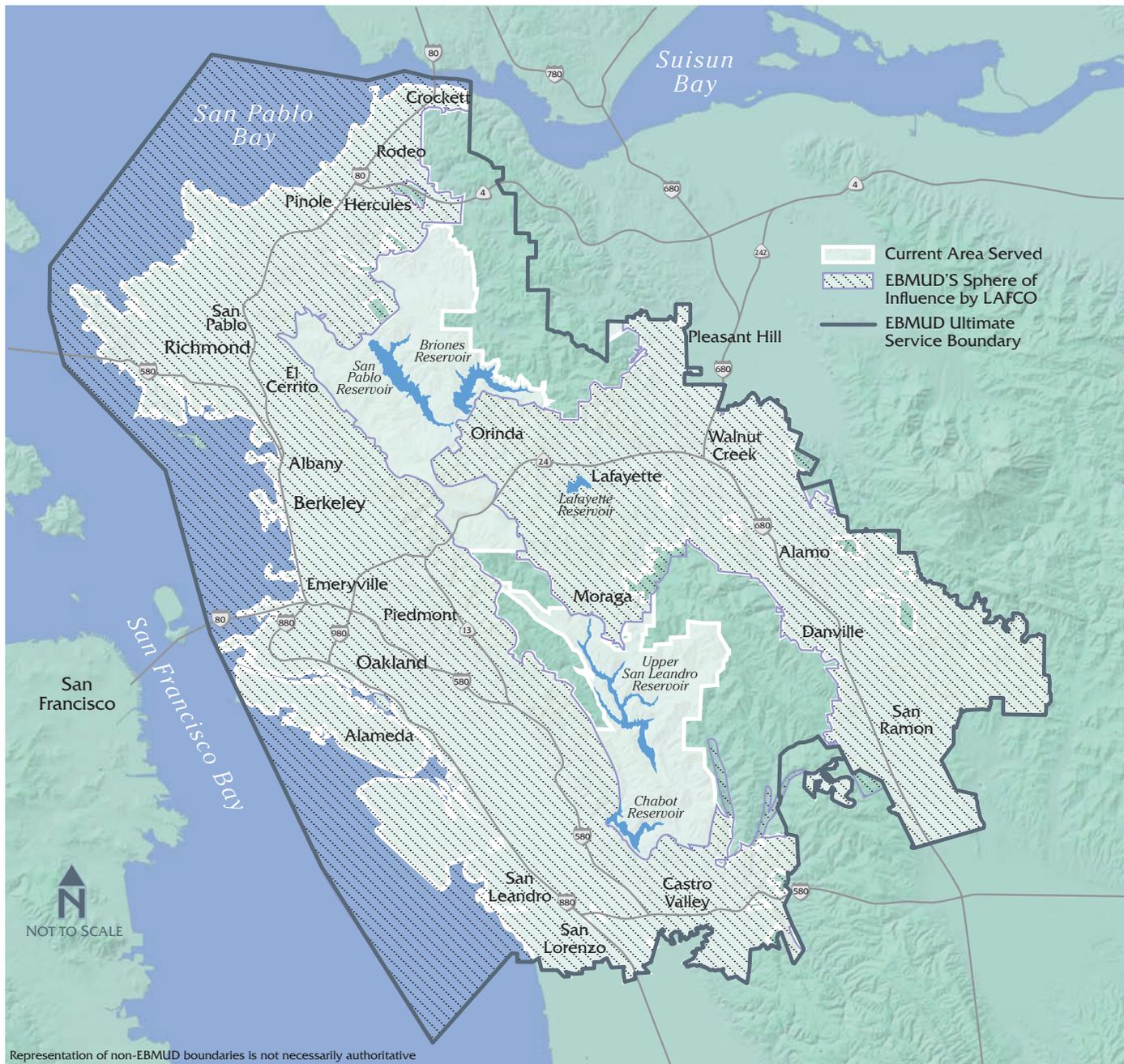
EBMUD supplies water and provides wastewater treatment for significant parts of Alameda and Contra Costa counties. Based on 2010 census data, approximately 1.34 million people are served by EBMUD’s water system in a 332-square-mile area extending from Crockett on the north, southward to San Lorenzo (encompassing 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 650,000 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. EBMUD customers include residential, industrial, commercial, institutional and irrigation water users.

TABLE 1-1 URBAN WATER MANAGEMENT PLANNING ACT AND AMENDMENTS

BILL	INTRODUCED BY	CHAPTERED
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
<b>SB 1087</b>	<b>FLOREZ</b>	<b>2005</b>
<b>AB 1420</b>	<b>LAIRD</b>	<b>2007</b>
<b>SBX7-7</b>	<b>STEINBERG</b>	<b>2009</b>
<b>AB 2409</b>	<b>NESTANDE</b>	<b>2010</b>

FIGURE 1-1

EBMUD SERVICE BOUNDARY



**Boundary**

The EBMUD service area encompasses incorporated and unincorporated areas within Alameda and Contra Costa counties. The current service area, illustrated in Figure 1-1, 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 1-1, defines the area that can be served by EBMUD, as defined by LAFCO.

**Climate and Topography**

Within the EBMUD service area there are significant differences in geography, climate, and land use. These characteristics are important as they influence how water

TABLE 1-2

EBMUD SERVICE AREA CLIMATE STATISTICS

WEST OF HILLS					EAST OF HILLS			
MONTH	RAINFALL (IN)	MAXIMUM TEMPERATURE (°F)	MINIMUM TEMPERATURE (°F)	AVERAGE TEMPERATURE (°F)	RAINFALL (IN)	MAXIMUM TEMPERATURE (°F)	MINIMUM TEMPERATURE (°F)	AVERAGE TEMPERATURE (°F)
JAN	5.0	59	47	53	5.9	56	39	47
FEB	4.3	61	48	55	5.2	59	41	50
MAR	3.6	66	50	58	4.0	65	43	54
APR	1.9	66	51	59	2.0	66	44	55
MAY	0.7	71	55	63	0.8	73	49	61
JUN	0.2	74	58	66	0.1	79	53	66
JUL	0.0	76	60	68	0.0	82	56	69
AUG	0.1	76	60	68	0.1	82	56	69
SEP	0.3	76	59	68	0.3	82	54	68
OCT	1.5	74	56	65	1.4	74	50	62
NOV	3.3	66	52	59	3.4	64	44	54
DEC	4.6	59	47	53	5.2	56	40	48
<b>ANNUAL</b>	<b>25.5</b>	<b>69</b>	<b>54</b>	<b>61</b>	<b>28.4</b>	<b>70</b>	<b>47</b>	<b>59</b>

NOTE:

West-of-Hills climate data based on measurements from USL Water Treatment Plant station, and East-of-Hills climate data based on measurements from Lafayette Reservoir station. Rainfall is based on data from 1953-2009, and temperature is based on data from 2000-2009.

is used in various portions of the service area. These characteristics also are factors considered in future water demand projections.

Geographically, the EBMUD service area is divided by the Oakland/ Berkeley Hills that rise to about 1,900 feet above sea level. The area west of the Oakland/ Berkeley Hills (West-of-Hills) is characterized by a plain that extends from Richmond to Hayward and from the shore of the Bay inland. The terrain east of the Oakland/Berkeley Hills (East-of-Hills) is characterized by rolling hills as the land descends to about 100 feet above sea level near Walnut Creek. West of Hills areas border San Francisco Bay and experience a moderate climate that is tempered by ocean and Bay waters. In contrast, East-of-Hills 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 East-of-Hills and West-of-Hills portions of the EBMUD service area are illustrated in Table 1-2.

### Land Uses

Urban land uses in the EBMUD service area include residential (ranging from very low-density single-family lots to high density multi-family residences), commercial, industrial including petroleum refining and public facilities, such as parks 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 Pleasant Hill, the San Ramon Valley, and Walnut Creek. Over the next 25 years, the increased water demand as projected would come mainly from increased densities in existing developed urban areas, as formerly lower consumption land uses are replaced with more intensive mixed use and other development. See Chapter 4 for more discussion on projected demands.

EBMUD owns and manages approximately 28,000 acres of land and water surface areas in the East Bay, comprising portions of 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. There are a number of land uses on EBMUD-owned lands. The predominant agricultural land use is livestock grazing which serves to reduce the danger of wildfires in the watershed and in areas near the wildland/urban interfaces. EBMUD also leases its watershed lands for other agricultural uses such as Christmas tree and hay farming. EBMUD is also in the early stages of evaluating the potential feasibility of establishing a mitigation/conservation bank on EBMUD-owned lands in the Pinole Valley watershed (3,000 acres of land not tributary to any EBMUD reservoirs) to protect and enhance habitat for endangered species.

TABLE 1-3

POPULATION PROJECTIONS

REGION	2015	2020	2025	2030	2035
BAY AREA	7,678,000	8,018,000	8,365,000	8,719,000	9,074,000
ALAMEDA COUNTY	1,626,000	1,706,000	1,787,000	1,875,000	1,966,000
CONTRA COSTA COUNTY	1,131,000	1,177,000	1,226,000	1,274,000	1,323,000
<b>EBMUD SERVICE AREA</b>	<b>1,474,000</b>	<b>1,538,000</b>	<b>1,607,000</b>	<b>1,677,000</b>	<b>1,751,000</b>
SERVICE AREA WITHIN ALAMEDA CO.	935,000	975,000	1,019,000	1,066,000	1,117,000
SERVICE AREA WITHIN CONTRA COSTA CO.	539,000	563,000	588,000	611,000	634,000

NOTES:

1. Source: ABAG Projections 2009.
2. Population estimates for EBMUD service area include the following areas: ALAMEDA COUNTY – incorporated cities of Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont, and San Leandro; and subregional study areas of Hayward, Castro Valley, Cherryland-Fairview, Ashland, and San Lorenzo; CONTRA COSTA COUNTY- city sphere of influence areas of Danville, El Cerrito, Hercules, Lafayette, Moraga, Orinda, Pinole, Pleasant Hill, Richmond, San Pablo and Walnut Creek; and subregional study areas of San Ramon, Crockett-Rodeo and Blackhawk-Alamo.
3. 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%).

TABLE 1-4 MOKELUMNE BASIN RUNOFF AND CLIMATE STATISTICS

MONTH	AVERAGE RUNOFF <sup>1</sup> (FT <sup>3</sup> /SEC)	AVERAGE PRECIPITATION <sup>2</sup> (IN.)	AVERAGE SNOW DEPTH <sup>3</sup> (IN.)	AVERAGE TEMPERATURE (°F)
JAN	889	8.9	49	27
FEB	1,090	7.9	69	27
MAR	1,360	7.1	77	30
APR	2,110	4.1	60	35
MAY	3,150	2.2	27	42
JUN	2,010	0.8	2	50
JUL	456	0.2	0	57
AUG	87	0.3	0	57
SEP	60	0.8	0	51
OCT	96	2.5	1	43
NOV	322	5.5	8	34
DEC	629	8.0	24	29
<b>ANNUAL</b>	<b>1,020</b>	<b>48.3</b>	<b>—</b>	<b>40</b>

<sup>1</sup> Average True Natural Flow at Mokelumne Hill Gaging Station, 1930-2009.  
<sup>2</sup> EBMUD 4-station average, 1930-2009.  
<sup>3</sup> Snow depth and temperature from NOAA Twin Lakes station (#49105), 1919-2000. Western Regional Climate Center (<http://wrcc.dri.edu>).

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 prohibited 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 horseback riding (permit required).

**Population Projections**

By 2035, the Bay Area’s population is forecasted to grow by nearly 25 percent, or by 1.7 million residents, for a total of 9 million people. Nearly 75 percent of this growth is projected to occur in three Bay Area counties including Alameda and Contra Costa, significant parts of which

make up the EBMUD service area. Alameda and Contra Costa counties, along with Santa Clara County, will remain among the top three most populous in the region over the next several decades.

According to the Association of Bay Area Governments’ (ABAG) Projections 2009, Alameda County alone is projected to grow by 416,500 people, for a total of nearly 2 million people by 2035. It is forecasted that 327,000 jobs also will be added during this period. Almost all jurisdictions in Alameda County are expected to see significant changes in population and especially employment, although most growth will occur in the communities closest to the San Francisco Bay. Some of the biggest population changes will occur in Emeryville and Oakland. The City of Oakland is forecasted to continue to have over 25 percent of the county’s residents and jobs. Nearly 70 percent of the population growth in Western Alameda County is projected to occur in infill neighborhoods, where there is access to public transit.

By 2035, Contra Costa County’s population is forecasted to be over 1.3 million, an increase of approximately 233,000. Nearly 180,000 jobs will be added county wide during this time period, for a total of over 555,000. Several jurisdictions, including Hercules will see their jobs more than double by 2035. Among the communities expected to see the most population change are San Ramon and Hercules; each will grow by more than one-third.

Table 1-3 depicts population projections for the Bay Area and the EBMUD service area over the next 25 years. The population projections are based on ABAG’s Projections 2009.

## MOKELUMNE WATERSHED AND HYDROLOGY

Based on historical average, about 90 percent of the water delivered to EBMUD’s customers originates from the Mokelumne River watershed, and 10 percent originates as runoff from the protected watershed lands in the East Bay Area. The Mokelumne River watershed upstream of Camanche Dam is relatively narrow and steep and is located northeast of the Sacramento-San Joaquin River Delta on the western slope of the Sierra Nevada. Above Camanche Dam, the Mokelumne River drains over 600 square miles of mountains and foothills. The elevation in the watershed ranges from 235 feet at the dam to 10,000 feet in the headwater region.

### Runoff Characteristics

Annual precipitation and stream flow in the Mokelumne River watershed upstream of Camanche Dam 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 (see Table 1-4). Peak flows in the Mokelumne River normally occur during winter storms or during the spring snow melt season from March through June. These flows decrease to a minimum in late summer or fall.

Snow melt 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 percent 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 modified by various diversions and regulated by reservoir storage operations including a network of facilities operated by Pacific Gas and Electric Company. EBMUD collects the Mokelumne stream flow in Pardee Reservoir. A portion of the water stored in Pardee Reservoir is conveyed to the EBMUD service area via the Mokelumne Aqueducts, and to the Jackson Valley Irrigation District via the Jackson Creek Spillway outlet. The remainder of the water is released from Pardee Reservoir into Camanche Reservoir.

### Land Uses

Most of the Mokelumne River watershed upstream of Camanche Dam 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 percent 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 recreation such as camping and water-related activities are allowed at Pardee Reservoir (only non-body-contact activities allowed) and Camanche Reservoir (body-contact activities allowed). There also is an extensive system of Mokelumne area trails in the Sierra foothills such as the Coast-to-Crest trail across EBMUD land.

## REPORT FORMAT

The UWMP 2010 brings together important information and updates on EBMUD’s water supply planning projects and studies, and recycled water and conservation program activities undertaken since 2005.

This report consists of the following chapters that satisfy the provisions of the Urban Water Management Planning Act:

### CHAPTER 1 – GENERAL INFORMATION.

The chapter contains a discussion on the Urban Water Management Planning Act, as well as an overview of EBMUD;

### CHAPTER 2 – WATER SUPPLY AND WATER SUPPLY PLANNING.

The chapter contains an overview of EBMUD’s water supply system, reliability of the water supply, and future water supply planning;

### CHAPTER 3 – WATER SHORTAGE CONTINGENCY PLAN.

The chapter contains specifics on EBMUD’s Drought Management Program and its elements;

### CHAPTER 4 – WATER USAGE.

The chapter contains a discussion on past, current and projected demand as well as an assessment of supply and demand for various scenarios as specified in the Act;

### CHAPTER 5 – WASTEWATER AND RECYCLED WATER.

The chapter contains an overview of the wastewater system, current and planned recycled water projects, methods of encouraging recycled water use, and other existing non-potable water projects; and

### CHAPTER 6 – WATER CONSERVATION.

The chapter contains an overview of EBMUD’s demand-side and supply-side conservation programs, existing and future conservation projects, Best Management Practices, and EBMUD compliance with California’s “20 percent by 2020” reduction in per capita urban water use requirement.

## APPENDICES

APPENDIX A contains the UWMP Act and its amendments;

APPENDIX B contains 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 contains the comments received during the public review period, the public comment meeting and public hearing and responses to those comments;

APPENDIX D contains the Board Resolution adopting the UWMP 2010 and the Water Shortage Contingency Plan;

APPENDIX E contains the South East Bay Plain Groundwater Basin Description;

APPENDIX F contains referenced governing EBMUD regulations, and the rate structures for water and wastewater services;

APPENDIX G contains the 2010 Water Shortage Contingency Plan Supplement;

APPENDIX H contains SBx7-7 Detailed Analyses;

APPENDIX I contains the 2009 and 2010 Annual Report of Best Management Practices submitted to the California Urban Water Conservation Council, and EBMUD Conservation Research Projects; and

APPENDIX J contains a glossary of terms used in the UWMP 2010.

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## CHAPTER 2. WATER SUPPLY SYSTEM AND WATER RESOURCES PLANNING

*EBMUD's water supply system extends from the Mokelumne River watershed on the western slope of the Sierra Nevada Mountains to the East Bay. The Mokelumne River water supply, in concert with aggressive conservation and recycled water programs, 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. EBMUD is investigating opportunities to improve the reliability of its water supply and close the gap between water supplies and water needs during multi-year drought periods.*

### WATER SUPPLY SYSTEM

The EBMUD water supply system collects, transmits, treats, and distributes high-quality water from its primary water source, the Mokelumne River, to its customers in the San Francisco East Bay Area (see Figure 2-1). The Mokelumne Aqueducts convey the Mokelumne River supply from Pardee Reservoir across the Sacramento-San Joaquin River Delta (Delta) to local storage and treatment facilities. After treatment, water is distributed to 20 incorporated cities and 15 unincorporated communities in Alameda and Contra Costa Counties. The cities are Alameda, Albany, Berkeley, Danville, El Cerrito, Emeryville, parts of Hayward, Hercules, Lafayette, Moraga, Oakland, Orinda, Piedmont, Pinole, parts of Pleasant Hill, Richmond, San Leandro, San Pablo, San Ramon, and parts 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 late 1920s, EBMUD's primary source of water has been the Mokelumne River. For details on dry-year supplemental supply sources and infrastructure refer to the "Existing Supplemental Water Supply Sources" section in this chapter.

### Mokelumne River

The Mokelumne River serves a variety of uses, including agriculture, fisheries, hydropower, recreation, and municipal and industrial use. 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 to the senior water rights of other users, downstream fishery flow requirements, and other Mokelumne River water uses.

Figure 2-2 (see page 2-5) displays EBMUD's Mokelumne River flow commitments which are determined by hydrology; a variety of agreements between EBMUD and other Mokelumne River users; water rights priorities; agreements with State and Federal regulatory agencies; State Board orders and decisions; federal directives; court decrees; and numerous agreements both upstream and downstream of EBMUD's Mokelumne River facilities.

Amongst these factors, EBMUD's Mokelumne River flow commitments are generally tied to the variability in the Mokelumne River watershed rainfall and runoff patterns which govern the release requirements for the year. Figure 2-2 provides information regarding EBMUD's flow commitments during normal and 'dry' years. For comparison, the figure also provides information on the average runoff for various periods of historical records, EBMUD's maximum water rights appropriations, and other pertinent information that illustrate the complex nature of agreements and uses on the Mokelumne River.

As depicted in Figure 2-2, EBMUD continues to meet its commitment to protect the lower Mokelumne River by providing instream flow releases from EBMUD's Camanche Dam to improve fishery conditions, per the requirements of the 1998 Joint Settlement Agreement (JSA) among EBMUD, US Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG).

In the long-term, during drought periods, the Mokelumne River cannot meet EBMUD's projected customer demands, even with an "up to 15 percent" rationing imposed under EBMUD's Board Policy 9.03 (see Appendix F) and use of existing dry-year supplemental supplies. Furthermore, EBMUD's Mokelumne River supply is expected to be reduced as demands on the Mokelumne River increase from the growing needs from users in Amador, Calaveras, and San Joaquin counties with water rights senior to those of EBMUD's.

## Local Runoff

EBMUD’s secondary water supply source is local runoff from the East Bay area watersheds that is stored in the terminal reservoirs located within the service area boundaries. The availability of water from local runoff is dependent on two factors: hydrologic conditions and terminal reservoir storage availability. Hydrologic conditions determine the amount of runoff in the local watershed. In dry-years, evaporation can exceed runoff, resulting in no net local supply. In addition, the amount of storage available for capturing local runoff is limited. Maintaining lower water levels in the terminal reservoirs would provide space for storing additional to supplement EBMUD’s existing dry-year supplies. The collaborative effort has already resulted in a \$25 million grant, and up to \$12 million was allocated for the construction of the Freeport Regional Water Facility. local runoff. However, because these reservoirs also regulate EBMUD’s Mokelumne River supply and provide emergency standby storage, limited space can be held for the variable local runoff. Average local supply that is used in the East Bay is 15 to 25 MGD during normal hydrologic years and is near zero during drought conditions.

## EXISTING WATER SUPPLY INFRASTRUCTURE

EBMUD’s water supply system consists of a network of reservoirs, aqueducts (pipelines), water treatment plants (WTP), pumping plants, and other distribution facilities that convey Mokelumne River from Pardee Reservoir to EBMUD customers.

## Pardee Dam and Reservoir

Pardee Dam and Reservoir are located approximately 38 miles northeast of Stockton near the town of Valley Springs, downstream from Pacific Gas and Electric Company’s Mokelumne River Hydroelectric Project. Pardee Dam, constructed in 1929, is a concrete gravity arch structure rising 345 feet above the river bed. The reservoir has 37 miles of shoreline, a surface area of 2,222 acres, and a current capacity of 197,950<sup>1</sup> acre-feet (AF) at spillway crest elevation. A 27.8-megawatt (MW) Pardee Powerhouse, located at the base of the dam, was placed in service in 1930. It generates 140 million kilowatt hours (kWh) during a median runoff year.

Pardee Reservoir is used principally for EBMUD’s municipal water supply, power generation, and as a supply source for Jackson Valley Irrigation District. Pardee Reservoir also is operated to provide recreational facilities to the public and to protect and enhance the fishery resources and ecosystem of the lower Mokelumne River.

<sup>1</sup> Licensed quantity to store in Pardee Reservoir is 209,950 AFY.

<sup>2</sup> Camanche Reservoir was originally constructed with a capacity of 431,500 AF

## Camanche Dam and Reservoir

Camanche Dam is located on the Mokelumne River approximately 10 miles downstream from Pardee Dam. Camanche Dam, constructed in 1964, is a zoned earthen structure. Camanche Reservoir has 63 miles of shoreline, a surface area of 7,470 acres, and a current capacity of 417,120AF<sup>2</sup> at spillway crest elevation. An 11.25-MW Camanche Powerhouse, located at the base of the dam, was placed in service in 1983. It generates 45 million kWh during a median runoff year.

Camanche Reservoir is operated jointly with Pardee Reservoir to provide water supply benefits while maintaining numerous downstream obligations, including stream-flow regulation, water for fisheries and riparian habitat, flood control, and obligations to downstream diverters. It also provides power generation and recreation opportunities.

## Mokelumne Aqueduct System

Raw water from Pardee Reservoir is transported approximately 91 miles to EBMUD WTPs 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 East Bay.

The Pardee Tunnel is a 2.2 mile, 8 foot high horseshoe structure constructed in 1929. The Mokelumne Aqueducts (see Table 2-1 for pipeline characteristics) are comprised of three 82 mile long pipelines that transport water from the end of Pardee Tunnel in Campo Seco to Walnut Creek at the east end of the two Lafayette Aqueducts. The Mokelumne Aqueducts have a total capacity of 200 MGD by gravity flow and up to 325 MGD with pumping at the Walnut Creek pumping plants.

TABLE 2-1 MOKELUMNE AQUEDUCT SYSTEM CHARACTERISTICS

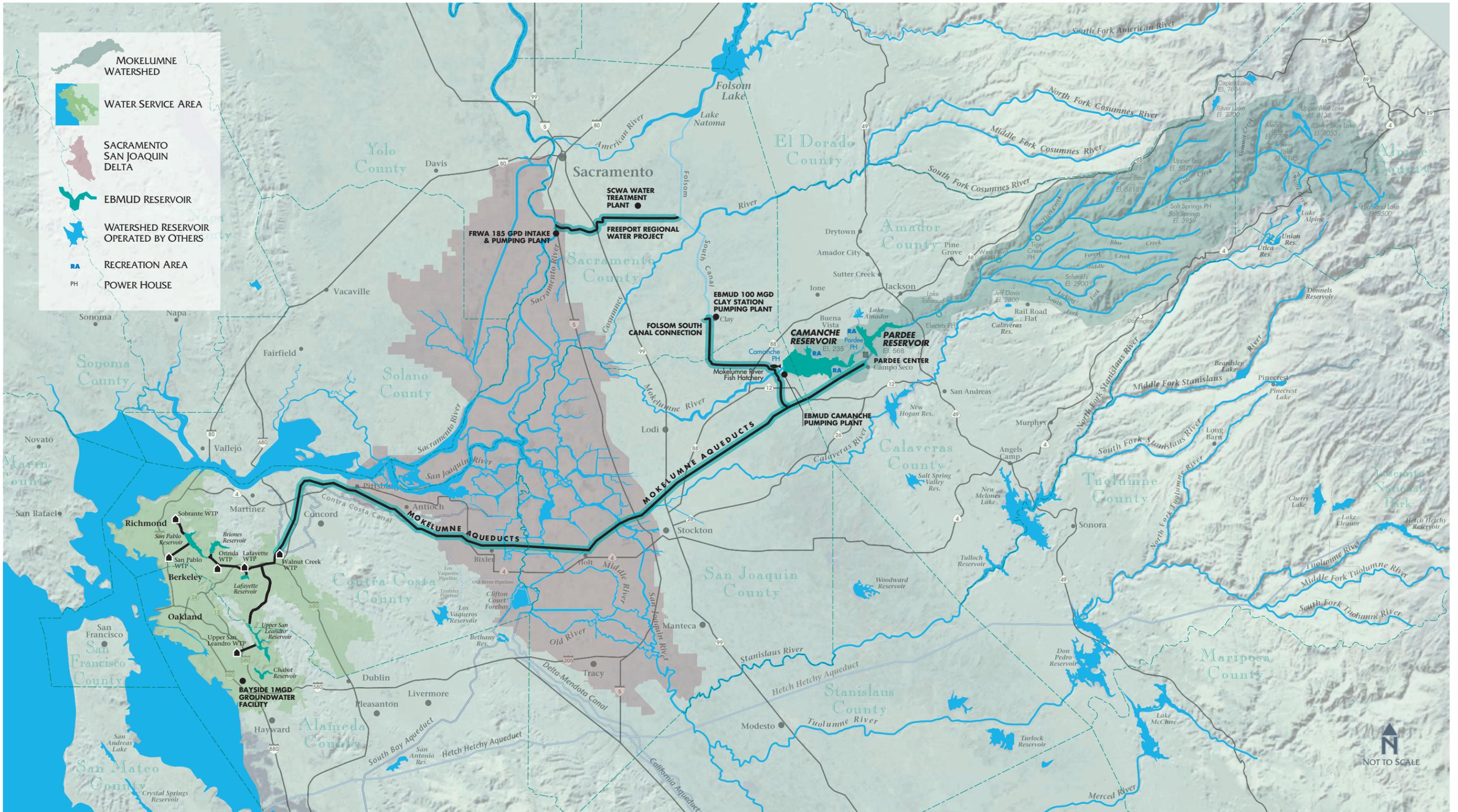
PIPELINE	CONSTRUCTED	DIAMETER (INCHES)	MATERIAL
MOKELUMNE AQUEDUCT NO. 1	1929	65	STEEL
MOKELUMNE AQUEDUCT NO. 2	1949	67	STEEL
MOKELUMNE AQUEDUCT NO. 3	1963	87	STEEL

## EBMUD Water Treatment Infrastructure

Water from Pardee Reservoir is transported to the EBMUD service area in the Mokelumne Aqueducts, which terminate in Walnut Creek. From Walnut Creek, the water is sent directly to EBMUD’s three in-line filtration WTPs or to one or more of the EBMUD terminal reservoirs (see Figure 2-1).

FIGURE 2-1

EBMUD WATER SUPPLY SYSTEM



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FIGURE 2-2 EBMUD FLOW COMMITMENTS

BASIN RUNOFF	DIVERSIONS & LOSSES	MAXIMUM (TAF/CY)	DRY YEAR MAXIMUM (TAF/CY)
	AMADOR & CALAVERAS COUNTIES <sup>1</sup>	47.0	13.1
	<b>MOKELUMNE HILL GAGE</b>	AVERAGE <sup>2</sup> 728	
	JACKSON VALLEY IRRIGATION DISTRICT <sup>3</sup> (AMADOR COUNTY)	3.85	0
	EBMUD AQUEDUCT DRAFT	364 (325 MGD)	SEE FOOTNOTE 4
	EBMUD DIVERSIONS TO STORAGE	562.9	SEE FOOTNOTE 4
	<b>TOTAL CAMANCHE RELEASE</b>	AVERAGE <sup>2</sup> 484	
	FISH RELEASE PER JOINT SETTLEMENT AGREEMENT (JSA)	165.9 <sup>5</sup>	65 <sup>6</sup>
	NORTH SAN JOAQUIN WATER CONSERVATION DISTRICT <sup>7</sup>	20	0
	RIPARIAN & SENIOR APPROPRIATORS (ABOVE WID)	14.4	11.2
	WOODBIDGE IRRIGATION DISTRICT <sup>8</sup>	60	39
<b>WOODBIDGE GAGE<sup>9</sup></b>	AVERAGE <sup>2</sup> 415		
RIPARIAN & SENIOR APPROPRIATORS (BELOW WID)	6.2	4.8	
<b>TOTAL NET CHANNEL LOSSES</b>	120	56	

- Amador County has 15 TAF of pre-14 rights, which could be exercised in dry years if there is sufficient runoff.
- Average data provided for the various periods of historical record.
- May be "0" if no water is available under JVID priority or Pardee elevation is below 550 ft.
- Varies with runoff and storage conditions.
- Water releases committed by EBMUD to protect fishery per "Normal and Above" water year type under JSA criteria.
- Water releases committed by EBMUD to protect fishery per "Dry" water year type under JSA criteria. In critically dry years, the minimum releases could be as low as 22.5 TAF.
- May be "0" if no water is available surplus to EBMUD needs.
- EBMUD's obligation to release water to the Woodbridge Irrigation District is governed by a series of water rights settlement agreements to a maximum of 60 TAF/yr when inflow to Pardee is greater than 375 TAF.
- Includes local runoff between Camanche and WID.

The in-line filtration plants that receive water directly from Pardee Reservoir are Walnut Creek WTP, Lafayette WTP, and Orinda WTP. Walnut Creek WTP and Lafayette WTP serve the area east of Oakland-Berkeley Hills and Orinda WTP serves primarily the central parts of the area west of the Oakland-Berkeley Hills. Three other plants, Upper San Leandro WTP, San Pablo WTP, and Sobrante WTP provide full conventional treatment and receive water from EBMUD's terminal reservoirs. These plants serve the northern and southern parts of the EBMUD distribution system west of the Oakland-Berkeley Hills.

### EBMUD Terminal Reservoirs

Water that is not immediately put through the WTPs and distributed is stored in five EBMUD terminal reservoirs: Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro reservoirs. The total maximum capacity of these reservoirs is 151,670 AF. The terminal reservoirs serve multiple functions that include:

- regulating EBMUD's Mokelumne River supply in winter and spring;
- augmenting EBMUD's Mokelumne water supply with local runoff;
- providing emergency sources of supply during extended drought or in the event of interruption of delivery of the Mokelumne supply;
- providing environmental and recreational benefits to East Bay communities; and
- minimizing flooding.

Upper San Leandro, San Pablo and Briones reservoirs can supply water to EBMUD throughout the year, where as Lafayette Reservoir and Lake Chabot provide emergency standby supply. Lake Chabot also provides untreated water supply to several golf courses. These two reservoirs are not used for regular domestic supplies and are used for public recreation (e.g. fishing, sailing, canoeing, hiking, jogging, bicycling, picnicking, walking, and nature observations). San Pablo Reservoir is also used for public recreation. Table 2-2 provides the capacities and water sources of the terminal reservoirs.

### EBMUD Distribution Facilities

After the WTPs, water is distributed throughout EBMUD's service area, which is divided into more than 120 pressure zones ranging in elevation from sea level to 1,450 feet. Approximately 50 percent of treated water is distributed to customers by gravity. The water distribution network includes 4,100 miles of pipe, 140 pumping plants and 170

TABLE 2-2

TERMINAL RESERVOIR CHARACTERISTICS

RESERVOIR	CONSTRUCTED	CAPACITY (ACRE-FEET)	WATER SOURCES
BRIONES	1964	60,510	MOKELUMNE RIVER, BEAR CREEK
CHABOT	1875	10,350	MOKELUMNE RIVER, SAN LEANDRO CREEK, UPPER SAN LEANDRO RESERVOIR, MILLER CREEK
LAFAYETTE	1933	4,250	LAFAYETTE CREEK <sup>1</sup>
SAN PABLO	1920	38,600	MOKELUMNE RIVER, SAN PABLO CREEK, BEAR CREEK, BRIONES RESERVOIR
UPPER SAN LEANDRO	1926	37,960	MOKELUMNE RIVER, SAN LEANDRO CREEK AND TRIBUTARIES

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

neighborhood reservoirs (tanks storing treated drinking water) having a total capacity of 830 million gallons.

### VULNERABILITIES IN WATER SUPPLY AND SYSTEM RELIABILITY

The reliability of EBMUD’s water supply sources and transmission system are affected by many factors. Droughts and climatic variations can adversely affect the availability of EBMUD’s water supplies. In addition to such gradually-occurring phenomena, sudden catastrophic interruptions also can compromise the availability of water. Despite efforts to upgrade the system, the structural strength of the Mokelumne Aqueducts that cross the Delta region, could be undermined by a levee failure, especially during flooding and earthquakes. Federal authorities have warned the nation’s major water suppliers

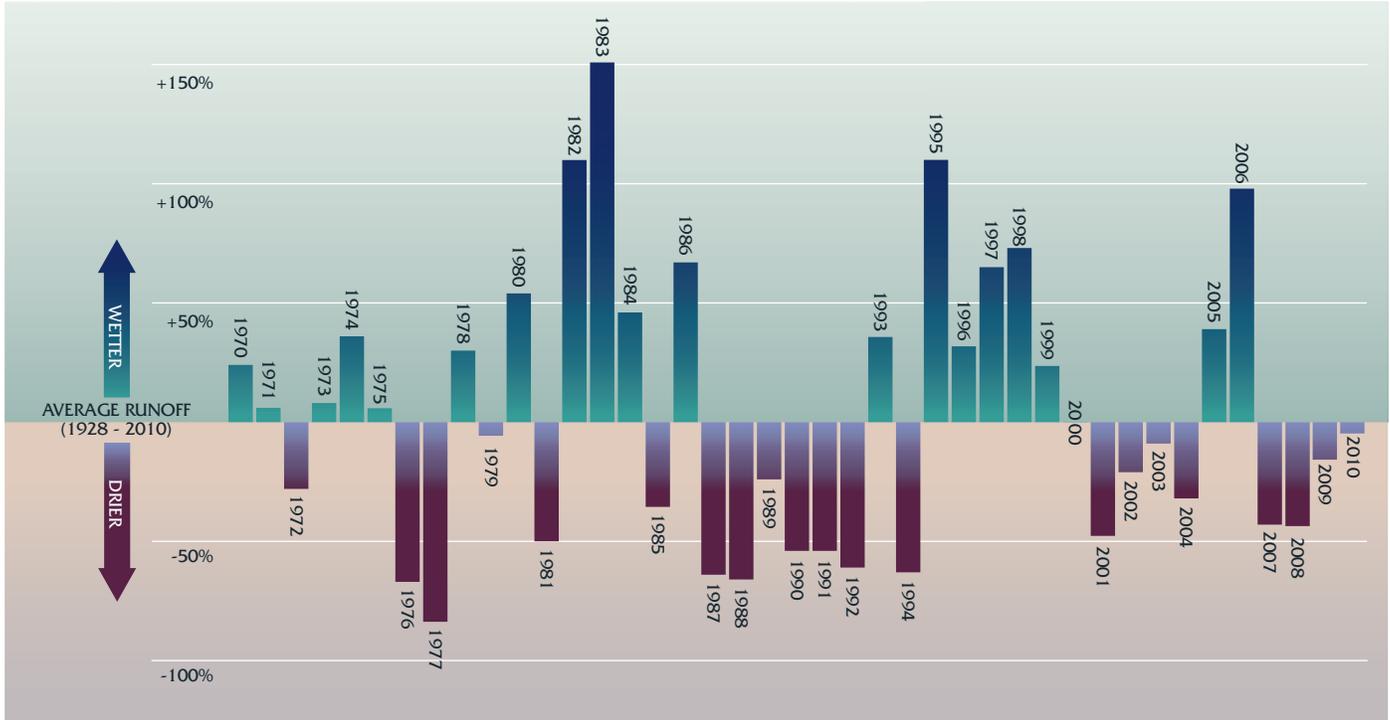
that the integrity of their water supply systems could be compromised by terrorist attacks. Other factors that could affect the availability of water supply include periods of poor water quality from high turbidity, which affects the water treatment system; potential contamination of supplies; maintenance outages at terminal reservoirs; shortfalls in distribution system capacity; widespread power outage; fires; and civil disturbances.

### DROUGHTS

Northern California’s water resources, including EBMUD’s supplies, have been stressed by periodic drought cycles. Historical multi-year droughts have significantly diminished the supplies of water available to EBMUD’s customers. The periodic drought cycles, including the most recent 2007-2009 hydrologic drought

FIGURE 2-3

VARIABILITY IN MOKELUMNE WATERSHED RUNOFF 1970-2010



and high variability of runoff in the Mokelumne River watershed are illustrated in Figure 2-3.

During the early stages of a drought and throughout the drought period, EBMUD imposes drought management programs to reduce customer demands, thereby saving water for the following year in case drought conditions continue. Chapter 3 of the UWMP 2010 includes the details of EBMUD's drought management program; Chapter 4 provides an assessment of the reliability of water service for EBMUD customers during normal, single, and multiple dry-years.

### **EFFECTS OF CLIMATE CHANGE**

Climate change is a growing threat to water resources. Although the full impact of climate change has not been felt, EBMUD has initiated the planning for climate change to ensure that it can continue to provide reliable, high quality water and wastewater services to its customers.

In 2008, EBMUD incorporated climate change into its Strategic Plan and issued its first Climate Change Monitoring and Response Plan. Both documents were updated in 2010. An interdisciplinary staff committee is reviewing the evolving science of climate change, assessing potential water supply impacts and vulnerabilities, and developing strategies for adaptation and mitigation.

In 2009 EBMUD evaluated the sensitivity of its current water supply system to potential climate change impacts. The results of the analysis are intended to help guide EBMUD in managing water supplies to meet demand with the maximum amount of flexibility and the ability to adapt to unknown future conditions, and show that:

- the water supply is most vulnerable to decreases in annual runoff volumes;
- an increase in air temperature may result in increases in the temperature of water flowing into Pardee Reservoir and in customer demand; and
- the frequency of rationing is sensitive to decreases in annual precipitation volume.

Although EBMUD may experience these changes in its Mokelumne River watershed supply in the future, due to the uncertainty in regional climate change projections, the severity of these impacts is unknown.

EBMUD also participates in external working groups focused on climate change, including the Climate Ready Water Utilities Working Group and the Climate Resilience Evaluation and Assessment Tool (CREAT) Working Group.

These working groups are part of the Environmental Protection Agency's Climate Ready Water Utilities Program. The purpose of both groups is to increase utility awareness of climate change impacts, educate and prepare utilities for climate change, and identify and provide tools to assess and understand the impact of climate change.

The Climate Ready Water Utilities Working Group is charged with developing attributes for climate ready utilities; identifying tools, training, and products to address short and long-term needs; and facilitating the adoption of climate change adaptation and mitigation strategies. The CREAT Working Group guided the development of a computer based tool to support utilities with performing traditional risk based and scenario based assessments to evaluate the utilities resilience to climate change. Version 1 of the software was released by the EPA in 2010.

### **REGULATORY CONSTRAINTS**

EBMUD's ability to use its full entitlement of Mokelumne River water is constrained by the limitations incorporated into the state issued licenses and permits that grant EBMUD the right to serve its customers 325 MGD from the Mokelumne River. Although EBMUD's water supply system was designed and constructed to deliver 325 MGD, in dry-years, the extent to which EBMUD's water rights can be exercised is further constrained by other Mokelumne River water users with water entitlements that are senior to those held by EBMUD.

In addition to the requirements set forth in the licenses and permits, EBMUD's water supply system operating goals and objectives must also conform to State Water Resources Control Board Decisions, Court Decisions, Federal Energy Regulatory Commission Orders, and water right settlement agreements. EBMUD is obligated to meet multiple operating objectives, including providing municipal water supply benefits, streamflow regulation, fishery/ public trust interests, flood control, temperature management, and obligations to downstream diverters.

In 2007, the State Water Resources Control Board (SWRCB) commenced a formal proceeding on EBMUD's petition for a time extension of its permit to put Mokelumne River water rights entitlement to full beneficial use. In accordance with the California Environmental Quality Act, EBMUD issued a Notice of Preparation of an Environmental Impact Report (EIR) for the permit extension in November 2008 with the Draft EIR expected to be released for public review at a later date.

## WATER SUPPLY QUALITY

EBMUD consistently provides the highest quality water possible. EBMUD’s primary water supply from the Mokelumne River requires only limited treatment to meet or surpass health standards, because it comes from a remote, mostly undeveloped watershed and is transported within two days to the EBMUD’s service area in large steel pipes. EBMUD has further protected 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 Mokelumne River supply is minimally exposed to common sources of contaminants such as pesticides, agricultural or urban runoff, municipal sewage discharges, or industrial toxics.

EBMUD and county health departments have posted health warnings to notify the public about fish consumption and elevated mercury levels. Mercury in the foothills including Pardee and Camanche Reservoirs has been associated with historical gold mining activity. However it is important to note that mercury has never been detected in EBMUD’s drinking water supply from Pardee or Camanche Reservoirs at levels above the California Public Health Goal (PHG) of 1.2 ug/L.

On certain occasions, turbidity in Pardee reservoir can exceed the water quality limits that the District water treatment plants can treat adequately and reliably to meet regulatory water quality standards. The degradation in water quality has historically been attributed to extreme weather or unusual watershed emergencies such as landslides. In those situations, the Mokelumne Aqueducts must be shutdown or throttled to low flow until the water quality in Pardee Reservoir sufficiently improves. The District’s local reservoir supply is the primary source of supply in these emergency situations. Since 1982 the aqueducts were taken out of service at least three times because of poor raw water quality (i.e. high turbidity) in Pardee Reservoir, caused by winter storm runoff or landslides. The longest recorded shutdown duration was for a period of 65 days in 1997 when a landslide occurred on January 7, on a slope of the Mokelumne River in the Upper Mokelumne River watershed.

As performance regulations for drinking water treatment become more stringent, recovery from poor water quality events is expected to take longer, resulting in longer aqueduct shutdowns or reduced flows.

When the aqueducts are shut down because of severe water quality events, EBMUD implements

water management plans, which are already in place. Terminal reservoirs are normally operated to provide 180 days of standby storage at reduced consumption, and EBMUD meets its service area demands by relying on this supply when the Mokelumne River supply is temporarily unavailable. After water quality has returned to acceptable levels, the terminal reservoirs are refilled as soon as practical by the Mokelumne Aqueducts to meet standby storage levels.

EBMUD WTPs that process the water supplied by local terminal reservoirs are designed to handle high turbidity conditions that can be caused by severe local storms. Consequently, water quality variations do not limit the water supply available from terminal reservoirs.

## EARTHQUAKES

Potential seismic events pose a significant threat to the delivery of water in the San Francisco Bay Area. Within or near EBMUD’s service area, several earthquake faults, including the San Andreas, San Gregorio, Hayward, Calaveras, Concord, Antioch, Greenville, Mt. Diablo Thrust, Midland, and others, as depicted in Figure 2-4, pose varying degrees of risk to the water distribution system and to the Mokelumne Aqueducts in the Delta area. The most significant seismic threat comes from the Hayward Fault that crosses the Claremont Tunnel, which is the most critical conduit of treated water to the East Bay plain. See Table 2-3 for a list of significant earthquakes that have occurred in the Bay Area since 1836.

EBMUD’s Mokelumne River facilities are also located in a seismically active area. Pardee Dam is located within three miles of the Bear Mountain Fault zone (see Figure 2-5); however, according to analyses completed in 1992, it will not be adversely impacted by a seismic

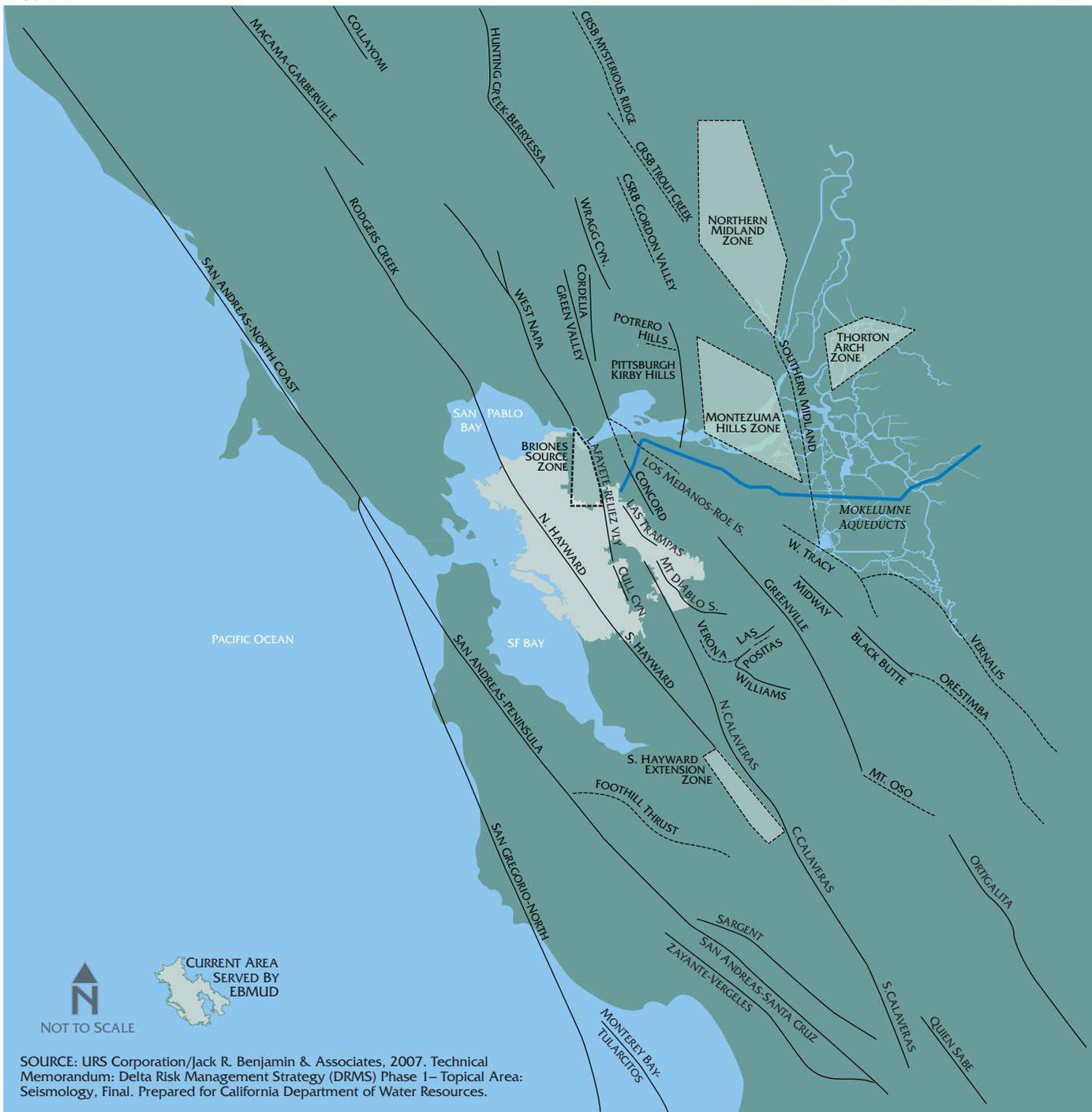
TABLE 2-3 SIGNIFICANT BAY AREA EARTHQUAKES (M>6.5)

YEAR	FAULT	RICHTER MAGNITUDE
1836	HAYWARD	6.75
1838	SAN ANDREAS	7.0
1865	SAN ANDREAS	6.5
1868	HAYWARD	7.0
1892	UNDETERMINED	6.5
1898	UNDETERMINED	6.5
1906	SAN ANDREAS	8.25
1911	CALAVERAS	6.5
1989	SAN ANDREAS	7.1

Source: <http://seismo.berkeley.edu/seismo.basels.html>

FIGURE 2-4

SAN FRANCISCO BAY AREA REGION FAULTS

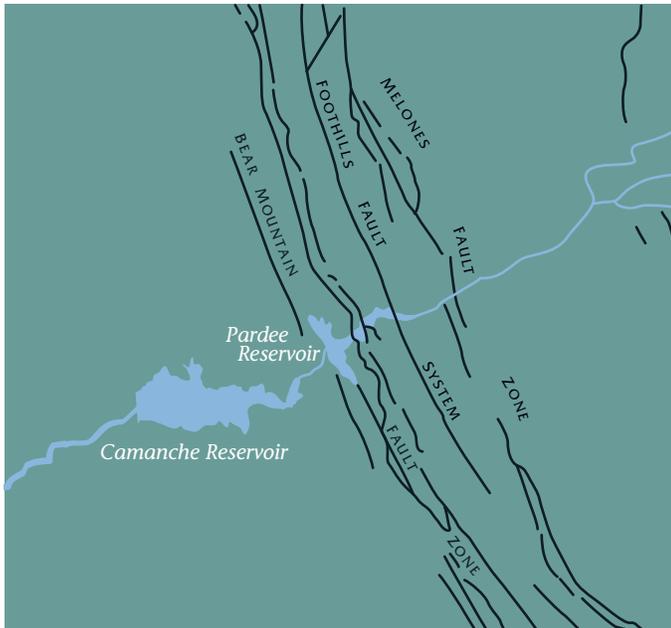


event on that fault. A seismic study of Camanche Dam completed in 2010 concluded that a major earthquake on the Bear Mountain Fault zone could cause liquefaction of the tailings materials under the Camanche Main Dam embankment. The resultant deformation would be limited to the downstream toe area and would not affect the overall dam stability nor lead to dam overtopping.

### 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

FIGURE 2-5 UPCOUNTRY AREA FAULTS



to flow into Upper Jones Tract (see Figure 2-6). This event nearly undermined the aqueduct supports in the area. Necessary repairs were made.

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 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 damage to their exterior coatings.

### IMPROVING WATER SUPPLY AND SYSTEM RELIABILITY

To prepare for conditions that may affect the availability of water, EBMUD implements infrastructure related programs and projects that improve the reliability of its water supply. Among these are supplemental water supply projects that not only reduce the frequency and magnitude of water rationing required of customers during droughts, but also provide EBMUD customers with greater assurance against other possible adverse situations, such as emergency water shortages. In addition to pursuing supplemental water supply sources, EBMUD also maximizes resources through continuous improvements in the delivery and transmission of available water supplies, and investments in ensuring the safety of its existing water supply facilities.

LEVEE FAILURE ON THE LOWER JONES TRACT IN 1980



### INFRASTRUCTURE IMPROVEMENT PROJECTS

#### Seismic Improvement Program

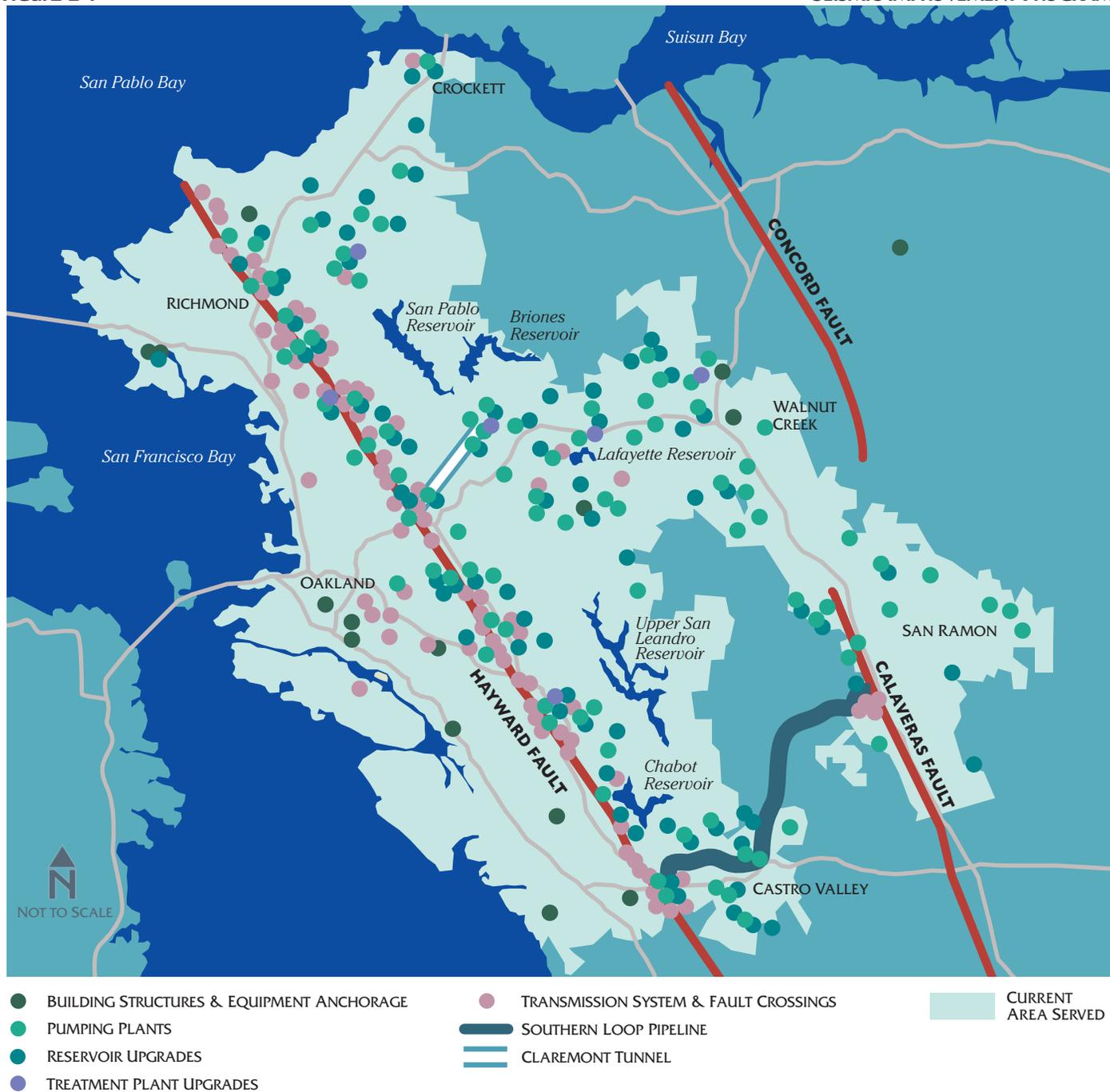
EBMUD is internationally recognized for its proactive approach to minimizing seismic risk. A Seismic Improvement Program completed in 2007, made EBMUD the first water agency in the United States to retrofit its facilities on a comprehensive scale. The program was designed and implemented to protect public safety and preserve the regional economy by making improvements that would allow EBMUD to partially restore water service to its customers following a major earthquake within 30 days. The seismic improvements improved the system’s operational flexibility and reliability and put in place the necessary tools for rapid response, repairs, and recovery. As illustrated in Figure 2-7, the program included installation of an 11-mile pipeline at the southern end of the service area to create an alternate transmission route, upgrades and retrofits to more than 300 critical facilities, and an innovative bypass tunnel through the Hayward Fault zone for the Claremont Tunnel, a critical facility that brings water through the Oakland-Berkeley hills to approximately 800,000 customers.

#### Mokelumne Aqueduct Seismic Upgrade

The Mokelumne Aqueducts convey the Mokelumne River supply from Pardee Reservoir across the Delta to EBMUD’s service area. The aqueducts are buried for most of their length. At Delta river and slough crossings, they are buried from 10 to 40 feet below the channel bottoms or levee crests. The remaining above-ground sections are supported on timber, reinforced concrete or steel bents for approximately ten miles as the aqueducts cross the islands in the Delta. The

FIGURE 2-7

SEISMIC IMPROVEMENT PROGRAM



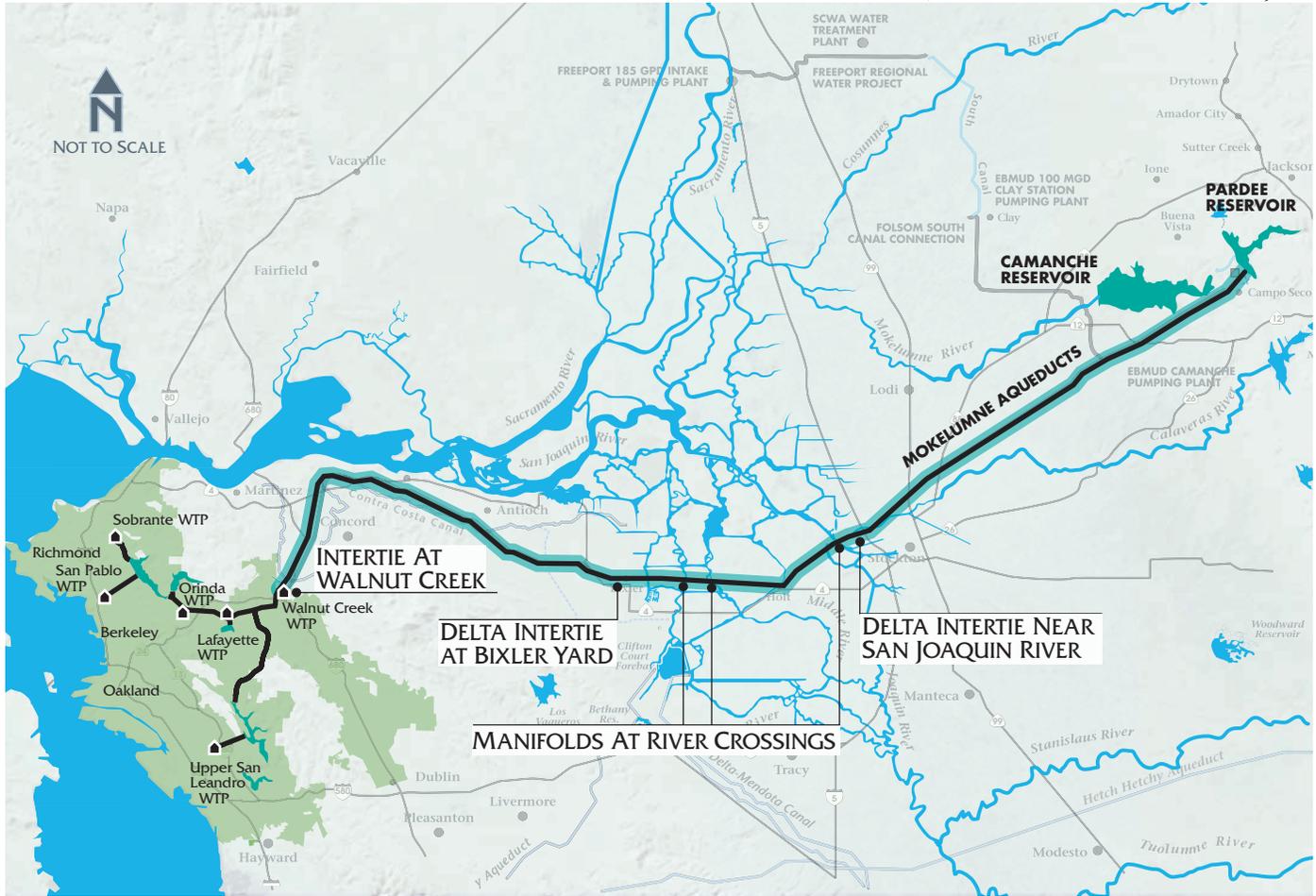
aqueducts also cross non-engineered levees constructed in the late 1800s, which provide little support.

In the 1990s, EBMUD began the Mokelumne Aqueduct Seismic Upgrade Project, as part of the comprehensive Mokelumne Aqueduct Security program, to improve the seismic performance of the aqueducts in the Delta and to ensure that raw water deliveries can be partially

restored within 180 days after a major earthquake. The project improved the seismic performance of the Mokelumne Aqueduct No. 3, by strengthening of levees at aqueduct crossings and of pipe foundations at river crossings; reinforcing all pipe joints on buried portions of the pipe; and the strengthening of pipe support structures on elevated portions of the aqueduct. The project also included replacement of all low strength

FIGURE 2-8

MOKELUMNE AQUEDUCT INTERCONNECTION PROJECT



bolts with high strength bolts on elevated portions of Mokelumne Aqueduct No. 2 and No. 3. The final phase of this program was completed in 2005.

EBMUD prepared an Aqueduct Section Emergency Plan that will 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 be activated. If the water supply to the service area is impacted, the Water Shortage Contingency Plan (see Chapter 3) will also be activated.

### Mokelumne Aqueduct Interconnection Project

EBMUD is currently in the design phase of the Mokelumne Aqueduct Interconnection Project that will further improve the reliability of its water supply delivered through the Mokelumne Aqueducts. The project includes the addition of interconnections between the aqueducts in two locations in the Delta area and near Walnut Creek,

and adding emergency piping manifolds to Mokelumne Aqueduct No. 3 at the Delta river crossings (see Figure 2-8). The interconnections in the Delta will allow the District to bypass segments of the Mokelumne Aqueducts that may be damaged following a levee failure or seismic event, and thus, maximize flows through surviving segments of the aqueducts. The interconnection near Walnut Creek will allow for isolation and bypassing at the two tunnels that are at the end of the Mokelumne Aqueducts to improve operational flexibility. Following an emergency event, the piping manifolds on Mokelumne Aqueduct No. 3 at the Delta river crossing will allow water to temporarily bypass these three main river crossings in the Delta, where the Mokelumne Aqueduct No. 3 is more susceptible to damage, until permanent repairs can be made.

The project is funded by a Proposition 84 grant from the California Department of Water Resources (DWR) in the amount of \$10 million as part of the State's Integrated Regional Water Management Program (IRWMP).

FIGURE 2-9

WATER TREATMENT AND TRANSMISSION IMPROVEMENTS PROGRAM



### Walnut Creek–San Ramon Valley Improvement Project

The Walnut Creek–San Ramon Valley Improvement Project increased system reliability in the eastern portion of the service area, improving water pressure and water availability during prolonged seasonal hot periods while maintaining adequate reserves for fire flows. This project was completed in the mid-2000s. It included capacity expansion and upgrades to the Walnut Creek WTP, 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.

### Water Treatment and Transmission Improvements Program

The Water Treatment and Transmission Improvements Program (WTTIP) addresses regulatory issues, maintenance needs, and water treatment and transmission capacity needs in Lafayette, Moraga, Orinda, western Walnut Creek, and parts of unincorporated Contra Costa County. The program will allow EBMUD to reliably and efficiently meet current and projected 2030 water demands of the WTTIP area. It includes improvements to the Lafayette, Orinda, Walnut Creek, Sobrante, and Upper San Leandro WTPs, four new or upgraded storage tanks, nine new or upgraded pumping plants, and approximately 5.5 miles of new pipeline, as illustrated in Figure 2-9. The WTTIP EIR and recommended projects was approved by the Board in December 2006.

One of the WTTIP components, the Moraga Road Pipeline, a new three mile 36-inch and 48-inch diameter pipeline, was placed in-service in December 2008. Highland Reservoir, a new 2.7 million gallon reservoir is scheduled to be placed in-service by the end of 2011. The Walnut Creek WTP project completion is expected in 2012, and includes construction of two new filters, a new 34 MGD distribution system pumping plant and backwash water recycling system improvements.

### West-of-Hills Master Plan

The West-of-Hills Master Plan was completed in 2010 and addresses regulatory issues, existing maintenance needs, and existing and future water treatment and transmission capacity needs for the western portion of the EBMUD service area. This regional master plan was undertaken to better understand WTP and transmission capacity limitations, integrate long-range plans with the WTTIP, and develop strategies to resolve competing needs from individual pressure zones. The proposed improvements include expansion and upgrades to Orinda, Sobrante, and Upper San Leandro WTPs, five water storage reservoirs, two pumping plants, and 23 miles of new transmission pipeline projects ranging in size from 30-inches to 72-inches in diameter. Some of components of the West-of-Hills Master Plan will be completed as needed, when future development and projected water demand growth materialize.

### Dam Safety Program

EBMUD maintains a comprehensive Dam Safety Program. Instrumentation monitoring, monthly visual inspections, and periodic dam safety reviews are conducted to prevent loss of life, personal injury and property damage from dam failures. EBMUD staff utilizes the latest technology in geotechnical, structural and earthquake engineering to conduct monitoring, inspection, and evaluation of the dams. While most EBMUD dams are under the jurisdiction of the California Division of Safety of Dams (DSOD), Pardee and Camanche Dams also are monitored by the Federal Energy Regulatory Commission (FERC) because they produce hydropower. DSOD and FERC conduct their annual dam inspections independently of EBMUD monitoring and inspection.

FERC uses the Potential Failure Mode Analysis (PFMA), a component of its Dam Safety Performance Monitoring Program, to identify, evaluate, and categorize potential failure modes for dams that are under FERC jurisdiction. In 2008, in compliance with FERC’s regulatory requirements, an independent consultant and project team conducted

the PFMA for Pardee and Camanche Dams. The results of the analysis show that Pardee and Camanche Dams were well designed, constructed, instrumented, monitored, and maintained by EBMUD. Based on results of the analyses, FERC recommended that EBMUD continues to implement its comprehensive Dam Safety Program for both dams.

In 2004 and 2005, EBMUD completed stability evaluations for San Pablo, Chabot, and Lafayette Dams. Based on the results, EBMUD completed seismic upgrades at San Pablo Dam by improving the foundation materials with cement deep soil mixing technology and a larger downstream buttress, and plans to start seismic upgrade work at Chabot Dam in the coming decade. The embankment of Lafayette Dam was found to be seismically adequate; however, its outlet tower may require seismic upgrades. EBMUD is working with DSOD to identify the appropriate measures. The seismic evaluation of Upper San Leandro Dam is currently underway and it is expected to be completed in 2011.

### Security

Working with law enforcement and utility industry security experts, EBMUD has established a comprehensive security program to protect its water supply. Acting on the recommendations of the Federal Bureau of Investigation, the American Water Works Association, and the California Emergency Management Agency, EBMUD continually reviews and updates emergency response plans, and guards its water and wastewater systems.

As required by the Federal “Bioterrorism Preparedness and Response Act, Public Law 107-188,” EBMUD submitted its Vulnerability Assessment to the United States Environmental Protection Agency (EPA) in 2003, and established a Security and Emergency Preparedness Section (SEPS) to coordinate its security efforts. Since 2003, the SEPS has continued to stay abreast of security developments and been prepared to respond to security issues that might arise. EBMUD’s SEPS has trained and certified EBMUD staff in compliance with all legal requirements.

EBMUD has continually improved its ability to deter and delay criminal activity; to detect such activity when it does happen; to assess alarm and potential security breach conditions; and to dispatch responders to security incidents promptly. Physical improvements to key EBMUD facilities include, but are not limited to, re-keying locks, fencing, access control systems, lighting, alarms (interior and exterior), motion detectors, cameras, video recorders, 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 (submitted to the EPA in 2003). In 2009, the SEPS revised the Emergency Operations Plan for full compliance with the National Incident Management System (NIMS). In addition, per EBMUD’s FERC license, periodic security inspections are conducted and specific requirements have to be met to ensure the security of the FERC licensed hydropower project. EBMUD also maintains and annually updates its Emergency Action Plan for Pardee and Camanche Reservoirs to comply with current FERC requirements. EBMUD continues to adjust and improve security measures as warranted to protect against potential terrorism and other security concerns experienced by EBMUD.

Ensuring the safety of public water supplies is EBMUD’s top priority. EBMUD uses an all-hazard, multi-barrier approach with physical, chemical, and operational controls to safeguard the drinking water provided to consumers. This approach is advocated by national industry and homeland security experts. In response to a threat or situation in which the quality of the water supply is potentially affected or compromised, EBMUD follows a systematic approach to assess the threat or likelihood of potential contamination, to investigate the event, and to respond appropriately to protect the public and the water system. EBMUD has plans in place and is ready to issue all required and appropriate public notices if there is a question or concern regarding the safety of its public water supplies.

EBMUD’s Emergency Operations Team (EOT) is ready to respond quickly and appropriately to any emergency with other public safety and first responder agencies. The EOT manages emergency responses, meets, trains, and conducts exercises routinely. EBMUD’s EOT utilizes the California Standardized Emergency Management System that incorporates all NIMS requirements, and is very well integrated with other utilities directly, by agreement, and by its active engagement with the California Utilities Emergency Association. See Chapter 3 for details on inter-agency emergency support.

## EXISTING SUPPLEMENTAL WATER SUPPLY SOURCES

EBMUD’s long-term water supply goals include improving water supply reliability and diversifying its water supply portfolio. Since the UWMP 2005 update, two critical steps toward realizing those goals were completed when EBMUD finished the construction of the Freeport Regional Water Facility and the Bayside Groundwater Facility. These facilities provide additional water to augment EBMUD’s water supply during drought periods.

### Freeport Regional Water Facility

The Freeport Regional Water Facility is a result of a regional water supply project undertaken by Freeport Regional Water Authority (FRWA), which was created by exercise of a joint powers agreement between Sacramento County Water Agency (SCWA) and EBMUD. The City of Sacramento is an associate partner. The facility, as shown in Figure 2-1, (see page 2-3) enables delivery of water diverted from the Sacramento River near the town of Freeport to EBMUD customers during dry-years and will provide water in all years for the Sacramento County. It will be used to supplement EBMUD’s aggressive water conservation and recycling programs to reduce the potential for severe water rationing and associated economic losses during droughts.

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 United States Bureau of Reclamation (USBR) for delivery of Central Valley Project (CVP) water from the American River. Years of litigation followed, preventing construction of the infrastructure necessary to deliver this water supply to EBMUD. In 2000, USBR, EBMUD, and Sacramento parties reached an agreement to modify the contract and to develop a joint water supply from the Sacramento River, rather than from the American River. FRWA was created in 2002, to implement the development of the Freeport facility. The facility, as illustrated in Figure 2-1, includes:

TABLE 2-4

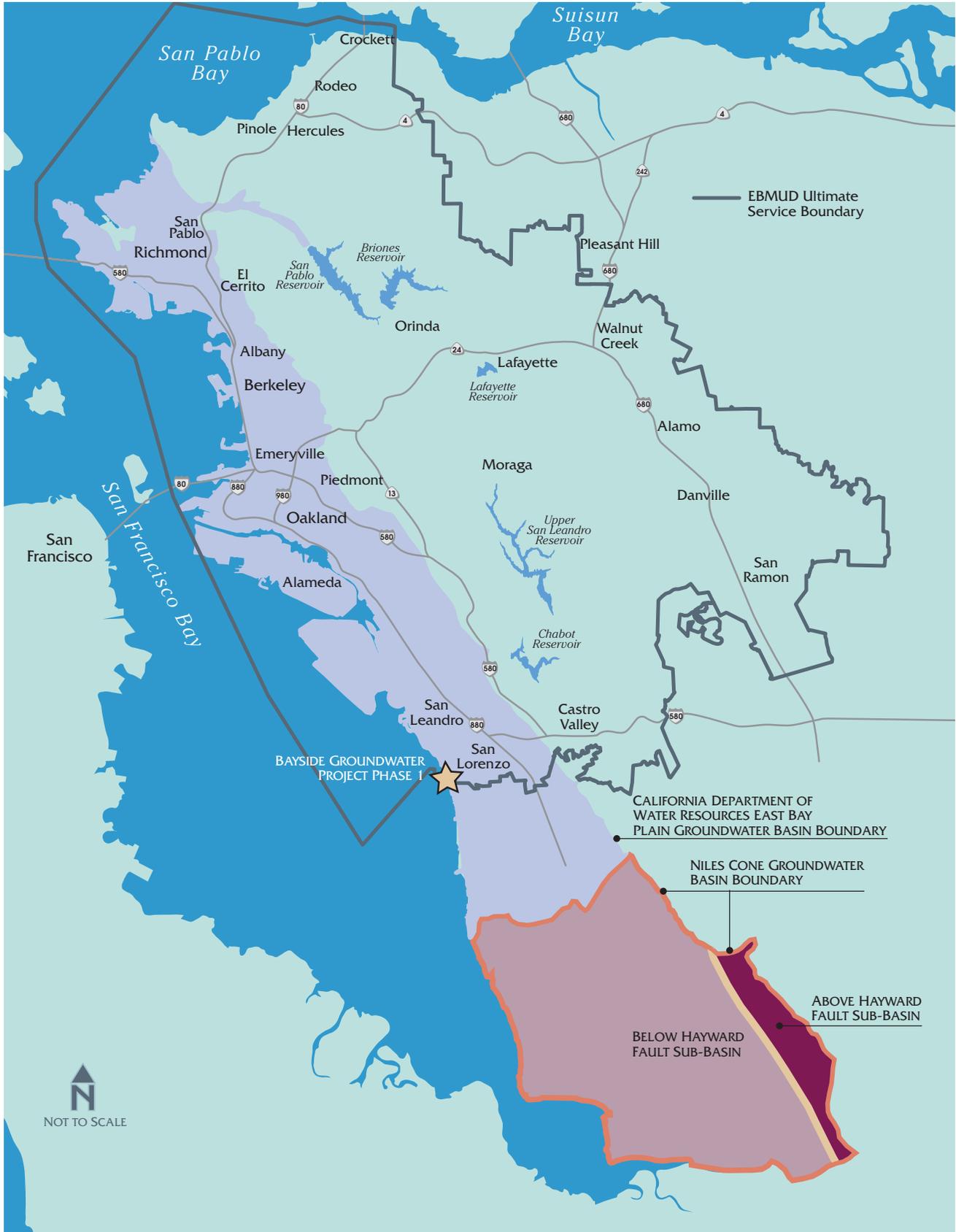
EXISTING SUPPLEMENTAL WATER SUPPLY QUANTITIES (IN ACRE-FEET PER YEAR)

SOURCES	NORMAL YEAR	MAXIMUM SINGLE DRY YEAR	MULTIPLE DRY YEARS		
			YEAR 1	YEAR 2	YEAR 3
FREEPORT REGIONAL WATER FACILITY	0	UP TO 112,000 <sup>1</sup>	165,000 OVER THREE YEARS		
BAYSIDE GROUNDWATER FACILITY	0	1,120	1,120	1,120	1,120

<sup>1</sup> Contractual single-year limit of supply from USBR is 133,000 AF. Continuous operation at 100 MGD, EBMUD’s allocation capacity in the FRWP, yields a maximum annual delivery of 112,000 AF. Supply from the FRWP is also limited by the availability of CVP water during dry-years.

FIGURE 2-10

SOUTH EAST BAY PLAIN BASIN



- 185-MGD water intake and pumping plant (with state-of-the-art fish screens) on the Sacramento River near Freeport;
- 72- to 84-inch diameter pipeline to transport water eastward from the Sacramento River to the existing Folsom South Canal and to SCWA's treatment plant, which is presently under construction;
- the aforementioned WTP in central Sacramento County; and
- approximately 20 miles of 72-inch diameter pipeline and two 100 MGD pumping plants to transport water from the southern end of the Folsom South Canal to EBMUD's Mokelumne Aqueducts.

The project became operational in February 2011. EBMUD's ability to take delivery of water through the Freeport facility is based on its Long Term Renewal Contract (LTRC) with the USBR, which provides for up to 133,000 AF in a single dry-year, not to exceed a total of 165,000 AF in three consecutive dry-years. Under the LTRC, the CVP supply is available to EBMUD only in dry-years when EBMUD's total stored water supply is forecast to be below 500 TAF on September 30 of each year (See Chapter 3 and Appendix G for further details). Table 2-4 illustrates the supplemental supply quantities provided to EBMUD by the Freeport facility.

### Bayside Groundwater Facility

The Bayside Groundwater Facility was built to enable EBMUD to inject potable drinking water into the deep aquifer of the South East Bay Plain Groundwater Basin (SEBPB) during wet years until its subsequent recovery, treatment and use during times of drought. The facility supplies supplemental water to EBMUD customers only when supplemental water is needed, and overall, the quantity of water injected into the aquifer of the SEBPB will exceed the quantity of water extracted. See Figure 2-10 for basin location.

Groundwater from the SEBPB is available only to a limited extent as part of the implementation of the injection/extraction system associated with the Bayside Groundwater Facility. Because it is possible that some extractions may include native groundwater, which will subsequently be treated, EBMUD has started the process for preparing a groundwater management plan for the SEBPB (see SEBPB Groundwater Management Plan Development section of this Chapter), but EBMUD has not yet adopted a groundwater management

plan. The native groundwater of the SEBPB is not available as a significant source of water to EBMUD.

The groundwater facility became operational in 2010. The facility consists of a new water treatment facility and associated pipelines linking the treatment plant to the injection/ extraction well, subsidence monitoring system, and a network of groundwater monitoring wells. The project will supply water to EBMUD customers only when supplemental water is needed because of drought conditions.

The injection/ extraction system uses a 600-foot deep well, located on property leased from the Oro Loma Sanitary District in San Leandro. When operated in injection mode, treated water from EBMUD's distribution system is directed through the project well into the deep aquifers of the SEBPB. The injection mode operation will take place during wet years when surplus water is available for storage. During droughts water will be extracted and treated to meet all federal and state drinking water standards prior to distribution to the customers. A permit from the Department of Public Health, which is pending, is required before the groundwater can be extracted and treated for municipal use.

The project is designed to yield 2 MGD over a 6-month period, resulting in an average annual production capacity of 1 MGD or 1,120 acre-feet per year (AFY). The supplemental supply quantities available to EBMUD as a result of operation of the project are presented in Table 2-4. EBMUD's long-range plan calls for investigating potential expansion of the Bayside Groundwater Facility in the future.

## POTENTIAL SUPPLEMENTAL WATER SUPPLY SOURCES

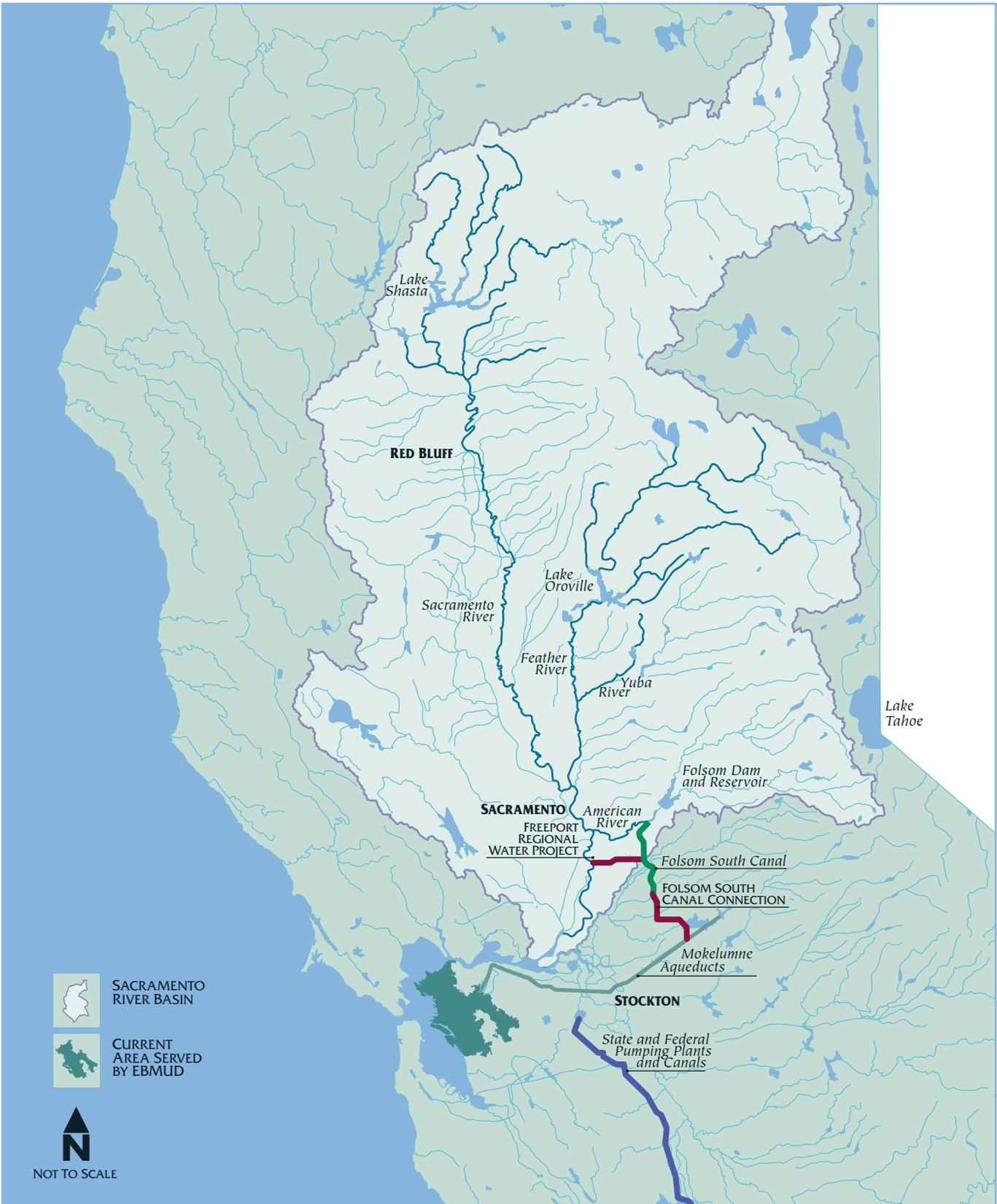
### Short-Term Potential Supplemental Water Supply Projects

EBMUD will meet future growth in projected customer demand with aggressive conservation and recycled water development, and, as necessary, by implementing additional supplemental supply components. These supply components will lower the customer rationing burden during droughts and thereby decrease direct impacts on EBMUD customers.

EBMUD has established aggressive targets for conservation and recycling, and these two actions will meet a total of 50 MGD of future demand, as described in detail in Chapter 5 and Chapter 6, respectively, of the UWMP 2010. The supplemental supply components that

FIGURE 2-11

POTENTIAL WATER TRANSFER SOURCE AREAS AND CONVEYANCE



EBMUD may pursue in order to enhance its supplies during dry-years include, but are not limited to, water transfers, and groundwater banking/ exchange efforts. EBMUD will simultaneously pursue supplemental supply projects to meet future water needs consistent with the resources management strategies presented in DWR's 2009 California Water Plan. By considering a broad mix of projects, with inherent scalability and the ability to adjust implementation schedules for a particular component, EBMUD will be able to minimize the risks associated with future uncertainties such as project implementation challenges and global climate change. If EBMUD is able to successfully develop one component, this could result in deferral of other additional supplemental supply components over the planning period. EBMUD is interested in partnering with other agencies and other water rights owners in exploring projects to ensure the water supply for the future. Partnerships offer the best potential solutions that are environmentally sound, cost-effective, and sustainable. Separate project-level environmental documentation will be prepared, as appropriate, for specific components as they are developed in further detail and implemented in accordance with EBMUD's water supply needs.

Because EBMUD's extensive conservation savings have limited the ability to ration in dry and critical dry years without extensive cost to customers, EBMUD has set the rationing goal to up to 15 percent during multi-year droughts. As a practical matter, EBMUD may be unable to reduce rationing to 15 percent until it has developed sufficient dry-year supply to meet the demands during any particular drought. As new supplemental supplies are secured, EBMUD will be able to gradually reduce the amount of rationing it imposes upon its customers.

### **Northern California Water Transfers**

EBMUD is interested in exploring a water transfer program to secure up to 13 MGD of dry-year water supply through voluntary water transfers. The purpose of EBMUD's Water Transfer Program is to develop and implement water transfer and exchange opportunities throughout northern California. EBMUD plans to use the Freeport facilities, illustrated in Figure 2-11, to convey the transfer water to EBMUD's service area.

Due to recent demand reductions resulting from economic downturn and drought and in combination with the District's rationing policy, EBMUD's water supplies are currently sufficient in the near-term. Therefore, EBMUD's primary interest is exploring partnership opportunities

with willing parties within the Sacramento River Watershed on long-term or permanent water transfer arrangements. In the future, EBMUD's Water Transfer Program also may pursue short-term transfer arrangements, as needed, to help reliably meet EBMUD's dry-year water supply needs.

### **Bayside Groundwater Project Expansion**

EBMUD plans to examine the potential expansion of the Bayside Groundwater Facility that was completed in 2010. EBMUD plans to utilize information gained from the operation of the facility to help determine whether and how to proceed with the expansion. EBMUD would prepare a project specific EIR for Phase 2 prior to the development of the project.

Phase 2 is envisioned to have an annual capacity ranging between 2 and 9 MGD and to use the South East Bay Plain Groundwater Basin (SEBPB), although details regarding proposed capacity, locations, and configuration of Phase 2 facilities will not be developed until Phase 1 is operated for a period of time. As planning for Phase 2 moves forward, EBMUD will work with the Bayside Community Liaison Group to address community concerns.

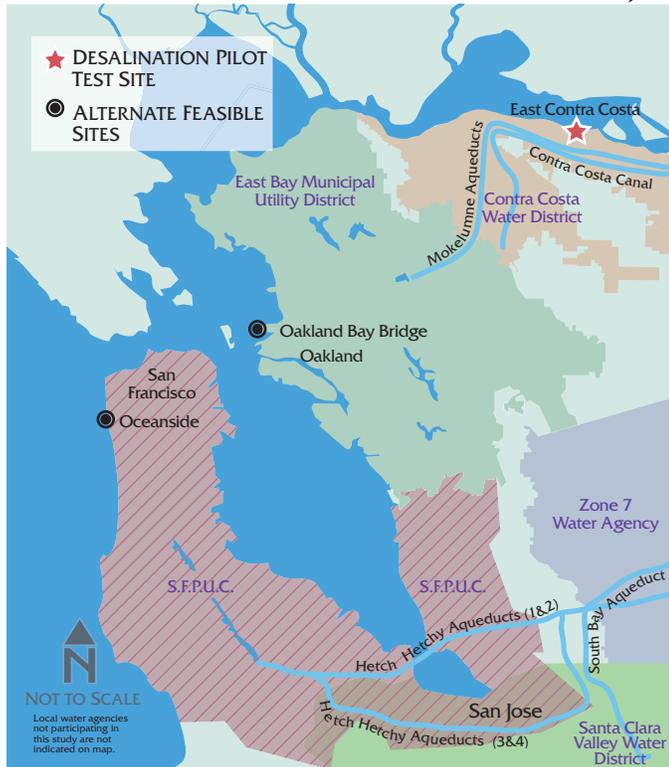
### **SEBPB Groundwater Management Plan Development**

With the completion of the Bayside Groundwater Facility and the potential expansion of the facility, local groundwater resources have become a key component of EBMUD's future supplemental supply strategy. Because the groundwater facility relies on the SEBPB, EBMUD plans to develop a Groundwater Management Plan (GMP) in collaboration with local stakeholders as a tool to manage basin water quality and quantity. In accordance with the Urban Water Management Act, a description of the East Bay Plain Basin is provided in Appendix E of the UWMP 2010.

The SEBPB GMP development is anticipated to include a hydrogeologic review to gain a deeper understanding of basin characteristics, working with stakeholders, and setting basin management objectives. The GMP will be consistent with commitments made in the Bayside Groundwater Project EIR Mitigation Monitoring and Reporting Plan.

The first step in GMP development will be a stakeholder assessment. A collaborative workgroup will be formed and detailed objectives of the GMP will be collectively developed. As per AB 3030, the GMP development process will solicit public involvement and outreach will likely include workshops and public meetings. The GMP work effort will also include updating studies to

**FIGURE 2-12** BAY AREA REGIONAL DESALINATION PROJECT



BARDP goals and benefits:

- provide a reliable water supply source that is available even during contract delivery reductions, extended droughts, and emergencies such as earthquakes or levee failures;
- allow other major facilities such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs;
- minimize the potential for adverse environmental impacts; and
- leverage existing and contiguous infrastructure to meet needs and minimize costs.

Three potential sites have been identified where a regional desalination facility could be located: a site in the eastern part of Contra Costa County (East Contra Costa); a site in Oakland near the Bay Bridge (Oakland Bay Bridge); and a site in San Francisco near Oceanside (Oceanside). A feasibility study was completed in 2007 and a six month pilot test was completed in 2009 at the East Contra Costa site (CCWD’s Mallard Slough Pump Station site). The project’s pilot testing collected data on technical feasibility (pretreatment options, membrane performance, and design parameters) and the environmental impacts (brine disposal and marine life). The pilot testing confirmed:

- membrane pre-treatment and desalination can produce desired water quality;
- sensitive species, such as the Delta and Longfin smelt, may be present during certain times of the year; and
- brine, a salty by-product produced at the desalination plant, did not have a significant negative impact on local species.

Regional Desalination Project would require an assessment of potential environmental impacts and would undergo an extensive and complex regulatory review process. Implementation of the Regional Desalination Project would involve significant public outreach, hearings and negotiations to obtain a number of permits from many different agencies.

### Inter-Regional Groundwater Banking/Exchange

EBMUD is investigating long-range options for combined use of groundwater and surface water sources beyond the East Bay service area. Groundwater storage is being explored in Sacramento County and San Joaquin County. Water banked underground would benefit either location, as it would help address the over-

define the basin boundaries and characteristics. Some studies were conducted for the Bayside Phase 1 efforts. Additional technical studies may be used to update basin groundwater modeling, basin yield and storage estimates, and water quality characterizations. The GMP planning effort began in 2010. It is anticipated that the GMP development will take about two years to complete.

## Long-Term Conceptual Supplemental Water Supply Projects

### Bay Area Regional Desalination Project

The Contra Costa Water District (CCWD), EBMUD, San Francisco Public Utilities Commission (SFPUC), Santa Clara Valley Water District (SCVWD), and the Alameda County Flood Control and Water Conservation District - Zone 7 are jointly exploring the development of regional desalination facilities that would benefit over 5.6 million Bay Area residents and businesses served by these agencies. The Bay Area Regional Desalination Project (BARDP) would consist of one or more facilities, as shown in Figure 2-12, with an estimated capacity range of 10 to 50 MGD. Up to a maximum of 22,400 acre-feet per year of ocean/ bay/ brackish water would be made available to EBMUD for municipal use.

drafted groundwater basins in both regions, while providing a potential dry-year supply for EBMUD.

A Sacramento County groundwater project option would most likely be located adjacent to a stretch of EBMUD's pipeline from the Freeport facility (a pipe which traverses the central and southern portion of Sacramento County) or the Folsom South Canal. A San Joaquin County groundwater storage project option would most likely be located in the proximity of EBMUD's Mokelumne Aqueducts (which traverse the northern portion of San Joaquin County along a west-to-east route). The proximity of the projects to existing EBMUD conveyance facilities would allow efficient transport of stored groundwater to the EBMUD service area.

Entities in both locales have discussed the potential to develop groundwater storage and banking projects in partnership with other water agencies in the IRWMP prepared for the respective regions (i.e., American River Basin IRWMP, the Mokelumne/ Amador/ Calaveras IRWMP and Northeastern San Joaquin Groundwater Banking Authority's IRWMP) .

### Inter-Regional Conjunctive Use Project

The Mokelumne River Forum (Forum) is made up primarily of water agencies, local governments, and non-governmental organizations with an interest in the Mokelumne River. In April 2005, the Forum members signed a Memorandum of Understanding with the DWR and committed to seek mutually beneficial and regionally focused solutions that meet water management needs in the Sierra Foothills, San Joaquin County, and the portion of the East Bay served by EBMUD. A result of those discussions is the Mokelumne River Inter-Regional Conjunctive Use Project (IRCUP). The IRCUP envisions conjunctive use on a regional scale, with the potential to provide water supply and environmental benefits to a broad range of Mokelumne River basin stakeholders. Benefits would include:

- storage and supplies for drought protection and to meet the future water needs of the citizens of Amador and Calaveras Counties;
- long-term drought protection for areas of Alameda and Contra Costa Counties served by EBMUD;
- drought protection, replenishment of the groundwater basin, and water to create a hydraulic barrier to prevent further saline intrusion for San Joaquin County citizens; and
- enhanced cold water pool to benefit water temperatures and therefore fish in the Lower Mokelumne.

The IRCUP project elements, as currently envisioned, include the capture of excess surface water during wet years (potentially within expanded existing Mokelumne reservoirs and/ or within new off-stream reservoirs) and the diversion of water to groundwater storage/ recharge facilities that could be located in San Joaquin County and/ or western Calaveras County. During dry-years, previously stored groundwater would be extracted to supplement surface water supplies. Conveyance would be accommodated through use of existing and new systems (pipelines). EBMUD plans to continue participating with other Forum members in further refining the IRCUP concept. There are no plans to move into a project-specific stage of development until the concept is better understood and support is garnered within the region that would benefit from the IRCUP.

### Expansion of Surface Water Storage

In the future, EBMUD plans to explore a wide range of options to improve reliability of its supply during droughts and to meet future needs, including examination of participation in the Los Vaqueros Expansion. If Los Vaqueros Expansion becomes feasible as a short-term potential supplemental water supply project, then the 2015 UWMP will incorporate and quantify the project. Enlargement of EBMUD's existing facilities on the Mokelumne River may be pursued in the long-term as part of an interrelated set of upcountry projects with a common set of partners. Enlargement of the Lower Bear Reservoir could also be pursued on a regional basis, and the enlargement would increase the surface water storage capacity within the upper Mokelumne watershed. If regional upcountry actions are pursued in the future, additional negotiations, as well as planning, design and environmental review, will have to be conducted.

### PARTNERSHIPS IN REGIONAL MANAGEMENT PLANS

EBMUD partners with other water agencies to develop integrated water resources management strategies that would supplement existing water supplies. EBMUD participates in several consensus-based regional water management efforts with stakeholders in the San Francisco Bay Region as well as the Mokelumne and American River Basins to explore regional and statewide water resource issues.

## San Francisco Bay Area Regional Partnerships

As a member of the Bay Area Water Agencies Coalition (BAWAC), EBMUD continues to work with local agencies under a Letter of Mutual Understanding to update an IRWMP that was drafted in 2007 for the nine Bay Area counties. The goal is to systematically combine water supply reliability, water quality, storm water and wastewater management, and environmental restoration planning. Integrating regional water management and planning 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 has been able to compete more effectively for funding from broader sources such as state bond funds and federal appropriations.

Through BAWAC, EBMUD partners with other local member agencies (Alameda County Water District, Bay Area Water Users Association, CCWD, SCVWD, and SFPUC) to formulate and support a mutually agreeable set of actions to improve water quality and supply reliability in the San Francisco Bay Area. Examples of such collaboration include: the ongoing study of a regional desalination project, in cooperation with the SFPUC, CCWD and SCVWD and (as of 2010) the Zone 7 Water Agency; completion of the SFPUC-Hayward-EBMUD Intertie Project between SFPUC, Hayward, and EBMUD; completion of the FRWP; and preparation of numerous regional grant applications submitted between 2005 through 2010 that resulted in the utilization of state funds (funds as made available through Proposition 50 and Proposition 84) to implement a broad range of supplemental supply projects, conservation programs, 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 received approximately \$1 million in grants to complete a watershed assessment and a plan for the Upper Mokelumne (above Pardee Reservoir) watershed. That plan was completed in 2008. The project collected and assembled watershed data, conducted additional monitoring, developed a model for assessing changes in the watershed, and involved 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. Moving forward, UMRWA has taken over the development of updates to the Mokelumne/ Amador /Calaveras IRWMP, as was prepared by a range of upcountry stakeholders in 2006. UMRWA intends to apply for grant funding to support this work and work on water-saving measures such as distribution system leak detection and repairs that would benefit the entire UMRWA community.

EBMUD is also an active participant in the Mokelumne River Forum, as described in the “Inter-Regional Conjunctive Use Project” section in this Chapter.

## American River Basin Partnerships

EBMUD, along with a number of water agencies and interest groups in Sacramento County, prepared the American River Basin (ARB) IRWMP in 2006/ 2007. EBMUD’s participation is consistent with a 2005 agreement between SCWA and EBMUD to 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

## WATER SUPPLY MANAGEMENT EFFORTS

EBMUD is in the process of developing a Water Supply Management Program that will analyze means of serving its long-term projected demands through the year 2040. EBMUD is presently supplementing the environmental analysis of the Water Supply Management Program 2040, and the District plans to adopt the Water Supply Management Program 2040 after considering the supplemental information regarding impacts and alternatives for securing supplemental supplies. This action will likely take place in 2012.

## CHAPTER 3. 2010 WATER SHORTAGE CONTINGENCY PLAN

*This chapter constitutes EBMUD's 2010 Water Shortage Contingency Plan, which is adopted with the resolution adopting the UWMP 2010. During times of extreme shortages, including a catastrophic interruption of water supply, EBMUD implements the Water Shortage Contingency Plan. EBMUD evaluates the availability and reliability of its supply each year in accordance with its Water Supply Availability and Deficiency Policy.*

### INTRODUCTION

Section 10632 of the California Water Code requires UWMPs to include an urban water shortage contingency analysis, which is incorporated into an Urban Water Shortage Contingency Plan (Contingency Plan). The relevant section of the Code is included in Appendix A. In 1992, EBMUD adopted its first Contingency Plan in Resolution 32568 as required by the Water Code. This chapter constitutes an update to that 1992 Contingency Plan as a result of the following:

- a significant increase in the population in EBMUD's service area;
- the drought management program in 2007-2010;
- the completion of the Freeport Regional Water Project (FRWP);
- a change to EBMUD's customer rationing policy;
- the increased use of technologies for broader customer outreach;
- the increased uncertainty in water supply reliability due to climate change, the regulatory environment, and water system security challenges; and
- the consideration of planning recommendations from the Urban Drought Guidebook 2008 Updated Edition.

Chapter 1 of the UWMP 2010 discusses the process for the public review, meeting, and hearing for the Contingency Plan. At its meeting on June 28, 2011, the EBMUD Board of Directors adopted its 2010 Urban Water Shortage Contingency Plan as part of the UWMP 2010. A copy of the Board Resolution is included in Appendix D of this UWMP 2010.

### PURPOSE OF A WATER SHORTAGE CONTINGENCY PLAN

The EBMUD water supply system, like other large systems, is vulnerable to droughts and disasters, such as earthquakes, floods, regional power outages, and water contamination, that result in water shortages. Extreme water shortage events resulting from these disasters could compromise EBMUD's ability to supply water for drinking, fire fighting, and treating wastewater.

The Contingency Plan guides the planning and response to these emergencies through prudent management of the water supply. It lays out an orderly process for EBMUD to collect information on water supply availability, to assess conditions, and to respond appropriately based on the severity of the situation. The Contingency Plan describes EBMUD's broad powers to implement and enforce regulations and restrictions for managing a water shortage when it declares a water shortage emergency under the authority of the Water Code. It also describes EBMUD's predetermined actions to manage supply and demand before and during a water shortage to ensure a reliable water supply system. In an emergency, EBMUD dedicates the water supply to meeting essential health, safety, and fire fighting needs.

As required by the Water Code, the Contingency Plan addresses the following elements:

- stages of action in response to water shortages;
- estimated minimum supply available for three consecutive dry years (Chapter 4);
- catastrophic supply interruption preparation and response;
- prohibitions, penalties, and consumption reduction methods;
- analysis of revenue and expenditure impacts due to reduced water sales and mitigation measures;
- water shortage contingency resolution (Appendix D); and
- water reduction monitoring procedure.

The Contingency Plan also outlines EBMUD's local agency level responsibilities to manage water shortage conditions, which support both regional and statewide efforts to manage water in an emergency. The section on Emergency Preparedness Program details EBMUD's roles and responsibilities to provide mutual aid and highlights expected coordination efforts with State agencies. This coordination fits the State strategy to prepare for, respond to, and recover from droughts and water shortages as

discussed in the California Drought Contingency Plan (CDCP), November 2010. As a product of the California Water Plan development process, the CDCP is anticipated to minimize drought impact, enhance recovery, foster communication, and coordinate among agencies/ organizations. The CDCP defines roles and responsibilities of state agencies, establishes the structure for integrating state interagency planning, and identifies an integrated regional approach to assessing droughts, drought action levels, and appropriate agency responses as drought severity changes.

### **DROUGHT PLANNING SEQUENCE**

During some historical dry periods when runoff from the Mokelumne River Basin was insufficient to meet service area demands, EBMUD relied on stored water in its reservoirs to meet most of its customers’ water needs. The worst hydrologic 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”) with an uncertain precipitation and runoff forecast for the following year, EBMUD continued to mandate rationing to avoid depleting the system storage. Fortunately, a very wet year (beginning in 1978) followed the critically dry year of 1977 and contributed to the system’s rapid recovery. If the drought continued into the third dry year in 1978 and rationing had been lifted, EBMUD would not have had sufficient water to meet customer needs or its downstream obligations.

Three consecutive extremely dry years could occur. To plan for the possibility of such an event, EBMUD uses a three year “drought planning sequence” to assess the adequacy of its water supply. This maximum credible drought event defines EBMUD’s need for additional water in its integrated water resources planning. The first and second years of this drought planning sequence are modeled with the runoff that occurred in 1976 and 1977, the driest recorded two-year period. The runoff in the third year is assumed to be 185 thousand acre-feet (TAF), which is an average of the runoff from 1976 and 1977. EBMUD’s water planning model further assumes 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 UWMP 2010 provides an assessment of EBMUD’s supply and demand during normal and drought periods.

## **WATER SUPPLY SHORTAGE DECLARATION**

### **DROUGHT COMMITTEE**

EBMUD begins drought preparations early in the calendar year when a water shortage appears possible. Beginning each January, the senior staff member responsible for water supplies takes the lead in monitoring water supplies and, if a shortage is possible, convenes the District’s Drought Committee. This committee includes senior staff representing key functions that are affected by and involved in customer response to drought. As warranted by the water supply status, this group initiates response activities necessary for addressing a potential shortage or drought and sets timelines for these activities. This multi-disciplinary team develops staff recommendations regarding water shortage and drought programs and services, manages program implementation, and monitors and reports on results. A second multi-disciplinary team of mid-level staff advises the leadership team and guides program implementation throughout the organization. Key tasks organized by function are shown in Table 3-1.

### **WATER SUPPLY AVAILABILITY AND DEFICIENCY POLICY**

By May 1 of each year, EBMUD prepares a report that evaluates the adequacy of its current and long-term water supply in accordance with its Water Supply Availability and Deficiency Policy 9.03 (Appendix F). The report provides the Board with the basis for determining whether to enact a Drought Management Program (DMP).

EBMUD adopted its first Water Supply Availability and Deficiency Policy in 1985. Since 1989 when EBMUD revised that policy, water rationing had been limited to a maximum of 25 percent of total customer demand until 2010 when the Board adopted Policy 9.03. That policy lowered the customer rationing threshold to a maximum of 15 percent of total annual demand if additional supplemental supplies are developed. The new policy is designed to lessen the burden of rationing during extended droughts on customers. On-going water conservation and recycling have decreased the flexibility customers have to further reduce demand during droughts. However, unless dry-year supplemental supplies (as discussed in Chapter 2) are secured, and water conservation and recycled water initiatives are fully carried out, EBMUD may not be able to limit rationing to 15 percent.

TABLE 3-1

## DROUGHT COMMITTEE KEY ROLES AND RESPONSIBILITIES

COMMUNICATIONS
<ul style="list-style-type: none"> <li>■ EXPLAIN THE REASONS WHY THE WATER SHORTAGE OCCURRED, THE ELEMENTS OF EBMUD'S DMP, AND WHAT IS EXPECTED OF CUSTOMERS AND EMPLOYEES.</li> <li>■ PROVIDE OPPORTUNITIES FOR PUBLIC INPUT AND FEEDBACK ON CUSTOMER ACTIONS AS THE DROUGHT RESPONSE CONTINUES.</li> </ul>
CUSTOMER SERVICE MANAGEMENT
<ul style="list-style-type: none"> <li>■ PROVIDE CONSERVATION SERVICES TO HELP CUSTOMERS SAVE WATER.</li> <li>■ BILL CUSTOMERS CONSISTENT WITH DROUGHT REGULATIONS AND HELP CUSTOMERS UNDERSTAND CHARGES.</li> <li>■ ENFORCE WATER USE RESTRICTIONS THROUGH BOARD-APPROVED FEES AND/ OR SERVICE INTERRUPTION.</li> <li>■ ENFORCE WATER USE PROHIBITIONS (E.G. IRRIGATION RESTRICTIONS, NO NEW METERS, NO HYDRANT METERS.)</li> </ul>
DATA MANAGEMENT
<ul style="list-style-type: none"> <li>■ COMPLETE PROGRAMMING TO SET CUSTOMER WATER USE ALLOCATIONS, UPDATE THE BILLING STRUCTURE, AND MODIFY EBMUD'S WEBSITE TO ACCOMMODATE DROUGHT-RELATED PROGRAMS AND SERVICES.</li> <li>■ PREPARE AND RUN REPORTS THAT PROVIDE DATA TO MANAGE AND EVALUATE DROUGHT PROGRAMS AND SERVICES.</li> </ul>
FINANCIAL MANAGEMENT
<ul style="list-style-type: none"> <li>■ ANALYZE COSTS OF PROVIDING DROUGHT SERVICES AND PERFORM RATE ANALYSES TO RECOMMEND DROUGHT RATES AND CHARGES.</li> <li>■ MONITOR BUDGETARY IMPACTS.</li> </ul>
LEGAL SUPPORT
<ul style="list-style-type: none"> <li>■ CLARIFY LEGAL AUTHORITY AND RESTRICTIONS ON EBMUD DROUGHT PROGRAMS.</li> <li>■ ADVISE ON WATER USE RESTRICTION ENFORCEMENT.</li> </ul>
RECREATION MANAGEMENT
<ul style="list-style-type: none"> <li>■ PLAN FOR RECREATIONAL IMPACTS OF LOWERED RESERVOIR LEVELS AND COMMUNICATE ISSUES TO USERS.</li> </ul>
WATER OPERATIONS
<ul style="list-style-type: none"> <li>■ PROVIDE UPDATED INFORMATION AS NEEDED ON THE WATER SUPPLY.</li> <li>■ ASSURE ALL EBMUD FACILITIES AND MAINTENANCE ACTIVITIES USE WATER EFFICIENTLY AND AVOID WATER WASTE.</li> </ul>
WATER RECYCLING OPERATIONS
<ul style="list-style-type: none"> <li>■ MAKE RECYCLED WATER AVAILABLE FOR CONSTRUCTION AND OTHER USES.</li> </ul>

## WATER SUPPLY SHORTAGE RESPONSE

### DROUGHT MANAGEMENT PROGRAM

EBMUD's Drought Management Program (DMP) is designed to minimize drought impacts on EBMUD customers while continuing to meet stream flow release requirements and obligations to downstream water users. In conjunction with Policy 9.03, the DMP provides guidelines to manage demand so that customer needs can be met in the following year with carryover storage at no more than 15 percent deficiency in the system. The DMP guided EBMUD in successfully managing demand during mandatory and voluntary rationing periods in calendar years 1976-1978, 1987-1994, and 2007-2010 when supplies were limited. Under the previous policy, water rationing was anticipated to not exceed 25 percent of total annual customer demand despite a supply that could drop below 50 percent of normal, such as during the 1976-1977 and 1987-1992 hydrologic droughts.

### Stages of Action

The supply storage projected in April for the end of a water year in the Water Supply and Availability Report determines the need for requiring customers to change their water use. The DMP level of rationing is dependent on supply storage, modeled after the DMP guidelines established in the 1992 Contingency Plan and modified to reflect the maximum 15 percent rationing goal as adopted by the Board in October 2009. The DMP follows this process:

- based on water year runoff predicted in April, estimate total system storage that will be available at end of water year (September 30);
- if total system storage is projected to be less than 500 TAF, prepare and implement a DMP; and
- adjust the DMP as conditions change during an extended dry period.

The resulting Long-Term Drought Management Program Guidelines are shown in Table 3-2.

TABLE 3-2 LONG-TERM DROUGHT MANAGEMENT PROGRAM GUIDELINES

STAGE	APRIL PROJECTION OF TOTAL SYSTEM STORAGE <sup>1</sup> ON SEPTEMBER 30 <sup>2</sup>	PERCENT OF MAXIMUM SYSTEM STORAGE <sup>3</sup>	RATIONING REDUCTION GOAL	VOLUNTARY/ MANDATORY
NORMAL	500 TAF OR MORE	65% OR GREATER	NONE	
MODERATE	500 – 450 TAF	59% TO 65%	0 TO 10%	VOLUNTARY
SEVERE	450 – 300 TAF	39% TO 59%	10 TO 15%	MANDATORY
CRITICAL	LESS THAN 300 TAF	39% OR LESS	15%	MANDATORY

<sup>1</sup> Total System Storage represents total storage in Pardee, Camanche, and Terminal reservoirs.  
<sup>2</sup> Without consideration of supplemental supplies that may be available.  
<sup>3</sup> Maximum system storage represents the maximum Total System Storage capacity of approximately 767 TAF.

Effective in 2010, EBMUD implemented Interim DMP Guidelines (Appendix G-2.1), which reflect the temporary reduction in customer demand resulting from the residual effects of the recent drought and the adverse economic conditions, and account for dry-year water available from EBMUD’s Central Valley Project (CVP) contract through the Freeport Regional Water Facility. The revised guidelines will remain in effect until the economy recovers and post-drought consumption rebounds to demand planning levels in the 2040 Demand Study.

Typical actions that may be undertaken during each stage of a drought are presented in Table 3-3. EBMUD’s response to the Severe Drought Stage is applicable for system storage at less than 50 percent of maximum.

### Central Valley Project Public Health and Safety Supply

EBMUD, like all CVP contractors, receives an allocated CVP supply from the United States Bureau of Reclamation (USBR) during shortage conditions. If drought conditions become severe, cutbacks in allocations may have to be limited to sustain a “Public Health and Safety” (PH&S) level of supply. The USBR determines the quantity of CVP water needed to supplement EBMUD’s supply up to that PH&S level during a critical drought. Appendix G-1, as part of this Contingency Plan, discusses operating principles for the EBMUD system to be recognized in estimating EBMUD’s available supply from non-CVP sources in a critical drought. An illustration is also provided on EBMUD’s approach for determining the minimum CVP supply required to meet PH&S needs in a critical drought when the USBR’s initial allocation is less than the amount requested by EBMUD.

### EMERGENCY PREPAREDNESS PROGRAM

Under Policy 7.03 (Appendix F), EBMUD maintains an active emergency preparedness program and coordinates emergency responses with other public and private organizations. EBMUD’s Security and Emergency

Preparedness Section coordinates and publishes the EBMUD Emergency Operations Plan (EOP), which details the internal organizational structure used in the response to all emergencies, including regional power outages and earthquakes. The EOP was last revised in 2009 and fully complies with the California Standardized Emergency Management System (SEMS), which includes all National Incident Management System (NIMS) guidance for federal emergency operations plans. EBMUD also prepared Business Continuity plans for all key departments and functions in coordination with EOP actions.

In response to an emergency incident or an event requiring significant planning for a potential emergency, a well-trained team of EBMUD personnel will form the Emergency Operations Team (EOT) to carry out the five SEMS functions (Command/ Management, Operations, Planning, Logistics, and Finance/ Administration). Operating under the EOP, the Operations Section Chief establishes response priorities based on the nature of the emergency, focusing on actions to address life safety, incident stabilization, restoration of normal operations, and working with the Planning Section to determine the needs for mutual aid/ assistance resources, the scope of work to be done, and the planning objectives to accomplish this work.

### Inter-Agency Emergency Support

#### Mutual Assistance and Coordination With Other Agencies

Effective coordination with state and local agencies is critical in responding to a catastrophic event that interrupts water supplies. As one of the eight major water suppliers in the San Francisco Bay Area, EBMUD, as do the other agencies, recognizes that in the event of a regional catastrophic event, assistance from other local agencies is not guaranteed. To mitigate the risk of limited access to local mutual aid, EBMUD entered into an agreement with Los Angeles Department of Water and Power (LADWP) to mutually supply as much of the requested resources as

TABLE 3-3

## DROUGHT MANAGEMENT PROGRAM ELEMENTS

DROUGHT STAGE	ACTIONS
MODERATE SHORTAGE <10%	<ul style="list-style-type: none"> <li>■ ESTABLISH VOLUNTARY OR MANDATORY WATER USE GOALS AND DETERMINE USE RESTRICTIONS NEEDED AND SERVICES THAT WILL BE OFFERED TO HELP CUSTOMERS COMPLY WITH THE RESTRICTIONS.</li> <li>■ INITIATE A PUBLIC INFORMATION CAMPAIGN TO EXPLAIN THE WATER SUPPLY ISSUES AND WHAT CUSTOMERS NEED TO DO. WORK WITH THE MEDIA AND KEY STAKEHOLDER GROUPS TO PROMOTE CUSTOMER AWARENESS OF THE SHORTAGE. INCREASE ADVERTISING OF WATER-SAVING DEVICES PROVIDED FREE TO CUSTOMERS AND OTHER FREE CONSERVATION SERVICES.</li> <li>■ INCREASE EFFICIENCY OF SYSTEM WATER SUPPLIES, E.G. INTENSIFY ENFORCEMENT OF HYDRANT-OPENING REGULATIONS; INCREASE METER-READING EFFICIENCY AND METER MAINTENANCE; AND INTENSIFY LEAK DETECTION AND REPAIR PROGRAM.</li> <li>■ PREPARE AND DISSEMINATE EDUCATIONAL INFORMATION (WEB SITE INFORMATION, BILL INSERTS, ETC.) THAT EXPLAIN THE WATER SHORTAGE AND WAYS IN WHICH CUSTOMERS CAN SAVE WATER.</li> <li>■ CONDUCT OUTREACH TO SPECIFIC CUSTOMER TYPES ON WAYS TO SAVE WATER.</li> </ul>
SEVERE 10% < SHORTAGE <15%	<ul style="list-style-type: none"> <li>■ DECLARE A WATER SHORTAGE EMERGENCY (DEPENDING ON AVAILABLE SUPPLIES FOR FUTURE YEARS).</li> <li>■ IMPLEMENT RATE AND WATER RESTRICTION CHANGES APPROPRIATE TO SHORTAGE.</li> <li>■ INTENSIFY ALL OF THE MODERATE STAGE STEPS.</li> <li>■ INSTITUTE RATE CHANGES TO PROMOTE CONSERVATION, IF MANDATORY WATER USE RESTRICTION PROGRAM IS IN PLACE. EXPLAIN NEW RATE SCHEDULES TO CUSTOMERS. EXPLAIN FURTHER REDUCTIONS PLANNED FOR SUCCEEDING RATIONING STAGES.</li> <li>■ SEEK AND PROCURE A SUPPLEMENTAL WATER SUPPLY (DEPENDING ON AVAILABLE SUPPLIES FOR FUTURE YEARS.)</li> </ul>
CRITICAL SHORTAGE >15%	<ul style="list-style-type: none"> <li>■ INTENSIFY ALL OF THE SEVERE STAGE STEPS.</li> </ul>

possible to the other agency, if a regional disaster impacts only one of the agencies. 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 available resources.

### Coordination Among Local, County, Regional, State, and Federal Governments

EBMUD and other special districts, such as schools and parks are considered local government agencies, which coordinate resources and manage operations in an emergency at the local level and interface with the Operational Area Emergency Management Agency. In California, each county is responsible for maintaining the Operational Area Emergency Management Agency. The State is divided into six regions, each of which is responsible for maintaining a Regional Operations Center (REOC). The State of California, which regulates SEMS, maintains the Emergency Management Agency that oversees these REOCs and the Operational Areas at the State Operations Center (SOC).

SEMS was mandated by Government Code 8607 following the 1991 East Bay Hills Firestorm. Reimbursement for claims filed after a disaster requires that all EBMUD emergency plans, procedures, and training follow the

SEMS regulations, and that they directly correlate with the EOP. The SEMS in California and the guidelines for training for all emergency responders roll up from the states to the federal government under the national response framework. Each state has a Principle Coordination Official assigned by the federal government to coordinate planning and response under the Emergency Support Functions (ESF) established by the federal government.

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 January 1996 Multi-Agency Emergency Response Procedures for Potable Water Procurement and Distribution report. In 2007, EBMUD spearheaded the efforts of a working group that includes the eight largest water agencies in the Bay Area, Operational Area, and Bay Area Regional Emergency Management Agencies to update this document. Published in its second edition and formally adopted by the State of California for the first time, this document is intended to allow water agencies to request assistance from city, county, or regional SEMS response levels to acquire and distribute potable water during a state or local emergency in California. This allows water agencies that sustain heavy damage to focus on rebuilding and returning their system to a level of service that can be depended upon.

## **WATER SUPPLY SHORTAGE MITIGATION**

In addition to managing demand, EBMUD devotes significant effort to supply-side conservation measures to extend the water supply. As part of its long-term planning, EBMUD will undertake several supplemental water supply initiatives as identified in Chapter 2. These ongoing efforts to secure supplemental supplies will provide customers not only with partial relief from frequent and severe water rationing during droughts, but also with greater assurances against other possible adverse situations, such as emergency water shortages.

However, during extreme and catastrophic water shortage conditions, EBMUD may need to explore supplemental water supply options that temporarily augment supply. Constraints, such as obtaining environmental and regulatory approvals in time to alleviate drought effects, can be overcome with streamlined planning. Temporary supplemental water supply options include:

- trucking recycled water to replace potable water use;
- drawing from reserve supplies (180 days of standby storage normally available in the terminal reservoirs);
- drawing down Camanche Reservoir dead storage (about 4,000 AF available below the low-level intake structure elevation); and
- emergency transfers.

## **WATER RESERVE DRAWDOWN**

EBMUD's terminal reservoirs are normally operated to maintain a sufficient amount of emergency standby storage that can meet rationed customer demand for 180 days if the Mokelumne River supply is disrupted. After the emergency ends, the Mokelumne River supply is used as soon as practical to refill the terminal reservoirs to meet minimum standby storage levels. Emergency supplies through interties with the Contra Costa Water District (CCWD), San Francisco Public Utilities Commission (SFPUC), Dublin San Ramon Services District (DSRSD), and City of Hayward (Hayward) also help EBMUD's recovery in re-establishing that 180 day standby storage level.

## **SUPPLY-SIDE WATER USE EFFICIENCY**

Supply-side conservation is part of EBMUD's standard operating practices, and includes maintaining aggressive water distribution system leak detection and repair programs, regularly testing and replacing meters, and implementing on-going pipeline replacement projects. During droughts and water shortages, EBMUD expands

potential supply-side programs during droughts by including system pressure management and visible conservation strategies at District facilities, such as limiting irrigation and use of water features.

## **INTERTIES AND AGREEMENTS FOR TRANSFERS AND EXCHANGES**

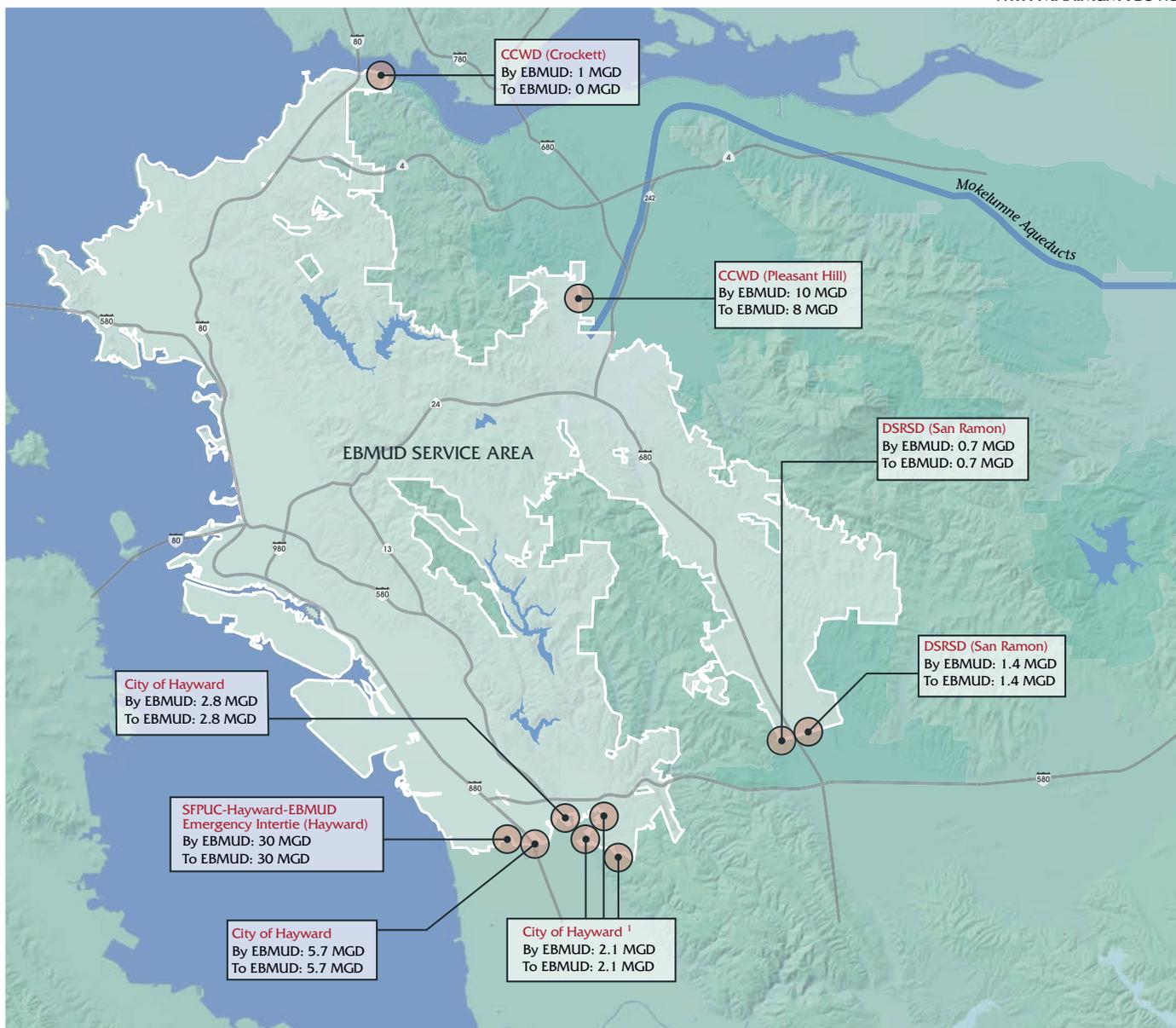
Through its involvement in the Bay Area Water Agencies Coalition, EBMUD continues its efforts to formulate and to support mutually agreeable actions, including the development of interties that improve water quality and supply reliability for the Bay Area. As a partner agency in providing mutual aid, EBMUD has limited, short-term water sharing agreements for emergencies with several neighboring agencies, including SFPUC, DSRSD, Hayward, and CCWD. Transfer/ exchanges are made only for a short-term period of one year or less. These agreements would provide an alternate source of water during planned facility outages and for emergency mutual aid to the parties, but situations involving a shortage of water due to high demand or drought do not apply. Figure 3-1 illustrates these emergency interties for transfers/ exchanges in EBMUD's service areas and lists the agreed upon quantities for transfer/ exchange with water service agencies during emergencies. EBMUD, the Freeport Regional Water Authority, County of Sacramento, and Sacramento County Water Agency entered into a long-term non-emergency agreement for water delivery with CCWD and separately with Santa Clara Valley Water District (SCVWD) as part of the negotiated settlement of the Freeport Regional Water Project (FRWP) EIR/ EIS.

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

In 2002, EBMUD formed a regional partnership with SFPUC and Hayward to construct the SFPUC-Hayward-EBMUD Intertie Project (Intertie Project). This project increases water service reliability by allowing EBMUD and SFPUC to obtain a short-term water supply during emergencies or planned outage of critical facilities. Up to 30 MGD could be provided to either EBMUD or SFPUC and Hayward through the intertie. The Intertie Project included a new pump station and 1.5 miles of pipeline within Hayward, with minor improvements in EBMUD's and SFPUC's water systems. Construction was completed in 2007.

FIGURE 3-1

EMERGENCY INTERTIES FOR SHORT-TERM TRANSFERS AND EXCHANGES WITH MAXIMUM FLOWS



<sup>1</sup> Emergency Water Transfers/Exchanges to City of Hayward are supplied through connections between fire hydrants instead of through dedicated constructed appurtenances.

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

EBMUD has two locations earmarked for connecting smaller interties (2.8 and 5.7 MGD) with Hayward’s water system under a 2000 agreement, and three additional sites for treated water transfer through fire hydrants (2.1 MGD each) under a 1994 agreement. Interconnections are made only for a short-term basis by mutual consent and under emergency conditions, and are not substitutes for standby or reserve sources of water for normal operations. Hayward’s and EBMUD’s personnel would connect the

systems during a declared emergency in accordance with 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

The 1990 agreement with the DSRSD identified two locations available for transferring treated water between the two agencies at up to 1.4 MGD at one and up to 0.7 MGD at the second location. The process and billing are outlined in an agreement similar to that with Hayward.

## Agreement for Emergency Services with CCWD

Per the 2002 agreement with CCWD, intertie locations can be added, removed, or modified as mutually agreed upon by each agency. Currently two intertie locations are identified. Up to 1 MGD could be provided to CCWD at one location. The second location could allow transfer of up to 10 MGD to CCWD and up to 8 MGD to EBMUD. One agency will provide the other with water quantities that will reasonably meet needs during the emergency without endangering the supplying agency's system and overall supplies.

## Agreement for Non-Emergency Services with CCWD

The 2004 agreement allows CCWD to request and receive from EBMUD 3,200 acre-feet per year (AFY) at a maximum rate of 100 MGD of water wheeled via EBMUD through the Freeport Regional Water Facilities. Wheeling cannot occur if there are unavoidable capacity-limiting conditions that prohibit either EBMUD or the Freeport Regional Water Authority (FRWA) agencies from meeting the request. CCWD, which completed construction of the interconnection facilities at the intersection of the Mokelumne Aqueducts and Los Vaqueros Pipeline in Brentwood in 2007, would pay wheeling costs for water received. The rate of delivery of the wheeled water is determined annually and concurrently with the wheeling schedule.

## Agreement for Non-Emergency Services with SCVWD

The 2003 agreement entitles the SCVWD to 6.5 TAF of EBMUD's CVP contract allocation in the first year the supplemental supply from the Freeport Regional Water Facility is invoked. At EBMUD's request, the SCVWD will return the water in the second or third dry year if the drought continues. If the drought does not continue (i.e. EBMUD's Total System Storage at the end of September exceeds 500 TAF), the SCVWD will compensate EBMUD for the 6.5 TAF of CVP water taken in the first dry year. The cost of water for EBMUD and the SCVWD will be in accordance with the terms specified in each agency's USBR water service contract. The SCVWD will take delivery of EBMUD's CVP water at the Tracy Pumping Plant, and EBMUD will take delivery of the SCVWD's CVP water at the Freeport Regional Water Facility.

## DEMAND REDUCTION METHODS

### DROUGHT COMMUNICATION PLAN

During a water shortage emergency, EBMUD implements an aggressive public education program to promote water use reductions and improved efficiencies. The campaign explains the potential impacts of a water shortage, methods to reduce water consumption, and customers' responsibilities during a shortage. At the onset of a water shortage, EBMUD develops a detailed Drought Communication Plan (DCP) (a component of the DMP) to relay clear information to customers and other stakeholders. Components of an effective DCP include a set of well-defined, focused key messages and an action plan detailing all communication activities. The DCP outlines general and targeted communication methods. General communication methods focus on creating a strong advertising campaign, intensifying media and stakeholder outreach, and making available helpful information to customers via the web, through mailings with customer bills, and through the customer contact center. Targeted communication methods focus on increasing direct contact with high-volume water users, proactively offering more support to customers through conservation training and tools, and increasing EBMUD's interactions with customers about their water use.

### General Communication Methods

#### Advertising Campaign and Media Outreach

Advertising campaigns used in past droughts included broadcasting conservation messages throughout the EBMUD service area on radio and cable television, in local newspapers and magazines, on bus exteriors, and on EBMUD billboards. In these campaigns, EBMUD expressed appreciation for customers' response and offered continual encouragement to customers to save water and money by fixing leaks and installing efficient outdoor landscape irrigation. EBMUD also has participated in regional advertising campaigns on radio and television when the messages between EBMUD and the region were consistent.

#### Customer Service on the Phone and Web Site

To ensure a continuous level of quality customer service during a water shortage, EBMUD invests in systems that support customer contacts and customer billing functions. Drought periods increase the customer contact center volume, and EBMUD ensures adequate staffing to respond to customers' questions and requests for assistance. Drought periods increase web site use by customers, and

in recent campaigns the web has proven to be an effective tool to disseminate information to customers and the media on demand.

## Targeted Communication Methods

### Increased Customer Direct Contact

During water shortage periods, EBMUD initiates significantly more direct customer contacts and responds to significantly more contacts from customers. Water conservation and field services staff monitor the service area and distribute drought messages and water savings devices, encourage water savings, assist customers in changing their water use, and educate customers on voluntary program requirements, and enforce mandatory requirements. Direct mail is used to deliver specific messages about water conservation targeted to specific user groups. “Out-dial” calls are used to alert customers to the start of the drought program and request curtailed water use during especially prolonged hot weather.

### Increased Public Outreach

EBMUD routinely conducts outreach to civic, community, non-governmental and business groups, homeowner associations, nurseries, schools, and local officials. This work expands when the need to communicate shortages or drought information to customers develops. EBMUD educates local stakeholder groups and seek their assistance in communicating with their constituents, which generates a multiplier effect as they share the information with additional customers.

## WATER USE RESTRICTIONS

### Prohibitions and Penalties

EBMUD has two regulations that prohibit water waste. Section 29 (Prohibiting Wasteful Use of Water) of the *Regulations Governing Water Use by Customers of the East Bay Municipal Utility District* in Appendix F is continuously in force. Section 28 (Water Use During Water Shortage Emergency Condition) is adopted when the EBMUD Board of Directors declares a Water Shortage Emergency.

Section 29 describes on-going actions that residential and non-residential customers must observe to eliminate wasteful use. Under normal water conditions, the provisions of Section 29 are enforced through customer education. Under this program, EBMUD responds to customer and field staff reports of over-watering and water waste. Water conservation and field services personnel apprise the responsible customer of the wasteful conditions and provide recommendations on repairing leaks or using water more efficiently. If the customer

cannot be located, and the water loss is significant, staff may turn off the water at the meter until the customer is contacted or the problem is resolved. The ongoing provisions in Section 29 are supplemented temporarily with additional water use restrictions invoked through Section 28 when a DMP is adopted.

Section 28 identifies water use rules and provides guidance to customers on reducing water use during a declared water shortage emergency. Provisions in that section are tailored to the severity of the water shortage. Section 28 defines water use allocations and reduction goals based on customer account type, prohibits certain types of water uses, provides guidelines on efficient water use, provides for enforcement measures, and may include drought rates. It may also include restrictions on annexations and new connections in conjunction with Section 31 on Water Efficiency Requirements for new water services (see Appendix F). These regulations are enforced with warnings, installation of flow restrictors, and, finally, disconnection of service. Drought rates under Section 28 are implemented using a two-step rate setting process through public notification and adoption at a public hearing.

Section 28 was adopted in May 2008 in response to a severe water shortage emergency and subsequently rescinded in June 2009 when the water supply condition improved. Examples of prohibitions enforced during the recent drought included:

- filling and operating decorative ponds, lakes, and fountains;
- washing vehicles using hoses without shutoff nozzles;
- washing hard-surfaced areas not required for public health and sanitation;
- irrigating outdoor lawns frequently;
- creating wasteful run-off;
- flushing sewers, hydrants, or washing streets with potable water not for essential operations; and
- using potable water for construction, soil compaction, and dust control instead of available alternatives (e.g. recycled water).

### Water Waste Restriction Enforcement

During a water shortage, staff monitors the service area to encourage water savings, assists customers in changing their water use, and enforces program requirements and water waste prohibition rules. In the recent shortage, EBMUD developed a Water Savings Team staffed by EBMUD employees that patrolled the service area

responding to reports of water waste, placing warning hangers on doors, educating customers to save water, and assisting customers with conservation activities, such as identifying leaks and installing water-efficient fixtures and appliances.

During shortages, a higher volume of calls are received from neighbors who report water waste within their communities via the EBMUD website and Water Waste Hotline. The location and nature of the waste are reported to the Water Savings Team, who follows up on necessary corrections. The reporting system also helps staff adjust priorities for responding to reported distribution system leaks.

### WATER CONSUMPTION REDUCTION

EBMUD partners with its customers to implement customer-oriented rationing programs that produce significant and sustained demand reductions. In past droughts, EBMUD has encouraged water consumption reduction using a combination of a tiered-volume rate structure for single family residents and uniform rate increases for other customers. In addition, surcharges have been applied to individual accounts when consumption exceeded water use allocations. Incentives and rebate programs that encouraged greater water use efficiency and enforcement of water waste restrictions further supported customer water savings efforts. Appendix G-3 details actions implemented during the 2008-2009 DMP and lessons learned that could be applied in future droughts. The specific response to each impending drought will continue to be developed with community input.

### Maximum Rationing Targets

EBMUD will implement a maximum rationing level of up to 15 percent of total annual customer demand in conformance with Policy 9.03. Table 3-4 lists example customer category reduction goals that EBMUD estimates would be required to achieve this district-wide

TABLE 3-4 EXAMPLE OF CUSTOMER CATEGORY REDUCTION GOALS

CUSTOMER CATEGORY	REDUCTION GOAL*
SINGLE-FAMILY RESIDENTIAL	19%
MULTI-FAMILY RESIDENTIAL	11%
COMMERCIAL	12%
INSTITUTIONAL	9%
INDUSTRIAL	5%
IRRIGATION	30%
<b>TOTAL CUSTOMER DEMAND RATIONING GOAL</b>	<b>15%</b>

\*Annual average goals estimated to achieve 15% reduction of year 2040 total demand.

rationing target. Specific reduction goals by customer class are set by EBMUD’s Board of Directors after the Board declares a drought.

The reduction goals are based on an analysis of the total demand of each customer category, the outdoor water use of each category, and the potential aggregate economic impact on the service area. Several factors are considered: drought management principles; analysis of historical consumption; and likelihood that customers in each category can achieve their water use reduction goals through indoor and outdoor demand management. The distribution of rationing varies across customer categories, and the actual savings from each customer category could vary due to several factors, including methods of implementation and enforcement. Modeled from the experience of the 2008-2009 DMP, key assumptions and data for setting customer goals are:

1. Balancing water use reductions across customer categories based on four principles:
  - emphasizing reductions in non-essential uses of water;
  - avoiding and limiting impacts to the economy and the environment;
  - safeguarding water supplies for uses that meet public health needs; and
  - considering the perceived equity of water use reduction expectations.
2. Evaluating each customer category’s actual historical consumption:
  - determining the percent of total water demand by customer category, and
  - determining the percent of indoor and outdoor demand by customer category.
3. Gauging customer response to water savings measures:
  - assessing the likelihood of achieving the potential savings from each measure;
  - assessing research on customer ability and willingness to comply with measures; and
  - considering previous EBMUD experience in managing and monitoring measures.

### Water Use Allocation

During the 2008-2009 DMP, individual water use allocations and baseline uses were printed on water bills for each billing cycle to help customers gauge their progress toward meeting their conservation goals. A

discussion of the process used in the 2008-2009 DMP for determining baselines and allocations is included in Appendix G-3. As rationing begins in the second half of the year following the first recognition of drought conditions in April when the annual Water Supply Availability and Deficiency report is prepared, allocations are set at one-half of the year's reduction goals in the first dry year for practicality. This allocation is also considered in the water supply management and planning process. During the 2008-2009 DMP, private fire service, hydrant meter, recycled and raw water accounts were exempt from water use allocation assignments.

### **Drought Rate Structure**

When a DMP is adopted, EBMUD considers increasing water rates and adding drought surcharges both to give customers a financial incentive to conserve water and to maintain adequate system revenue during periods of reduced water sales. Drought rates and surcharges are uniquely determined for each drought event. Appendix G-3 includes a discussion of the drought rate structure adopted for the 2008-2009 DMP, which is provided as a past example, but does not necessarily reflect future planned actions.

In 2008-2009, the drought rate structure increased water volume charges across the three existing tiered inclining rates for Single Family Residential (SFR) customers but exempted those SFR customers whose usage did not exceed 100 gallons per day in a billing period. This structure provides an incentive to conserve water since the rate and total charges are directly proportional to water use. Higher drought volume charges also apply to the existing single-tier rate for non-SFR customers.

The 2008-2009 drought surcharge added an additional water volume charge to each customer's consumption that exceeded their allotted water use. Some customers affected by special circumstances were eligible for exemptions to the drought surcharge. Exceptions for residential customers included medical requirements, incorrect customer classification, inappropriate basis of historical use from change in ownership or tenancy, and change in occupancy. Exceptions for non-residential customers included creation of unnecessary and undue hardship including adverse economic impacts, and causing an emergency condition affecting sanitation, fire protection, or customer/ public health and safety. Recycled water customers, who met their needs by substituting potable water with sufficiently available recycled water sources, were also exempt. In addition, raw water

customers were exempt from the drought rate structure for reasons similar to the recycled water customers.

Potentially an additional surcharge will be imposed on all potable water consumed whenever supplemental water is delivered to EBMUD through the Freeport Regional Water Facility. EBMUD will develop the specific approach for each future drought. Supplemental water benefits all customers by increasing water supplies to reduce the need for water rationing and drought restrictions. A surcharge recovers the added Freeport operating costs. The duration of the applied surcharge will be adjusted to recover the actual operating costs.

### **CONSUMPTION REDUCTION MONITORING**

EBMUD monitors customer consumption during a drought to assess the effectiveness of its DMP in reducing water use. The consumption data helps determine the need to propose refinements to the drought rate structure or to adjust public outreach efforts to garner greater response.

### **CUSTOMER CONSUMPTION AND WATER PRODUCTION MONITORING**

During a DMP, EBMUD evaluates both billed consumption and daily water production data relative to reduction goals. Using this process, staff gauges EBMUD's effectiveness in managing overall demand and customers' responsiveness to conserve. The results are presented to the EBMUD Board of Directors in regular drought management reports. The reporting frequency depends on the level of activity occurring and the severity of the drought.

EBMUD customers' accounts are metered, providing bi-monthly (single-family residential) and monthly consumption data that can be evaluated by customer category characteristics. Water production data tracks treated water input to the distribution system leading to customers' taps. Temperature variations are also tracked with water production to observe the effects of weather conditions on consumption behavior. Using financial records summarized from customer bills, EBMUD analyzes whether customer groups are reaching their conservation targets based on the distribution of customers affected by drought surcharges and higher drought rates.

EBMUD assesses the effectiveness of its demand management programs on the projected water supply in each report. This ensures timely action can be taken to recommend improvements to the DMP for Board consideration if results fall short of EBMUD's water use reduction goals.

## WATER BILL MONITORING

The success of a DMP depends on customers reducing their water use. Experience shows that providing clear feedback on consumption relative to goals, benchmarking efficient water use among customer sectors, clearly stating the financial penalties for overuse, and acknowledging customers' efforts to save water all reinforce prudent behavior. EBMUD uses its Customer Information System (CIS) to inform customers of their current and past water uses and allocations through printed messages on customer water bills. This information helps customers monitor their individual rationing efforts and encourage adjustments to usage.

In 2008-2009, each customer received a customized bill that compared current use to the consumption baseline, customer category goal, and the individual customer allocation goal that would trigger a drought surcharge if the goal was not met. The bill itemized charges at the drought rate and applicable drought surcharges for use that exceeded the allocation goal.

## FINANCIAL IMPACT ANALYSIS

Water sales provide approximately 76 percent of EBMUD's operating revenues. The balance includes fees and charges, taxes, hydropower sales revenue, and interest. Appendix F includes the water rates.

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 determined by two types of project costs associated with disaster preparation and drought-related water shortages: the multi-year large capital project costs to mitigate disaster and drought-related water shortages, and annual 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 several different revenue sources. The diversity minimizes impacts on customers and distributes the costs equitably to both existing and future customers through water rates, fees and charges. For example, infrastructure improvements include EBMUD's recently completed 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, which are discussed in Chapter 2 of this UWMP 2010.

## IMPACT ANALYSIS OF REDUCED SALES ON REVENUES AND EXPENDITURES

EBMUD includes an assessment of water availability or deficiency in its financial planning and annual rate review process for budgeting purposes. When the assessment recommends implementing mandatory water use reductions to promote conservation, EBMUD adopts a revenue schedule to allow increasing the volume rate, adding a drought surcharge, and using the contingency and rate stabilization reserve fund to fully recover costs of providing ongoing water service, mitigate expenses of implementing the DMP, and recover lost revenues from lower water consumption. However, when revenues were suppressed in the absence of a drought emergency during the voluntary water use reduction and post-drought demand recovery period from FY10 to FY11, the budget was balanced by reducing expenditures through a hiring freeze, operational efficiencies, and deferred capital projects.

The rates and charges implemented through EBMUD's DMP are designed to distribute the financial impacts equitably to each customer category and to avoid long-term financial impacts to EBMUD. Consumption analyses helps determine the reduction goals for each customer category and the rate adjustments needed to recover revenue.

Revenue recovery covers the increased expenses of the DMP. As an example, Table 3-5 lists items from the \$5.2 million 2008-2009 DMP implementation budget.

The actual costs for program elements were under budget for the 2008-2009 DMP as a result of overall management of program costs and strong customer drought response. Costs for the DMP were partially offset by leveraging use of

TABLE 3-5 2008-2009 DROUGHT MANAGEMENT PROGRAM IMPLEMENTATION BUDGET

ADVERTISING CAMPAIGN AND MEDIA OUTREACH	\$2,175,000
INCREASED DIRECT CONTACT WITH CUSTOMERS, ADDITIONAL STAFF HIRES, AND CONSERVATION REBATES, DEVICES AND KITS	\$2,084,000
INCREASED OUTREACH TO COMMUNITY LEADERSHIP GROUPS AND TO SCHOOLS, ADDITIONAL STAFF HIRES	\$435,000
ENSURE HIGH QUALITY CUSTOMER SERVICE ON THE PHONE AND WEB SITE, INCLUDING ADDITIONAL STAFF HIRES	\$520,000
<b>TOTAL</b>	<b>\$5,200,000</b>

existing personnel and equipment and expanding ongoing outreach. EBMUD can selectively reallocate and reassign current employees based on compatible skill sets to different duties to address priorities of the DMP. These functions include responding to outside inquiries, modifying billing software, and conducting and responding to leak surveys. The District's routine public outreach activities also were redirected to focus heavily on drought management.

### Increased Resource Demands

Additional resources and revenues are needed to implement a DMP to meet goals and to support expanding personnel and equipment resources, increasing outreach efforts, and offering more water conservation rebates and free devices for distribution.

#### Human Resources

Employing temporary staff increases salary costs. During a DMP, fiscal year budgets may be amended mid-year to hire temporary staff to increase outreach to include informing customers of their water reduction use goals and conservation tips, assisting them in meeting their goals, and managing and enforcing the drought activity program. Duties may include:

- providing administrative support to respond to customer and media inquiries;
- providing field support to perform water use audits;
- assisting customers in monitoring leaks and conducting water use audits;
- providing information technology support for bill adjustments; and
- assisting with outreach efforts using mass media.

#### Outreach Efforts

Outreach is intensified during a DMP. Costs and funding increase for media advertisement, web services, publications, automated "out-dial" phone calls, informational and outreach mailings, conservation-related devices offered free to the public, and seminars stressing conservation tips in meeting water use reduction goals. These efforts enable EBMUD to heighten awareness of water use prohibitions, emphasize individual customer responsibilities in the drought, and assist customers with coping with the drought.

### Distribution of Water Conservation Devices, Kits, and Rebates

Drought revenues fund DMPs to promote conservation and to assist customers with changing their water use habits. During droughts, EBMUD will distribute more water saving devices and water conservation kits to customers. Devices include showerheads, faucet aerators, small irrigation equipment, sprinkler spray heads, drip irrigation equipment, and soil sensors. Kits include dye tabs, water measurement bags, indoor and outdoor WaterSmart saving tips, and publications. Additional costs are also incurred for increased rebates to improve water conservation and efficiency, such as for toilets and clothes washers, high-efficiency fixtures/ equipment, and water-efficient commercial equipment.

## RATE CHANGE NOTIFICATION

### PROPOSITION 218 NOTICE REQUIREMENTS FOR RATE CHANGES

Proposition 218, approved by California voters in 1996, added Article XIII C (taxes) and D (fees and assessments) to the California Constitution. Proposition 218 establishes specific rules for implementing new rates or adjusting rates that apply to EBMUD and other water suppliers proposing to adopt drought rates. Proposition 218 requires that charges cannot exceed the proportional cost of service, written notice of the proposed charges be mailed, a public meeting be held not less than 45 days after the mailing, and if written protests are presented by a majority, the agency cannot impose the fee or charge.

By implementing drought rates in a timely manner, EBMUD increases its ability to successfully manage water supplies during the upcoming warm dry months of the year. Proposition 218 notification requirements control the schedule for selecting and implementing drought rates and charges. Consequently, EBMUD must consider options for drought rate structures prior to the anticipated start of a drought program. Efforts will be coordinated with the water supply forecast and drought planning process of EBMUD's Water Supply Availability and Deficiency report presented by May. This approach provides sufficient time for public input, alternative feasible drought rate design reviews, and deliberation prior to issuing a Proposition 218 notice so that drought rates can be promptly implemented to curtail water use at the height of summer in the affected year.

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## CHAPTER 4. WATER DEMAND

Currently, water consumption within the EBMUD service area has dropped as a result of an economic downturn in the Bay Area, suppressed demand in response to the drought management program, and unusually cool weather. In looking out to year 2040, EBMUD’s water supply is not sufficient to meet customer demand during single- and multi-year drought periods. A supply and demand assessment was done based on a land-use based method to forecast demands.

### PAST AND CURRENT DEMAND

Historical water use within the EBMUD service area is illustrated in Figure 4-1. Total demand has remained relatively constant with some variance despite the increase in the number of water service accounts (or service connections). Water use dipped significantly during periods of drought rationing in calendar years 1976-78, 1987-94, and recently in 2007-2010.

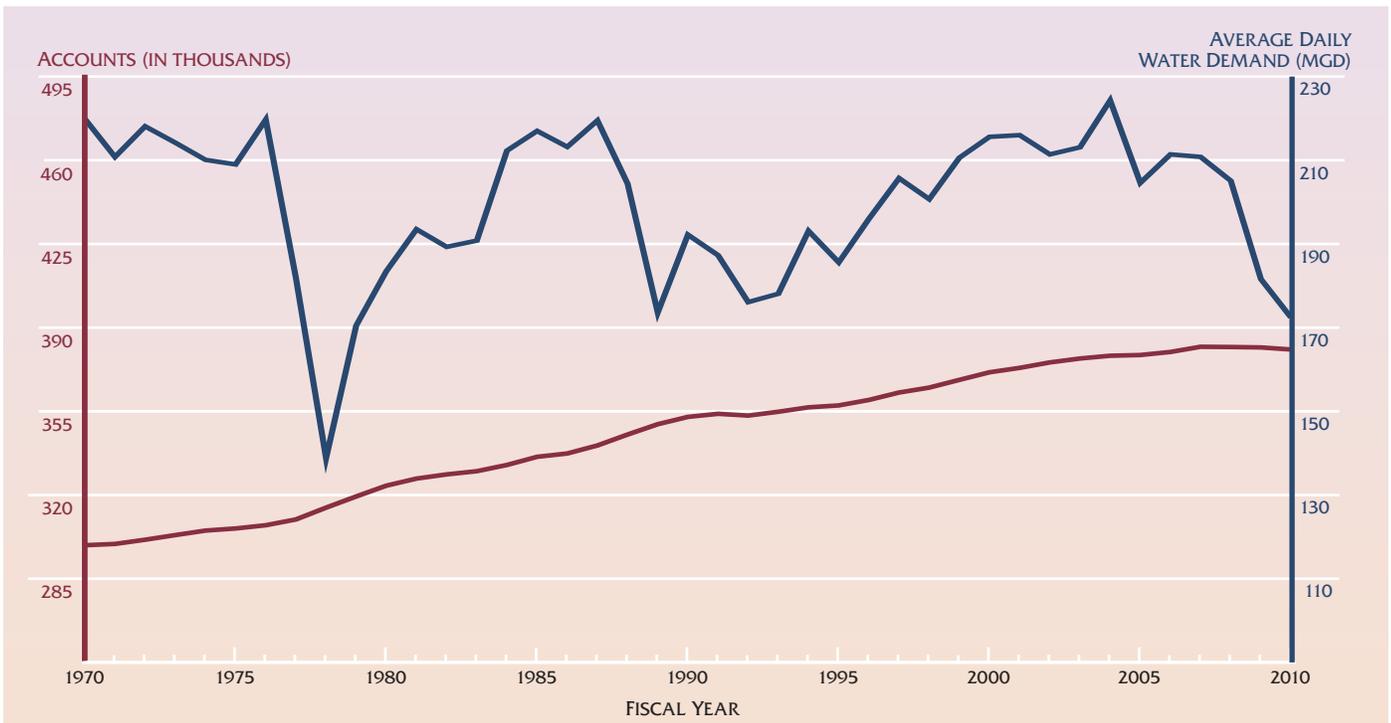
Many factors contributed to the reduced water use from the amount that would otherwise be anticipated including:

- water restrictions imposed for drought management in 1976-78, 1987-94, and recently in 2007-2010;
- EBMUD’s aggressive water conservation and recycling activities;

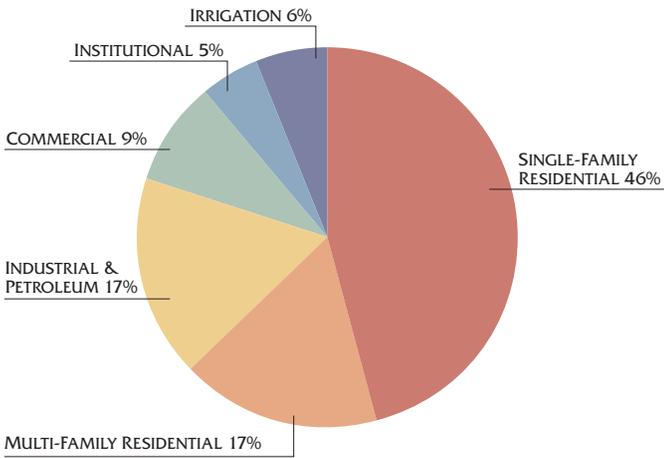
- changed consumption demographics to a variety of land use conversions, many of which also have high efficiency water use patterns;
- legislative changes including new plumbing efficiency standards, landscape ordinances, the 1992 and 2005 Federal Energy Policy Act; and
- the economic downturn within EBMUD’s service area and the region that has continued since 2007.

Figure 4-2 displays how total metered water consumption is distributed among different customer categories. The single-family residential customer category is the largest water user category followed by multi-family residential, industrial and petroleum, commercial, irrigation, and institutional users. Approximately 63 percent of the historical total water consumption was delivered to

FIGURE 4-1 EBMUD WATER ACCOUNTS AND TOTAL DEMAND



**FIGURE 4-2** WATER USE BY CUSTOMER CATEGORY



NOTE:  
Based on Calendar Year 1975-2010 consumption data.

EBMUD’s residential customers. Historical water use for each EBMUD customer land use category is presented in Figure 4-3. It illustrates the number of accounts and metered water consumption for single-family residential, multi-family residential, industrial and petroleum, commercial, institutional, and irrigation customer categories from 1975-2010.

Other characteristics of historical water use (also from 1975-2010) are illustrated in Figures 4-4 through 4-5. In Figure 4-4, winter season water use is compared to summer season water use for each customer category. In Figure 4-5, water consumption for each customer category is differentiated between accounts situated east and west of the Oakland-Berkeley Hills. Figure 4-6 illustrates the regional variations in historical daily average water use per account for the single-family residential category within the EBMUD service area relative to the historical District-wide average.

Figures 4-7 and 4-8 illustrate residential water use characteristics. In Figure 4-7, indoor water use for an average single-family residential household is presented by specific use categories based on most recent available data from calendar year 2009 (for a drought affected year in a down economy). In Figure 4-8, indoor residential water use in calendar year 2010 averaged 68 percent of the total residential water use, and outdoor residential use averaged 32 percent.

## PROJECTED WATER DEMAND

EBMUD’s water demand projections are based on the *2040 Demand Study*, which was completed in 2009. The 2040 Demand Study uses a land-use based method to project average annual water demands of the distribution system out to year 2040.

The land-use based methodology relies on existing land uses and existing water consumption data for the study area. Demand projections were based on consumption data from year 2005, which provided the last complete year of conservation and water consumption data preceding development of the 2040 Demand Study and is unaffected by distribution system operation anomalies. The land use and water consumption data were used to calculate Land use Unit Demands (LUDs), a measure of water consumption per acre for each land use category. The 2005 LUDs were adjusted for historical weather effects (i.e. dry vs. wet year) and non-weather effects (e.g. economic conditions) to produce a “normalized” year. Additional adjustments to LUDs included accounting for unmetered water and future density growth. These LUDs were then applied to acreages of projected land uses that were determined by local planning agencies. The land use categories consisted of seven residential, four mixed-use (residential above commercial in the same building), and 12 non-residential. The demand projections were made for years 2010, 2015, 2020, 2025, 2030, and 2040.

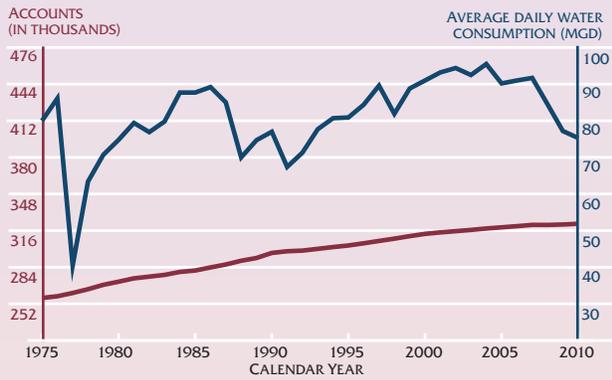
The land use, consumption data, adjustment factors, and demand projections were developed in a geographic information system database, which allows for the spatial allocation of data. For example, consumption data was allocated by meter location and future growth adjustments by demand model regions (EBMUD service area is divided into 11 regions). The end result consists of demand projections that can be aggregated by land use and location.

The 2040 Demand Study relied on the adopted general plans of the cities and counties in the EBMUD service area and on a series of meetings with local planning agencies regarding the timing and direction of future development in their respective communities. The district-wide land use analysis was conducted during a period reflecting an expectation of continued economic expansion. Although the economy began a period of recession in December 2007, the Demand Study projections are consistent with the anticipated level of developments in the general plans. Therefore, instead of reflecting the highest potential water demands, the demand projections in this analysis reflect

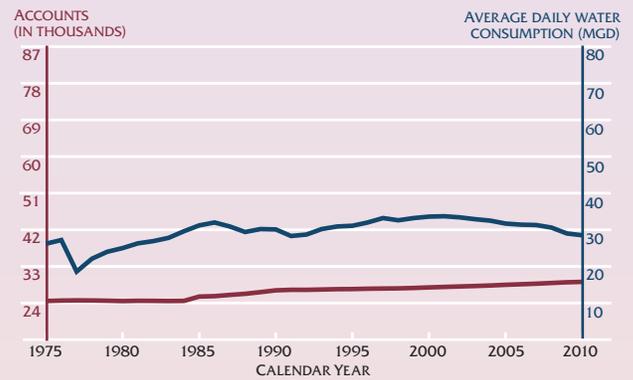
FIGURE 4-3

EBMUD WATER ACCOUNTS AND CONSUMPTION

SINGLE-FAMILY RESIDENTIAL



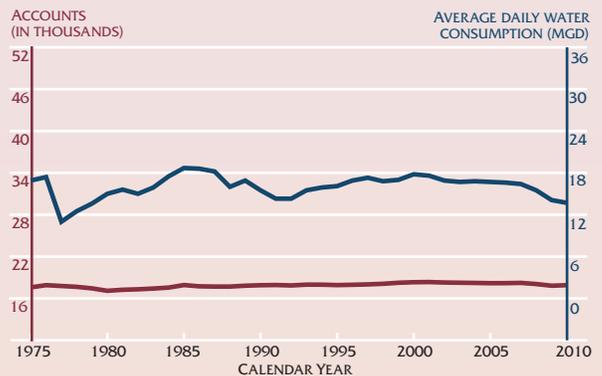
MULTI-FAMILY RESIDENTIAL



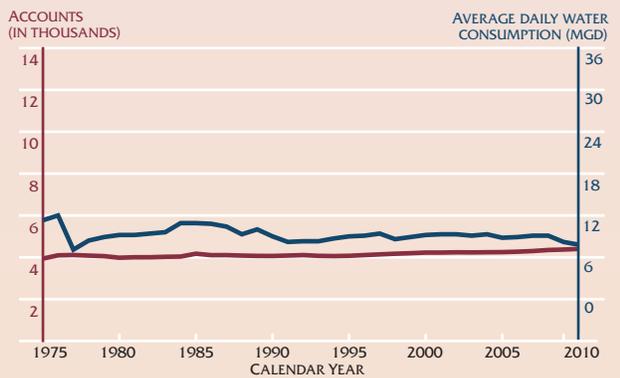
INDUSTRIAL & PETROLEUM



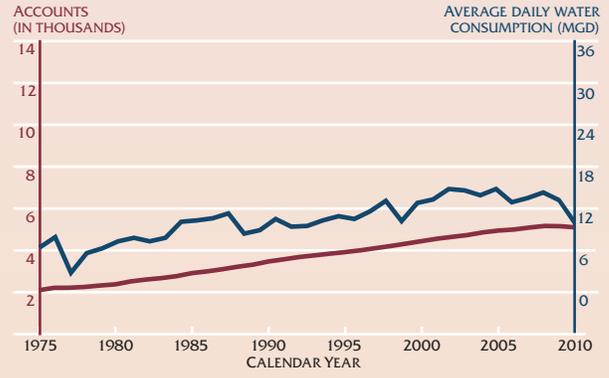
COMMERCIAL



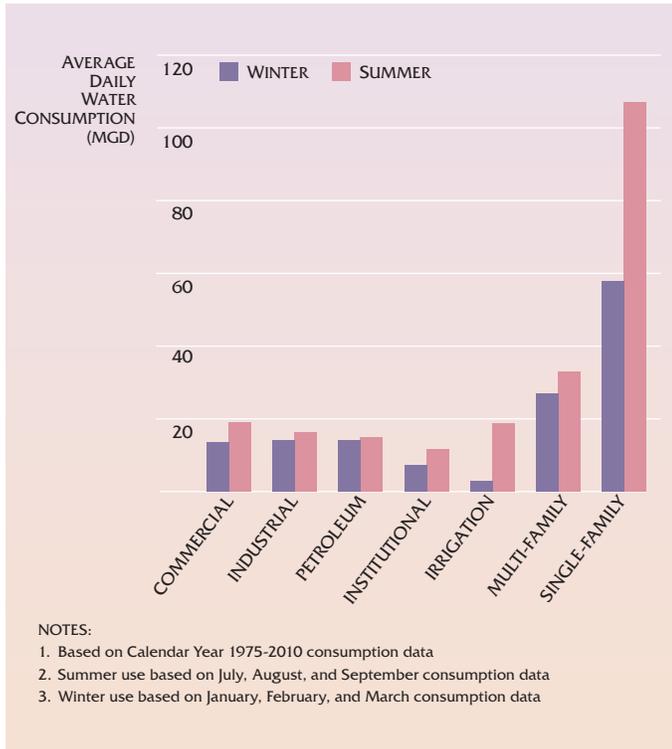
INSTITUTIONAL



IRRIGATION



**FIGURE 4-4** WINTER AND SUMMER WATER USE BY CUSTOMER CATEGORY



current planning policy by land use agencies. Higher demand projections may be associated with other forecasting techniques. These include long range population projections or demands based on assumptions that most land uses will increase in density over time, which do not specifically reflect community policy. While the actual developments and the associated increase in water demand will very likely be realized more slowly in the near term until 2020, the 2040 Demand Study still reflects a reasonable expectation for growth over the long term for demand in year 2040. Future Demand Studies will reflect updates of the general and specific plans of the cities and counties within the EBMUD service area.

The 2040 Demand Study forecasts an unadjusted customer demand of 312 million gallons per day (MGD) for the year 2040. Assuming that cumulative savings since implementation of the WCMP in 1994 of 62 MGD is achieved through existing and future conservation efforts and cumulative savings of 20 MGD is achieved through existing and future recycled water programs, the adjusted 2040 forecasted planning level of demand is 230 MGD. As a long-term planning tool, the planning level of demand remains unchanged through the current drought or other events that may temporarily impact demands. Chapters 5 and 6 of this UWMP 2010 provide further details on projected recycled water and conservation savings goals, respectively.

**FIGURE 4-5** EAST-OF-HILLS AND WEST-OF-HILLS WATER USE BY CUSTOMER CATEGORY

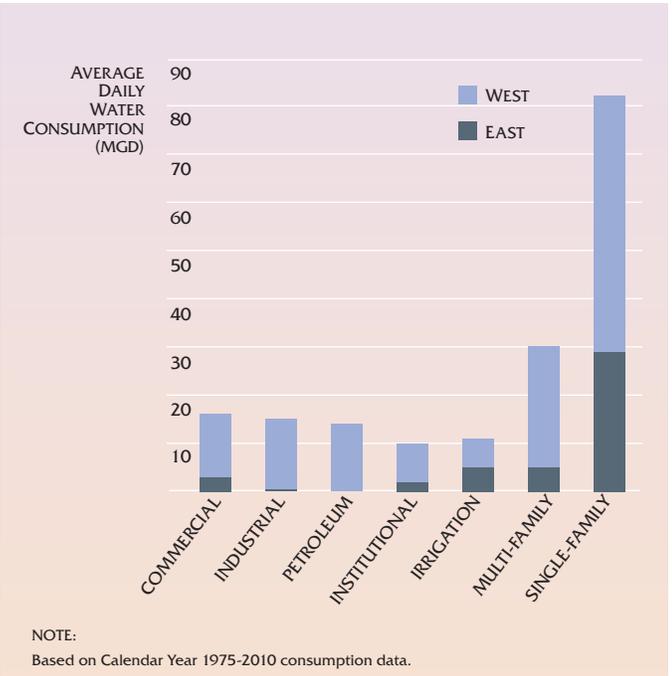


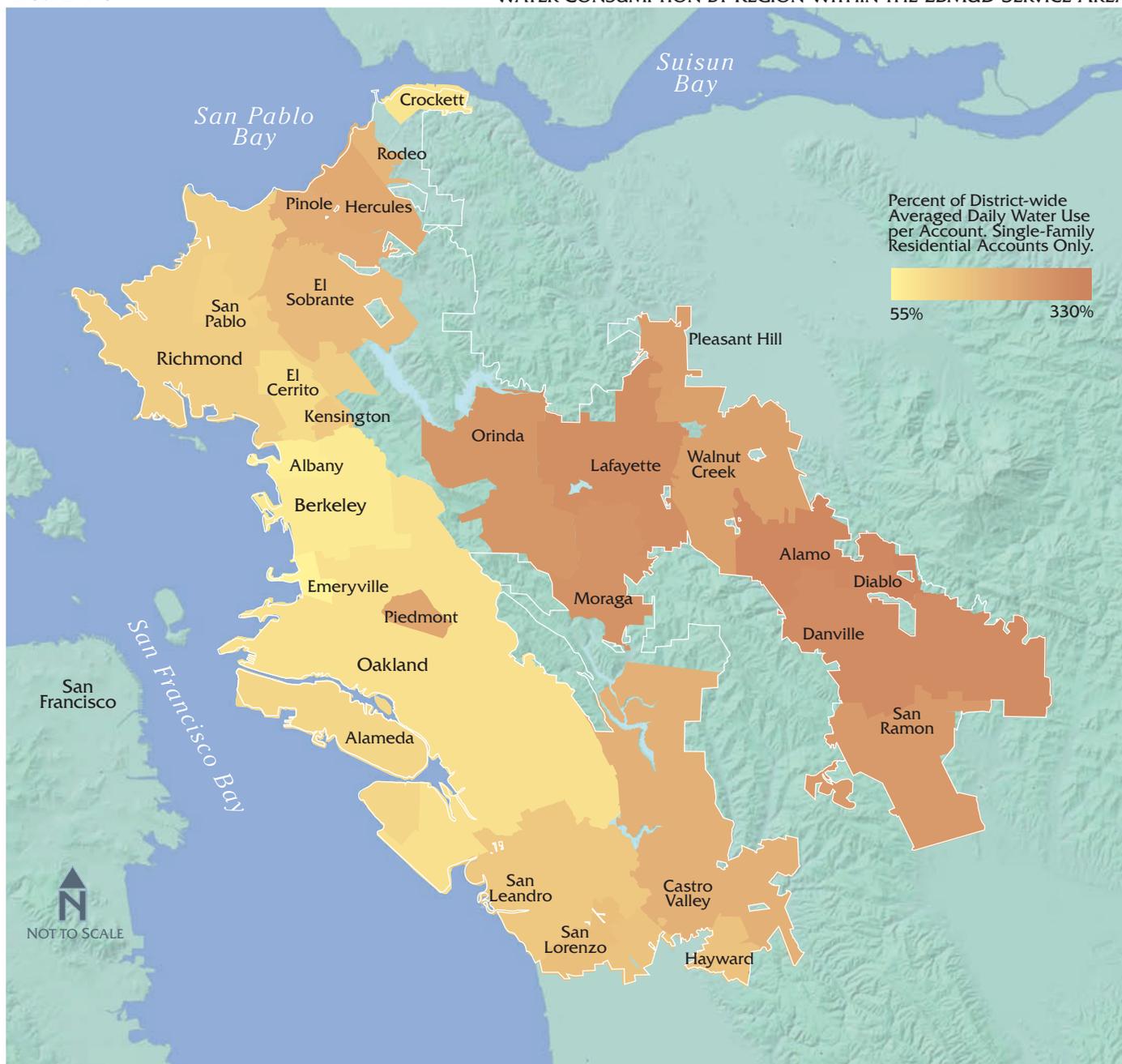
Table 4-1 illustrates water demand projections for each customer category (or water use sector): single- and multi-family, commercial, industrial, institutional, and irrigation users. The demand projections for the six customer categories are consolidated from the 23 land use categories, based on the predominant customer category found in each land use category.

### WATER DEMAND PROJECTIONS FOR LOWER INCOME HOUSING

Water Code Section 10631.1 requires an estimate of projected water use needed for lower income single-family and multi-family residential housing within the EBMUD service area, which is summarized in Table 4-2. The estimated lower income water demand is based on available housing data published by the Association of Bay Area Governments (ABAG), consumption data from EBMUD water accounts, and EBMUD’s water demand projections. The most recent 2008 housing data from ABAG and its projected 2007-2014 housing needs data are derived from the housing element portion of city and county general plans. The percentage of lower income housing units (4.4%) within the total housing stock in

FIGURE 4-6

HISTORICAL SINGLE-FAMILY RESIDENTIAL WATER CONSUMPTION BY REGION WITHIN THE EBMUD SERVICE AREA

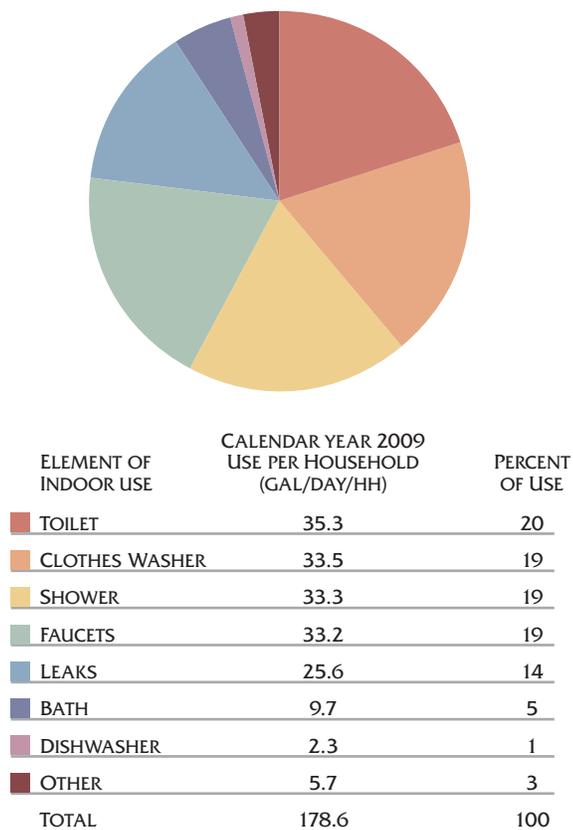


Potable water accounts only. Based on historical daily average consumption, 1975-2010  
Representation of non-EBMUD boundaries is not necessarily authoritative

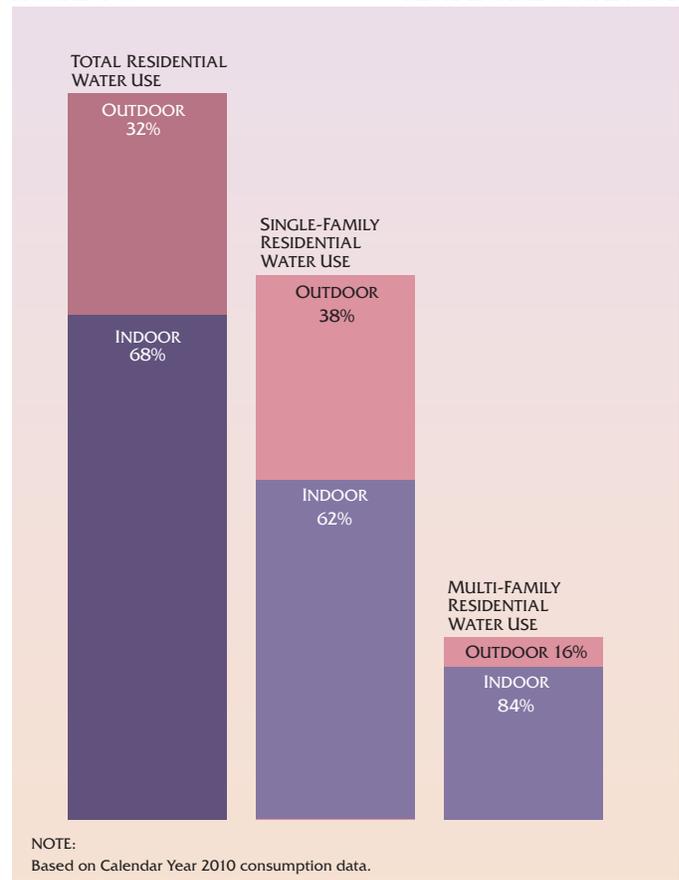
EBMUD’s service area in year 2008 as estimated by ABAG is assumed the same as the percentage of lower income accounts that make up EBMUD’s residential accounts in 2008. This estimated number of lower income accounts will be the 2008 baseline from which extrapolations will be made. Using an annualized average growth rate (5.85%) derived from ABAG’s projection of lower income housing growth for years 2007-2014, EBMUD extrapolated the

number of lower income EBMUD accounts for years 2015 to 2040. The total lower income water demand was estimated by assuming that water use for each account is equivalent to the average use of an EBMUD Customer Assistance Program (CAP) account in 2008. Income qualified single-family and multi-family (homeless shelter) accounts that enroll in the CAP receive discounted water rates. However, income eligibility requirements for CAP,

**FIGURE 4-7** AVERAGE SINGLE-FAMILY RESIDENTIAL HOUSEHOLD INDOOR WATER USE



**FIGURE 4-8** INDOOR AND OUTDOOR RESIDENTIAL WATER USE



**TABLE 4-1**

**WATER DEMAND PROJECTIONS FOR EACH WATER USE SECTOR**  
AVERAGE ANNUAL DEMANDS (MGD)<sup>1</sup>

CALENDAR YEAR	SINGLE-FAMILY	MULTI-FAMILY	COMMERCIAL	INDUSTRIAL	INSTITUTIONAL	IRRIGATION	TOTAL
2010 <sup>2</sup>	120	31	26	22	8	9	216
2015 <sup>3</sup>	121	36	26	23	8	9	223
2020	118	41	26	20	8	8	221
2025	117	47	26	19	7	8	224
2030	117	53	26	18	7	8	229
2035 <sup>4</sup>	117	54	26	18	7	7	229
2040	117	54	27	18	7	7	230

<sup>1</sup> Demand represents the Planning Level of Demand.

<sup>2</sup> 2010 demands are based on projections, which differ from actual water consumption.

<sup>3</sup> 2015 demands are based on projections and do not reflect the demand during the recovery period. The slight increase in total demand as compared to 2010 and 2020 is due to implementing conservation and recycled water projects later than anticipated as the customer demand recovers in the post-drought and from the economic downturn.

<sup>4</sup> 2035 values are interpolated from 2030 and 2040 demand projections.

which are based on the California Life Line Annual Income schedule, is a subset of the classification of “lower income households” as defined in Section 50079.5 of the California Health and Safety Code. Based on the ratio of projected demand between single- and multi-family categories derived from Table 4-1, EBMUD applied the same ratios to the total lower income water demand for each reporting year to estimate the appropriate allocation of the single- and multi-family categories. EBMUD’s Water Service Policy 3.07 (in Appendix F) ensures that priority for new water service connections during restrictive periods is given to lower income households and that their demands are met first. This policy assures that the portion of overall water demands, as provided in Table 4-1, for lower income single-family and multi-family residential households can be met.

**EFFECT OF SBX7-7 REQUIREMENTS ON PROJECTED DEMAND**

Senate Bill No. 7 (SBx7-7) that establishes the program known as the Water Conservation Act of 2009 and often referred to as ‘20 by 2020,’ creates a framework for future planning and actions by urban and agricultural water suppliers to reduce California’s water use and requires urban water agencies to assist in reducing statewide per capita water consumption by 20 percent by the year 2020. Specifically, among other requirements, this bill establishes four methods for urban water suppliers to select from to achieve the statewide goal of a 20 percent reduction in urban water use. The act requires urban water suppliers to set an interim urban water use target for 2015 and meet the overall target by 2020.

As a water supplier, EBMUD is required to comply with the requirements of this bill to be eligible for water related state grant funding or loans. Chapter 6 and Appendix H discuss the development of the water use baseline and the targets. The projected demand of 221 MGD in year 2020 is expected to meet the requirements of SBx7-7.

**SUPPLY-DEMAND ASSESSMENT**

In order to meet its customers’ water needs now and in the future, EBMUD must balance water supply and customer demand. Both supply and demand vary seasonally and become critical during drought periods which can last several years. For planning purposes and looking to the year 2040, EBMUD’s current supply is insufficient to meet customer needs during single- and multi-year droughts despite EBMUD’s aggressive water conservation and recycled water programs.

**PAST AND CURRENT SUPPLY-DEMAND**

EBMUD’s water demand in 1970 reached as high as 220 MGD. Subsequently, demand dropped sharply as a result of cutbacks during the three most recent drought rationing periods when drought-related programs were in effect in 1976-1978, 1987-1994, and 2007-2010. Demand was low in wetter years that immediately followed the first two droughts. This temporary event reflected changed customer water use behavior, successfully implemented conservation practices, and delayed post-drought recovery in customer consumption. As time progressed, demand recovered to pre-drought levels. Current demand levels remain lower than the planning level of demand as a result of residual effects from the 2007-2010 drought, a depressed economy, and unusually cool temperatures. In FY10, EBMUD’s system demand was on average 174 MGD.

**TABLE 4-2 WATER DEMAND ESTIMATES FOR LOWER INCOME RESIDENTIAL ACCOUNTS**

CALENDAR YEAR	SINGLE-FAMILY		MULTI-FAMILY		TOTAL RESIDENTIAL	
	DEMAND (MGD)	% OF SECTOR DEMAND	DEMAND (MGD)	% OF SECTOR DEMAND	DEMAND (MGD)	% OF TOTAL RESIDENTIAL SECTOR DEMAND
2015	2.4	2%	0.7	2%	3.1	2%
2020	3.1	3%	1.1	3%	4.2	3%
2025	3.9	3%	1.6	3%	5.5	3%
2030	5.1	4%	2.3	4%	7.4	4%
2035	6.7	6%	3.1	6%	9.8	6%
2040	8.9	8%	4.1	8%	13.0	8%

## PROJECTED SUPPLY-DEMAND

### Planning Level of Demand

The planning level of demand does not include the short-term reduction and rebound in demand caused by the multi-year drought and the downturn in the economy. The planning level of demand is used to assess demands as dictated by community policies. The 2040 Demand Study projected, on average, less than a one percent growth each year in customer demand through 2030 followed by a much lower increase thereafter to a 2040 planning level of demand of 230 MGD after applying reductions from conservation and recycled water savings. However, due to

the current suppressed demand that is lower than estimated in the 2040 Demand Study, some planned recycled water projects and conservation programs will be deferred until the end of the anticipated recovery period. Consequently, the projected planning level of demand for 2015 has been revised to 223 MGD and is reflected in Table 4-3. Figure 4-9 shows both historical and projected demands and projected recycled water and conservation savings from 2010 to 2040.

A summary of EBMUD’s demand and supply projections over the next thirty years is provided in Table 4-3. The

FIGURE 4-9

HISTORICAL AND PROJECTED DEMAND

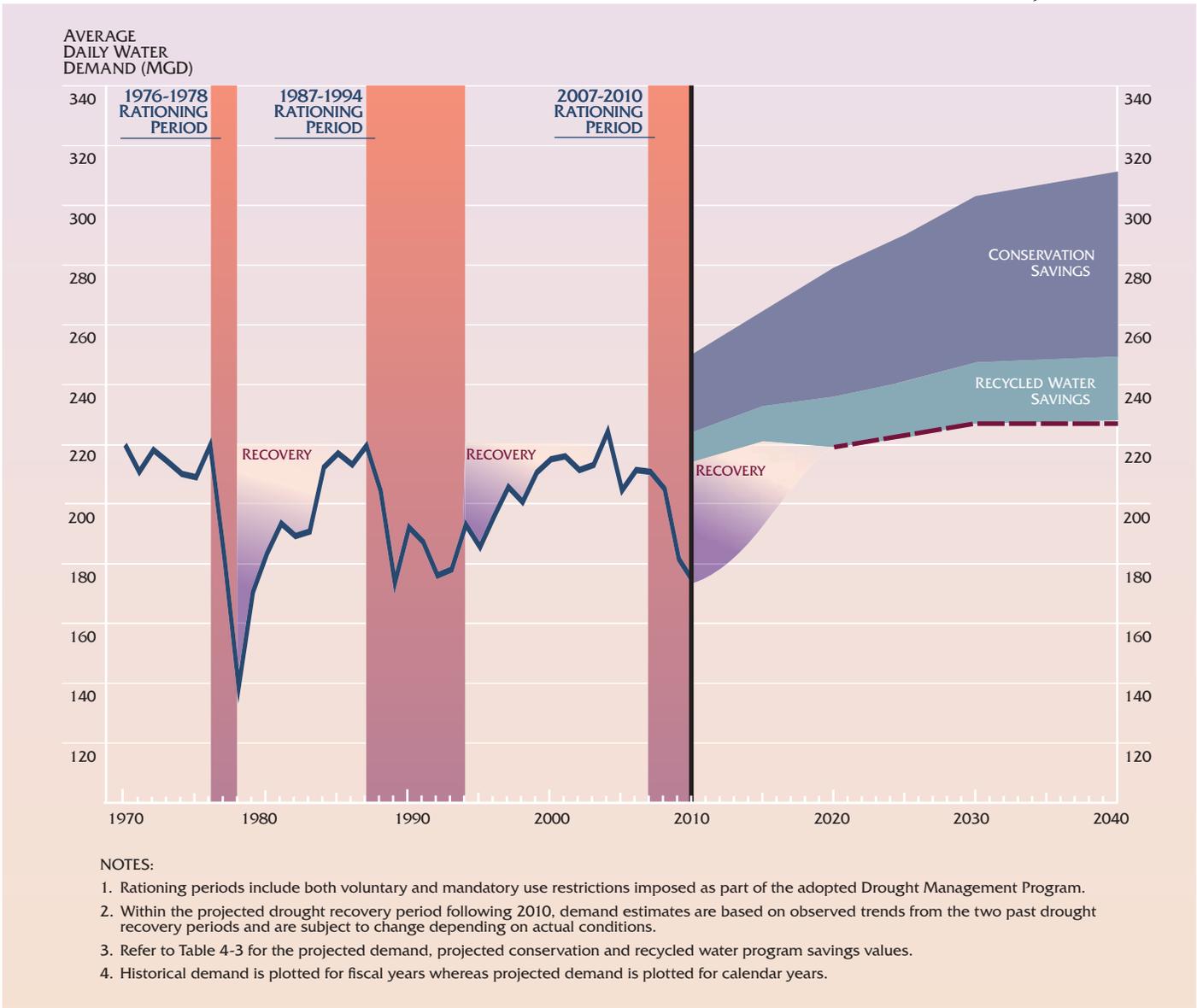


TABLE 4-3 EBMUD DEMAND AND SUPPLY PROJECTIONS

	2010	2015	2020	2025	2030	2035 <sup>1</sup>	2040
<b>PROJECTED DEMAND (MGD)</b>							
CUSTOMER DEMAND <sup>2</sup>	251	266	280	291	304	308	312
ADJUSTED FOR CUMULATIVE CONSERVATION <sup>3</sup>	(26)	(32)	(43)	(49)	(56)	(59)	(62)
ADJUSTED FOR RECYCLED WATER <sup>4</sup>	(9)	(11)	(16)	(18)	(19)	(20)	(20)
PLANNING LEVEL OF DEMAND	216	223	221	224	229	229	230
<b>PROJECTED AVAILABLE SUPPLY AND NEED FOR SUPPLEMENTAL SUPPLY (MGD)<sup>5</sup></b>							
NORMAL YEAR	>216	>223	>221	>224	>229	>229	>230
SUPPLEMENTAL SUPPLY NEED	0	0	0	0	0	0	0
<b>SINGLE DRY YEAR (MULTIPLE DRY YEARS – YEAR 1)</b>							
AVAILABLE SUPPLY	211	217	215	218	223	222	222
CUSTOMER RATIONING <sup>6</sup>	2%	3%	3%	3%	3%	3%	4%
SUPPLEMENTAL SUPPLY NEED <sup>7</sup>	5	6	6	7	7	8	8
<b>MULTIPLE DRY YEARS – YEAR 2</b>							
AVAILABLE SUPPLY	183	189	188	190	194	194	195
CUSTOMER RATIONING <sup>6</sup>	15%	15%	15%	15%	15%	15%	15%
SUPPLEMENTAL SUPPLY NEED <sup>7</sup>	21	21	21	21	22	22	22
<b>MULTIPLE DRY YEARS – YEAR 3</b>							
AVAILABLE SUPPLY	183	189	188	190	183	164	144
CUSTOMER RATIONING <sup>6</sup>	15%	15%	15%	15%	15%	15%	15%
SUPPLEMENTAL SUPPLY NEED <sup>7</sup>	21	21	21	21	33	53	73
<b>THREE-YEAR DROUGHT</b>							
TOTAL SUPPLEMENTAL SUPPLY NEED (TAF) <sup>7</sup>	53	54	54	55	69	93	115

<sup>1</sup> Projected demand for 2035 is interpolated.

<sup>2</sup> Customer demand values are based on the demand projections from the "2040 Demand Study," Feb 2009. These projected water demands are based on land use in EBMUD's ultimate service area and is unadjusted for conservation and non-potable water. The values are also unadjusted for the current suppressed demand due to the 2007-2010 rationing period and the economic downturn.

<sup>3</sup> Existing conservation saving from the "1994 Water Conservation Master Plan" and planned conservation program savings based on the "2011 Water Conservation Master Plan".

<sup>4</sup> Existing recycled water achieved per the "1993 Water Supply Management Program" and planned recycled water program savings as outlined in Chapter 5 of the UWMP 2010.

<sup>5</sup> Projected available supply data includes dry year supply deliveries from the Freeport Regional Water Project (FRWP) and Bayside Groundwater Project, Phase 1. Delivery rules for the FRWP follow the rules as developed in the Freeport EIR, 2003.

<sup>6</sup> Rationing reduction goals are determined according to projected system storage levels in the Long-Term Drought Management Program guidelines per Table 3-2 in Chapter 3 of the UWMP 2010.

<sup>7</sup> The supplemental supply need is based on EBMUDSIM modeling studies. It is the amount of water needed based on EBMUD's updated demand projections, the provisions of the 1998 Joint Settlement Agreement and the rationing policy stated in Table 3-2, Chapter 3 of the UWMP 2010. The actual need will be dependent on antecedent conditions and the severity of actual drought conditions. Supplemental supply stored during the initial year of the drought could be later released, diminishing supplemental supply needs. During the drought that continued into 2010, the combined effects of water rationing and an economic downturn suppressed demand below the planning level of demand to maintain a sufficient water supply and deferred the need for supplemental water. However, if the drought had continued into its second year, most likely supplemental supplies would have been obtained from the Freeport Regional Water Facility as anticipated in the Interim Drought Management Program Guidelines discussed in Appendix G-2.

demand data is based on EBMUD's 2040 Demand Study (as discussed in the Projected Water Demand section of this chapter) and revised projections. The supply data is derived from EBMUD's water supply system Simulation Model (EBMUDSIM).

EBMUD evaluates and forecasts water supply availability for any calendar year based on forecasted runoff and existing storage levels in the reservoirs. A "normal year" is a year in which EBMUD does not need to implement a Drought Management Program. For a normal year, the

April projection of the total system storage at the end of September would be 500 thousand acre-feet (TAF) or greater (as shown in Table 3-2). EBMUD can meet customer demands through the year 2040 during normal year conditions; therefore, the available supply is considered equal to or greater than demand. However, as discussed in Chapter 2, unless supplemental water supplies are developed and while EBMUD's Mokelumne River supply continues to decrease, the frequency of normal year-types will decrease in the future. The frequency of dry years that require customer rationing is expected to increase.

In evaluating its water supply availability, EBMUD takes into account diversions of both upstream and downstream water right holders and fishery releases. The available water supply shown in Table 4-3 in years one, two, and three 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 to minimum operating levels by the end of the third year of the drought planning sequence;
- 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 continues to increase up to 47 TAF in 2040;
- releases from Camanche are sufficient to meet the requirements of downstream senior water right holders;
- minimum instream flow requirements for the Lower Mokelumne River are in accordance with the 1998 Joint Settlement Agreement;
- dry-year supply of CVP water, through the Freeport Regional Water Facility, is available beginning in 2010; and
- Bayside Groundwater Project, Phase 1, is available beginning in 2010.

In Table 4-3, “Single Dry Year” (or Multiple Dry Years - Year 1) is a year in which EBMUD would implement Drought Management Program elements at the “moderate” stage with the goal to achieve a reduction between zero to ten percent in customer demand (as shown in Table 3-2). Based on this EBMUD rationing policy, rationing in the first year of a drought is estimated at two percent of the planning level of demand in 2010 and four percent in 2040 only if additional supplemental supplies beyond the dry-year supply available through the Freeport Regional Water Facility and through the Bayside Groundwater Facility are obtained. Therefore, deficiencies continue to exist unless additional supplemental supplies are obtained.

Year 2 of “Multiple Dry Years” is a year in which EBMUD would implement Drought Management Program elements at the “severe” stage with the goal to achieve between 10 to 15 percent reduction in customer demand (as shown in Table 3-2). Year 3 of “Multiple Dry Years” is a year in which

EBMUD would implement Drought Management Program elements at the “critical” stage. Despite water savings from EBMUD’s aggressive conservation and recycling programs and rationing of up to 15 percent, additional supplemental supplies beyond those provided through the Freeport Regional Water Facility and the Bayside Groundwater Facility will be needed during Years 2 and 3 of a three year drought. In Table 4-3, the term “Supplemental Supply Need” is the additional amount of water necessary to limit customer rationing to 15 percent during droughts while meeting the requirements of senior downstream water right holders and the provisions of the 1998 Joint Settlement Agreement. The forecasted need for supplemental supply ranges from 21 MGD in 2010 to 73 MGD by 2040 during Year 3 of a three year drought.

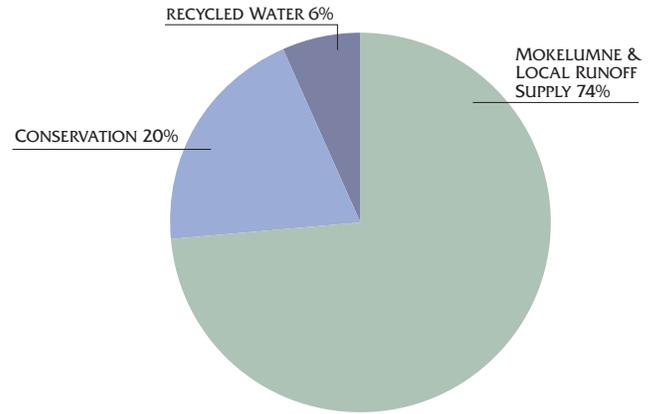
As indicated in Table 4-3, EBMUD has a total supplemental supply need of 69 TAF over multiple dry years for 2030 level demands, beyond the current supplemental supplies provided through the Freeport Regional Water Facility and the Bayside Groundwater Facility. EBMUD plans to meet this need by relying on short-term supplemental supply sources that include the Northern California Water Transfers (expected to provide up to 13 MGD (15 TAF/yr) of dry-year water) and the Bayside Groundwater Project Expansion (expected to provide up to 9 MGD (10 TAF/yr) of dry-year water) as described in Chapter 2. Beyond 2030 and outside the current required 20-year planning horizon of the UWMP, EBMUD’s supplemental supply needs will be met by implementing long-term conceptual supplemental supply sources, whose project capacities can only be quantified in subsequent UWMPs through refined project developments. Chapter 3 discusses how EBMUD would plan for and manage a water supply shortage.

Figure 4-10 illustrates the projected water supply available to EBMUD by 2040. In a normal year, conservation and recycled water programs will play a very important role in future reliability of EBMUD’s supply. In a normal year for a 312 MGD demand, conservation is expected to offset about 20 percent of the needed supply, and recycled water programs will offset about 6 percent. For a 312 MGD demand in an average drought year of a three year drought sequence projected for year 2040, rationing and supplemental supply will account for 25% and the projected shortfall to be met by developing supplemental water supply sources will be about 11%.

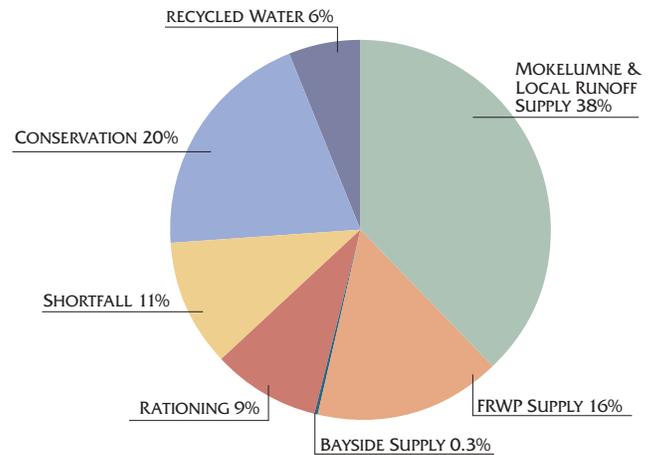
### Interim Level of Demand

During the recent 2007-2010 rationing period, EBMUD customers were subjected to mandatory and voluntary water use restrictions. The residual rationing effect of the recently ended drought management program and the suppressed demand from the downturn in the economy has led EBMUD to adopt interim drought management program guidelines. These interim guidelines recognize that demand is below the planning level during the recovery period as depicted in Figure 4-9. During this time, when demand remains significantly suppressed, below the planning level of demand, the existing water supply is sufficient, which defers the need for any supplemental drought year water supply. Appendix G-2 provides further discussion on the interim drought management program guidelines.

FIGURE 4-10 PROJECTED (2040) WATER SUPPLY — 312 MGD  
NORMAL YEAR



THREE YEAR DROUGHT AVERAGE YEAR



NOTE:  
Numbers may not add to 100% due to rounding.

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## CHAPTER 5. WASTEWATER AND RECYCLED WATER

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*EBMUD and several other wastewater utilities collect and treat wastewater in the EBMUD water service area. Currently four wastewater treatment facilities provide recycled water to EBMUD customers. Recycled water use reduces the demand for EBMUD's potable water supplies. 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.*

### WASTEWATER 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 area in 1944. SD-1 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.

### WASTEWATER GENERATION, COLLECTION AND TREATMENT

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Based on 2010 census data, approximately 1.34 million people are served by EBMUD's water service district. 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 650,000 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 5-1 lists wastewater utilities shown on Figure 5-1 with their capacities and average dry weather wastewater flow projections from 2010 to 2040. 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 Collection System

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EBMUD'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.

### Wastewater Treatment System

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Wastewater collected by the interceptors flows to EBMUD's Main Wastewater Treatment Plant (MWWTP), which is located in Oakland near the foot 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 65 MGD.

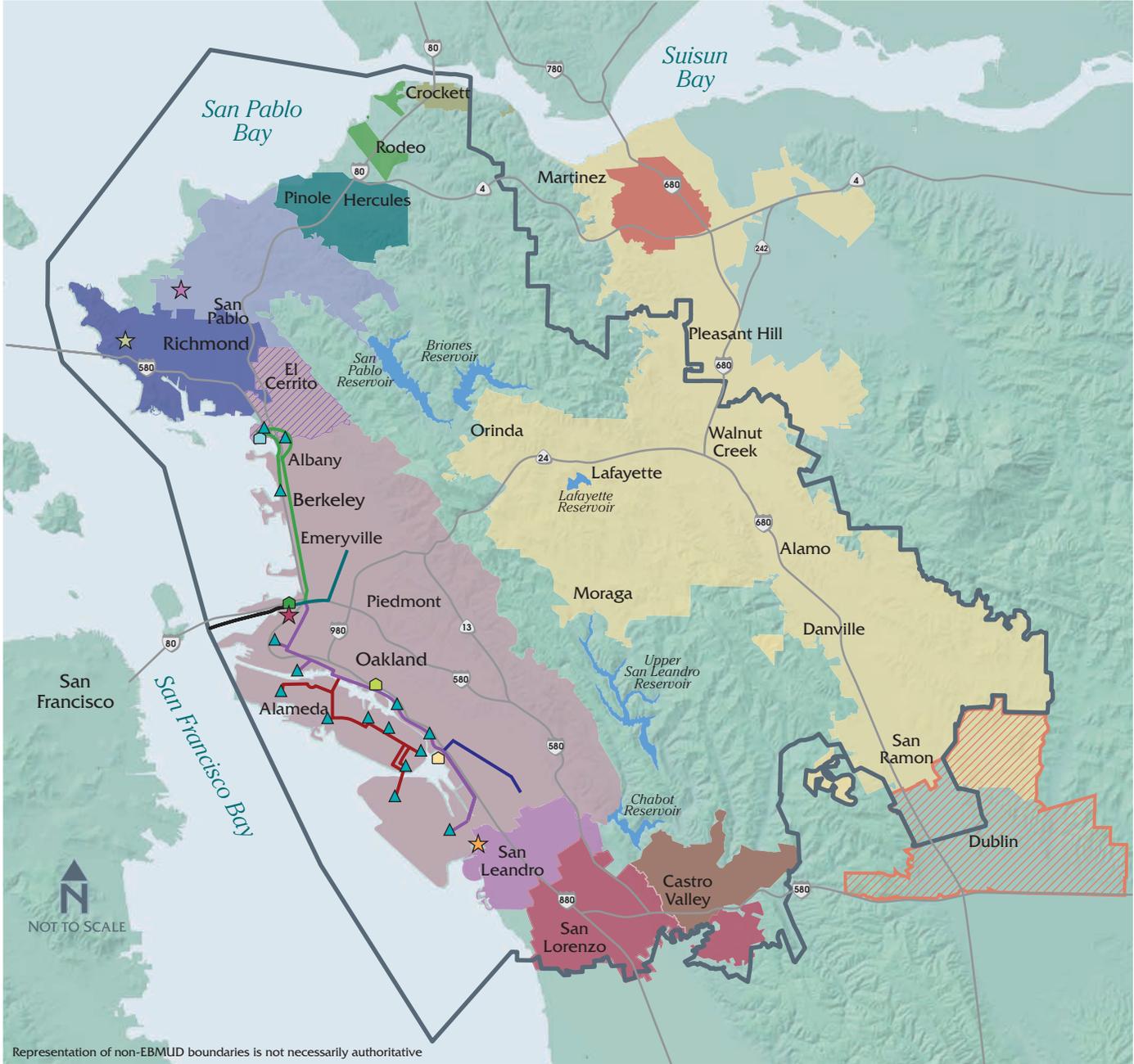
Primary treatment removes floating materials, oils and greases, sand and silt and organic solids heavy enough to settle in water. Secondary treatment biologically removes most of the suspended and dissolved organic and chemical impurities that would deplete life-giving oxygen from the waters of the Bay 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 DISPOSAL

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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. Table 5-2 illustrates characteristics of treated wastewater and the projected

FIGURE 5-1 WASTEWATER DISTRICTS WITHIN EBMUD'S WATER SERVICE BOUNDARY



**WASTEWATER DISTRICTS**

- SD-1
- STEGE SANITARY DISTRICT
- CITY OF RICHMOND SANITARY DISTRICT
- WEST COUNTY WASTEWATER DISTRICT
- CITY OF PINOLE/HERCULES
- RODEO SANITARY DISTRICT
- CROCKETT COMMUNITY SERVICES DISTRICT
- MOUNTAIN VIEW SANITARY DISTRICT
- CENTRAL CONTRA COSTA SERVICES DISTRICT
- DUBLIN - SAN RAMON SERVICES DISTRICT
- CASTRO VALLEY SANITARY DISTRICT
- ORO LOMA SANITARY DISTRICT
- CITY OF SAN LEANDRO

**FACILITIES**

- OAKPORT WET WEATHER FACILITY
- SAN ANTONIO CREEK WET WEATHER FACILITY
- MAIN WASTEWATER TREATMENT PLANT
- POINT ISABEL WET WEATHER FACILITY
- SAN LEANDRO RECYCLED WATER FACILITY
- EAST BAYSHORE RECYCLED WATER FACILITY
- NORTH RICHMOND RECYCLED WATER FACILITY
- RARE WATER PROJECT
- EBMUD PUMPING STATION

EBMUD ULTIMATE SERVICE BOUNDARY

**EBMUD INTERCEPTORS**

- SOUTH
- FOOTHILL
- ALAMEDA
- ADELINE
- NORTH
- MAIN WWTP

TABLE 5-1 COLLECTED AND TREATED WASTEWATER 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)		2010	2015	2020	2025	2030	2035	2040
EBMUD SPECIAL DISTRICT NO.1	OAKLAND	168	DISCHARGED & RECYCLED	74	74	74	74	74	74	74
CITY OF SAN LEANDRO	SAN LEANDRO	9.7	DISCHARGED & RECYCLED	5	5.34	5.68	6.02	6.36	6.7	7
DUBLIN SAN RAMON SERVICES DISTRICT	PLEASANTON	11.5	DISCHARGED & RECYCLED	11.7	12.43	15.64	17.56	18.45	18.71	18.71
CENTRAL CONTRA COSTA SANITARY DISTRICT	MARTINEZ	70	DISCHARGED & RECYCLED	37	39	41	43	46	48	50
CITY OF PINOLE/HERCULES	PINOLE	4.06	DISCHARGED & RECYCLED <sup>3</sup>	3.5	4	4	4	4	4	4
CITY OF RICHMOND	RICHMOND	16	DISCHARGED	8.5	8.5	8.5	8.5	8.5	8.5	8.5
WEST COUNTY WASTEWATER DISTRICT	RICHMOND	12.5	DISCHARGED & RECYCLED	6.6	8	8	8	8	8	8
RODEO SANITARY DISTRICT	RODEO	1.14	DISCHARGED & RECYCLED <sup>3</sup>	0.55	0.65	0.65	0.65	0.7	0.7	0.7
ORO LOMA SANITARY DISTRICT <sup>4</sup>	SAN LORENZO	20	DISCHARGED & RECYCLED	13.5	14	14.5	15	17	17	17
CROCKETT SANITARY DEPARTMENT <sup>5,6</sup>	CROCKETT	1.78	DISCHARGED	0.7	0.7	0.7	0.7	0.7	0.7	0.7
<b>TOTAL<sup>7</sup></b>				<b>161.0</b>	<b>166.6</b>	<b>172.7</b>	<b>177.4</b>	<b>183.7</b>	<b>186.3</b>	<b>188.6</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> The Rodeo Sanitary District and City of Pinole/Hercules utilize a joint outfall. Recycled water use from this joint outfall is anticipated post 2010.

<sup>4</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>5</sup> Crockett Sanitary Department includes flows from C & H Sugar.

<sup>6</sup> Crockett Sanitary Department was formerly known as Crockett-Valona Sanitary District.

<sup>7</sup> Total values have been rounded.

average dry weather flows of the portion of treated wastewater that are not recycled and that are discharged from each wastewater treatment plant within EBMUD’s water service area. Many of these treatment plants recycle water for washing down filters and for other in-plant operations.

## RECYCLED WATER PROGRAM

Recycled water is highly treated wastewater that is suitable for a variety of beneficial uses. Recycled water is stringently regulated by Title 22 of the California Code of Regulations, which dictates the level of treatment and use of recycled water in California.

The California Department of Public Health (CDPH) 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 CDPH, to prescribe and enforce water recycling requirements. Thus, the regional boards enforce CDPH’s water recycling criteria, and each water recycling project must have a permit from the appropriate

RWQCB conforming to CDPH 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 CDPH or RWQCBs. 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.

Recycled water use is a critical element of EBMUD’s water supply management policies and stretches EBMUD’s limited, high-quality drinking water supply, as any demand met with recycled or non-potable water reduces the demand for potable water supply. In addition to increasing water supply reliability and lessening the effect of extreme rationing during droughts, 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 discharges, 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.

EBMUD initiated water recycling programs that reduce demand on drinking water supplies in the early 1970s. EBMUD has been recycling water for landscape irrigation

TABLE 5-2 NON-RECYCLED WASTEWATER TREATED AND DISCHARGED IN THE EBMUD SERVICE AREA<sup>1</sup>

AGENCY	CURRENT DISPOSAL METHOD	CURRENT LEVEL OF TREATMENT FOR DISPOSED WASTEWATER <sup>3</sup>	NON-RECYCLED WASTEWATER FLOWS (MGD) <sup>2</sup>						
			2010	2015	2020	2025	2030	2035	2040
EBMUD SPECIAL DISTRICT NO.1	DISCHARGED TO SAN FRANCISCO BAY	SECONDARY	72.5	72.5	69.1	67.3	67.3	67.3	67.3
CITY OF SAN LEANDRO	DISCHARGED THROUGH EBDA PIPELINES TO S.F. BAY	SECONDARY	1.25	1.34	1.42	1.5	1.59	1.68	1.75
DUBLIN SAN RAMON SERVICES DISTRICT	DISCHARGED THROUGH LAVWMA/EBDA PIPELINES TO S.F. BAY	SECONDARY	1.9	1.47	1.77	0.77	0	0	0
CENTRAL CONTRA COSTA SANITARY DISTRICT	DISCHARGED TO SUISUN BAY	SECONDARY	37	38.8	40.6	42.4	45.4	47.3	49.3
CITY OF PINOLE/HERCULES	DISCHARGED TO PINOLE/HERCULES/RODEO OUTFALL THEN TO SAN PABLO BAY	SECONDARY	3.5	4	1.2	1.2	0.3	0.3	0.3
CITY OF RICHMOND	DISCHARGED TO SAN FRANCISCO BAY	SECONDARY	8.5	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
RODEO SANITARY DISTRICT	DISCHARGED TO PINOLE/HERCULES/RODEO OUTFALL THEN TO SAN PABLO BAY	SECONDARY	0.55	0.65	0.65	0.65	0.7	0.7	0.7
ORO LOMA SANITARY DISTRICT <sup>4</sup>	DISCHARGED THROUGH EBDA PIPELINES TO S.F. BAY	SECONDARY	13.24	13.74	14.24	14.74	16.74	16.74	16.74
CROCKETT SANITARY DEPARTMENT <sup>5</sup>	DISCHARGED TO CROCKETT	SECONDARY	0.7	0.7	0.7	0.7	0.7	0.7	0.7
<b>TOTAL<sup>6</sup></b>			<b>139.1</b>	<b>141.7</b>	<b>138.2</b>	<b>137.8</b>	<b>141.2</b>	<b>143.2</b>	<b>145.3</b>

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

<sup>2</sup> Assumes that non-recycled 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> The Rodeo Sanitary District and City of Pinole/Hercules utilize a joint outfall. Recycled water use from this joint outfall is anticipated post-2011. For this table, the recycled water demand from the outfall is attributed to City of Pinole/Hercules only.

<sup>5</sup> The Crockett Sanitary Department was formerly known as Crockett-Valona Sanitary District.

<sup>6</sup> Total values have been rounded.

and in-plant processes at its main wastewater treatment plant since 1971, and began its first golf course recycled water irrigation project in 1984. Highlights of EBMUD’s recycled water program are chronicled in Table 5-3.

Stressing the importance of recycled water as part of the overall water supply picture, EBMUD’s Board of Directors adopted the Non-potable Water Policy No. 9.05 (amended November 14, 2006, see Appendix F). The policy requires that EBMUD customers 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 or wildlife. It is EBMUD’s current practice to promote recycled water to its customers for appropriate non-potable uses.

During calendar year 2010, EBMUD provided more than 9 million gallons a day (MGD) of recycled water for non-residential landscape irrigation and industrial uses including reuse at its main wastewater treatment plant. Table 5-4 compares the actual recycled use in 2010 with

recycled water use as projected in the UWMP 2005. By 2040, EBMUD anticipates providing 20 MGD of recycled water.

### EXISTING RECYCLED WATER PROJECTS

EBMUD’s Water Recycling Program has grown significantly since EBMUD began producing and using recycled water at its MWWTP in 1971. Table 5-5 (see page 5-7) lists the characteristics of EBMUD’s ten existing recycled water projects, as well as the quantity of recycled water they supplied in 2010, and the quantity they are expected to supply through 2040. In 2010, these recycled water projects supplied an average of 9.3 MGD of recycled water. The Richmond Advanced Recycled Expansion Water Project (RARE), which commenced operations in 2010, is projected to provide an additional 3.5 MGD of recycled water.

Recycled water for these projects is used for various industrial purposes and for irrigating landscape. Wastewater sources for EBMUD’s existing recycling projects come from four wastewater treatment facilities owned and operated by four different agencies. In addition

TABLE 5-3 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 ESTABLISHED
1990S	
1993	EBMUD WATER SUPPLY MANAGEMENT PLAN INCORPORATES WATER RECYCLING GOALS
1994	BOARD ADOPTS WATER CONSERVATION AND RECYCLING MASTER PLANS
1995	JOINT POWERS AUTHORITY (DERWA) FORMS IN ORDER TO CREATE THE SAN RAMON VALLEY RECYCLED WATER PROGRAM
1996	NORTH RICHMOND WATER RECLAMATION PLANT PROVIDES RECYCLED WATER TO THE CHEVRON REFINERY
1999	FEDERAL WATER RESOURCE DEVELOPMENT ACT OF 1999 (WRDA) AUTHORIZES \$15 MILLION FOR THE SAN RAMON VALLEY RECYCLED WATER PROGRAM
2000S	
2000	WATER RECYCLING IN LANDSCAPING ACT ADOPTED BY THE STATE OF CALIFORNIA
2002	AWARD WINNING RECYCLED WATER CUSTOMER TRAINING VIDEOS AND MANUAL CREATED
2002	U.S. ARMY CORPS OF ENGINEERS AND DERWA PARTNER TO DESIGN SOME SAN RAMON VALLEY RECYCLED WATER PROJECT FACILITIES
2003	PIPELINE CONSTRUCTION BEGINS FOR THE EAST BAYSHORE AND SAN RAMON VALLEY RECYCLED WATER PROJECTS
2004	EBMUD BOARD OF DIRECTORS IMPROVES FINANCIAL INCENTIVES FOR USING RECYCLED WATER
2004	CALIFORNIA STATE WATER RESOURCES CONTROL BOARD INCREASES GRANTS AND LOW-INTEREST LOAN FUNDING FOR EBMUD RECYCLED WATER PROJECTS TO \$44.3 MILLION
2006	SAN RAMON VALLEY RECYCLED WATER PROJECT (PHASE 1) PROVIDES RECYCLED WATER TO IRRIGATION CUSTOMERS
2007	WRDA AUTHORIZES \$25 MILLION FOR EBMUD’S RECYCLED WATER PROGRAM.
2007	DEPARTMENT OF WATER RESOURCES AWARDS A \$2.1 MILLION GRANT FOR THE RICHMOND ADVANCED RECYCLED EXPANSION (RARE) WATER PROJECT
2008	EAST BAYSHORE RECYCLED WATER PROJECT PROVIDES RECYCLED WATER TO CUSTOMERS IN OAKLAND
2008	RECYCLED WATER TRUCK PROGRAM BEGINS OPERATION
2008	CONSTRUCTION BEGINS ON THE RARE WATER PROJECT
2009	EBMUD RECEIVED \$3.5 MILLION IN ECONOMIC STIMULUS FUNDING FOR THE SAN RAMON VALLEY RECYCLED WATER PROGRAM
2010	RARE WATER PROJECT PHASE 1 BEGINS OPERATION AT THE CHEVRON REFINERY
2010	CONSTRUCTION BEGINS ON SAN RAMON VALLEY PHASES 2 TO 4

TABLE 5-4 COMPARISON OF RECYCLED WATER USES: 2005 PROJECTION VS. 2010 ACTUAL

TYPE OF USE	2005 PROJECTION FOR 2010 (MGD)	2010 ACTUAL USE (MGD)
AGRICULTURE	-	-
LANDSCAPE IRRIGATION	2.7	1.8
WILDLIFE HABITAT	-	-
WETLANDS	-	-
INDUSTRIAL	9.2	7.5
GROUNDWATER RECHARGE	-	-
COMMERCIAL	0.01	0.01
INDIRECT POTABLE USE	-	-
<b>TOTAL</b>	<b>11.9</b>	<b>9.3</b>

NOTES:  
 1. Recycled water use for 2010 is a best estimate of actual use as of the publication of the UWMP 2010.  
 2. Total values have been rounded.

to EBMUD’s MWWTP, the wastewater is supplied through external partnerships with the West County Wastewater District (WCWD), the City of San Leandro, and Dublin San Ramon Services District. Figure 5-2 depicts water recycling sites within the EBMUD service area.

### 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 are irrigated with recycled water. The WCWD treatment plant provides pretreatment, primary clarification, activated sludge secondary treatment, and chlorination. It produces a secondary effluent which meets Title 22 standards for restricted golf course irrigation. In 2010, Richmond

Country Club used an average of 0.18 MGD of recycled water. EBMUD contracts the maintenance and operation of the pump station to WCWD.

### **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 the Metropolitan Golf Links complex in Oakland, the Chuck Corica Golf Complex in Alameda, and the Harbor Bay Parkway in Alameda.

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 2010. It should be noted that this customer mainly uses groundwater for irrigation purposes and uses recycled water for backup or for blending.

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 2010.

As part of the SLRF expansion, EBMUD also added piping to serve the nearby Harbor Bay Parkway. The average delivery was 0.02 MGD for roadway greenbelt irrigation in 2010.

### **CHEVRON REFINERY**

The Chevron Refinery is the largest single user of recycled water in EBMUD’s service area. In 1996, EBMUD began supplying recycled water to the Chevron Refinery for the operation of recirculating water cooling towers. Secondary effluent from WCWD is treated to tertiary levels at EBMUD’s North Richmond Water Reclamation Plant (NRWRP) and then piped to the refinery. The NRWRP treats the secondary effluent 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. EBMUD and Chevron have worked together to implement improvements to recycled water service to Chevron, and have brought the average use of recycled water service up from 2 MGD in 2004 to 4 MGD in 2010. The RARE Water project, detailed below, which became operational in 2010, will increase this usage significantly.

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

In 1971, EBMUD constructed treatment facilities to maximize the use of recycled water for plant processes and landscape irrigation at it’s MWWTP. In addition, recycled water for use as equipment wash down and construction projects was made available at the plant in the 1970s and during 1987-94 when EBMUD implemented a Drought Management Program. EBMUD continues to use recycled water for in-plant processes and landscape irrigation. In 2010, the average in-plant recycled water use was 3 MGD. Recycled water use at the EBMUD MWWTP is not included in the EBMUD recycled water goal of 20 MGD by 2040. Historically, the EBMUD MWWTP had not used potable water for processes and irrigation, and as a consequence current recycled water use does not offset potable water demand at the EBMUD MWWTP.

### **SAN RAMON VALLEY RECYCLED WATER PROGRAM— PHASE 1**

The San Ramon Valley Recycled Water Program (SRVRWP) is a partnership between EBMUD and the Dublin San Ramon Services District. Phase 1 of this multi-phased project was completed in 2006 and now delivers approximately 0.7 MGD to landscape irrigation customers in San Ramon. The project will eventually serve an annual average of 2.4 MGD of recycled water to EBMUD irrigation customers in portions of Blackhawk, Danville and San Ramon. See “Projects Under Construction” section in this chapter for more details.

### **RICHMOND ADVANCED RECYCLED EXPANSION WATER PROJECT – PHASE 1**

EBMUD’s newest recycled water project, the RARE Water Project, builds on EBMUD’s existing partnership with the Chevron refinery in Richmond. In collaboration with Chevron, EBMUD completed construction of the RARE Water Treatment Plant in 2010. Located within the refinery, the new RARE plant treats secondary effluent from WCWD via microfiltration and reverse osmosis to produce the high purity water quality required by the refinery’s boilers.

TABLE 5-5

QUANTITIES OF RECYCLED WATER SERVED FOR EBMUD RECYCLED WATER PROJECTS

PROJECT AND LOCATION	TYPE OF USE	YEAR INITIATED	WASTEWATER SUPPLY SOURCE	CAPITAL COST IN FY10 IN MILLIONS	AVERAGE DAILY RECYCLED WATER USE (MGD)							
					2010 <sup>1</sup>	2015	2020	2025	2030	2035	2040 <sup>2</sup>	
<b>EXISTING PROJECTS</b>												
RICHMOND COUNTRY CLUB [RICHMOND]	GOLF COURSE IRRIGATION	1984	WEST COUNTY WASTEWATER DISTRICT WWTP	—	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
METROPOLITAN GOLF LINKS [OAKLAND]	GOLF COURSE IRRIGATION	1988	CITY OF SAN LEANDRO WPCP	—	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
CHUCK CORICA GOLF COMPLEX [ALAMEDA]	GOLF COURSE IRRIGATION	1991	CITY OF SAN LEANDRO WPCP	—	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37
HARBOR BAY PARKWAY [ALAMEDA]	LANDSCAPE IRRIGATION	1991	CITY OF SAN LEANDRO WPCP	—	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CHEVRON REFINERY [NORTH RICHMOND]	COOLING TOWER WATER (INDUSTRIAL)	1996	WEST COUNTY WASTEWATER DISTRICT WWTP	—	4	4	4	4	4	4	4	4
SAN RAMON VALLEY RECYCLED WATER PROGRAM – PHASE 1 [CONTRA COSTA COUNTY]	LANDSCAPE IRRIGATION	2006	DSRSD WWTP	—	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
EAST BAYSHORE RECYCLED WATER PROJECT – PHASE 1A [ALAMEDA COUNTY]	INDUSTRIAL, LANDSCAPE IRRIGATION, TOILET FLUSHING, IN COMMERCIAL BUILDINGS	2008	EBMUD MAIN WWTP	—	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
RICHMOND ADVANCED RECYCLED EXPANSION (RARE) WATER PROJECT – PHASE 1 [CONTRA COSTA COUNTY]	INDUSTRIAL	2010	WCWD WWTP	—	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
RECYCLED WATER TRUCK PROGRAM	CONSTRUCTION WATER NEEDS, SEWER FLUSHING, OTHER NON-POTABLE USES	2008	EBMUD WWTP	—	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
EBMUD WASTEWATER TREATMENT PLANT (IN-PLANT USES) [OAKLAND] <sup>3</sup>	PLANT PROCESSES (INDUSTRIAL) AND LANDSCAPE IRRIGATION	1971	EBMUD MAIN WWTP	—	3	3	3	3	3	3	3	3
<b>TOTAL EXISTING CUSTOMER RECYCLED WATER USE<sup>3</sup></b>					<b>9.3</b>	<b>9.3</b>	<b>9.3</b>	<b>9.3</b>	<b>9.3</b>	<b>9.3</b>	<b>9.3</b>	<b>9.3</b>
<b>PLANNED UNDER CONSTRUCTION</b>												
SAN RAMON VALLEY RECYCLED WATER PROGRAM — PHASES 2 – 4 [CONTRA COSTA COUNTY]	LANDSCAPE IRRIGATION	2015	DSRSD WWTP	\$13	—	0.7	1.3	1.7	1.7	1.7	1.7	1.7
<b>TOTAL PLANNED UNDER CONSTRUCTION</b>					<b>0</b>	<b>0.7</b>	<b>1.3</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>	<b>1.7</b>
<b>ADDITIONAL PLANNED</b>												
RICHMOND ADVANCED RECYCLED EXPANSION (RARE) WATER PROJECT— FUTURE PHASES [CONTRA COSTA COUNTY]	INDUSTRIAL	2015	WEST COUNTY WASTEWATER DISTRICT WWTP	NOT YET DETERMINED	0	0.5	0.5	1.5	1.5	1.5	1.5	1.5
SATELLITE RECYCLED WATER PROJECTS [ALAMEDA COUNTY/CONTRA COSTA COUNTY]	LANDSCAPE IRRIGATION	2015	SATELLITE FACILITY	\$42	0	0.2	0.2	0.4	0.4	0.7	0.7	0.7
EAST BAYSHORE RECYCLED WATER PROJECT — PHASE 1B2 [ALAMEDA COUNTY]	LANDSCAPE IRRIGATION, INDUSTRIAL, TOILET FLUSHING, IN COMMERCIAL BUILDINGS	2020	EBMUD MAIN WWTP	\$37	0	0	1.2	1.8	1.8	1.8	1.8	1.8
SAN LEANDRO WATER RECLAMATION FACILITY EXPANSION PROJECT [ALAMEDA COUNTY] <sup>4</sup>	LANDSCAPE IRRIGATION	2020	CITY OF SAN LEANDRO WPCP	\$16	0	0	0.5	0.5	0.5	0.5	0.5	0.5
CONOCOPHILLIPS RECYCLED WATER PROJECT [CONTRA COSTA COUNTY]	INDUSTRIAL	2020	PINOLE/HERCULES/RODEO WWTPS (COMBINED DISCHARGE)	\$42	0	0	2.8	2.8	3.7	3.7	3.7	3.7
RELIEZ VALLEY RECYCLED WATER PROJECT [CONTRA COSTA COUNTY]	LANDSCAPE IRRIGATION	2020	CCCSO WWTP	\$3	0	0	0.2	0.2	0.2	0.2	0.2	0.2
SAN RAMON VALLEY RECYCLED WATER PROJECT PHASES 5–6 [CONTRA COSTA COUNTY]	LANDSCAPE IRRIGATION	2030	DSRSD WWTP	\$9	0	0	0	0	0.3	0.5	0.5	0.5
<b>TOTAL ADDITIONAL PLANNED</b>					<b>0</b>	<b>0.7</b>	<b>5.4</b>	<b>7.2</b>	<b>8.4</b>	<b>8.9</b>	<b>8.9</b>	<b>8.9</b>
<b>TOTAL OF ALL PROJECTS<sup>3,5</sup></b>					<b>9.3</b>	<b>10.7</b>	<b>16</b>	<b>18.2</b>	<b>19.4</b>	<b>19.9</b>	<b>19.9</b>	<b>19.9</b>

<sup>1</sup> The 2010 recycled water use amount shown in this table includes the projected initial phases of San Ramon Valley and East Bayshore recycled water projects once completed. RARE Phase started up in 2010.

<sup>2</sup> EBMUD will implement the most cost-effective of these recycled water projects in order to meet recycled water goals of 20 MGD by 2040.

<sup>3</sup> Recycled water use at the EBMUD Main WWTP is not factored into the EBMUD recycled water goal of 20 MGD, and is not included in the Total Existing Customer Recycled Water Use in the table. 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 offset potable water demand at the EBMUD MWWTP.

<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.

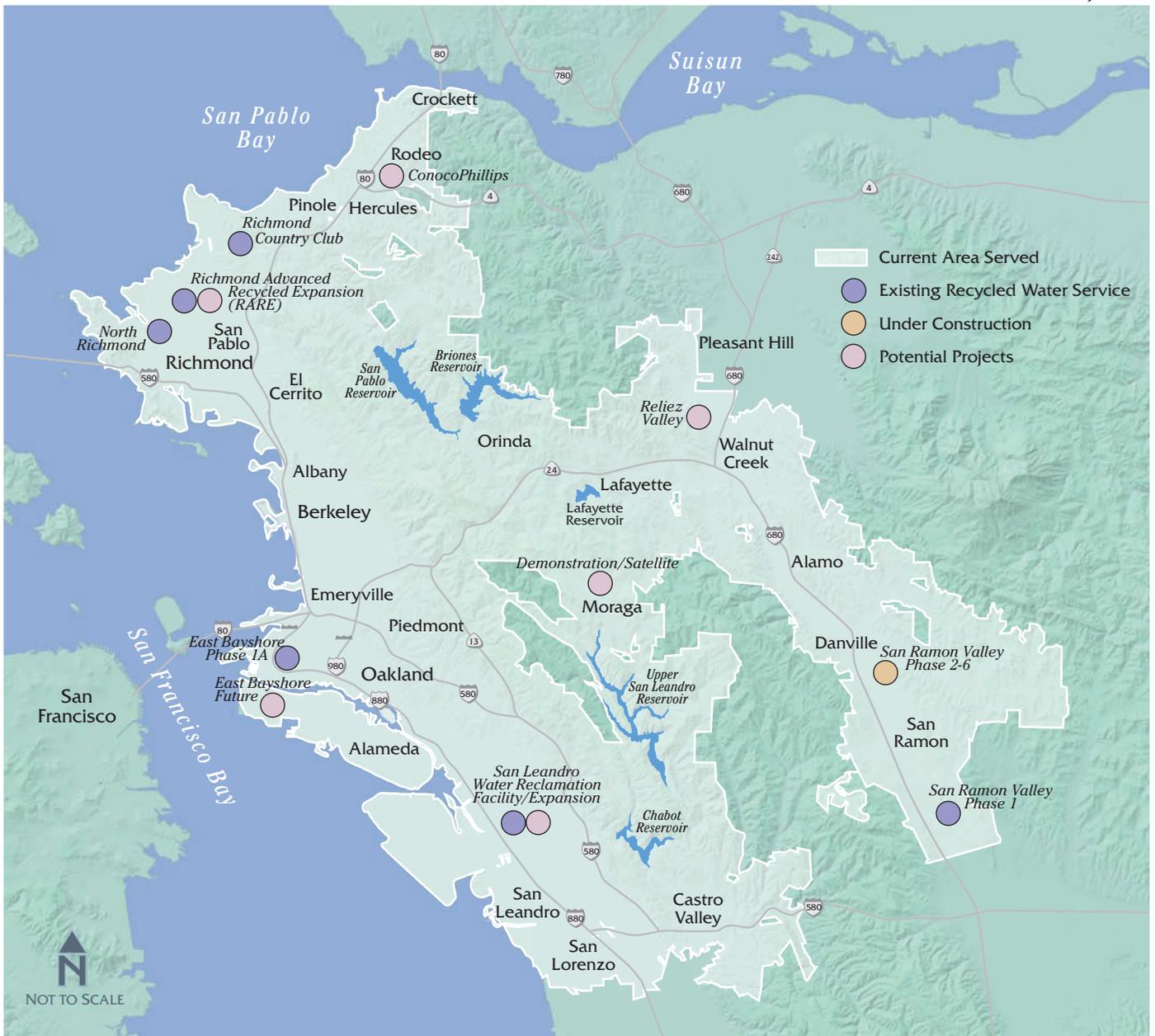
<sup>5</sup> Total values have been rounded.

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FIGURE 5-2

EBMUD RECYCLED AND NON-POTABLE WATER PROJECTS



The initial phase of RARE will produce up to 3.5 MGD of recycled water, thereby offsetting an equivalent amount of potable water. In the future, as additional source water becomes available, EBMUD and Chevron may expand the project to provide 4.0 MGD or even 5.0 MGD of recycled water.

EBMUD is responsible for operating and maintaining the treatment plant and influent pump station. Chevron is responsible for transmission mains through the refinery and for boiler feedwater operations.

### EAST BAYSHORE RECYCLED WATER PROJECT - PHASE 1A

The East Bayshore Recycled Water Project (EBRWP) is a multi-phased project that will provide up to 2.3 MGD of tertiary-treated 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 (I-80) and up to 24 miles of distribution pipelines, separate from the drinking water system, will distribute the recycled water to customers.

TABLE 5-6

RECYCLED WATER USE BY SPECIFIC TYPE

TYPE OF USE	TREATMENT LEVEL	RECYCLED WATER USE (MGD)						
		2010 <sup>1</sup>	2015	2020	2025	2030	2035	2040
AGRICULTURE	-	-	-	-	-	-	-	-
LANDSCAPE IRRIGATION	SECONDARY AND TERTIARY	1.8	2.7	5.2	6.4	6.7	7.2	7.2
WILDLIFE HABITAT	-	-	-	-	-	-	-	-
WETLANDS	-	-	-	-	-	-	-	-
INDUSTRIAL	TERTIARY	7.5	8	10.8	11.8	12.7	12.7	12.7
GROUNDWATER RECHARGE	-	-	-	-	-	-	-	-
COMMERCIAL	TERTIARY	0.01	0.01	0.01	0.01	0.01	0.01	0.01
<b>TOTAL<sup>2,3</sup></b>	-	<b>9.3</b>	<b>10.7</b>	<b>16</b>	<b>18.2</b>	<b>19.4</b>	<b>19.9</b>	<b>19.9</b>

<sup>1</sup> 2010 estimate provided as of August 2010.

<sup>2</sup> Recycled water use at the EBMUD Main WWTP is not factored into the EBMUD recycled water goal of 20 MGD by 2040. 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 offset potable water demand at the EBMUD Main WWTP.

<sup>3</sup> Total values have been rounded.

The recycled water will be used for landscape irrigation of parks, common planted areas within homeowner associations, greenbelts, roadway medians, and schools. 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.

Phase 1A is anticipated to provide approximately 0.5 MGD of recycled water to new and existing customers in portions of Albany, Berkeley, Emeryville, and Oakland. EBMUD began construction of Phase 1A distribution pipeline in the West Oakland area in 2003. Construction of the plant at the MWWTP was completed in 2008 and the first delivery of recycled water occurred on April 22, 2008 to customers in Oakland. The remainder of Phase 1A will be completed once funding is secured. EBMUD is in planning for Phase 1B, which will serve customers in Alameda.

New recycled water tertiary treatment facilities at the MWWTP in Oakland were completed in 2008 and include a pump station and 1.5 million gallons of storage. The plant filters and disinfects 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 State Water Resources Control Board (SWRCB), which approved a \$4.4 million grant and \$20.1 million in low interest loans to help fund design and construction costs of the first phase of the project.

### RECYCLED WATER TRUCK PROGRAM

In 2008, in response to the 2007-2010 period when EBMUD implemented a Drought Management Program, the District

began a recycled water truck program (RWTP) to make recycled water available to truck customers for approved uses. Through this program, EBMUD operates two recycled water filling stations, one at the MWWTP and one at the NRWRP. These filling stations provide recycled water to permitted customers for uses which include dust control, soil compaction, power washing, decorative fountains and ponds, landscape irrigation, street washing and sewer flushing. Although EBMUD has since declared the drought over, the RWTP continues to operate. Currently the RWTP offers recycled water free of charge.

### FUTURE RECYCLED WATER PROJECTS

Water recycling is a key element of EBMUD’s current and future water supply portfolio. EBMUD’s goal is to provide a total of 20 MGD of recycled water by 2040. Table 5-6 summarizes the quantity of recycled water use by specific type of use for 2010-2040. Projected quantities are based on average usage by existing projects and potential average delivery of planned recycled water projects. EBMUD’s plan 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, recycled water use is anticipated to steadily increase over the next thirty years. Recycled water will be used primarily for industrial and landscape irrigation applications, as shown in Table 5-6, and some commercial applications. EBMUD continues to seek opportunities to use recycled water for wetlands and wildlife enhancement. At this time EBMUD does not anticipate using recycled water to recharge the existing groundwater supply.

Eight major water recycling projects are currently planned to help EBMUD meet its goal of recycling 20 MGD by 2040. One project is currently in construction and seven are in

planning phases. 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 viability.

Recycled water project currently under construction is:

- San Ramon Valley Recycled Water Program (SRVRWP) - Phases 2-4.

The seven projects currently in planning phases are:

- RARE Water Project - Future Phases,
- Satellite Recycled Water Treatment Plant Project (Alameda and Contra Costa counties),
- East Bayshore Recycled Water Project (EBRWP) - Future Phases,
- San Leandro Water Reclamation Facility Expansion Project,
- San Ramon Valley Recycled Water Project - Phases 5 and 6,
- ConocoPhillips Recycled Water Project, and
- Reliez Valley Recycled Water Project.

The initial operational phases of the SRVRWP and EBRWP were completed in 2006 and 2008 respectively with additional phases anticipated in the future. The RARE Water Project became operational in 2010. The remaining projects are anticipated to be implemented by 2040. The locations of the eight planned projects are illustrated in Figure 5-2.

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 20 MGD goal.

### **PROJECT UNDER CONSTRUCTION**

EBMUD completed construction of the initial phase of the SRVRWP, which began deliveries in early 2006. Table 5-5 (see page 5-7) summarizes this project's features and the quantity of recycled water it supplied in 2010, and the quantity it is expected to supply through 2040.

### **San Ramon Valley Recycled Water Program – Phases 2-4**

The SRVRWP is a multi-phase, joint regional project between EBMUD and the Dublin San Ramon Services District (DSRSD). The two agencies formed a Joint Powers Authority in 1995 called the DSRSD-EBMUD Recycled Water Authority (DERWA) to implement the program which serves recycled water to their customers within portions of the Blackhawk, Danville, Dublin, and San Ramon areas. 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 located at the DSRSD Wastewater Treatment Plant that consists of either sand filtration or microfiltration followed by ultraviolet light and chemical disinfection. DSRSD customers will receive up to 3.3 MGD, and EBMUD customers will receive up to 2.4 MGD. EBMUD's initial Phase 1 now delivers approximately 0.7 MGD to existing landscape irrigation customers located in San Ramon. Future EBMUD customers include large irrigation users in parts of Blackhawk, Danville, Dublin, and San Ramon such as golf courses, parks, common planted areas within homeowner associations, roadway medians and greenbelts, schools, and office complexes.

DERWA and its member agencies developed agreements regarding specific responsibilities for recycled water supply and sales and for facilities operation. DERWA's role is to design, build, and operate the recycled water treatment facilities, as well as the main backbone transmission system which includes pipelines, pump stations and storage reservoirs. 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 their own recycled water distribution infrastructure within each respective service area and marketing recycled water to its respective customers.

In order to receive federal funding, DERWA partnered with the U.S. Army Corps of Engineers in 2002 to design the remaining backbone facilities. The federal Water Resource Development Act of 1999 authorized \$15 million for the SRVRWP. To date, Congress has appropriated funds totaling \$14.5 million for design and construction assistance through the U.S. Army Corps of Engineers. SRVRWP has received both federal and state funding. The SWRCB approved a \$5 million grant and a \$24.8 million low-interest loan for the first phase of the DERWA backbone facilities.

DERWA's Phase 2 construction is anticipated for completion in FY11. EBMUD's Phases 2, 3, and 4 design for the SRVRWP was completed in FY10. Construction of the pipelines for portions of Phases 2 and 3 and Phase 4 are anticipated to be completed in FY11/FY12. Completion of the remaining portions of pipeline in Phases 2 and 3 and the pump stations in Phases 3 and 4 will depend on additional outside funding assistance.

### **ADDITIONAL PLANNED PROJECTS**

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

- RARE Water Project Future Phases,
- Satellite Recycled Water Treatment Plant Project,
- East Bayshore Recycled Water Project (EBRWP) - Future Phases,
- San Leandro Reclamation Facility Expansion Project,
- San Ramon Valley Recycled Water Project - Phases 5 and 6,
- Conoco Philips Recycled Water Project, and
- Reliez Valley Recycled Water Project.

These planned projects are scheduled for implementation by 2040 to meet EBMUD's water recycling goal. They are expected to provide 8.9 MGD of savings by 2040, in addition to savings provided by existing projects (9.3 MGD) and projects under construction (1.7 MGD), for a total of 20 MGD by 2040. Most projects will provide recycled water use for landscape irrigation and industrial purposes. Table 5-5 (see pages 5-7) summarizes these projects' features and the quantity of recycled water use for each identified recycled water project from 2010 to 2040.

### **Richmond Advanced Recycled Expansion Water Project - Future Phases**

The initial RARE Water Project was completed in 2010, and provides 3.5 MGD recycled water for boiler feedwater applications at the Chevron Refinery in Richmond. This second phase of the RARE project would increase the capacity to 4.0 MGD by installing additional Microfiltration membranes modules. Like the initial RARE project, this expansion may utilize wastewater from the WCWD water pollution control plant. However, if WCWD supply were unavailable, the RARE expansion project may take water from the Chevron Refinery's wastewater effluent stream. Depending on supply, this project may be operational by 2015.

A third phase, potentially operational by 2025, depending on source water supply, would build out the RARE treatment plant to increase the project's ultimate capacity to 5.0 MGD.

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

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.

In 2009, EBMUD evaluated five satellite recycled water treatment plant projects, each yielding from 50-200 AFY. Each project would treat raw sewage on-site for local use, which in these cases would be for irrigating cemeteries, landscaping and golf courses. The five projects that were evaluated are:

- Rolling Hills Cemetery - 45 acres, 50-200 AFY
- Diablo Country Club - 200 AFY
- Mountain View and St. Mary's Cemeteries, Oakland - 40 acres, 100-200 AFY
- Rossmoor Golf Course, Rossmoor Valley - 100-150 AFY
- Moraga Country Club, Moraga - 100 - 200 AFY

After the project-level environmental documentation process is completed, design and construction of the first of these facilities is anticipated to be completed by 2015, pending funding assistance.

### **East Bayshore Recycled Water Project - Future Phases**

The EBRWP Phase 1B will expand recycled water deliveries by 1.2 MGD to customers in Alameda. Final design and construction of Phase 1B is pending outside funding assistance. A future Phase 2 expansion will connect additional customer and new developments in the Oakland area (0.6 MGD).

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

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 by an additional 0.5 MGD is anticipated to begin by 2020.

In addition to EBMUD's project, the City of San Leandro may also 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 20 MGD by 2040.

### ConocoPhillips Recycled Water Project

The ConocoPhillips Recycled Water Project (previously known as the Rodeo Recycled Water Project) could potentially supply up to about 3.7 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. EBMUD and ConocoPhillips have entered into a Memorandum of Understanding (MOU) to evaluate the feasibility of developing this project. High purity recycled water would replace potable water currently used in plant processes.

The first phase project, which could provide up to 2.8 MGD, is in planning phases, and could be operational by 2020. The second phase could provide an additional 0.9 MGD.

### San Ramon Valley Recycled Water Project - Phases 5 and 6

The SRVRWP is a joint regional program between EBMUD and Dublin San Ramon Services District (DSRSD). Phase 1 of this project was completed in 2006 and Phases 2 - 4 are scheduled to be implemented in 2010 to 2025. Phases 1 - 4 are planned to provide up to 2.4 MGD of recycled water for landscape irrigation for EBMUD customers by 2040. The source water comes from the DSRSD WWTP. The project serves tertiary treated recycled water to both EBMUD and DSRSD customers.

Phases 5 and 6, using the same water source and the same treatment facilities, are now in conceptual phases of development and will serve additional landscape irrigation uses in the San Ramon Valley area. Phase 5 would provide an average of 0.3 MGD by 2030 and Phase 6 would provide an average of 0.2 MGD of recycled water by 2035.

### Reliez Valley Recycled Water Project

For this potential project, EBMUD would partner with Central Contra Costa Sanitary District (Central San) to obtain recycled water from their existing system and distribute it to two cemeteries, a golf course and to the city of Pleasant Hill for landscape irrigation. This project could supply 0.2 MGD of recycled water, reducing the demand for potable water. It is now in the conceptual planning phase, and could be operational as early as 2020.

### RECYCLED WATER PROJECTS IMPLEMENTATION CHALLENGES

EBMUD's goal is to identify and implement the most cost-effective recycled water projects so as to provide a total of 20 MGD of recycled water by 2040. 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. One of the major challenges is the added cost associated with installing recycled water distribution systems that are separate from EBMUD's 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 for 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 retrofit the project. To minimize the costs of retrofits associated with separate plumbing systems, EBMUD reviews applications for new potable water services 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. CDPH 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 CDPH. When a distribution system serves a number of customers with varying uses, an appropriate level of treatment must be selected to meet the needs of all customers within the system. To reduce the cost of building new treatment facilities and the annual increased

chemical costs attributed to a higher level treatment, EBMUD considers the implementation of satellite treatment plants at specific customer locations. EBMUD constantly seeks to find creative solutions to the technical challenges inherent in recycled water projects in order to improve the economic viability of its projects.

### NON-POTABLE/RAW WATER PROJECTS

EBMUD has a number of existing projects that utilize raw or non-potable water, as 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. Existing raw/ non-potable water projects, listed in Table 5-7, reduce demands on EBMUD’s potable water supply by almost 2 MGD.

#### 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 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.

#### LAKE CHABOT GOLF COURSE

This project, completed in 1991, provided an average of 0.09 MGD of water in 2009 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 for potable water supply is reduced. 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 0.07 MGD of water from Lake Chabot in 2009 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 also taken from the Chabot Reservoir, reducing demand for 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 2009, the project used an average of 0.07 MGD of non-potable water.

#### LAKE CHABOT RAW WATER EXPANSION PROJECT

This project would be an expansion of the Lake Chabot Golf Course and Willow Park Golf Course projects, described above. It would expand the use of raw water from the Chabot Reservoir and provide this water for irrigation and other non-potable uses at a nearby country club, the Oakland Zoo and other nearby customers. It would provide up to 1.4 MGD during peak irrigation months, or an average of up to 0.4 MGD.

TABLE 5-7

EXISTING EBMUD NON-POTABLE/RAW WATER PROJECTS

USER	WATER SUPPLY SOURCE	NON-POTABLE/ RAW WATER USE	AVERAGE DAILY 2010 DEMAND (MGD)	YEAR INITIATED
WATER TREATMENT PLANTS	WASHWATER RECLAMATION IN EBMUD WATER TREATMENT PLANTS	RECYCLE FILTER BACKWASH	1.7 (ESTIMATED)	1970S
LAKE CHABOT GOLF COURSE	CHABOT RESERVOIR	GOLF COURSE IRRIGATION	0.10	1991
WILLOW PARK GOLF COURSE	CHABOT RESERVOIR	GOLF COURSE IRRIGATION	0.03	1991
SUNSET VIEW LANDSCAPE IRRIGATION	SAN PABLO FILTER PLANT	CEMETERY IRRIGATION	0.05	1998

## ENCOURAGING RECYCLED WATER USE

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In general, EBMUD prices recycled water to provide an economic incentive to customers. EBMUD also uses state and federal funding, when available, to make recycled water projects more cost effective.

### INCENTIVE PROGRAM

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

In addition, EBMUD has provided a number of incentives to encourage customers within EBMUD's service area to use recycled water. These have been primarily in the form of subsidized costs, reduced rates for recycled water and penalties for refusing recycled water when available.

### SUBSIDIZED COSTS

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To promote the use of recycled water, EBMUD funds cost-effective site retrofits that 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 free technical support to customers who receive recycled water.

### RATE DISCOUNTS

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The connection fees charged to new recycled water customers are lower than those charged to new potable water customers. 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. The current policy offers new recycled water customers a 20 percent 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

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Historically, EBMUD has provided low interest rate loans to customers who funded facility retrofits required to accommodate the use of recycled water and also has funded retrofit costs that were 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 have been applied toward the planning, design and construction phases of the projects, whereas the low interest

rate loans have been used to help reduce the overall cost of constructing the projects. Some of the sources of these monies have included the State Water Bond Bill (Proposition 13 passed in March 2000), the Federal Water Resources Development Act (WRDA), the SWRCB Revolving Fund program, and the Water Reuse Financing Authority for low interest loans, and the Department of Water Resources Integrated Regional Water Management Plan (IRWMP) implementation grants. In 1999, WRDA authorized up to \$15 million in grant funds for the San Ramon Valley Recycled Water Project. In 2007, WRDA authorized up to \$25 million for EBMUD's recycled water program.

Grant funds from the SWRCB have been used in the planning, design, and construction phases of the EBRWP and the SRVRWP. In addition, the construction of EBMUD's NRWTP was made possible through a low interest rate loan provided through the SWRCB's low interest rate loan program. Additionally, EBMUD's RARE facility received a \$2.1 million grant from the California Department of Water Resources, through the Integrated Regional Water Management Program, for the purchase of the microfiltration system. EBMUD will continue to seek outside funding sources for recycled water projects in order to help reduce the overall cost of recycled water to EBMUD customers.

### LONG-TERM CONTRACTS

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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 to ensure both the stability of the price of the recycled water and the reliability of the source of the recycled water. EBMUD's Policy 9.05 requires, wherever possible, that agreements with other agencies have a term of twenty years or more. Policy 9.05 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

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As a member of the Bay Area Water Agencies Coalition (BAWAC) and Bay Area Clean Water Agencies (BACWA) EBMUD participated in a regional effort to develop a Bay Area IRWMP. This IRWMP includes EBMUD's water recycling program and provides 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 was a cooperative effort among numerous Bay Area water and wastewater agencies and state and federal organizations. Its efforts were 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 partnering with other agencies, as well as one project where EBMUD will utilize its own recycled water supplies. Through its involvement with BARWRP, EBMUD was able to support the use of recycled water regionally.

In addition to participating in long-range planning efforts through BAWAC, BACWA, and BARWRP, EBMUD works with planning groups within other local planning agencies and utilities that are located in EBMUD's water service area to identify opportunities to implement recycled water projects.

## PUBLIC EDUCATION/INFORMATION

In order to encourage the increased 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 and at conferences, coordinating workshops, meetings with potential customers, and local planning agencies, and distribution of educational materials, EBMUD is increasing public awareness of the benefits of using recycled water. EBMUD also provides information on recycled water in general and on the EBMUD's recycled water program specifically both in print and electronically through EBMUD's website at <http://www.ebmud.com>.

EBMUD developed an award-winning Recycled Water Irrigation Customer Training Program in order to provide training to irrigation customers in the safe and effective use of recycled water. This program consists of a manual and two videos covering health and safety and landscape best management practices in using recycled water. EBMUD continues to provide appropriate training and support to its recycled water customers.

## PROHIBIT SPECIFIC FRESH WATER USES

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

## REQUIRE RECYCLED WATER USE

EBMUD's Policy 9.05 (consistent with California Water Code, Section 13550) requires 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 or wildlife. To date, however, EBMUD has been effective in providing incentives to use recycled water, rather than mandating its use.

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

EBMUD'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 and 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 160 MGD of wastewater is currently generated within EBMUD's service area, and that quantity is expected to increase to nearly 190 MGD by the year 2040. 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

*Water conservation is a major component of EBMUD's water supply portfolio designed to increase water supply reliability. EBMUD's long-standing water conservation program continually makes an aggressive push to educate its customers on water-efficiency and to increase their conservation efforts. EBMUD monitors water demand, new technology, and changes in consumer preferences, and works closely with other local, regional, state and national entities to enhance its water conservation services. California's 2009 legislation (SBx7-7) calling for a statewide 20 percent reduction in per capita water consumption by 2020 sets new water conservation standards that EBMUD is prepared to meet.*

### 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. This chapter specifically discusses EBMUD's water conservation efforts following the implementation of its first Water Conservation Master Plan (WCMP) adopted in 1994.

EBMUD's water conservation program addresses both supply-side (water supplier) and demand-side (customer) measures. Demand-side water conservation measures improve customer water use efficiency and include incentives for residential and non-residential customers, education and outreach activities, market support activities and regulatory programs. Supply-side water conservation measures, which improve water use efficiency before and after use by the customer, include distribution system leak detection and repair programs and water recycling programs (discussed in greater detail in Chapter 5).

In 2011, EBMUD is developing its WCMP to include existing and planned efforts in support of meeting long-term water conservation planning goals to the year 2040. The WCMP is designed to achieve cost-effective and sustained water savings going forward, while maintaining high-quality savings achieved from past EBMUD conservation efforts implemented since the 1970s. The established and future water conservation approach includes identified conservation measures, implementation strategies, and budgetary resources required to meet the need-for-water and drought management program goals to minimize customer rationing during a water shortage. Conservation measures include, for example, greater customer outreach, expanded water use surveys, increased technical and

financial incentives, device distribution, and new water efficiency regulations. The WCMP presents a phased implementation of conservation measures based on threshold water production and customer demand levels designed to achieve a cumulative 62 million gallons per day (MGD)<sup>1</sup> of water savings by 2040.

A list of about 100 conservation measures considered potentially appropriate for the EBMUD service area was developed from known technology and services that would save water. Fifty-three selected conservation measures were further analyzed and combined into multiple component programs of increasingly higher water savings and implementation costs. The conservation savings are based on 10 percent to 90 percent market saturation for existing accounts and new development ordinances (account participation). A summary of the long-term water conservation program measures is listed in Table 6-2.

During the recent multi-year (2007-10) rationing period, EBMUD imposed voluntary and mandatory rationing within its drought management program. During the mandatory rationing program, EBMUD set a 15 percent average water savings goal. EBMUD emphasized educating customers on water conservation activities that return quick savings, while reinforcing the long-term hardware, infrastructure and behavioral changes that residential and business customers can make to realize savings for years to come. The drought management program dramatically increased water conservation staffing, outreach activities, services, and incentives; and customers responded with water savings of 36 MGD<sup>2</sup> in fiscal year (FY)10. A Water Saving Team of technicians, who supplemented existing conservation efforts with a supportive field presence, investigated water waste and distributed informational materials. EBMUD also launched a comprehensive \$1.8

<sup>1</sup> The WCMP adopted in 1994 provided measures that resulted in 23 MGD savings as of 2008.

<sup>2</sup> The reduced demand is compared relatively to the average demand of FY05-07 and includes the effect of drought, local economic conditions, and mandatory conservation.

TABLE 6-1

WATER CONSERVATION PROGRAM HISTORICAL HIGHLIGHTS

PRE-1970	
	ALL EBMUD CUSTOMERS HAVE ALWAYS BEEN METERED.
1961	DISTRIBUTION SYSTEM LEAK DETECTION AND PIPE REPLACEMENT PROGRAM BEGINS.
1970S	
1974	SCHOOL EDUCATION PROGRAM BEGINS. OVER 1.5 MILLION STUDENTS HAVE RECEIVED MATERIAL AND TRAINING SINCE 1974.
1976	COMMUNITY SPEAKERS BUREAU IS FORMED.
1977	DROUGHT RESPONSE PROGRAM. EBMUD CUSTOMERS ACHIEVE 39 PERCENT ANNUAL REDUCTION IN USE.
1978	FILTER PLANT BACKWASH RECYCLING BEGINS.
1980S	
1982	FIRST FOUR IN A SERIES OF WATER-CONSERVING DEMONSTRATION GARDENS IS DEDICATED.
1983	EBMUD SPONSORS THE CALIFORNIA URBAN WATER MANAGEMENT PLANNING ACT (ASSEMBLY BILL 797).
1984	FIRST OF FIVE GOLF COURSES BEGINS USING RECYCLED WATER. WATER CONSERVATION ADMINISTRATOR IS HIRED TO IMPLEMENT BROAD-BASED CONSERVATION PROGRAM.
1985	UWMP IS ADOPTED AND IMPLEMENTATION IS INITIATED.
1986	EBMUD SPONSORS FIRST NORTHERN CALIFORNIA XERISCAPE CONFERENCE. EBMUD <i>Water Conserving Plants and Landscapes for the Bay Area</i> BOOK IS RELEASED.
1987	RESIDENTIAL AND LARGE LANDSCAPE SITE WATER USE SURVEYS ARE OFFERED. LANDSCAPE PLAN REVIEWS ARE OFFERED.
1988	PUBLIC LANDSCAPE ADVISORY COMMITTEE IS FORMED. FIRST WEATHER STATION IS INSTALLED WITH TELEPHONE HOTLINE FOR LANDSCAPE WATER REQUIREMENT INFORMATION. WATER SERVICE REGULATION SECTION 29 IS ADOPTED PROHIBITING WASTEFUL WATER USE PRACTICES. LANDSCAPE VIDEO IS DEVELOPED WITH SUNSET MAGAZINE AND 28 OTHER AGENCIES. COMMUNITY WATER CONSERVATION PORTABLE DISPLAY PROGRAM IS INITIATED (40 SITES).
1989	QUARTERLY LANDSCAPE ADVISORY NEWSLETTER IS INITIATED. METER DISCOUNT PROGRAM INITIATED FOR PUBLIC AGENCIES INSTALLING WATER-CONSERVING LANDSCAPES.
1990S	
1990	IRRIGATION REBATE PROGRAM IS OFFERED TO IRRIGATION CUSTOMERS. CONSERVATION "WELCOME" PACKET PROGRAM FOR NEW HOMEOWNERS OFFERED AT MODEL HOME SITES.
1991	STUDY IS CONDUCTED ON PERFORMANCE/SAVINGS OF 1.6 GALLON PER FLUSH TOILETS AND WATER-SAVING SHOWERHEADS. FOUR LANDSCAPE RECYCLED WATER PROJECTS INITIATED, SAVING 0.65 MGD.
1992	INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL WATER USE SURVEYS ARE OFFERED. PROJECT FIRESCAPE INITIATED WITH TWO DEMONSTRATION GARDENS AND BROCHURE PROMOTING FIRE SAFETY/ WATER CONSERVATION. URBAN WATER SHORTAGE CONTINGENCY PLAN ADOPTED.
1993	BOARD ADOPTS WATER SUPPLY MANAGEMENT PROGRAM 2020. BOARD DIRECTS STAFF TO DEVELOP WATER CONSERVATION AND WATER RECLAMATION MASTER PLANS. EBMUD SIGNS STATEWIDE CIWCC MOU REGARDING IMPLEMENTATION OF BEST MANAGEMENT PRACTICES.
1994	BOARD ADOPTS WATER CONSERVATION MASTER PLAN AND RECLAMATION IMPLEMENTATION PLAN. TOILET REBATE PROGRAM IS OFFERED. WATER CONSERVATION BASELINE STUDY CONDUCTED TO ESTABLISH MONITORING AND EVALUATION PROGRAM.
1995	EBMUD INDUSTRIAL WATER RECYCLING PROJECT COMPLETED, CAPACITY OF 5.4 MGD. RATE STUDY IS COMPLETED AND BOARD ADOPTS NEW RESIDENTIAL TIERED WATER-CONSERVING RATE STRUCTURE. COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL REBATE PROGRAM IS OFFERED. NON-RESIDENTIAL PLAN REVIEW PROGRAM IS INITIATED.
1996	CLOTHES WASHER REBATE PROGRAM OFFERED TO SINGLE-FAMILY CUSTOMERS.
1998	LANDSCAPE REBATE PROGRAM OFFERED TO SINGLE-FAMILY CUSTOMERS (FOR IRRIGATION AND GRAYWATER SYSTEMS, PLANT MATERIAL). GRAYWATER STUDY IS COMPLETED. MARKET PENETRATION STUDY OF TOILETS, SHOWERHEAD AND FAUCET AERATORS IS CONDUCTED.
1999	CLOTHES WASHER REBATES OFFERED TO ALL CUSTOMER GROUPS.

TABLE 6-1

WATER CONSERVATION PROGRAM HISTORICAL HIGHLIGHTS CONTINUED

2000S	
2000	EBMUD NAMED TO CALIFORNIA URBAN WATER CONSERVATION COUNCIL (CUWCC) STEERING COMMITTEE. EBMUD NAMED TO CALFED WATER USE EFFICIENCY SUBCOMMITTEE.
2001	EBMUD SPONSORS SUCCESSFUL PASSAGE OF SENATE BILL 221, LINKING WATER SUPPLY AND LAND USE PLANNING.
2002	EBMUD RE-ELECTED TO CUWCC STEERING COMMITTEE.
2003	LAUNCHED WATERSTART™ CONSERVATION CERTIFICATION AND PRODUCT LABELING PROGRAM. EBMUD RESIDENTIAL END-USE STUDY COMPLETED. INITIATED STRATEGIC MARKETING PLAN FOR WATER CONSERVATION AND RECYCLING. DEMAND MANAGEMENT ADVISORY COMMITTEE REPORT COMPLETED.
2004	NEW EDITION OF EBMUD PLANT BOOK <i>Plants and Landscapes for Summer Dry Climates</i> IS PUBLISHED. EBMUD NATIONAL MULTI-FAMILY RESIDENTIAL SUB-METER STUDY COMPLETED.
2005	AWARDED \$1 MILLION IN GRANTS FOR VARIOUS WATER CONSERVATION STUDIES/ PROJECTS.
2006	LAUNCHED WEATHER-BASED IRRIGATION CONTROLLER REBATE PROGRAM. EBMUD RE-ELECTED TO CUWCC STEERING COMMITTEE.
2007	AWARDED \$1.9 MILLION IN GRANTS FOR VARIOUS WATER CONSERVATION STUDIES/ PROJECTS. ESTABLISHED WATER SERVICE REGULATIONS/ EFFICIENCY REQUIREMENTS FOR ALL NEW WATER SERVICE ACCOUNTS.
2008	EBMUD PUBLISHES WATER SMART GUIDEBOOK FOR BUSINESSES. WATER SAVINGS TEAM PATROLS CONDUCT DROUGHT RESPONSE. EBMUD RE-ELECTED TO CUWCC STEERING COMMITTEE. PIPELINE AND AQUEDUCT LEAK DETECTION STUDIES LAUNCHED.
2009	EBMUD ADOPTS INDIVIDUAL METERING REQUIREMENTS FOR NEW MULTI-FAMILY RESIDENTIAL AND COMMERCIAL USES. EBMUD WATER SMART BUSINESS CERTIFICATION PROGRAM LAUNCHED.
2010	EBMUD RE-ELECTED TO CUWCC AND AWE BOARDS OF DIRECTORS. DEVELOPMENT OF THE WATER CONSERVATION MASTER PLAN INITIATED.

million marketing campaign using television, radio, and print media to inform customers of the severe water shortage, rationing goals, and ways to conserve.

As a result of its customers' efforts and ample spring rainfall in 2009, EBMUD ended mandatory rationing in June 2009 and maintained 10 percent voluntary rationing to further protect future supplies and to support Governor Arnold Schwarzenegger's request for water savings from all Californians. The voluntary restrictions were lifted in May 2010 due to the positive water supply outlook and customers' continuing conservation efforts. See Chapter 3 for further details on EBMUD's Drought Management Program.

### WATER CONSERVATION MASTER PLAN

The WCMP details water conservation programs and methodologies and goals that are established in water supply planning and mandated by regulation or statute. The primary purpose of the WCMP is to define the implementation strategies, objectives, and tactics required to achieve long-term water conservation savings. The 2011 WCMP will highlight a ten-year implementation plan designed to achieve savings that meet EBMUD's adopted

per capita demand reduction targets identified in the UWMP 2010 required under SBx7-7 legislation (2009) and under the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU) for Statewide Urban Water Conservation in the year 2020 and beyond.

Existing and expanded EBMUD water conservation programs include water use surveys, water-saving device distribution, financial incentives, targeted education and outreach, market support, new technology research, and regulatory activities. To be eligible for water service, new EBMUD customers must meet rigorous indoor and outdoor water-efficiency standards for plumbing fixtures, appliances, landscaping, and for commercial processes that use water. Additional savings are expected to result from "natural replacement." Natural replacement occurs through EBMUD-supported market advancement in technology, standards and codes, and water use practices, such as the installation of increasingly efficient hardware (toilets, showerheads, and faucets) and landscape conversions.

TABLE 6-2

WATER CONSERVATION PROGRAM MEASURES

RESIDENTIAL MEASURES	COMMERCIAL, INSTITUTIONAL OR INDUSTRIAL MEASURES
ARTIFICIAL TURF SF RESIDENTIAL	CII REBATES TO REPLACE INEFFICIENT EQUIPMENT
CISTERNS	CII SURVEYS
CONDO SURVEYS	CII SURVEYS WITH AMS
CONDO WATER SURVEYS WITH AUTOMATED METER SYSTEMS (AMS)	DENTAL VACUUM PUMP
GARBAGE DISPOSAL SF	HIGH-EFFICIENCY URINAL REBATE (<0.25 GALLON)
GRAYWATER NEW SF	IRRIGATION WATER SURVEYS
GRAYWATER RETROFIT SF	REQUIRE 0.5 GAL/FLUSH URINALS IN NEW BUILDINGS
HIGH-EFFICIENCY TOILET (HET) REBATES (EXPANDED)	REQUIRE PLAN REVIEW FOR NEW CII
HIGH-EFFICIENCY TOILET (HET) REBATES	WATER BROOMS
MULTI-FAMILY SUBMETER INCENTIVE	
MULTI-FAMILY TOILET ORDINANCE	<b>IRRIGATION MEASURES</b>
MULTI-FAMILY SURVEYS	ARTIFICIAL TURF SPORTS FIELDS
MULTI-FAMILY SURVEYS WITH AMS	IRRIGATION WATER BUDGETS
MULTI-FAMILY WASHER REBATE	REQUIRE LANDSCAPE AND IRRIGATION REQUIREMENTS
MULTI-FAMILY WASHER REBATE (EXPANDED)	UPDATED IRRIGATION WATER BUDGETS W/ AMS ON EXISTING ACCOUNTS
PUBLIC INFORMATION PROGRAM	
REQUIRE EFFICIENT DISHWASHERS	<b>MEASURES FOR ALL CUSTOMERS</b>
REQUIRE HIGH-EFFICIENCY CLOTHES WASHERS	FINANCIAL INCENTIVES FOR IRRIGATION UPGRADES
REQUIRE HIGH-EFFICIENCY FAUCETS AND SHOWERHEADS	FINANCIAL INCENTIVES FOR IRRIGATION UPGRADES (EXPANDED)
REQUIRE HIGH-EFFICIENCY TOILETS (HET)	INSTALL AMS
REQUIRE HOT WATER ON DEMAND	REAL WATER LOSS REDUCTION – I
REQUIRE MULTI FAMILY SUBMETERING ON NEW ACCOUNTS	REAL WATER LOSS REDUCTION – II
REQUIRE PLUMBING FOR FUTURE GRAY WATER USE	REAL WATER LOSS REDUCTION – III
REQUIRE SMART IRRIGATION CONTROLLERS AND RAIN SENSORS	
SINGLE-FAMILY TOILET ORDINANCE	<b>RESIDENTIAL AND IRRIGATION MEASURES</b>
SINGLE-FAMILY WATER SURVEYS I	SMART IRRIGATION CONTROLLER REBATES
SINGLE-FAMILY WATER SURVEYS I WITH AMS	
SINGLE-FAMILY WATER SURVEYS II	
SINGLE-FAMILY WATER SURVEYS II WITH AMS	
SINGLE-FAMILY WATER SURVEYS III	
SINGLE-FAMILY WATER SURVEYS III WITH AMS	
WASHER REBATES	
WASHER REBATES FOR HIGH-EFFICIENCY MACHINES	

## ESTIMATED WATER SAVINGS AND PROGRAM BUDGET

Water savings from conservation programs, especially those that rely on customer behavioral changes, diminish or “depreciate” at varying levels over time. Despite EBMUD’s efforts to encourage water-saving behavior, customer behaviors are expected to change over time, and savings from hardware replacements can degrade with product wear. EBMUD reports on total conservation savings efforts that incorporate depreciation to reflect a more conservative estimate of achieved annual savings toward meeting the long-term conservation goal of 62 MGD through 2040. Water savings estimates are summarized by program participation according to individual customer accounts, rather than by customer

class levels, to improve estimate accuracy. Methods of water savings estimates are based on previous EBMUD research, pilot studies, and water consumption monitoring. Savings calculations include measuring site-specific savings from implemented conservation measures, using standard industry values from scientifically established savings rates for each fixture or appliance, and applying a percentage reduction in actual (average) pre-intervention consumption.

Since adoption of the WCMP in 1994, EBMUD has achieved an estimated additional conservation savings of 26 MGD through 2010 year-end (see Figure 6-1). Since the 1970s EBMUD has invested more than \$65 million for implementation of customer-targeted water conservation programs. EBMUD’s WCMP five-year budgetary plan

through FY15 includes an additional \$18.3 million for water conservation program funding, as shown in Figure 6-2. By 2015, EBMUD will have invested more than \$60 per capita on customer-targeted conservation programs since 1970. Water Conservation Program expenditures do not include additional expenditures for EBMUD funded conservation-related activities, such as distribution system leak detection, meter testing and replacement, or other field service customer assistance and education efforts.

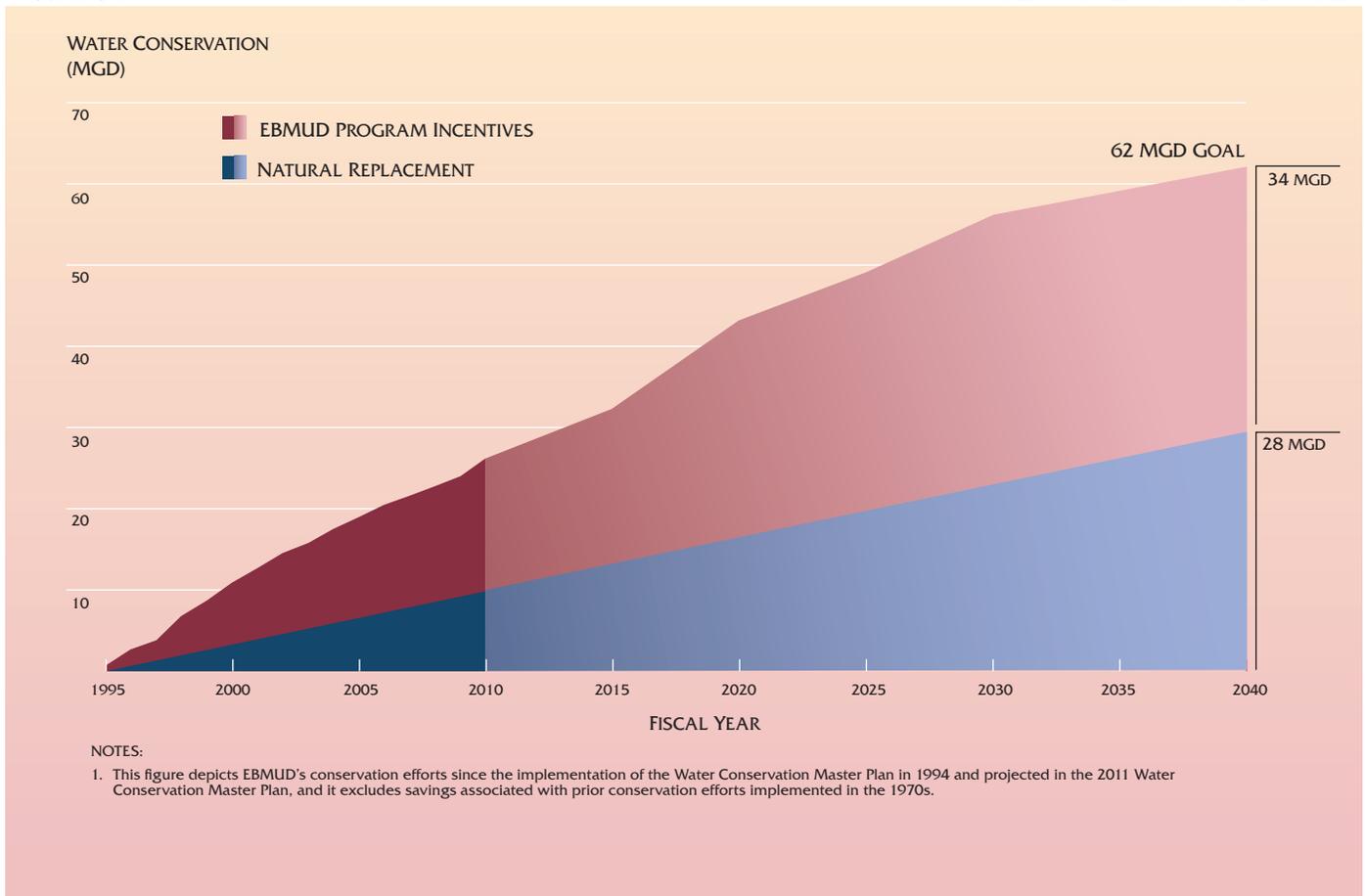
EBMUD water rates and charges support the cost of implementing the conservation program and continued investments in achieving water use efficiencies as outlined in the WCMP. The water rates and rate structure are established biennially by the EBMUD Board of Directors. Any increases in the cost of the conservation program would be reflected in proposed water rate changes, subjected to a procedure of public notice and hearing to allow for input from the public and rate payers.

Key EBMUD water conservation program accomplishments in FY09 and FY10 are listed in Table 6-3 and include:

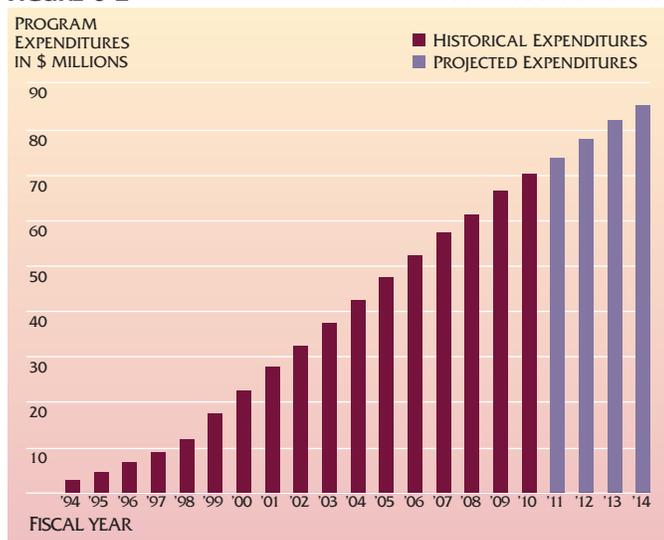
- nearly 36,000 rebates totaling more than \$4.5 million were distributed to EBMUD customers;
- nearly 125,000 free water-saving devices (e.g. showerheads, faucet aerators) were distributed;
- more than 16,000 water use site surveys and self-survey kits were completed;
- more than 2,000 water waste reports were handled during the drought;
- more than 66,000 restaurant tent cards, hotel and health club stickers were distributed to some 800 restaurants and 30 health clubs to announce the drought and ask customers to use water efficiently and sparingly; and
- EBMUD sold more than 3,500 copies of its award-winning book *Plants and Landscapes for Summer Dry Climates*.

FIGURE 6-1

## WATER CONSERVATION AND GOALS



**FIGURE 6-2** CUMULATIVE CONSERVATION PROGRAM BUDGET



### SBx7-7 WATER USE BASELINE AND TARGETS

Senate Bill No. 7 (SBx7-7) established the Water Conservation Act of 2009 program that is often referred to as “20x2020.” The legislation calls for a 20 percent reduction in per capita water use statewide by the year 2020. All urban water agencies are required to report their baseline per capita water use and reduction targets in their 2010 UWMP.

Since the 1970s, demand management has been an important part of EBMUD’s water practices and policies to promote reasonable and efficient use of supplies. Figure 6-3 of the Draft UWMP shows that EBMUD has made significant strides in decreasing historical daily per capital water demand as a result of EBMUD’s aggressive water conservation and recycling efforts and other factors. Gross overall water demand has remained relatively consistent as the number of accounts has grown steadily. This continuous effort has resulted in more than a 25% reduction in daily per capita water use and goes beyond the short-term focus on consumption reduction as required through SBx7-7.

To allow agencies including EBMUD to capture previously realized conservation and recycled water savings, SBx7-7 was designed with flexibility to allow suppliers to select one of four methods for establishing its SBx7-7 targets. EBMUD researched each of the four target methodologies and selected a target method that would allow EBMUD to:

- be credited for its aggressive water conservation and recycling programs;
- implement demand management program budgets that are appropriately tailored to customer usage;
- anticipate the post-drought and economic rebound; and
- account for anticipated demand hardening in consumption behavior.

The three alternative target methodologies, which EBMUD did not use, are not suitable to the EBMUD service area as the per capita use targets could perpetuate the economic downturn and subject customers to further hardship.

In conformance with the reporting requirements of SBx7-7, Table 6-4 summarizes EBMUD’s analyses of its baseline daily per capita water use and water use targets for 2015 and 2020. Because EBMUD’s recycled water supply makes up less than ten percent of its measured retail water demand for 2008, EBMUD meets the criteria for applying the ten year baseline period to developing the target levels of per capita water use. The selected ten-year period is calendar years 1995-2004. Figure 6-3 illustrates the historical daily per capita water demand and the 2020 target demand for EBMUD’s selected target method. Detailed calculations supporting the analyses of the baseline and target water use to meet the requirements of SBx7-7 are presented in Appendix H. The target water use will be finalized in the next UWMP submittal in 2015, and compliance reporting will be presented in future Urban Water Management Plans beginning in 2015.

To comply with SBx7-7, EBMUD will achieve its target water use by implementing recommendations for conservation programs as outlined in the WCMP and for recycled water programs as discussed in Chapter 5 of this UWMP 2010. The conservation and recycled water programs are based on long-term water supply planning levels.

EBMUD’s 2020 water use target of 175 gallons per capita per day (GPCD) is calculated using Target Method No. 2. As a result of the 2020 target being greater than the minimum 5% reduction from EBMUD’s 2003-07 five-year baseline, EBMUD will pursue a lower target of 150 GPCD. EBMUD’s 2015 interim target is 158 GPCD. Implementing its planning level programs, EBMUD projects a lower demand level of 151 GPCD for year 2015. In addition, EBMUD’s UWMP 2010 planning level programs project an even more aggressive and lower 2020 demand level of 144 GPD.

TABLE 6-3 KEY FISCAL YEAR 2009 AND 2010 WATER CONSERVATION PROGRAM ACCOMPLISHMENTS

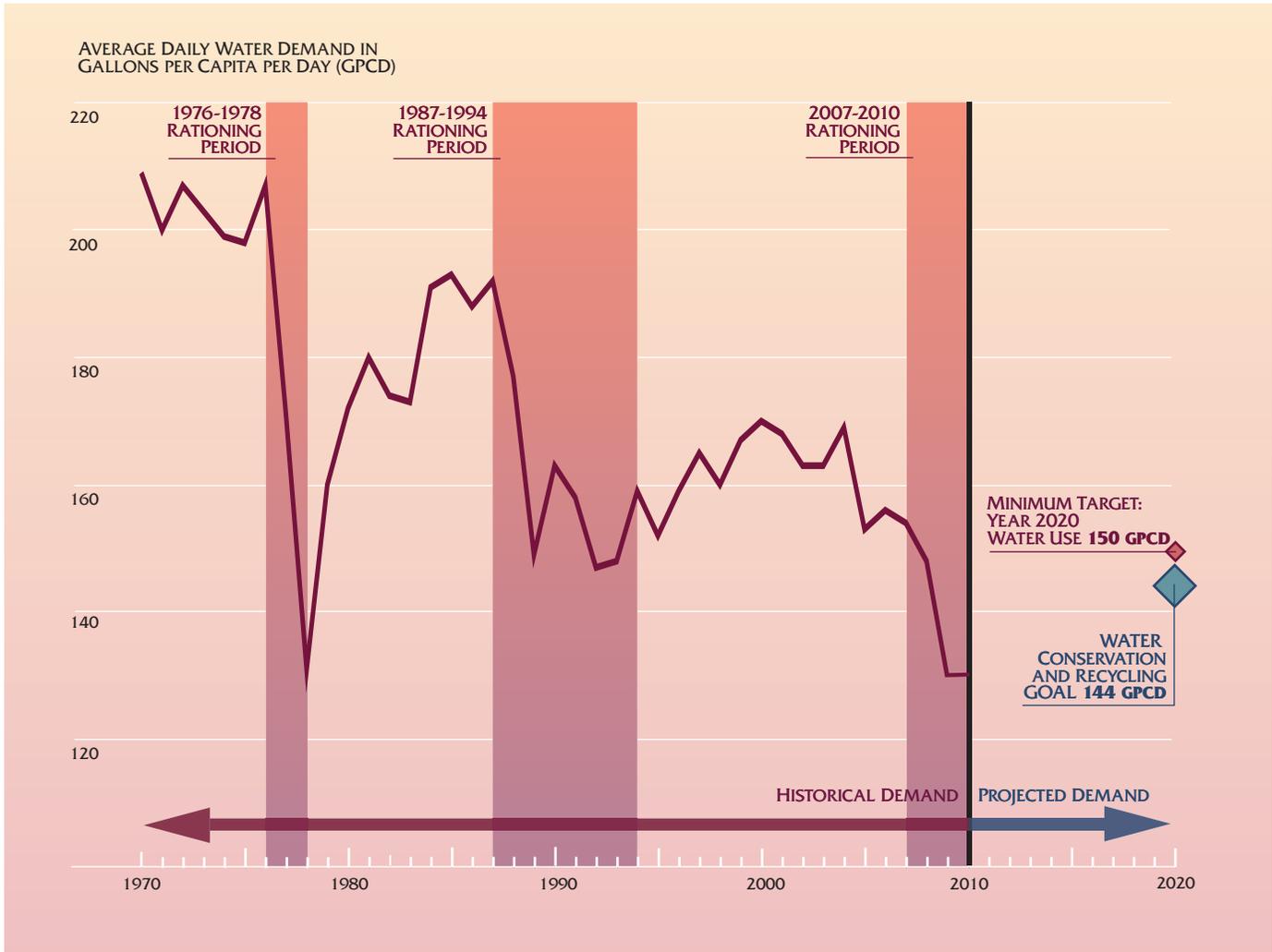
PROGRAM DESCRIPTION	ACTIVITY OR ACCOUNTS	INCENTIVES (\$)	WATER SAVINGS (GPD)
<b>RESIDENTIAL SERVICES</b>			
SINGLE-FAMILY SURVEYS	812	NA	56,000
MULTI-FAMILY SURVEYS	931	NA	165,400
CYES STUDENT SURVEYS	1,283	NA	83,500
HOME WATER USE DO-IT-YOURSELF SURVEY KITS	16,152	NA	174,100
LEAK DETECTION ADVICE	11	NA	1,000
<b>RESIDENTIAL INCENTIVES</b>			
HIGH-EFFICIENCY CLOTHES WASHER REBATES	21,179	\$2,310,510	400,300
HIGH-EFFICIENCY TOILET REBATES	13,000	\$1,650,710	290,400
RESIDENTIAL LANDSCAPE REBATES	175	\$129,509	8,900
FREE DEVICE DISTRIBUTION	124,412	\$190,000	78,400
<b>SUBTOTAL RESIDENTIAL PROGRAM SAVINGS/INCENTIVES</b>	<b>177,955</b>	<b>\$4,280,729</b>	<b>1,258,000</b>
<b>NON-RESIDENTIAL SERVICES</b>			
COMMERCIAL SURVEYS	372	NA	32,700
INDUSTRIAL SURVEYS	20	NA	2,200
INSTITUTIONAL SURVEYS	79	NA	10,700
LEAK DETECTION ADVICE	7	NA	39,500
<b>NON-RESIDENTIAL INCENTIVES</b>			
COMMERCIAL CLOTHES WASHER REBATES	96	\$18,300	10,000
CUSTOM NON-RESIDENTIAL REBATES	208	\$9,198	1,600
COMMERCIAL DISHWASHING SPRAY VALVES	27	\$810	3,000
TOILET/URINAL REBATES	639	\$68,551	16,100
<b>SUBTOTAL NON-RESIDENTIAL PROGRAM SAVINGS/INCENTIVES</b>	<b>1,448</b>	<b>\$96,859</b>	<b>115,800</b>
<b>IRRIGATION SERVICES/INCENTIVES</b>			
IRRIGATION SURVEYS	416	NA	233,000
IRRIGATION REDUCTION INFORMATION SYSTEM	486	NA	90,300
LANDSCAPE IRRIGATION UPGRADE REBATES	92	\$97,446	75,200
IRRIGATION CONTROLLERS (RESIDENTIAL & COMMERCIAL)	158	\$38,997	38,400
<b>SUBTOTAL IRRIGATION SAVINGS/INCENTIVES</b>	<b>1,152</b>	<b>\$136,443</b>	<b>436,900</b>
<b>TOTAL EBMUD PROGRAM INCENTIVES/SAVINGS FY09 &amp; 10</b>	<b>180,555</b>	<b>\$4,514,031</b>	<b>1,810,700</b>
Water savings rounded to 100 gpd			

TABLE 6-4 SBX7-7 BASELINE WATER USE AND WATER USE TARGETS

	DAILY PER CAPITA WATER USE (GPCD)
10-YR AVERAGE BASELINE (CALENDAR YEARS 1995–2004)	165
SELECTED TARGET METHOD #2 (55 GPCD RESIDENTIAL INDOOR; 70-80% ET <sub>o</sub> OUTDOOR LANDSCAPE USE; 10% CII REDUCTION)	175
5-YR AVERAGE BASELINE (CALENDAR YEARS 2003–2007)	158
MINIMUM WATER USE REDUCTION REQUIREMENT (5% REDUCTION)	150
YEAR 2015, INTERIM TARGET	158
YEAR 2020, USING MINIMUM WATER USE REDUCTION REQUIREMENT	150

FIGURE 6-3

SBX7-7 2020 WATER USE TARGET



## DEMAND-SIDE CONSERVATION

### RESIDENTIAL WATER CONSERVATION PROGRAMS

EBMUD’s array of demand-side water conservation programs and services covers all customer categories. Residential water conservation programs are designed to offer customers water conservation incentives and to educate them about water supply, water use habits, and water-saving technologies and behaviors. Programs and services include free water surveys and water-savings devices, incentives for installing water-saving plumbing fixtures, appliances, and irrigation equipment, lawn conversion, water-efficiency plan review requirements for new water services, and education and outreach programs. EBMUD continually monitors these programs to ensure that conservation objectives are being met. The

importance of water conservation is emphasized to customers not only during droughts, but also every year, whether or not a drought is occurring, as water conservation stretches limited resources and plays a crucial part in EBMUD’s water supply portfolio.

### Water Conservation Survey Programs

#### Single-Family Water Surveys

Water surveys for single-family residential customers include measuring and assessing indoor and outdoor end uses of water and offering customized recommendations on how to save water in and around the home. Targeting high water use customers is key to maximizing water savings from delivery of this service. WCMP conservation program implementation identifies a target of 2,500 surveys annually. To achieve this target, staff will expand existing delivery mechanisms and develop outreach

initiatives to enlist customer participation. Existing delivery mechanisms include self-survey kits, telephone surveys, and in-person surveys.

### Home Water Use Do-It-Yourself Survey Kits

In advance of a scheduled in-person survey, EBMUD provides customers with free self-survey kits to help guide them through a step-by-step self-assessment of their water use. Customers who return completed self-surveys identifying high-water using devices, such as showerheads or faucet aerators, may request free first-time water-efficient replacements from EBMUD.

Self-surveys are currently made available to customers in print and online via the EBMUD WaterSmart Center as downloadable files. The customer is directed to check for indoor and outdoor leaks, take inventory of water-using hardware and equipment, and measure flow rates. While potentially more cost-effective than in-person surveys, this survey delivery mechanism limits the customization of water saving recommendations and results in only minimal data collection for the small percentage of customers that complete and return survey forms.

Self-guided surveys will be expanded through development of an interactive web-based user interface comprised of simple step-by-step instructions for completing a home water uses assessment. Development of an online interactive self-survey via the EBMUD WaterSmart Center will help customers assess their water usage, compare personal usage to benchmarks, and view available technical information, water conservation tips, rebates, and incentives based on their individual responses. The online service will also include an irrigation scheduling calculator that incorporates imagery of individual parcels and a measurement tool to allow customers to measure irrigated areas and establish landscape water budgets.

An automated online service will give customers access to water services during all days and times rather than just during EBMUD business hours and automate program data collection and entry. Envisioned future development of online applications for mobile devices would allow customers to move throughout their home/ site while conducting self-surveys. Development of a self-guided user interface and functionality requires a robust database and the integration of existing EBMUD information systems. Therefore, it is a substantial software application development project dependent upon the availability of EBMUD information system development resources. In the near term, the existing manual self-survey process will be

updated and marketed and will serve as a basis for developing online content and automation.

### Telephone Surveys

EBMUD customers can currently obtain telephone consultation and advice regarding their water consumption and conservation tips. Most of these interactions are initiated by customers as high bill complaints and are handled by a Customer Service Representative in EBMUD's Contact Center. Customers needing additional consultation are referred to Water Conservation staff for more detailed consultation where staff assists the customer in reviewing and assessing their water consumption and end uses of water. Planned enhanced services include separate tracking of customer contacts generated in the Contact Center and revising the process for conducting telephone surveys to improve data collection, documentation of outcomes, and EBMUD-initiated follow-up within EBMUD's Customer database.

### In-Person Surveys

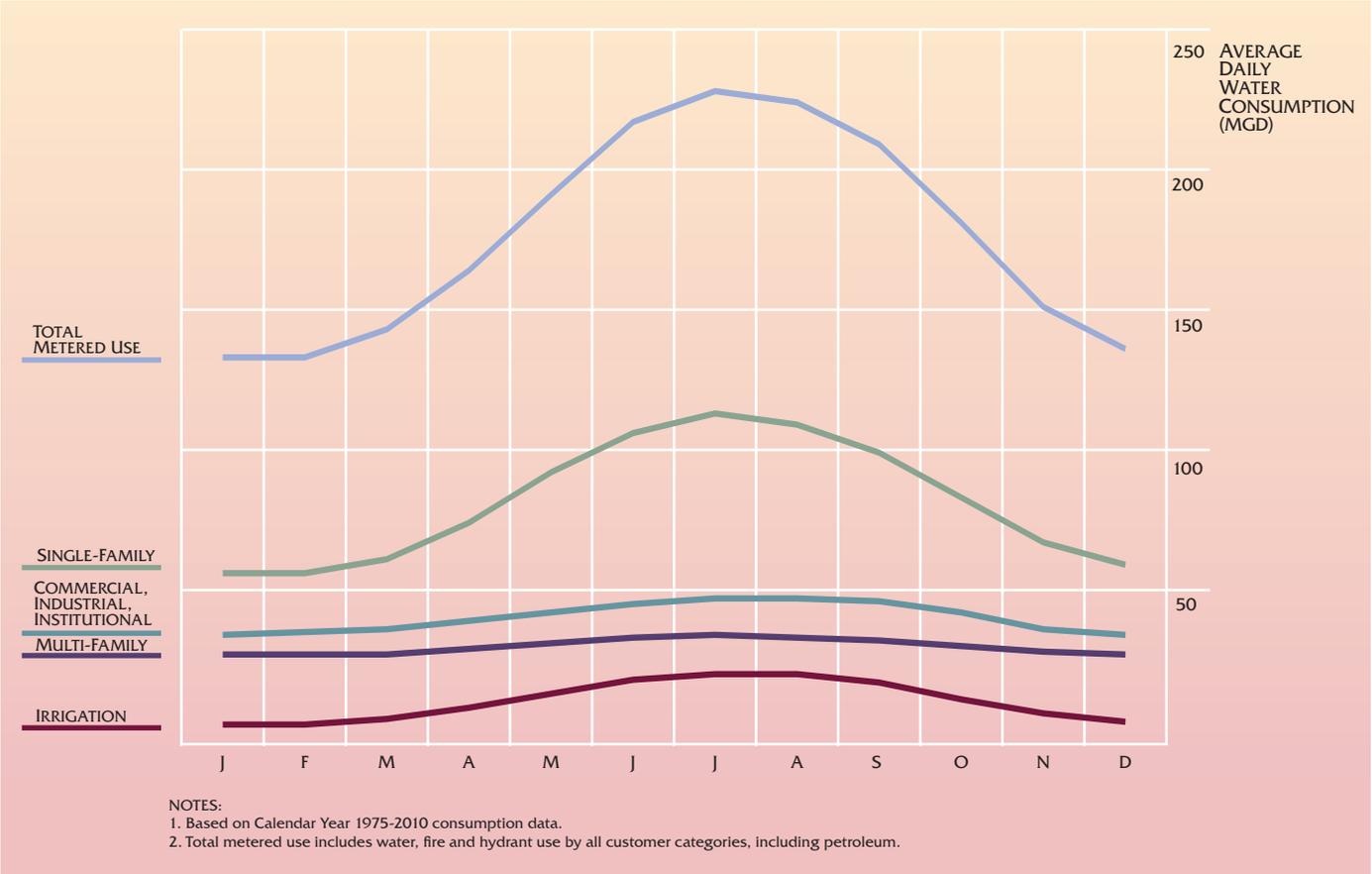
Currently, EBMUD customers can schedule free in-person water surveys with EBMUD staff. A site visit, which typically lasts up to one hour, includes a meeting with a resident/ homeowner to review water consumption history, a test for leaks, an assessment of indoor water using fixture flow rates, and outdoor landscape irrigation. Recommendations for water-efficiency improvements and informational brochures are provided as needed. While all EBMUD customers are eligible for in-person surveys, a number of customers are initially directed to self or telephone surveys. As online and telephone survey delivery mechanism are further developed, higher-cost in-person services will be de-emphasized in favor of more cost-effective and interactive delivery mechanisms.

### Landscape Consultations

Landscape consultations are in-person surveys with additional emphasis on efficient landscape irrigation scheduling, irrigation hardware efficiency, automatic irrigation controller programming, and sustainable landscape design and maintenance. Landscape consultations are scheduled at sites with high dry-season water and automatic irrigation systems. While available to all customers, the majority of sites that benefit from this service are in communities with low-density housing on large lots with installed landscapes. Development of interactive online tools to assess outdoor use will automate and improve the ability to assess landscape water use efficiency by customers but will not completely replaced the need for in-person services. This service will be

FIGURE 6-4

MONTHLY WATER USE BY CUSTOMER CATEGORY



increasingly targeted to high-water use sites with pre-identified irrigation usage. Figure 6-4, which illustrates monthly water use by customer category, emphasizes residential consumption as the single largest component of total consumption and highlights the difference in residential use in winter months versus summer months.

### Multi-Family Water Surveys

Multi-family water surveys target existing multi-family residential customers at sites with five or more units. WCMP water conservation planning targets 200 accounts and approximately 3,400 dwelling units annually. Surveys are provided in-person through scheduled appointments with property managers and apartment building owners. The survey includes the same elements as single-family audits. At each site, representative samples of dwelling units are inspected and assessed for indoor water use efficiency. Outdoor water use served by mixed-use (indoor and outdoor) water meters is also assessed. Sites with high-water use and multiple sites under the same ownership or manager are targeted for this service. On-site

surveys are required for high volume water-saving device distribution, and free devices are delivered as part of this service.

### Rebate and Incentive Programs

Incentives and rebates for indoor water-efficient appliances, plumbing fixtures, and outdoor irrigation systems (irrigation controllers and drought-tolerant landscaping), and distribution of devices (clothes washers, high-efficiency toilets, free water-efficient showerheads, faucet aerators, and quick-closing toilet flappers) are offered to residential customers. These rebates to residential customers totaled nearly \$4.3 million in FY09 and FY10.

### Residential Landscape Consultations and Rebate Program

Implemented in February 1998, the Residential Landscape Program promotes outdoor water use efficiency in the single-family residential sector. EBMUD offers residential customers free on-site landscape consultations to help

with new plantings and improvements to their landscape irrigation efficiency. The consultations emphasize proper irrigation scheduling, low water use plant selection, and other sustainable landscape practices such as mulching and proper maintenance. In FY09 and FY10, EBMUD continued to offer rebates to qualifying residential customers for converting lawns to sustainable landscaping and coordinated an online mulch coupon offer with local retailers. There is a strong educational component to the program; pre- and post-conversion site visits include in-person education regarding water conservation, water-efficient landscape design, irrigation scheduling, and maintenance practices.

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

EBMUD's Residential 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 its participation in a regional initiative with Pacific Gas and Electric and with Bay Area water agencies to offer combined water and energy efficiency rebates for high-efficiency clothes washers and increase program visibility regionally among customers and appliance retailers.

EBMUD is among the first water agencies to enhance its clothes washer rebate with tiered rebates based on the water-efficiency level of eligible clothes washer models. Tiered rebates influence consumers to purchase appliance models that meet or exceed higher efficiency standards. FY09 and FY10 were the two single highest years of EBMUD customer participation with more than 21,000 clothes washers rebated that totaled more than \$2.3 million in incentives distributed and saved an estimated 146 million gallons of water annually. EBMUD has rebated more than 77,000 clothes washer purchases since the program began in 1996. EBMUD also offers rebates for the installation of family-sized clothes washers in multi-family housing.

### **High-Efficiency Toilet Rebate Program**

Since 1995, EBMUD has offered its residential customers rebates and free installations of new toilets to support replacement of higher water-volume models. The current program rebates the purchase of high-efficiency toilet (HET) models that use 20 percent less water than the standard 1.6 gallons per flush ultra low-flow toilets. As a United States Environmental Protection Agency (USEPA) WaterSense Partner, EBMUD promotes WaterSense labeled products through home improvement retailers,

manufacturers, and distributors throughout its service area. EBMUD and other water agencies working directly with manufacturers, distributors, and retailers encourage expanded production and distribution of water-efficient toilets. In FY09 and FY10, HET retrofits were popular with customers, with households receiving 13,000 rebates totaling more than \$1.6 million. Those toilets save an estimated 290,000 gallons of water or more every day or nearly 106 million gallons annually.

### **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 customer water use surveys, through direct mail, and over the counter at EBMUD offices. 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. Nearly 80,000 water-efficient devices and products were distributed to EBMUD customers during the FY09-FY10 period.

## **NON-RESIDENTIAL WATER CONSERVATION PROGRAMS**

EBMUD tailors an array of demand-side water conservation programs to commercial, industrial, institutional and landscape irrigation customers to assist with improving their indoor and outdoor water use efficiency. Non-residential water conservation programs include free water surveys, water-saving device distributions, technical consultations, plan reviews, and life-cycle cost and savings estimates. Financial incentives support the installation of water-efficient appliances, plumbing fixtures, and process equipment. In FY09 and FY10 nearly 1,400 non-residential customer surveys and over 1,200 conservation rebates saved more than 550,000 gallons per day (GPD) or more than 200 million gallons annually.

East Bay businesses helped with water savings during the recent drought through their own indoor and outdoor water savings initiatives, as well as working with EBMUD to install water-efficient appliances, plumbing fixtures, process equipment, and irrigation systems. Business customer water use was down an average of five million gallons per day compared to the pre-drought three-year average from 2005 to 2007.

## 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. CII water surveys consist of free on-site visits conducted by EBMUD staff. Staff works with consultants and landscape and facility managers to identify opportunities to increase water use efficiency and achieve associated benefits in reduced energy use, wastewater discharge, chemicals, and downsized treatment facilities. Irrigation water surveys include a review of current and past water use efficiencies, on-site inspection of irrigation equipment, tests for system leaks and sprinkler uniformity, training of landscape personnel in principles of efficient irrigation systems, assistance with irrigation scheduling, and recommendations for improving irrigation system efficiency. If the surveyor determines that existing devices are not efficient, first-time free water-efficient devices are provided, which include quick-closing toilet flapper valves, water-conserving showerheads, low-flow faucet aerators, and commercial dishwashing spray valves.

Businesses with relatively simple end uses of water have successfully used 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 identify the most cost-effective measures, including opportunities 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 landscape personnel on principles of efficient irrigation, and recommendations for increasing water use efficiency. Irrigation water surveys are targeted at nearly 5,000 EBMUD irrigation accounts where landscape irrigation comprises most or all of the use at the site.

Homeowners associations (HOA) 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 billing inquiries.

### Rebate and Incentive Programs

EBMUD offers non-residential customers financial

incentives in the form of customized rebates, free water-efficient device distributions, and fixed rebates for water-efficient products, including plumbing fixtures, commercial appliances, process and cooling equipment, and irrigation system upgrades.

### Toilet/Urinal Replacement Program

EBMUD administers both a fixed and customized rebate program for the purchase of qualifying high-efficiency toilet (HET) and high-efficiency urinal (HEU) models. EBMUD continued a long-term assessment of HEU products through installation within its own facilities.

### Commercial Clothes Washer Rebates

EBMUD offers rebates for the installation of commercial-grade units in common area laundries, businesses or institutions with on-premise laundry facilities, and coin laundry stores.

### Commercial Landscape Irrigation Upgrade Program

This program seeks to minimize customer water consumption and utility costs, and to introduce customers to new efficient irrigation technology to help large-landscape irrigators improve the efficiency of their existing irrigation systems.

### Irrigation Reduction Information System

EBMUD's Irrigation Reduction Information System (IRIS) continues to be a leader in landscape water budget programs across the state. The Geographic Information System (GIS) based program is designed to inform EBMUD irrigation customers on how much water should have been used during a billing period. Water use estimates are based on actual irrigated landscape areas and real time weather data from local weather stations. The IRIS program prints the water budget on every water bill that the customer receives after joining the program. The information helps customers improve management of their irrigation systems by reducing water use and increasing cost savings. In FY10, over 20,000 landscape water budgets were printed on water bills for more than 3,300 irrigation customers.

### Device Distribution Program

Since the early 1980s, EBMUD has been distributing 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.

## Water-Efficient Fixtures and Appliance Incentives

EBMUD provides rebates to business customers for purchasing water-efficient plumbing fixtures such as high-efficiency gravity and pressurized toilets, low or zero-water using urinals, commercial-grade clothes washers, and pre-rinse dishwashing spray valves.

## Custom Financial Incentives

EBMUD offers custom financial and technical assistance to businesses that undertake specialized water-efficiency projects. Rebates offset a portion of the initial costs of installing water-saving equipment and systems, and they shorten the payback period for the customer's investment in equipment upgrades. Rebate values are based on estimated water savings and may be up to 50 percent of the costs of implementing hardware or process changes that demonstrate improved water use efficiency. Incentives covered multiple technologies and practices, such as boiler-less food steamers, air-cooled ice machines, and recirculating cooling systems, dishwashing, water treatment, wash down equipment, and others.

On a case-by-case basis, EBMUD also partners with business and industrial customers on joint research to develop new technologies and water management practices that demonstrate and promote cost-effective water savings. Each custom project is required to enter into a performance contract with EBMUD and achieve a project-defined water budget to be eligible for EBMUD financial assistance.

## EDUCATION AND OUTREACH ACTIVITIES

Education and outreach activities support all other conservation programs and increase both customer awareness and acceptance of EBMUD conservation efforts. EBMUD has a long history of providing customers with educational services including publications, newsletters, school curricula, public workshops and events, and demonstration projects. To make its water conservation programs and services more visible, EBMUD works cooperatively with other agencies and organizations by participating in trade shows and community events. Outreach activities include general and targeted marketing, community presentations and workshops, and participation in regional and statewide conservation organizations.

## Education

Publications are a valuable educational tool for promoting conservation practices. In 2004 EBMUD published its award-winning *Plants and Landscapes for Summer-Dry Climates of the San Francisco Bay Region*. The book is a modern, updated reference on low water use and drought adapted plants for Mediterranean climates and further establishes EBMUD as a leader in outdoor conservation education. The book describes over 630 plants adapted to summer-dry climates and features over 540 stunning color photographs of plants and landscapes. Charts provide quick reference, and lists identify 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 beyond EBMUD's communities.

Recognizing its many educational benefits, EBMUD expanded its school outreach programs to help increase water-efficiency at schools to save water and money; provided school community outreach and support; and educated students on responsible water use and environmental protection. 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 and watershed service learning with EBMUD Rangers/ Naturalists. In 2000, EBMUD also initiated a School Garden Grant Program in partnership with the nonprofit Watershed Project 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 both EBMUD and other agencies, educators and their students learn how to reduce water and pesticide use in the garden.

## 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 efficient water use. The "specific" approach includes

interactions with individual customers or groups of customers and marketing of EBMUD conservation programs, technologies, and services tailored to them.

Examples of marketing tools that EBMUD has used include:

- web-based resources;
- bill inserts;
- newspaper and magazine ads;
- billboards;
- AC Transit posters;
- BART billboards;
- promotional items at community events;
- theater ads;
- cable television;
- EBMUD WaterSmart™ Business Certification Program; and
- support of WaterSense product labeling initiatives.

EBMUD initiated a strong public information campaign to spread the word about ways with which the customers could save water in their homes and businesses. In FY09, EBMUD expanded its website and online *Drought Help Center*, a one-stop education resource. Online videos highlighted what customers were doing in their own homes and yards to save water, and weekly conservation tips showcased simple changes that could add up to significant savings. Customers could view the historical water use and projected allocations, as well as place web orders for free water-saving devices such as showerheads, faucet aerators, hose shut-off nozzles, and conservation publications.

In 2003, EBMUD initiated its long-term strategic Marketing Plan to enhance the branding and marketing of EBMUD's water conservation and recycling programs. The WaterSmart program is designed to brand water conservation services that inform customers and retailers of the best available technology and management practices to help EBMUD achieve its conservation goals. In FY09, EBMUD formally launched its WaterSmart Business Certification Program following development and focus group testing. Mirrored closely to other green business certification programs, EBMUD's program is designed to heighten awareness of water (and energy) conservation benefits by recognizing businesses that implement water-efficiency measures and reach or exceed defined efficiency benchmarks. EBMUD staff work one-on-one

with businesses, green business certification programs, and the local energy provider to promote changes that not only help customers save money by lowering water use, but also save energy and chemical costs. The WaterSmart Certification Program was developed specifically to:

- improve branding of water-efficient EBMUD services;
- promote water-efficient products and technologies through product labeling, analogous to the USEPA's WaterSense and ENERGY STAR programs; and
- register and recognize those businesses and customers that meet or surpass EBMUD demand management goals and objectives.

In FY09, EBMUD partnered with the CUWCC to conduct WaterSmart Guidebook training workshops in northern and southern California. In FY10, EBMUD continued to market its WaterSmart Business Development Guidebook to promote the latest water-efficient technologies, products, and best practices to city planners, water professionals, and commercial, industrial, and institutional customers.

## SUPPORT ACTIVITIES

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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 regularly partners with a number of California, U.S., and international water agencies, energy utilities, green business organizations, and other research entities to study water use and pilot new water-efficiency programs and technologies. 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. For example, EBMUD is a member of the Bay Area Water Agencies Coalition (BAWAC) established by several Bay Area water agencies to act in a unified manner on water planning activities. EBMUD also remains an active Board member of the CUWCC, California Urban Water Agencies (CUWA), and the national Alliance for Water Efficiency.

## Partnerships

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EBMUD recognizes that partnerships broaden the visibility of conservation programs, create cost-sharing opportunities and potential economies of scale, and can

TABLE 6-5

## WATER CONSERVATION PARTNERSHIPS

**LANDSCAPE ADVISORY COMMITTEE**

Formed in 1988, the Landscape Advisory Committee (LAC) brings together green-industry professionals representing the landscape designers, contractors, nurseries, sod producers, educators and product manufacturers and distributors. Committee members assist staff in identifying best principles and practices for smart landscaping. The LAC has been meeting annually to provide comments on District conservation programs, new technologies, industry trends, and presentations.

**THE GREEN BUSINESS PROGRAM**

EBMUD contributes funding to both the Alameda County and the Contra Costa County Green Business Programs, and conducts water conservation surveys at local businesses interested in becoming a certified Green Business. The Program began targeting automobile repair shops, printing facilities, and office buildings, and now has expanded to nearly all small and medium sized businesses. Through this partnership, EBMUD helped certify over 400 businesses since the inception of the Green Business Program.

**STOPWASTE**

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 environmental assessments, and helps to provide customers with one-stop shopping for waste management and resource conservation services. Bay-Friendly Landscape is a program of StopWaste that promotes resource conservation, waste reduction, and pollution prevention in the design and maintenance of urban landscaping. EBMUD promotes and leverages Bay-Friendly Landscape informational resources in customer outreach, lends expertise to workshops and educational presentations, and is pursuing co-branding and joint outreach initiatives to the nursery industry.

**BAY-FRIENDLY LANDSCAPE COALITION**

The Bay-Friendly Landscape Coalition is an initiative to promote Bay-Friendly Landscape Principles regionally. EBMUD is a signatory to the Bay-Friendly Landscape Principles and a founding sponsor of a developing non-profit organization. EBMUD sponsored and participated in two regional conferences in 2008 and 2010.

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

The Center is a primary resource for food service operators, designers, consultants, vendors and manufacturers. It promotes efficient design and operation of food service facilities. EBMUD partnered with the FSTC to offer workshops for food service providers and to develop performance specifications for water and energy-efficient spray valves used in dishwashing operations. EBMUD has partnered with FSTC and other water purveyors to monitor and measure the water and energy savings potential of the new “connectionless” commercial food steamers and commercial ice machines. EBMUD continues to partner with FSTC on dual audits of large kitchen facilities.

**CALIFORNIA YOUTH ENERGY SERVICES (CYES)**

EBMUD partners with local schools and community groups to support youth training projects that educate students about water resources and water conservation. EBMUD contributes financially and through in-kind services to California Youth Energy Services, a local non-profit, to provide students involved in job training projects with water conservation information, educational activities, and support for residential and business water conservation retrofit projects. These partnerships build communities of youth with passion for resource conservation and community service and the know-how to accomplish real water and energy savings. Since the beginning of this partnership, over 5,000 student surveys have been performed.

**WATER AGENCIES**

Joint grant applications, primarily with water utility partners, improve the likelihood that proposals for conservation funding will be awarded. EBMUD customers who participate in the grant funded programs directly benefit from the supplemental funding for rebates, installations, and on-going water savings. EBMUD was among the water agency’s Prop. 50 grant recipients in support of the regional clothes washer water and energy initiative implemented with Pacific Gas and Electric Company (PG&E). EBMUD continued to host and participate in meetings of the Bay Area Water Conservation Coordinators, an informal group of regional water utility water conservation practitioners who meet to share information about research and implementation, and to discuss emerging technologies and issues impacting water use efficiency.

TABLE 6-5

WATER CONSERVATION PARTNERSHIPS CONTINUED

### BAY AREA WATER AGENCIES COALITION (BAWAC)

BAWAC represents a coalition of Bay Area water agencies collaborating on comprehensive water management strategies and innovative approaches for securing a reliable, high quality Bay Area water supply. Shared efforts include, but are not limited to, water quality and treatment, demand management (conservation and recycling), and watershed protection. In FY10, EBMUD was among several water agencies that initiated preparation of a Prop. 84 Integrated Regional Water Management Plan grant proposal with water conservation, recycling, and green infrastructure components.

### THE CALIFORNIA URBAN WATER AGENCIES (CUWA)

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

### CALIFORNIA URBAN WATER CONSERVATION COUNCIL (CUWCC)

The Memorandum of Understanding (MOU) Regarding Urban Water Conservation in California created and implemented a broadly supported agreement specifying urban water conservation Best Management Practices (BMPs). CUWCC, a non-profit organization consisting of urban water suppliers, environmental organizations, and other interested parties, is charged with overseeing the best practices implementation process. EBMUD staff actively participated in the 2007-09 BMPs revision process, and served on the organization's governing Board and subcommittees. EBMUD funded work performed by the CUWCC to develop and improve plumbing standards that impact water use efficiency. EBMUD sponsors CUWCC through membership dues and staff participation, and its Water Conservation Program complies with MOU requirements. In FY09 and FY10, EBMUD staff supported CUWCC's role in the statewide SBx7-7 implementation.

### DELTA PLAN DEVELOPMENT

In November 2009, the comprehensive "Delta Legislative Bill Package" was enacted, effectively replacing the CALFED Bay-Delta Program and imposing a new urban conservation goal of 20 percent per capita reduction in water use by 2020 in SBx7-7. EBMUD staff is directly engaged with DWR and other stakeholders in developing the regulatory framework for this law. With the implementation of the stringent conservation and recycling goals for long-term planning, EBMUD anticipates full compliance with SBx7-7.

### 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. From FY05 through FY08, EBMUD co-sponsored teacher workshops within the East Bay and funded teacher-action grants for school projects that emphasize water conservation. The Kids in Gardens program promotes watershed stewardship by encouraging educators to create and use healthy, low-maintenance gardens to teach pesticides-free gardening methods and the importance of water conservation and urban runoff pollution prevention.

### THE WATER CONSERVATION SHOWCASE

Each March since 2004, EBMUD along with PG&E's Pacific Energy Center and the U.S. Green Building Council, Northern California Chapter, have joined together to present the Water Conservation Showcase. The Water Conservation Showcase has included over 90 presentations by water experts from the Bay Area and nationwide. Presentations over the Showcase's seven year history have addressed almost every water conservation topic, from innovative water treatment techniques to infrastructure development. Additional topics have included California's water history, water reuse solutions, water quality, and water rights.

expand customer benefits by addressing multiple conservation areas such as water, energy, wastewater, and solid waste. In FY10, EBMUD continued its co-sponsorship with Pacific Gas and Electric, and the U.S. Green Building Council of the 2010 Water Conservation Showcase at the Pacific Energy Center in San Francisco. Each year the event draws a larger audience, and more vendor exhibitors showcase water-efficient technologies and services. Other FY10 EBMUD partnerships are listed in Table 6-5.

### **Demand Management Advisory Committee**

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In mid-2001, EBMUD's Board of Directors established a "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, the business community, taxpayer groups, and nonprofit organizations. The DMAC reviewed EBMUD's water conservation programs and generally concurred with its objectives and approach. Many of the DMAC recommendations are reflected in current and planned future incentives. More recently during the water supply planning process, a Community Liaison Community (a community stakeholder group) also reviewed and advised the Board on programs of interest, including conservation that were incorporated into EBMUD's water supply plan.

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

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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 a National Multi-Family Residential Sub-Meter Study. The study was conceived, organized and administered by EBMUD, and was developed in cooperation with the USEPA, nine 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 metering and/or submetering within the multi-family sector.

### **Residential End-Use Studies**

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EBMUD has completed a number of residential end-use studies to quantify end uses of water by sector, water-using technology, and climate and consumer demographics.

These studies help quantify current demand and future potential conservation savings from applied technology retrofits and behavioral change. In 2003 EBMUD monitored water use at 33 single-family homes to assess end uses of water, and measured the impacts of conservation retrofits. The study found that while indoor per capita single-family use varied, the average use could be reduced approximately 20-25 percent to approximately 55 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 is participating in a statewide study to evaluate the current water use patterns and the current state of water-efficiency in single-family homes. This study will be used to make generalized projections of the remaining potential for water conservation and to better facilitate water supply planning efforts. 120 participating EBMUD customers were selected at random to represent water usage patterns typically found in the service area. During March and April of 2007, these homes were equipped with datalogger devices which were used to help determine the end uses within each home and how much water was used in each application. Participants were also asked to complete surveys describing the types of appliances they have within their homes. The California Department of Water Resources (DWR) co-sponsored this program along with ten participating water agencies. In FY10, EBMUD participated in draft research report review and field data verification.

### **Advanced Metering Studies**

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EBMUD is conducting several small advanced metering infrastructure (AMI) pilot studies in its service area to test new metering technologies that can collect, record, and remotely transmit monthly, daily, and hourly water consumption data to improve customer water-efficiency practices. The pilot studies are co-funded by grants from DWR and the United States Bureau of Reclamation (USBR).

### **Other Studies**

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EBMUD conducted numerous market saturation studies (1995, 1998, and 2001) to collect data on water conservation attitudes and behaviors, determine the types and market saturation of water-conserving hardware, assess water conservation potential for identified market sectors, and compare current and previous study findings.

EBMUD partnered with other water utilities, such as the USEPA and the California Urban Water Conservation Council. They completed the study conducted by the

TABLE 6-6

## WATER CONSERVATION RESEARCH ACTIVITIES

**METER TECHNOLOGY STUDY**

EBMUD continues its metering technologies research 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.

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

EBMUD supports research conducted by the CUWCC through its membership, and it participated in the CUWCC Research and Evaluation (R&E) Committee. The R&E Committee oversees assessments of technology as Potential Best Management Practices (PBMPs). PBMPs are studied to identify possible implementation of economically reasonable Best Management Practices.

**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 Prop. 13 grant for a Weather-Based Irrigation Controller Program to install state-of-the-art controllers within six counties in Northern California. Through this grant, EBMUD’s portion of the program was \$625,000 for 800 controllers. Program implementation began in January 2007. Outdoor water savings to date for customers who participated in the pilot program total nearly 175 million gallons.

**MULTI-FAMILY SUBMETERING**

In April 2006, the EBMUD Board of Directors authorized acceptance of a Prop. 50 matching grant in the amount of \$150,000 from DWR to investigate the business case for individually metering multi-family dwelling units. The grant contains three phases, each receiving matching funds of \$50,000. The first phase, a study of the costs, benefits, and administrative issues of metering new multi-family dwelling units, was completed in September 2006. As a result of the first phase, the EBMUD Board adopted a new regulation effective January 1, 2009, requiring individual metering for multi-family and multi-occupancy structures three stories and under. In September 2008, Phase Two of the metering study was initiated and included a voluntary pilot incentive program for customers to sub-meter existing multi-family residential properties. The final phase, slated for implementation in 2011-12, involves studying the accuracy, and applicability of point-of-use metering technology.

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

EBMUD was awarded a Prop. 50 grant from the DWR 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 was published in 2008 and presents the technology associated with water-efficient hardware and processes applicable to the CII sector. In addition, EBMUD together with the CUWCC has held training classes in both Northern and Southern California on the guidebook. A final report on the plan review water savings is expected in 2012.

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

EBMUD has partnered with the AWWARF in the following cooperative studies: (1) “Water Efficiency 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 Prop. 50 grant to determine single-family indoor and outdoor end uses of water and water use efficiency at 1,200 homes in California. Indoor and outdoor water use 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.

**PIPELINE LEAK DETECTION PROJECT**

With partial funding from a USBR grant, EBMUD is investigating the cost-effectiveness of permanent installation of water leak detection logger equipment versus the lift and shift method. EBMUD has installed approximately 850 acoustic leak detection loggers covering approximately 250 miles of pipe within the city of Berkeley and has continually collected leak detection data for 18 months. EBMUD investigated and repaired over 100 leaks identified. An additional 150 loggers are used in a lift and shift manner. Other goals of the study are to accelerate leak identification and repair, learn the nature and cause of leaks, measure how long leaks take to surface, and learn how much water can be saved by aggressive leak detection methods.

TABLE 6-6

## WATER CONSERVATION RESEARCH ACTIVITIES CONTINUED

**AQUEDUCT LEAK DETECTION PROJECT**

With partial funding from a USBR grant, EBMUD is demonstrating the use of specialized water leak detection equipment on large pipelines and aqueducts where traditional equipment does not work. EBMUD tested three different acoustic technologies on the same and similar pipelines and compared the benefits and weaknesses of each method. One technology deemed to be more cost-effective was selected for a second phase inspection on a larger number of pipelines. During the study, approximately 86 miles were surveyed, and numerous leaks were identified. The technology was also used as a method to help inform pipeline condition assessment and prioritize pipe replacements and repair strategies.

**FIXED NETWORK LEAK DETECTION PROJECT**

With partial funding from a USBR grant, EBMUD is demonstrating the use of leak detection technology utilizing remote sensors that can detect leaks in pipelines and can then report the information to EBMUD without requiring a field visit. This project is expected to monitor approximately 20 miles of pipeline in the same area as an Advanced Metering Infrastructure Pilot and may use the same telemetry equipment.

**WATERSMART ADVANCED METERING INFRASTRUCTURE (AMI) PILOT**

With partial funding from the USBR and DWR grants, EBMUD is investigating the conservation potential of using AMI technology in conjunction with a web interface. The WaterSmart Toolbox web interface allows customer to monitor their yearly, monthly, daily, and even hourly water usage on a user-friendly web interface. The toolbox also provides corresponding weather information, can send users emails when they have leaks or exceed user-defined water budgets, and also offers friendly tips on ways to save water. Aside from saving water directly, the goal of the study is to better define the conservation of this technology for future use and to optimize savings and customer services.

**COMBINED AMI AND ET CONTROLLER PROJECT**

With partial funding from the USBR, EBMUD is investigating the use of Evaporation (ET) Controller technology with customers that have the WaterSmart Toolbox and AMI technology. These users will be better able to ascertain the performance of their ET technology and hopefully improve the savings potential of both technologies.

**SYSTEM OPERATIONS REVIEW AND AMI IMPLEMENTATION PLAN**

With partial funding from the USBR, EBMUD is conducting a review of its system performance and water losses, identifying ways to optimize this performance, and reducing overall leakage. The potential benefits of using an AMI system to optimize the system will be studied. The project will then identify the best way to implement this AMI technology to maximize system performance as well as meter reading processes.

American Water Works Association Research Foundation on the efficacy of water budget-based rate structures as a tool to provide a meaningful price signal to increase water use efficiency and manage drought response.

Table 6-6 lists research projects that EBMUD is currently pursuing. A comprehensive list of EBMUD Research Projects is included in Appendix I-2.

**REGULATORY PROGRAMS**

EBMUD's Water Service Regulations include a number of water-efficiency requirements to enhance supply reliability. A number of these regulations govern all water use.

**Water-Efficiency Requirements**

In 2007, EBMUD adopted a new water service regulation, Section 31 (Appendix F), that identifies water-efficiency requirements for water service and a procedure for notifying applicants that water-efficiency measures are

required. Water service shall not be furnished to any applicant for new or expanded service unless all the applicable water-efficiency measures described in this regulation are installed at the applicant's expense. Applicants for expanded service may be required to retrofit existing water service facilities or uses to comply with these requirements. Applicants are required to maintain design documents and construction and installation records and furnish a copy of said documents and records to EBMUD upon request. EBMUD may inspect the installation of water-efficiency measures to verify that the items are installed and performing to the required water use levels.

EBMUD has also adopted a new water service regulation on applying for service, Section 2 (Appendix F), affecting multi-family and multi-space commercial/ industrial developments of three stories or less in height. Effective January 1, 2009, the new regulation requires a developer to

plumb every unit or space so that it can be individually metered by EBMUD at an approved metering site. EBMUD will require individual metering of each separate unit in a structure of three stories or less in height, whenever it is feasible in the opinion of EBMUD to do so. Individual metering of each unit or space would be required regardless of their number in the structure or how the hot water is supplied. For example, if the hot water to each apartment or commercial space is supplied by a common boiler, then the cold water supply for each unit must be metered by EBMUD at the approved metering site and the hot water will be metered separately as a “house” or landlord meter.

### Landscape Plan Review

EBMUD’s services complement the DWR’s 2009 Updated Model Water Efficient Landscape Ordinance, which is codified in Title 23 of the California Code of Regulations (Sections 490-495) and required by the Water Conservation in Landscaping Act. From 1995-2000, EBMUD has offered voluntary plan review for non-residential new construction projects at the time new service connections are requested. All projects with new service connections of three inches or larger were encouraged to submit plans to the Water Conservation

Division for review and comment. Since 2007, as part of its review and approval of proposed new water service to landscape projects, EBMUD determines compliance with water-efficiency requirements, such as minimized overspray and run-off, appropriate use and groupings of plants, and required automatic irrigation systems and schedules.

EBMUD works with cities and counties within its water service area to support local and state landscape ordinances through landscape plan review requirements and services for all new water service accounts. EBMUD also provides voluntary plan review for existing customers upon request. All plans are reviewed for irrigation system efficiency and scheduling, if provided, and for plant selection and planting design. Comments are returned to the jurisdiction that submitted the plan for EBMUD’s review.

### SUPPLY-SIDE CONSERVATION

#### DISTRIBUTION AND RAW WATER SYSTEM LOSS ACCOUNTING

EBMUD’s water distribution system includes approximately 4,100 miles of pipe. EBMUD implements best practices to manage water losses for the supply-side of the distribution

TABLE 6-7 DISTRIBUTION WATER LOSSES AND RAW WATER LOSSES ACCOUNTING

DISTRIBUTION WATER LOSSES	APPARENT LOSSES	UNAUTHORIZED CONSUMPTION E.G. THEFT – ILLEGAL TAPS, UNAUTHORIZED FIRE HYDRANT USE (UNMETERED CONSTRUCTION CREWS, ILLEGAL HYDRANT OPENINGS)  CUSTOMER METERING INACCURACIES E.G. METER ERROR ADJUSTMENTS  SYSTEMATIC DATA HANDLING ERRORS E.G. ERRORS THAT OCCUR ANYWHERE FROM THE TIME THE METER READING IS REGISTERED TO THE FINAL REPORTING AND USE OF THE CONSUMPTION DATA
	REAL LOSSES	LEAKAGE ON MAINS E.G. TRANSMISSION AND DISTRIBUTION PIPELINE LEAKAGE AND BREAKS  LEAKAGE AND OVERFLOWS AT STORAGES E.G. LOSSES FROM OPEN-CUT RESERVOIRS, STORAGE TANKS, AND TERMINAL STORAGE RESERVOIRS  LEAKAGE ON SERVICE CONNECTIONS UP TO CUSTOMER METERING E.G. LOSSES ON LATERALS FROM DISTRICT MAIN TO CUSTOMER METER
RAW WATER LOSSES	APPARENT LOSSES	UNAUTHORIZED USE  METERING INACCURACIES E.G. METER ERROR ADJUSTMENTS
	REAL LOSSES	LEAKAGE ON AQUEDUCTS AND RAW WATER PIPELINES E.G. AQUEDUCT LEAKAGE AND BREAKS, REAL LOSSES IN THE WATER TREATMENT PLANTS  LEAKAGE AT WATER TREATMENT PLANTS E.G. REAL LOSSES AT THE WATER TREATMENT PLANTS
NOTE: Components adopted from American Water Works Association (AWWA) and International Water Association Audit Components.		

and raw water systems. Modeled after the American Water Works Association (AWWA) Water Audits standards, EBMUD has a protocol for identifying and assessing water losses. The supply-side management program is integral to operating and maintaining the water system and is critical to ensuring efficient management of EBMUD's limited water supply. A standardized procedure to account for all losses in the distribution and raw water systems helps EBMUD understand the nature of those water losses such that it can take appropriate action to reduce them. EBMUD has also identified and made staff accountable for measuring, collecting, assessing, retrieving, validating, and reporting data on District water supply losses.

The difference between the volume of water produced at the treatment plants (also called Distribution System Input) and the sum of all billed and unbilled authorized consumption (also called Authorized Consumption) is termed Distribution Water Losses. Distribution Water Losses consist of all apparent losses and all real losses in the distribution system. Apparent losses are the total losses of treated water from unauthorized consumption (theft), inaccuracies associated with customer metering, and systematic data handling errors. All real losses are the total physical losses of treated water from storage system overflows or draining, main and service line breaks, and background leakages. EBMUD's Distribution Water Losses from 2001-2010 are around 11 percent.

Raw water losses consist of apparent losses and real losses in the raw water system. Raw water apparent losses are the total losses of raw water due to raw water meter errors, unauthorized use from theft, and transmission line blow-offs and flushings. Raw water real losses are the total physical losses of raw water that include overflows and leakage up to and at the water treatment plants, such as leaks and breaks from aqueducts, transmission lines, or other parts of the raw water distribution system, and water treatment plant losses. Table 6-7 summarizes several examples of both distribution water losses and raw water losses.

Distribution water losses and raw water losses are part of non-revenue water. The benefits of managing and minimizing non-revenue water include:

- reducing demand on scarce water supplies and minimizing the need to develop an additional supply;
- reducing water and revenue losses;
- reducing pumping and treatment costs;

- increasing knowledge of the distribution system; and
- reducing property damage through improved maintenance.

## LEAK DETECTION

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EBMUD controls water loss using a variety of efforts. The first is to identify the magnitude and source of that loss. The second is to review accuracy of meters used to measure system inflow and outflow. The third is to develop an appropriate leak detection program. The fourth is to have a reasonable program to respond to identified leaks. The final step is a pipe replacement program that helps to ensure a tight distribution system. Techniques used to locate leaks include visual inspections, sonic leak detection (in both the pipe and externally connected devices), and customer reports. EBMUD crews are equipped with electronic sound detection equipment to routinely detect leaks in the field.

EBMUD is conducting two pilot projects looking at new and developing technology in distribution pipeline leak detection. These projects will find leaks in pipelines and allow EBMUD to fix them before water is seen on the street. Both of these projects identify leaks using acoustic technology that recognizes the sound made by a small leak in a pipeline. One project tests the performance with sonic probes placed on the inside of large pipelines or hydrophones connected to available taps (such as hydrants and air valves) on the pipelines while water is flowing through them. The second project tests the performance with sonic probes placed at fixed locations on the outside of smaller pipelines instead. The pilot studies are partially funded with grants from the USBR. Field work was completed in 2010, and the final reports are anticipated to be completed in 2011.

## PIPE REPLACEMENT

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Many conditions affect the rate of 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 where the rate of overall system deterioration has been stabilized to minimize impacts over time. The Pipeline Replacement Program identifies potential main failures and renews those pipelines in need of replacement based on maintenance histories and leak records.

FOUNDATIONAL AND PROGRAMMATIC BMPS

TABLE 6-8

FOUNDATIONAL BMPS - BMPS CONSIDERED TO BE ESSENTIAL WATER CONSERVATION ACTIVITIES.

NEW BMP CATEGORY	OLD BMP NAME
A. UTILITY OPERATIONS PROGRAMS	
1.1 OPERATIONS PRACTICES	WHOLESALE AGENCY ASSISTANCE PROGRAM (N/A)
	CONSERVATION COORDINATOR (EBMUD STAFFS AND MAINTAINS THE POSITION OF WATER CONSERVATION COORDINATOR.)
	WATER WASTE PROHIBITION
1.2 WATER LOSS CONTROL	SYSTEM WATER AUDITS, LEAK DETECTION AND REPAIR
1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS	METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS (ALL SERVICE CONNECTIONS WITHIN EBMUD SERVICE AREA ARE METERED.)
1.4 RETAIL CONSERVATION PRICING	CONSERVATION PRICING (EBMUD MAINTAINS RATE STRUCTURE CONSISTENT WITH BMP'S DEFINITION OF CONSERVATION)
B. EDUCATION PROGRAMS	
2.1 PUBLIC INFORMATION PROGRAMS	PUBLIC INFORMATION PROGRAMS
2.2 SCHOOL EDUCATION PROGRAMS	SCHOOL EDUCATION PROGRAMS

PROGRAMMATIC BMPS - BMPS THAT PROMOTE NEW INITIATIVES IN WATER CONSERVATION.

NEW BMP CATEGORY	OLD BMP NAME
A. RESIDENTIAL	WATER SURVEY PROGRAMS FOR SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL CUSTOMERS
	RESIDENTIAL PLUMBING RETROFIT
	HIGH-EFFICIENCY CLOTHES WASHING MACHINE FINANCIAL INCENTIVE PROGRAMS
B. COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL	RESIDENTIAL ULFT REPLACEMENT PROGRAMS
	CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL (CII) ACCOUNTS SCHOOL EDUCATION PROGRAMS
C. LANDSCAPE	LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES

**CORROSION CONTROL**

EBMUD’s corrosion control program has been active since its inception in 1923. The corrosion control program extends the useful life of EBMUD pipelines by installing and upgrading cathodic protection systems. The program, covering the Mokelumne Aqueducts and distribution piping and facilities, effectively reduces 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 with 44 individual impressed current cathodic protection systems and approximately 650 test locations to monitor the levels of corrosion control. The distribution system pipelines are protected from corrosion by 155 impressed current cathodic protection stations and over 1,300 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 in these pipelines is controlled with lime additions to the water system to raise pH levels. Designs for all structures are carefully reviewed to select proper coatings, materials, and other corrosion control measures to maximize the life of EBMUD facilities and pipelines.

**BEST MANAGEMENT PRACTICES**

EBMUD is a founding author of the “Memorandum of Understanding Regarding Urban Water Conservation in California” (MOU), administered by the California Urban Water Conservation Council (CUWCC) and first adopted September 1991 and last amended June 2010. As a long-standing member of the CUWCC, EBMUD has remained in compliance with the MOU in the implementation of water conservation Best Management Practices (BMPs). A BMP is a policy, program, practice, rule, regulation or ordinance, or the use of devices, equipment, or facilities that results in the efficient use or conservation of water as an established and generally accepted practice among water suppliers.

The Council's 14 BMPs instituted before the 2010 MOU amendment are now organized into five new categories. Two categories, Utility Operations and Education, are "Foundational BMPs". The remaining three categories, 1) Residential, 2) Commercial, Industrial, and Institutional (CII), and 3) Landscape, are "Programmatic BMPs". Foundational BMPs are further divided into sub-categories. Conservation practices which currently meet the definition of a BMP, as per the MOU are listed in Table 6-8, are discussed in this Plan.

EBMUD currently implements all of the identified BMPs as well as a number of additional conservation measures that go beyond the BMPs. EBMUD's compliance with the 2009 and 2010 Urban Water Conservation MOU coverage requirements for programmatic BMP implementation is presented in a tabular format in Appendix I-1. On-going upgrades to the CUWCC reporting database preclude the use of the CUWCC reporting format. Overall, EBMUD has self-certified that its water conservation achievements to date are on-track, ahead of schedule or have reached 100% completion for all established BMP, Flex Trak or GPCD coverage requirements.

## CONSERVATION IN THE FUTURE

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Water conservation is a central component of EBMUD's long-term water supply planning efforts which seek to address issues that impact the reliability of EBMUD's water supply now and in the future. EBMUD is committed to continue investing in water conservation programs to meet EBMUD's water conservation goals, to provide a reliable water supply, and to help meet the statewide per capita water use reduction goals of SBx7-7. Developed as part of the implementation plan with water recycling efforts for compliance with SBx7-7, the WCMP outlines the various conservation programs that will assure EBMUD achieves its water use targets.

Looking at water demand and supply projections, the contribution of conservation to water supply is evident. Conservation and water recycling are expected to account for 26 percent of projected demand not met by Mokelumne River, Freeport Regional Water Project, and Bayside supplies. In normal rainfall years, conservation will play an important role in the future reliability of supply and will reduce the frequency of shortages. A further discussion on projected water supply is presented in Chapter 4 and Figure 4-10.

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# APPENDIX A. URBAN WATER MANAGEMENT PLANNING ACT

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# CALIFORNIA WATER CODE DIVISION 6

## PART 2.6. URBAN WATER MANAGEMENT PLANNING

All California Codes have been updated to include the 2010 Statutes.

CHAPTER 1.	GENERAL DECLARATION AND POLICY	<a href="#">10610-10610.4</a>
CHAPTER 2.	DEFINITIONS	<a href="#">10611-10617</a>
CHAPTER 3.	URBAN WATER MANAGEMENT PLANS	
Article 1.	General Provisions	<a href="#">10620-10621</a>
Article 2.	Contents of Plans	<a href="#">10630-10634</a>
Article 2.5.	Water Service Reliability	<a href="#">10635</a>
Article 3.	Adoption and Implementation of Plans	<a href="#">10640-10645</a>
CHAPTER 4.	MISCELLANEOUS PROVISIONS	<a href="#">10650-10656</a>

### WATER CODE

#### SECTION 10610-10610.4

**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.

## **WATER CODE**

### **SECTION 10611-10617**

**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.

## **WATER CODE**

### **SECTION 10620-10621**

**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, at least 60 days prior to the public hearing on the plan required by Section 10642, 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).

## **WATER CODE**

### **SECTION 10630-10634**

**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 that 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) (1) 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:

- (A) An average water year.
- (B) A single dry water year.
- (C) Multiple dry water years.

(2) 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) For purposes of this part, urban water suppliers that are members of the California Urban Water Conservation Council shall be deemed in compliance with the requirements of subdivisions (f) and (g) by complying with all the provisions of the "Memorandum of Understanding Regarding Urban Water Conservation in California,"

dated December 10, 2008, as it may be amended, and by submitting the annual reports required by Section 6.2 of that memorandum.

(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).

**10631.1.** (a) The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.

(b) It is the intent of the Legislature that the identification of projected water use for single-family and multifamily residential housing for lower income households will assist a supplier in complying with the requirement under Section 65589.7 of the Government Code to grant a priority for the provision of service to housing units affordable to lower income households.

**10631.5.** (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall

determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of

the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) 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. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

**10631.7.** The department, in consultation with the California Urban Water Conservation Council, shall convene an independent technical panel to provide information and recommendations to the department and the Legislature on new demand management measures, technologies, and approaches. The panel shall consist of no more than seven members, who shall be selected by the department to reflect a balanced representation of experts. The panel shall have at least one, but no more than two, representatives from each of the following: retail water suppliers, environmental organizations, the business community, wholesale water suppliers, and academia. The panel shall be convened by January 1, 2009, and shall report to the Legislature no later than January 1, 2010, and every five years thereafter. The department shall review the panel report and include in the final report to the Legislature the department's recommendations and comments regarding the panel process and the panel's recommendations.

**10632.** (a) The plan shall provide an urban water shortage contingency analysis that includes each of the following elements that are within the authority of the urban water supplier:

(1) 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 that are applicable to each stage.

(2) 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.

(3) 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.

(4) 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.

(5) 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.

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

(7) An analysis of the impacts of each of the actions and conditions described in paragraphs (1) to (6), 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.

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

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

(b) Commencing with the urban water management plan update due December 31, 2015, for purposes of developing the water shortage contingency analysis pursuant to subdivision (a), the urban water supplier shall analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code.

**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, indirect potable reuse, 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.

## **WATER CODE**

### **SECTION 10635**

**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.

## **WATER CODE**

### **SECTION 10640-10645**

**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 submit to the department, the California State Library, 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 submitted to the department, the California State Library, 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 exemplary elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has submitted its plan to 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.

(c) (1) For the purpose of identifying the exemplary elements of the individual plans, the department shall identify in the report those water demand management measures adopted and implemented by specific urban water suppliers, and identified pursuant to Section

10631, that achieve water savings significantly above the levels established by the department to meet the requirements of Section 10631.5.

(2) The department shall distribute to the panel convened pursuant to Section 10631.7 the results achieved by the implementation of those water demand management measures described in paragraph (1).

(3) The department shall make available to the public the standard the department will use to identify exemplary water demand management measures.

**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.

## **WATER CODE**

### **SECTION 10650-10656**

**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.

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## APPENDIX B. PUBLIC NOTICE

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## APPENDIX B. PUBLIC NOTICE

EBMUD published public notices in the following newspapers on the dates indicated below. A sample declaration of the published notices is provided in subsequent pages of this appendix.

**TABLE B-1** LEGAL NOTICE ADVISING OF THE SECOND COMMENT PERIOD EXTENSION

DATE (2011)	ALAMEDA NEWSPAPER GROUP	CONTRA COSTA NEWSPAPER GROUP	SACRAMENTO BEE	CALAVERAS ENTERPRISE	AMADOR LEDGER	LODI NEWS SENTINAL	STOCKTON RECORD
MONDAY, MAY 9						■	
TUESDAY MAY 10				■	■		
THURSDAY, MAY 12							
FRIDAY, MAY 13	■	■	■	■	■	■	■
SATURDAY, MAY 14	■	■	■			■	■
SUNDAY, MAY 15	■	■	■				■
MONDAY, MAY 16						■	
TUESDAY, MAY 17				■	■		
THURSDAY, MAY 19							
FRIDAY, MAY 20	■	■	■	■	■	■	■
SATURDAY, MAY 21	■	■	■			■	■
SUNDAY, MAY 22	■	■	■				■

LEGAL NOTICE ADVISING OF THE HEARING POSTPONEMENT AND COMMENT PERIOD EXTENSION

DATE (2011)	ALAMEDA NEWSPAPER GROUP	CONTRA COSTA NEWSPAPER GROUP	SACRAMENTO BEE	CALAVERAS ENTERPRISE	AMADOR LEDGER	LODI NEWS SENTINAL	STOCKTON RECORD
THURSDAY, APRIL 21							
FRIDAY, APRIL 22	■	■	■	■		■	■
SATURDAY, APRIL 23	■	■	■			■	■
SUNDAY, APRIL 24	■	■	■				■
MONDAY, APRIL 25						■	
TUESDAY, APRIL 26				■			
THURSDAY, APRIL 28							
FRIDAY, APRIL 29	■	■	■	■	■	■	■
SATURDAY, APRIL 30	■	■	■			■	■
SUNDAY, MAY 1	■	■	■				■
MONDAY, MAY 2						■	
TUESDAY, MAY 3				■	■		
THURSDAY, MAY 5							
FRIDAY, MAY 6					■		

LEGAL NOTICE ANNOUNCING THE PUBLICATION OF THE DRAFT UWMP

DATE (2011)	ALAMEDA NEWSPAPER GROUP	CONTRA COSTA NEWSPAPER GROUP	SACRAMENTO BEE	CALAVERAS ENTERPRISE	AMADOR LEDGER	LODI NEWS SENTINAL	STOCKTON RECORD
TUESDAY, APRIL 12				■	■		
THURSDAY, APRIL 14							
FRIDAY, APRIL 15	■	■	■	■	■	■	■
SATURDAY, APRIL 16	■	■	■			■	■
SUNDAY, APRIL 17	■	■	■				■
MONDAY, APRIL 18						■	

# The Sacramento Bee

P.O. Box 15779 • 2100 Q Street • Sacramento, CA 95852

**EAST BAY MUNICIPAL UTILITY DIST**  
**375 11<sup>TH</sup> ST ms806**  
**OAKLAND, CA 97607**

RECEIVED  
MAY 24 2011  
SECRETARY'S OFFICE

DECLARATION OF PUBLICATION  
(C.C.P. 2015.5)

COUNTY OF SACRAMENTO  
STATE OF CALIFORNIA

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

**May 13, 14, 15, 20, 21, 22, 2011**

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on **May 22, 2011**.

  
\_\_\_\_\_  
(Signature)

**NO 482 PUBLIC NOTICE**

**NOTICE OF SECOND COMMENT PERIOD EXTENSION**

**East Bay Municipal Utility District  
Draft Urban Water Management Plan 2010,  
2010 Water Shortage Contingency Plan, and  
SBx7-7 Implementation Plan.**

THIS IS TO ADVISE YOU THAT, IN RESPONSE TO A REQUEST FROM THE PUBLIC, THE COMMENT PERIOD FOR THE DRAFT UWMP 2010 HAS BEEN EXTENDED FOR A SECOND TIME. AN UPDATED DRAFT UWMP 2010 WAS RELEASED ON MAY 6, 2011 AND THE PUBLIC REVIEW AND COMMENT PERIOD WILL NOW END ON MAY 31, 2011.

The Urban Water Management Plan (UWMP) brings together important information on water supply and usage, recycled water and conservation programs at East Bay Municipal Utility District (EBMUD). In accordance with the statutory requirements, EBMUD is updating its 2005 UWMP to reflect current conditions and legislation including requirements established in SBx7-7, Water Conservation Act of 2009. The UWMP presents EBMUD's efforts to promote efficient water use consistent with the California Urban Water Management Planning Act as part of the California Water Code.

EBMUD will review and consider all comments received (or postmarked) by May 31, 2011, 4:30pm. All written comments should be submitted to Suzie Corralejo by email to [scorrale@ebmud.com](mailto:scorrale@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

Copies of the Updated Draft UWMP 2010 are available at the public libraries located within the EBMUD service area, the California State Library, and the plan is posted on [www.ebmud.com](http://www.ebmud.com). Additionally copies may be requested by contacting Suzie Corralejo by telephone at 510-287-0109, by email to [scorrale@ebmud.com](mailto:scorrale@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

The UWMP will be considered for adoption by the EBMUD Board of Directors during the regularly scheduled EBMUD Board meeting, beginning at 1:30 pm on June 28, 2011, in the Board Room, EBMUD Administration Building, 375 Eleventh Street, Oakland, California. The next revision to the UWMP will occur no earlier than 2015.

5/13, 5/14, 5/15, 5/20, 5/21, 5/22  
Lynelle M. Lewis  
Secretary of the District

# The Sacramento Bee

P.O. Box 15779 • 2100 Q Street • Sacramento, CA 95852

**EAST BAY MUNICIPAL UTILITY DIST  
375 11<sup>TH</sup> ST MS806  
OAKLAND, CA 97607**

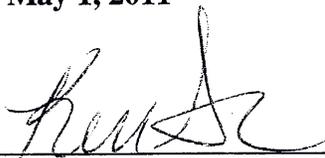
**DECLARATION OF PUBLICATION  
(C.C.P. 2015.5)**

**COUNTY OF SACRAMENTO  
STATE OF CALIFORNIA**

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

**April 29, 30, 2011 &  
May 1, 2011**

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on **May 1, 2011**

  
\_\_\_\_\_  
(Signature)

RECEIVED  
MAY 10 2011  
CLERK OF SUPERIOR COURT

**NO 453 PUBLIC NOTICE**

**NOTICE OF HEARING AND  
COMMENT PERIOD EXTENSION**

**East Bay Municipal Utility District  
Draft Urban Water Management Plan 2010,  
2010 Water Shortage Contingency Plan, and  
SBx7-7 Implementation Plan.**

THE UPDATED DRAFT UWMP 2010 WILL BE RELEASED ON MAY 6, 2011 AND THE PUBLIC REVIEW AND COMMENT PERIOD IS EXTENDED THROUGH MAY 20, 2011. A PUBLIC HEARING ON THE DRAFT UWMP 2010 WILL NOW BE HELD DURING THE REGULARLY SCHEDULED EBMUD BOARD MEETING, BEGINNING AT 1:30 PM ON MAY 10, 2011 IN THE BOARD ROOM, EBMUD ADMINISTRATION BUILDING, 375 ELEVENTH STREET, OAKLAND, CALIFORNIA.

The Urban Water Management Plan (UWMP) brings together important information on water supply and usage, recycled water and conservation programs at East Bay Municipal Utility District (EBMUD). EBMUD is updating its 2005 UWMP to reflect current conditions and legislation including requirements established in SBx7-7, Water Conservation Act of 2009. The UWMP presents EBMUD's efforts to promote efficient water use consistent with the California Urban Water Management Planning Act as part of the California Water Code.

The May 10 hearing will provide the public an opportunity to comment on EBMUD's UWMP, Water Shortage Contingency Plan, and SBx7-7 Implementation Plan. EBMUD will review and consider all comments received (or postmarked) by May 20, 2011, 4:30pm. All written comments should be submitted to Suzie Corralejo by email to [scorrale@ebmud.com](mailto:scorrale@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

Copies of the Updated Draft UWMP 2010 will be available at the public libraries located within the EBMUD service area, and at the California State Library, and will also be posted on [www.ebmud.com](http://www.ebmud.com) on May 6, 2011. Additionally copies may be requested by contacting Suzie Corralejo by telephone at 510-287-0109, by email to [scorrale@ebmud.com](mailto:scorrale@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

The UWMP will be considered for adoption by the EBMUD Board of Directors during the regularly scheduled EBMUD Board meeting, beginning at 1:30 pm on June 28, 2011, in the Board Room, EBMUD Administration Building, 375 Eleventh Street, Oakland, California. The next revision to the UWMP will occur no earlier than 2015.

Lynelle M. Lewis  
Secretary of the District

# The Sacramento Bee

P.O. Box 15779 • 2100 Q Street • Sacramento, CA 95852

**EAST BAY MUNICIPAL UTILITY DIST  
375 11<sup>TH</sup> ST  
OAKLAND, CA 97607**

**DECLARATION OF PUBLICATION  
(C.C.P. 2015.5)**

**COUNTY OF SACRAMENTO  
STATE OF CALIFORNIA**

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

**April 22, 23, 24, 2011**

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on **April 24, 2011**



(Signature)

**NO 480 PUBLIC NOTICE**

**NOTICE OF HEARING POSTPONEMENT AND COMMENT PERIOD EXTENSION**

**East Bay Municipal Utility District  
Draft Urban Water Management Plan 2010,  
2010 Water Shortage Contingency Plan, and  
SBx7-7 Implementation Plan.**

THIS IS TO ADVISE YOU THAT THE PUBLIC HEARING SCHEDULED TO BEGIN AT 1:45 PM ON APRIL 26, 2011 IN THE BOARD ROOM, EBMUD ADMINISTRATION BUILDING, 375 ELEVENTH STREET, OAKLAND, CALIFORNIA HAS BEEN CANCELLED. EBMUD IS REVISING THE DRAFT UWMP 2010, WITH A NEW SCHEDULE AS FOLLOWS.

THE UPDATED DRAFT UWMP 2010 WILL BE RELEASED ON MAY 6, 2011 AND THE PUBLIC REVIEW AND COMMENT PERIOD IS EXTENDED THROUGH MAY 20, 2011. A PUBLIC HEARING ON THE DRAFT UWMP 2010 WILL NOW BE HELD DURING THE REGULARLY SCHEDULED EBMUD BOARD MEETING, BEGINNING AT 1:30 PM ON MAY 10, 2011 IN THE BOARD ROOM, EBMUD ADMINISTRATION BUILDING, 375 ELEVENTH STREET, OAKLAND, CALIFORNIA.

The Urban Water Management Plan (UWMP) brings together important information on water supply and usage, recycled water and conservation programs at East Bay Municipal Utility District (EBMUD). EBMUD is updating its 2005 UWMP to reflect current conditions and legislation including requirements established in SBx7-7, Water Conservation Act of 2009. The UWMP presents EBMUD's efforts to promote efficient water use consistent with the California Urban Water Management Planning Act as part of the California Water Code.

The May 10 hearing will provide the public an opportunity to comment on EBMUD's UWMP, Water Shortage Contingency Plan, and SBx7-7 Implementation Plan. EBMUD will review and consider all comments received (or postmarked) by May 20, 2011, 4:30pm. All written comments should be submitted to Suzie Corralejo by email to [scorraie@ebmud.com](mailto:scorraie@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

Copies of the updated Draft UWMP 2010 will be available at the public libraries located within the EBMUD service area, and at the California State Library, and will also be posted on [www.ebmud.com](http://www.ebmud.com) on May 6, 2011. Additionally copies may be requested by contacting Suzie Corralejo by telephone at 510-287-0109, by email to [scorraie@ebmud.com](mailto:scorraie@ebmud.com), or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

The UWMP will be considered for adoption by the EBMUD Board of Directors during the regularly scheduled EBMUD Board meeting, beginning at 1:30 pm on June 28, 2011, in the Board Room, EBMUD Administration Building, 375 Eleventh Street, Oakland, California. The next revision to the UWMP will occur no earlier than 2015.

Lynelle M. Lewis  
Secretary of the District

# The Sacramento Bee

P.O. Box 15779 • 2100 Q Street • Sacramento, CA 95852

**EAST BAY MUNICIPAL UTILITY DIST**  
**375 11<sup>TH</sup> ST**  
**OAKLAND, CA 97607**

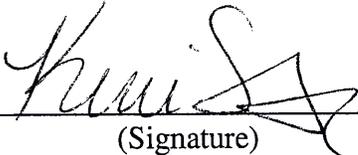
**DECLARATION OF PUBLICATION**  
**(C.C.P. 2015.5)**

**COUNTY OF SACRAMENTO**  
**STATE OF CALIFORNIA**

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interest ed in the above entitled matter. I am the printer and principal clerk of the publisher of The Sacramento Bee, printed and published in the City of Sacramento, County of Sacramento, State of California, daily, for which said newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Sacramento, State of California, under the date of September 26, 1994, Action No. 379071; that the notice of which the annexed is a printed copy, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

**April 15, 16, 17, 2011**

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Sacramento, California, on **April 17, 2011**

  
 (Signature)

NO 479 PUBLIC NOTICE

**East Bay Municipal Utility District**  
**Draft Urban Water Management Plan 2010,**  
**2010 Water Shortage Contingency Plan, and**  
**SBx7-7 Implementation Plan.**

To be released for public review and comment beginning on April 15, 2011 AND ENDING on May 6, 2011. A public Comment meeting on the uwmp will be held on April 21, 2011 at 6:00 pm. In addition, A public hearing will be held during the regularly scheduled EBMUD Board meeting beginning at 1:45 pm on April 26, 2011. The Hearing and the comment meeting will be held in the Board Room, EBMUD Administration Building, 375 Eleventh Street, Oakland, California.

The Urban Water Management Plan (UWMP) brings together important information on water supply and usage, recycled water and conservation programs at East Bay Municipal Utility District (EBMUD). EBMUD is updating its 2005 UWMP to reflect current conditions and legislation including requirements established in SBx7-7, Water Conservation Act of 2009. The UWMP presents EBMUD's efforts to promote efficient water use consistent with the California Urban Water Management Planning Act as part of the California Water Code.

The April 21 comment meeting and the April 26 hearing will provide the public an opportunity to comment on EBMUD's UWMP, Water Shortage Contingency Plan, and SBx7-7 Implementation Plan. EBMUD will review and consider all comments received at the hearing, comment meeting and written comments received (or postmarked) by May 6, 2011, 4:30pm. All written comments should be submitted to Suzie Corralejo by email to scorrale@ebmud.com, or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

Copies of the draft UWMP 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, or copies may be requested by contacting Suzie Corralejo by telephone at 510-287-0109, by email to scorrale@ebmud.com, or by mail to: Attn: Ms. S. Corralejo, Water Resources Planning Division, EBMUD, PO BOX 24055, MS 901, Oakland, California, 94623-1055.

The UWMP will be considered for adoption by the EBMUD Board of Directors during the regularly scheduled EBMUD Board meeting, beginning at 1:45 pm on June 28, 2011, in the Board Room, EBMUD Administration Building, 375 Eleventh Street, Oakland, California. The next revision to the UWMP will occur no earlier than 2015.

Dated: April 15, 16, 17, 2011  
 Lynelle M. Lewis  
 Secretary of the District

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## APPENDIX C. COMMENTS AND RESPONSES

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### APPENDIX C—TABLE OF CONTENTS

NAME	DATE COMMENT RECEIVED	PAGE NUMBER
TOM INFUSINO	05/31/2011	APPENDIX C-1
SAIC	05/31/2011	APPENDIX C-19
AMADOR WATER AGENCY	05/31/2011	APPENDIX C-22
EDITH LUIS	05/23/2011 AND 06/03/2011	APPENDIX C-23
RANDY BERG	05/17/2011	APPENDIX C-25
LARY HEATH	05/14/2011	APPENDIX C-26
MICHAEL J. SPADONI	05/12/2011	APPENDIX C-27
LEE R. PETERSON	05/12/2011	APPENDIX C-28
WAYNE AND VALERIE BRUNMEIER	05/11/2011	APPENDIX C-29
JOHN KNOX WHITE	04/21/2011	APPENDIX C-30

In addition to changes identified in the responses to comments above, editorial and clarification changes were made throughout the document.

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## APPENDIX C. COMMENTS AND RESPONSES

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Tom Infusino, et. al.

**Date Comment Received:** 05/31/2011

**Name of Organization/ Agency/ Individual:** Tom Infusino on behalf of the Foothill Conservancy, California Sportfishing Protection Alliance, and Friends of the River

**Comment:**

---

**From:** Tom Infusino [mailto:tomi@volcano.net]  
**Sent:** Tuesday, May 31, 2011 3:35 PM  
**To:** Corralejo, Suzanne  
**Subject:** Comments on the 2010 DUWMP

Dear Ms. Corralejo:

Attached are comments on the Draft Urban Water Management Plan. Please contact me if you have any trouble opening the attachment.

Sincerely,

Tom Infusino

---

Thomas P. Infusino  
 P.O. Box 792  
 Pine Grove, CA 95665  
 tomi@volcano.net  
 (209) 295-8866

5/31/11

East Bay Municipal Utility District  
 Water Resources Planning  
 Attn: S. Corralejo  
 P.O. BOX 24055, MS #901  
 Oakland, CA 94623-1055

Re: Comments on Draft Urban Water Management Plan 2010.

Dear Ms. Corralejo:

My name is Tom Infusino and I am writing on behalf of the Foothill Conservancy, California Sportfishing Protection Alliance, and Friends of the River. They encourage you to drop Pardee Expansion as a potential future water supply enhancement, and to revise the 2010 Draft Urban Water Management Plan (2010 DUWMP) to conform to the requirements of the Water Code.

As you know, the future water supply projects relied upon in the Draft 2010 Urban Water Management Plan (DUWMP) include expanding the size of Pardee and Lower Bear reservoirs by building a new dam (Pardee) and raising the heights of the existing dam (Lower Bear). The reservoirs are located in Amador and Calaveras counties. Also, the 2010 DUWMP relies on additional water supplies from the Interregional Conjunctive Use Plan + (IRCUP+). In addition to the Bear and Pardee expansions, IRCUP+ includes the construction of a reservoir at Duck Creek, which requires the condemnation of an existing California Department of Fish and Game wildlife conservation easement. Participating in the expansion of Los Vaqueros Reservoir is not listed among the supply options available to EBMUD, despite the invitation to do so by Contra Costa Water District, and a recent court ruling requiring the consideration of that alternative in EBMUD's Water Supply Management Plan 2040 (WSMP 2040) PEIR.

**I. Members of the Foothill Conservancy will be harmed by your dam plans.**

The Foothill Conservancy is a nonprofit organization with members who live and work in the Mokelumne River watershed. The Foothill Conservancy seeks to restore, protect, and sustain the natural and human environment in and around Amador and Calaveras Counties. The Foothill Conservancy's vision for this area includes protected scenic quality, conserved forest lands, restored natural diversity of native plants and animals, free-flowing

rivers, coordinated land use planning, and balanced economic development that is ecologically and socially sustainable.

Our Infrastructure Planning and Development Principles ask agencies to employ demand-side management techniques, including conservation and efficiency, before taking on expensive expansion projects, and to develop infrastructure with minimal harm to the natural and built environment. Our River and Watershed Principles

- Recognize that the ecological health of our rivers and watersheds is of primary importance,
- Support National Wild and Scenic River designation for the Mokelumne River,
- Oppose new on-stream dams, and
- Encourage safe public access and recreational use of rivers.

These principles are more than currently popular platitudes. They are the culmination of wisdom learned through two decades of conservation work by the Foothill Conservancy in the Mokelumne River watershed. Over those years we played a key role in negotiating a settlement agreement for the relicensing of PG&E's hydroelectric project on the Mokelumne River, which set a national precedent; led to the breaching, dismantling or removal of three dams on North Fork Mokelumne tributary streams; and began improvements to river health and recreation. We sponsor annual Mokelumne River Cleanups. We helped secured public access to the Middle Bar reach of the Mokelumne River (below Highway 49 to Pardee Reservoir), which had been closed to public access for more than 30 years. We helped protect more than nine miles of the North Fork of the Mokelumne River by stopping the proposed Devil's Nose Dam project. We recently won a court ruling requiring EBMUD to set aside approval of its 2040 WSMP and EIR certification for failure to consider impacts from Pardee Expansion and failure to consider a broad range of alternatives.

The Foothill Conservancy has its headquarters in Amador County. Members of the Foothill Conservancy and their families have taken their place in the Sierra Nevada foothills. Like the many shoots that form a willow basket, their diverse lives and cherished memories are interwoven with the multifaceted landscape of this unique region. It is the place they work and struggle, where they stick out the hot summers and the muddy winters. They endure lower incomes, limited career opportunities and inadequate levels of public service because they love our landscape and quality of life.

The Mokelumne River is one of the special places that bind our members to the land. Members of the Foothill Conservancy rely on the Mokelumne River and its watershed not only as a source of water, but as a place of residence, business, recreation and spiritual renewal. It is where young couples meet and fall in love. It is where they take long walks to discuss their future. It is where they run the rapids. It is where their children will catch their first trout, and learn about rivers and nature. It is where they live today, and where they will be laid to eternal rest tomorrow.

The uses made of the Mokelumne River watershed by members of the Foothill Conservancy, and by the public at large, will be impaired by the proposed foothill dams.

Expanding Pardee as proposed would inundate the Middle Bar Reach recreation area, valued for whitewater rafting and kayaking, fishing, gold panning, wildflower viewing, family picnics, bird watching, and historic and cultural resources and Native American cultural activities. Expanding Pardee would remove the Middle Bar Bridge, eliminating a first responder access and a resident evacuation route in the event of a wildland fire, putting lives and property at grave risk, and increasing the likelihood of catastrophic wildland fire on EBMUD's watershed lands with resulting harm to EBMUD's water quality.

Furthermore, members of the Foothill Conservancy suffer from local political arenas too often focused on divisive debate over controversial projects thrust upon us by outside interests, and too infrequently focused on making progress in our broad fields of agreement for the good of the local citizenry. EBMUD's proposed foothill projects drag our communities' energies away from making progress on water supplies we agree on and force us to focus time and money on fighting another colonial raid on our resources.

We urge EBMUD to withdraw the Pardee Expansion from further consideration as a component of its 2010 UWMP. The project is included in the plan to meet water needs that are not adequately demonstrated, using water that will likely not be available for diversion above the Sacramento-San Joaquin Delta. The project will harm the communities,

economy, and natural environment of our foothill counties. And it plainly conflicts with the stated objectives of the Urban Water Management Planning Act.

## II. Drop Pardee Expansion (PE) from the 2010 Urban Water Management Plan.


TI-1

### A) Drop PE because it is not consistent with the intent of the UWMP Act.

The amendments to the UWMP Act over the last decade reflect two key beliefs of the California State Legislature. The first is that, “[T]he people of California will best be served by meeting municipal, agricultural and environmental water needs of each hydrologic region to the maximum extent practicable without diminishing the resources of other regions that are necessary to meet the present and future needs of those regions.” The second is that, “The health, safety, and well-being of the people of the State of California will best be served by employing current and developing water treatment and conservation technologies.” (Stats of 2001, c. 320 (S.B. 672).) “Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.” (Water Code, sec. 10608.)

Given the State’s focus on regional self-sufficiency, the use of new technologies and management practices, and the desire to avoid harm to other regions, it seems inconceivable that EBMUD’s response in the 2010 DUWMP is to rebuild its 20<sup>th</sup> century dam and to further harm the foothill region. Right in EBMUD’s own backyard, Contra Costa Water District is expanding a state-of-the-art low-impact water storage facility, with room to grow to accommodate EBMUD’s needs. If EBMUD feels the need for a new storage facility, Los Vaqueros Expansion (LVE) is the modern local alternative that EBMUD should pursue. Please include LVE as a possible future supply in the final 2010 UWMP.

### B) Drop PE from the 2010 DUWMP because it does not provide the water supply security that your constituents want.

One of the important topics discussed in an UWMP is water supply reliability. (Water Code, secs. 10631, subd. (c) and 10635.) During the 2040 WSMP process, EBMUD hand picked a Community Liaison Committee to review future policies and water supply options. The water supply portfolio concept that got the most support from the CLC was the proposal to develop a new source of water storage closer to EBMUD’s customers, not on the other side of the geologically unstable Central Valley. Pardee Expansion does not provide this key element of water supply security to EBMUD customers (a need, incidentally, recognized by EBMUD since the 1950s). Please drop Pardee Expansion from the 2010 DUWMP. Los Vaqueros Expansion would give your customers the security to know that a major component of their water storage is close at hand. Please include LVE as a possible future supply enhancement in the final 2010 UWMP.

### C. Drop PE from the 2010 DUWMP because your Board already knows PE is neither needed nor desirable.

An important focus of an UWMP is the comparison of future supply and future demand. (Water Code, sec. 10631, subds. (a - h).) During the 2040 WSMP hearing, members of the EBMUD Board correctly assessed that Pardee Expansion was an unnecessary water supply source, that its construction and operation would be unnecessarily harmful to people and the environment, and that its inclusion in EBMUD plans would lead to litigation and strained relations with foothill interests. These Board members were right on all three counts. If EBMUD simply uses its 2002 growth projections and its 25 percent rationing policy, there is no need to include Pardee Expansion in future water plans. EBMUD’s inclusion of Pardee Expansion in the 2040 WSMP did lead to strained relations and litigation. As noted by the court in *Foothill Conservancy, et al. v. EBMUD*, the Pardee Expansion has the potential to significantly impact public safety, Miwok cultural practices, and river recreation. Please do not make the same mistake again. Please leave Pardee Expansion out of the 2010 UWMP.

## III. EBMUD must comply with the many provisions of the UWMP before it can qualify for state grants and loans.


TI-2

The Urban Water Management Plan Act compels water suppliers to evaluate current and future water demand, evaluate current and future water supply, describe opportunities for water transfers, implement feasible water conservation measures, plan for responding to droughts, and reduce the water rate hardships of low-income customers.

Unfortunately, even after 20 years of implementation, water suppliers have done a poor job of completing and implementing urban water management plans. In its report to the Legislature in 2006, the Department of Water Resources indicated that, of the 460 water suppliers required to file an UWMP in 2005, 166 didn't even manage to file a plan. Of the 139 plans reviewed by DWR, only 39 plans (28 percent) were complete. Over half the plans reviewed lacked a water shortage contingency plan, a recycled water plan, or a plan to implement 10 of the 14 proposed demand management measures. (DWR, Summary of the Status of 2005 Urban Water Management Plans, pp. A-12 and B-1.) Considering that the completion and implementation of these plans is critical to California's future water supply for people, for the environment, and for economic growth; these dismal compliance numbers are appalling.

To create a disincentive for non-compliance, the Legislature has now determined that failure to complete an UWMPA and implement its demand management plan may result in a water supplier being ineligible for state grants and loans. (Water Code, secs. 10631.5 and 10656.)

**IV. We have the following comments regarding specific provisions of the 2010 DUWMP.**

**A) Chapter 1: General Information.**

Page 1-4: The plan states that population growth in the EBMUD service area will increase from 1,474,000 in 2015 to 1,751,000 in 2035. That is an increase of 18.8 percent. However, during this same period (by 2020), the State of California is trying to reduce per capita customer demand by 20 percent. EBMUD seeks to take advantage of compliance options to limit its per capita reduction to only 12.7 percent (from 165 to 144 GPCD). However, if EBMUD instead continued to do its part, and reduced per capita demand by the full 20 percent (from 165 to 132 GPCD), it could absorb the projected population increase without the need for costly water supply enhancements. Right now, EBMUD's current use averages 130 GPCD. Why not strive to keep the GPCD low?



Page 1-4: The plan provides run-off statistics for the Mokelumne watershed, but not for the watersheds in the EBMUD service area. The report should identify the amount of stormwater runoff that is captured in the Bay Area. Rather than running this water through stormdrains and disposing of it as untreated discharge to the Bay, this water could be treated and used for landscape irrigation, industrial purposes and other beneficial uses. It is the intent of the California Legislature that each hydrologic region seek to meet its own needs first, before taking or despoiling the resources of other regions. Please add the run-off information in the final 2010 UWMP, and identify a program for stormwater collection, treatment, and use.

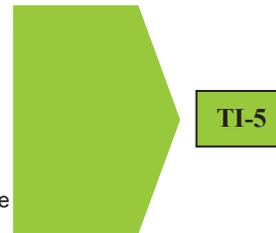


**B) Chapter 2: Water Supply and Water Supply Planning.**

Page 2-1: The plan states:

"In the long-term, during drought periods, the Mokelumne River cannot meet EBMUD's projected customer demands, even with an 'up to 15%' rationing imposed under EBMUD's Board Policy 9.03 (see Appendix F) and use of existing dry-year supplemental supplies."

The change from 25 percent dry-year rationing to 15 percent dry-year rationing was made by the EBMUD Board in the 2040 WSMP. EBMUD has been directed by the California Superior Court to set aside certification of the 2040 WSMP Program EIR, and "and all related project approvals." (Judge Timothy M. Frawley, Peremptory Writ of Mandate, *Foothill Conservancy et al. v. EBMUD*, 5/25/11, p. 1.) Thus, pending completion of the 2040 WSMP PEIR, EBMUD's 2010 UWMP and the analyses therein must not presume a reduction to a 15 percent rationing level during droughts. The presumption of the 15 percent rationing level would effectively reinstate the 2040 WSMP prior to completion of the PEIR, in violation of CEQA and the court's writ.



Page 2-1: The plan states that storing local run-off is limited by reservoir capacity, yet no mention is made of increasing local reservoir capacity to capture additional local runoff. It is the intent of the California Legislature that each hydrologic region seek to meet its own needs first, before taking or despoiling the resources of other regions. In the final UWMP, please identify the potential for storing, treating, and using local runoff.



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Page 2-1: The plan states:

“Pardee Reservoir also is operated to provide recreational facilities to the public and to protect and enhance the fishery resources and ecosystem of the lower Mokelumne River.”

While this is a true statement, it is far from the whole truth. The whole truth is that the operation of Pardee Reservoir has severely limited public access to the Mokelumne River for traditional public trust uses. In addition, the existence of Pardee Reservoir (and the later-constructed Camanche Reservoir downstream) prevents the migration of salmon and steelhead to their native spawning beds upstream. Please add this information to the final 2010 UWMP. Without this information, the description of Pardee Reservoir is not entirely accurate. The UWMP should be a factual document, and as such, must include all of the pertinent facts.

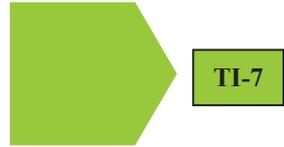
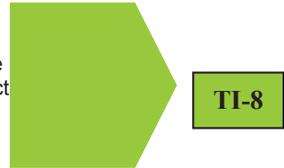


Figure 2-2: What exactly is this figure intended to show? Does it show that in an average year there is insufficient flow in the Mokelumne River to meet the maximum water allocations for all appropriators and fish releases? In the final 2010 UWMP, please provide a better discussion of the water rights held by the Mokelumne appropriators, and the impact that the future use of these rights will have on both EBMUD’s supply and the amount of water remaining in the river. The environmental information is needed for the evaluation of demand management measures pursuant to Water Code, sec. 10631, subd. (g)(1).



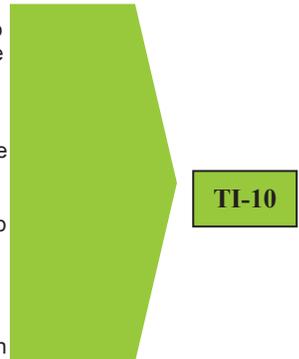
Page 2-5 and 2-6: The plan lists a series of supply vulnerabilities. With the exception of drought, the plan provides no indication of the historic frequency of any of the other supply interruptions over the years. Such information is essential if EBMUD is to prioritize the most pressing supply vulnerabilities and to cost-effectively improve water supply reliability.



Page 2-7: The plan states:

“EBMUD consistently provides the highest quality water possible. EBMUD’s primary water supply from the Mokelumne River requires only limited treatment to meet or surpass health standards, because it comes from a remote, mostly undeveloped watershed and is transported within two days to the EBMUD’s service area in large steel pipes.”

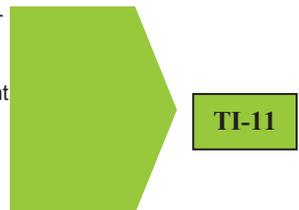
This method of protecting water quality precludes water from flowing farther downstream to restore fisheries and riparian ecosystems. When Pardee Reservoir began operations in the late 1920s, water purification technologies were rudimentary by modern standards, and urban water diversions from the Mokelumne River were smaller. At that time, it probably made sense to grab the purest water as high in the Sierra as feasible and deliver it to Bay Area customers. However, today the water diversion demands on the Mokelumne River are much greater, and water suppliers have a host of modern technologies available to purify water diverted much farther downstream. Urban Water Management Planning is supposed to result in the use of improvements in technology and water management practices to help meet the need for water for environmental uses. (Water Code, sec. 10608, subd. (f).) Nevertheless, in the 2010 DUWMP, EBMUD does not look at taking its Mokelumne River water farther downstream from Pardee Reservoir. Nor does it explore exchange opportunities with other water suppliers to allow them to take Mokelumne River water further downstream. (Water Code, sec. 10631, subd. (d).) Please evaluate these options in the final 2010 UWMP.



Page 2-7: The plan states:

“As a result, the Mokelumne River supply is not exposed to common sources of contaminants such as pesticides, agricultural or urban runoff, municipal sewage, or industrial toxics.”

This is not an entirely accurate statement. Urban runoff is affecting Mokelumne River water supplies even farther upstream than Pardee Reservoir. For example, the Amador Water Agency’s is planning to move the water intake for its CAWP system upstream to the Tiger Creek Regulator Reservoir specifically to avoid water quality degradation from development runoff. In addition, recent studies on the Mokelumne River have identified bacterial contamination hot spots upstream of Pardee Reservoir. Also, the Pardee water supply is not immune from contamination by toxins. Right now, EBMUD is developing health warnings due to the elevated levels of mercury in the fish in Pardee Reservoir, most likely



from historic mining activity in the watershed. Please disclose these facts in the final 2010 UWMP.

TI-11

Page 2-17: The plan states:

“In recognition of the extensive conservation savings that EBMUD has achieved to date and issues associated with demand hardening, EBMUD has set the rationing goal up to 15% during multi-year droughts.”

The change from 25 percent dry-year rationing to 15 percent dry-year rationing was made by the EBMUD Board in the 2040 WSMP. EBMUD has been directed by the California Superior Court to set aside certification of the 2040 WSMP Program EIR, and “and all related project approvals.” (Judge Timothy M. Frawley, Peremptory Writ of Mandate, *Foothill Conservancy et al. v. EBMUD*, 5/25/11, p. 1.) Thus, pending completion of the 2040 WSMP PEIR, EBMUD’s 2010 UWMP and the analyses therein must not presume a reduction to a 15 percent rationing level during droughts. The presumption of the 15 percent rationing level would effectively reinstate the 2040 WSMP prior to completion of the PEIR, in violation of CEQA and the court’s writ.

Page 2-20: Just like the 2040 WSMP, the 2010 DUWMP discusses the IRCUP+ as a potential supplemental water supply. The plan describes IRCUP+ as including Pardee Expansion and/or Duck Creek Reservoir as components. (See also, EBMUD, *IRCUP Terms & Conditions Agreement*, 2009.) Just like the 2040 WSMP, the 2010 DUWMP discusses enlarging EBMUD’s existing facilities on the Mokelumne River. Just like the 2040 WSMP, the 2010 DUWMP makes no mention of the possibility that a Los Vaqueros Expansion could be an option for EBMUD’s future water supply.

TI-12

EBMUD has been directed by the California Superior Court to set aside certification of the 2040 WSMP Program EIR, and “and all related project approvals.” (Judge Timothy M. Frawley, Peremptory Writ of Mandate, *Foothill Conservancy et al. v. EBMUD*, 5/25/11, p. 1.) Thus, pending completion of the 2040 WSMP PEIR, EBMUD’s 2010 UWMP and the analyses therein must *not* presume the upcountry reservoir expansions are the only ones available to supplement EBMUD’s future water dry-year water supply. If EBMUD approves a legally required UWMP with a supply analysis that lists the upcountry reservoir expansions to the exclusion of LVE, it effectively reinstates the 2040 WSMP prior to completion of the PEIR, in violation of CEQA and the court’s writ. It also impermissibly prejudices the selection of alternatives when the 2040 WSMP EIR is revised.

**C) Chapter 3: Water Shortage Contingency Plan.**

Pages 3-2 to 3-4, and 3-10: The text refers to EBMUD’s 2010 change from the 25 percent dry-year rationing limit to the 15 percent dry-year rationing limit.

The change from 25 percent dry-year rationing to 15 percent dry-year rationing was made by the EBMUD Board in the 2040 WSMP. EBMUD has been directed by the California Superior Court to set aside certification of the 2040 WSMP Program EIR, and “and all related project approvals.” (Judge Timothy M. Frawley, Peremptory Writ of Mandate, *Foothill Conservancy et al. v. EBMUD*, 5/25/11, p. 1.) Thus, pending completion of the 2040 WSMP PEIR, EBMUD’s 2010 UWMP and the analyses therein must not presume a reduction to a 15 percent rationing level during droughts. The presumption of the 15 percent rationing level would effectively reinstate the 2040 WSMP prior to completion of the PEIR, in violation of CEQA and the court’s writ.

TI-13

**D) Chapter 4: Water Usage.**

Page 4-2 to 4-3: The plan states that the demand figures are from the 2040 Demand Study using the land-based method, and that these figures still reflect a reasonable expectation for growth over the long to 2040.

However, there is a great risk in basing expensive future infrastructure plans on one set of demand projections. As a result, prudent planners generally look at a range of possible future demand, and then make contingency plans accordingly. This is especially prudent when EBMUD’s demand estimates have *increased* greatly, but actual demand has not.

TI-14

In the past EBMUD has used the projected growth model rather than the land use based model. EBMUD shifted to the land use model in 2002, and then modified that land use model again for the 2040 plan. The 1992 data analysis based on projected growth

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estimated EBMUD gross demand in 2020 at 277 million gallons per day. (*Foothill Conservancy et al. v. EBMUD*, 66 Administrative Record (AR) 25685; 93 AR 35626) Using a land use method, the 2005 Urban Water Management Plan estimated EBMUD's gross demand in 2030 to be 281 mgd. (*Foothill Conservancy et al. v. EBMUD*, 106 AR 40299 – 40301.) That is not a major difference. However, just five years later, the Land Use Model was altered and all of a sudden the 2030 demand shot up from 281 mgd to 304 mgd, with the 2040 gross demand estimated at 312 mgd. (*Foothill Conservancy et al. v. EBMUD*, 10 AR 4312) Thus, by choosing to tweak the model, EBMUD created a 23 mgd increase in gross demand in 2030. By way of comparison, that 23 mgd is more water than any single component of the 2040 WSMP other than Conservation (39 mgd) and Pardee Expansion (51.2 mgd.). (*Foothill Conservancy et al. v. EBMUD*, 4 AR 771)

We agree that community-centered growth and infill development are likely to play an important role in future growth in the EBMUD service area. The biggest problem with these new demand figures is that they are based upon the questionable assumption that population and economic growth in the service area will *accelerate* to fill the increased available development capacity of the local-government-generated land use planning maps for the region. (Of course, another possibility is that the same rate of growth will take place and merely use up less land in the process.) The “if you map it they will come faster” theory has obvious limitations, not the least of which are the ability of such dense infill development opportunities to attract investors to build the units and consumers to purchase the units in the numbers estimated by EBMUD. Unfortunately, the huge caveat on page 3-15 of the 2040 Demand Study is rarely fully appreciated when its results are considered: “Although the total demands still reflect development per the general plans, *the timing of development and therefore demands may be slower than that projected in this study.*” (Emphasis added.) However, the demand inflation did not stop there.

The 2040 WSMP EIR shows that the reduction in dry-year rationing from 25% down to 15% created the need for an additional 20 mgd of water. (*Foothill Conservancy et al. v. EBMUD*, 4 AR 774) Thus, by choosing a modified demand methodology (plus 23 mgd), and a new rationing policy (plus 20 mgd), EBMUD increased its 2040 gross water demand by 43 mgd. By way of comparison, according to the 2040 WSMP DEIR, that 43 mgd is more water than is produced by any single 2040 WSMP component other than Pardee Expansion (51.2 mgd.). (*Foothill Conservancy et al. v. EBMUD*, 4 AR 771)

In the final 2010 UWMP, please also look at the multiple dry-year demand given the prior demand model and the 25 percent dry-year rationing. Given this information, and the true extent of the impacts of Pardee Expansion, we hope that the EBMUD Board will chose to stick with the 25 percent dry-year rationing, and/or choose to stick with the 2002 demand model. These two things, in combination with the desalination component (up to 20 mgd yield), would avoid any need for Pardee Expansion. (*Foothill Conservancy et al. v. EBMUD*, 4 AR 771)

Pages 4-6 to 4-10: An UWMP is supposed to, “Identify and quantify, to the extent practicable, the existing and planned sources of **water** available to the supplier” in five-year increments. If one of the supplies is groundwater, the UWMP must provide a copy of any applicable groundwater management plan, a description of the basin, information as to whether the basin is overdrafted, efforts being undertaken to eliminate long-term overdraft, and the amount of groundwater expected to be pumped. (Water code, sec. 10631, subd. (b).) The 2010 DUWMP does not do this.

Furthermore, an Urban Water Management Plan is required to:

“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:

- (A) An average water year.
- (B) A single dry water year.
- (C) 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.” (Water code, sec. 10631, subd. (c).)

The 2010 DUWMP does not do this.

TI-14

TI-15

TI-16

Finally, and Urban Water Management Plan must:

“Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use 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.” (Water code, sec. 10631, subd. (h).)

The 2010 DUWMP does not do this.

TI-17

Chapter four of DWR’s *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan*, provides an explanation of the information needed to conform to the requirements of the aforementioned code sections. (See, DWR Guidebook, pp. 4-1 to 4-4; Section I, pp. 1-4 to 1-6. items 13-23.) :

*The failure to provide this information is perhaps the most glaring inadequacy in the 2010 DUWMP.* In recent amendments to the UWMPA, the Legislature declared that, “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.” The Legislature acknowledged that, “The quality of source supplies can have a significant impact on water management strategies and supply reliability.” The intent of UWMPA is “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.” (Water Code, sec. 10610.2, subsd. (a)(4), (a) (9), and (b).)

TI-18

In short, an Urban Water Management Plan is supposed to compare future water *demand* and future water *supply*. By failing to identify the yield of each potential supplemental supply source, the timing of its implementation, and its reliability in average, dry, and multiple dry years, EBMUD has failed to complete the challenging half the of its 2010 DUWMP. This failure is magnified by EBMUD omitting details about the groundwater basins that it seeks to use for future supply. Instead of dealing with these issues head on, EBMUD hid important supply distinctions by aggregating future supply and reliability information, and not filling supply gaps. (See 2010 DUWMP, pp. 4-10.) That is a far cry from the source-by-source disclosure envisioned in the UWMPA.

**E) Chapter 5: Wastewater and Recycled Water.**

Table 5-5: This table indicates that recycled water use will increase from 9.3 mgd to 19.9 mgd from 2010 to 2040. However, the 19.9 mgd figure is still only 10.6 percent of the total 188.6 mgd of wastewater to be collected and treated in 2040. Why is the recycling percentage so low? In rural Calaveras County, where the low average income of the customers and the geographic challenges are much greater than in the East Bay, the water district currently recycles over 85 percent of the wastewater it collects, and expects to continue to do so through 2040. (Calaveras County Water District, 2010 *Draft Urban Water Management Plan*, Chapter 5.) If Calaveras County can do this to keep water in the Mokelumne River for fish, wildlife and recreation; why can’t EBMUD? If EBMUD were to recycle 85 percent of the wastewater it expects to collect in 2040, that would result in a water supply enhancement of over 160 mgd, or *three times the yield of the Pardee Expansion*. Put another way, EBMUD would only have to recycling 27.2 percent of the effluent it expects to collect in 2040 to equal the yield of the Pardee Expansion. This 51.2 mgd of recycled water could be used to supply residential outdoor demand (about 54 mgd in 2040) and irrigation demand (7 mgd in 2040).

TI-19

The amendments to the UWMP Act over the last decade reflect two key beliefs of the California State Legislature. The first is that, “[T]he people of California will best be served by meeting municipal, agricultural, and environmental water needs of each hydrologic region to the maximum extent practicable without diminishing the resources of other

regions that are necessary to meet the present and future needs of those regions.” The second is that, “The health, safety, and well-being of the people of the State of California will best be served by employing current and developing water treatment and conservation technologies.” (Stats of 2001, c. 320 (S.B. 672).) Given the State’s focus on regional self-sufficiency, the use of new technologies and management practices, and the desire to avoid harm to other regions, please consider a higher level of water recycling in the final 2040 UWMP.

#### F) Chapter 6: Water Conservation.

Table 6-4: This table shows that EBMUD will take advantage of Senate Bill 7 compliance options to limit its per capita reduction to only 12.7 percent (from 165 to 144 GPCD). We recommend that EBMUD instead reduced per capita demand by the full 20 percent (from 165 to 132 GPCD). Please make the commitment to do this in the final 2010 UWMP. In addition, EBMUD could further reduce its water demand and set an example for the rest of the state. According to the U.S. Geological Survey, cited in the Sierra Club *Yodeler* (May-June 2010), New Mexico has reduced residential water consumption to 107 GPCD.


**TI-20**

#### V. Conclusions

##### A) EBMUD’s 2010 DUWMP is deficient in many respects.

Most notably, Chapter 1 fails to describe a potential local source of water (local stormwater runoff) that could offset the need to construct damaging foothill dams. Chapter 2 fails to consider a downstream diversion point to reduce impacts of water taken from the Mokelumne River. Chapter 4 relies on a single inflated demand calculation based upon an admittedly weak assumption, relies on a drought rationing policy set aside by the Superior Court, and does not provide basic required information about each future source of water supply. Finally, in Chapter 5 EBMUD commits to only a very low level of water recycling. Please bring the final 2010 UWMP into compliance with the Water Code.


**TI-21**

##### B) EBMUD’s 2010 DUWMP violates CEQA and the Court’s Writ.

The Public Resources Code, section 21168.9(a) (2) allows a court administering a writ to suspend agency activities that “will prejudice the consideration or implementation of particular mitigation measures or alternatives to the project.” In *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4<sup>th</sup> 713, the court chose not to allow any portion of the project to proceed, including non-impacting aspects like surveying, to avoid just this sort of bureaucratic momentum from building up prior to completion of a CEQA-compliant revised EIR.


**TI-22**

The writ in *Foothill Conservancy, et al. v. EBMUD* directed EBMUD to set aside the 2040 WSMP PEIR and related project approvals, pending completion of a valid PEIR that better evaluates impacts of Pardee Expansion, and considers a broad range of alternatives, including Los Vaqueros Expansion.

Nevertheless, the 2010 DUWMP repeatedly relies upon components adopted as part of the 2040 WSMP. It also relies upon water supply alternatives selected in the 2040 WSMP, to the exclusion of other alternatives such as LVE. For example:

Chapter 2 regarding “Water Supply System & Water Resources Planning” still refers to the reduction in drought rationing to 15%. (“In recognition of the extensive conservation savings that EBMUD has achieved to date and issues associated with demand hardening, EBMUD has set the rationing goal up to 15% during multi-year droughts.” [P. 2-17].) This change occurred after the proposal was adopted in the 2040 WSMP, in April 2010. Also, Chapter 2 makes no mention of the possibility Los Vaqueros Expansion as an option for future EBMUD water supply.

Chapter 3 regarding “2010 Water Shortage Contingency Plan” refers to the change from 25% to the 15% rationing limit, and specifies that its success is contingent on development of additional water supply components. (pp. 3-2 to 3-3, 3-10.).

Chapter 4 on “Water Demand” is still using the inflated demand model from the 2040 WSMP (p. 4-2), and the 15% rationing assumption (p. 4-9.)

Appendix F listing EBMUD Policies and Rates still includes Policy 9.03, approved in April 2010 following the 2040 WSMP approval that changed the drought rationing limit to 15% from 25%. (pp. F-6 & F-7)

Appendix G on the “2010 Water Shortage Contingency Plan Supplement” plan is based on the change to a 15% rationing limit (p. G-3).

While the 2010 UWMP is not subject to CEQA review, the 2040 WSMP ruling sets aside the 2040 WSMP and EIR, and directs EBMUD to comply with CEQA in evaluating alternatives including Pardee Expansion and Los Vaqueros Expansion. If EBMUD approves a legally required UWMP with 20-year demand that presumes the same components as the 2040 WSMP (the reduction to a 15 percent rationing level, the 2040 WSMP demand numbers, the 2040 WSMP levels of conservation and recycling) then that UWMP prejudices the selection of alternatives when the 2040 WSMP EIR is revised. Similarly, if the 2010 UWMP’s supply analysis lists the upcountry reservoir expansions to the exclusion of LVE, it also prejudices the selection of alternatives when the 2040 WSMP EIR is revised. As the court put it, “By adopting the Water Supply Plan, the District committed itself to particular rationing, conservation, and recycling levels. This, in turn, committed the District to a specific programmatic direction that will require the District to pursue various supplemental water supply projects to bridge the gap between supply and demand.” (Ruling, pp. 9-10.)

Furthermore, EBMUD’s completion of the 2010 UWMP opens the door to state funding for its water supply components. By including PE as a potential supply source, but excluding LVE as a potential supply source, EBMUD is prejudicing the LVE alternative to the 2040 WSMP by unnecessarily burdening it with funding barriers and additional administrative costs (e.g. for a subsequent 2010 UWMP amendment).

Thus, pending completion of the 2040 WSMP PEIR, EBMUD’s 2010 UWMP and the analyses therein must not presume a reduction to a 15 percent rationing level during droughts. It must not presume that the upcountry reservoir expansions are the lone reservoir expansion options. Instead, EBMUD must leave open the opportunity that LVE is an option. EBMUD must not presume that the 2040 WSMP’s inflated demand figures alone are valid, and must consider other valid options. To do otherwise would essentially reinstate the 2040 WSMP prior to completion of the PEIR, in violation of CEQA and the court’s writ.

**C) EBMUD’s 2010 DUWMP repeats the mistakes of the 2040 WSMP**



The 2040 Water Supply Management Plan made many mistakes. It relied on a single inflated demand calculation based upon an admittedly weak assumption. It failed to consider and adopt alternatives that would reduce the impacts of EBMUD’s water supply including the collection of local stormwater runoff, an increase in the rate of water recycling, the use of a downstream diversion point for water taken from the Mokelumne River, and the Los Vaqueros Expansion. It did not provide basic information about each future source of water supply that was necessary to empower the Board to make a rational decision. As noted above, the 2010 DUWMP makes these same mistakes.

We strongly encourage EBMUD to learn from the mistakes made in the 2040 WSMP, and not repeat them in the final 2010 UWMP. This is your first, best chance to correct those mistakes and move on. Please embrace this opportunity.

**D) Drop PE and embrace a better future.**

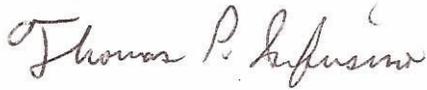


For years the leadership at EBMUD has periodically lurched forward, against EBMUD’s own history and internal bureaucratic inertia, toward a more enlightened approach to water supply, demand management, and conflict resolution. As a result of that leadership, EBMUD staff and customers have implemented conservation programs that have repeatedly yielded greater results than the naysayers and statisticians anticipated. However, in the face of these great accomplishments, periodically EBMUD leadership returns out of fear to its old security blanket: bigger dams in the Mokelumne River watershed. The hard-working Mokelumne River does not deserve your bigger dam. It deserves your tender, loving care. Your successful conservation employees do not deserve your fear. They deserve your confidence and support. Your customers’ desire for the security of a local reservoir does not deserve to be ignored. They deserve your attention. Drop PE from the 2010 UWMP. If you set your sights on a better future today, the future will thank you for it tomorrow.

**Tom Infusino, et. al.**

We hope that your final UWMP will properly address the concerns detailed in this letter, and those of expressed by other commenters. Please notify us a when the final UWMP is available, and when EBMUD intends to make its decision.

Sincerely,



Thomas P. Infusino,

for the Foothill Conservancy, California Sportfishing Protection Alliance, and Friends of the River

cc: Mr. John Beuttler, California Sportfishing Protection Alliance  
 Mr. Chuck Bonham, Trout Unlimited  
 Mr. Jim Eicher, Bureau of Land Management  
 Mr. Terry Davis, Sierra Club Mother Lode Chapter  
 Ms. Sonia Diermayer, Sierra Club Bay Chapter  
 Mr. Stuart M. Flashman  
 Mr. Mike Jackson, California Sportfishing Protection Alliance  
 Mr. Bill Jennings, California Sportfishing Protection Alliance  
 Mr. Curtis Knight, CalTrout  
 Mr. David Moller, PG&E  
 Mr. Matt Morrison, Sierra Club Bay Chapter  
 Mr. David Nesmith, Environmental Water Caucus  
 Ms. Beth Paulson, US Forest Service  
 Mr. Chris Shutes, California Sportfishing Protection Alliance  
 Mr. Dave Steindorf, American Whitewater  
 Mr. Ron Stork, Friends of the River  
 Mr. Steve Evans, Friends of the River  
 Supervisor Steve Wilensky, Calaveras County  
 Ms. Ann Hayden, Environmental Defense Fund  
 Mr. Spreck Rosekrans, Environmental Defense Fund

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## EBMUD Response:

### TI-1 Response

EBMUD reorganized the text in the UWMP to clarify the discussion in the UWMP regarding potential future supplemental water supply sources. The “Potential Supplemental Water Supply Sources” section (pages 2-17 through 2-21) has been divided into “Short-Term Potential Supplemental Water Supply Projects” and “Long-Term Conceptual Supplemental Water Supply Projects” with the intent to recognize that some of the longer term supplemental supply sources are not likely to be developed in the 20-year time frame that is the primary focus of the UWMP. Projects listed under the Short-Term Potential Supplemental Water Supply Projects are anticipated to be implemented by 2030, which is within the 20-year planning horizon as mandated by the UWMP Act (Water code, Secs. 10631 (h) and 10635.) Projects, including those for expansion of surface supply, that are listed under the Long-Term Conceptual Supplemental Water Supply Projects section are in the conceptual stage and are anticipated to take place beyond the UWMP’s 20-year planning horizon. The project scope and availability of these long-term supplemental supplies will be refined in subsequent UWMPs, which are updated every 5 years.

In the “Long-Term Conceptual Supplemental Water Supply Projects” section, EBMUD updated the text of the UWMP to acknowledge its commitment to examine its participation in the Los Vaqueros Expansion as a means of satisfying its future long-term need for supplemental supply as part of the effort to supplement the analysis of impacts and alternatives in the Program Environmental Impact Report for the WSMP 2040. As noted on page 2-21 of the UWMP, if pursued in the future, any expansion of surface water storage on the Mokelumne River, as well as

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any participation in the expansion of local reservoir projects, will be subject to “additional negotiations, as well as planning, design and environmental review.”

**TI-2 Response**

EBMUD’s UWMP acknowledges the legal requirements in the provisions of the UWMP Act. (see Water Code, secs. 10631.5 and 10656 in Appendix A-7 and A-15)

**TI-3 Response**

Since the 1970s, demand management has been an important part of EBMUD’s water practices and policies to promote reasonable and efficient use of supplies. Figure 6-3 of the UWMP shows that EBMUD has made significant strides in decreasing historical daily per capita water demand as a result of EBMUD’s aggressive water conservation and recycling efforts and other factors. This continuous effort in reducing daily per capita water use goes beyond the short-term focus on consumption reduction as required through SBx7-7.

SB x7-7 was drafted with the intent to allow agencies including EBMUD to capture previously realized conservation and recycled water savings, and the law thus provides flexibility to allow suppliers to select one of four methods for establishing its SBx7-7 targets. EBMUD selected a target method that would allow EBMUD to be credited for its aggressive water conservation and recycling programs, implement demand management program budgets that are appropriately tailored to customer usage, and account for anticipated demand hardening in consumption behavior that is the result, in part, of EBMUD’s existing aggressive conservation efforts.

EBMUD is also committed to achieving an estimated projected use at 144 gallons per capita per day (gpcd) in year 2020, which exceeds the requirement of its SBx7-7 target of 150 gpcd.

**TI-4 Response**

The comment is unclear on the exact action requested. Runoff – includes both the runoff from precipitation that falls on watershed lands within the basin of a reservoir or runoff from precipitation that falls on urbanized areas and is captured in storm drains. Both types of runoff are addressed in the UWMP to the extent that they are relevant to EBMUD’s supplies and means of reducing demand and serving its customers.

As noted in Chapter 2 of the UWMP, East Bay reservoir runoff from EBMUD’s local watersheds to the reservoirs constitutes a portion of EBMUD’s secondary supply source. About 15-25 MGD of EBMUD’s supply comes from local runoff in normal hydrologic years. In dry years, evaporation can exceed local runoff and result in no net local supply.

Secondly, as noted in Table 6-2, EBMUD’s long-term water conservation planning efforts includes future measures for capturing graywater. Specifically the identified measures include drain line plumbing for future installation of graywater systems in new and retrofitted single-family homes. EBMUD has promoted the study of graywater as an alternative local water source for decades, including its 1996 study with the California Department of Water Resources. EBMUD also works with local jurisdictions and interested parties on advancing the knowledge and science of rainwater catchment systems.

It is important to note that only cities/ counties have the authority to implement programs that allow for storm water collection, treatment and use, and that management of graywater systems is outside of EBMUD’s jurisdiction. The measures included within EBMUD’s long-term water conservation program are designed to encourage the use of graywater. Since measures for capturing graywater are currently identified as potentially appropriate and included as

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part of the long-term water conservation program, any further developments in graywater use in the community served by EBMUD will be discussed in future UWMPs.

**TI-5 Response**

The actions taken in lowering the targeted level of customer rationing to 15%, as adopted by EBMUD's BOD through Policy 9.03 is independent of the ongoing WSMP 2040 process and is the result of the recognition that EBMUD has instituted an aggressive conservation program that has limited the ability to achieve further water use reductions during dry and critical dry years without severe economic hardship. The discussion in the UWMP is consistent with the legislative goal of ensuring that the District explores the reliability of its supplies and the specific factors that affect that reliability.

As noted in Figure 4-10, rationing is a critical component of EBMUD's water supply portfolio, and EBMUD expects that its customers will curtail their use during droughts. To ease the burden on its customers, while recognizing possible economic hardships to specific customer class categories; and as EBMUD customers are approaching demand hardening, which limits their ability to ration further, and heightens the impact of additional water use reductions in dry and critical dry years as a result of extensive conservation practices already put in place, EBMUD's BOD lowered its targeted customer rationing level to 15 percent. However, as noted, to obtain the 15 percent rationing level, EBMUD will need to pursue and implement the short term potential supplemental water supply projects as identified in Chapter 2.

**TI-6 Response**

East Bay Municipal Utility District operates five local reservoirs – Briones Dam, Chabot Dam, Lafayette Dam, San Pablo Dam and Upper San Leandro Dam as described in Chapter 2 of the UWMP. Due to urban development in the area and limitations in topography, none of the five reservoirs is a candidate for significant future expansion and an expansion of these reservoirs would not feasibly yield significant supplemental supplies.

Other local storage options that EBMUD had evaluated included potential surface storage construction within Bollinger Canyon, Cull Canyon, Curry Canyon, and Kellogg Canyon., all within the East Bay. But these new projects all involve significant issues and environmental effects.

**TI-7 Response**

The referenced statement appears on page 2-2. The UWMP Act requires the supplier to describe its service area, projected water needs, and to identify and quantify existing and planned sources available to serve demand over a 20 year planning period. (Water Code, sec. 10631). The requested information is not required to be included in an urban water management plan and is not relevant to an assessment of EBMUD's water supply and demand.

**TI-8 Response**

The amounts available for Mokelumne River use vary in a given year depending on a number of factors, including hydrology, which itself is highly variable as depicted in Figure 2-3. The purpose of Figure 2-2 is to illustrate how Mokelumne River flows are generally allocated to various uses.

Please note that because the identified needs must be met (particularly fish requirements) they are not affected by EBMUD's actions to institute demand management measures discussed in Water Code section 10631, subd. (g)(1). EBMUD is in compliance with the California Urban Water Conservation Council's Memorandum of Understanding

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through the implementation of urban water conservation best management practices (BMPs) as well as a number of additional conservation measures that go beyond the BMPs. (pages 6-22 to 6-23 of the UWMP)

**TI-9 Response**

EBMUD has updated the text of the UWMP to include the historic frequency of supply vulnerabilities listed in Chapter 2 (pages 2-6 to 2-10).

EBMUD has updated the text of the UWMP to include a table of earthquakes of significance that have occurred in the Bay Area since 1836.

EBMUD has updated the text of the UWMP to clarify water quality impacts to water supply. The 1997 shutdown of the Mokelumne Aqueducts caused Briones Reservoir to be drafted down to its lowest level since it was first filled. Briones holds more than half of the District's standby storage, and it was crucial to replace the water by pumping at the Walnut Creek Pumping Plant once the aqueducts were back online. The cause of the high turbidity in Pardee was due to a landslide that occurred on January 9, 1997 on a slope by the Mokelumne River in the wilderness are of the Upper Mokelumne River watershed. The slide created very high turbidity in Pardee Reservoir and the water entered the Mokelumne Aqueduct reached a peak turbidity of about 60 NTUs. As the District's in-line water treatment plants are not designed to adequately treat water of this range of turbidity, EBMUD switched the source of supply from Pardee Reservoir to Briones Reservoir.

**TI-10 Response**

Consistent with the UWMP Act, EBMUD's UWMP describes the service area of the supplier and the projected water needs, and identifies and quantifies existing and planned sources available to serve demand over a 20 year planning period and the infrastructure that makes these sources available. (Water Code, sec. 10631). As noted in Water Code, sec 10631 (d) referenced on page A-5 of the UWMP, EBMUD has acknowledged the requirement to discuss opportunities for supplemental water supplies through exchanges/ transfers of water supplies with other suppliers. Long term exchange/ transfer opportunities are discussed on pages 2-19, 2-20 and 2-21 of the UWMP; short-term exchange/ transfer opportunities are discussed on pages 3-6 through 3-8. As this text recognizes, while EBMUD may obtain supplemental supplies through transfers or exchanges, there are few exchange opportunities that would allow for EBMUD to meet its demands through diversions of Mokelumne River water further downstream.

**TI-11 Response**

EBMUD has updated the text of the UWMP to clarify that the Mokelumne River supply is "minimally" exposed to common sources of contaminants and to acknowledge that despite precautionary warnings of mercury found in the fish, mercury has never been detected in the water supply in Pardee Reservoir at levels above the California Public Health Goal (PHG) of 1.2 ug/L on page 2-8.

**TI-12 Response**

The statement has been modified in the text of the UWMP on page 2-19. Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 and TI-5 found on page Appendix C-13 of EBMUD's UWMP (as related to LVE).

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**TI-13 Response**

Please see EBMUD Response TI-5 found on page Appendix C-13 of EBMUD’s UWMP.

**TI-14 Response**

The demand study is based on a land use model, which is viewed within the field of water demand estimating as the most rigorous analysis methodology, as compared to using population projections or growth rate projections and population based demand category correlation. The demand study was developed with direct input from city and county land-use planning agencies reflecting the agencies’ best estimate of both land use and timing of both new development and redevelopment through 2040. This approach also supports the intent of the UWMP Act, which requires that “[e]ach 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....” (Water Code, sec. 10620, subd. (d)(2)). In planning and developing any long-term supplemental supply projects, EBMUD would confirm the demand estimates and assess the necessity of the project.

**TI-15 Response**

EBMUD has updated the text of the UWMP to clarify that native groundwater is used only to a limited extent as part of the implementation of the injection/extraction system associated with the Bayside Groundwater Facility. As noted on page 2-17, the project supplies supplemental water to EBMUD customers only when supplemental water is needed, and overall, the quantity of water injected into the aquifer of the South East Bay Plain Groundwater Basin will exceed the quantity of water extracted.

**TI-16 Response**

Consistent with Water Code, Sec. 10631, subd. (c), Table 4-3 of the UWMP provides water supply data for average, single and multiple dry water years. Although the supply sources included in Table 4-3 are currently expected to be available on a consistent level, factors, other than droughts, that may temporarily affect these sources or factors whose impacts have not been quantified at the present (such as global climate change) are described on page 2-6 and 2-7 of the UWMP.

**TI-17 Response**

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD’s UWMP. The UWMP identifies possible yields from the short-term supplemental supply projects.

**TI-18 Response**

Please see response TI-16 for consistency with Water Code, Sec. 10631, Subd. (c), and response TI-15 for SEBPB discussion.

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EBMUD has updated the text of the UWMP to clarify how the projected supplemental supply need anticipated in dry years (and presented in Table 4-3 of the UWMP) will be met by EBMUD. Information regarding the individual project capacities that will be used to met the need during dry years (provided on pages 2-17 through 2-19 of the UWMP), has also been restated in Chapter 4.

#### TI-19 Response

In accordance with the California Water Code, EBMUD's policy requires the use of recycled water for appropriate uses 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. EBMUD has an appropriate recycled water program in an urban environment where recycled water projects are developed based on supply and demand locations.

Recycled water projects are developed if there is adequate wastewater supply and sufficient demands near the supply source to implement cost-effective projects. EBMUD's service area spans 332 square miles and includes 20 incorporated cities and 15 unincorporated communities in two counties. Building recycled water projects and extensive distribution systems in an urban environment is difficult and more costly than compared to a rural environment.

In some cases where wastewater supply is available, there isn't sufficient demand close to the supply source to develop a project that utilizes all of the supply. Therefore, a cost-effective project is developed where a portion of the wastewater supply is used. An example is the East Bayshore Recycled Water Project (see discussion on page 5-9 of the UWMP). In other cases, there is sufficient demand close to the wastewater supply to develop a project that utilizes all of the supply. Therefore, a cost-effective project is developed where all of the wastewater supply is used. An example is the Richmond Advanced Recycled Expansion Water Project (see discussion on pages 5-6 and 5-9 of the UWMP).

Almost all of EBMUD's recycled water customers are existing urban users where each customer site has to be retrofitted to use recycled water, an added complexity and expense. Also, a higher level of treatment, primarily tertiary, is required which is more costly. There are no agricultural recycled water customers in EBMUD's service area.

It is not appropriate to compare EBMUD's recycled water program to other programs in rural areas where a minimum level of treatment and less infrastructure are needed to meet a large agricultural irrigation demand. Complete detail of EBMUD's recycle water program is in Chapter 5 of the UWMP.

#### TI-20 Response

Please see EBMUD Response TI-3 found on page Appendix C-12 of EBMUD's UWMP.

EBMUD's baseline per capita water use and SBx7-7 target is well below the statewide average of 192 gpcd. Per capita water use represents an approximation tool or metric for water utilities to measure consumption patterns and trends within their own agency over time. Per capita water use is not a good measure for comparing use between agencies or geographic areas due to the inherent differences in land use, climate, service area demographics, business and industrial markets, and more. These factors affecting per capita use is evident in the wide variation of reported baseline per capita water use within California's hydrologic regions of 154 to 346 gpcd.<sup>1</sup>

<sup>1</sup> 20x2020 Water Conservation Plan, California Department of Water Resources, State Water Resources Control Board, California Bay-Delta Authority, California Energy Commission, California Department of Public Health, California Public Utilities Commission, California Air Resources Board, February 2010.

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**TI-21 Response**

EBMUD has prepared the 2010 Urban Water Management Plan in order to comply with the Urban Water Management Planning Act and the Water Conservation Act of 2009. The final 2010 UWMP meets the requirements of California law.

For questions on Chapter 1, please see EBMUD Response TI-4 found on page Appendix C-12 to C-13.

For questions on Chapter 2, please see EBMUD Response TI-10 found on page Appendix C-14.

For questions on Chapter 4, please see response EBMUD Response TI-14 found on page Appendix C-15 and TI-18 found on page Appendix C-15 to C-16.

For questions on Chapter 5, please see EBMUD Response TI-19 found on page Appendix C-16.

**TI-22 Response**

EBMUD's legally mandated adoption of the 2010 UWMP is not an action that will prejudice the consideration or implementation of particular mitigation measures or alternatives to the Water Supply Management Program 2040, which is presently under review. The Urban Water Management Planning Act requires EBMUD to prepare and adopt an urban water management plan that provides a description of EBMUD's water demand management measures and includes an evaluation of economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors affecting the implementation of new water demand management measures.

EBMUD's Drought Management Program includes a policy to implement rationing at a maximum of 15% of total annual demand based on the recognition that on-going water conservation and recycling have decreased the flexibility to further reduce demand during droughts. It is this recognition that EBMUD's increasingly aggressive conservation efforts have reduced the ability to achieve further conservation during a drought that resulted in the lowering of the planned rationing level. It may be necessary for EBMUD to include greater levels of demand reduction during a multiple year drought to the extent that additional supplemental supplies cannot be obtained to meet demand but this may result in significant customer hardship, particularly as demand increases, and costs and burdens will not be distributed equally among customer categories. For the short-term, as explained in Appendix G, demand has been suppressed by the response to earlier drought conditions and the economic recession in the Bay Area. As demand and population within the service area increases, however, the aggressive conservation levels set forth in the UWMP are expected to further limit the feasibility of achieving rationing levels beyond 15% during multiple dry years without severe hardship to EBMUD's customers.

The adoption of the UWMP plan, including the mandated SBx7-7 targets, water shortage contingency actions, and the plan to continue the development of recycled water projects, will not prejudice the analysis and selection of alternatives for satisfying long-term demand projections as part of the current review and further development of the WSMP 2040. In adopting the 2010 UWMP, EBMUD is complying with the Urban Water Management Planning Act, as well as the Water Conservation Act of 2009, and EBMUD is continuing its long-standing policy, consistent with the Water Code, to provide recycled water in lieu of potable water for landscape irrigation and certain industrial uses where feasible.

It should be noted that the 2010 UWMP is not intended to facilitate funding or development of the enlargement of EBMUD's existing facilities on the Mokelumne River or any of EBMUD's other longer term supplemental supply options, particularly because these supplemental sources are intended to be examined if necessary in the long term, as part of an interrelated set of projects. As noted in Appendix A, the Urban Water Management Plan is required to identify and quantify, to the extent practicable, the expected demand for twenty years and to identify and quantify existing and planned sources to serve that demand. The Act requires that the analysis be reviewed every five years, and these regular reviews will allow EBMUD to revisit the identified supply sources, as well as demands and

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demand reduction options. In the meantime, EBMUD does not intend to use the UWMP as the basis for funding for the identified supplemental supply sources and has instead identified potential supplemental supplies in the UWMP in order to comply with the Urban Water Management Planning Act.

**TI-23 Response**

Please see EBMUD Response:

- TI-1 found on page Appendix C-11 to C-12
- TI-4 found on page Appendix C-12 to C-13
- TI-10 found on page Appendix C-14
- TI-14 found on page Appendix C-15
- TI-19 found on page Appendix C-16

**TI-24 Response**

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

SAIC

**Date Comment Received:** 05/31/2011**Name of Organization/ Agency/ Individual:** SAIC on behalf of Chevron Environmental Management Company**Comment:**

---

**From:** Burns, Thomas A. [mailto:THOMAS.A.BURNS@saic.com]  
**Sent:** Tuesday, May 31, 2011 1:29 PM  
**To:** Jain, Priyanka  
**Cc:** Anzelon, Daniel B.; Hoang, Tan T.  
**Subject:** EBMUD Draft Urban Water Management Plan

Ms. Jain-

Attached is a letter of introduction that was sent to EBMUD in September 2009 regarding inactive former historic petroleum pipelines that were located within EBMUD's service area boundary. On behalf of Chevron Environmental Management Company (CEMC), SAIC is sending this letter and associated pipeline information to you to be used when EBMUD plans urban water management construction projects.



Please contact me with any questions.

Regards-

Thomas A. Burns, PG | Benham, An SAIC Company  
 Principal Geologist/Program Manager  
 Energy, Engineering & Infrastructure Business Unit  
 Office: 916.979.3748

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## Attachment



**Lee Higgins, PG**  
Environmental Project  
Manager

**Chevron Environmental  
Management Company**  
6111 Bollinger Canyon Road  
BR1Y/3484  
San Ramon, CA 94583  
Tel (925) 543-2365  
Fax (925) 543-2323  
lee Higgins@chevron.com

September 3, 2009

Stakeholder Correspondence—East Bay Municipal Utility District

Ms. Lesa R. McIntosh  
Director – Ward 1  
East Bay Municipal Utility District  
375 11th Street  
Oakland, CA 94607

**Subject: East Bay Municipal Utility District**  
Chevron Environmental Management Company  
Historic Pipeline Alignment—Bakersfield to Richmond

Dear Ms. McIntosh:

Chevron Environmental Management Company (CEMC) recently assessed the locations of water transmission pipelines operated by the East Bay Municipal Utility District (EBMUD) in Contra Costa County. The purpose of this letter is to notify stakeholders of EBMUD as to the location of formerly active crude-oil transportation pipelines with respect to the EBMUD Service Area. The intent is that the pipeline location information will be incorporated into future engineering and environmental documents for EBMUD infrastructure/utility projects.

In the early 1900s, Tidewater Associated Oil Company (TAOC) and Standard Oil (Standard) built pipeline systems to transport heavy crude oil from oilfields in the southern San Joaquin Valley to refineries in the San Francisco Bay Area. These pipelines were operated until the early 1970s when they were decommissioned. Currently, CEMC manages work associated with these historic pipelines.

Evidence of historic releases associated with the formerly active pipelines is sometimes identified during the course of underground utility work and other subsurface construction activities near the pipeline right-of-ways. Generally, residual weathered crude oil associated with TAOC's and Standard's historical pipeline operations can be observed visually; however, analytical testing is necessary to confirm that the likely source of the affected material is associated with these former pipelines. Analytical results from human health risk assessments performed by CEMC at several known historical pipeline release sites confirm that soil affected by the historic release of product from the pipelines is non-hazardous, and does not pose significant health risks.

CEMC's experience indicates that the potential exists for subsurface soil along and near the former TAOC and Standard alignments to be affected by undocumented residual weathered crude oil; however, encountering affected soil from these former pipelines should not delay the progress of EBMUD projects. CEMC requests to be informed of planned projects in the vicinity of the former TAOC and Standard alignments.

Ms. Lesa R. McIntosh  
September 3, 2009  
Page 2

For more information regarding the Historical Pipeline Portfolio—Bakersfield to Richmond alignment, please visit <http://www.hppinfo.com/>. If you have any questions, require additional information or would like to request more detailed maps, please call SAIC consultants Tom Burns at (916) 979-3748 or Mohamed Ibrahim (916) 979-3828.

Sincerely,

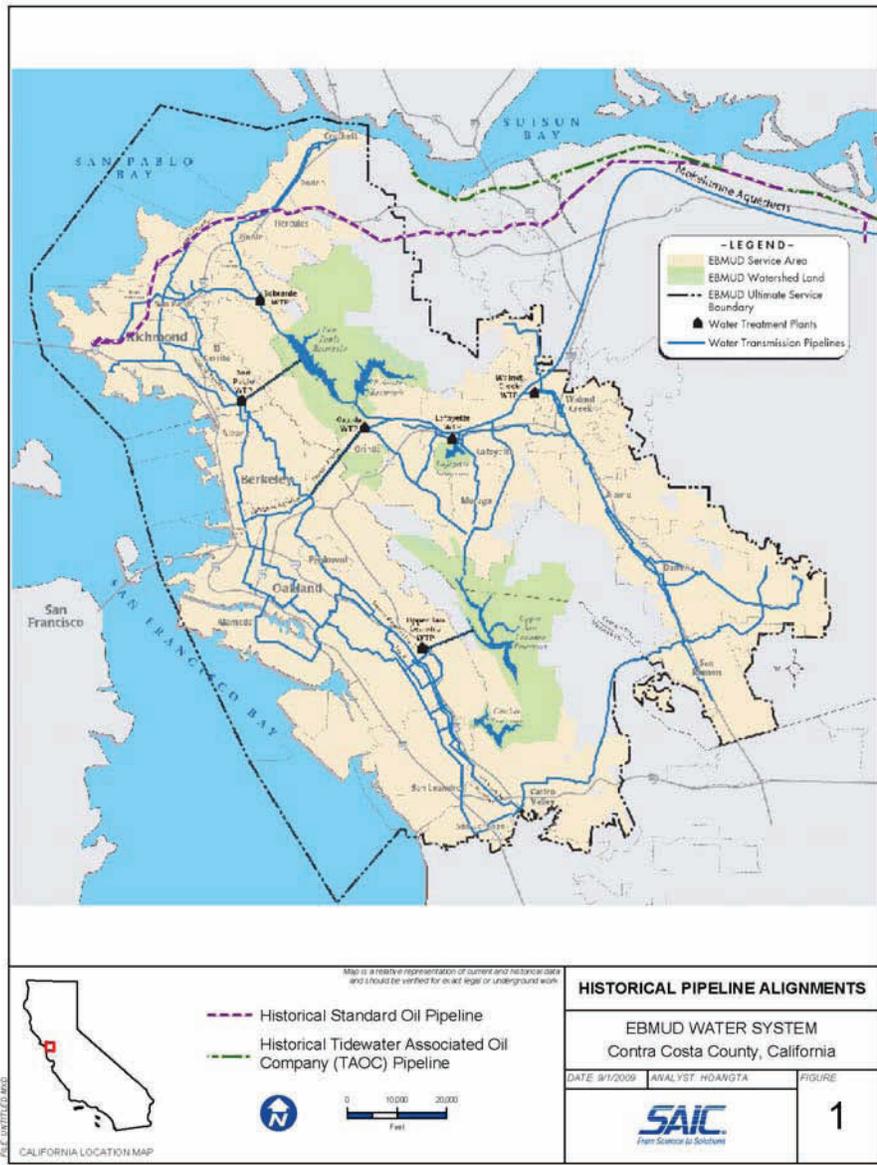
Lee Higgins, PG

LPH/klg

Enclosures:  
Figure 1. Historic Pipeline Alignments

cc: Mr. Tom Burns – SAIC  
3800 Watt Avenue, Suite 210, Sacramento, California 95821  
Mr. Mike Jenkins – SAIC (letter only)  
3800 Watt Avenue, Suite 210, Sacramento, California 95821  
Mr. Mohamed Ibrahim – SAIC  
3800 Watt Avenue, Suite 210, Sacramento, California 95821

Attachment



**EBMUD Response:**

**SAIC -I Response**

EBMUD’s Urban Water Management Plan 2010 provides an assessment of water supply availability and water demand for a 20 year horizon as well as a water shortage contingency plan. Your comment is intended for use during construction projects and would not be applicable to this water management plan. Your comment has been noted.

**Amador Water Agency**

**Date Comment Received:** 05/31/2011

**Name of Organization/ Agency/ Individual:** Amador Water Agency

**Comment:**

---

A Public Agency



12800 Ridge Road, Sutter Creek, CA 95685-9630 • www.amadorwater.org • OFFICE: (209) 223-3018  
FAX: (209) 257-5281

May 26, 2011

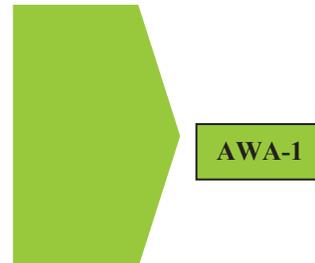
Mr. Alexander Coate  
General Manager  
EBMUD  
375 11<sup>th</sup> Street  
Oakland, CA 94607

Re: EBMUD Urban Water Management Plan Update

Dear Mr. Coate,

The Amador Water Agency values its partnership with EBMUD in the Mokelumne Water Forum and Upper Mokelumne River Watershed Authority. We encourage EBMUD to continue to seek regional solutions for future water supply. Like you, we are working to ensure that the future water needs of our ratepayers can be met in the most cost-effective manner with the least controversy and minimal social, economic and environmental harm.

We look forward to continue working with EBMUD to develop regional water solutions that will provide the future water supply security that all parties in the Mokelumne Forum desire and to protect the Mokelumne River and its important environmental resources.



Sincerely,

A handwritten signature in blue ink that reads 'Gary Thomas'.

Gary Thomas  
Amador Water Agency  
Vice President, Board of Directors

---

**EBMUD Response:**

**AWA-1 Response**

EBMUD's Urban Water Management Plan 2010 contains a discussion of regional conjunctive use projects on page 2-21 which can provide benefits to a broad range of Mokelumne River basin stakeholders. Your comment has been noted.

**Edith Luis**

**Date Comment Received:** 05/23/2011 and 06/03/2011  
**Name of Organization/ Agency/ Individual:** Edith Luis

**Comment:**



May 24, 2011

Edith Luis  
 14946 Raven Rd.  
 Pioneer, CA 95666

RE: Correspondence

Dear Ms. Luis,

We received your letter dated May 19, 2011. Thank you for your comments on the Draft Urban Water Management Plan 2010 (UWMP 2010). Comments received by May 31, 2011 will be addressed in the final UWMP 2010.

In order to respond to your letter (enclosed), please clarify the following statement:

“Could we revise a bit less a bit more often? 2011-2013 \ 2013-2015”

Thank you for participating in the public review process.

Sincerely,

*Priyanka Jain*  
 Priyanka K. Jain  
 Project Manager – UWMP 2010

RECEIVED  
 JUN 03 2011

WATER RESOURCES PLANNING DIV.

PKJ:smc

Enclosure

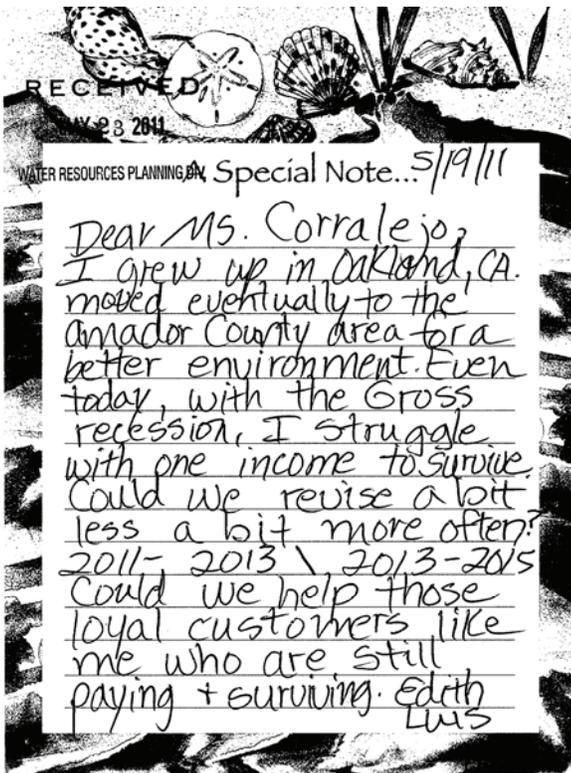
*example:  
 Charge rates at lower cost  
 every 2 yrs instead of "hike"  
 every 4 yrs — to long term  
 Customers like me...  
 Thank you  
 Edith Luis*



375 ELEVENTH STREET • OAKLAND • CA 94607-4240 • TOLL FREE 1-866-40-EBMUD

Rec'd Paper

Edith Luis



**EBMUD Response:**

**EL-1 Response**

EBMUD water rates and rate structure are established biennially by the EBMUD Board of Directors. Any changes are subjected to a procedure of public notice and hearing to allow for input from the public and rate payers. Page 3-13 of the UWMP provides more information on this public notification process.

Randy Berg

Date Comment Received: 05/17/2011

Name of Organization/ Agency/ Individual: Randy Berg

Comment:

RECEIVED

MAY 17 2011

WATER RESOURCES PLANNING DIV.

May 12, 2011

To the board of EBMUD,

I happened to attend the February 4th hearing in Judge Frawleys' court room. One of the first things that your attorney stated was that EBMUD **DID NOT NEED TO ENLARGE THE PARDEE RESERVOIR**. Was he lying to the judge? Why is the enlargement of the Pardee Reservoir still listed as a possible surface water supply option in your draft UWMP? You lost that lawsuit. The Judge ordered, among other things, that you evaluate and consider the option of joining in the Los Vaqueros expansion. Why is that NOT in your draft UWMP? The environmental groups are not going to go away. They will fight you to the bitter end on this and cost you plenty of your ratepayer's dollars. Doug Linney stated back in October 2009 that the Pardee Reservoir expansion would be an albatross around your necks and he is right. The Los Vaqueros expansion has no opposition by environmental groups. Storing your water closer to your customers so any catastrophe in the delta won't cut off your supply seems like a no brainer. Perhaps that's your problem. no brains! Stop listening to your attorneys who only want to line their pockets by fighting this issue. Step into the 21st century and leave the technology of the 20th century behind! Remove the option to enlarge the Pardee Reservoir from your plans!!!

Sincerely,



Randy Berg  
PO Box 266  
Jackson, CA 95642

RB-1

EBMUD Response:

RB-1 Response

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

Lary Heath

**Date Comment Received:** 05/14/2011

**Name of Organization/ Agency/ Individual:** Lary Heath

**Comment:**

---

**From:** Lary Heath [laryheath@sbcglobal.net]  
**Sent:** Saturday, May 14, 2011 12:00 PM  
**To:** Corralejo, Suzanne  
**Subject:** Conservation first

Ms. Corrale,

Before the Pardee, do more for conservation and grey water. If we did, probably would not need the dam.  
Thank you.

Lary Heath



LH-1

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**EBMUD Response:**

**LH-1 Response**

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

Please see EBMUD Response TI-3 found on page Appendix C-12 of EBMUD's UWMP for further details on EBMUD's conservation efforts.

Please see EBMUD Response TI-4 found on page Appendix C-12 to C-13 of EBMUD's UWMP for a discussion of graywater.

**Michael J. Spadoni****Date Comment Received:** 05/12/2011**Name of Organization/ Agency/ Individual:** Michael J. Spadoni**Comment:**

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**From:** Michael J. Spadoni [mailto:michaeljack@volcano.net]  
**Sent:** Thursday, May 12, 2011 6:27 AM  
**To:** Corralejo, Suzanne  
**Subject:** NO Pardee Expansion up the Mokelumne River

Expand Los Vaqueros instead!

Better Yet: Teach EBMUD and its customers (better called "consumers"?) to conserve and reuse water, and leave all natural flows NATURAL...

Michael J. Spadoni  
PO Box 430 / 1902 Garner Road  
Rail Road Flat, CA 95248

**MJS-1**

---

**EBMUD Response:****MJS-1 Response**

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

Please see EBMUD Response TI-3 found on page Appendix C-12 of EBMUD's UWMP for further details on EBMUD's conservation efforts.

Please see EBMUD Response TI-18 found on page Appendix C-15 to C-16 of EBMUD's UWMP for further details on EBMUD's recycled water program.

Lee R. Peterson

**Date Comment Received:** 05/12/2011

**Name of Organization/ Agency/ Individual:** Lee R. Peterson

**Comment:**

**From:** solarnwind@gmail.com [mailto:solarnwind@gmail.com]  
**Sent:** Thursday, May 12, 2011 9:13 AM  
**To:** Corralejo, Suzanne  
**Cc:** Linda & John Judd; Phyllis Murdoch; Jane P. Hodgson; Nadine Peterson; Mike Tuciarone; Lindsey Peterson  
**Subject:** It's Time for EBMUD to Drop its Plans to Expand the Pardee and Destroy the Mokelumne Wild River !

Dear EBMUD Board Members,

As a former resident of the East Bay and someone that still has most of my extended family living in the East Bay; I understand how important it is for EBMUD to work toward securing water for its residents and customers in the future.

As someone that is concerned about protecting our environment, I am deeply concerned about EBMUD's apparent obsession with moving ahead with plans to raise Pardee Reservoir and thereby destroy this wonderful whitewater section of the Mokelumne River. This is in spite of overwhelming public and local opposition from environmentalists and residents in and around Jackson, including conservation groups, fishermen, rafting and kayaking enthusiasts.

The court ruling that EBMUD lost on April 11th of this year was overwhelming. EBMUD failed to properly and honestly analyze or mitigate impacts to the river's cultural and recreational resources. EBMUD violated the California Environmental Quality Act by failing to consider the expansion of Los Vaqueros Reservoir as one of its water supply alternatives. Los Vaqueros is right in EBMUD's back yard, EBMUD refused to look at Los Vaqueros Reservoir as an alternative and viable source.

EBMUD's reputation as a responsible utility district has suffered. This reflects negatively on all residents in the East Bay.

EBMUD's Board of Directors have a stated "Public Responsibility to Preserve the region's resources and set industry standards for how the water utilities conduct themselves" <http://www.ebmud.com/about-ebmud/board-directors/your-board-members>

I believe if EBMUD Directors continue to conduct themselves in this fashion, by pursuing this course of action, then you are in violation of your public trust. Your responsibilities should extend beyond the perimeter that makes up EBMUD's customers. It should also reflect that of local communities that your actions have a direct impact on.

It's time to drop the Pardee expansion from EBMUD's long-term water plans.  
 It's time to stop EBMUD plans that would destroy the wild & Scenic Section of the Moke  
 It's time to consider the expansion of Los Vaqueros Reservoir, which the court ordered EBMUD to consider.

Thank you for listening, if you're listening,

Sincerely,  
 Lee R. Peterson



LRP-1

**EBMUD Response:**

LRP-1 Response

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

**Wayne and Valerie Brunmeier****Date Comment Received:** 05/11/2011**Name of Organization/ Agency/ Individual:** Wayne and Valerie Brunmeier**Comment:**

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**From:** Wayne Brunmeier [mailto:wbrunmeier@hotmail.com]  
**Sent:** Wednesday, May 11, 2011 11:26 AM  
**To:** Corralejo, Suzanne  
**Subject:** Pardee Expansion

Dear Ms. CORRALEJO,

As a long time resident of Calaveras County we encourage EBMUD to drop the Pardee expansion from their long-term water plans and fully support National Wild and Scenic River designation for the Mokelumne from Salt Springs Dam to the backwaters of Pardee Reservoir.

Thank you,

Wayne Brunmeier  
Valerie Brunmeier  
Valley Springs, Ca.

**WB-1**

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**EBMUD Response:****WB-1 Response**

Please see EBMUD Response TI-1 found on page Appendix C-11 to C-12 of EBMUD's UWMP for a discussion of the identified supplemental supply projects.

**Date Comment Received:** 04/21/2011

**Name of Organization/ Agency/ Individual:** John Knox White

**Comment:**

*Note: Comment below is typed verbatim as heard on the recorded tape during the April 21, 2011 UWMP 2010 Public Meeting.*

**Comment by John Knox White:**

Thank you for the presentation and clearly this is the result of a lot of work. I have a couple of comments that I [am] probably less comfortable making being the only person speaking here. Quickly, I'm pretty new to a lot of this water management, water management plans, and whatnot; by which I mean I didn't know they existed until about two weeks ago.

Reading through the Water Management Planning Act, one of the three policy goals of the Act is for Urban Water Suppliers should be required to develop water management plans to actively pursue the efficient use of available supplies. And yet, I found that this Plan[s] directly stated goal is designed to satisfy the requirements of this Planning Act, but to provide the public with a report on EBMUD's progress implementing conservation. I think that in reading the Plan it seems to have missed the goal of actually actively pursuing policies and planning to...it's the actual pursuit part that seems to be missing in the Plan. The Plan is more of a static document that kind of faithfully provides the required elements that are in the Planning Act, but it doesn't actually plan for the next thirty years. It represents Plans that have already been put together, and says here what we are doing and here's what we have done. I think that it's a missed opportunity; I'm unclear on whether or not it meets the letter of what the goal was, and I'm uncomfortable given that you guys are one of the implementing agencies for getting the Planning Act started, and together; I won't tell you what it's suppose to be for. But, I think that it's a great snapshot and it shows that you guys are doing a lot of work and whatever else, but it's a missed opportunity to come to the Board with a document, that is only put together every five years, and say, OK Board we want to set a course for the future. It's more of a, if somebody wants to say hey, what we were doing in 2010 and what were we thinking could possibly happen in the future. You'd pull it off the shelf and read it and say, oh, OK that's what was going on and here's were some of the conversations that were happening.

JKW-1

An example, I think is the drought planning section, which is probably the only issue with EBMUD that I've been involved in; I was...I spoke once before the Board and it was during the drought pricing. Which was a... it wasn't contentious, but there were a variety of ideas on how the District should move forward with encouraging the voluntary reduction of water use. To me, hum, here I'm going to read what I wrote, because I'm stumbling here. The document identifies the drought committee, it lists out the committee's rules and responsibilities, it identifies what was done from 2010 during the last dry spell, and it outlines possible approaches for the future in Appendix G. But all that it presented is a process for dealing with another drought, but there is no Board...you're not asking your Board to actually say, but this is how you are going to deal with it. These, when we have to make the difficult decisions, these are the policies by which we are going to make the decisions when the staff drought committee gathers, because a drought has been declared. What are the guiding policies that the Board would expect staff to be trying to meet and coming up with a proposal for how to do it? I'm not saying that none of us know what that drought is going to look like at this time. I can be a policy and process person, I think that well design policies and processes lead us to really good results and that documents like this, which are put together every five years, are the appropriate place to really have these large conversations, and holistic discussions about how do we want to make decisions about how we are going to deal with the drought and encourage behavior and what not. It felt to me like that was missing from this document. This morning I was told that it was the Water Supply Management Plan that actually had a lot of the policies in it, but when I went to that it too just explained what has been done in terms of conservation. There were no, where are we going and how we are going to drive the decisions that lay before us. Again, that's not to say that we have to change everything that's being done, but the document does do a pretty good job of laying out issues that are coming forward. I would expect that... it would seem to me that a plan would also lay out the path for how we are going to get there, and ask the Board for direction on how we should be shaping that path. Because you know there are so many options, like I said, Appendix G lists out five or six different ways we can deal with the drought next time. That is to me the opposite of planning, that's

JKW-2

## John Knox White

a menu, and maybe we should be looking at not necessarily choosing, possibly choosing, how we want to deal with the drought. But if we don't want to make that decision right now, because every drought is different and every time is different, there maybe some issues about equity, current water use etc. that the Board should be looking at and saying, OK, but when you come back with a plan we want to encourage conservation and reduction of water this way, etc. Knowing that you are trying to have this adopted into the state by July it's probably unlikely you are going to be able do that, but one might be able to adopt into this a set of policies that say we are going to start having those conversations by the next time. That the future Water Management Plans will have that kind of...laying out the path forward.

JKW-2

I have a couple of questions based on what I heard and I really appreciate it being able to hear this presented as well, but quickly, there were a couple of, just, these are just small things. There are a couple of places in which accumulative data is presented as opposed to household data, and I thought it was actually...I hadn't been aware of the Steinberg amendment from 2009 that actually set the state goals for what you guys are trying to achieve. And I was interested that those are per capita goals, and yet almost everything that is presented through here is cumulative information that shows water usage constantly going up, and I know that it is a... right.... The agency has to be aware of total water needs so that you can plan for how much more water your going to need in the future. On the other hand, I think that if you are also at the same time trying to be, to minimize that by looking at reducing household, or reducing per capita use, or per household use, a lot of the information would be well served by presenting the per capita or per household usage data as well. But I had two kind of specific examples that, I think, figure 4.5 shows the west-of-the-hills and east-of-the-hills in aggregate and it ignores, or it doesn't present at all that west-of-the-hills households in people far out number the east-of-the-hills households. And a reasonable reader reading this would assume that the west-of-the-hills households are using twice as much water, and really are, the water usage is rampant over here on the west, when in fact we know there are about three times as many people living over here and that the per household usage is about the reverse. I think that is a... where some of the graphs and whatever else, I think it would be good to show the per household...this is one where I think; actually the graph itself is showing the exact opposite of what is happening, and actually leads to misunderstanding of the District and water use within the District. I would assume that the EBMUD's databases could easily kick this out on a zip code or by city basis that would provide a more accurate and more useful presentation that would show up a picture of where is water getting used and in what ways so... and I would imagine that would be useful in terms of conservation etc. those programs that are going on.

JKW-3

And the other one, was just I found it kind of jarring to read the accumulative amounts that are being spent on the conservation programs since 1976 that was just a... it certainly sounds big when you say, since 1970's EBMUD has invested 65 million dollars in implementation of customer targeted water conservation programs. When you look at the per annual it's...you aren't spending that much and you are doing great work. I think in terms of budgeting and whatever else, it would be actually better to show what you are spending every year. If I was in charge of the department I would want to show that too; just to make sure that it doesn't dip down, you know, you can cut that budget in half and it would still show the accumulative going up. If you are trying to make the case that we need to conserve more at budget time, having a report that shows how much we are spending right now, and that we haven't really increased our spending on conservation, from what I could calculate trying to look at the differences in the accumulative, I think having that spelled out annually, what we are spending would be a little more useful. Plus 65 million dollars since the 1970's is a...I don't want to say it's a meaningless number; it's great that the money's been spent, but I'm not sure what anybody reading that can really assume, is that a big number, or a good number, or it doesn't really tell us how that relates to the works' being done and does that seem like...even...does that seem like a good number or not?

JKW-4

So those are my, I'll say criticisms, and I'm sorry, unfortunately that tends to sum up public comment [inaudible]. But in terms of planning I want to say that I think EBMUD's use of local planning documents, as a baseline for how the East Bay's going to grow is a good thing. Rather than trying to ascertain something from, let's say, the census data and whatever else, I think looking at how local communities are planning to grow and use their land use and whatever else is probably a better measure of moving forward. A comment that was...this was something I learned about during the drought that the idea of going into drought...the drought... this will give you an example of a policy that I think should be in this document. The idea that drought pricing leads to a budget gap, leads, I think that...this

JKW-5

**John Knox White**

is bigger than this document, but there is probably a big conversation to be had about how EBMUD is doing its pricing if encouraging people to conserve their water becomes a budget issue. And that perhaps there is a different way to price the water based on usage that might allow that to become less of a problem. Water and water availabilities only going to become probably more of a problem as we move forward, and looking at that, so that... looking at that again at a time when we don't have to implement it. Because there isn't a drought now, would maybe be the time of looking at how we might want to structure drought pricing so that it doesn't lead to cut backs. At a time according to this report EBMUD's actually going out and spending more money, because in order to get people to reduce their uh,... five million dollars for the...to do communications, whatever, for the drought plan that was a eye opening, not in a bad way, but eye opening in a wow I was surprised that you guys have brought that many more people on. I know it's not a huge number especially when you're dealing with three hundred thousand households etc. but again I...EBMUD's got to find a way to do; be able to do drought pricing and not drive itself into a hole. And again I think Plans like this are a time to do that and then you know I'm not sure if anybody, if Mr. Harris wants to answer this question or not, but I was interested that the gallons per day includes commercial and whatnot. And I'm curious how does a district like EBMUD deal with the idea that you have all these cities within the District working really hard to bring new commercial and whatever else businesses here, but the population may not grow accordingly you could end up increasing your commercial water use significantly with a small change in, probably unlikely, the small change in population and end up having to conserve more to hit that 20%. Is there a way for which...I'm just curious... does the state take that into account? And the other question I have is I know that EBMUD has been very, very successful in the conservation you guys have done compared to other water districts a really great job when we're looking at the 2020. Do you guys get credit for that or do you still have to bring down your water usage 20 whereas other districts that have kind of, let's say, allowed water use to be more rampant they're not making the same...you know, there's a certain point in time everybody cuts and cuts and cuts the next cut is harder to make the next cut is even harder to make. I don't think we are anywhere near where it's really difficult for any of us to make those cuts. My wife is from west Australia their water use there, in a place that lives as nice a lifestyle as we do here in the Bay Area, is less than half. I even want to say it's about a third we do per household, so I think there's lots of places to go. But I'm curious how the state's...how your guys past success, does that come back and bite us as a District in the behind? I'm all done, thank you.



**JKW-5**



**JKW-6**



**JKW-7**

**EBMUD Response:**

**JKW-1 Response**

Consistent with the UWMP Act, EBMUD's UWMP describes the service area and the projected water needs of the supplier, and identifies and quantifies existing and planned water sources available to serve demand over a 20 year planning period. (Water Code, sec. 10631).

EBMUD has in place adopted organizational principles and numerous existing policies that support planning activities to pursue the efficient use of available water supplies. These principles and policies, in conjunction with the UWMP and other water management plans, all provide guidance on demand management and water use efficiency.

For instance, the guiding principles in EBMUD's mission statement (see page 1-2 of the UWMP) clearly directs EBMUD to pursue water resource planning activities that ensure environmental responsibility and sustainability. Policies include Policy 9.05 Non-Potable Water, Section 29 Prohibiting Wasteful Use of Water, and Section 31 Water Efficiency Requirements (see Appendix F of the UWMP), which all promote recycled water use, the efficient use of available supplies, and conservation that are key components of EBMUD's long-term water supply planning objectives.

## John Knox White

is bigger than this document, but there is probably a big conversation to be had about how EBMUD is doing its pricing if encouraging people to conserve their water becomes a budget issue. And that perhaps there is a different way to price the water based on usage that might allow that to become less of a problem. Water and water availabilities only going to become probably more of a problem as we move forward, and looking at that, so that... looking at that again at a time when we don't have to implement it. Because there isn't a drought now, would maybe be the time of looking at how we might want to structure drought pricing so that it doesn't lead to cut backs. At a time according to this report EBMUD's actually going out and spending more money, because in order to get people to reduce their uh,... five million dollars for the...to do communications, whatever, for the drought plan that was a eye opening, not in a bad way, but eye opening in a wow I was surprised that you guys have brought that many more people on. I know it's not a huge number especially when you're dealing with three hundred thousand households etc. but again I...EBMUD's got to find a way to do; be able to do drought pricing and not drive itself into a hole. And again I think Plans like this are a time to do that and then you know I'm not sure if anybody, if Mr. Harris wants to answer this question or not, but I was interested that the gallons per day includes commercial and whatnot. And I'm curious how does a district like EBMUD deal with the idea that you have all these cities within the District working really hard to bring new commercial and whatever else businesses here, but the population may not grow accordingly you could end up increasing your commercial water use significantly with a small change in, probably unlikely, the small change in population and end up having to conserve more to hit that 20%. Is there a way for which...I'm just curious... does the state take that into account? And the other question I have is I know that EBMUD has been very, very successful in the conservation you guys have done compared to other water districts a really great job when we're looking at the 2020. Do you guys get credit for that or do you still have to bring down your water usage 20 whereas other districts that have kind of, let's say, allowed water use to be more rampant they're not making the same...you know, there's a certain point in time everybody cuts and cuts and cuts the next cut is harder to make the next cut is even harder to make. I don't think we are anywhere near where it's really difficult for any of us to make those cuts. My wife is from west Australia their water use there, in a place that lives as nice a lifestyle as we do here in the Bay Area, is less than half. I even want to say it's about a third we do per household, so I think there's lots of places to go. But I'm curious how the state's...how your guys past success, does that come back and bite us as a District in the behind? I'm all done, thank you.

JKW-5

JKW-6

JKW-7

**EBMUD Response:****JKW-1 Response**

Consistent with the UWMP Act, EBMUD's UWMP describes the service area and the projected water needs of the supplier, and identifies and quantifies existing and planned water sources available to serve demand over a 20 year planning period. (Water Code, sec. 10631).

EBMUD has in place adopted organizational principles and numerous existing policies that support planning activities to pursue the efficient use of available water supplies. These principles and policies, in conjunction with the UWMP and other water management plans, all provide guidance on demand management and water use efficiency.

For instance, the guiding principles in EBMUD's mission statement (see page 1-2 of the UWMP) clearly directs EBMUD to pursue water resource planning activities that ensure environmental responsibility and sustainability. Policies include Policy 9.05 Non-Potable Water, Section 29 Prohibiting Wasteful Use of Water, and Section 31 Water Efficiency Requirements (see Appendix F of the UWMP), which all promote recycled water use, the efficient use of available supplies, and conservation that are key components of EBMUD's long-term water supply planning objectives.

**JKW-2 Response**

EBMUD's water supply shortage response is presented in detail in Chapter 3 of the UWMP. Drought Management Program Elements, presented in Table 3-3 of the UWMP, outline the various actions that EBMUD may take based on the severity of a drought to encourage conservation and reduction of water use. As referenced in Appendix F of the UWMP, water service regulations Sections 28 (adopted with a water shortage emergency declaration), 29, and 31, and Policy 9.03 already provide guidance on responding to a water supply shortage. The combination of the actions outlined in Table 3-3, and the underlying regulations, and policies create the basis for developing a drought management program customized to flexibly meet the unique needs of each drought.

**JKW-3 Response**

Figure 6-3 of the UWMP charts historic daily per capita water demand.

EBMUD acknowledges that the east-of-hills and west-of-hills aggregate water use for single-families can lead to a misunderstanding of regional water use characteristics within the EBMUD service area. Consequently EBMUD has included a new figure (Figure 4-6) in the final UWMP that illustrates the variation in single-family water use per account within the EBMUD service area.

**JKW-4 Response**

Figure 6-2 of the UWMP illustrates EBMUD's cumulative annual Water Conservation Program (WCP) expenditures. Annual expenditures can be estimated from the same graph by comparing each year's cumulative expenditure with that from the previous year. As noted on pages 6-4 through 6-5 of the UWMP, EBMUD's historical expenditures for the WCP was \$65 million since the 1970s, and the five-year budgetary plan through FY15 includes an additional \$18.3 million. This information provides a comparison of historic and future annual expenditures.

**JKW-5 Response**

EBMUD's BOD considers drought rate pricing when it declares a water shortage emergency. Drought rate pricing development involves analyses of numerous complex variables including water availability, consumption behavior, and anticipated consumption reductions, which provide inherent uncertainties. As noted on page 3-12 of the UWMP, EBMUD adopts a revenue schedule to allow increasing the volume rate, adding a drought surcharge, and using the contingency and rate stabilization reserve fund to fully recover costs of providing ongoing water service, mitigate the expense of implementing the Drought Management Program, and recover lost revenues from lower water consumption. A well-designed drought rate pricing is desired. Gradual improvements in calibrating forecasts will be gained through insight from experience of past droughts.

**JKW-6 Response**

Since the 1970s, demand management has been an important part of EBMUD's water practices and policies to promote reasonable and efficient use of supplies. Figure 6-3 of the UWMP shows that EBMUD has made significant strides in decreasing historical daily per capita water demand as a result of EBMUD's aggressive water conservation and recycling efforts and other factors. This continuous effort in reducing daily per capita water use goes beyond the short-term focus on consumption reduction as required through SBx7-7.

**John Knox White**

Current statewide per capita water use has been dramatically reduced in some communities due to a combined 3-year drought and the significant economic recession. The law developed by the legislature and the methodology adopted by the Department of Water Resources, as mandated by SBx7-7, were designed to not limit the economic growth of the state, while recognizing and ensuring efficiency in past and future water use respectively.

To allow agencies including EBMUD to capture previously realized conservation and recycled water savings, SBx7-7 was designed with flexibility to allow suppliers to select one of four methods for establishing its SBx7-7 targets. EBMUD selected a target method that would allow EBMUD to be credited for its aggressive water conservation and recycling programs, implement demand management program budgets that are appropriately tailored to customer usage, anticipate the post-drought and economic rebound, and account for anticipated demand hardening in consumption behavior.

Furthermore, EBMUD is committed to an estimated projected use at 144 gallons per capita per day (gpcd) in year 2020, which exceeds the requirement of its SBx7-7 target of 150 gpcd.

**JKW-7 Response**

Please see EBMUD Response TI-3 found on page Appendix C-12 of EBMUD's UWMP for further details on EBMUD's conservation efforts.

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## APPENDIX D. BOARD RESOLUTIONS

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## APPENDIX D. BOARD RESOLUTIONS

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RESOLUTION NO. 33832-11

### ADOPTING THE URBAN WATER MANAGEMENT PLAN 2010

Introduced by Director Foulkes ; Seconded by Director Mellon

WHEREAS, the California Urban Water Management Planning Act (“Act”) requires urban water suppliers to adopt an urban water management plan every five years; and

WHEREAS, the East Bay Municipal Utility District (“District”) last updated its Urban Water Management Plan in accordance with the provisions of the Act in 2005; and

WHEREAS, in accordance with the requirements of the Act, the District commenced a review of the Urban Water Management Plan and an update to its provisions in 2010, and based upon the review, the District has prepared a revised and updated Urban Water Management Plan (Plan); and

WHEREAS, a draft of the updated Plan was made available for public inspection beginning in April 2011, and a noticed public hearing was conducted by the District Board of Directors on May 10, 2011, and all comments received from the public and from public agencies have been reviewed and considered and the District has modified the Plan.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of the East Bay Municipal Utility District does hereby adopt the Plan dated June 2011, and directs the Secretary to file a copy of the Plan with the California Department of Water Resources, to distribute a copy of the Plan to the California State Library, and copies to 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 28<sup>th</sup> day of June, 2011 by the following vote:

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

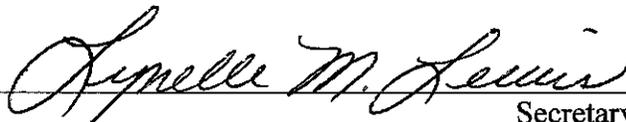
NOES: None.

ABSENT: Director Linney.

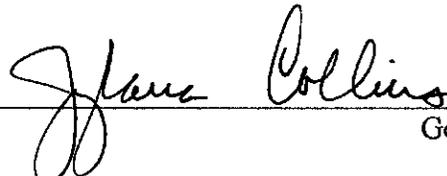
ABSTAIN: None.

  
\_\_\_\_\_  
President

ATTEST:

  
\_\_\_\_\_  
Secretary

APPROVED AS TO FORM AND PROCEDURE:

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

RESOLUTION NO. 33833-11ADOPTING UPDATED URBAN WATER SHORTAGE CONTNGENCY PLAN FOR  
INCLUSION WITHIN THE EBMUD UPDATED URBAN WATER MANAGEMENT PLAN  
2010

Introduced by Director Foulkes ; Seconded by Director Mellon

WHEREAS, in 1992, the Board of Directors of East Bay Municipal Utility District adopted an Urban Water Shortage Contingency Plan in accordance with the requirements of the California Urban Water Management Planning Act; and

WHEREAS, recent water resource planning changes, including an updated rationing policy, recent drought events, and the availability of an additional dry year supply from the Freeport Regional Water Facility, make it necessary to update the Contingency Plan to plan and respond to periods of water shortage; and

WHEREAS, a draft of the Contingency Plan, and the draft Urban Water Management Plan in which it is included, were made available for public inspection beginning with a first draft in April 2011; and

WHEREAS, a noticed public hearing was conducted by this Board of Directors on May 10, 2011, and all comments received from the public and from public agencies have been reviewed and considered.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors does hereby adopt the Urban Water Shortage Contingency Plan and directs the Secretary to file a copy of the Contingency Plan, as included in the 2010 Urban Water Management Plan with the California Department of Water Resources within 30 days of adoption of the 2010 Urban Water

Management Plan. The Secretary is further directed to make the plan available for public review during normal District business hours.

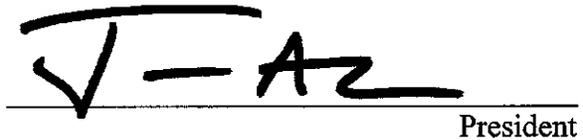
ADOPTED this 28<sup>th</sup> day of June, 2011 by the following vote:

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

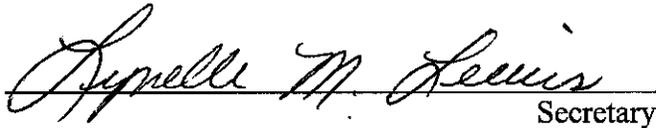
NOES: None.

ABSENT: Director Linney.

ABSTAIN: None.

  
\_\_\_\_\_  
President

ATTEST:

  
\_\_\_\_\_  
Secretary

APPROVED AS TO FORM AND PROCEDURE:

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

## APPENDIX E. SOUTH EAST BAY PLAIN GROUNDWATER BASIN OVERVIEW

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## APPENDIX E. SOUTH EAST BAY PLAIN GROUNDWATER BASIN OVERVIEW

*In accordance with the Urban Water Management Planning Act under California Water Codes section 10631(b), this appendix of the Plan provides a comprehensive description of the South East Bay Plain Basin where the Bayside Groundwater Project (Phase 1 and the potential Phase 2) 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 E-1. Consisting of a portion of the East Bay Plain Basin, the South East Bay Plain Groundwater Basin (SEBPB) is bounded to the east by the Hayward Fault and extends beneath San Francisco Bay to the west. The exact location of the western boundary under the Bay is not precisely known/ defined; therefore, the boundary is assumed to coincide with the edge of the Bay, consistent with the California Department of Water Resources' (DWR) depiction of the basin in their Bulletin 118. 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 three main aquifer systems. The SEBPB aquifer systems include:

- The shallow aquifer 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 middle aquifer is comprised of deposits at depths of about 130 to 375 feet bgs. 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 interfingering 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 local stakeholders such as the Alameda County Public Works Department, Alameda County Water District (ACWD), City of Hayward, and the DWR to share groundwater monitoring data and project operational data. In addition, EBMUD has conducted geohydrological studies and continues conducting subsidence investigations of the SEBPB in partnership with local and federal partners. During the Bayside Groundwater Project's EIR process, EBMUD in partnership with ACWD developed 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) to evaluate potential project impacts on groundwater levels in this area. Currently, EBMUD is exploring feasibility to collaboratively develop a groundwater management plan for the SEBPB in partnership with local stakeholders.

### WATER BUDGET

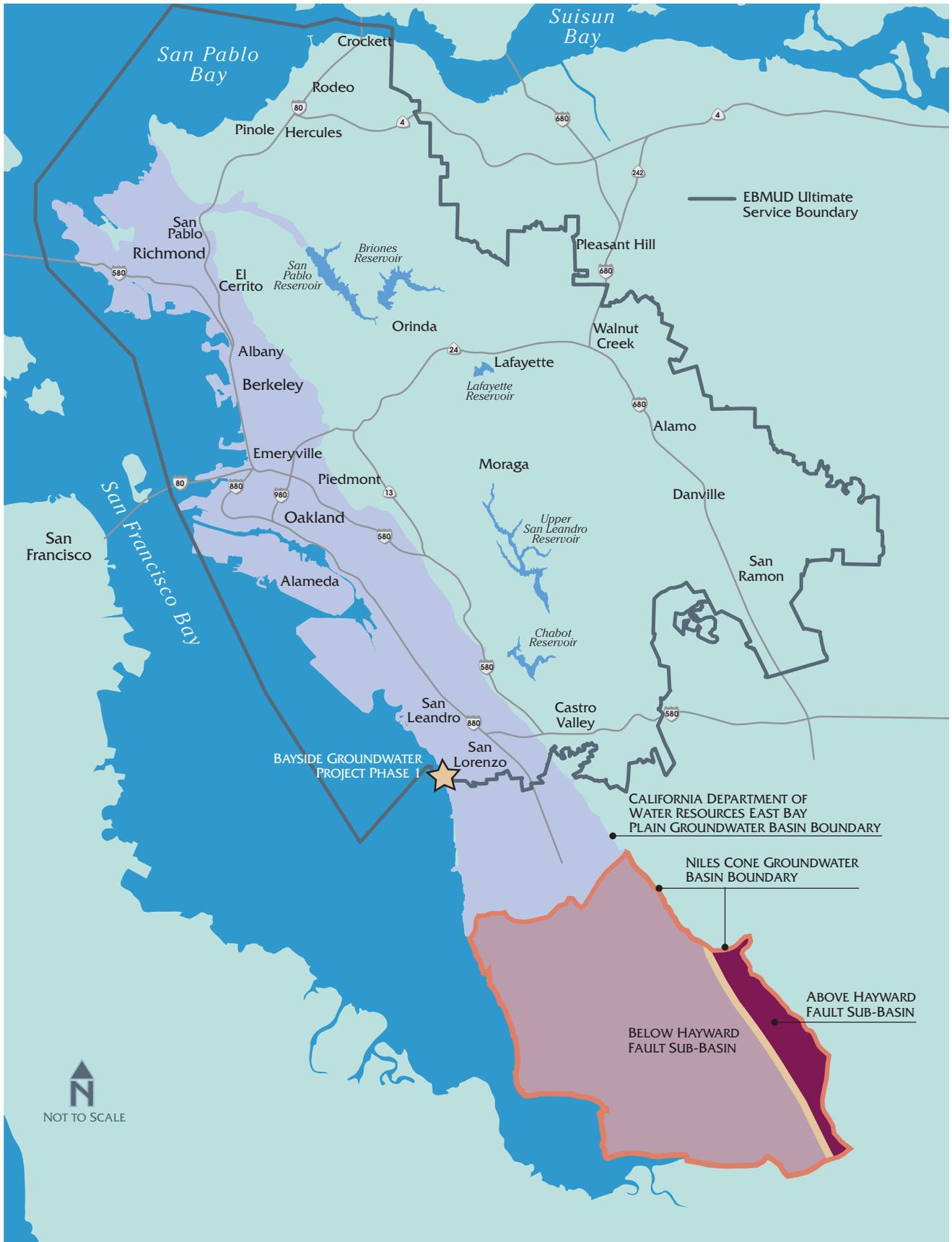
The historic low basin water level and associated low storage volume were observed in early 1960s. Currently the basin is fully recovered from historic pumping and basin water level is steady/ stable. The basin is not in an overdraft condition. Water balance results indicate the basin is experiencing, on average, a net recharge of 1,300 acre-feet (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). This result is reflected in the field, where rising water levels in the Deep Aquifer have been observed for some time.

### SEBPB GROUNDWATER MOVEMENT

Currently, groundwater in the shallow units of the SEBPB generally flows from east to west, from the Hayward Fault

FIGURE E-1

SOUTH EAST BAY PLAIN BASIN



towards San Francisco Bay, with an average horizontal flow gradient of about 0.002. Average horizontal gradients in the middle aquifer are also about 0.002. The horizontal flow gradient in the Deep Aquifer is about 0.001 with a northerly flow component.

Vertical downward gradients (i.e., the head in the upper unit is higher than that of the adjacent lower unit) are present throughout the SEBPB 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 insignificant near the foothills where the Old Bay Mud pinches out.

### **HISTORIC WATER LEVELS**

Maximum drawdown in the SEBPB occurred in the early 1960s. Water levels were at about -90 to -110 feet below Mean Sea Level (MSL) at that time, with gradual recovery to the present. Currently, the basin water levels range approximately between -5 to -10 feet below MSL, under normal water year and basin usage conditions.

### **GROUNDWATER QUALITY IN THE SEBPB**

Groundwater of the shallow aquifer, based on total depths less than about 200 feet bgs, contains relatively high concentrations of total dissolved solids (TDS), chloride, nitrate, and sulfate, especially compared to deeper units, and is more vulnerable 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 portions of the shallow aquifer that underlies the San Leandro/ San Lorenzo area. Iron

concentrations in the shallow aquifer are typically less than 0.05 parts per million. Based on available data, groundwater from wells completed within the intermediate aquifer 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 (wells with depths greater than 500 feet bgs), are primarily found in the southern-most portion of the SEBPB. Groundwater from these wells is generally of high quality with 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. Note that high manganese content is common in native groundwater (not just in the SEBPB). Standard treatment methods for manganese are filtration and dilution. For the Bayside project, the treatment facility includes filter platforms and pipe assembly, which can be used to install manganese filtration system as needed. Radon, which commonly occurs in the air and soil, can also be found in groundwater and is currently not regulated. The native groundwater from the Deep Aquifer of the project area contains radon with the concentration of 800 picocuries per liter. The water quality samples from the Deep Aquifer are also analyzed for hexavalent chromium by using EPA 218.6 method. The analysis did not detect hexavalent chromium at or above the method detection limit.

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## APPENDIX F. EBMUD POLICIES AND RATES

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# Policy 3.07

EFFECTIVE 27 APR 10

SUPERSEDES 14 OCT 08

## RESPONSIBILITY TO SERVE WATER CUSTOMERS

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

Ensure that during times of water shortage, available water supplies are appropriately allocated to water customers.

---

#### Discussion

Water supplies that were available to EBMUD's customers were limited due to rationing necessitated by past drought conditions.

It is expected that the water available for supplying EBMUD's customers will vary over time depending on the following factors: diversions by Mokelumne River users with senior water rights, requirements for instream flows to protect fish and wildlife in the Mokelumne River, the Sacramento- San Joaquin River Delta, and the San Francisco Bay, as well as development of future supplemental supplies.

Water agencies are responsible for planning to meet the needs of their customers through periods of drought with minimal disruption to residential, commercial, and industrial activities within their service area.

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#### Water Service Responsibility

EBMUD recognizes that when there is a water shortage or projected water shortage, EBMUD's responsibility to serve its customers and service area is prioritized as follows:

- First, to serve its existing customers within its existing service area.
- Second, to serve expected new customers within its existing service area, but only if this does not unacceptably impair EBMUD's ability to serve its existing customers.
- Third, to consider serving new customers outside of its existing service area, but only if this does not impair EBMUD's ability to serve existing and expected new customers within its service area.

In accordance with California Government Code, Section 65589.7, when new service connections are restricted by EBMUD's Board of Directors, priority shall be given to applicants for water service to proposed developments within EBMUD's existing service area that include housing units affordable to lower income households, pursuant to administrative procedures adopted and implemented by the General Manager. Applicants granted such priority shall comply with all of EBMUD's Water Service regulations and pay all requisite fees.

Restrictions on provision of new water service connections may be due to the following:

- A declaration of a water shortage emergency condition under California Water Code, Section 350, et seq.
- A determination by the Board of Directors, based on EBMUD's Urban Water Management Plan, that sufficient water supply is not available to support the granting of all requests for new service, as provided in California Government Code, Section 66473.7.

## Responsibility to Serve Water Customers

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- A determination by the Board of Directors, based on a written engineering report, that EBMUD does not have sufficient water treatment or distribution capacity to serve the needs of proposed development.
  - The imposition of a compliance order by the Department of Health Services limiting new connections.
- 

### Authority

Resolution No. 32867-94, June 28, 1994  
As amended by Resolution No. 33443-04, September 28, 2004  
As amended by Resolution No. 33543-06, June 27, 2006  
As amended by Resolution No. 33687-08, October 14, 2008  
As amended by Resolution No. 33763-10, April 27, 2010.

California Government Code, Section 65589.7

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# Policy 7.03

EFFECTIVE 23 NOV 10

SUPERSEDES 24 FEB 09

## EMERGENCY PREPAREDNESS/BUSINESS CONTINUITY

### 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) written and administered to help manage the District's critical functions during any emergency and protect people, property, and the environment. The District will coordinate the EOP function and response with Federal, State, and local agencies and private entities charged with emergency duties. The District will also create and maintain a Business Continuity Program Plan to minimize impacts to critical business functions and enhance its capability to recover operations expediently and successfully following a disruptive incident.

**Emergency** An emergency includes actual or threatened existence of conditions of disaster or extreme peril to critical District functions and/or the health and safety of staff or the public. These conditions may be caused by an earthquake, power outage, dam failure, freeze, water supply contamination, national security incident, and other conditions that may be beyond the capability of District forces and may require support from other political subdivisions, other agencies, volunteer and non-profit organizations, or the private sector.

**Emergency Preparedness Program** The District's Emergency Preparedness Program shall include an EOP written and administered in accordance with the guidelines of the National Response Framework (NRF), the National Incident Management System (NIMS), and the California Standardized Emergency Management System (SEMS). In accordance with NIMS and SEMS, the Emergency Preparedness Program will consist of four phases of emergency management: mitigation, preparedness/planning, response, and recovery. The EOP will include guidelines for identifying and training District staff in the NIMS, designate District staff to critical positions identified in the EOP, and designate 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. The Regulatory Compliance Office will facilitate progress on this program.

**National Response Framework** The NRF is a guide to how the nation conducts all-hazards emergency response. It is built upon scalable, flexible, and adaptable coordinating structures to align key roles and responsibilities across the nation. It describes specific authorities and best practices for managing incidents that range from the serious but purely local, to large-scale terrorist attacks or catastrophic natural disasters. It builds upon the NIMS and focuses particularly on how the Federal Government is organized to support local entities and States in catastrophic incidents.

**National Incident Management System** NIMS is a system mandated by Homeland Security Presidential Directive 5 that provides a consistent nationwide approach for Federal, State, local and tribal governments, the private sector, and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to, and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among Federal, State, local and tribal capabilities, the NIMS includes a core set of concepts, principles, and terminology.

**Emergency Preparedness/Business Continuity**

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**Standardized Emergency Management System**

The State Office of Emergency Services regulates the SEMS which was created by Government Code Section 8607 following the 1991 East Bay Hills Firestorm. SEMS is used to establish consistent response operations, coordinate emergency response, provide a method through which jurisdictions can request assistance, and provide a means for communication among levels of government. To ensure eligibility for state funding of response-related costs, all District emergency plans, procedures, and training will follow the SEMS regulations, and coordinate with the District-wide EOP.

**Authorization During District Emergencies**

When an emergency condition arises that necessitates 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, or successor, 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 of Directors summarizing all expenditures made and contracts executed in response to said emergency. Periodic reports shall be generated at the direction of the Board until the emergency is concluded.

Following a Presidential Declaration of an emergency, the Federal Government historically deploys personnel, equipment and financial resources to support the recovery effort. Following a Governor's State of Emergency Proclamation, State assistance for emergency response costs and permanent restoration assistance for mutual aid/assistance may be available. The Governor may direct execution of the State's emergency plan, or commit other State resources as the situation demands. 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 requesting/negotiating for the needed resources.

**Emergency Operations Director**

The District's 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 consultation with the General Manager, the EOD will identify staff to fulfill the planning and response duties listed in the EOP. As the need arises, the EOD may direct all staff or material resources of the District to combat the effects of a threatened, declared or actual emergency.

**Mutual Aid/ Assistance**

The California Master Mutual Aid Agreement (Government Code Sections 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 interties, and other emergency response agreements.

**Emergency Preparedness/Business  
Continuity**

NUMBER 7.03

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**Business  
Continuity  
Program**

The District provides products and services that support the economic, human, and environmental health of the East Bay. Therefore, the District must have a program that facilitates the performance of essential functions during an emergency situation that disrupts normal operations and/or the timely resumption of normal operations once the emergency has ended. The Business Continuity Program Plan (BCPP) provides the overall framework for the program and outlines the basic priorities for recovery of business functions in individual departmental Business Continuity Plans (BCPs). The Regulatory Compliance Office will manage the program and maintain the BCPP. Departments will create BCPs that outline: the critical functions, which must be performed before, during and after an event; the personnel responsible for completing the necessary actions; and the vital records, equipment, and systems required to accomplish the identified tasks. The departments are responsible to ensure that their BCPs are maintained, employees trained, plans tested, and their vital records necessary to maintain operations are available. Vital records include all information and records, which if lost, would place significant financial, operational, or legal restrictions on the continuation of District services.

**Continuity of  
Management**

The District's BCPs will list at least three successors to critical staff identified in each 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.

**Status Reports**

The General Manager will provide periodic Emergency Preparedness Program progress reports to the Board of Directors, as necessary, and the District's response to a declared District emergency, when applicable.

**Authority**

Resolution No. 33014-96, November 12, 1996  
 As amended by Resolution No. 33027-02, September 24, 2002  
 As amended by Resolution No. 33460-05, February 8, 2005  
 As amended by Resolution No. 33564-06, November 14, 2006  
 As amended by Resolution No. 33703-09, February 24, 2009  
 As amended by Resolution No. 33793-10, November 23, 2010

**References**

District Emergency Operations Plan  
 Procedure 122 - Emergency Purchases  
 Policy 7.13 – Security  
 Municipal Utility District Act – Section 12753  
 California Master Mutual Aid Agreement  
 Standardized Emergency Management System  
 National Response Framework  
 National Incident Management System



# Policy 9.03

EFFECTIVE 14 JUN 11

SUPERSEDES 13 APR 10

## WATER SUPPLY AVAILABILITY AND DEFICIENCY

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

Evaluate the availability of the District's water supplies and determine the acceptable maximum level of annual customer demand for the District's service area based on limiting rationing up to a maximum of 15 percent of District-wide annual demand and implementation of current and proposed District conservation programs, recycled water programs and supplemental supply projects.

<b>Annual Water Supplies Report</b>	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 before May 1 <sup>st</sup> of each year. The report shall include an evaluation of the adequacy of the District's water supplies to satisfy customer demand for the current water year and a projection through the year 2040, based on the determination of the Allowable Maximum Level of Demand.
<b>Long-Term Water Supply Reliability</b>	An assessment of long-term water supply reliability through the year 2040 shall be made assuming: <ul style="list-style-type: none"> <li>• Water service will be provided in accordance with the District's Regulations Governing Water Service to Customers.</li> <li>• Water conservation and water recycling programs will be implemented as provided in the District's current Urban Water Management Plan (UWMP).</li> </ul>
<b>Supplemental Supplies</b>	The District shall pursue supplemental supplies if existing supplies are found to be inadequate either for the current year or through the year 2040 as provided in the District's current UWMP.
<b>Rationing</b>	The District shall have a goal of limiting customer rationing to a maximum of 15% of District-wide annual demand and will implement this policy consistent with the District's Drought Management Program Guidelines, as outlined in the current UWMP.
<b>Notification Surplus Water</b>	In accordance with the 1998 Joint Settlement Agreement when a determination of the availability of Mokelumne River water is made, the District will notify the Resources Agencies, specifically the United States Fish and Wildlife Services and the California Department of Fish and Game, of the availability of the additional water.
<b>Definitions</b>	<p><i>Drought Planning Sequence (DPS)</i> – Three year hydrology sequence presenting a worst case drought scenario derived from historical record.</p> <p><i>Allowable Maximum Level of Demand (AMLD)</i> – The allowable maximum level of customer demand, in MGD as an annual average, that the system can sustain under the DPS.</p>

**Water Supply Availability and Deficiency**

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**Definitions**      *Drought Planning Sequence (DPS)* – Three year hydrology sequence presenting a worst case drought scenario derived from historical record

*Allowable Maximum Level of Demand (AMLD)* – The allowable maximum level of customer demand, in MGD as an annual average, that the system can sustain under the DPS.

**Authority**      Amended by Resolution 31,246, May 14, 1985  
 Amended by Resolution No. 32,204, May 9, 1989  
 Amended by Resolution No. 33175-99, November 9, 1999  
 Amended by Resolution No. 33759-10, April 13, 2010  
 Amended by Resolution No. 33821-11, June 14, 2011

**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  
 Procedure 900 – Water Supply Accounting and Reporting  
 Procedure 901 – Recycled Water Accounting and Reporting  
 Procedure 902 – Water Conservation Accounting and Reporting

EBMUD's Urban Water Management Plan



# Policy 9.05

EFFECTIVE 14 NOV 06

SUPERSEDES 28 SEP 04

## NON-POTABLE WATER

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

Require that customers of the East Bay Municipal Utility District (“EBMUD”) use non-potable water, including 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. 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.

#### Findings Related To Use Of Non-potable Water

The Board of Directors of EBMUD has determined that existing water supplies will not adequately accommodate existing and future demand within the EBMUD’s Ultimate Service Boundary. Non-potable water resources, including treated wastewater discharged to the San Francisco Bay from EBMUD and other Bay Area treatment plants, could provide a safe and effective alternative water supply for certain non-potable purposes, increase the availability of the limited water supplies of EBMUD, assure non-potable 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 non-potable 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.)

#### Definitions

Non-potable 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 EBMUD to be suitable for non-domestic purposes and feasible for the particular intended use.

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

#### Mandated Uses Of Non-potable Water

Customers may be required to use non-potable water for their non-domestic uses 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.

**Non-potable Water**

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**Determination Of Feasibility Of Non-potable Water**

In determining whether non-potable water is feasible for a particular non-domestic use, EBMUD shall consider the following factors:

- Whether the non-potable water may be furnished for the intended use at a reasonable cost to the customer and EBMUD.
- Whether the non-potable water is of adequate quality for the intended use and does not require significant additional on-site treatment beyond that required for potable water.
- Whether the use of non-potable water is consistent with all applicable federal, state, and local laws and regulations.
- Whether the use of non-potable water will not be detrimental to the public health and will not adversely affect plant life, fish and wildlife.

**Regulations Governing Non-potable Service**

The regulations governing non-potable 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.

**Water Reuse Zones**

EBMUD designates Water Reuse Zones within EBMUD's service area where non-potable water service has been determined to be reasonably available.

**Non-potable Water Service Agreements**

Where implementation of this 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 non-potable water service pursuant to that agreement shall be governed by the non-potable water service regulations and rate schedule, unless a new agreement is entered into.

**Authority**

Resolution No. 32981-96, April 9, 1996  
As amended by Resolution No. 33443-04, September 28, 2004  
As amended by Resolution No. 33564-06, November 14, 2006

**References**

Regulations Governing Water Service and Schedule of Rates and Charges for Customers of East Bay Municipal Utility District

**SECTION 2****APPLYING FOR SERVICE**

If a service connection is already serving the premises, applications for service are taken at the business offices of the District. If a new service connection is required, applications for service are taken at the New Business Office of the District. The District's requirements for the type of service desired must be met before an application will be approved (see Section 31 – Water Efficiency Requirements).

If standard service (see Section 3) is not reasonably available, or if the premises are outside the District's boundaries, or if unusual conditions exist, the applicant will be advised of the terms and conditions which must be met before an application for service may be accepted. In determining whether the portion of an applicant's premises lying directly along a main constitutes principal frontage, the District's decision shall be final.

Effective January 1, 2009, each new multi-family residential or multi-occupancy commercial/industrial unit in a structure of three stories in height or less shall be individually metered when the District has determined it is feasible to do so. The determination of feasibility is made by the District to meter each unit individually when reasonably possible to do so and this determination by the District is final.

Continuance of service is dependent on compliance with the District's regulations governing service, and on conditions at the location of the service remaining unchanged to the extent that they do not conflict with the District's requirements for obtaining service. Where a change in conditions at the location of the service makes a customer ineligible for continued service, the customer concerned shall be responsible for promptly notifying the District in writing of the change.

Applicants for service shall pay all the applicable charges as provided in the Schedule of Rates and Charges, including the following:

- Account Establishment Charge
- Service Installation Charges
- Water Service Estimate Fee (if applicable)
- Water Main Extension Charges (if required)
- System Capacity Charge
- Charges for Annexation (if applicable)
- Wastewater Capacity Fee (if applicable)

Applicants shall provide all information determined by the District necessary to establish conditions at the location of service. This information can include, but not be limited to:

- Property descriptions
- Improvement plans, including certification of subgrade elevation
- Information regarding soils and known contaminated soil conditions
- Environmental documentation
- Fire flow form signed by responsible fire agency



## SECTION 2

### APPLYING FOR SERVICE (continued)

- Topographical map(s)
- Development and site plans with hydrant locations identified and signed by the responsible fire department (if applicable)
- Hydraulic calculations for proposed fire sprinkler system (if applicable)

#### AMORTIZATION OF CONNECTION AND INSTALLATION FEES

Applicants for service that satisfy the criteria set forth below may make written application to the District to amortize the payment of water service installation charges (Schedules D and E), water main extension charges (Schedule G), system capacity charges (Schedule J) and wastewater capacity fees, pursuant to the following terms and conditions:

- The amount amortized shall be at least \$5,000 but not more than \$150,000.
- Applicant shall pay in advance a minimum of 25% of the estimated cost to provide the new service connection.
- Applicant shall enter into an agreement with the District which provides that:
  - a. amortized charges that shall be paid in equal installments over a maximum period of 24 months;
  - b. interest shall be applied to the balance due at a rate set by the Director of Finance;
  - c. water service may be terminated for failure to pay any installment when due;
  - d. repayment of the amortized charges shall be secured by real property owned by applicant and District shall have the right of foreclosure by a power of sale;
  - e. applicant shall pay all escrow and title search costs incurred.
- Applicant shall execute deeds of trust which shall constitute a lien upon real property interests described therein, which property shall be situated in California and shall be sufficient to secure repayment of the amortized charges.

#### Applicant Criteria

- I. Applicants providing job training in District job skills.

In order to make application to amortize charges pursuant to this section, the applicant must:

- a. make written application to the District for water service;
- b. have tax-exempt status under Internal Revenue Code section 501(c)3;
- c. provide job training, including job skills utilized in District job classifications, to unemployed individuals; and
- d. own and occupy the property for which water service application is made.



## SECTION 2

APPLYING FOR SERVICE  
(continued)

- II. Applicants providing low income housing incorporating water conserving devices and landscaping.

In order to make application to amortize charges pursuant to this section, the applicant must:

- be organized solely for the purpose of constructing low income housing;
- provide evidence of eligibility for Community Development Block Grant (CDBG) assistance;
- own the property for which water service is requested;
- seek to amortize charges related to providing water service to a low-income housing project that:
  - i) is restricted to such use for at least 15 years or such other time specified or required by law; and
  - ii) will provide rental units for low-income residents or, if intended for ownership, will be owner-occupied units for low-income residents.
- incorporate water conservation features, beyond those required by law, into the design of the project and install and maintain water conserving landscaping approved by the District; and
- specify the cost benefit that will inure to residents of the project.

For purposes of this section, “housing” and “low-income housing” shall have the following meaning:

- Housing is defined to include rental housing, condominiums, cooperative housing, ownership housing, housing for families, senior housing, housing for physically and/or mentally disabled people, emergency shelters and shared housing.
- Low-income housing is defined as housing which is subsidized in whole or in part by one or more governmental agencies or foundations and which is rented or owned by individuals or families whose incomes are within ranges specified as low-income by the U.S. Department of Housing and Urban Development for Alameda and Contra Costa Counties.

- III. In addition to the above criteria, applicants must make written application to the District for water service and provide evidence of tax-exempt status under Internal Revenue Code section 501(c)(3).

**SECTION 3****STANDARD SERVICE****SERVICE CONNECTION EXISTS AT TIME APPLICATION RECEIVED**

A standard service may be granted where a complete service connection for the premises exists, there is no change in the use of the premises, the service has been active within the previous five years, there is no change in service size, and the District's requirements are met as stated in these regulations (see Section 2, Applying for Service and Section 31 – Water Efficiency Requirements). In such cases, if sufficient advance notice is furnished to the District, the service will be turned on at the meter on the date requested by the customer, except Saturdays, Sundays, and holidays.

All requirements established for the existing service connection shall remain in effect, including the requirement for a pressure regulator or backflow prevention device.

**SERVICE CONNECTION DOES NOT EXIST AT TIME APPLICATION RECEIVED**

When an application is received for a standard service to premises where a service connection does not exist, or the existing service connection is inadequate, as determined by the District, a standard service may be granted and installed provided the applicant meets the District's general requirements as stated elsewhere in these regulations, and:

1. Service is reasonably available at the premises to be served.
2. The size of the service connection is approved by the District.
3. The applicable District charges have been paid.
4. The applicant agrees to install a pressure regulator or backflow prevention device when required by the District.
5. There is an immediate need for water service to the premises.
6. The applicant agrees to meter the development as specifically approved by the District.

If service is not reasonably available or if unusual conditions exist, the applicant will be advised of the terms and conditions which must be met before an application for service will be accepted.

Additional requirements for nonpotable water service are included in Sections 30 and 31 of these regulations.

**SECTION 3****STANDARD SERVICE**

(continued)

In circumstances under which the District anticipates unusual conditions, the applicant shall pay installation charges based on the District's estimate of the total cost of all materials, labor and other costs incidental to the installation. Unusual conditions shall exist when, in the opinion of the District, the installation is to be made under conditions which would result in unusual or significant departure from the basic installation charges set forth in the Schedule of Rates and Charges to Customers. Such circumstances shall include, but not be limited to, the length of the lateral, the type of pavement, anticipated soil or other underground conditions, and the width or travel conditions of the roadway or right-of-way.

Water service will generally be made available by extending a main if the premises to be served does not have principal frontage on an existing water main of adequate flow and pressure (See Section 4). However, water service will not be provided by the extension of a water main where the meter(s) for the premises concerned will be located at an elevation of less than 100 feet below the overflow level of the reservoir supplying such main.

**EXCEPTIONS****TEMPORARY CONSTRUCTION SERVICE**

The District may grant a temporary construction service where it is expected that the service will be in use for a short period to serve a temporary operation not related to any particular premises. In such cases, the appropriate installation and system capacity charges set forth in the Schedule of Rates and Charges shall be paid in advance and billing at the current rate for a standard service shall apply.

**INSTALLATION OF SERVICES CONNECTIONS IN NEW SUBDIVISIONS**

Under special conditions the District may install a service connection without the meter in advance of actual need to avoid later cutting of pavement or for other reasons. In such cases, the appropriate installation charges set forth in the Schedule of Rates and Charges shall be paid in advance, but billing procedure shall not apply as the service will not be turned on until a standard service is required and approved by the District. The System Capacity Charge shall be paid in accordance with the provisions of Section 3B. If the service connection is not completed by a request for meter installation and turned on within one year of installation of the connection, the District may determine there is no immediate need for water service and may remove the service connection. Regardless of whether the service connection was removed, to establish service a new service application will be required under the Regulations and Schedule of Rates and Charges then in effect.



### SECTION 3

#### STANDARD SERVICE (continued)

##### **STREET LANDSCAPING SERVICE**

The District may grant a street landscaping service for planting strips or areas which lie within public streets and are devoted to and maintained for landscaping and related purposes by the public agency having jurisdiction over the streets. In such cases, the planting strip or area may be considered a single unit for the purposes of receiving, using and paying for service regardless of its division or intersection by other public streets. The District shall approve the size and location of the service and the distance or area which may constitute a single unit. The appropriate installation and system capacity charge set forth in the Schedule of Rates and Charges shall be paid, and billing at the current rate for a standard service shall apply. Additional requirements for nonpotable and potable water service are contained in Sections 30 and 31 of these regulations.

##### **COMBINATION STANDARD AND FIRE SERVICE**

The District may grant a service to provide both standard service and a supply to a private fire protection system for a single-family premises or a multi-family premises of two units. A separate fire service connection is required for service to a private fire protection system at all other premises except the following:

1. New service or the enlargement of existing connections required for large area premises with public or private educational facilities and publicly-owned facilities served with combined standard and fire service.
2. Service to multi-family residential premises when it is determined by the District that a combined service connection is acceptable for metering normal water use and is approved by the responsible fire protection agency.
3. Service to group homes or residential facilities when it is determined by the District that a combined service connection is acceptable for metering normal water use and is approved by the responsible fire protection agency.

Except for the System Capacity Charge as provided in Schedule J, the rates and charges pertaining to the service shall be based on actual meter size.

##### **IRRIGATION METERING**

A separate irrigation meter shall be required for all new (residential and nonresidential) irrigated landscaping covering an area of 5,000 square feet or more, except as provided in Section 31 of these regulations.

**SECTION 3****STANDARD SERVICE  
(continued)****BRANCH METERING**

The District may grant two or more standard services from a single service connection for a premises other than a single-family premises. The appropriate installation charge set forth in the Schedule of Rates and Charges shall be paid.

**MASTER METERING**

Each separate structure of a premises shall be separately metered.

The District may grant a single service to a premises with two or more dwelling units and or commercial/industrial units such as a residential or commercial condominium project, provided all the following conditions are met:

1. The property to be served must be in single ownership, including streets containing the owner's water service pipelines. Where dwelling units are individually owned, the property surrounding the structures must be in single common ownership under a residents or homeowners association.
2. There must be a resident manager for the property who will be responsible for maintaining the private water system beyond the master meter and for payment of all water service charges.
3. The applicant must furnish a written statement from the fire district or other public agency with jurisdiction, indicating its acceptance of the proposed arrangement for providing fire flow, and that the liability for supplying water for fire protection rests solely with the property owner responsible for the private water system.
4. It has been determined by the District that individual metering of each unit is not feasible in accordance with Section 2 of these regulations

**SERVICE CONNECTION NOT AT THE PRINCIPAL FRONTAGE**

In certain unusual circumstances, the District may locate a conditional service connection for a premises at other than the principal frontage provided:

- service is reasonably available at that location,
- the principal frontage must be on a private road or driveway and set back no more than 150 feet from the service connection,

**SECTION 3****STANDARD SERVICE  
(continued)**

- there is only one premises which would be so served,
- there is no apparent possibility of further extension to serve other premises,
- there is no requirement for a fire hydrant,
- a main extension for adjacent premises would not be required.

The owner(s) of the premises shall agree in writing to the conditions of service and to relocate the service and pay any applicable costs in the future, should standard service become available at the principal frontage. This agreement shall be a covenant against the premises to be served and shall run with the land, and will be recorded by the District.

**SERVICE CONNECTION AT ALTERNATE MAJOR FRONTAGE**

The District may locate the service connection for a premises at that part of the perimeter immediately adjacent to a street or road of general public access, where a water main exists or may be installed, even though it is not the normal vehicle access to the property and provided that the fire hydrant location in relation to the premises is acceptable to the responsible fire protection agency.

The District may locate the service connection(s) for a multi-family residential unit(s) or multi-occupancy commercial/industrial unit(s) at that part of the perimeter immediately adjacent to a street or road of general public access in a development where individual metering of all multi-family residential or multi-occupancy commercial/industrial unit(s) has been determined to be feasible in the sole discretion of the District in accordance with Section 2 of these Regulations.



## 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.



## SECTION 31

### WATER EFFICIENCY REQUIREMENTS

These regulations identify the types of water efficiency requirements for water service and the procedure for notification to Applicants that water efficiency measures are required.

#### **A. DETERMINATION OF FEASIBILITY OF WATER EFFICIENCY MEASURES**

The District will review applications for new standard services and determine the applicability of, and compliance with, water-efficiency requirements. Applicants for expanded service may be required to retrofit existing water service facilities or uses to comply with these requirements. Applicant shall maintain design documents and construction and installation records and furnish a copy of said documents and records to the District upon request. The District may inspect the installation of water efficiency measures to verify that the items are installed and performing to the required water use levels. The Applicant or their representative may be present during any District inspection.

#### **B. WATER EFFICIENCY REQUIREMENTS FOR NEW DEVELOPMENT OR EXPANDED SERVICE**

Water service shall not be furnished to any Applicant for new or expanded service unless all the applicable water-efficiency measures hereinafter described in this Section 31 have been reviewed and approved by the District. All the applicable and required water-efficiency measures shall be installed at Applicant expense.

#### **C. RESIDENTIAL SERVICE**

##### **1. Indoor Water Use (All Applicants)**

- a. Toilets shall be high-efficiency or dual flush models rated and (third party) tested at a maximum average flush volume of 1.28 gallons per flush (gpf), and be certified as passing a 350 gram or higher flush test as established by the U.S. Environmental Protection Agency WaterSense Specification or other District-accepted third party testing entity. No flush or conversion devices of any other kind shall be accepted.
- b. Showerheads shall be individually plumbed and have a maximum rated flow of 2.5 gallons per minute or less and be limited to one showerhead per shower stall of 2,500 sq. inches in area or less. Installation of flow restrictors in existing showerheads does not satisfy this requirement.
- c. Lavatory faucets shall have aerators or laminar flow control devices (i.e. orifices) with a maximum rated flow of 1.5 gallons per minute or less.
- d. Kitchen faucets shall have aerators or laminar flow control devices (i.e. orifices) with a maximum rated flow of 2.2 gallons per minute or less.



## SECTION 31

WATER EFFICIENCY REQUIREMENTS  
(continued)

- e. Clothes washing machines shall be front loading horizontal axis or top loading models with both: (1) a water factor rating of 6.0 or less. A water factor rating of 6.0 means a maximum average water use of 6.0 gallons per cubic foot of laundry.
- f. Dishwashers rated as standard size (i.e. 324 kWh/year) shall use less than or equal to 5.8 gallons/cycle. Dishwashers rated as compact size (i.e. 234 kWh/year) shall use less than or equal to 4.0 gallons/cycle.

**2. Outdoor Water Use (All applicants except as noted below)**

- a. Landscaping.
  - i. Plans with design details including plants, irrigation, grading and hydrozones shall be submitted to the District for review and approval by District for compliance with these Regulations prior to planting. Landscaping shall be designed to be less than or equal to the maximum allowable landscape irrigation requirement to maintain a functional, healthy landscape and shall not exceed 70% of the reference evapotranspiration (the amount of water required to maintain a healthy landscape accounting for the evaporation of water from the soil surface and the transpiration of water through the plant foliage) for the irrigated area. Recreational turf landscaping shall be designed to be irrigated at no more than 100% of the reference evapotranspiration. Applicants with less than three residential units shall be required to complete a check list provided by the District in lieu of a detailed landscaping plan.
  - ii. Ornamental Turf areas shall be limited to no more than 25% of the total irrigated area. Exceptions may be granted, in the sole discretion of the District, when using drought tolerant grasses and for approved recreational areas. Turf is not permitted in areas or medians less than eight feet in width. These provisions do not apply to applicants with less than three residential units.
  - iii. Non-turf areas. At least 80% of the plant area shall be native or climate-appropriate low water use species and require minimal water once established. Up to 20% of the plant area may be of a non-drought tolerant variety as long as they are appropriately grouped together and irrigated separately and efficiently.
  - iv. Mulch: A minimum 2 inch layer of mulch shall be specified for non-turf planting areas unless there is a horticultural reason not to mulch.



## SECTION 31

WATER EFFICIENCY REQUIREMENTS  
(continued)

- b. Irrigation.
- i. Irrigation Efficiency. Irrigation systems shall be designed, installed and operated to avoid overspray and runoff and to meet the maximum allowable landscape irrigation requirement to maintain a functional, healthy landscape and shall not exceed 70% of the reference evapotranspiration (the amount of water required to maintain a healthy landscape accounting for the evaporation of water from the soil surface and the transpiration of water through the plant foliage) for the irrigated area. These provisions do not apply to applicants with less than three residential units.
  - ii. Automatic, self-adjusting irrigation controllers shall be required on all irrigation systems and shall automatically activate and deactivate the irrigation system based on changes in the climate or soil moisture. All automatic irrigation systems shall be equipped with a rain sensor shutoff. Applicants with less than three residential units are not required to install weather-based controllers.
  - iii. Overhead sprinklers and spray heads shall not be permitted in areas less than eight feet wide. All sprinklers shall have matched precipitation rates within each control valve and circuit. Landscape design best practices shall include distribution uniformity, head-to-head spacing and setbacks from walkways and pavement.
  - iv. Valves and circuits shall be separated (individual hydrozones) based on plant material and water need.
  - v. Dedicated Irrigation Meter shall be required for irrigated landscaping of 5,000 square feet or more.
- c. Swimming Pools and Spas.
- i. Covers shall be required for all pool and spa water features.

**D. NONRESIDENTIAL SERVICE (including Residential Common Area)****1. Indoor Plumbing**

- a. Toilets shall be high-efficiency or dual flush models rated and (third-party) tested at a maximum average flush volume of 1.28 gallons per flush (gpf), and be certified as passing a 350 gram or higher flush test as established by the U.S. Environmental Protection Agency WaterSense Specification or other District-accepted third party testing entity. Pressure-assisted type toilets shall be high-efficiency rated at a maximum 1.0 gpf. No flush or conversion devices of any other kind shall be accepted.



## SECTION 31

WATER EFFICIENCY REQUIREMENTS  
(continued)

- b. Urinals shall have a maximum rated flow of 0.5 gpf or less, or be zero water consumption urinals.
- c. Showerheads shall be individually plumbed and have a maximum rated flow of 2.5 gallons per minute or less, and be limited to one showerhead per shower stall of 2,500 sq. inches in area or less. Installation of flow restrictors in existing showerheads does not satisfy this requirement.
- d. Lavatory faucets shall have aerators or laminar flow control devices (i.e. orifices) with a maximum rated flow of 1.5 gallons per minute or less.
- e. Kitchen faucets shall have aerators or laminar flow control devices (i.e. orifices) with a maximum rated flow of 2.2 gallons per minute or less.
- f. Laundry washing machines shall be front loading horizontal axis or top loading models with both: (1) a maximum water factor rating of 6.0 or less. A water factor of 6.0 means a maximum average water use of 6.0 gallons per cubic foot of laundry or less.
- g. Cooling towers not utilizing recycled water shall be equipped with recirculating systems and operate at a minimum of five (5) cycles of concentration. Newly constructed cooling towers shall be operated with conductivity controllers, as well as make up and blowdown meters.
- h. Food steamers in all food service facilities shall be boiler less or self-contained models where applicable.
- i. Ice machines shall be air-cooled or use no more than 25 gallons of water per 100 pounds of ice and shall be equipped with a recirculating cooling unit.
- j. Commercial refrigeration shall be air-cooled or if water-cooled, must have a closed looped system. No once through, single pass systems are permitted.
- k. Pre-Rinse Dishwashing Spray Valves shall have a maximum rated flow of 1.6 gpm or less.
- l. Vehicle wash facilities shall reuse a minimum of 50% of water from previous vehicle rinses in subsequent washes.



## SECTION 31

WATER EFFICIENCY REQUIREMENTS  
(continued)**2. Outdoor Water Use**a. Landscaping.

- i. Plans with design details including plants, irrigation, grading and hydrozones shall be submitted to the District for review and approval by District for compliance with these Regulations prior to planting. Landscaping shall be designed to be less than or equal to the maximum allowable landscape irrigation requirement to maintain a functional, healthy landscape and shall not exceed 70% of the reference evapotranspiration (the amount of water required to maintain a healthy landscape accounting for the evaporation of water from the soil surface and the transpiration of water through the plant foliage) for the irrigated area. Recreational turf landscaping shall be designed to be irrigated at no more than 100% of the reference evapotranspiration.
- ii. Ornamental Turf areas shall be limited to no more than 25% of the total irrigated area. Exceptions may be granted, in the sole discretion of the District, when using drought tolerant grasses and for approved recreational areas such as sports fields, parks and picnic grounds. Turf is not permitted in areas or medians less than eight feet in width.
- iii. Non turf areas. At least 80% of the plant area shall be native or climate-appropriate low water use species and require minimal water once established. Up to 20% of the plant area may be of a non-drought tolerant variety as long as they are appropriately grouped together and irrigated separately and efficiently.

b. Irrigation.

- i. Irrigation Efficiency. Irrigation systems shall be designed, installed and operated to avoid overspray and runoff and to meet the maximum allowable landscape irrigation requirement to maintain a functional, healthy landscape and shall not exceed 70% of the reference evapotranspiration (the amount of water required to maintain a healthy landscape accounting for the evaporation of water from the soil surface and the transpiration of water through the plant foliage) for the irrigated area.
- ii. Automatic, self-adjusting irrigation controllers shall be required on all irrigation systems and shall automatically activate and deactivate the irrigation system based on changes in climate or soil moisture. All automatic irrigation systems shall be equipped with a rain sensor shutoff.



## SECTION 31

WATER EFFICIENCY REQUIREMENTS  
(continued)

- iii. Overhead sprinklers and spray heads shall not be permitted in areas less than eight feet wide. All sprinklers shall have matched precipitation rates within each control valve and circuit. Landscape design best practices shall include distribution uniformity, head-to-head spacing, and setbacks from walkways and pavement.
- iv. Valves and circuits shall be separated (individual hydrozones) based on plant material and water need.
- v. Dedicated Irrigation Meter shall be required for irrigated landscaping of 5,000 square feet or more.
- vi. Mulch: A minimum 2 inch layer of mulch shall be specified for non-turf planting areas unless there is a horticultural reason not to mulch.

**E. PENALTIES/CONSEQUENCES**

Failure of Applicant to conform to this Regulation and these water-efficiency requirements stated herein may result in:

1. A requirement to resubmit water service application and water-efficiency plan at Applicant's expense until District approves water service.
2. District's inability to release water meter(s) for installation and inability to activate account until water-efficiency plan is approved by District.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-A

EFFECTIVE 07/01/11

SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

The following rates apply to water service received inside and outside District boundaries unless otherwise indicated.

**A. ONE MONTH BILLING**

Bills for all metered services shall consist of:

FIRST - A SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$11.54	\$1.08
1 inch meter .....	18.55	2.71
1-1/2 inch meter .....	29.91	5.41
2 inch meter .....	43.69	8.65
3 inch meter .....	75.84	16.21
4 inch meter .....	121.76	27.01
6 inch meter .....	236.58	54.03
8 inch meter .....	374.36	86.43
10 inch meter .....	535.10	124.25
12 inch meter .....	741.77	172.86
14 inch meter .....	948.44	221.49
16 inch meter .....	1,201.03	280.91
18 inch meter .....	1,453.63	340.33

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.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-B

EFFECTIVE 07/01/11

SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**A. ONE MONTH BILLING (Continued)**

SECOND - A SEISMIC IMPROVEMENT SURCHARGE for each Single Family Residential or Multiple Family Residential account.

SEISMIC  
IMPROVEMENT  
SURCHARGE PER ACCOUNT

Single Family Residential Accounts	\$1.08
Multiple Family Residential Accounts	5.08

THIRD - A CHARGE FOR WATER DELIVERED and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on one month meter readings for all water delivered per 100 cu. ft.:

	WATER DELIVERED	SEISMIC
	CHARGE PER	IMPROVEMENT
	100 CU. FT.	SURCHARGE PER
		100 CU. FT.

**INSIDE DISTRICT BOUNDARIES**

Potable Water Service

Single Family Residential Accounts:		
For the first 172 gpd	\$2.28	\$--
For all water used in excess of 172 gpd, up to 393 gpd	2.83	--
For all water used in excess of 393 gpd	3.47	--
Multiple Family Residential Accounts:		
For all water used	2.89	--
All Other Water Use:		
For all water used	2.99	.12

All individually metered multi-family dwelling units or individually metered mobile home residential units that receive District service shall be billed at the single family residential rate.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-C

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**A. ONE MONTH BILLING (Continued)**

WATER DELIVERED  
CHARGE PER  
100 CU. FT.

Nonpotable Water Service

For all water used	\$2.49
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Nonpotable Water Use Incentive Rate

A customer for whom the District has determined, pursuant to Section 30 of the Water Service Regulations, that the provision of nonpotable water service is feasible and to whom the District has issued written notification that specifies a date by which the customer site must be ready to accept nonpotable water service, shall ready the site by the date specified or pay the Nonpotable Water Use Incentive Rate for all potable water used during the period of noncompliance. The Nonpotable Water Use Incentive Rate shall be charged at a rate 20 percent higher than the applicable potable water rate.

**OUTSIDE DISTRICT BOUNDARIES**

Charge per 100 cu. ft. will be twice the charge applicable for inside District Boundaries.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING**

Bills for all metered services shall consist of:

FIRST - A SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$23.08	\$2.16
1 inch meter .....	37.10	5.42
1-1/2 inch meter .....	59.82	10.82
2 inch meter .....	87.38	17.30
3 inch meter .....	151.68	32.42
4 inch meter .....	243.52	54.02
6 inch meter .....	473.16	108.06
8 inch meter .....	748.72	172.86
10 inch meter .....	1,070.20	248.50
12 inch meter .....	1,483.54	345.72
14 inch meter .....	1,896.88	442.96
16 inch meter .....	2,402.06	561.82
18 inch meter .....	2,907.26	680.66

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.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.

SECOND - A SEISMIC IMPROVEMENT SURCHARGE for each Single Family Residential or Multiple Family Residential account.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING (Continued)**

SEISMIC IMPROVEMENT  
CHARGE PER ACCOUNT

Single Family Residential Accounts	\$2.16
Multiple Family Residential Accounts	10.16

THIRD - A CHARGE FOR WATER DELIVERED and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on two month meter readings for all water delivered per 100 cu. ft.

	WATER DELIVERED CHARGE PER 100 CU. FT.	SEISMIC IMPROVEMENT SURCHARGE PER 100 CU. FT.
--	--	--

**INSIDE DISTRICT BOUNDARIES**

Potable Water Service

Single Family Residential Accounts:

For the first 172 gpd	\$2.28	\$--
For all water used in excess of 172 gpd, up to 393 gpd	2.83	--
For all water used in excess of 393 gpd	3.47	--

Multiple Family Residential Accounts:

For all water used	2.89	--
--------------------	------	----

All Other Water Use:

For all water used	2.99	.12
--------------------	------	-----

All individually metered multi-family dwelling units or individually metered mobile home residential units that receive District service shall be billed at the single family residential rate.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING (Continued)**

WATER DELIVERED  
CHARGE PER  
100 CU. FT.

Nonpotable Water Service

For all water used \$2.49

Nonpotable Water Use Incentive Rate

A customer for whom the District has determined, pursuant to Section 30 of the Water Service Regulations, that the provision of nonpotable water service is feasible and to whom the District has issued written notification that specifies a date by which the customer site must be ready to accept nonpotable water service, shall ready the site by the date specified or pay the Nonpotable Water Use Incentive Rate for all potable water used during the period of noncompliance. The Nonpotable Water Use Incentive Rate shall be charged at a rate 20 percent higher than the applicable potable water rate.

**OUTSIDE DISTRICT BOUNDARIES**

Charge per 100 cu. ft. will be twice the charge applicable for inside District Boundaries.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**C. EXCEPTION TO TWO MONTH BILLING**

Except as provided below, customer accounts will be subject to bi-monthly meter reading and customer billing schedules.

- Accounts for which the average monthly bill is estimated to exceed \$1500; such account will be billed monthly.
- Accounts for which there are reasonable and justifiable customer requests for monthly billing.
- Accounts for which the average monthly bill is estimated to be between \$100 and \$1500, and the customer service manager recommends monthly billing based on an evaluation of credit and/or collection problems.

**D. PRIVATE FIRE SERVICES**

Effective July 1, 2005, the rates for Private Fire Services shall consist of:

FIRST - A MONTHLY SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$9.75	\$1.08
1 inch meter .....	14.00	2.71
1-1/2 inch meter .....	20.92	5.41
2 inch meter .....	29.31	8.65
3 inch meter .....	48.88	16.21
4 inch meter .....	76.82	27.01
6 inch meter .....	146.67	54.03
8 inch meter .....	230.52	86.43
10 inch meter .....	328.34	124.25
12 inch meter .....	454.09	172.86
14 inch meter .....	579.84	221.49
16 inch meter .....	733.55	280.91
18 inch meter .....	887.26	340.33



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**D. PRIVATE FIRE SERVICES (Continued)**

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.

SECOND - A CHARGE FOR WATER DELIVERED based on two-month meter readings for all water delivered per 100 cu. ft.:

There shall be no charge for water used through such services extinguishing accidental fires, but any water lost through leakage or used in violation of the District's Regulations shall be paid for at double the rate for general use.

**E. ELEVATION SURCHARGE**

Elevation Designator	AMOUNT PER 100 CU. FT.
0 and 1	\$0.00
2 through 5	0.43
6 and greater	0.88

Elevation surcharge is determined by the pressure zone in which the service connection is located. Pressure zones are identified by designations which include an elevation designator.

**F. SUPPLEMENTAL SUPPLY SURCHARGE**

<u>Potable Water Service</u>	<u>Surcharge Amount</u>
All potable water customer accounts	14% of the total Charge for Water Delivered for the Billing Period

The supplemental supply surcharge is effective on each potable water bill after the District Board declares a need to use the Freeport Project to deliver supplemental supplies from outside of the District's normal watershed. The supplemental supply surcharge shall not be applied to nonpotable water service.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-A

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

The following rates apply to water service received inside and outside District boundaries unless otherwise indicated.

**A. ONE MONTH BILLING**

Bills for all metered services shall consist of:

FIRST - A SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$12.23	\$1.14
1 inch meter .....	19.66	2.87
1-1/2 inch meter .....	31.70	5.73
2 inch meter .....	46.31	9.17
3 inch meter .....	80.39	17.18
4 inch meter .....	129.07	28.63
6 inch meter .....	250.77	57.27
8 inch meter .....	396.82	91.62
10 inch meter .....	567.21	131.71
12 inch meter .....	786.28	183.23
14 inch meter .....	1,005.35	234.78
16 inch meter .....	1,273.09	297.76
18 inch meter .....	1,540.85	360.75

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.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**A. ONE MONTH BILLING (Continued)**

SECOND - A SEISMIC IMPROVEMENT SURCHARGE for each Single Family Residential or Multiple Family Residential account.

SEISMIC  
IMPROVEMENT  
SURCHARGE PER ACCOUNT

Single Family Residential Accounts	\$1.14
Multiple Family Residential Accounts	5.38

THIRD - A CHARGE FOR WATER DELIVERED and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on one month meter readings for all water delivered per 100 cu. ft.:

	WATER DELIVERED CHARGE PER 100 CU. FT.	SEISMIC IMPROVEMENT SURCHARGE PER 100 CU. FT.
--	--	--

**INSIDE DISTRICT BOUNDARIES**

Potable Water Service

Single Family Residential Accounts:		
For the first 172 gpd	\$2.42	\$--
For all water used in excess of 172 gpd, up to 393 gpd	3.00	--
For all water used in excess of 393 gpd	3.68	--
Multiple Family Residential Accounts:		
For all water used	3.06	--
All Other Water Use:		
For all water used	3.17	.13

All individually metered multi-family dwelling units or individually metered mobile home residential units that receive District service shall be billed at the single family residential rate.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-C

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**A. ONE MONTH BILLING (Continued)**

WATER DELIVERED  
CHARGE PER  
100 CU. FT.

Nonpotable Water Service

For all water used \$2.64

Nonpotable Water Use Incentive Rate

A customer for whom the District has determined, pursuant to Section 30 of the Water Service Regulations, that the provision of nonpotable water service is feasible and to whom the District has issued written notification that specifies a date by which the customer site must be ready to accept nonpotable water service, shall ready the site by the date specified or pay the Nonpotable Water Use Incentive Rate for all potable water used during the period of noncompliance. The Nonpotable Water Use Incentive Rate shall be charged at a rate 20 percent higher than the applicable potable water rate.

**OUTSIDE DISTRICT BOUNDARIES**

Charge per 100 cu. ft. will be twice the charge applicable for inside District Boundaries.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING**

Bills for all metered services shall consist of:

FIRST - A SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$24.46	\$2.28
1 inch meter .....	39.32	5.74
1-1/2 inch meter .....	63.40	11.46
2 inch meter .....	92.62	18.34
3 inch meter .....	160.78	34.36
4 inch meter .....	258.14	57.26
6 inch meter .....	501.54	114.54
8 inch meter .....	793.64	183.24
10 inch meter .....	1,134.42	263.42
12 inch meter .....	1,572.56	366.46
14 inch meter .....	2,010.70	469.56
16 inch meter .....	2,546.18	595.52
18 inch meter .....	3,081.70	721.50

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.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.

SECOND - A SEISMIC IMPROVEMENT SURCHARGE for each Single Family Residential or Multiple Family Residential account.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING (Continued)**

SEISMIC IMPROVEMENT  
CHARGE PER ACCOUNT

Single Family Residential Accounts	\$2.28
Multiple Family Residential Accounts	10.76

THIRD - A CHARGE FOR WATER DELIVERED and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on two month meter readings for all water delivered per 100 cu. ft.

	WATER DELIVERED CHARGE PER 100 CU. FT.	SEISMIC IMPROVEMENT SURCHARGE PER 100 CU. FT.
--	--	--

**INSIDE DISTRICT BOUNDARIES**

Potable Water Service

Single Family Residential Accounts:

For the first 172 gpd	\$2.42	\$--
For all water used in excess of 172 gpd, up to 393 gpd	3.00	--
For all water used in excess of 393 gpd	3.68	--

Multiple Family Residential Accounts:

For all water used	3.06	--
--------------------	------	----

All Other Water Use:

For all water used	3.17	.13
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All individually metered multi-family dwelling units or individually metered mobile home residential units that receive District service shall be billed at the single family residential rate.

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**B. TWO MONTH BILLING (Continued)**

WATER DELIVERED  
CHARGE PER  
100 CU. FT.

Nonpotable Water Service

For all water used \$2.64

Nonpotable Water Use Incentive Rate

A customer for whom the District has determined, pursuant to Section 30 of the Water Service Regulations, that the provision of nonpotable water service is feasible and to whom the District has issued written notification that specifies a date by which the customer site must be ready to accept nonpotable water service, shall ready the site by the date specified or pay the Nonpotable Water Use Incentive Rate for all potable water used during the period of noncompliance. The Nonpotable Water Use Incentive Rate shall be charged at a rate 20 percent higher than the applicable potable water rate.

**OUTSIDE DISTRICT BOUNDARIES**

Charge per 100 cu. ft. will be twice the charge applicable for inside District Boundaries.



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-G

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**C. EXCEPTION TO TWO MONTH BILLING**

Except as provided below, customer accounts will be subject to bi-monthly meter reading and customer billing schedules.

- Accounts for which the average monthly bill is estimated to exceed \$1500; such account will be billed monthly.
- Accounts for which there are reasonable and justifiable customer requests for monthly billing.
- Accounts for which the average monthly bill is estimated to be between \$100 and \$1500, and the customer service manager recommends monthly billing based on an evaluation of credit and/or collection problems.

**D. PRIVATE FIRE SERVICES**

Effective July 1, 2005, the rates for Private Fire Services shall consist of:

FIRST - A MONTHLY SERVICE CHARGE and A SEISMIC IMPROVEMENT PROGRAM SURCHARGE based on the size of a standard meter:

SIZE	SERVICE CHARGE AMOUNT	SEISMIC IMPROVEMENT SURCHARGE
5/8 and 3/4 inch meters .....	\$10.34	\$1.14
1 inch meter .....	14.84	2.87
1-1/2 inch meter .....	22.18	5.73
2 inch meter .....	31.07	9.17
3 inch meter .....	51.81	17.18
4 inch meter .....	81.43	28.63
6 inch meter .....	155.47	57.27
8 inch meter .....	244.35	91.62
10 inch meter .....	348.04	131.71
12 inch meter .....	481.34	183.23
14 inch meter .....	614.63	234.78
16 inch meter .....	777.56	297.76
18 inch meter .....	940.50	360.75



**SCHEDULE OF RATES AND CHARGES TO CUSTOMERS  
OF THE EAST BAY MUNICIPAL UTILITY DISTRICT**

PAGE NUMBER 1-H

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SCHEDULE A

RATE SCHEDULE FOR WATER SERVICE

**D. PRIVATE FIRE SERVICES (Continued)**

The seismic improvement program surcharge is effective on each potable water bill through February 28, 2025. The seismic improvement program surcharge shall not be applied to nonpotable water service.

Effective July 1, 1997, 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.

SECOND - A CHARGE FOR WATER DELIVERED based on two-month meter readings for all water delivered per 100 cu. ft.:

There shall be no charge for water used through such services extinguishing accidental fires, but any water lost through leakage or used in violation of the District's Regulations shall be paid for at double the rate for general use.

**E. ELEVATION SURCHARGE**

Elevation Designator	AMOUNT PER 100 CU. FT.
0 and 1	\$0.00
2 through 5	0.46
6 and greater	0.93

Elevation surcharge is determined by the pressure zone in which the service connection is located. Pressure zones are identified by designations which include an elevation designator.

**F. SUPPLEMENTAL SUPPLY SURCHARGE**

<u>Potable Water Service</u>	<u>Surcharge Amount</u>
All potable water customer accounts	14% of the total Charge for Water Delivered for the Billing Period

The supplemental supply surcharge is effective on each potable water bill after the District Board declares a need to use the Freeport Project to deliver supplemental supplies from outside of the District's normal watershed. The supplemental supply surcharge shall not be applied to nonpotable water service.

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## APPENDIX G. 2010 WATER SHORTAGE CONTINGENCY PLAN SUPPLEMENT

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## APPENDIX G. 2010 WATER SHORTAGE CONTINGENCY PLAN SUPPLEMENT

### G-1. CENTRAL VALLEY PROJECT SUPPLY

As detailed in Chapter 2, EBMUD has a long-term renewal contract with the United States for the Central Valley Project (CVP) supplemental water supply. The contract term ends in 2046 and can be renewed for additional terms of 40 years. During specified drought conditions, EBMUD may request delivery of the CVP water and convey it by using the Freeport Regional Water Facility. The key contractual limitation on this supply is that EBMUD's maximum cumulative delivery over three sequential dry years is 165,000 acre-feet (AF). The contractual maximum delivery in any single dry year is 133,000 AF. EBMUD anticipates that it would generally utilize its full contractual amount of 165,000 AF of CVP water over any three year drought period. The year-by-year decisions on how much CVP water to request involve the following considerations:

- current projections of customer demand;
- current-year projection of total system storage (with reference to Table 3-2);
- supply conditions in the two key CVP reservoirs (Shasta and Folsom), which indicate whether EBMUD may receive the full amount of CVP water it requests, or whether CVP shortages may lead to reduced deliveries (see below for a fuller discussion); and
- the remaining amount of the 165,000 AF three year contractual quantity available to EBMUD in the current CVP contract year based on deliveries taken in the preceding two CVP contract years.

Allocation by the United States Bureau of Reclamation (USBR) of CVP water among all contractors during shortage conditions is subject to the draft CVP Municipal and Industrial (M&I) Shortage Policy; this policy was under review in 2010, and may be revised and issued as a revised draft or final policy in 2011 or later. The policy reflects the fact that in some dry years there will not be sufficient CVP water available to meet the aggregate amount requested by contractors. Furthermore, the policy recognizes that under severe drought conditions, cutbacks in allocations to M&I contractors, such as EBMUD, may have to be limited so that a "Public Health and Safety" (PH&S) level of supply can be sustained.

### CVP SUPPLY TO MEET PUBLIC HEALTH AND SAFETY

EBMUD's understanding is that the USBR will follow its then-existing M&I Shortage Policy in determining the quantity of CVP water needed to bring EBMUD's supply up to a PH&S level during a critical drought. Whereas the policy is currently under review and, in any event, cannot be assumed to be static over the long-term, it appears likely that the policy will always contain at least the following basic elements applicable to PH&S levels of supply:

- determination of an M&I contractor's PH&S need that is based on population served (for residential need) as well as historical deliveries to commercial, institutional, and industrial customers; and
- estimation of an M&I contractor's available supply from non-CVP sources in a critical drought.

In estimating EBMUD's available supply from non-CVP sources in a critical drought in the context of its PH&S needs, the following operating principles should be recognized:

1. EBMUD currently defines the threshold between Severe and Critical Conditions as an end-of-water-year total system storage level of 300,000 AF, as depicted in Table 3-2 (and also, for the near term, in Table G-2.1). When projected total system storage levels indicate Severe or Critical conditions, EBMUD prepares for the possibility that the following water year will also be critically dry.
2. EBMUD's ability to divert from the Mokelumne River or from its storage is restricted, especially during a critical drought, because the following reservations and releases must be achieved:
  - a. Required releases from Camanche Reservoir per the 1998 Joint Settlement Agreement (JSA) with state and federal resource agencies for fishery protection are at a minimum of 22,500 AF in a critically dry water year and increase when more water is available.
  - b. The JSA also requires EBMUD to reserve up to 20,000 AF (beyond the above mentioned prescribed fish releases) once in a drought period to enhance flows for fish species in the lower Mokelumne River.

- c. Releases for senior appropriations and riparian water rights along the lower Mokelumne River are at least 58,000 AF.
- d. A minimum of 38,000 AF must be released from Camanche Reservoir in critically dry water years to make up for channel losses.
- e. A minimum of 88,000 AF of storage in EBMUD’s East Bay local surface reservoirs (part of total system storage) is reserved for up to six months of emergency supply to cope with potential infrastructure damage to its Mokelumne Aqueducts as a result of disruptive events such as earthquakes or Delta flooding.
- f. Approximately 16,000 AF of the total system storage is dead pool storage in Pardee and Camanche Reservoirs.

Considering the sum of the quantities in items (a) through (f) above, a minimum of 242,500 AF of water supply must be reserved or released and cannot be used as non-emergency supply for EBMUD’s customers.

EBMUD’s understanding is that when the USBR’s initial allocation in a CVP contract year<sup>1</sup> is less than the amount requested by EBMUD based on its contractual limits, EBMUD may submit to the USBR a determination of how much CVP water is required to meet EBMUD’s PH&S needs. Table G-1.1 illustrates, using two examples of Critical Conditions, how EBMUD intends to make such a determination. The calculations illustrated in Table G-1.1 incorporate a projection of non-CVP supply in the *following* water year based on the assumption of Critical conditions in that year also.

Further to the calculation illustrated in Table G-1.1, assume that the USBR and EBMUD determine that EBMUD’s PH&S need is 150,000 AF:

- Using example number 1 for the Critical Condition, the quantity needed from the CVP to meet PH&S needs in the current CVP contract year is *zero*, since EBMUD projects it will have sufficient supply through the remainder of the current water year and at least 150,500 AF available for supply in the following water year. The 150,500 AF available for the following water year exceeds the PH&S annual need of 150,000 AF.
- Using example number 2 for the Critical Condition, the quantity needed from the CVP to meet PH&S needs is *59,500 AF*, since EBMUD projects that although it will have sufficient supply for the remainder of the current water year, it may have as little as 90,500 AF available for supply in the following water year excluding any CVP supply. The 90,500 AF (without CVP supply) available for the following water year, assuming it is also Critical, is insufficient to meet the PH&S annual need of 150,000 AF.

## G-2. INTERIM DROUGHT MANAGEMENT PLAN GUIDELINES

EBMUD temporarily revised its Drought Management Program Guidelines. The resulting Interim Drought Management Program Guidelines (Table G-2.1) were implemented in January 2010. They will remain in effect until the economy recovers and post-drought consumption rebounds to 2040 Demand Study (February 2009) planning levels. Based on past consumption trends for previous droughts in the 1970s and 1980s, the suppressed demand is expected to rebound and return to anticipated planning levels as projected in the 2040 Demand Study by 2020.

TABLE G-1.1 ILLUSTRATION: DETERMINING MINIMUM CVP SUPPLY TO MEET PUBLIC HEALTH AND SAFETY NEEDS

	EXAMPLE NUMBER 1 OF CRITICAL CONDITION IN CURRENT WATER YEAR <sup>1</sup>	EXAMPLE NUMBER 2 OF CRITICAL CONDITION IN CURRENT WATER YEAR <sup>1</sup>
A. PROJECTED TOTAL SYSTEM STORAGE AT END OF CURRENT WATER YEAR	260,000 AF	200,000 AF
B. CRITICAL-YEAR RUNOFF ASSUMED FOR THE FOLLOWING WATER YEAR <sup>2</sup>	133,000 AF	133,000 AF
C. MINIMUM REQUIRED RELEASES FROM CAMANCHE RESERVOIR AND MINIMUM STORAGE RESERVATIONS	242,500 AF	242,500 AF
D. NET QUANTITY AVAILABLE FOR SUPPLY IN A FOLLOWING CRITICAL WATER YEAR WITHOUT ADDITION OF CVP SUPPLY <sup>3</sup> [= ROW A + ROW B - ROW C]	150,500 AF	90,500 AF

<sup>1</sup> EBMUD’s water year extends from October 1 through September 30 of the following calendar year. The determination as to whether a Severe or Critical condition exists in the current water year is typically made in April under policy 9.03 (Appendix F) using total system storage projected forward to September 30, the end of the current water year.

<sup>2</sup> Runoff into Pardee Reservoir (i.e. net of upstream diversions) is 133,000 AF for a 1977 hydrological year when modeled using estimated 2010 upstream diversions. This is the most critical water year on record.

<sup>3</sup> Adjustments must be made for supplies available to EBMUD from other sources including the Bayside Groundwater Project.

<sup>1</sup> The CVP contract year runs from March 1 through February 28/29 of the following calendar year.

TABLE G-2.1

INTERIM DROUGHT MANAGEMENT PROGRAM GUIDELINES<sup>1</sup>

STAGE	APRIL PROJECTION OF TOTAL SYSTEM STORAGE ON SEPTEMBER 30 (THOUSAND ACRE-FEET)	PERCENT OF MAXIMUM SYSTEM STORAGE <sup>2</sup>	CVP IMPORT QUANTITY (THOUSAND ACRE-FEET)	RATIONING REDUCTION GOAL <sup>3</sup>
NORMAL	500 OR MORE	65% AND GREATER	0	NONE
MODERATE	500-450	65 TO 59%	0	0-15% - VOLUNTARY
	450-425	59 TO 55%	UP TO 35	0-15% - VOLUNTARY
SEVERE	425- 300	55 TO 39%	35 - 65	15% - MANDATORY
CRITICAL <sup>4</sup>	<300	39% AND BELOW	65	15% - MANDATORY

<sup>1</sup> Source: Revised Drought Management Program Guidelines Memorandum, issued January 21, 2010 to the Board of Directors. It is based on numerical modeling that accounts for 2010 projected demand of 189 million gallons per day (MGD) with CVP supplies via Freeport. This level of demand was reduced from the 2040 Demand Study (February 2009) assumption of 216 MGD for year 2010 from recent rationing and adverse economic conditions. Demand is expected to return to long term planning levels when the post-drought consumption rebound ends and the economy recovers.

<sup>2</sup> Maximum system storage represents the maximum reservoir capacity of approximately 767 TAF.

<sup>3</sup> Policy 9.03 limits rationing up to 15 percent in planning for drought management.

<sup>4</sup> With the availability of CVP supplies and up to 15 percent rationing, critical conditions would only occur in the third year of the design drought.

The interim guidelines account for the following recent developments affecting drought planning:

- completion of the Freeport Regional Water Facility in 2010;
- change of a maximum rationing level of up to 15 percent of overall demand; and
- current suppressed customer demand resulting from the aftereffects of the recent drought and adverse economic conditions.

These guidelines factor in operating conditions for initiating customer rationing and for importing water under the Freeport Regional Water Project (EBMUD’s Central Valley Project (CVP) contract). Constraints were considered, such as the water delivery schedule under the CVP contract and the risk of reduced allocations from the USBR due to supply shortages. When the projected end-of-September total system storage falls below 500 thousand acre-feet (TAF), voluntary rationing up to 15 percent will be considered. Early rationing minimizes the need for CVP supplies and mandatory rationing if dry conditions persist and ensures that a sufficient water supply is available in following years. In accordance with the interim guidelines, when total system storage falls between 450 and 425 TAF, EBMUD will access CVP supplies to minimize the risk of exhausting remaining water supplies at the end of a severe three year drought. When projected total system storage, including CVP supplies, falls below 425 TAF, mandatory rationing to achieve 15 percent demand reduction will be implemented.

### G-3. 2008-2009 DROUGHT MANAGEMENT PROGRAM

The following sections highlight the process used during the 2008-2009 Drought Management Program (DMP) to determine reduction goals, water use allocations, and

drought rate structure pricing. This recent drought, as well as the 1976-77 and 1987-92 droughts, provided guidelines and experiences that EBMUD could consider for future drought management programs. For each drought period in the future, EBMUD will develop and implement a specific drought management program.

### RECENT REDUCTION GOALS

Table G-3.1 illustrates the reduction goals for each customer group and their anticipated reductions in indoor and outdoor use from the implementation of the 2008-2009 DMP. The expected reductions were based on experience and discretionary use.

Customers were expected to achieve an overall 10 percent reduction for indoor use and an overall 27 percent reduction for outdoor use. Water use reduction goals for each customer class were determined by taking the weighted average of the expected reductions for indoor and outdoor water use and the proportion of indoor and outdoor water use to the total. For example, Single-Family Residential customers are expected to reduce indoor water use by 13 percent and outdoor use by 28 percent. The weighted average of these reductions and the indoor/ outdoor use (62 percent indoor/ 38 percent outdoor) is calculated to be 19 percent for the customer class reduction goal.

### WATER USE ALLOCATION

During the 2008-2009 DMP, each customer’s water use allocation was based on a percentage of their baseline use. The baseline use and individual water use allocation for each customer were determined using the following principles:

1. Each customer’s baseline water use was the customer’s three year average consumption from FY 2005 to FY 2007. Each billing cycle had its own baseline water use.

TABLE G-3.1 2008-2009 DROUGHT MANAGEMENT PROGRAM GOALS BY CUSTOMER CLASS

CUSTOMER CLASS	% USE <sup>1</sup>			% REDUCTION <sup>2</sup>			PROPORTION (%) OF EBMUD'S GOAL
	TOTAL	INDOOR	OUTDOOR	INDOOR	OUTDOOR	GOAL	
SINGLE-FAMILY RESIDENTIAL	46	62	38	13	28	19	58
MULTI-FAMILY RESIDENTIAL	17	86	14	10	21	11	13
IRRIGATION	6	0	100	0	30	30	12
INSTITUTIONAL	3	85	15	7	24	9	2
COMMERCIAL	11	90	10	11	25	12	9
INDUSTRIAL	17	98	2	5	30	5	6
TOTAL	100						
<b>SERVICE AREA-WIDE AVERAGE</b>		<b>72</b>	<b>28</b>	<b>10</b>	<b>27</b>	<b>15</b>	<b>100</b>

<sup>1</sup> Actual use based on 1970-2004 long-term average.  
<sup>2</sup> Customer class rationing goals estimated to achieve district-wide rationing target.

- Accounts with less than one year’s billing history or no billing history had baselines estimated for missing billing cycles using the procedures for SFR and non-SFR customers listed below.
- Water use allocation estimates were rounded up to whole numbers.
- Private fire service, hydrant meter, recycled and raw water customers were not assigned water use allocations.

- Setting individual water use allocations for customers, based on using half of the water use reduction goal for the customer category as a percentage of the baseline water use.
- Instituting a drought surcharge of \$2.00 per ccf (1 ccf = 100 cubic feet = 748 gallons) for consumption exceeding the allocated water use with some exceptions.
- Using up to \$31 million of the \$43 million rate stabilization reserve fund in FY 2009 to partially offset reduced water sales revenue.

**Special Procedures for SFR Customers:**

- If baseline use was unavailable for a billing period because of missing data or no consumption, EBMUD used the average SFR customer consumption in the SFR customer’s zip code for the baseline use for each corresponding billing period.

**Special Procedures for non-SFR Customers:**

- For the FY 2005 to FY 2007 period, billed consumption from the service address was used to calculate the current customer’s baseline use if the Business Classification Code (BCC) for the service address had not changed.
- If the baseline use for a billing period could not be calculated because of missing data, EBMUD estimated the missing baseline using either the average ratio of the customer’s available consumption with the average consumption for the same BCC or the consumption from similar facility and customer characteristics.

**DROUGHT RATE STRUCTURE**

The drought rate structure adopted in FY 2009 consisted of:

- Increasing the FY 2009 volume charges by ten percent for all customers with some exceptions.

All customers (except industrial) who conserved and met their water use reduction goals paid less for total water use under the drought rate structure than under the pre-drought adopted FY 2009 rates. However, industrial customers who achieved their reduction goals of only five percent saw their bills increase by four percent, and those who reduced their consumption by ten percent paid the same as under the pre-drought adopted FY 2009 rates. Certain customer groups were recognized for significantly reducing their potable water consumption. For instance, SFR customers with low use (using an average of 100 gallons per day (GPD) or less per billing period during the drought emergency) and recycled water customers were exempt from incentive pricing tied to allocations and surcharges.

**FUTURE CONSIDERATIONS**

The experience from the 2008-2009 DMP provided insight into future program improvements, such as processes to develop more effective allocations, consumption analyses, and consumption feedback. Despite being the only mandatory program in the San Francisco Bay Area, the DMP successfully increased customer awareness of water conservation and achieved substantial water savings. It was also EBMUD customers’ first experience with mandatory

rationing in nearly two decades. Although the following considerations were not part of the DMP, there are other available tools that could be considered in the future.

### Exploration of Rate Alternatives

Water use varies over EBMUD's geographically diverse service area characterized by regional land use and weather patterns. A drought rate structure based on water allocations or an absence of it (i.e. severe use restrictions with heavy enforcement or steep tier pricing) may not necessarily be an appropriate fit for such diverse water use patterns. Experience from the 2008-2009 DMP suggests that sufficient time should be allocated to exploring rate alternatives and soliciting public input in developing an equitable drought rate structure.

### Allocation Adjustment Process

Experience during the recent 2008-2009 DMP validated that a clear and transparent process for customers to seek allocation adjustments helped ensure equity and would also be vital in future programs for accommodating special circumstances for some customers. Audits for approved allocation adjustments ensure that accurate information was submitted and assure the integrity of the process.

### Water Consumption Data Analysis

Effective demand reduction measures are designed based on analyses of historical consumption data, which models customer consumption behavior. Statistical analyses on average, monthly, seasonal, annual, and indoor and outdoor water use data provide insight into potential impacts on customers from implementing planned demand restrictions, allocation structures, and rationing goals. These analyses can also help assess the effect of drought water rates and surcharges on revenues. Data on average consumption grouped by zip code for each customer category, by the BCC, and by per capita daily water use are examples of water use characteristics that could be considered as the basis for adjusting water use allocations.

### Monthly vs. Bimonthly Billing

A DMP that increases the frequency of billing cycles from bimonthly to monthly would send more timely price signals to encourage customers to conserve. When conservation measures are quickly implemented, a drought response program realizes conservation benefits sooner and effectively preserves more water and emergency storage for the remaining and following years. Rationing earlier at uncomfortable yet manageable levels

and at graduated intensity is preferred over waiting and rationing later at extreme levels.

The current staggered bimonthly billing cycles requires more time for customers to adjust their water consumption behavior in response to adopted drought rates and water allocations. A monthly billing format may enable EBMUD to better gauge customers' current consumption response relative to allocation targets and to assess the need to adjust conservation earlier. Due to resource constraints with current meter reading technology, monthly billings for all accounts is not practical unless meters were upgraded to accommodate automated meter readings. EBMUD has begun a pilot study of automated meter reading.

### Other Industry Methods

Other allocation methods used by the water retail industry include percentage reduction; financial rationing; per connection allotment; per capita allotment, and hybrid per capita/ percentage.

- **A percentage reduction** assigns each customer a consumption reduction goal that is a percentage of the historical consumption level. Required percent reductions can be constant, stepped, or variable. Excess use charges are applied to water consumption above a baseline allotment level. EBMUD used this method during the 2008-2009 DMP.
- **Financial rationing** sets tiers based on past use for non-residential customers and the average number of occupants for each account for residential customers.
- **Per Connection allotment** (for residential customers only) establishes a customer's water consumption goal on a unit basis (based on, for example, the number of bedrooms per single family home or multi-family unit) calculated from an estimate of essential uses.
- **Per Capita allotment** (for residential customers only) provides a fixed amount of water per person.
- **Hybrid per capita/percentage allotment** programs allow limited outside irrigation and distinguish between single-family and multi-family dwellings with different water use requirements. The hybrid provides water for inside use and a percentage of the five year average for outside use. A geographic information system (GIS) could be used to estimate the outside use portion of the hybrid system based on the landscaped area served by each meter. A maximum per customer allocation is necessary because it limits the amount of water allocated to large parcels.

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APPENDIX H.  
SBX7-7 20X2020 BASELINE AND TARGET METHODOLOGY

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## APPENDIX H. SBX7-7 20X2020 BASELINE AND TARGET METHODOLOGY

In late 2009 the legislature adopted Senate Bill x7-7 (SBx7-7), the Water Conservation Act of 2009, which calls for a 20 percent statewide reduction in per capita water use by the year 2020 and directs urban retail water suppliers to set 2020 urban water use targets. Under the bill and the 2020 Water Conservation Plan adopted by the California Department of Water Resources, all urban water agencies are required to report their per capita water use and reduction targets in their Urban Water Management Plan (UWMP). This appendix presents the background data, methodology, and calculations for the baseline and target using one of the target methods established by law.

EBMUD will achieve its target water use by implementing water conservation and recycling programs identified in its long-term integrated resources planning. Phased implementation of water savings programs are incorporated into EBMUD’s Water Conservation Master Plan, as summarized in Chapter 6 of this UWMP and recycled water programs as discussed in Chapter 5 of this UWMP 2010. The target water use will be finalized in the next UWMP submittal in 2015.

### BASELINE CALCULATION

Water suppliers must define a ten year base period for water use that will be used to develop their target levels of per capita water use. Water suppliers must also calculate water use for a five year baseline period, and use that value to determine minimum required reduction in water use by 2020.

### GROSS WATER USE

Section 10608.12(g) of the California Water Code defines “Gross Water Use” as:

*the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:*

- (1) *Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.*
- (2) *The net volume of water that the urban retail water supplier places into long-term storage.*
- (3) *The volume of water the urban retail water supplier conveys for use by another urban water supplier.*

- (4) *The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.*

EBMUD gross water use is a measure of water supplied to the entire distribution system including raw water within the Service Area Boundary over a continuous 12-month calendar year, adjusted for changes in distribution system storage and recycled water deliveries. The methodology for calculating gross water use broadly follows American Water Works Association (AWWA) Manual M36 guidance for calculating Distribution System Input. Table H-1 presents tallied gross water use data for the calendar years 1995 thru 2004 and includes both treated and untreated water for residential and non-residential uses, and fire safety.

TABLE H-1 EBMUD GROSS WATER USE (1995-2004)

CALENDAR YEAR	ANNUAL WATER PRODUCTION (MG)	ANNUAL WATER PRODUCTION (MGD)
1995	69,663	191
1996	71,533	196
1997	77,188	211
1998	74,258	203
1999	77,058	211
2000	78,719	216
2001	78,871	216
2002	78,637	215
2003	78,360	215
2004	80,180	220

Sample Gross Water Use calculation: Raw water source volume (+/-) meter accuracy adjustment (+/-) change in distribution storage.

### SERVICE AREA POPULATION

As a Category 1 water supplier, EBMUD service area population data was compiled from the Association of Bay Area Governments and from EBMUD’s UWMPs since 1990. Where individual yearly data was not available, it was interpolated using published projections. The data is checked against other state and federal sources such as the California Department of Finance and U.S. Census.

### BASE DAILY PER CAPITA WATER USE

Base Daily Per Capita Water Use is defined as average gross water use, expressed in gallons per capita daily (GPCD) for a continuous, multi-year base period. The Water Code specifies two different base periods for

**TABLE H-2** EBMUD BASELINE DAILY PER CAPITA WATER USE CALCULATION (1995-2004)

CALENDAR YEAR	POPULATION	ANNUAL WATER PRODUCTION (MG)	ANNUAL WATER CONSUMPTION (GPCD)
1995	1,225,000	69,663	156
1996	1,234,000	71,533	159
1997	1,243,000	77,188	170
1998	1,252,000	74,258	162
1999	1,261,000	77,058	167
2000	1,270,000	78,719	170
2001	1,283,600	78,871	168
2002	1,297,200	78,637	166
2003	1,310,800	78,360	164
2004	1,324,400	8,0180	166
<b>10-YEAR AVERAGE BASELINE</b>			<b>165</b>

calculating Base Daily Per Capita Water Use. EBMUD’s ten year base daily per capita water use was calculated over a continuous 1995-2004 baseline period (Water Code Section 10608.20). Figure H-1 illustrates a map of the service area boundary changes that occurred during the 1995-2004 base period.

The following calculation is required only if the five year baseline per capita water use per Section 10608.12 (b) (3) is greater than 100 GPCD. The calculation is used to determine whether the water supplier’s 2015 and 2020 per capita water use targets meet the legislation’s minimum water use reduction requirement per Section 10608.22.

EBMUD’s second continuous baseline period covers the years 2003-07 and was used to calculate the minimum water use reduction target requirement per Section 10608.22 of the Water Code. The tabulated data is presented in Tables H- 2 and H-3. Figure H-2 illustrates a map of the service area boundary changes that occurred during the 2003-2007 base period

**TARGET DAILY PER CAPITA WATER USE**

An urban retail water supplier must set a 2020 water use target and a 2015 interim target using one of the methods outlined in the legislation and by the Department of Water Resources.

The Water Code directs that water suppliers must compare their actual water use in 2020 with their calculated targets to assess compliance. Water suppliers must also report interim compliance in 2015 as compared to an interim target (generally halfway between the baseline water use and the 2020 target level). A water supplier is allowed to revise its water use target in its 2015 UWMP or in an amended plan.

**TABLE H-3** EBMUD MINIMUM DAILY PER CAPITA WATER USE CALCULATION (2003-2007)

CALENDAR YEAR	POPULATION	ANNUAL WATER PRODUCTION (MG)	ANNUAL WATER CONSUMPTION (GPCD)
2003	1,310,800	78,360	164
2004	1,324,400	80,180	165
2005	1,338,000	76,065	156
2006	1,352,800	76,218	154
2007	1,367,600	75,021	150
<b>5-YEAR AVERAGE BASELINE</b>			<b>158</b>
<b>5% MINIMUM WATER USE REDUCTION REQUIREMENT</b>			<b>150</b>

EBMUD’s target is based on Target Method #2 (TM2) using the following components to calculate the water use target for 2020:

- Indoor Residential Water Use = 55 gallons per capita daily water use (GPCD) (provisional standard subject to adjustment by Legislative statute);
- Commercial, Industrial, and Institutional (CII) Uses = 10% reduction in water use from the baseline CII water use; and
- Landscaped Area Water Use = water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 of Division 2 of Title 23 of the California Code of Regulations.

Under TM2, the target year per capita water use is determined as the sum of residential indoor use, the landscaped area water use and commercial, industrial, and institutional (CII) water use. As shown in Table H-4, EBMUD’s calculated 2020 Target Daily Per Capita Use is 175 GPCD. This exceeds the required minimum reduction shown in Table H-3, therefore the lower minimum water use reduction target of 150 GPCD will be used. The midpoint between this 2020 target level and the baseline

**TABLE H-4** EBMUD TM2 TARGET DAILY PER CAPITA WATER USE

PROJECTED USE	2020	
	MGD	GPCD <sup>1</sup>
RESIDENTIAL INDOOR	85	55
LANDSCAPE (IRRIGATION & RESIDENTIAL INDOOR)	105	68
COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL <sup>2</sup>	80	52
<b>TOTAL</b>	<b>269</b>	<b>175</b>

<sup>1</sup> Based on projected 2020 population of 1,538,000 sourced from ABAG Projections 2009. The 2020 target may be updated in UWMP 2015 as revised ABAG projections based on the 2010 census data become available.

<sup>2</sup> Institutional use includes District uses and other non-revenue water uses.

FIGURE H-1

1995 AREA SERVED WITH ANNEXATIONS FROM 1995–2004



water use is the interim 2015 target of 158 GPCD. EBMUD anticipates it will meet this interim 2015 target through its planning level programs, which project an even more aggressive and lower demand level of 151 GPCD for year 2015.

Though Section 10608.20(b)(2)(A) sets a provisional standard for efficient indoor use (55 GPCD) that urban retail water suppliers using TM2 must use to set their 2020

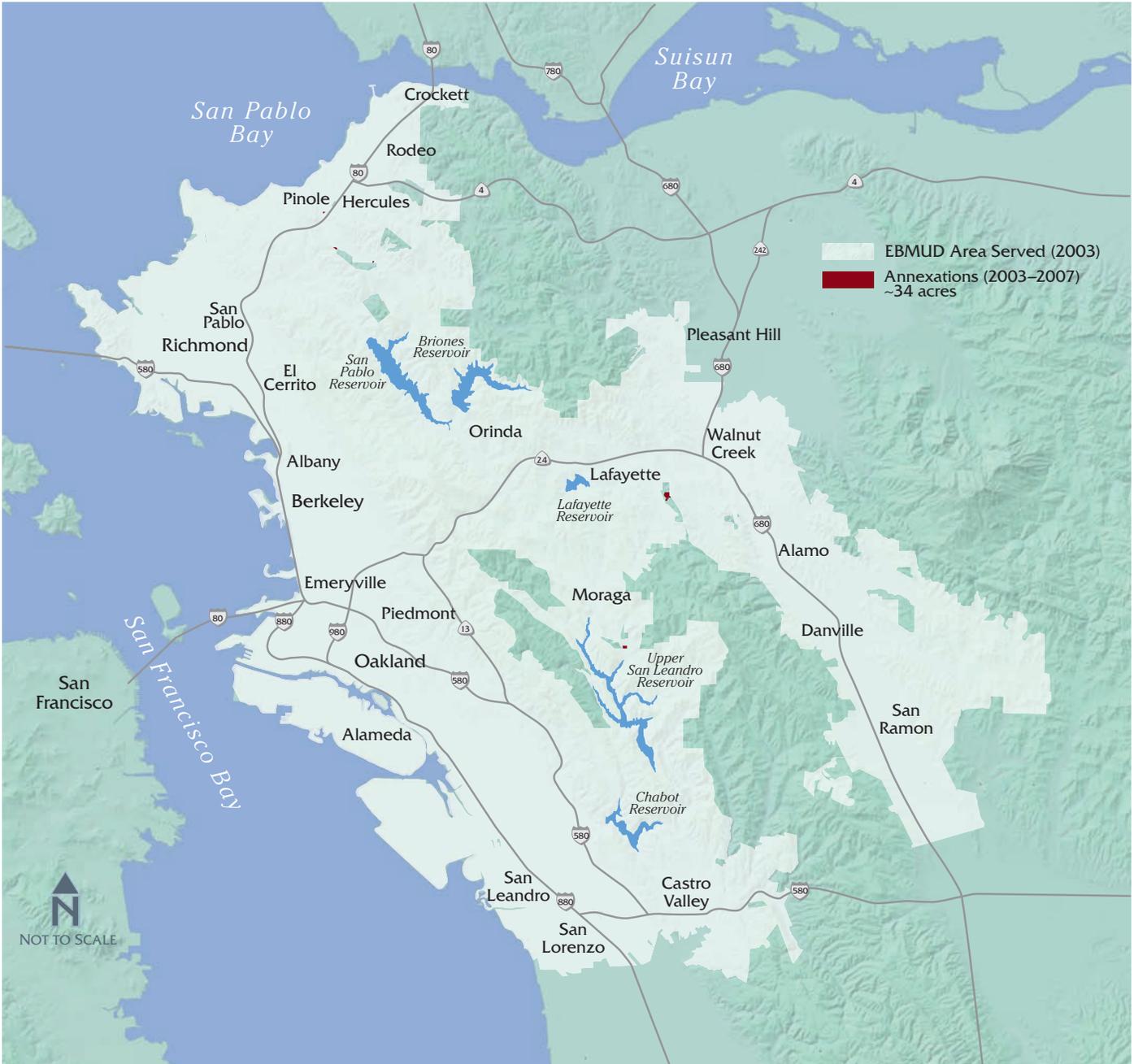
target, suppliers can use a combination of the indoor residential use, landscaped area water use and commercial, industrial, and institutional (CII) water use to collectively meet the overall 2020 target.

### CII WATER USE

As shown in Table H-5, the base CII water use is 58 GPCD. Applying the required ten percent reduction results in a target of 52 GPCD for 2020.

FIGURE H-2

2003 AREA SERVED WITH ANNEXATIONS FROM 2003–2007



**LANDSCAPE WATER USE**

As outlined by DWR, landscaped area for the purposes of calculating the TM2 target shall mean the water supplier’s estimate or measurement of 2020 landscaped areas that are irrigated and served by residential or dedicated landscape meters or connections. Water suppliers shall develop a preliminary estimate (forecast) of 2020 landscaped areas for purposes of setting urban water use targets and interim urban water use targets under

Subdivision 10608.20 (a) (1). For final compliance-year calculations, water suppliers shall update the estimate of 2020 landscaped areas using one of the techniques allowed.

Water suppliers shall follow five steps to calculate Landscaped Area Water Use:

- Identify applicable State Model Water-Efficient Landscape Ordinance (MWELO) (1992 or 2010) by parcel.

Calculation of Baseline Commercial, Industrial and Institutional (CII) Water Use Component

TABLE H-5

CALENDAR YEAR	POPULATION	ANNUAL WATER PRODUCTION (MG)	ANNUAL WATER CONSUMPTION (GPCD)
1995	1,225,000	24,885	56
1996	1,234,000	24,639	55
1997	1,243,000	27,511	61
1998	1,252,000	28,665	63
1999	1,261,000	27,798	60
2000	1,270,000	28,132	61
2001	1,283,600	27,042	58
2002	1,297,200	26,596	56
2003	1,310,800	27,438	57
2004	1,324,400	27,842	58
<b>10-YEAR AVERAGE BASELINE</b>			<b>58</b>
<b>10% REDUCTION TARGET</b>			<b>52</b>

Estimated Number of 2020 EBMUD Customer Landscape Water Use Accounts

TABLE H-6

PARCEL AREA/ STRATA (SQ.FT.)	WOH	CENT	EOH
0-4,000	44,163	11,653	3,051
4,001-8,000	111,730	46,855	11,310
8,001-12,000	16,307	15,477	12,518
12,001-16,000	5,377	6,580	6,538
16,001-20,000	2,346	4,061	3,942
20,001-24,000	1,392	3,746	3,654
>24,001	7,417	11,351	7,871
<b>TOTAL</b>	<b>188,732</b>	<b>99,723</b>	<b>48,884</b>

- Estimate irrigated landscaped area for each parcel.
- Determine reference evapotranspiration for each parcel.
- Use the Maximum Applied Water Allowance (MAWA) equation from the applicable MWELo to calculate annual volume of landscaped area water use.
- Convert annual volume to GPCD.

The estimated landscape water use component under TM2 is 68 GPCD. This value factors total estimated landscape areas and associated water budgets utilizing historical landscape water use over the 10-year baseline period of 1995-2004, water efficiency requirements for new accounts under EBMUD’s Water Service Regulations and the MWELo, and estimated account growth between 2010-2020.

Before computing landscaped area, water suppliers must determine how MWELo ordinances apply to specific

parcels in their service areas. Two versions of MWELo apply according to the date when landscaping was installed in a given parcel:

- For landscaped areas installed on or after January 1, 2010, the MAWA equation and all applicable criteria from the 2009 version of the ordinance or its equivalent shall be used.
- For landscaped areas installed before January 1, 2010, the MAWA equation and all applicable criteria from the 1992 version of the ordinance or its equivalent shall be used.

For the current 2020 landscape water use estimate, approximately 99% of the landscapes were installed prior to January 1, 2010 and all applicable criteria from the 1992 version of the MWELo were applied.

- The landscaped area must be measured or estimated for all parcels served by a residential or dedicated landscape water meter or connection in the water supplier’s service area.
- Only irrigated landscaped area served by residential or dedicated landscape water meter or connection is included in the calculation of Landscaped Area Water Use.
- Landscape served by CII connections and non-irrigated landscape is excluded.

The purpose of this landscape measurement is to estimate the irrigation efficiency of EBMUD customers. It requires a measurement (or estimate) of landscaped area and of the landscape water use per unit area based on a reference evapotranspiration (ET). All landscape irrigated by dedicated or residential meters must be included, including multi-family residential parcels irrigated through dedicated or residential meters or connections. The selected methodology relies on the collection of a statistical random, stratified sample of customer parcels, irrigated area, outdoor water use group by parcel size which is statistically field verified and extrapolated for the rest of the District. Estimates are based on (Geographical Information System) GIS images, photographs provided by Google, and from a representative number of sites and field visits.

Division of Service Area

For the purposes of this analysis, the EBMUD service area was divided into six distinct areas with similar weather patterns/characteristics as follows:

- **West of Hills (WOH):** Cities of Alameda, Albany, Berkeley, Castro Valley, Crockett, El Sobrante,

Richmond, El Cerrito, Emeryville, Hayward, Hercules, Oakland, San Leandro, San Lorenzo.

- **Central (CENT):** Cities of Lafayette, Moraga, Orinda.
- **East of Hills (EOH):** Cities of Alamo, Danville, Pleasant Hill, San Ramon, Walnut Creek.

Parcels within each area were then segmented into seven subcategories by parcel size.

### Measuring with Remote Sensing

The landscaped area was determined through a combination of measurements using remote sensing (aerial or satellite imaging) and field site visits to identify the landscaped areas in conjunction with a GIS representation of the parcels in service area.

- The remote-sensing information must be overlaid onto a GIS representation of each parcel boundaries to estimate the irrigated landscaped area in each parcel.
- The remote-sensing imagery must have a resolution of 1 meter or fewer per pixel.
- The remote-sensing technique must be verified for accuracy by comparing its results to the results of field-based measurement for a subset of parcels selected using random sampling.

### Using Sampling to Estimate Landscaped Area on Small Parcels

The landscaped area for smaller-sized parcels was calculated by measuring the percentage of total parcel area that is landscaped in a sample of similar parcels and applying that percentage to the remaining parcels. This technique was used for parcels with a total land area of 24,000 square feet or less. The parcels for which this technique was used was divided into groups, or strata, based on parcel size increments of 4,000 square feet or less. (For example, parcels up to 4,000 square feet would form one group, parcels between 4,001 and 8,000 square feet would form another group, and so forth.)

Field-based measurement and remote sensing was used to calculate the landscaped area for a subset of parcels sampled at random in each parcel size group. The percentage of landscaped area to total land area for the sampled parcels in each group was then be used to calculate the landscaped area for all other parcels in the group. Parcels greater than 24,000 square feet are to be measured separately.

The methodology/technique was tested for accuracy by comparing the results of satellite and field-based measurement for a subset of parcels. Satellite and field-based

measurement were performed for a subset of parcels selected at random. The percent error between the calculations of landscaped area produced by the selected satellite technique and those produced by field-based measurements were used to create coefficient values for extrapolating parcel data across a total of 168 customer account categories, micro-climate regions, and parcel size tier. Summary findings from this analysis in included in Table H-6.

### Data Collection

The goal of this analysis is to collect data about a representative number of parcels to determine irrigation efficiency. A combination of field visits, GIS, Google Earth and Google Street maps was used to determine the nature of each property. For each property the following information was used obtained and/or measured:

- Parcel size (county records and polygon of parcel).
- Square footage of property on County Records.
- Footprint of home and structures on property.
- Hardscape not including footprint. This may include items such as driveway, patio, sidewalks, or other paved areas.
- Irrigable area which is ground where plants could be grown but not necessarily where there are plants now or where intentional irrigation is taking place. This is calculated as the difference between recorded or measured lot size and footprint plus hardscape.
- Total Turf Area.
- Other Irrigated area. This is calculated as the area defined by polygons where plants are known or believe to be irrigated.
- Total Irrigated Area. This is the sum of turf and non-turf areas that appear to be irrigated.
- Non-irrigated irrigable area. This is the remainder of irrigable area minus Total Irrigated Area.
- Outdoor water use based on monthly consumption.

### Number of Statistical Samples

From each subgroup a statistical number of sample services were collected. Additional samples were taken and landscape estimates were measured with the use of GIS until the results are repeatable and a smaller standard deviation is achieved. The confidence coefficient should be 95%.

### Extrapolation of Results

Once the confidence coefficient has been achieved for each subgroup a number of relationships were defined that

IMAGE 1



IMAGE 2



were extrapolated for the rest of the group and a calculation of current landscape efficiency was measured. Examples of relationships are shown below.

#### Sample calculation

For homes in WOH between 4,000 and 8,000 SF:

- Average square footage = 6,000 SF
- Average footprint = 1802 SF
- Average hardscape = 1000 SF
- Ratio of hardscape to average square footage =  $1000/6000$
- Average irrigable area =  $6000 - 1802 - 1000 = 3198$
- Ratio of irrigable area to average square footage =  $3198/6000$
- Average area of irrigated turf = 1200 SF
- Average area of irrigated non-turf = 825 SF
- Total area of irrigated area = 2025
- Ratio of irrigable area which is irrigated =  $2025/3198$
- Ratio of irrigated area to lot size =  $2025/6000$

### ArcGIS

EBMUD maintains a sophisticated GIS database. Images for the analysis were at a resolution of between 4 and 6 inches per pixel. Alameda and Contra Costa County records including parcel and building footprint statistics were used and overlaid on the aerial photos. Described below are the steps taken to measure water service

characteristics consistent with the adopted state methodology. Results of the landscape water use analysis for single-family, multi-family, and irrigation accounts are presented in Tables H-7 through H-9.

### Calculating Footprint

Polygons were drawn around the footprint of obvious structures. (Images 1 and 2) Obvious structures include any structure which a person can enter:

- Building
- Garage or Carport
- Shed
- Covered gazebo

Properties and structures were also viewed in Google Earth or Google Street View when available to improve viewpoints (see Images 3 to 5 of a second sample site).

### Measuring Polygons-HardScape

Hardscape is defined as any grade level area which can not support landscape such as driveways, sidewalks or compacted dirt. It also includes grade level structures such as decks, patios, or stone pathways. It may also include artificial turf or sheet mulched areas (see Image 6).

IMAGE 3



IMAGE 5



IMAGE 4



in summer vs. winter for the size of the estimated landscape.

In Image 7 the property appears to have both a front and rear lawn. It also appears to have manicured shrubs in the front and larger trees in the back. The shrubs on either side of the property appear to be shared with neighbors with approximately half of the watering of these shared areas taken by each adjacent neighbor. In this case, the trees are not likely to be separately watered but probably obtain some water from the irrigated turf, so the assumption is that the area of lawn hidden by the tree canopy is lawn or equivalent root zone of the trees.

In Image 7 the green polygon represents the irrigated turf areas. The irrigated non-turf areas are in the gaps northwest and southeast of the house to the parcel line.

### Measuring – Landscape Area-Irrigable

Irrigable area is defined as any property which is neither under the footprint of a building or hardscape. Therefore, it can be calculated as the difference between the parcel size and (hardscape plus footprint). It would include any vegetated area or non-vegetated area that is not otherwise covered.

### Measuring – Irrigated Areas-Turf and Non-Turf

Determining whether landscape is being actively irrigated from photographs is an inexact science. However certain clues help make the work more accurate. The first is by looking at different imagery to see if the landscape is brown during different seasons. That would indicate that it may not be irrigated. Another clue is to look at the water use for a property to see if the usage is reasonably higher

### Field Verification

EBMUD landscape water budgets and GIS calculations were performed on statistically sampled sites, which were visited to verify the accuracy of the GIS method, establish uniform correction factors, or determine if more field visits were necessary. A field visit consists of the following:

- Random selection of the sites to be visited.
- Contacting the customer of record and asking the following:
  - a. Area of their property.
  - b. What is the type of landscape they have?
  - c. Would it be okay to visit their backyard?
  - d. Would they be interested in receiving a free water audit?

IMAGE 6



IMAGE 7



- Bring a 11x17 copy of the aerial photograph marked up with polygons indicating landscape of presumed irrigated area. Green for grass, blue for shrubs.
- Mark up the aerial photograph with any corrections. Data collected for each analyzed parcel includes:
  - a. Service #
  - b. City
  - c. Square footage of home from county records
  - d. Square footage of parcel size
  - e. Footprint of home measured
  - f. Hardscape measured
  - g. Irrigable area calculated
  - h. Irrigated Turf measured
  - i. Irrigated non-turf measured
  - j. Total irrigated area calculated
  - k. Non-irrigated irrigable area calculated
  - l. Outdoor water use
  - m. GIS Operator
  - n. Field corrected turf irrigated area
  - o. Field corrected non-turf irrigated area.
  - p. Field Inspector

ESTIMATED 2020 EBMUD SINGLE FAMILY RESIDENTIAL LANDSCAPE WATER USE

LOCATION	TIER (SQ.FT.)	NUMBER OF SERVICES	AVE. PARCEL AREA (SQ.FT.)	SUM PARCEL AREA (SQ.FT.)	AVE. BLDG. AREA (SQ.FT.)	SUM BLDG. AREA (SQ.FT.)	AVE. YEAR BUILT	NUMBER OF POOLS	% OF MULTI-STORY BLDG.	AVE. LOT SCAPE-ADDED SERVICE <sup>1</sup> (SQ.FT.)	AVE. LOT OTHER FEATURES PER SERVICE <sup>2</sup> (SQ.FT.)	TOTAL BLDG. FOOTPRINT <sup>3</sup> (SQ.FT.)	SUM OF TOTAL BUILDING FOOTPRINT (SQ.FT.)	IRRIGATABLE AREA (SQ.FT.)	IRRIGATED AREA FACTOR (%)	IRRIGATED AREA (SQ.FT.)	REF.ET (IN.)	TOTAL M/MAWA (GPD)	
EOH	0-4,000	3,001	2,955	8,867,373	1,735	5,120,419	1987	4	71%	2,251	330	2,581	7,744,686	1,122,687	53%	599,430	50	40,972	
EOH	4,001-8,000	11,167	6,489	72,467,098	2,144	23,709,502	1982	895	54%	2,868	431	3,298	36,832,129	35,634,969	46%	16,406,694	50	1,121,422	
EOH	8,001-12,000	12,284	9,983	122,634,124	2,243	27,394,085	1973	2,700	43%	3,786	1,119	4,905	60,258,450	62,375,674	76%	47,251,511	50	3,229,711	
EOH	12,001-16,000	6,404	14,113	90,379,179	2,498	15,824,349	1973	2,287	38%	4,489	1,474	5,963	38,183,945	52,195,234	61%	31,729,890	50	2,168,785	
EOH	16,001-20,000	3,827	17,912	68,550,843	2,761	10,377,124	1973	1,670	36%	5,123	1,639	6,762	25,877,354	42,673,489	48%	20,398,450	50	1,394,264	
EOH	20,001-24,000	3,552	21,807	77,458,727	2,901	10,095,366	1971	1,805	33%	5,039	1,899	6,938	24,645,537	52,813,190	28%	14,927,352	50	1,020,307	
EOH	24,000+	6,300	95,702	602,923,964	10,091	49,981,824	1975	2,498	33%	16,981	8,743	25,724	162,059,293	440,864,671	22%	97,140,499	50	6,639,698	
<b>SUBTOTAL</b>		<b>46,535</b>	<b>1,043,281,308</b>		<b>142,502,669</b>		<b>1976</b>	<b>11,859</b>	<b>44%</b>	<b>5,791</b>	<b>2,233</b>	<b>8,024</b>	<b>355,601,395</b>	<b>687,679,913</b>	<b>48%</b>	<b>228,453,826</b>		<b>15,615,159</b>	
<b>AVERAGE</b>		<b>24,137</b>	<b>3,482</b>		<b>1,976</b>		<b>1949</b>	<b>2,053</b>	<b>6,819</b>	<b>34%</b>	<b>38</b>								
WOH	0-4,000	40,036	3,268	130,825,254	1,452	57,305,609	1931	45	19%	2,039	386	2,426	97,110,418	33,714,836	35%	11,711,365	38	604,487	
WOH	4,001-8,000	98,929	5,501	544,214,748	1,871	183,285,529	1939	793	21%	2,621	672	3,293	325,723,903	218,490,845	53%	116,502,000	38	6,013,299	
WOH	8,001-12,000	13,764	9,612	132,293,789	2,718	36,118,761	1949	476	26%	3,878	759	4,637	63,828,816	68,464,973	21%	14,300,693	38	738,136	
WOH	12,001-16,000	4,285	13,733	58,845,582	3,129	12,125,808	1952	218	26%	4,048	1,669	5,718	24,500,740	34,344,842	17%	5,873,989	38	303,188	
WOH	16,001-20,000	1,810	17,923	32,440,551	4,048	6,160,305	1956	112	28%	5,876	1,463	7,339	13,284,108	19,156,443	45%	8,710,526	38	449,597	
WOH	20,001-24,000	1,035	21,839	22,603,343	4,937	3,816,399	1958	54	23%	6,391	1,799	8,190	8,476,453	14,126,890	54%	7,586,835	38	391,598	
WOH	24,000+	4,428	128,085	567,161,621	10,051	18,212,786	1959	239	12%	8,508	7,625	16,134	71,439,332	495,722,289	12%	57,851,820	38	2,986,046	
<b>SUBTOTAL</b>		<b>164,287</b>	<b>1,488,384,888</b>		<b>317,025,197</b>		<b>1937</b>	<b>1,937</b>	<b>22%</b>	<b>4,766</b>	<b>2,053</b>	<b>6,819</b>	<b>604,363,770</b>	<b>884,021,118</b>	<b>34%</b>	<b>222,537,229</b>		<b>11,486,352</b>	
<b>AVERAGE</b>		<b>28,566</b>	<b>4,030</b>		<b>1,949</b>		<b>1949</b>	<b>2,053</b>	<b>6,819</b>	<b>34%</b>	<b>38</b>								
CENT	0-4,000	11,246	3,038	34,161,251	1,379	15,080,592	1965	15	40%	1,546	309	1,855	20,865,313	13,295,938	81%	10,782,789	45	661,447	
CENT	4,001-8,000	44,972	5,806	261,090,536	1,599	71,523,149	1959	942	18%	2,748	607	3,354	150,850,846	110,239,690	57%	62,614,541	45	3,840,953	
CENT	8,001-12,000	14,816	9,803	145,239,251	1,950	28,551,754	1965	1,490	22%	3,645	626	4,271	63,281,852	81,957,399	35%	29,076,735	45	1,783,649	
CENT	12,001-16,000	6,201	13,842	85,835,560	2,225	13,563,896	1964	1,020	22%	4,190	1,589	5,779	35,833,313	50,002,247	38%	19,059,955	45	1,169,192	
CENT	16,001-20,000	3,788	17,933	67,928,753	2,417	8,911,112	1962	804	21%	4,886	1,800	6,686	25,326,634	42,602,119	38%	16,066,722	45	985,578	
CENT	20,001-24,000	3,531	21,975	77,594,465	2,745	9,202,163	1964	925	24%	5,082	2,152	7,234	25,544,292	52,050,173	22%	11,339,717	45	695,610	
CENT	24,000+	9,111	90,010	820,083,869	5,448	39,842,102	1966	2,344	23%	9,185	5,542	14,727	134,177,731	685,906,138	20%	135,196,927	45	8,293,362	
<b>SUBTOTAL</b>		<b>93,665</b>	<b>1,491,933,685</b>		<b>186,674,768</b>		<b>1964</b>	<b>7,540</b>	<b>24%</b>	<b>4,469</b>	<b>1,804</b>	<b>6,272</b>	<b>455,879,981</b>	<b>1,036,053,704</b>	<b>42%</b>	<b>284,137,387</b>		<b>17,429,792</b>	
<b>AVERAGE</b>		<b>23,201</b>	<b>2,538</b>		<b>1,964</b>		<b>1964</b>	<b>1,804</b>	<b>6,272</b>	<b>42%</b>	<b>45</b>								
<b>TOTAL</b>		<b>304,487</b>	<b>4,023,599,881</b>		<b>646,202,634</b>		<b>1963</b>	<b>21,336</b>	<b>30%</b>	<b>5,009</b>	<b>2,030</b>	<b>7,039</b>	<b>1,415,845,145</b>	<b>2,607,754,736</b>	<b>41%</b>	<b>735,128,441</b>		<b>44,531,302</b>	
<b>AVERAGE</b>		<b>25,301</b>	<b>3,350</b>		<b>1,963</b>		<b>1963</b>	<b>2,030</b>	<b>7,039</b>	<b>41%</b>	<b>44</b>								
<b>2020 POPULATION: 1,538,000</b>																			
<b>2020 GPCD: 29</b>																			

<sup>1</sup> Sidewalks, patios, decks, roofline  
<sup>2</sup> Driveways, detached garage, pool, sheds  
<sup>3</sup> Including hardscape and features

TABLE H-8 ESTIMATED 2020 EBMUD MULTI-FAMILY RESIDENTIAL LANDSCAPE WATER USE

LOCATION	TIER (SQ.FT.)	NUMBER SERVICES	AVE. PARCEL AREA (SQ.FT.)	SUM PARCEL AREA (SQ.FT.)	AVE. BLDG. AREA (SQ.FT.)	SUM BLDG. AREA (SQ.FT.)	AVE. YEAR BUILT	NUMBER OF POOLS	AVE. BLDG. HARD-SCAPE PER SQUARE FOOT <sup>1</sup> (SQ.FT.)	AVE. LOT OTHER FEATURES PER SQUARE FOOT <sup>2</sup> (SQ.FT.)	TOTAL BLDG. FOOTPRINT <sup>3</sup> (SQ.FT.)	SUM OF TOTAL BUILDING FOOTPRINT (SQ.FT.)	IRRIGATABLE AREA (SQ.FT.)	IRRIGATED AREA FACTOR (%)	IRRIGATED AREA (SQ.FT.)	IRFET (IN.)	TOTAL H2O (GPD)
EOH	0-4,000	23	2,556	58,787	1,530	29,061	1979	1,324	-	1,324	30,444	28,343	43%	12,234	50	836	
EOH	4,001-8,000	92	6,713	617,620	2,528	227,498	1961	3,767	874	4,641	426,967	190,653	32%	60,692	50	4,148	
EOH	8,001-12,000	158	9,795	1,547,543	3,732	574,743	1965	5,110	1,592	6,702	1,058,944	488,599	26%	125,946	50	8,609	
EOH	12,001-16,000	92	14,063	1,293,829	5,058	419,829	1969	9,877	1,535	11,412	1,049,929	243,900	49%	120,726	50	8,252	
EOH	16,001-20,000	81	18,006	1,458,492	5,662	356,692	1970	3,728	5,928	9,656	782,129	676,363	95%	643,857	50	44,009	
EOH	20,001-24,000	75	21,995	1,649,638	5,407	346,076	1969	5,965	4,616	10,581	793,582	856,056	36%	308,079	50	21,058	
EOH	24,000+	854	224,974	192,127,819	44,364	18,544,274	1977	22,919	29,652	52,571	44,895,613	147,232,206	16%	23,985,986	50	1,639,478	
<b>SUBTOTAL</b>		<b>1,375</b>		<b>198,753,728</b>		<b>20,498,173</b>		<b>137</b>		<b>6,314</b>	<b>13,841</b>	<b>49,037,608</b>	<b>149,716,120</b>	<b>43%</b>	<b>25,257,519</b>	<b>50</b>	<b>1,726,389</b>
<b>AVERAGE</b>			<b>42,586</b>		<b>9,754</b>		<b>1970</b>		<b>7,527</b>		<b>13,841</b>		<b>43%</b>				
WOH	0-4,000	3,947	3,236	12,771,340	2,311	8,793,636	1918	2,030	369	2,399	9,468,079	3,303,261	27%	889,073	38	45,890	
WOH	4,001-8,000	12,331	5,715	70,470,898	3,506	41,516,050	1928	3,140	829	3,969	48,945,199	21,525,699	28%	6,039,928	38	311,753	
WOH	8,001-12,000	2,357	9,688	22,833,743	7,430	15,900,518	1939	4,336	1,380	5,716	13,472,040	9,361,703	76%	7,100,771	38	366,509	
WOH	12,001-16,000	956	13,769	13,163,152	12,086	9,934,282	1948	7,544	3,633	11,177	10,685,011	2,478,141	43%	1,053,633	38	54,384	
WOH	16,001-20,000	434	18,069	7,841,902	16,896	6,352,924	1954	6,525	3,549	10,075	4,372,489	3,469,413	44%	1,541,735	38	79,577	
WOH	20,001-24,000	261	21,911	5,718,731	20,344	3,967,050	1964	9,989	2,634	12,622	3,294,452	2,424,279	37%	891,006	38	45,990	
WOH	24,000+	1,664	182,648	303,927,076	74,366	81,058,764	1974	33,704	28,798	62,502	104,004,045	199,923,031	80%	159,397,050	38	8,227,345	
<b>SUBTOTAL</b>		<b>21,950</b>		<b>436,726,842</b>		<b>167,523,224</b>		<b>218</b>		<b>15,494</b>	<b>194,241,317</b>	<b>242,485,525</b>	<b>48%</b>	<b>176,913,198</b>	<b>38</b>	<b>9,131,448</b>	
<b>AVERAGE</b>			<b>36,434</b>		<b>19,563</b>		<b>1946</b>		<b>9,610</b>		<b>15,494</b>		<b>48%</b>				
CENT	0-4,000	357	3,063	1,093,501	2,017	625,388	1942	1,536	301	1,837	655,850	437,651	21%	93,400	45	5,729	
CENT	4,001-8,000	1,681	5,753	9,670,347	2,639	4,337,997	1950	4,270	1,036	3,806	6,397,432	3,272,915	21%	692,925	45	42,506	
CENT	8,001-12,000	585	9,747	5,701,991	3,318	1,837,971	1955	8	3,285	5,985	3,501,208	2,200,783	18%	402,208	45	24,673	
CENT	12,001-16,000	343	13,881	4,761,265	4,201	1,293,937	1953	9	3,693	9,383	3,218,264	1,543,001	19%	288,950	45	17,725	
CENT	16,001-20,000	227	18,000	4,085,959	4,965	1,042,611	1954	12	3,144	12,491	2,835,464	1,250,495	16%	204,427	45	12,540	
CENT	20,001-24,000	167	21,823	3,644,519	5,957	941,213	1959	10	9,115	13,606	2,272,283	1,372,236	9%	122,669	45	7,525	
CENT	24,000+	1,410	251,100	354,050,526	100,502	102,712,641	1979	103	78,498	118,265	166,753,923	187,296,603	14%	26,718,258	45	1,638,974	
<b>SUBTOTAL</b>		<b>4,770</b>		<b>363,008,108</b>		<b>112,791,758</b>		<b>146</b>		<b>23,625</b>	<b>185,634,424</b>	<b>197,373,684</b>	<b>17%</b>	<b>28,522,838</b>	<b>45</b>	<b>1,749,672</b>	
<b>AVERAGE</b>			<b>46,195</b>		<b>17,657</b>		<b>1956</b>		<b>14,577</b>		<b>23,625</b>		<b>17%</b>				
<b>TOTAL</b>		<b>28,095</b>		<b>1,018,488,678</b>		<b>300,813,155</b>		<b>501</b>			<b>428,913,349</b>	<b>589,575,329</b>	<b>36%</b>	<b>230,693,555</b>	<b>44</b>	<b>12,607,509</b>	
<b>AVERAGE</b>			<b>41,738</b>		<b>15,658</b>		<b>1958</b>		<b>10,571</b>		<b>17,653</b>		<b>36%</b>				
<b>2020 POPULATION: 1,538,000</b>																	
<b>2020 GPCD: 8</b>																	

<sup>1</sup> Sidewalks, patios, decks, roofline  
<sup>2</sup> Driveways, detached garage, pool, sheds  
<sup>3</sup> Including hardscape and features

TABLE H-9 ESTIMATED 2020 EBMUD IRRIGATION ONLY LANDSCAPE WATER USE

LOCATION	TIER (SQ.FT.)	NUMBER OF SERVICES	AVERAGE PARCEL AREA (SQ.FT.)	SUM PARCEL AREA (SQ.FT.)	AVERAGE BUILDING AREA (SQ.FT.)	SUM BUILDING AREA (SQ.FT.)	AVERAGE YEAR BUILT	NUMBER OF POOLS	IRRIGATED AREA FACTOR (%)	IRRIGATED AREA (SQ.FT.)	REF.ET (IN.)	TOTAL MAWA (GPD)
EOH	0-4,000	27	2,524	68,145	1,811	23,542	1984	0	37%	25,148	50	1,718
EOH	4,001-8,000	51	6,175	314,906	2,274	97,788	1988	3	43%	135,097	50	9,229
EOH	8,001-12,000	76	9,990	759,231	2,696	161,745	1979	14	36%	275,399	50	18,813
EOH	12,001-16,000	42	13,752	577,591	3,084	101,776	1985	9	38%	219,782	50	15,013
EOH	16,001-20,000	34	17,893	608,355	6,319	132,696	1991	3	46%	277,354	50	18,946
EOH	20,001-24,000	27	22,017	594,464	4,615	59,995	1980	5	38%	223,306	50	15,254
EOH	24,000+	717	439,444	315,081,265	57,807	13,758,127	1984	29	48%	150,861,416	50	10,305,419
<b>SUBTOTAL</b>		<b>974</b>		<b>318,003,957</b>		<b>14,335,669</b>		<b>63</b>		<b>152,017,503</b>		<b>10,384,392</b>
<b>AVERAGE</b>			<b>73,113</b>		<b>11,229</b>		<b>1984</b>		<b>35%</b>		<b>50</b>	
WOH	0-4,000	180	2,881	518,658	2,385	224,169	1969	0	31%	158,504	38	8,181
WOH	4,001-8,000	470	5,892	2,769,306	3,584	1,222,164	1955	4	36%	1,005,495	38	51,899
WOH	8,001-12,000	186	9,858	1,833,519	6,158	677,375	1952	3	38%	699,082	38	36,083
WOH	12,001-16,000	136	13,873	1,886,767	10,229	675,086	1962	0	35%	665,064	38	34,328
WOH	16,001-20,000	102	17,930	1,828,849	9,947	467,511	1963	3	44%	805,509	38	41,577
WOH	20,001-24,000	96	22,020	2,113,882	20,699	890,052	1973	1	30%	638,393	38	32,951
WOH	24,000+	1,325	567,809	752,347,315	68,183	31,296,088	1980	22	41%	308,804,232	38	15,939,059
<b>SUBTOTAL</b>		<b>2,495</b>		<b>763,298,296</b>		<b>35,452,445</b>		<b>33</b>		<b>312,776,281</b>		<b>16,144,078</b>
<b>AVERAGE</b>			<b>91,466</b>		<b>17,312</b>		<b>1965</b>		<b>32%</b>		<b>38</b>	
CENT	0-4,000	50	2,727	136,337	1,767	53,014	1990	0	31%	41,988	45	2,576
CENT	4,001-8,000	202	6,051	1,222,377	2,152	335,665	1977	2	42%	513,391	45	31,493
CENT	8,001-12,000	76	9,988	759,120	3,088	142,030	1974	1	43%	323,346	45	19,835
CENT	12,001-16,000	36	14,172	510,186	3,015	57,294	1980	0	31%	156,267	45	9,586
CENT	16,001-20,000	46	18,015	828,686	5,579	150,638	1981	2	26%	214,193	45	13,139
CENT	20,001-24,000	48	21,747	1,043,879	8,286	248,565	1986	0	26%	271,302	45	16,642
CENT	24,000+	830	1,163,543	965,740,594	104,021	36,823,497	1984	29	34%	332,407,223	45	20,390,800
<b>SUBTOTAL</b>		<b>1,288</b>		<b>970,241,179</b>		<b>37,810,703</b>		<b>34</b>		<b>333,927,708</b>		
<b>AVERAGE</b>			<b>176,606</b>		<b>18,273</b>		<b>1982</b>		<b>29%</b>		<b>45</b>	<b>20,484,071</b>
<b>TOTAL</b>		<b>4,757</b>		<b>2,051,543,432</b>		<b>87,598,817</b>		<b>130</b>		<b>798,721,491</b>		<b>47,012,541</b>
<b>AVERAGE</b>			<b>113,729</b>		<b>15,605</b>		<b>1977</b>		<b>32%</b>		<b>44</b>	
<b>2020 POPULATION:</b>	<b>1,538,000</b>											
<b>2020 GPCD:</b>	<b>31</b>											

## APPENDIX I. 2009-2010 CUWCC MOU ACTIVITY REPORTS AND EBMUD CONSERVATION RESEARCH PROJECTS

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## APPENDIX I. 2009-2010 CUWCC MOU ACTIVITY REPORTS AND EBMUD CONSERVATION RESEARCH PROJECTS

### I-1. 2009-2010 CUWCC MOU ACTIVITY REPORTS

Water Usage - 2009					Water Sources - 2009		
Property Type	Metered Accounts	Metered Water Delivered (AF/Year)	Un-Metered Accounts	Un-Metered Water Delivered (AF/Year)	Supply Source Name	Quantity Supplied AF/Year	Water Supply Type
<b>Potable</b>							
Single-Family	321,727	86,625	0	0	<b>Own Sources</b>		
Multi-Family	28,355	32,521	0	0	Mokelumne River	191,290	Potable
Commercial	15,433	15,551	0	0	Local reservoirs	9,770	Potable
Industrial	1,968	22,258	0	0	Subtotal	201,060	
Institutional	3,695	9,198	0	1,831	<b>Imported Water</b>	NA	NA
Irrigation	5,123	12,789	0	0	<b>Exported Water</b>	NA	NA
SubTotal	376,301	178,942	0	1,831	Total	201,060	
<b>Non-Potable</b>							
Single-Family	0	0	0	0	<b>Own Sources</b>		
Multi-Family	0	0	0	0	Wastewater Treatment	8,504	Recycled
Commercial	2	2	0	0	Local reservoirs	254	Raw
Industrial	1	4,418	0	0	Subtotal	8,758	
Institutional	0	0	0	0	<b>Imported Water</b>	NA	NA
Irrigation	57	1264	0	0	<b>Exported Water</b>	NA	NA
SubTotal	60	5,684	0	0	Total	8,758	
<b>Total</b>	<b>376,361</b>	<b>184,626</b>	<b>0</b>	<b>1,831</b>	<b>Total</b>	<b>209,818</b>	

Water Usage - 2010					Water Sources - 2010		
Property Type	Metered Accounts	Metered Water Delivered (AF/Year)	Un-Metered # Account	Un-Metered Water Deliveries (AF/Year)	Supply Source Name	Quantity Supplied AF/Year	Water Supply Type
<b>Potable</b>							
Single-Family	322,306	84,526	0	0	<b>Own Sources</b>		
Multi-Family	28,412	32,019	0	0	Mokelumne River	187,166	Potable
Commercial	15,386	15,037	0	0	Local reservoirs	13,192	Potable
Industrial	1,943	20,638	0	0	Subtotal	200,358	
Institutional	3,688	8,695	0	1,825	<b>Imported Water</b>	NA	NA
Irrigation	5,116	11,928	0	0	<b>Exported Water</b>	NA	NA
SubTotal	376,851	172,844	0	1,825	Total	200,358	
<b>Non-Potable</b>							
Single-Family	0	0	0	0	<b>Own Sources</b>		
Multi-Family	0	0	0	0	Wastewater Treatment	11,746	Recycled
Commercial	2	0	0	0	Local reservoirs	NA	Raw
Industrial	2	5,695	0	0	Subtotal	11,746	
Institutional	0	0	0	0	<b>Imported Water</b>	NA	NA
Irrigation	61	1152	0	0	<b>Exported Water</b>	NA	NA
SubTotal	65	6,847	0	0	Total	11,746	
<b>Total</b>	<b>376,916</b>	<b>179,691</b>	<b>0</b>	<b>1,825</b>	<b>Total</b>	<b>212,104</b>	

Operation Practices - 2009				
<b>Conservation Coordinator</b>				
Name	Richard Harris	Street Address 1	375 11th Street	
Title	Manager of Water Conservation	Street Address 2		
Phone	510-287-1675	City	Oakland	
Mobile	510-384-8499	State	CA	
Email	<a href="mailto:rharris@ebmud.com">rharris@ebmud.com</a>	Zip	94607	
<b>Water Waste Prevention</b>				
Option A	EBMUD Water Service Regulation Section 28 - "Water Use During Water Shortage" and Section 29 - "Prohibiting Wasteful Use of Water" establish dry-year and normal year conditions/restrictions to limit the waste of indoor and outdoor water use among residential and non-residential customers; the regulations can be found at <a href="http://www.ebmud.com">www.ebmud.com</a>			
Option B	EBMUD Procedure 900 - Water Supply Accounting and Reporting; Procedure 901 - Recycled Water Accounting and Reporting; and Procedure 902 - Water Conservation Accounting and Reporting establish utility operations best management practices, definitions, procedures and reporting frequencies to account for all water supply and demand to maximize efficiency.			
Option C	EBMUD 2009 Drought Management Program included a Water Savings Team canvassing the service area; mandatory water rationing allocations and enforcement measures.			
<b>Enforcement Reporting</b>	<b>Water Waste Prevention Type</b>	<b>Importance Ranking</b>	<b>Description</b>	<b>Actions</b>
Water Savings Team, Field Services	Excessive runoff and overspray	NA	Correspondence, followed by field visit and ultimately flow restriction and or account interruptions.	
<b>Financial Investments &amp; Bulking Partnerships</b>	<b>BMP Name</b>	<b>Expense</b>	<b>Equivalent Resources Provided</b>	<b>Actions</b>
NA	NA	NA	NA	NA
<b>Technical Support</b>	<b>Tech Support Type</b>	<b>Tech Support Expense</b>	<b>Description</b>	<b>Actions</b>
NA	NA	NA	NA	NA
<b>Program Management</b>	<b>BMP Name</b>	<b>Program Description</b>	<b>Organization Name</b>	<b>Actions</b>
NA	NA	NA	NA	NA
<b>Water Shortage Allocation</b>				
Agency has a water shortage allocation plan or policy				<b>Yes</b>
Date of Adoption: Water Supply Availability and Deficiency Rule				
<b>Encourage CUWCC Membership</b>				
List efforts to recruit retail agencies			Board and committee member participation; present CUWCC activities, encourage participation at Bay Area Water Agencies Coalition and other water industry events.	
Amount of dues paid on behalf of retail agencies				NA

Operation Practices - 2010				
<b>Conservation Coordinator</b>				
Name	Richard Harris	Street Address 1	375 11th Street	
Title	Manager of Water Conservation	Street Address 2		
Phone	510-287-1675	City	Oakland	
Mobile	510-384-8499	State	CA	
Email	<a href="mailto:rharris@ebmud.com">rharris@ebmud.com</a>	Zip	94607	
<b>Water Waste Prevention</b>				
Option A	EBMUD Water Service Regulation Section 29 - "Prohibiting Wasteful Use of Water" establish dry-year and normal year conditions/restrictions to limit the waste of indoor and outdoor water use among residential and non-residential customers; the regulations can be found at <a href="http://www.ebmud.com">www.ebmud.com</a>			
Option B	EBMUD Procedure 900 - Water Supply Accounting and Reporting; Procedure 901 - Recycled Water Accounting and Reporting; and Procedure 902 - Water Conservation Accounting and Reporting establish utility operations best management practices, definitions, procedures and reporting frequencies to account for all water supply and demand to maximize efficiency.			
Enforcement Reporting	Water Waste Prevention Type	Importance Ranking	Description	Actions
Water Savings Team, Field Services	Excessive runoff and overspray	NA	Correspondence, followed by field visit and ultimately flow restriction and or account interruptions.	
Financial Investments & Bulking Partnerships	BMP Name	Expense	Equivalent Resources Provided	Actions
NA	NA	NA	NA	NA
Technical Support	Tech Support Type	Tech Support Expense	Description	Actions
NA	NA	NA	NA	NA
Program Management	BMP Name	Program Description	Organization Name	Actions
NA	NA	NA	NA	NA
<b>Water Shortage Allocation</b>				
Agency has a water shortage allocation plan or policy				Yes
Date of Adoption: Water Supply Availability and Deficiency Rule				
<b>Encourage CUWCC Membership</b>				
List efforts to recruit retail agencies	Board and committee member participation; present CUWCC activities, encourage participation at Bay Area Water Agencies Coalition and other water industry events.			
Amount of dues paid on behalf of retail agencies	NA			
<b>Encourage CUWCC Membership</b>				
List efforts to recruit retail agencies	Board and committee member			
Amount of dues paid on behalf of retail agencies	NA			

<b>Water Loss Control - 2009</b>	
<b>AWWA Water Audit</b>	
Agency to complete a water audit & balance using the AWWA software upload worksheets (AWWA Water Audit)	Yes
Agency test source, import & production meters this reporting year	Yes
Water Audit Validity Score	84
Agency completed training in the AWWA Water Audit Method	Yes
Agency completed training in the Component Analysis Process	In Progress
Completed/Updated the Component Analysis (at least every 4 years)?	In Progress
Component Analysis completed/updated Date	In Progress
<b>Water Loss Performance</b>	
Agency Demonstrated Progress in Water Loss Control Performance	Yes
Agency repaired all reported leaks & breaks to the extent cost effective	Yes
Agency established and maintained a record keeping system for the repair of reported leaks for the following	Yes
Leak Location	Yes
Leak running time from report to repair	Yes
Cost of Repair	Yes
Date/Time Reported	Yes
Type of leaking pipe segment or fitting	Yes
Leak volume estimate	Yes
Agency located and repaired unreported leaks to the extent cost effective	Yes
Type of Program activities used to detect unreported leaks	
EBMUD conducts routine field leak surveys of pipe. EBMUD conducted research projects involving (a) semi-permanent installation of acoustic leak detection loggers on 250 miles of pipe and (b) a large pipe leak detection technologies on approximately 100 miles of pipe.	
Procedure 900 - Water Supply Accounting and Reporting and On-line Water Loss Control Manual stipulate EBMUD procedures, actions to account and report on apparent and real water loss.	
<b>Water Loss Control - 2010</b>	
<b>AWWA Water Audit</b>	
Agency to complete a water audit & balance using the AWWA software upload worksheets (AWWA Water Audit)	Yes
Agency test source, import & production meters this reporting year	Yes
Water Audit Validity Score	84
Agency completed training in the AWWA Water Audit Method	Yes
Agency completed training in the Component Analysis Process	In Progress
Completed/Updated the Component Analysis (at least every 4 years)?	In Progress
Component Analysis completed/updated Date	In Progress
<b>Water Loss Performance</b>	
Agency Demonstrated Progress in Water Loss Control Performance	Yes
Agency repaired all reported leaks & breaks to the extent cost effective	Yes
Agency established and maintained a record keeping system for the repair of reported leaks for the following	Yes
Leak Location	Yes
Leak running time from report to repair	Yes
Cost of Repair	Yes
Date/Time Reported	Yes
Type of leaking pipe segment or fitting	Yes
Leak volume estimate	Yes
Agency located and repaired unreported leaks to the extent cost effective	Yes
Type of Program activities used to detect unreported leaks	
EBMUD conducts routine field leak surveys of pipe. EBMUD conducted research projects involving (a) semi-permanent installation of acoustic leak detection loggers on 250 miles of pipe and (b) a large pipe leak detection technologies on approximately 100 miles of pipe.	
Procedure 900 - Water Supply Accounting and Reporting and On-line Water Loss Control Manual stipulate EBMUD procedures, actions to account and report on apparent and real water loss.	

AWWA WLCC Free Water Audit Software: Reporting Worksheet				<a href="#">Back to Instructions</a>
		Copyright © 2010, American Water Works Association. All Rights Reserved.	WAS v4.1	
<input type="button" value="Click to access definition"/>		Water Audit Report for: <b>East Bay Municipal Utility District</b> Reporting Year: <b>CY2009</b>   <b>1/2009 - 12/2009</b>		
Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades				
<b>All volumes to be entered as: MILLION GALLONS (US) PER YEAR</b>				
<b>WATER SUPPLIED</b>				
<< Enter grading in column 'E'				
Volume from own sources:	<input type="button" value="9"/>	<input type="text" value="66,431.900"/>		Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	<input type="button" value="9"/>	<input type="text" value="1,391.200"/>	<input type="text" value="over-registered"/>	MG/Yr
Water imported:	<input type="button" value="n/a"/>	<input type="text" value="0.000"/>		MG/Yr
Water exported:	<input type="button" value="n/a"/>	<input type="text" value="0.000"/>		MG/Yr
<b>WATER SUPPLIED:</b>		<input type="text" value="65,040.700"/>		MG/Yr
<b>AUTHORIZED CONSUMPTION</b>				
Billed metered:	<input type="button" value="9"/>	<input type="text" value="58,312.300"/>		MG/Yr
Billed unmetered:	<input type="button" value="n/a"/>	<input type="text" value="0.000"/>		MG/Yr
Unbilled metered:	<input type="button" value="8"/>	<input type="text" value="8.800"/>		MG/Yr
Unbilled unmetered:	<input type="button" value="6"/>	<input type="text" value="108.400"/>		MG/Yr
<b>AUTHORIZED CONSUMPTION:</b>		<input type="text" value="58,429.500"/>		MG/Yr
<b>WATER LOSSES (Water Supplied - Authorized Consumption)</b>				
		<input type="text" value="6,611.200"/>		MG/Yr
<b>Apparent Losses</b>				
Unauthorized consumption:	<input type="button" value="4"/>	<input type="text" value="74.000"/>		MG/Yr
Customer metering inaccuracies:	<input type="button" value="6"/>	<input type="text" value="466.000"/>		MG/Yr
Systematic data handling errors:	<input type="button" value="6"/>	<input type="text" value="0.700"/>		MG/Yr
<b>Apparent Losses:</b>		<input type="text" value="540.700"/>		
<b>Real Losses (Current Annual Real Losses or CARL)</b>				
Real Losses = Water Losses - Apparent Losses:		<input type="text" value="6,070.500"/>		MG/Yr
<b>WATER LOSSES:</b>		<input type="text" value="6,611.200"/>		MG/Yr
<b>NON-REVENUE WATER</b>				
<b>NON-REVENUE WATER:</b>		<input type="text" value="6,728.400"/>		MG/Yr
= Total Water Loss + Unbilled Metered + Unbilled Unmetered				
<b>SYSTEM DATA</b>				
Length of mains:	<input type="button" value="9"/>	<input type="text" value="4,108.0"/>		miles
Number of active AND inactive service connections:	<input type="button" value="9"/>	<input type="text" value="381,728"/>		
Connection density:		<input type="text" value="93"/>		conn./mile main
Average length of customer service line:	<input type="button" value="10"/>	<input type="text" value="0.0"/>		ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	<input type="button" value="3"/>	<input type="text" value="83.0"/>		psi
<b>COST DATA</b>				
Total annual cost of operating water system:	<input type="button" value="10"/>	<input type="text" value="\$230,490,000"/>		\$/Year
Customer retail unit cost (applied to Apparent Losses):	<input type="button" value="10"/>	<input type="text" value="\$4.86"/>		\$/1000 gallons (US)
Variable production cost (applied to Real Losses):	<input type="button" value="5"/>	<input type="text" value="\$220.00"/>		\$/Million gallons
<b>PERFORMANCE INDICATORS</b>				
<b>Financial Indicators</b>				
Non-revenue water as percent by volume of Water Supplied:		<input type="text" value="10.3%"/>		
Non-revenue water as percent by cost of operating system:		<input type="text" value="1.7%"/>		
Annual cost of Apparent Losses:		<input type="text" value="\$2,627,802"/>		
Annual cost of Real Losses:		<input type="text" value="\$1,335,510"/>		
<b>Operational Efficiency Indicators</b>				
Apparent Losses per service connection per day:		<input type="text" value="3.88"/>		gallons/connection/day
Real Losses per service connection per day*:		<input type="text" value="43.57"/>		gallons/connection/day
Real Losses per length of main per day*:		<input type="text" value="N/A"/>		
Real Losses per service connection per day per psi pressure:		<input type="text" value="0.52"/>		gallons/connection/day/psi
<input type="button" value="9"/> Unavoidable Annual Real Losses (UARL):		<input type="text" value="2,407.95"/>		million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):		<input type="text" value="6,070.50"/>		million gallons/year
<input type="button" value="9"/> Infrastructure Leakage Index (ILI) [CARL/UARL]:		<input type="text" value="2.52"/>		
* only the most applicable of these two indicators will be calculated				
<b>WATER AUDIT DATA VALIDITY SCORE:</b> <div style="border: 1px solid red; padding: 5px; display: inline-block; margin: 5px 0;"> <b>*** YOUR SCORE IS: 80 out of 100 ***</b> </div> <p style="font-size: x-small; margin-top: 5px;">A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score</p> <p><b>PRIORITY AREAS FOR ATTENTION:</b></p> <p>Based on the information provided, audit accuracy can be improved by addressing the following components:</p> <div style="border: 1px solid red; padding: 2px; margin-bottom: 2px;">1: Variable production cost (applied to Real Losses)</div> <div style="border: 1px solid red; padding: 2px; margin-bottom: 2px;">2: Unauthorized consumption</div> <div style="border: 1px solid red; padding: 2px; margin-bottom: 2px;">3: Customer metering inaccuracies</div> <div style="border: 1px solid blue; padding: 2px; margin-top: 5px; text-align: center; width: fit-content; margin-left: auto; margin-right: auto;">                 For more information, click here to see the Grading Matrix worksheet             </div>				

Metering with Commodity - 2009						
<b>Implementation</b>						
Does agency have any unmetered service connections?						No
If yes, has your agency completed a meter retrofit plan?						NA
If yes, number of previously unmetered accounts fitted with meters during reporting year:						NA
Are all new service connections being metered?						Yes
Are all new service connections being billed volumetrically?						Yes
Has your agency completed and submitted electronically to the Council a written plan, policy, or program to test, repair, and replace meters?						Yes
<b>Matrix</b>						
Account Type	# Metered Accounts	# Metered Accts. Read	# Metered Accts. Billed by Volume	Billing Frequency by Year	# Volume Estimates	
Single Family	321,727	321,727	321,727	Bi-monthly	NA	
Multi-Family	28,355	28,355	28,355	Bi-monthly	NA	
Commercial	15,433	15,433	15,433	Bi-monthly	NA	
Industrial	1,968	1,968	1,968	Monthly	NA	
Institutional	3,695	3,695	3,695	Bi-monthly	NA	
Landscape Irrigation	5,123	5,123	5,123	Bi-monthly	NA	
<b>Subtotal</b>	<b>376,301</b>	<b>376,301</b>	<b>376,301</b>			
<b>Feasibility Study</b>						
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
If yes, please fill in the following information:						NA
When was the feasibility study conducted?						NA
Description, upload, link:						NA
Number of CII accounts with mixed use meters						2,745
Number of CII accounts with mixed use meters retrofitted with dedicated irrigation meters.						13
<b>At Least as Effective As</b>						
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"						NA
<b>Metering with Commodity - 2010</b>						
<b>Implementation</b>						
Does agency have any unmetered service connections?						No
If yes, has your agency completed a meter retrofit plan?						NA
If yes, number of previously unmetered accounts fitted with meters during reporting year:						NA
Are all new service connections being metered?						Yes
Are all new service connections being billed volumetrically?						Yes
Has your agency completed and submitted electronically to the Council a written plan, policy, or program to test, repair, and replace meters?						Yes
<b>Matrix</b>						
Account Type	# Metered Accounts	# Metered Accts. Read	# Metered Accts. Billed by Volume	Billing Frequency by Year	# Volume Estimates	
Single Family	322,306	322,306	322,306	Bi-monthly	NA	
Multi-Family	28,412	28,412	28,412	Bi-monthly	NA	
Commercial	15,386	15,386	15,386	Bi-monthly	NA	
Industrial	1,943	1,943	1,943	Monthly	NA	
Institutional	3,688	3,688	3,688	Bi-monthly	NA	
Landscape Irrigation	5,116	5,116	5,116	Bi-monthly	NA	
<b>Subtotal</b>	<b>376,851</b>	<b>376,851</b>	<b>376,851</b>			
<b>Feasibility Study</b>						
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
If yes, please fill in the following information:						NA
When was the feasibility study conducted?						NA
Description, upload, link:						NA
Number of CII accounts with mixed use meters						2,745
Number of CII accounts with mixed use meters retrofitted with dedicated irrigation meters.						10
<b>At Least as Effective As</b>						
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"						NA

<b>Retail Conservation Pricing - 2009</b>				
<b>Implementation (Water Rate Structure)</b>				
Compliant?				Yes
<b>Water Rate Structures that are assigned to the majority of your customers, by customer class</b>				
<b>Rate Structure Option</b>	<b>Customer Class Name</b>	<b>Total Revenue Commodity Charges (\$Millions)</b>	<b>Total Revenue Customer Meter/Service (Fixed) Charges (\$Millions)</b>	<b>Commodity vs. Fixed Ratio (%)</b>
Volumetric 3-Tier	Single-Family Residential	103.6	44.7	70%
Volumetric Single-Tier	Multi-Family Residential	41.2	7.1	85%
Volumetric Single-Tier	Commercial	21.8	3.4	87%
Volumetric Single-Tier	Industrial	28.7	0.8	97%
Volumetric Single-Tier	Institutional / Government	13.4	1.2	92%
Volumetric Single-Tier	Dedicated Irrigation	18.5	1.6	92%
Volumetric Single-Tier	Recycled	5.7	0.1	98%
Volumetric Single-Tier	Raw	0.2	0.02	91%
<b>Total</b>		<b>233.1</b>	<b>58.9</b>	<b>80%</b>
<b>Implementation Option</b>				
<b>Retail Waste Water (Sewer) Rate Structure by Customer Class</b>				
Compliant?				Yes
<b>Select the Retail Waste Water (Sewer) Rate Structure assigned to the majority of your</b>				
<b>Rate Structure Option</b>	<b>Customer Class Name</b>	<b>Total Revenue Commodity Charges (\$Millions)</b>	<b>Total Revenue Customer Meter/Service (Fixed) Charges (\$Millions)</b>	<b>Commodity vs. Fixed Ratio (%)</b>
Volumetric 3-Tier	Single-Family Residential	5.7	17	25%
Volumetric Single-Tier	Multi-Family Residential	7.8	3.5	69%
Volumetric Single-Tier	Commercial	7.7	0.7	92%
Volumetric Single-Tier	Industrial	0.1	2.7	4%
Volumetric Single-Tier	Institutional / Government	NA	NA	NA
Volumetric Single-Tier	Dedicated Irrigation	NA	NA	NA
Volumetric Single-Tier	Recycled	NA	NA	NA
Volumetric Single-Tier	Raw	15.6	6.9	69%
<b>Total</b>		<b>36.9</b>	<b>30.8</b>	<b>55%</b>
<b>At Least as Effective As</b>				
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				NA
<b>Exemption Request</b>				
Agency has requested an exemption from implementing this BMP				No
Exemption Type				NA

<b>Retail Conservation Pricing - 2010</b>				
<b>Implementation (Water Rate Structure)</b>				
Compliant?				Yes
<b>Water Rate Structures that are assigned to the majority of your customers, by customer class</b>				
<b>Rate Structure Option</b>	<b>Customer Class Name</b>	<b>Total Revenue Commodity Charges (\$Millions)</b>	<b>Total Revenue Customer Meter/Service (Fixed) Charges (\$Millions)</b>	<b>Commodity vs. Fixed Ratio (%)</b>
Volumetric 3-Tier	Single-Family Residential	95.8	47.7	67%
Volumetric Single-Tier	Multi-Family Residential	37.9	7.8	83%
Volumetric Single-Tier	Commercial	19.3	3.7	84%
Volumetric Single-Tier	Industrial	27.3	0.9	97%
Volumetric Single-Tier	Institutional / Government	11.2	1.4	89%
Volumetric Single-Tier	Dedicated Irrigation	15.5	1.8	90%
Volumetric Single-Tier	Recycled	4.8	0.1	98%
Volumetric Single-Tier	Raw	0.2	0.02	91%
<b>Total</b>		<b>212.0</b>	<b>63.4</b>	<b>77%</b>
<b>Implementation Option</b>				
<b>Retail Waste Water (Sewer) Rate Structure by Customer Class</b>				
Compliant?				Yes
<b>Select the Retail Waste Water (Sewer) Rate Structure assigned to the majority of your</b>				
<b>Rate Structure Option</b>	<b>Customer Class Name</b>	<b>Total Revenue Commodity Charges (\$Millions)</b>	<b>Total Revenue Customer Meter/Service (Fixed) Charges (\$Millions)</b>	<b>Commodity vs. Fixed Ratio (%)</b>
Volumetric 3-Tier	Single-Family Residential	5.9	17.7	<b>25%</b>
Volumetric Single-Tier	Multi-Family Residential	8.2	3.7	<b>69%</b>
Volumetric Single-Tier	Commercial	8	0.7	<b>92%</b>
Volumetric Single-Tier	Industrial	2.9	0.1	<b>97%</b>
Volumetric Single-Tier	Institutional / Government	NA	NA	NA
Volumetric Single-Tier	Dedicated Irrigation	NA	NA	NA
Volumetric Single-Tier	Recycled	NA	NA	NA
Volumetric Single-Tier	Raw	19.1	4.5	<b>81%</b>
<b>Total</b>		<b>44.1</b>	<b>26.7</b>	<b>62%</b>
<b>At Least as Effective As</b>				
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				NA
<b>Exemption Request</b>				
Agency has requested an exemption from implementing this BMP				No
Exemption Type				NA

<b>Public Outreach - 2009</b>		<b>Yes</b>
<b>Is the Retail Agency Performing Public Outreach?</b>		
<b>Public Information Program List</b>		
<b># Public Contacts</b>	<b>Public Information Programs</b>	<b>Did at least one contact take place during each quarter of the reporting year?</b>
2.3 million	Individual mailings sent six times annually to over 376,000 water service accounts including fliers and/or brochures, bill stuffers including <i>Pipeline</i> newsletter with conservation articles and messages printed on bill.	Yes
119,304	WaterSmart Center website hits to <a href="http://www.ebmud.com/watersmart">www.ebmud.com/watersmart</a> which includes conservation rebates and services information, water saving tips and videos, publications, access to free water saving devices, and links to information resources.	Yes
4	Workshops and media campaigns with Bay Friendly Landscaping and Gardening.	Yes
3,298	Conservation-related customer telephone contacts with EBMUD Contact Center and Water Conservation.	Yes
2	Website links to Irrigation Association of California and StopWaste.	No
2,000	EBMUD initiated customer contacts to high consumption accounts (approximately 800 annually) and responses to conservation-related email inquiries (approximately 1,200 annually).	Yes
25	Responses to Garden Grant Program application requests.	Yes
10	Conservation booths at community events.	Yes
18,930	Provide bi-monthly water use reports to customers with comparison of water use to water budget.	Yes
258	Conduct conservation presentations to community groups, schools, and other agencies. 38-(Water Conservation), 220-(Public Information Office)	Yes
42	Conduct media outreach: news releases, editorial board visits, written editorials, newspaper contacts, television, contacts, radio contact, articles or stories resulting from outreach.	Yes
1	Conducted Adult Education/Training Programs: Irrigation Courses.	Yes
3	Sponsor or co-sponsored landscape workshops/training for homeowners and/or homeowners associations: 2-Bay Friendly Presentations/Year. 1-Master Gardener Presentation/Year.	Yes
\$3.66 million	Total reporting period budget expenditure for public outreach/training/adult education programs including 31 Water Conservation and temporary drought response staffing, three Public Information staff, and a \$1.8 million drought response multi-media marketing campaign.	Yes
<b>Contact with the Media</b>		
<b># Media Contacts</b>	<b>Media Contact Types</b>	<b>Did at least one contact take place during each quarter of the reporting year?</b>
12	Press Releases	Yes
30	Television and radio media	Yes
Performing Website Updates:		Yes
URL (website address):		<a href="http://www.ebmud.com/">http://www.ebmud.com/</a>

<b>Public Outreach - 2009</b>	
<b>Water conservation related updates to website:</b>	
1	Quarterly Qualifying High-Efficiency Clothes Washers and WaterSense Toilets. Yes
2	Biannual program information updates for all rebate programs Yes
3	Biannual updates to online Mulch Coupon Offer Yes
4	Quarterly updates to WaterSmart Center messages Yes
5	Quarterly updates and maintenance to website online store Yes
6	As needed updates and maintenance of Water Conservation publications & links to other sites Yes
7	Monthly Workshops & Events updates Yes
<b>Public Outreach Expenses</b>	
<b>Expense Amount</b>	<b>Expense Category</b>
\$22,416	Staffing Community Events.
\$23,571	Water Conservation Presentations to community groups.
<b>Additional Public Information Program</b>	
Were there additional Public Outreach efforts? Yes	
<b>Public Information Programs</b>	
	Annual Water Conservation & Recycling Program Report NA
	WaterSmart (Business) Certification Program Yes
	WaterSmart Garden Grant Program NA
	Annual Water Conservation Showcase NA
	California Youth Energy Services Yes
	Field Learning Environmental Education Sites: Chabot, Nunes and Valle Vista. Yes
<b>Social Marketing Programs/Branding</b>	
Does your agency have a water conservation "brand", "theme" or mascot? Yes	
<b>Market Research</b>	
Have you sponsored or participated in market research to refine your message? Yes	
Market Research Topic: WaterSmart Certification Program	
<b>Community Committees</b>	
Do you have a community conservation committee? Yes	
Select the name(s) of Focus or Foci: Landscape Advisory Committee	

Public Outreach - 2010		Yes
Is the Retail Agency Performing Public Outreach?		
Public Information Program List		
# Public Contacts	Public Information Programs	Did at least one contact take place during each quarter of the reporting year?
2.3 million	Individual mailings sent six times annually to approximately 377,000 water service accounts including flyers and/or brochures, bill stuffers including <i>Pipeline</i> newsletter with conservation articles and messages printed on bill.	Yes
120,390	WaterSmart Center website hits to <a href="http://www.ebmud.com/watersmart">www.ebmud.com/watersmart</a> which includes conservation rebates and services information, water saving tips and videos, publications, access to free water saving devices, and links to information resources.	Yes
4	Workshops and media campaigns with Bay Friendly Landscaping and Gardening.	Yes
2,000	Conservation-related customer telephone contacts with EBMUD Contact Center and Water Conservation.	
2	Website links to Irrigation Association of California and StopWaste.	No
2,000	EBMUD initiated customer contacts to high consumption accounts (approximately 800 annually) and responses to conservation-related email inquiries (approximately 1,200 annually).	Yes
5,000	Direct mail for WaterSmart Certification Program.	No
10	Conservation booths at community events.	Yes
18,930	Provide bi-monthly water use reports to customers with comparison of water use to water budget.	Yes
74	Conduct conservation presentations to community groups, schools, and other agencies.	Yes
8	Conduct media outreach: news releases, editorial board visits, written editorials, newspaper contacts, television, contacts, radio contact, articles or stories resulting from outreach.	Yes
2	Conducted Adult Education/Training Programs: Irrigation Courses.	Yes
3	Sponsor or co-sponsored landscape workshops/training for homeowners and/or homeowners associations: 2-Bay Friendly Presentations/year. 1-Master Gardener Presentation/year.	Yes
\$2 million	Total reporting period budget expenditure for public outreach/training/adult education programs including, 16 Water Conservation and 3 Public Information staff.	Yes
Contact with the Media		
# Media Contacts	Media Contact Types	Did at least one contact take place during each quarter of the reporting year?
8	Press Releases	Yes
30	Television and radio media	Yes
Is Your Agency Performing Website Updates:		Yes
URL (website address):		<a href="http://www.ebmud.com/">http://www.ebmud.com/</a>

<b>Public Outreach - 2010</b>	
<b>Water conservation related updates to website:</b>	
1	Quarterly Qualifying High-Efficiency Clothes Washers and WaterSense Toilets. Yes
2	Biannual program information updates for all rebate programs Yes
3	Biannual updates to online Mulch Coupon Offer Yes
4	Quarterly updates to WaterSmart Center messages Yes
5	Quarterly updates and maintenance to website online store Yes
6	As needed updates and maintenance of Water Conservation publications & links to other sites Yes
7	Monthly Workshops & Events updates Yes
<b>Public Outreach Expenses</b>	
<b>Expense Amount</b>	<b>Expense Category</b>
\$31,952	Staffing Community Events. Yes
\$17,195	Water Conservation Presentations to community groups. Yes
<b>Additional Public Information Program</b>	
Were there additional Public Outreach efforts? Yes	
<b>Public Outreach Additional Information</b>	
<b>Public Information Programs</b>	
	Annual Water Conservation & Recycling Program Report NA
	WaterSmart (Business) Certification Program Yes
	WaterSmart Garden Grant Program NA
	Annual Water Conservation Showcase NA
	California Youth Energy Services Yes
	Field Learning Environmental Education Sites: Chabot, Nunes and Valle Vista. Yes
<b>Social Marketing Programs/Branding</b>	
Does your agency have a water conservation "brand", "theme" or mascot?	
	<b>WaterSmart</b> is an umbrella brand for EBMUD conservation programs depicting environmentally friendly and customer oriented services. Originally developed through market research and testing, the brand is consistently deployed for water-conservation-related online and print communications. Yes
<b>Market Research</b>	
Have you sponsored or participated in market research to refine your message?	
	Yes
Market Research Topic:	
	Customer surveys
<b>Community</b>	
Do you have a community conservation committee?	
	Yes
Select the name(s) of Focus or Foci:	
	Landscape Advisory Committee

<b>School Education - 2009</b>			
<b>Required School Programs</b>			
Is a wholesale agency implementing school programs which can be counted to help your agency comply with this BMP?			
Materials meet state education framework requirements?			
<table border="1" style="float: right;"> <tr><td>No</td></tr> <tr><td>Yes</td></tr> </table>		No	Yes
No			
Yes			
<b>Description of Materials</b>			
Materials distributed to K-6 Students?	Coloring books, educational comic books, education lesson courses, and water awareness activity workbooks.		
Description of materials distributed to K-6 Students.	Creative and age appropriate introduction to water awareness consisting of coloring and comic books with simple sentences structure and content. Story lines follow "Captain Hydro's" life in the water world.		
Number of students reached:	47,793		
Materials distributed to 7-12 Students?	Educational workbooks, educational lesson courses, and water awareness activity lessons.		
Description of materials distributed to 7-12 Students.	Materials focus on where EBMUD water comes from, how water is treated, stored, and delivered. Other lessons and lesson plans include pollution prevention waste water treatment as they relate to world history and geography and integrate with other science and social science awareness.		
Number of Distribution:	19,522		
Annual Budget of school education program:	\$200,000		
Description of all other water supplier education programs:	Newsletters (Customer Pipelines and Equalizer) Reports (Annual, Technical, and Water Supply Resource); Fact Sheets (Budget by Fiscal Year, EBMUD Energy, EBMUD & Delta, Family Disaster Preparedness, and Waterlines are Lifelines) Workshops and Events (Water Conservation Showcase, Bay Friendly Gardens, and Native Garden Tours and Irrigation Workshops); and coordination with Environmental Education Organizations (Chabot, Nunes and Valle Vista).		
<b>Voluntary School Program Activities</b>			
<b>Large group assemblies:</b>			
Number of presentations:	4		
Number of attendees:	185		
<b>Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:</b>			
Number of presentations:	2		
Number of attendees:	40		
<b>Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):</b>			
Description:	Newsletters and Educational School Books distributed twice a year to all schools including 155 School Superintendents, School Board Members and County Offices of Education; 563 schools and outdoor educational entities such as Scout groups; and 30 to various water agencies and related groups. Also, Pencils & Sharpeners were distributed to all the schools.		
Number distributed:	14,364 - Newsletters; 1,000 - Educational School Books; 30,000 Pencils & Sharpeners.		

**School Education - 2010**

<b>Required School Programs</b>		No
Is a wholesale agency implementing school programs which can be counted to help your agency comply with this BMP?		Yes
Materials meet state education framework requirements?		
<b>Description of Materials</b>		
Materials distributed to K-6 Students?	Coloring books, educational comic books, education lesson courses, and water awareness activity workbooks.	
Description of materials distributed to K-6 Students.	Creative and age appropriate introduction to water awareness consisting of coloring and comic books with simple sentences structure and content. Story lines follow "Captain Hydro's" life in the water world.	
Number of students reached:		47,793.00
Materials distributed to 7-12 Students?	The materials distributed to 7 - 12 students were educational workbooks, educational lesson courses, and water awareness activity lessons.	
Description of materials distributed to 7-12 Students.	Materials focus on where EBMUD water comes from, how water is treated, stored, and delivered. Other lessons and lesson plans include pollution prevention waste water treatment as they relate to world history and geography and integrate with other science and social science awareness.	
Number of Distribution:		19,522
Annual Budget of school education program:		\$150,000
Description of all other water supplier education programs:	Newsletters (Customer Pipelines and Equalizer) Reports (Annual, Technical, and Water Supply Resource); Fact Sheets (Budget by Fiscal Year, EBMUD Energy, EBMUD & Delta, Family Disaster Preparedness, and Waterlines are Lifelines) Workshops and Events (Water Conservation Showcase, Bay Friendly Gardens, and Native Garden Tours and Irrigation Workshops); and coordination with Environmental Education Organizations (Chabot, Nunes and Valle Vista).	
<b>Voluntary School Program Activities</b>		
<b>Large group assemblies:</b>		
Number of presentations:		1
Number of attendees:		20
<b>Cooperative efforts with existing science/water education programs (various workshops, science fair awards or judging) and follow-up:</b>		
Number of presentations:		2
Number of attendees:		40
<b>Other methods of disseminating information (i.e. themed age-appropriate classroom loaner kits):</b>		
Description:	Newsletters and Educational School Books distributed twice a year to all schools including 155 School Superintendents, School Board Members and County Offices of Education; 563 schools and outdoor educational entities such as Scout groups; and 30 to various water agencies and related groups. Also, Pencils & Sharpeners were distributed to all the schools.	
Number distributed:	14,364 - Newsletters. 1,000 - Educational School Books.	

Programmatic BMP Implementation Component and Coverage Requirement		Coverage Requirement Basis							
Implementation Component	Coverage Requirement Description	Coverage Requirement Component	Annual Coverage Rate	Total Coverage Requirement	2008 Base Amount	Base Unit	Annual Coverage Requirement	Coverage Requirement Through 2010	Total Coverage Requirement
<b>BMP 3 Residential</b>									
	Provide leak detection assistance to an average of 1.5 percent per year of current single-family accounts and 1.5 percent per year of current multi-family units during the first ten years after signing the MOU. After completing the ten-year 1.5 percent target, agencies will maintain a program at the level of high-bill complaints or not less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units. Showerhead distribution will be considered complete when 75 percent market saturation is achieved.	SF Leak Detection	1.50%	15.00%	320,785	Accounts	4,812	9,624	48,118
<b>Residential Assistance</b>		MF Leak Detection	1.50%	15.00%	254,043	Dwelling Units	3,811	7,621	38,106
		Showerhead Saturation	7.50%	75.00%	849,670	Showerheads	63,725	127,451	637,253
<b>Landscape Water Survey</b>	Provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. After completing the ten-year 1.5 percent target, agencies will maintain a program at the level of high-bill complaints or no less than 0.75 percent per year of current single-family accounts.	SF Surveys	1.50%	9.80%	320,785	Accounts	794	1,588	7,939
<b>High efficiency clothes washers</b>	Provide financial incentives for the purchase of HECWs that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount. Incentives shall be provided to 0.9 percent of current single-family accounts during the first reporting period following BMP implementation, rising to 1.0 percent per year of current single-family accounts for the remainder of ten year period following signing of the MOU. An alternative method is to demonstrate 1.4 percent per year of the market penetration during the first ten years after signing the MOU.	SF incentives WSS HEW	0.90%	10.00%	320,785	Accounts	2,887	5,774	32,079
<b>HET Rebate Program</b>	A financial incentive shall continue to be offered for toilets meeting the current WSS and updated standard whenever a more efficient toilet is identified by WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater, toilets at or above the level achieved through a retrofit on rebate ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.	Toilet Saturation < 3.5 gpf	7.50%	75.00%	978,500	Toilets	73,388	146,775	733,875
<b>WSS New Development</b>	An incentive shall continue to be offered until a water agency, or local, state or federal regulation is in effect meeting at a minimum, WSS for water efficient single-family homes. Multi-family housing shall also meet the WSS in all applicable criteria regardless of the total number of stories in the building.	Regulation	Incentive or Regulation	Incentive or Regulation			NA		

Programmatic BMP Implementation Component and Coverage Requirement		Coverage Requirement Basis							
Implementation Component	Coverage Requirement Description	Coverage Requirement Component	Annual Coverage Rate	Total Coverage Requirement	2008 Base Amount	Base Unit	Annual Coverage Requirement	Coverage Requirement Through 2010	Total Coverage Requirement
<b>BMP 4 CII</b>									
<b>Water Savings</b>	Coverage shall consist of meeting the annual water savings goal in Section A. Although it is not one of the criteria in meeting implementation, agencies will be considered on track if estimated savings as a percent of baseline water use equals or exceeds the following: 0.5% by the end of first reporting period (year two), 2.4% by the end of year four, 4.3% by the end of year six, 6.4% by the end of year eight, and 9% by the end of year ten. Percentages will be adjusted proportionally for up to 50% past credit referred to in the implementation section.	Percentage of 2008 Baseline Consumption	0.50%	10.00%	49,919	Acre Feet	NA	125	4,992
<b>BMP 5 Landscape</b>									
<b>Water Budgets</b>	1) E-to-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years.	Water Budgets (dedicated meters)	9.00%	90.00%	5,167	Accounts	465	930	4,650
<b>Technical Assistance</b>	2) Offer site-specific technical assistance annually to all accounts that are 20% over budget within six years of the date implementation was to commence.	Annual Assistance (to over budget accs)	20.00%	Accounts > 20 percent over water budgets		Accounts		Varies by year	
<b>Water Use Surveys</b>	3) Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.) An agency will be considered on track if the percent of CII accounts with mixed-use meters receiving a landscape water use survey equals or exceeds the following: 1.5% by the end of the first reporting period (year two) following the date implementation is to commence; 3.6% by the end of year four; 6.3% by the end of year six; 9.6% by the end of year eight; and 13.5% by the end of year ten.  Agency may credit 100% of the number of landscape water use surveys for CII accounts with mixed-use meters completed prior to July 1, 2007 that have received a follow-up inspection against the coverage requirement; agency may credit 50% of surveys that have not received follow-up inspections. Agency may credit 100% of the number of landscape water use surveys completed for CII accounts with mixed-use meters after July 1, 2007 against the coverage requirement.	Mixed-use Account. Water Surveys	1.50%	15.00%	2,745	Accounts	41	82	412
<b>Incentives for Retrofit</b>	4) Agency will implement and maintain a customer incentive program(s) for irrigation equipment retrofits.	Maintain Program	NA	NA	Program Implemented			Yes or No	

Programmatic BMP Implementation Component and Coverage Requirement		EBMUD Coverage Requirement					2009-2010 Activity and Compliance Status					
Implementation Component	Coverage Requirement Description	Coverage Requirement Component	Total Activity Thru 2008	EBMUD Basis	Remaining Annual Target	Annual Activity 2009	Annual Activity 2010	Total Activity to Date	Percent Coverage Requirement Thru 2010	Percent of Total Coverage Requirement	Status	
<b>BMP 3 Residential</b>												
<b>Residential Assistance</b>	Provide leak detection assistance to an average of 1.5 percent per year of current single-family accounts and 1.5 percent per year of current multi-family units during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or not less than 0.75 percent per year of current single-family accounts and 0.75 percent per year of current multi-family units. Showerhead distribution will be considered complete when 75 percent market saturation is achieved.	SF Leak Detection	38,313	9,805	980	884	546	39,743	413%	83%	On Track	
		MF Leak Detection	45,682	0	0	3,375	3,411	52,468	688%	138%	Complete	
		Showerhead Saturation	781,696	0	0	5,119	1,656	788,471	619%	124%	Complete	
<b>Landscape Water Survey</b>	Provide landscape water surveys to an average of 1.5 percent per year of current single-family accounts during the first ten years after signing the MOU. After completing the ten-year 15 percent target, agencies will maintain a program at the level of high-bill complaints or no less than 0.75 percent per year of current single-family accounts.	SF Surveys	2,624	5,315	532	178	35	2,837	179%	36%	On Track	
<b>High efficiency clothes washers</b>	Provide financial incentives for the purchase of HECWs that meet an average water factor value of 5.0. If the WaterSense Specification is less than 5.0, then the water factor value will decrease to that amount. Incentives shall be provided to 0.9 percent of current single-family accounts during the first reporting period following BMP implementation, rising to 1.0 percent per year of current single-family accounts for the remainder of ten year period following signing of the MOU. An alternative method is to demonstrate 1.4 percent per year of the market penetration during the first ten years after signing the MOU.	SF incentives WSS HEW	62,883	0	0	10,465	10,258	83,606	1448%	261%	Complete	
<b>HET Rebate Program</b>	A financial incentive shall continue to be offered for toilets meeting the current WSS and updated standard whenever a more efficient toilet is identified by WSS. Compliance will entail demonstrating a number of toilet replacements of 3.5 gpf or greater, toilets at or above the level achieved through a retrofit on resale ordinance until 2014, or a market saturation of 75% is demonstrated, whichever is sooner.	Toilet Saturation < 3.5 gpf	615,816	118,059	11,806	39,140	39,140	694,096	473%	95%	On Track	
<b>WSS New Development</b>	An incentive shall continue to be offered until a water agency or local, state or federal regulation is in effect meeting at a minimum, WSS for water efficient single-family homes. Multi-family housing shall also meet the WSS in all applicable criteria regardless of the total number of stories in the building.	Regulation Implemented 2007	Regulation Implemented 2007	New Service Water Conservation Requirements	New Service Water Conservation Meet WSS Requirements	New Service Water Conservation Regulation Implementation			100%	NA	On Track	

Programmatic BMP Implementation Component and Coverage Requirement		EBMUD Coverage Requirement				2009-2010 Activity and Compliance Status						
Implementation Component	Coverage Requirement Description	Coverage Requirement Component	Total Activity Thru 2008	EBMUD Basis	Remaining Annual Target	Annual Activity 2009	Annual Activity 2010	Total Activity to Date	Percent Coverage Requirement Thru 2010	Percent of Total Coverage Requirement	Status	
<b>BMP 4 CII</b>												
<b>Water Savings</b>	Coverage shall consist of meeting the annual water savings goal in Section A. Although it is not one of the criteria in meeting implementation, agencies will be considered on track if estimated savings as a percent of baseline water use equals or exceeds the following: 0.5% by the end of first reporting period (year two), 2.4% by the end of year four, 4.3% by the end of year six, 6.4% by the end of year eight, and 9% by the end of year ten. Percentages will be adjusted proportionally for up to 50% past credit referred to in the Implementation section.	Percentage of 2008 Baseline Consumption	19,695	2,496	250	105	1,299	1,404	1125%	56%	On Track	
<b>BMP 5 Landscape</b>												
<b>Water Budgets</b>	1) ETo-based water use budgets developed for 90% of CII accounts with dedicated irrigation meters at an average rate of 9% per year over 10 years.	Water Budgets (dedicated meters)	NA	4,650	465	3,155	3,315	3,315	356%	71%	On Track	
<b>Technical Assistance</b>	2) Offer site-specific technical assistance annually to all accounts that are 20% over budget within six years of the date implementation was to commence.	Annual Assistance (to over budget accts)	All accounts offered assistance	Varies by year		All sites over budget are offered technical assistance						
<b>Water Use Surveys</b>	3) Complete irrigation water use surveys for not less than 15% of CII accounts with mixed-use meters and un-metered accounts within 10 years of the date implementation is to commence. (Note: CII surveys that include both indoor and outdoor components can be credited against coverage requirements for both the Landscape and CII BMPs.) An agency will be considered on track if the percent of CII accounts with mixed-use meters receiving a landscape water use survey equals or exceeds the following: 1.5% by the end of the first reporting period (year two) following the date implementation is to commence; 3.6% by the end of year four; 6.9% by the end of year six; 9.6% by the end of year eight; and 13.5% by the end of year ten.	Mixed-use Account. Water Surveys	485	2,260	226	13	10	508	617%	123%	Complete	
<b>Incentives for Retrofit</b>	4) Agency will implement and maintain a customer incentive program for irrigation equipment retrofits.	Maintain Program	Program Implemented	NA	NA	Program Implemented						

## I-2. EBMUD CONSERVATION RESEARCH PROJECTS

TABLE I-2.1 CONSERVATION RESEARCH PROJECTS

PROJECT NAME	FUNDING YEAR	EBMUD COST	DESCRIPTION
1.6 GALLON PER FLUSH (GPF) TOILETS STUDY	1991	\$125,000	TO DETERMINE TOILET AND SHOWERHEAD WATER SAVINGS AND IMPACT ON SEWER LINES.
IMPACTS OF ULTRA LOW-FLOW TOILETS (ULFT) ON SEWER LATERALS AND WASTEWATER OPERATIONS STUDY	1992	\$75,000	TO DETERMINE THE IMPACT OF 1.6 GPF TOILETS ON SEWER LATERAL FLOWS AND ON WASTEWATER OPERATIONS.
CUSTOMER INCENTIVE FOR WATER CONSERVATION STUDY	1994	\$10,000	TO DETERMINE THE EFFICACY OF VARIOUS WATER CONSERVATION INCENTIVE PROGRAMS.
WATER CONSERVATION BASELINE STUDY	1995	\$100,000	TO DETERMINE BASELINE CUSTOMER KNOWLEDGE OF WATER CONSERVATION PRACTICES AND MARKET PENETRATION OF WATER SAVING FIXTURES.
POTENTIAL ENERGY SAVINGS WITH OFF-PEAK IRRIGATION STUDY	1995	\$10,000	TO DETERMINE IRRIGATION HABITS IN THE EBMUD SERVICE AREA AND ESTIMATE POTENTIAL ENERGY SAVINGS FROM OFF-PEAK IRRIGATION.
WATER CONSERVATION RATE STRUCTURES STUDY	1997	\$10,000	TO DETERMINE INNOVATIVE WAYS TO PRICE URBAN WATER SERVICE.
THE HIGH-EFFICIENCY LAUNDRY METERING AND MARKETING ANALYSIS (THELMA) PROJECT	1998	\$25,000	TO COLLECT INFORMATION TO HELP TRANSFORM THE CLOTHES WASHER INDUSTRY TO CHANGE TO MORE EFFICIENT PRODUCTS.
BEST MANAGEMENT PRACTICES (BMPs) COSTS AND SAVINGS STUDY	2000	\$20,000	TO DEVELOP METHODS AND DATA TO ENACT ECONOMIC ANALYSIS FOR WATER CONSERVATION BMPs.
LABORATORY EVALUATION OF SELECTED 1.6 GPF TOILET FIXTURES	2001	\$10,000	TO DETERMINE PERFORMANCE OF SELECTED 1.6 GPF TOILETS AND TO PROPOSE INDUSTRY TESTING STANDARDS.
COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL (CII) ULFT SAVINGS STUDY	2001	\$10,000	TO DETERMINE WATER SAVINGS OF 1.6 GPF TOILETS IN THE BUSINESS SECTOR.
WATER CONSERVATION MARKET PENETRATION STUDY	2002	\$300,000	TO DETERMINE MARKET PENETRATION OF WATER SAVING FIXTURES AND EQUIPMENT.
WATER CLOSET PERFORMANCE TESTING STUDY	2002	\$30,000	TO DEVELOP INFORMATION ON PRODUCT PERFORMANCE, WATER SAVINGS RELIABILITY, AND TO HELP CONSUMERS EVALUATE PRODUCTS.
DEMAND HARDENING STUDY	2002	\$10,000	TO DETERMINE THE IMPACT OF DEMAND HARDENING ON FUTURE CONSERVATION AND ABILITY TO RESPOND TO WATER SHORTAGES.
TOILET FREERIDERS STUDY	2002	\$10,000	TO DETERMINE THE IMPACT OF FREERIDERS ON COST-EFFECTIVENESS OF TOILET REBATES.
EVAPOTRANSPIRATION (ET) CONTROLLER EVALUATION	2002	\$65,000	TO EVALUATE DIFFERENT WEATHER BASED CONTROLLERS AND THEIR POTENTIAL WATER SAVINGS.
MARKETING PLAN STUDY	2003	\$50,000	TO MAKE MARKETING RECOMMENDATIONS FOR PROMOTING WATER CONSERVATION.
RESIDENTIAL END USE STUDY	2003	\$100,000	TO DETERMINE INDOOR WATER USE AND WATER USE OF DIFFERENT FIXTURES.
NATIONAL SUBMETERING STUDY	2004	\$75,000	TO DETERMINE WATER SAVINGS ASSOCIATED WITH SUBMETERING IN MULTI-FAMILY DWELLINGS.
URBAN WATER CONSERVATION POTENTIAL	2004	\$10,000	TO DETERMINE URBAN WATER CONSERVATION POTENTIAL IN CALIFORNIA.
BMP COSTS AND SAVINGS STUDY	2004	\$20,000	TO DETERMINE THE COSTS AND WATER SAVINGS OF VARIOUS NEW WATER SAVING PRODUCTS.
SELF-CONTAINED FOOD STEAMERS STUDY	2004	\$25,000	FIELD STUDY ON BOILER VERSUS BOILERLESS STEAMERS AND THE POTENTIAL WATER SAVINGS AND COST-EFFECTIVENESS.
PRE-RINSE SPRAY VALVE AND DISHWASHER STUDY	2005	\$100,000	TO ANALYZE WATER SAVINGS FROM THE INSTALLATION OF WATER AND ENERGY EFFICIENT PRE-RINSE SPRAY VALVES AND DISHWASHERS AT FOOD SERVICES.
IRRIGATED AREA AND WATER USE BY MAJOR PLANT TYPE	2005	\$10,000	TO DETERMINE THE TOTAL IRRIGATED AREA IN THE EBMUD SERVICE AREA BY MAJOR PLANT TYPE AND THE AMOUNT OF WATER USED BY PLANT TYPE.
WATER LOSS AND CONTROL STRATEGY	2005	\$10,000	TO DEVELOP AN INTERACTIVE ON-LINE WATER LOSS CONTROL MANUAL.
NON-COMPLIANT SHOWERHEAD TESTING STUDY	2005	\$10,000	TO TEST SELECTED SHOWERHEADS FOR COMPLIANCE WITH STATE AND FEDERAL PLUMBING CODES.
END USE DEMAND AND METERING TECHNOLOGY STUDY	2005-2008	\$125,000	USING AUTOMATED METER READING (AMR) TECHNOLOGY TO PROVIDE CUSTOMER FEEDBACK ON USE AND POTENTIAL LEAKS.

CONSERVATION RESEARCH PROJECTS CONTINUED

PROJECT NAME	FUNDING YEAR	EBMUD COST	DESCRIPTION
VALUING THE ENVIRONMENTAL BENEFITS OF URBAN WATER CONSERVATION	2006	\$10,000	TO DETERMINE THE VALUE OF SAVED WATER TO THE ENVIRONMENT AND SOCIETY.
EXPANDED METERING PILOT PROGRAM AND STUDY (SUBMETERING)	2006	\$150,000	TO DETERMINE ISSUES ASSOCIATED WITH THE EBMUD METERING IN MULTI-FAMILY (MF) SECTOR AND TO RECOMMEND A PROGRAM.
WATER-EFFICIENCY PROGRAMS FOR SUPPLY PLANNING	2006	\$10,000	TO INVESTIGATE THE RELATIONSHIP BETWEEN WATER-EFFICIENCY PROGRAMS AND SUPPLY PLANNING.
ICE MACHINE EFFICIENCY STUDY	2006	\$15,000	FIELD STUDY ON AIR AND WATER-COOLED ICE MACHINES TO DETERMINE WATER SAVINGS POTENTIAL AND COST-EFFECTIVENESS.
X-RAY FILM PROCESSOR PILOT PROJECT	2006	\$50,000	TO REPLACE WATER USING X-RAY MACHINES WITH DIGITAL X-RAY MACHINES AND TO DETERMINE WATER SAVINGS.
PIPELINE LEAK DETECTION STUDY	2006-2010	\$500,000	TESTING ACOUSTIC TECHNOLOGY TO DETECT LEAKS IN THE DISTRIBUTION SYSTEM.
AQUEDUCT LEAK DETECTION STUDY	2006-2010	\$300,000	TO DEMONSTRATE ADVANCED LEAK DETECTION TECHNOLOGIES IN TRANSMISSION MAINS.
PG&E EMBEDDED ENERGY STUDY	2007	\$5,000	TO EVALUATE UTILITY ENERGY SAVINGS THROUGH WATER CONSERVATION.
WATER BUDGETS AND RATE STRUCTURES STUDY	2007	\$20,000	TO DETERMINE IMPACT OF WATER BUDGETS AND RATE STRUCTURES ON WATER SAVINGS.
CALIFORNIA SINGLE FAMILY WATER-USE EFFICIENCY STUDY	2007-2011	\$15,000	PROVIDE DETAILED WATER USE DATA AND BENCHMARK EFFICIENCY FOR A SAMPLE OF CALIFORNIA HOMES.
WATER CONSERVATION THROUGH AUTOMATED METER READING (AMR) SYSTEMS	2007-2012	\$800,000	PROVIDED 4,000 CUSTOMERS WITH WEB ACCESS TO THEIR REAL-TIME CONSUMPTION INFORMATION IN A GRAPHICAL FORMAT (CAPABLE OF HOURLY INTERVAL DISPLAYS) INCORPORATING WATER BUDGETS AND LEAK NOTIFICATION
WEATHER BASED IRRIGATION CONTROLLER (WBIC) PROGRAM AND STUDY	2008	\$15,000	TO EVALUATE WATER SAVINGS OF PILOT WEATHER BASED IRRIGATION CONTROLLERS.
POTENTIAL BMPS STUDY	2008	\$10,000	USING AUTOMATED METER READING (AMR) TO DETERMINE THE EFFICACY OF POTENTIAL NEW WATER CONSERVATION MEASURES.
WATERSMART GUIDEBOOK PROJECT	2008	\$100,000	TO DETERMINE BUSINESS END USES OF WATER AND TO IDENTIFY WATER EFFICIENT FIXTURES, APPLIANCES, AND PROCESSES.
URBAN WATER CONSERVATION ACCOMPLISHMENTS STUDY	2008	\$5,000	TO DETERMINE WHAT CALIFORNIA URBAN WATER AGENCIES HAVE ACCOMPLISHED IN WATER CONSERVATION.
WATERSMART CERTIFICATION AND RECOGNITION PROGRAM MARKETING PLAN	2009	\$25,000	PILOT STUDY TO TEST CUSTOMER INTEREST AND MARKET ACCEPTANCE OF A CERTIFICATION PROGRAM FOR WATER EFFICIENT BUSINESSES
PLAN REVIEW PILOT STUDY	2009	\$100,000	TO REVIEW BUSINESS CONSTRUCTION PLANS FOR WATER-EFFICIENCY AND ESTIMATE WATER SAVINGS AND PROGRAM COST-EFFECTIVENESS.
IRRIGATION CONTROLLER STUDY	2009	\$15,000	TO DEVELOP TESTING STANDARDS TO EVALUATE IRRIGATION CONTROLLERS FOR WATER-EFFICIENCY POTENTIAL.
SUBSURFACE IRRIGATION STUDY	2009	IN-KIND SERVICES	TO DETERMINE THE EFFICACY OF SUBSURFACE IRRIGATION SYSTEMS.
WATER SYSTEM OPTIMIZATION THROUGH THE DEVELOPMENT OF AN ADVANCED METERING INFRASTRUCTURE (AMI) IMPLEMENTATION PLAN	2009-2011	\$600,000	EVALUATION AND IMPLEMENTATION PLANNING FOR SYSTEM-WIDE ADVANCED METERING INFRASTRUCTURE AND AND CONSERVATION BENEFITS STUDY
CUSTOMER (EFFICIENCY) OPINION RESEARCH	2009-2011	\$150,000	CUSTOMER SURVEYS, FOCUS GROUPS, AND SEMINARS TO GAIN INSIGHT INTO CUSTOMERS' DROUGHT RESPONSE, CONSERVATION PRACTICES AND USE OF WATER-EFFICIENT TECHNOLOGY
FIXED NETWORK ACOUSTIC LEAK DETECTION	2009-2011	\$50,000	DEMONSTRATION OF REMOTE READING OF ACOUSTIC PIPELINE LEAK DETECTION EQUIPMENT USING AMR SYSTEMS
GIS-BASED LANDSCAPE WATER BUDGETING CALCULATOR	2010	\$300,000	DEVELOPMENT OF AN AUTOMATED LANDSCAPE WATER BUDGETING TOOL FOR CUSTOMER TO MEET MODEL LANDSCAPE ORDINANCE REQUIREMENTS
CALIFORNIA PUBLIC UTILITIES COMMISSION (CPUC) WATER PROFILE STUDY	2010-2011	\$7,000	IDENTIFY WATER AND ENERGY USE PATTERNS AND WATER-CONSERVATION RELATED ENERGY SAVINGS POTENTIAL FOR CALIFORNIA'S RESOURCE PLANNING PURPOSES
WATER SAVINGS EVALUATION STUDY	ONGOING	\$50,000	TO DETERMINE WATER SAVINGS BY PROGRAM MEASURE USING PRE- AND POST-INTERVENTION ANALYSIS.

Since 1991 EBMUD has fully or partially sponsored 51 conservation research projects costing approximately 3.49 million dollars. These studies are conducted to apply results and lessons learned to future conservation activities and to advance the science of water conservation. These studies are summarized in Table I-2.1.

### ***Discussion of Research Projects***

The 51 research projects itemized in Table I-2.1 are discussed chronologically in more detail below.

***1.6 Gallons Per Flush (gpf) Toilets Study.*** This 1991 study involved the retrofitting of 25 single-family homes in the EBMUD service area to determine the water savings associated with 1.6 gpf toilets and the water and energy savings associated with water saving showerheads. This study found that (1) despite a slight increase in double flushing over conventional toilets, there were still significant water savings (5.3 gallons/person/day), and (2) the savings associated with lower flow showerheads was 2.8 gallons/person/day. This study indicated there was no energy savings because the water temperature increased with the water savings showerhead to offset showerhead aeration.

***Impacts of Ultra Low-Flow Toilets (ULFT) on Sewer Laterals and Wastewater Operations Study.*** In 1992, when 1.6 gpf toilets were introduced into the marketplace, there was concern over their (1) impact on flows in the sanitary laterals and distribution system, and (2) impact on the wastewater treatment facility. Through a literature search and a survey of wastewater agencies, this study found that (1) there was no increase in the maintenance requirements in the sanitary line distribution system, and (2) the operating costs for a wastewater treatment plant in most cases decreased and in a few cases increased slightly.

***Customer Incentive for Water Conservation Study.*** In 1995, EBMUD, in a collaborative effort, investigated the efficacy of various water conservation incentive programs. The purpose of this study was to assess various incentive programs from different water providers and energy companies and to make recommendations for future conservation incentive efforts.

***Water Conservation Baseline Study.*** The purpose of this 1995 study was to determine how customers used water by (1) identifying the types and saturation of water-using hardware for selected customer groups, (2) characterizing water conservation attitudes and behaviors of the general public, and (3) developing a recommended monitoring and evaluation plan. The information collected helped in designing a plan to best market water conservation through targeted programs.

### ***Potential Energy Savings with Off-Peak Irrigation Study.***

This 1995 study was conducted to determine the potential to shift current irrigation scheduling for large irrigators to off-energy peak hours. This study found that in the EBMUD service area, most irrigation customers already irrigated during off-energy peak hours, namely at night or in the early morning.

***Water Conservation Rate Structures Study.*** EBMUD was a co-sponsor in this 1997 study titled “Designing, Evaluating and Implementing Conservation Rate Structures,” which looked at methods for designing conservation-oriented rates. The handbook, while not recommending a specific rate structure, discussed the many issues a utility needs to consider in implementing conservation rates.

***The High-Efficiency Laundry Metering and Marketing Analysis (THELMA) Project.*** This 1998 collaborative study involving EBMUD was designed to obtain data and insights for utility promotion of front loading clothes washers, which at the time of this study had only a 2% market penetration in the United States despite significant energy and water savings. EBMUD, which started offering incentives for water and energy efficient clothes washers in 1996, used this information to help transform the clothes washing market to more efficient ones. By 2005, nearly 20% of EBMUD customers had installed water and energy efficient clothes washers.

***Best Management Practices (BMPs) Costs and Savings Study.*** EBMUD was involved in this 2000 collaborative study which served as a guide to the data and methods for cost-effectiveness analysis of urban water conservation BMPs. This study assembles the best available information currently available for quantifying and valuing conservation activity.

### ***Laboratory Evaluation of Selected 1.6 gpf Toilet Fixtures.***

EBMUD was a co-sponsor in this 2001 collaborative study to identify, purchase, and laboratory test a series of water closets for which field experience is available and to analyze the gathered data as supporting documentation for the recommended tests proposed for the American Society of Mechanical Engineers (ASME) standard. The goal of this study was to determine if and how the proposed standards and test protocols would represent an improvement over the current ASME requirements.

***Commercial, Industrial, and Institutional (CII) ULFT Savings Study.*** EBMUD was a co-sponsor in this 2001 collaborative study to empirically estimate water savings per ULFT installation in different CII market segments and to develop a practical approach for estimating the number

of toilets by CII market segment with the service area of a given water provider. This study indicates that the highest per toilet savings in the CII sector (about 52 gallons/toilet/day) were at wholesalers, food stores, and restaurants, and the lowest per toilet savings (about 20 gallons/toilet/day) were at offices, and hotels/ motels.

**Water Conservation Market Penetration Study.** This 2002 EBMUD study was conducted to (1) collect current data on water conservation attitudes and behavior, (2) determine the types and saturation of water-conserving hardware (fixtures and appliances), (3) assess water conservation potential for identified market sectors, and (4) relate the study findings to those of previous studies to infer market penetration rates of water conservation hardware.

**Water Closet Performance Testing Study.** This 2002 study co-sponsored by EBMUD was conducted to (1) develop information on toilet performance, water savings reliability, and physical characteristics that will assist the consumer in evaluating and making purchasing choices, and (2) evaluating current flush performance test protocol as a potential supplement to existing ASME pass/ fail protocols for the purpose of developing discriminatory data on toilet fixture performance.

**Demand Hardening Study.** This 2002 collaborative study involving EBMUD investigated the impact of past conservation efforts on the potential to reduce future use upon request during water shortages. This study found that past conservation efforts can reduce the frequency and depth of future drought responses and that habit change still represents an important element in meeting drought curtailment goals.

**Toilet Freeriders Study.** EBMUD was a funding partner in this 2002 study to determine freerider rates associated with ULFT programs offered by water providers in California. Freeriders are defined as utility incentive program participants who, without the incentive program, would still have replaced their toilets because of the state plumbing code requirements for ULFTs in effect since 1992. This study provides information on how to design a ULFT program to minimize the freerider potential. It also found that the highest freerider rates were associated with rebate programs (approximately 60%) and the lowest freerider rates were associated with free distribution programs (approximately 20%).

**Evapotranspiration (ET) Controller Evaluation.** In 2002, EBMUD, in collaboration with other water providers, initiated a study to evaluate different weather-based irrigation controllers and their potential for capturing water savings.

**Marketing Plan Study.** In 2003, EBMUD hired a marketing consultant to review EBMUD's current marketing efforts and to make recommendations for future marketing of the water conservation and recycling programs. The recommended marketing plan was presented in 2003, and elements of the plan were implemented in 2004. In developing the marketing plan, a number of messages and themes were tested on focus groups representing customers throughout the EBMUD service area.

**Residential End Use Study.** This study, funded in part with a grant from the United States Environmental Protection Agency (EPA) was completed in 2003. This study involved the monitoring of water use at 33 single-family homes within EBMUD and was designed to assess end uses of water and to measure the impacts of conservation retrofits on use. This study found that indoor per capita single-family use can be reduced to around 50 gallons/capita/day (gpcd). It also found that customers generally liked the more efficient products better than their conventional ones. One surprising study finding was the prevalence of leaks at a number of homes; accounting for nearly 30% of indoor water use at the 33 study sites. Most of the leaks disappeared when new toilets were installed indicating that flapper valve leaks is an issue that requires a targeted marketing effort.

**National Submetering Study.** In 2004, in cooperation with eight other water utilities and two apartment associations in seven states, EBMUD, as program administrator, implemented a nationwide assessment of conservation potential and administrative issues associated with submetering and allocation programs in multi-family residential settings. This national study investigated issues and water savings associated with third party billing programs of residents in the multi-family sector. This study indicates that submetering multi-family residents can achieve approximately a 15% savings in indoor water use. It also found that there are numerous issues associated with the mostly unregulated third party metering and allocation programs. This study furthered the water providers' understanding of third party billing and allocation practices and the national regulatory framework.

**Urban Water Conservation Potential.** This 2004 study, administered by the California Urban Water Agencies (CUWA) and co-funded by EBMUD in a collaborative effort, was conducted to generate an independent validation and update of the CALFED Bay-Delta Program (CALFED) estimates of water provider-funded efforts to study Best Management Practices (BMPs) for urban water conservation potential. This study provides estimates of

expected BMP-driven conservation savings and incorporates the key economic concept of cost-effective levels of BMP activities.

***BMP Costs and Savings Study.*** This 2004 study, co-funded by EBMUD in a collaborative effort, is an update of information provided in the 2000 study under a similar name. This follow-up study updated information provided in the earlier study and added cost and savings information on new water conservation measures and devices.

***Self-Contained Food Steamers Study.*** In 2005, EBMUD partnered with Pacific Gas and Electric (PG&E), Food Service Technology Center, and the United States Bureau of Reclamation (USBR), Mid-Pacific Region on an innovative conservation project to quantify the water and energy savings for “self-contained” or “boiler-less” commercial food service steamers. Atmospheric (boiler-based) compartment steamers are primary appliances in many commercial kitchens with recorded water consumption ranging from 20 to 40 gallons per hour, while the consumption for “boiler-less” or “connectionless” steamers can be up to 90% lower at less than 3 gallons per hour. Study results indicated significant water and energy savings.

***Pre-Rinse Spray Valves and Dishwashers Study.*** The 2005 study administered by EBMUD in co-operation with two other California utilities involved (1) the installation of 4,400 pre-rinse spray valves and 32 dishwashers, and (2) the analysis of water savings. This study found that the water saving pre-rinse nozzles saved approximately 1.56 gallons per minute over conventional spray nozzles or 94 gallons per day (GPD) assuming one hour of use. The water savings from the more efficient dishwasher was estimated at 2,290 GPD based on an evaluation of actual metered use.

***Irrigated Area and Water Use by Major Plant Type.*** An analysis was conducted in 2005 using Geographic Information System (GIS) information and EBMUD consumption data to estimate the irrigated area and water use by plant type in the EBMUD service area. This study found that lawn comprised about 50% of the irrigated plant material and used approximately 80% of the outdoor water. This information is important in helping to target long term and drought response efforts.

***Water Loss and Control Strategy.*** In 2005, EBMUD began developing an interactive On-Line Water Loss Control Manual. The manual describes all state-of-the-art methods EBMUD uses to control and prevent water losses with its

infrastructure and to properly account for all water delivered to its customers. This document will link other loss control programs into one comprehensive program to effectively manage losses.

***Non-Compliant Showerhead Testing Study.*** In 2005, EBMUD took the lead in administering the testing of six suspected non-complying showerheads in cooperation with the Seattle Public Utilities and the California Energy Commission. The test results found that none of the six showerheads tested passed for compliance with State and Federal flow rate and energy standards. Based on the test results, a complaint was filed with the Federal Trade Commission.

***End Use Demand and Metering Technology Study.*** EBMUD began working on this project in 2005 after receiving a \$75,000 grant from USBR. This study used new and developing metering technologies to collect real-time demand data from customer meters. This project involved retrofitting customer meters with electronic registers that collected, recorded, and transmitted hourly and even minute-by-minute consumption. EBMUD completed studies in four areas with four different technologies. Two of the study areas used fixed network technology (tower based collector), and two of the study areas used mobile network technology (car mounted collector). The results of the study were published in the May 2008 AWWA OpFlow magazine.

***Valuing the Environmental Benefits of Urban Water Conservation*** The purpose of this 2006 study, co-sponsored by EBMUD in a collaborative effort, was to create a methodology to assign economic value to the environmental benefits of raw water savings. The purpose of the environmental benefits model was to provide a practical tool with which utilities can estimate the environmental benefits, or costs, associated with a given BMP. This study uses the varying value of water savings based on hydrological regions, which in turn was based on changes in fish populations, vegetation, and wetlands affected by the saved water.

***Expanded Metering Pilot Program and Study (Submetering).*** In 2006, EBMUD began a two year study that (1) investigated the issues, costs, and water savings associated with its metering of new individual multi-family (MF) dwelling units and commercial properties, (2) quantified factors impacting MF customer water use to help guide potential EBMUD policy and programs for new and existing MF service accounts, and (3) researched potential conservation incentive program to encourage

additional metering within existing MF properties. In January 2009, EBMUD began metering the individual units in MF and commercial properties in its implementation of an expanded metering program. EBMUD's expanded metering program is an important conservation tool since, in the future, more MF units will be built proportionally to the current single-family/ MF ratio. This research was a follow-up to an EBMUD sponsored national study on submetering that indicated a significant potential for water conservation savings through metering of MF units.

***Water-Efficiency Programs for Supply Planning.*** In 2006, EBMUD did a collaborative study on the relationship between water conservation programs and water supply planning. Results of EBMUD flow modeling of the Mokelumne River (related to precipitation in the watershed) indicated that more efficient water use leads to less frequent and less severe water shortages.

***Ice Machine Study.*** From 2006-2007 EBMUD co-sponsored a study on the efficacy of air-cooled versus water-cooled ice machines. The objectives of this study were to (1) measure actual water and energy usage in commercial ice-cube machines, (2) compare the field-measured water and energy usage rates to the Air Conditioning and Refrigeration Institute (ARI) and/ or manufacturer supplied testing data, (3) determine for each machine the annual water, wastewater, and energy consumption and savings that could be achieved through retrofits with models that are more water/ energy efficient, and (4) capture field data that can be used to quantify the energy savings potential from reductions in regional water distribution and wastewater treatment.

***X-Ray Film Processor Pilot Project.*** In 2006, EBMUD was awarded a \$152,000 California Department of Water Resources research grant for the installation of up to 50 *WaterSaver Plus®* water recirculation units in existing x-ray film processors within EBMUD's service area. Because some film processors can use up to 2.5 gallons per minute and operate 24/7, this water recirculation unit represents a significant conservation potential with up to 85% in water savings. The grant will provide up to \$3,000 in EBMUD pre-approved vouchers for each x-ray unit purchased by eligible EBMUD customers who must go through an on-site survey and inspection. Once approved, the customer will then work directly with x-ray retrofit equipment distributors. In FY05, EBMUD secured two agreements with local x-ray retrofit equipment distributors to help market EBMUD's incentive program and to provide services.

***Pipeline Leak Detection Study.*** EBMUD began working on this project in 2006 after receiving a \$300,000 grant from USBR. EBMUD installed approximately 1,000 acoustic leak detection loggers on approximately 250 miles of distribution piping in and around the City of Berkeley. The purpose of the project is to obtain water savings from intensive leak detections and subsequent repairs and to better define the nature of pipeline leaks. This project was completed in December 2010.

***Aqueduct Leak Detection Study.*** EBMUD began working on this project in 2006 after receiving a \$300,000 grant from UBR. EBMUD demonstrated advanced leak detection technologies on large pipes for which traditional leak detection technologies have not been successful. This project was intended to accelerate water savings through the identification and repair of leaks on large pipelines and aqueducts and better understand the nature of leaks on these facilities. As part of this project, three different acoustic technologies were evaluated and performed on approximately 90 miles of EBMUD's large pipelines and aqueducts. This project was completed in December 2010.

***PG&E Embedded Energy Study.*** In 2006, EBMUD began working with its local energy company, PG&E, to determine where energy efficiency could be improved. This study involves a review of pumping schedules and equipment for the water system.

***Water Budgets and Rate Structures Study.*** In 2007, EBMUD, in a collaborative effort, investigated the impact of water budgets and rate structures on water savings. This study found that by establishing and applying water budgets to properties based on irrigated area and plant water requirements, the water supplier can send an effective message to end users. Since water budgets are based on efficiency standards, over-watering can be identified and billed at a higher rate.

***California Single-Family Water Use Efficiency Study.*** In 2007, EBMUD was among ten water utilities in California that provided historic consumption data and supported data collection at selected study sites. Automated data recording technology and an analytic technique known as "flow trace analysis" was used to characterize the end uses of water within a representative sample of California homes. Findings were analyzed to benchmark water use efficiency relative to comparable studies and assess water conservation potential in California. In 2010-2011, EBMUD provided extensive review of draft study reports, findings, and recommendations. Release of a final report is pending at this time.

***Water Conservation through Automated Meter Reading (AMR) Systems.*** EBMUD began working on this project in 2006 after receiving grants from both USBR and DWR. The purpose of the project is to obtain water savings by providing customers web access to their real time water use, working with them to identify conservation opportunities, such as ET Controllers, and better evaluating the conservation benefit from these measures. This project was completed in December 2010. This project uses Advanced Metering Infrastructure (AMI) to collect real-time demand data from customer meters, which is then made available to customers via a secure website. This project uses fixed network AMI technology where the meter reading transmissions will be picked up by collector towers located within the vicinity of the meters, which will then transmit the meter reads to a centrally located computer server. The water usage data collected from the meter reads can then be accessed in graphical format via an EBMUD-supported Intranet connection where it will be shared with customers for their use in identifying water conservation opportunities. EBMUD water conservation staff will then work with these customers to identify water conservation strategies, such as fixing leaks, alternative irrigation techniques, and replacing older appliances with new higher efficiency models. EBMUD staff believes that this faster, more immediately available and customer-friendly data will facilitate water conservation.

***Weather Based Irrigation Controller (WBIC) Program and Study.*** In 2004, the California Department of Water Resources (DWR) awarded EBMUD and five northern California partnering agencies a \$1.6 million Proposition 13 Grant for the Northern California WBIC Grant Program. EBMUD served as lead agency in administering the DWR grant and reporting on the effort for northern California. EBMUD installed approximately 800 ET based controllers as part of the study that included an analysis of water savings. Self-adjusting irrigation timers have proven effective in pilot studies in reducing outdoor irrigation. A web-based database tracked implementation of the program and was used to help evaluate water savings and program cost-effectiveness. A report was issued in 2009 on the cost-effectiveness of the WBIC program and the estimated water savings.

***Potential Best Management Practices (PBMPs) Study.*** In 2007, EBMUD, in collaboration with other water providers in California completed an initial three year study of PBMPs for possible implementation as a BMP if they are economically reasonable. Three reports were prepared in which a total of 14 PBMPs were evaluated.

***WaterSmart Guidebook Project.*** In 2008, EBMUD produced a 242-page guidebook on end uses of water and water efficient hardware and processes in the commercial, industrial, and institutional sector. The purpose of the guidebook is to help developers be more water efficient by providing information and programs for new projects. The information may also be used by water provider staff to review water uses and hardware for water-efficiency at existing businesses. The WaterSmart Guidebook was placed on the EBMUD website for use by others. In addition, two-day training workshops on technical information provided in the guidebook are being offered.

***Urban Water Conservation Accomplishments Study.*** This 2008 study compiled the water conservation accomplishments of the 11 members of the California Urban Water Agencies (CUWA) representing over 23 million people. CUWA's members have invested hundreds of millions of dollars over four decades to diversify their water supply portfolios to reduce dependence on imported water and to develop balance, sustainable, and reliable water supplies.

***WaterSmart Certification and Recognition Program Marketing Plan.*** EBMUD is seeking to enhance its WaterSmart conservation services brand and water savings through the development of a WaterSmart Certification and Recognition Program targeting non-residential customers (businesses, industry, and institutions). The Program rewards organizations for implementing water-savings strategies and achieving established community-wide benchmarks for their water conservation efforts by providing visible, third-party recognition of those efforts. This effort included an assessment of market interest, potential program participants and partners, and a comprehensive Strategic Marketing and Implementation Plan.

***Plan Review Pilot Study.*** In 2009, EBMUD began a one year plan review for water use efficiency for new construction projects. The one year pilot program will also include an evaluation of both water savings and the cooperation between EBMUD and planning agencies. As a precursor to the pilot program, a 242-page guidebook was developed, titled *WaterSmart Guidebook*, on water end uses and water efficient technology in the commercial, industrial, and institutional sector to be use as a resource guide in the plan review process. One important goal of the pilot program is to communicate the plan review requirements to project developers as early in the planning process as possible. A report will be issued in 2010 on the results of the pilot program.

***Irrigation Controller Study.*** In 2009, EBMUD, in a collaborative effort, initiated a study to determine testing standards to evaluate irrigation controllers for water-efficiency. The Center of Irrigation Technology in Fresno was retained to conduct the testing. This study will allow for an easy review of controller features by water providers to help promote the products that have features needed for the most efficient management of an automatic irrigation system

***Subsurface Irrigation Study.*** EBMUD provided in-kind services in 2008-2009 for a study on the water-efficiency effectiveness of subsurface irrigation systems conducted by U.C. Berkeley on large lawn areas on its campus. Early results indicate that there has been no observable water savings with the use of subsurface drip systems..

***Water System Optimization through the Development of an Advanced Metering Infrastructure (AMI) Implementation Plan.*** This study will include the investigation of all potential costs and benefits of an Advanced Metering Infrastructure (AMI) system to improve EBMUD's operational efficiency and the water efficiency of its customers. This investigation will serve as an example for other similar small, medium, and large water utilities to follow. The study will include the development of a comprehensive implementation plan for a full AMI system deployment across more than 380,000 customer accounts and more than 400,000 meters

***Customer (Efficiency) Opinion Research.*** Quantitative research to evaluate how EBMUD's 2008-2009 drought campaign and the evolving statewide water picture have modified customers' feelings toward water use restrictions, their opinions regarding their personal efforts to conserve, and their sense of responsibility for achieving water use reductions. Conducting this additional research through surveys, focus groups, and facilitated meetings will enable EBMUD to evaluate attitudinal changes among its 1.4 million customers and to build the most cost-effective and efficient long-term customer conservation program and strategies.

***Fixed Network Acoustic Leak Detection.*** This project involves the installation and testing of approximately 100 fixed network acoustic leak detection technology "loggers" in Danville, California in an area known as "Blackhawk." These acoustic logging devices will identify leaks on pipes and provide early detection of pipeline leaks before they become main failures. EBMUD will receive daily signals from these devices via fixed network Advanced Metering Infrastructure (AMI) installed in the Danville area. EBMUD has previously received grants from USBR to install the

AMI system in Blackhawk and to install approximately 1,000 acoustic loggers in the City of Berkeley using a mobile network collection system. This new approach will not only improve the response time to leaks in Blackhawk area, but also help establish the methodology to potentially utilize this new and developing technology throughout the EBMUD service area as well as in other comparable Western State water utilities.

***GIS-Based Landscape Water Budget Calculator.*** This project involves developing an automated landscape water budget tool to assist customers in meeting the recently enacted Maximum Allowable Water Allowance (MAWA) within the California Model Water Efficient Landscape Ordinance. Currently EBMUD has calculated more than 5,000 water budgets for its irrigation accounts, and more than 3,200 of those accounts receive budget information printed on their water bills. The water budget information is in a plain text format that is difficult for the customer to see. The proposed water budget report will automate the presentation of the target water efficiency levels along with estimated water bill savings for residential and non-residential accounts.

***California Public Utilities Commission (CPUC) Water Profile Study.*** In 2010, EBMUD supported a research effort to better understand the linkage between water use and energy demands. The study was managed for the CPUC by the California Institute for Energy and the Environment. EBMUD provided data for study sites and coordinated installation of automatic data recording instruments at multi-family, institutional, and industrial sites. The research aimed to determine to what extent it may be possible to impact the energy demands from municipal water agencies by means of altering the volumes and timing of water demands from their retail customers. The final report study is pending.

***Water Savings Evaluation Study.*** EBMUD estimates water conservation savings resulting from a variety of water conservation measures. A computer program is used to analyze water savings based on customer pre- and post-intervention water use. That estimate is normalized for the effect of weather and natural replacement rates. This program is best suited for analyzing water savings in the residential sector where use is affected by fewer variables than in the non-residential sector, which is affected also by production changes and economic impacts. The savings are reported in a "*Water Savings Analysis Report*" that is updated bi-annually.

## APPENDIX J. GLOSSARY

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## APPENDIX J. GLOSSARY

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### J-1.ACRONYMNS

ABAG	ASSOCIATION OF BAY AREA GOVERNMENTS
ACT	URBAN WATER MANAGEMENT PLANNING ACT
ACWD	ALAMEDA COUNTY WATER DISTRICT
AF	ACRE-FEET
AFY	ACRE-FEET PER YEAR
AMI	ADVANCED METERING INFRASTRUCTURE
AMR	AUTOMATED METER READING
ARB	AMERICAN RIVER BASIN
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AWWA	AMERICAN WATER WORKS ASSOCIATION
AWWARF	AMERICAN WATER WORKS ASSOCIATION FOUNDATION
BACWA	BAY AREA CLEAN WATER AGENCIES
BARDP	BAY AREA REGIONAL DESALINATION PROJECT
BARWRP	SAN FRANCISCO BAY AREA REGIONAL WATER RECYCLING PROGRAM
BAWAC	BAY AREA WATER AGENCIES COALITION
BCC	BUSINESS CLASSIFICATION CODE
BGS	BELOW GROUND SURFACE
BMPS	BEST MANAGEMENT PRACTICES
CALFED	CALFED BAY-DELTA PROGRAM
CAP	CUSTOMER ASSISTANCE PROGRAM
CCF	HUNDRED (CENTI-) CUBIC FEET
CCWD	CONTRA COSTA WATER DISTRICT
CDCP	CALIFORNIA DROUGHT CONTINGENCY PLAN
CDFG	CALIFORNIA DEPARTMENT OF FISH AND GAME
CDPH	CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
CENT	CENTRAL
CENTRAL SAN	CENTRAL CONTRA COSTA SANITARY DISTRICT
CII	COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL
CIMIS	CALIFORNIA IRRIGATION MANAGEMENT INFORMATION SYSTEM
CIS	CUSTOMER INFORMATION SYSTEM
CONTINGENCY PLAN	URBAN WATER SHORTAGE CONTINGENCY PLAN
CREAT	CLIMATE RESILIENCE EVALUATION AND ASSESSMENT TOOL
CUWA	CALIFORNIA URBAN WATER AGENCIES

<b>CUWCC</b>	CALIFORNIA URBAN WATER CONSERVATION COUNCIL
<b>CVP</b>	CENTRAL VALLEY PROJECT
<b>CYES</b>	CALIFORNIA YOUTH ENERGY SERVICES
<b>DCP</b>	DROUGHT COMMUNICATION PLAN
<b>DELTA</b>	SACRAMENTO-SAN JOAQUIN RIVER DELTA
<b>DERWA</b>	DSRSD-EBMUD RECYCLED WATER AUTHORITY
<b>DMAC</b>	DEMAND MANAGEMENT ADVISORY COMMITTEE
<b>DMP</b>	DROUGHT MANAGEMENT PROGRAM
<b>DSOD</b>	CALIFORNIA DIVISION OF SAFETY OF DAMS
<b>DSRSD</b>	DUBLIN SAN RAMON SERVICES DISTRICT
<b>DWR</b>	DEPARTMENT OF WATER RESOURCES
<b>EB</b>	ENVIRONMENTAL BENEFITS
<b>EBMUD</b>	EAST BAY MUNICIPAL UTILITY DISTRICT
<b>EBMUDSIM</b>	EBMUD RESERVOIR OPERATIONS PLANNING MODEL
<b>EBRWP</b>	EAST BAYSHORE RECYCLED WATER PROJECT
<b>EIR</b>	ENVIRONMENTAL IMPACT REPORT
<b>EOH</b>	EAST-OF-HILLS
<b>EOP</b>	EMERGENCY OPERATIONS PLAN
<b>EOT</b>	EMERGENCY OPERATIONS TEAM
<b>EPA</b>	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
<b>ESF</b>	EMERGENCY SUPPORT FUNCTIONS
<b>ET</b>	EVAPOTRANSPIRATION
<b>FERC</b>	FEDERAL ENERGY REGULATORY COMMISSION
<b>FORUM</b>	MOKELUMNE RIVER FORUM
<b>FRWA</b>	FREEMPORT REGIONAL WATER AUTHORITY
<b>FRWP</b>	FREEMPORT REGIONAL WATER PROJECT
<b>FSTC</b>	FOOD SERVICE TECHNOLOGY CENTER
<b>FY</b>	FISCAL YEAR
<b>GIS</b>	GEOGRAPHIC INFORMATION SYSTEM
<b>GMP</b>	GROUNDWATER MANAGEMENT PLAN
<b>GPCD</b>	GALLONS PER CAPITA PER DAY
<b>GPD</b>	GALLONS PER DAY
<b>GPF</b>	GALLONS PER FLUSH
<b>HAYWARD</b>	CITY OF HAYWARD
<b>HET</b>	HIGH-EFFICIENCY TOILET
<b>HEU</b>	HIGH-EFFICIENCY URINAL
<b>HOA</b>	HOMEOWNERS ASSOCIATION
<b>INTERTIE PROJECT</b>	SFPUC-HAYWARD-EBMUD INTERTIE PROJECT

<b>IRCUP</b>	MOKELUMNE RIVER INTER-REGIONAL CONJUNCTIVE USE PROJECT
<b>IRIS</b>	IRRIGATION REDUCTION INFORMATION SYSTEM
<b>IRWMP</b>	INTEGRATED REGIONAL WATER MANAGEMENT PLAN
<b>JSA</b>	1998 JOINT SETTLEMENT AGREEMENT
<b>KM</b>	KILOMETER
<b>KWH</b>	KILOWATT HOURS
<b>LAC</b>	LANDSCAPE ADVISORY COMMITTEE
<b>LADWP</b>	LOS ANGELES DEPARTMENT OF WATER AND POWER
<b>LAFCOS</b>	LOCAL AGENCY FORMATION COMMISSIONS
<b>LAWU</b>	LANDSCAPED AREA WATER USE
<b>LTRC</b>	LONG TERM RENEWAL CONTRACT
<b>LUDS</b>	LAND USE UNIT DEMANDS
<b>MAWA</b>	MAXIMUM APPLIED WATER ALLOWANCE
<b>MCL</b>	MAXIMUM CONTAMINANT LEVEL
<b>MF</b>	MULTI-FAMILY
<b>MG</b>	MILLION GALLONS
<b>MGD</b>	MILLION GALLONS PER DAY
<b>M&amp;I</b>	MUNICIPAL AND INDUSTRIAL
<b>MOU</b>	MEMORANDUM OF UNDERSTANDING
<b>MSL</b>	MEAN SEA LEVEL
<b>MUD</b>	MUNICIPAL UTILITY DISTRICT
<b>MW</b>	MEGAWATT
<b>MWELO</b>	STATE MODEL WATER-EFFICIENT LANDSCAPE ORDINANCE
<b>MWWTP</b>	EBMUD'S MAIN WASTEWATER TREATMENT PLANT
<b>NCGWB</b>	NILES CONE GROUNDWATER BASIN
<b>NEBIGSM</b>	NILES CONE AND SOUTH EAST BAY PLAIN INTEGRATED GROUNDWATER AND SURFACE WATER MODEL
<b>NIMS</b>	NATIONAL INCIDENT MANAGEMENT SYSTEM
<b>NPDES</b>	NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
<b>NRWRP</b>	NORTH RICHMOND WATER RECLAMATION PLANT
<b>PBMPS</b>	POTENTIAL BEST MANAGEMENT PRACTICES
<b>PFMA</b>	POTENTIAL FAILURE MODE ANALYSIS
<b>PG&amp;E</b>	PACIFIC GAS AND ELECTRIC COMPANY
<b>PH&amp;S</b>	PUBLIC HEALTH AND SAFETY
<b>PHG</b>	PUBLIC HEALTH GOAL
<b>R&amp;E</b>	RESEARCH AND EVALUATION
<b>RARE</b>	RICHMOND ADVANCED RECYCLED EXPANSION WATER PROJECT
<b>REOC</b>	REGIONAL OPERATIONS CENTER
<b>RWQCBS</b>	CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

<b>RWTP</b>	RECYCLED WATER TRUCK PROGRAM
<b>SBX7-7</b>	SENATE BILL NO. 7
<b>SCVWD</b>	SANTA CLARA VALLEY WATER DISTRICT
<b>SCWA</b>	SACRAMENTO COUNTY WATER AGENCY
<b>SD-1</b>	SPECIAL DISTRICT NO. 1
<b>SEMS</b>	CALIFORNIA STANDARDIZED EMERGENCY MANAGEMENT SYSTEM
<b>SEPS</b>	SECURITY AND EMERGENCY PREPAREDNESS SECTION
<b>SFPUC</b>	SAN FRANCISCO PUBLIC UTILITIES COMMISSION
<b>SFR</b>	SINGLE-FAMILY RESIDENTIAL
<b>SLRF</b>	SAN LEANDRO RECLAMATION FACILITY
<b>SOC</b>	STATE OPERATIONS CENTER
<b>SOI</b>	SPHERE OF INFLUENCE
<b>SQ. FT.</b>	SQUARE FEET
<b>SRVRWP</b>	SAN RAMON VALLEY RECYCLED WATER PROGRAM
<b>SWRCB</b>	STATE WATER RESOURCES CONTROL BOARD
<b>TAF</b>	THOUSAND ACRE-FEET
<b>TDS</b>	TOTAL DISSOLVED SOLIDS
<b>THELMA</b>	THE HIGH-EFFICIENCY LAUNDRY METERING AND MARKETING ANALYSIS
<b>TM2</b>	TARGET METHOD #2
<b>ULFT</b>	ULTRA LOW-FLOW TOILET
<b>UMRWA</b>	UPPER MOKELUMNE RIVER WATERSHED AUTHORITY
<b>USB</b>	ULTIMATE SERVICE BOUNDARY
<b>USBR</b>	UNITED STATES BUREAU OF RECLAMATION
<b>USEPA</b>	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
<b>USFWS</b>	US FISH AND WILDLIFE SERVICE
<b>UWMP</b>	URBAN WATER MANAGEMENT PLAN
<b>WARN</b>	WATER AGENCY RESPONSE NETWORK
<b>WATER</b>	WATER AWARENESS THROUGH EDUCATION AND RESEARCH
<b>WBIC</b>	WEATHER BASED IRRIGATION CONTROLLER
<b>WCMP</b>	WATER CONSERVATION MASTER PLAN
<b>WCWD</b>	WEST COUNTY WASTEWATER DISTRICT
<b>WOH</b>	WEST-OF-HILLS
<b>WPCP</b>	WATER POLLUTION CONTROL PLANT
<b>WRDA</b>	FEDERAL WATER RESOURCES DEVELOPMENT ACT
<b>WTP</b>	WATER TREATMENT PLANT
<b>WTTIP</b>	WATER TREATMENT AND TRANSMISSION IMPROVEMENTS PROGRAM

**J-2. SELECTED DEFINED TERMS**

<b>BEST MANAGEMENT PRACTICES</b>	A POLICY, PROGRAM, PRACTICE, RULE, REGULATION OR ORDINANCE, OR THE USE OF DEVICES, EQUIPMENT OR FACILITIES THAT RESULTS IN THE EFFICIENT USE OR CONSERVATION OF WATER AS AN ESTABLISHED AND GENERALLY ACCEPTED PRACTICE AMONG WATER SUPPLIERS
<b>CONSUMPTION</b>	METERED WATER-USE BY CUSTOMERS
<b>DEMAND OR TOTAL DEMAND</b>	QUANTITY OF TREATED WATER DELIVERED TO THE DISTRIBUTION SYSTEM, INTERCHANGEABLE TERM WITH SYSTEM DEMAND
<b>DROUGHT PLANNING SEQUENCE</b>	THREE YEAR HYDROLOGY SEQUENCE REPRESENTING A WORST CASE DROUGHT SCENARIO DERIVED FROM HISTORICAL RECORD
<b>EAST-OF-HILLS</b>	EBMUD'S SERVICE AREA REGION EAST OF THE OAKLAND-BERKELEY HILLS RIDGE
<b>EBMUD SPHERE OF INFLUENCE</b>	DEFINES THE AREA THAT CAN BE SERVED BY EBMUD, AS DEFINED BY THE LOCAL AGENCY FORMATION COMMISSIONS OF ALAMEDA AND CONTRA COSTA COUNTIES
<b>EBMUD ULTIMATE SERVICE BOUNDARY</b>	A BOUNDARY DEFINED BY EBMUD TO DEFINE ITS LIMITS OF FUTURE ANNEXATION FOR EXTENSION OF WATER SERVICE
<b>INTERIM LEVEL OF DEMAND</b>	TEMPORARILY SUPPRESSED DEMAND LEVEL BELOW THE PLANNING LEVEL OF DEMAND THAT IS ANTICIPATED DURING THE RECOVERY PERIOD TO 2020 AS A RESULT OF RESIDUAL RATIONING EFFECT OF THE RECENTLY ENDED 2007-2010 DROUGHT MANAGEMENT PROGRAM AND FROM THE ECONOMIC DOWNTURN
<b>LOWER INCOME HOUSEHOLDS</b>	PERSONS AND FAMILIES WHOSE INCOME DOES NOT EXCEED QUALIFYING LIMITS FOR LOWER INCOME FAMILIES AS DEFINED IN SECTION 50079.5 OF THE HEALTH AND SAFETY CODE. THE INCOME LIMITS FOR LOWER INCOME HOUSEHOLDS IS AT 80 PERCENT OF THE AREA MEDIAN INCOME, ADJUSTED FOR FAMILY SIZE
<b>PLANNING LEVEL OF DEMAND</b>	THE ADJUSTED DEMAND FOR PLANNING PURPOSES AFTER APPLYING CUMULATIVE CONSERVATION AND CUMULATIVE RECYCLED WATER SAVINGS ACHIEVED SINCE IMPLEMENTATION OF THE 1994 WATER CONSERVATION MASTER PLAN. PLANNING LEVEL OF DEMAND ALSO REPRESENTS PROJECTED SYSTEM DEMAND
<b>SYSTEM DEMAND</b>	QUANTITY OF TREATED WATER DELIVERED TO THE DISTRIBUTION SYSTEM, INTERCHANGEABLE TERM WITH DEMAND OR TOTAL DEMAND
<b>WEST-OF-HILLS</b>	EBMUD'S SERVICE AREA REGION WEST OF THE OAKLAND-BERKELEY HILLS RIDGE

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