MID-PENINSULA WATER DISTRICT

URBAN WATER MANAGEMENT PLAN

2006 – 2010

DECEMBER 2005

BOARD OF DIRECTORS:

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REPORT BY:

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URBAN WATER MANAGEMENT PLAN

INCLUDING A

WATER SHORTAGE CONTINGENCY PLAN

2006 - 2010

Mid-Peninsula Water District
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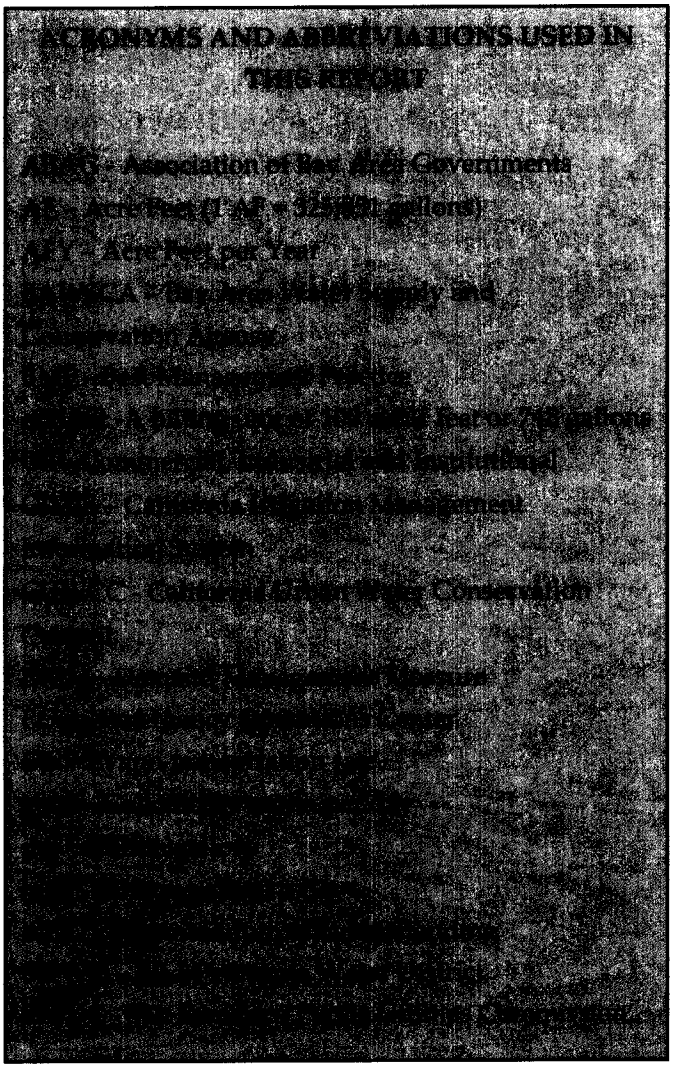
I. INTRODUCTION

This report has been prepared in compliance with the Urban Water Management Planning Act, as amended.[1] It updates the Mid-Peninsula Water District's existing *Urban Water Management Plan.*[2]

This is the fourth *Urban Water Management Plan* to be prepared by the District under the terms of AB 797 (1983) and subsequent amending legislation. This Plan also includes a *Water Shortage Contingency Plan* as required under the provisions of AB 11X of (1991) and addresses changes required by subsequent legislation including AB 892 (1993), SB 1017 (1994), AB 2853 (1994), SB 901 (1995), SB 610 (2001), SB 221 (2001) and AB 105 (2004). The Plan also incorporates the water conservation initiatives that the District has adopted under the terms of the *Memorandum of Understanding Regarding Urban Water Conservation in California,* to which the District is a signatory.



This Plan will be presented to the Water District's Board of Directors for review and adoption. Once adopted it will supersede the existing plan prepared in 2000. It will be filed with the Water Efficiency Office in the Department of Water Resources, as required by law, and will be used by the District staff during the current five-year planning cycle. As required by §10621 (a) of the Water Code, the District will update the Plan again by December 2010.

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[1]California Water Code, Division 6, Part 2.6; §10610, et. seq. Established by Assembly Bill 797 (1983),
[2]Mid-Peninsula Water District, *Urban Water Management Plan,* adopted December 2000.

II. PUBLIC PARTICIPATION AND INTERAGENCY COORDINATION

A. PUBLIC PARTICIPATION

The Mid-Peninsula Water District has encouraged community participation in its urban water management planning efforts since the first Plan was adopted in 1990. The District provided a notice of preparation of this *Urban Water Management Plan* to all customers through a printed message on their water bills in the summer of 2005. In December, 2005 the District will convene a public hearing at its office in Belmont to receive comments on the Plan prior to its final adoption by the Board of Directors and submittal to the California Department of Water Resources.

B. INTERAGENCY COORDINATION

The Water District is a member of BAWSCA, the Bay Area Water Supply and Conservation Agency and participates in a number of the regional water conservation initiatives coordinated by BAWSCA. Most land use planning and development approvals within the Water District's boundaries are the responsibility of the City of Belmont. The City of San Carlos and San Mateo County also have planning authority over small portions of the District's territory.[1] Wastewater treatment is provided by the South Bayside System Authority in Redwood City. Fire suppression services are provided by the South County Fire Authority. The coordination with these agencies is summarized in Table 1.

[1] The District has a single irrigation connection in the City of Redwood City and a single irrigation connection in the City of San Mateo. For purposes of this report these cities are classified as customers; they have not been contacted for assistance or coordination, nor have they been sent copies of the Draft Plan.

TABLE 1

COORDINATION AND PUBLIC INVOLVEMENT

Agency	Was contacted for Assistance	Was sent a copy of the Draft Plan	Was sent a Notice of Intention to Adopt
BAWSCA	✔	✔	✔
City of Belmont	✔	✔	✔
City of San Carlos		✔	✔
San Mateo County		✔	✔
South Bayside System Authority	✔	✔	✔
South County Fire Authority		✔	✔

III. DESCRIPTION OF THE MID-PENINSULA WATER DISTRICT[1]

A. LOCATION AND SIZE

The Mid-Peninsula Water District is located in east central San Mateo County on the San Francisco Peninsula about 30 miles south of San Francisco. It serves the City of Belmont and portions of the City of San Carlos and an unincorporated County area, covering an area of about 5 square miles. Figure 1 is a map of the District highlighting the District boundaries.

The District was formed in 1929 under the County Water District Act of California. When formed, the District consolidated the operations of seven small water systems serving about 320 customers. In the 1930's the District contracted with the San Francisco Water Department to purchase water from the newly built Hetchy Hetchy water project, eliminating local dependence on small, unreliable wells and gaining a more secure, reliable and expandable source of supply.

Like most of the Bay Area, the District experienced rapid growth following World War II. The 1950's and 1960's saw both population and housing growth and increased water demand. The rate of growth in the area served by the District tapered off dramatically in the 1970's and has remained low over the past 25 years.

B. CLIMATE

The Belmont area has a semi-arid Mediterranean climate typified by moderate to warm summers and mild winters. The warmest months of the year are August and September, and the coldest are December and January. As shown in Table 2, the average daily maximum temperature in September at the nearby San Mateo weather monitoring station is 78.0°, while the average minimum temperature in January is 41.7°.

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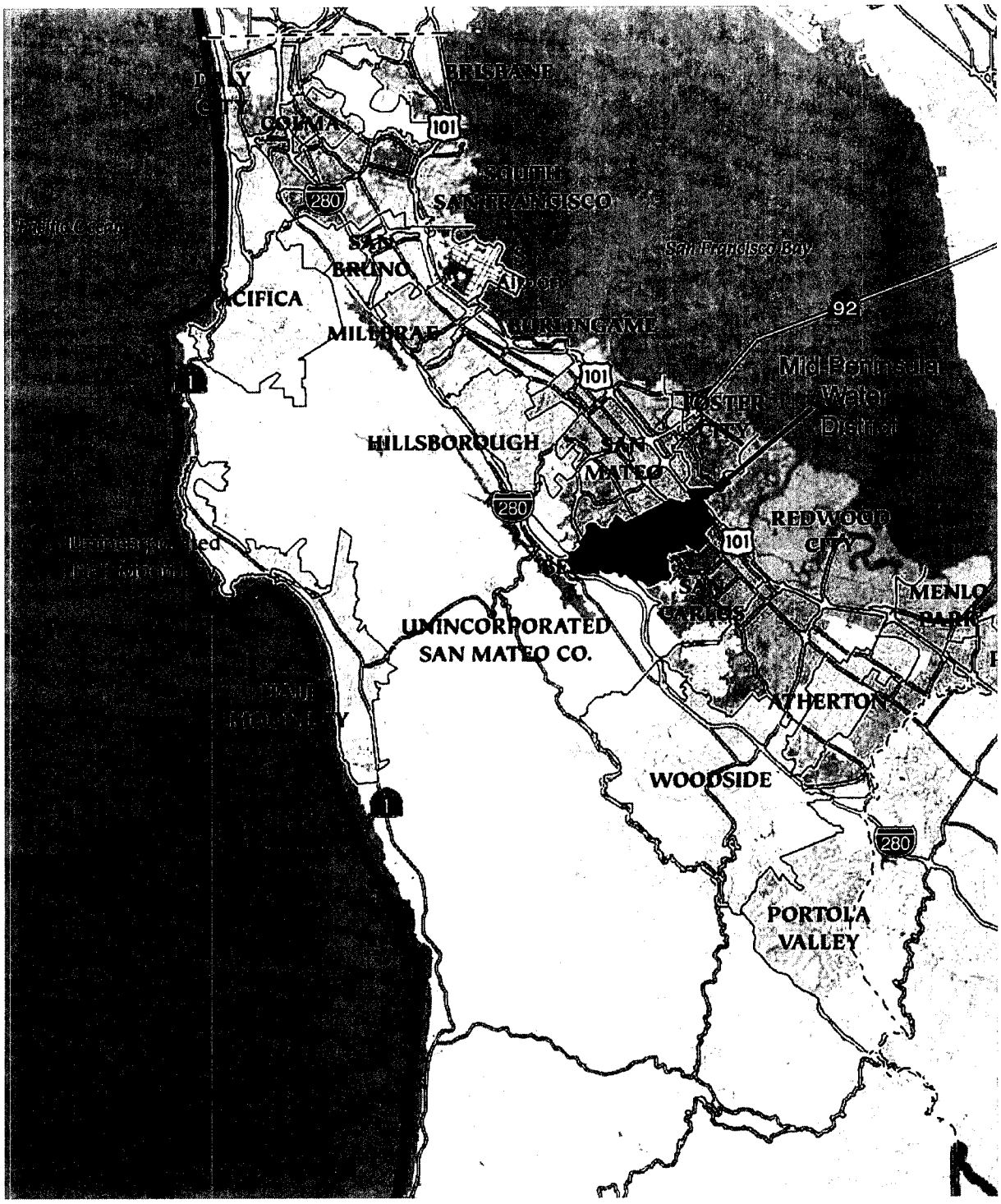
[1]Until July 2000 the Mid-Peninsula Water District was know as the Belmont County Water District.

DISTRICT LOCATION

FIGURE 1



Base Map: ABAG

STREET MAP SHOWING DISTRICT BOUNDARIES

FIGURE 2

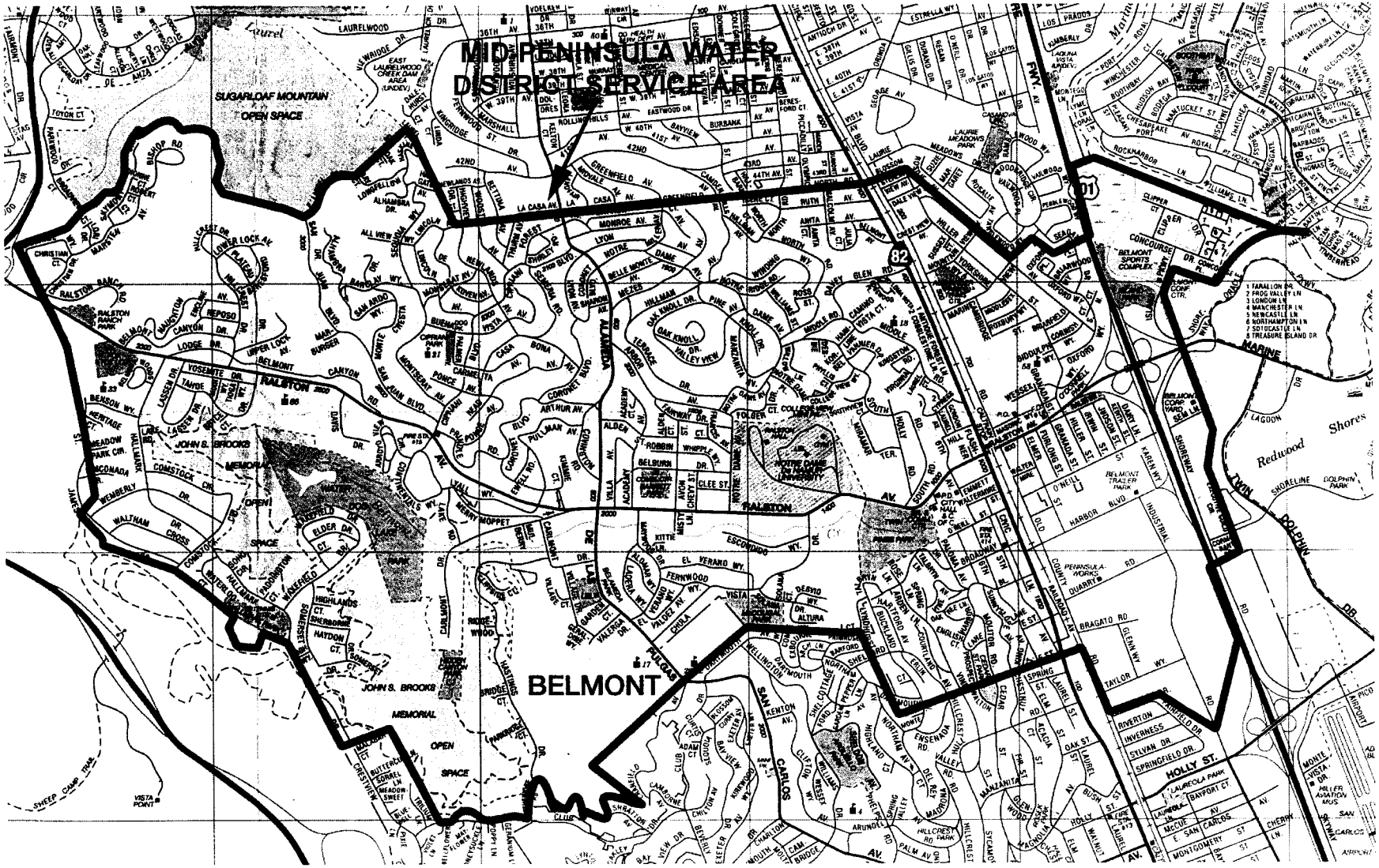


TABLE 2 MID-PENINSULA WATER DISTRICT CLIMATE DATA							
	January	February	March	April	May	June	July
Standard Average Eto (in./mo.)	1.55	1.96	3.56	4.80	5.74	6.30	6.51
Average Rainfall (in.)	4.37	2.65	2.47	1.49	0.40	0.11	0.05
Average Max. Temperature (°F)	57.8	61.7	63.7	66.7	70.1	74.2	76.8

	August	September	October	November	December	Annual
Standard Average Eto (in./mo.)	5.89	4.65	3.41	2.10	1.40	47.8
Average Rainfall (in)	0.06	0.18	0.98	2.49	43.52	18.77
Average Max. Temperature	77.0	78.0	73.2	65.6	58.4	68.6

Eto (EvapoTranspiration) rates in inches/month from California Irrigation Management System (CIMIS) reference Evapotranspiration Zones Map; averaged for Zone 3 (Coastal Valleys and Plains) and Zone 8 (Inland San Francisco Bay Area with some marine influence).

Rainfall and temperature data for San Mateo monitoring station, from Western Regional Climate Center; 1948-2004.

The average annual precipitation is 18.77 inches, virtually all of which is rainfall, with about 90 percent falling between November and April. Rainfall amounts vary widely from year to year, with a low of 11.16 inches in 1953 and a high of 29.77 inches in 1973.

The District is located on the eastern slopes of the coastal mountains overlooking San Francisco Bay, and features hilly terrain, with elevations ranging from sea level to almost 900 feet. As a result, the service area is located where two reference evapotranspiration zones blend together; the District's

winters are warmer than most of the Inland San Francisco Bay zone (Zone 8) while the summers are warmer than typical for the Coastal Valleys and Plains zone (Zone 3). The Eto Rates shown in Table 2 are an average of the rates for both zones.

C. DEMOGRAPHY

The population of the District was estimated at 25,460 in 2000. This includes all of the Belmont Sphere of Influence area (25,287 people) plus about 130 residents of San Carlos.[1]

Belmont is primarily residential, although there are significant commercial, institutional and industrial sectors to the local economy. According to ABAG, there are currently about 12,470 employed residents in Belmont while the City has an employment base of 8,190 jobs.[2] The Mid-Peninsula Water District also serves unincorporated Harbor Bay industrial area plus 32 commercial and 18 industrial customers in the City of San Carlos, so the actual number of employees served by the District is larger than the ABAG job projection for Belmont alone.

The population of the area served by the District has grown slowly in recent years. Between the 1990 and 2000, the population grew by about 626 people, an increase of only 2.5% over 10 years or 0.025% per year. During the same period, employment within the District decreased by a substantial amount – in 1990 the City of Belmont had an estimated 12,160 jobs, but by 2000 the number of jobs had dropped by 26%, to 8,950. ABAG does not project the number of jobs to rebound to their 1990 level before 2025.

Despite the recent slow growth and shortage of easily developed land, ABAG expects that the population of Belmont will grow by 12.9% over the next 25 years. The number of households, which is sometimes an indicator of changes in the number of water connections, is projected to increase by 12.5%, representing 1,340 new households by 2030. The population projections are summarized in Table 3. As indicated, ABAG projects that Belmont will grow from 25,500 to 28,800,

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[1]Association of Bay Area Governments (ABAG), *Projections 2005*, pp. 194, The District's 56 residential connections in San Carlos represent an estimated population of 130 people, based on ABAG's estimate of 2.36 persons per household.

[2]Ibid., pp. 198, 199.

between 2005 and 2030. The population of the area in San Carlos served by the District is expected to be stable, varying only in proportion to expected changes in persons per household. Overall population in the District is expected to grow at an average rate of about 0.5% per year in the next 25 years. ABAG expects that the rate of growth will be somewhat lower in the next decade, increasing after 2015.

TABLE 3
POPULATION PROJECTIONS
Mid-Peninsula Water District Service Area

Total Population	2005	2010	2015	2020	2025	2030
Belmont	25,500	26,000	26,700	27,500	28,100	28,800
San Carlos area	130	130	130	130	130	130
Total District Population	25,630	26,130	26,830	27,630	28,230	28,930

Source: ABAG, *Projections 2005*, pp. 194. Includes all of the Belmont Sphere of Influence area plus 56 residential connections in San Carlos.

At the beginning of 2005, the Water District had 7,981 service connections of which 93% were residential services. Over the next 25 years it is expected that the District will add connections at a rate that is generally proportional to the projected rate of growth, or approximately 54 new connections a year.

D. WATER SUPPLY FACILITIES

The District purchases all of its water from the San Francisco Public Utilities Commission (SFPUC). The SFPUC water is delivered to the District in two ways: via a 20-inch water transmission pipeline that is connected to the SFPUC system in Redwood City and via a 24-inch pipeline connected to a pump station on the SFPUC watershed property near the Pulgas Water Temple. Water from the regional system[1] is treated before delivery to the District.

The District operates and maintains a complex distribution system that includes 9 pressure zones, 19 pumps, 10 water tanks, 20 water regulating valves, 790 fire hydrants and 94 miles of water mains. The District has the ability to transfer water between pressure zones either in a pump up or flow down mode. The District also has redundancy built into the distribution system so that it can, if necessary, supply all customers from either one of the San Francisco Public Utilities Commission connections.

E. SUPPLY YIELDS

1. THE HETCH HETCHY SYSTEM

Since its formation in 1930 the District has obtained all of its water through wholesale purchases from the San Francisco Public Utilities Commission's (SFPUC) regional system. This supply is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The Mid-Peninsula Water District is one of 28 "suburban" wholesale purchasers of water from the SFPUC. The suburban purchasers, which include water districts, cities, and water companies, distribute the water to customers within their respective service areas in San Mateo, Santa Clara and Alameda counties.

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[1] In this report the terms "Hetch Hetchy System" and "Regional System" are used interchangeably and are intended to refer to the entire SFPUC system.

The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

The contractually assured supply for Mid-Peninsula from the San Francisco Public Utilities Commission is 3.89 mgd, equivalent to 1,420 mg a year or 4,357 acre-feet a year.

2. Other Sources of Supply

SurfaceWater. The Mid-Peninsula Water District's only viable supply source, at the current time, is the San Francisco Water Department's Hetch Hetchy System. None of the local streams produce sufficient quantity of water to be a viable source of supply, and no potential diversion and storage projects have been identified.

Groundwater. Local ground water resources are not considered to be adequate quality or quantity to be a viable augmenting resource, and have not been developed as a source of supply for the District.

Recycled Water. Recycled water is available at the South Bayside Systems Authority treatment plant, located a short distance south of the San Mateo Bridge. However, past engineering studies have determined that it would not be financially feasible to construct a transmission system to transport the reclaimed water to the Belmont area. It is not expected that recycled water will become available within the District's boundaries in the foreseeable future. See Chapter VI,D below, for further details.

Desalination. The Mid-Peninsula Water District does not have an existing or planned program to develop or distribute any desalinated water.

F. RELIABILITY OF SUPPLY

1. CURRENT CONTRACTUAL ASSURANCES

In 1984 the Mid-Peninsula Water District, (then *Belmont County Water District*) along with the 29 other suburban water suppliers, signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in June 2009, provide for a 184 million gallons a day (mgd, expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers collectively. Mid-Peninsula's individual Supply Assurance is 3.89 mgd (or approximately 4,357 acre feet per year). Although the Master Contract and accompanying Water Supply Contract expire in 2009, the Supply Assurance (which quantified San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

The SFPUC can meet the demands of its retail and wholesale customers in years of average and above-average precipitation. The Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an Interim Water Shortage Allocation Plan in 2000 to address the allocation of water between San Francisco and wholesale customers in aggregate and among individual wholesale customers during water shortages of up to 20% of system-wide use. This plan, which also expires in June 2009, is described in more detail in Appendix A.

As noted above and in Table 4, below, the District's contractually based assured supply in years of normal or above-normal precipitation is 4,357.4 AFY (3.89 mgd). The current constrained supply, developed under the terms of the Interim Water Shortage Allocation Plan is estimated to be about 3,069.2 AFY. The constrained yield is defined as the maximum amount of water that can reasonably be expected to be available for Mid-Peninsula during periods of severe drought such as occurred in 1989 - 91. The estimated constrained yield is based on the calculations by BAWSCA of the District's fair share of reductions that would have to be spread among all of the Suburban users. Using

formulas set out in the Interim Water Shortage Allocation Plan, the District would have an adjusted purchase cutback of 22.55% from its assured supply. Currently, the District's demand is not as great as its contractual assurance. Therefore the proportional cutback, relative to 2004 demand, would be somewhat higher, at 22.75%.

TABLE 4
ESTIMATED ANNUAL SUPPLY LIMITS
BASED ON SFPUC CONTRACTUAL ASSURANCE

Supply Source	Estimated Annual Maximum Supply	
	Constained Yield[a]	Normal Yield[a]
San Francisco Public Utilities Commission	3,069.2 AFY[c]	4,357.4 AFY[d]

[a] Supplies would typically be constrained in single or multiple years of below-normal precipitation.
[a] Normal yields typically are available in years of normal or above-normal precipitation.
[c] Based on BAWSCA/SFPUC sample calculations of purchase cutbacks required in years 2 and 3 of a multiple dry year scenario, under the Interim Water Shortage Allocation Plan, assuming 2005 purchase requests.
[d] SFPUC contractual allocation to the District (3.89 mgd).

Under the *Interim Water Shortage Allocation Plan*, BAWSCA members have agreed to allocate water available to suburban purchasers in the event of SFPUC reductions during drought, maintenance or scheduled maintenance under a formula that considers both Supply Assurances and actual wholesale purchases on a three-year rolling average. The currently projected Mid-Peninsula deliveries for single and multiple dry year scenarios under the SFPUC/BAWSCA agreements are described in Chapter IV, below.

3. Regional Water System Improvement Program

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

improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to its customers in a reliable, affordable and environmentally sustainable manner, far into the future.

The origins of the WSIP are rooted in the *Water Supply Master Plan.*[1] Planning efforts for the WSIP gained momentum in 2002 with the passage of San Francisco ballot measures Propositions A and E, which approved the financing for the water system improvements. Also in 2002, Governor Davis approved Assembly Bill No. 1823, the Wholesale Regional Water System Security and Reliability Act. The WSIP is expected to be completed in 2016, at a total cost estimated at $4.2 billion. It includes 38 major capital improvement projects, most of which are focused on improving seismic safety and delivery reliability.

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

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

G. EXCHANGES WITH OTHER AGENCIES

As a wholesale customer of the San Francisco PUC, the MPWD is directly connected to San Francisco's huge Hetch Hetchy system. As noted above, the District's water transmission system is connected with the San Francisco system at two points. There is a low elevation connection in Redwood City and a high elevation connection in the vicinity of the Pulgas Water Temple.

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[1] SPPUC/BAWUA, *Water Supply Master Plan,* April 2000.

In addition, the District has interties with four adjoining water systems. There are separate connections with the Redwood City system, the Foster City system, and the California Water Service Company systems serving San Mateo (2 connections) and San Carlos (also 2 connections).

The interties with Redwood City, Foster City and California Water Service, and the water exchanges that do occur between these systems, are neither a current nor planned source of water supply for the District. The interconnections are used to manage existing supplies, and also provide potential emergency back-up sources of water. As described below, the District also maintains a large volume of water in storage for potential emergency use.

The Draft Interim Water Shortage Allocation Plan allows voluntary transfers of water shortage allocations between the SFPUC and Suburban Purchasers or among Suburban Purchasers, including Redwood City and California Water Service. During water shortage conditions, the SFPUC will create a bank account for itself and each Suburban Purchaser. Voluntary transfers of banked water will be permitted between the SFPUC and any Suburban Purchasers and among the Suburban Purchasers and the Water Bank accounts will keep track of the amounts of water that are either saved or used in excess of the shortage allocation for each agency. Any credits that may be remaining at the end of a water shortage will expire, so this program will have short-term value by providing added flexibility in the management of the entire Hetch Hetchy system during a water shortage. It will not provide increases in long-term supplies for Mid-Peninsula or any other Suburban purveyor.

H. PLANNED WATER SUPPLY PROJECTS AND PROGRAMS

The Mid-Peninsula Water District serves an area that is almost built out, and the District's boundaries are set. Its supply assurance of 3.89 mgd (about 4,357 acre feet per year) under the terms of the Master Contract with the SFPUC continues indefinitely, and is sufficient to meet current and projected water demands. The District has no plans to increase its overall water supply.

I. STORAGE

The District has ten storage tanks with a total capacity of 12 million gallons. The District's storage tanks and capacities are listed in Table 5. The current storage capacity provides an adequate reserve for fire defense, and is sufficient to supply 3 - 4 days of emergency water supply, based on the current level of demand.

TABLE 5
MID - PENINSULA WATER DISTRICT
TREATED WATER STORAGE FACILITIES

#	Tank Identification	Capacity (gal.)
1.	Hallmark #1	2,500,000
2.	Hallmark #2	2,500,000
3.	West Belmont #1	790,000
4.	West Belmont #2	790,000
5.	DeKoven #1	720,000
6.	DeKoven #2	1,000,000
7.	Hersom	1,500,000
8.	Exborne	2,000,000
9.	Buckland #1	100,000
10.	Buckland #2	100,000
TOTAL		**12,000,000**

J. WATER QUALITY

The SFPUC maintains and monitors the quality of the water imported from Hetch Hetchy, and collected and distributed as part of its regional system. The Hetch Hetchy supply is treated with lime addition at River Rock for corrosion control and chloramines at Tesla Portal for disinfection. Water that is delivered to Bay Area reservoirs receives filtration and disinfection treatment at either

the Sunol or Harry Tracy filtration plants. Water from either of these treatment plants may be commingled with unfiltered Hetch Hetchy Water in Bay Area transmission pipelines.

The SFPUC and its wholesale customers were granted filtration avoidance for the Hetch Hetchy supply under Federal and State regulations in 1998. Under the regulations, public water systems serving water from the Hecth Hetchy supply, including the Mid-Peninsula Water District, must demonstrate to the California Department of Health Services that the supply meets the State criteria for filtration avoidance.

Monitoring of the water quality within the District's distribution system is the District's responsibility. The District regularly monitors the quality of water in its system following an established set of sampling and testing protocols that have been approved by the State Department of Health. Sampling and testing is done weekly for bacteriological quality and disinfection residual, monthly for general physical quality (color, odor, turbidity, pH, and temperature), and quarterly for trihalomethanes. The on-going water quality sampling and testing efforts have consistently demonstrated that the District's water supply meets all applicable State and Federal drinking water standards.

The District also has an on-going program of flushing distribution lines to remove deposits, encrustations, sediments and other materials and to mix water held in large storage tanks. These efforts are aimed at preventing water quality problems related to taste, odor, and turbidity, among others.

IV. PAST AND CURRRENT WATER USE

A. WATER PRODUCTION

All of the District's water is purchased from the San Francisco Public Utilities Commission. These wholesale purchases, which represent the District's water production volumes, are summarized in five-year increments since 1970 in Table 6, below.

TABLE 6

WATER PRODUCTION

1980 – 2000: 5 -Year Increments

2000 – 2004: Annual Increments

in Acre-Feet per Year and Million Gallons a Day

Year	Source: San Francisco Public Utilities Commission	
	AFY	mgd
1970	3,956.73	3.53
1975	4,237.84	3.78
1980	3,779.96	3.37
1985	4,102.12	3.66
1990	3,379.17	3.02
1995	3,230.02	2.88
2000	4,106.93	3.67
2001	3,921.09	3.50
2002	3,909.17	3.49
2003	3,702.02	3.30
2004	3,943.14	3.52
2005 (estimated)	3,746	3.34

In 8 of the past 30 years the District's water production requirements have been affected by reduced demand due to water rationing. Either a voluntary or mandatory rationing program was in effect for all of fiscal years 1978, 1989, 1991, and 1992, as well as portions of 1977, 1990 and 1993. Although the year- to-year variations are not shown in Table 7, the District's customers responded well to water conservation initiatives. The District's demand was 26% lower in FY 1978 than in FY 1976 and has continued at a reduced level. Although demand in 1987 approached the 1976 demand, it dropped by 9.2% the following year and by another 18.0% in 1989. In the past 4 years, water purchases have averaged 3,870 AFY, which is 13.6% lower that water purchases in 1976 and 10.7% lower than the 1987 demand. While the District's population has grown by more than 4% since 1980, water demand since 2000 has been modulated somewhat by an 8.5% reduction in job losses in the Belmont area.

B. WATER SALES AND UNMETERED WATER

The Mid-Peninsula Water District's annual water sales and unmetered water, in volume and as a percent of production, are depicted in Table 7. The data is presented in 5-year increments between 1975 and 2000 and in one-year segments for the past 5 years.

Unmetered water includes authorized and unauthorized uses. Authorized uses include water for fire fighting and training, hydrant flushing and other miscellaneous uses. Unauthorized uses include pipeline leaks, water meter inaccuracy, tank overflows, and possible stolen water. The unauthorized component of unmetered water is also known as unaccounted-for water. It is estimated that about one-third of the unmetered water goes to authorized uses; the remaining two-thirds is un-accounted for water. As can be seen in Table 7, unmetered water volumes can vary widely from year to year, particularly in the event of major pipeline breaks. The District has not had unmetered water volumes higher than 9% of its wholesale purchases in any of the past 30 years, and will continue its vigilance in reducing water losses with on-going programs to repair pipeline leaks as soon as they are discovered, replace old, less reliable pipelines, and upgrade older, potentially inaccurate, water meters.

TABLE 7
WATER SALES AND UNMETERED WATER
1980 – 2000: 5 -Year Increments
2000 – 2005: Annual Increments
in Acre-Feet per Year

	Water Sales	Unmetered Water[a]	Percent Unmetered Water[a]
1975	4,045.73	61.8	4.5%
1980	3,589.39	190.57	5.0%
1985	3,988.65	113.55	2.8%
1990	3,767.07	50.33	1.5%
1995	3,121.38	118.15	3.4%
2000	3,791.90	315.02	7.7%
2001	3,794.64	114.53	2.9%
2002	3,737.17	171.99	4.4%
2003	3,601.99	100.03	2.7%
2004	3,787.87	155.26	3.9%
2005[a]	3,598	132	3.7%

[a] Staff estimates that one-third is typically for authorized uses (fire fighting, main flushing, etc.) and two-thirds is unaccounted-for water.
[b] Estimated at 95% of 2004 based on production through October 2005

C. WATER SALES BY USER CATEGORY

Table 8 depicts the District's water sales by user categories for 1996 and 1998, as well as the past 5 years. In addition to showing water sales by user category, the number of active service connections is also shown. The District has no wholesale water accounts and does not supply any water for saline water intrusion barriers, groundwater recharge, or conjunctive use.[1]

[1]This information provided to comply with §10631(e)(1)(G) and (H) of the Urban Water Management Planning Act.

TABLE 8

WATER SALES BY SECTOR

1980 – 2000: 5 -Year Increments

2000 – 2004: Annual Increments

in Acre-Feet per Year

Year	No. Services/ Sales (AFY)	User Category					Total
		Single-Family Residential	Multi-Family Residential	Commercial	Industrial	Instit./ Other	
1996							
	Sales (AF)	1,971.46	590.15	482.73	168.48 AF	208.68	3,421.52
1998							
	Sales (AF)	1,934.9	598.84	508.41	201.31	174.0	3,408.62
2000							
	Sales (AF)	2,116.12	620.14	592.06	232.89	230.69	3,791.90
2001							
	Sales (AF)	2,174.92	600.72	550.25	229.97	238.77	3,794.64
2002							
	Sales (AF)	2,143.02	588.48	551.23	212.88	241.54	3,737.17
2003							
	Sales (AF)	2,085.46	562.49	531.55	202.33	220.16	3,601.99
2004							
	Sales (AF)	2176.81	591.08	565.73	202.32	251.92	3,787.87
2005[a]							
	Sales (AF)	2,068	561	537	192	239	3,598

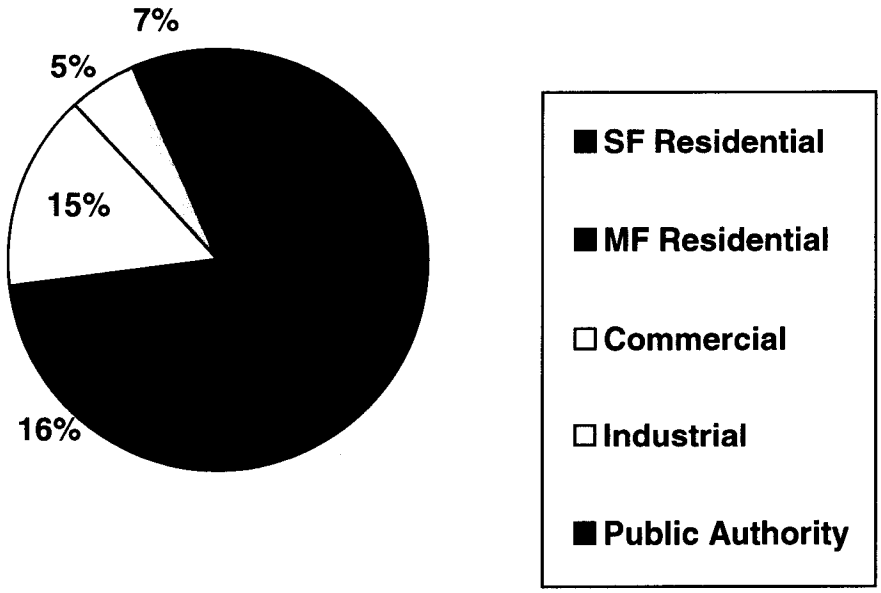
[a]Sales for 2005 are estimated at 95% of 2004 based on production requirements through October 2005.

As can be seen in Table 8, the vast majority of the District's connections are classified as residential. The Single Family category accounts for about 90% of the District's connections and the Multi-family category adds another 2.6%. Commercial accounts are the largest non-residential category,

constituting about 6.2% of the total. The District has 99 Institutional accounts, about 1.2% of the total and 51 Industrial accounts, about 0.6% of the total.

The proportion of sales, by sector, in 2004 is depicted in Figure 4. As shown, the two largest categories are both residential, and together, they accounted for 73% of sales. The Commercial sector accounts for 15% of sales while the Industrial and Public Authority sectors account for 5% and 7% of sales, respectively.

FIGURE 4 - SALES BY SECTOR



Based on an estimated population of 25,630, the District's total sales are the equivalent of 125.3 gallons per capita per day (gpcpd), while the residential per capita use is 91.6 gallons per day. The District's overall per capita use is below the average use for the entire San Francisco Regional system, although the residential per capita use is somewhat higher. The comparable systemwide average sales have been 143 gpcpd for total sales and 82 gpcpd for residential sales.[1]

[1]SPPUC/BAUWA, *Water Supply Master Plan*, April 2000, Table 3-1.

There is a wide variation between sectors in terms of average sales per connection. In 2004, sales to the single family residential sector were 273 gallons per connection per day, while sales to the industrial sector averaged 3,542 gallons per connection per day. The commercial sector averaged 1,014 gallons; public authorities averaged 2,272 gallons and multi-family residential buildings averaged 2,574 gallons per connection per day.

D. DROUGHT RESPONSE

The year-to-year variations in per capita average daily water usage since 1975 are plotted on Figure 5. The graph demonstrates the customer response to water rationing which was in effect for all of 1977, 1989, 1990, 1991, and 1992 as well as portions of 1976, 1988 and 1993.

As can be seen in Figure 5, the District's customers were very responsive to the water rationing programs that were implemented during the critically dry periods that occurred in the past 30 years. When compared to 1975, the year in which consumption per connection was the highest, the District's rationing and conservation programs reduced demand by 33.5% in 1977, a critically dry year. Demand rebounded but has never reached the 1975 level of 585 gallons per day per connection. In 1987, at the end of a period of above normal precipitation, demand was 491 gallons per connection per day, still 16.2% lower than in 1975. In the drought of 1989 to 1993, demand declined to as low as 322 gallons per connection per day, a level that was 34.2% lower than the 1987 demand and 44.8% lower than the 1975 demand level.

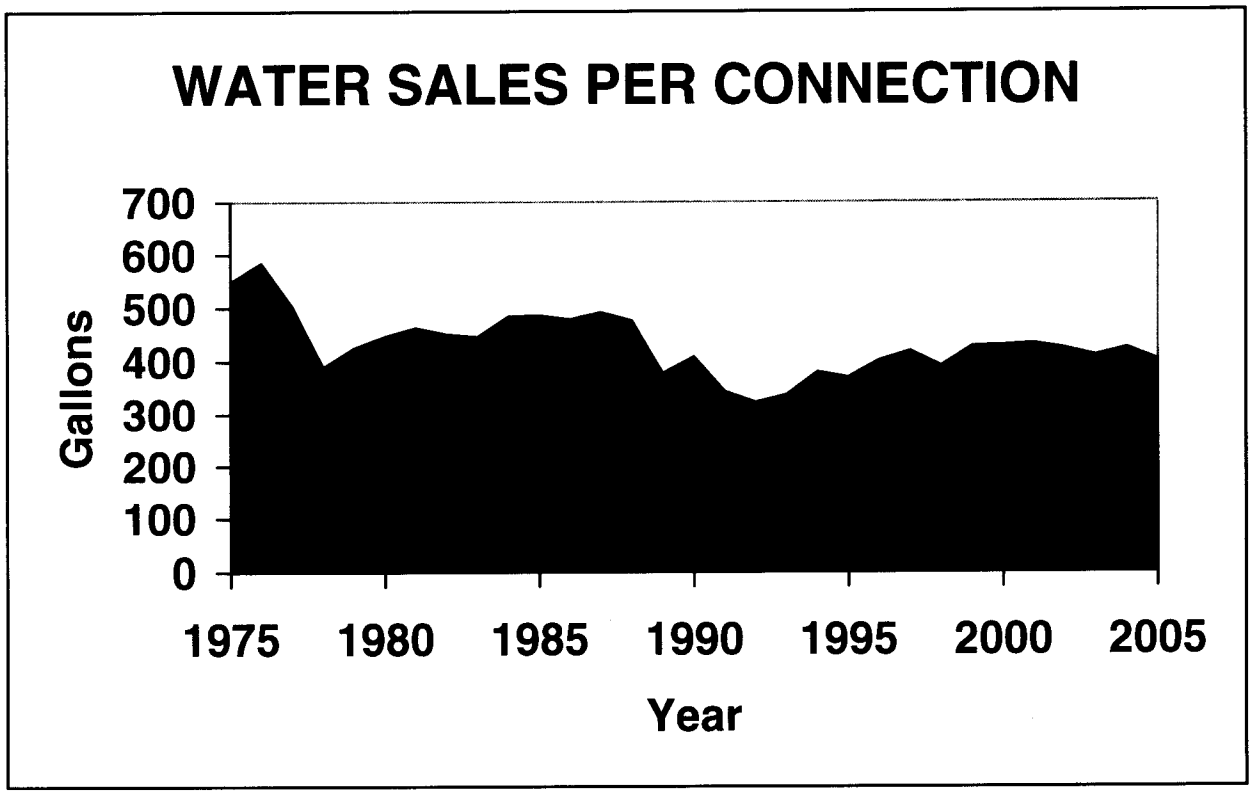


FIGURE 5: SALES PER CONNECTION PER DAY

Figure 5 also demonstrates that water sales per connection have never reached the peak experienced in the mid-1970's. Over the past 4 years demand has averaged about 422 gallons per connection per day, still 28% lower than in 1975. Although water use has gradually increased in the past decade, a period of years with normal or above normal precipitation, it is unlikely that the District will ever experience the peak consumption levels of the past due to the long-term water conservation benefits of residential retrofits, new low flow plumbing fixtures, the increased popularity of landscape plantings that require less irrigation, and a stronger water conservation ethic among customers.

V. PROJECTED WATER DEMAND

A. NORMAL YEARS

The City of Belmont grew rapidly in the 1960's, experiencing a population increase of 187% in that decade. By the early 1970's, however, most of the easily-developable land had been used and the rate of growth declined precipitously. In 1980, the population of the District was about 24,605,[1] and in 1990 it was estimated at 24,860. By 2000, it had grown slightly, to about 25,480 people, and it is currently estimated to be 25,630.[2] The City's General Plan anticipates a future population in the range of 27,000 to 28,000 people.[3]

Current population and employment projections between 2005 and 2030 for the Mid-Peninsula Water District are presented in Table 9.

As shown in Table 9, the Mid-Peninsula Water District can expect slow growth in population and households in the coming 25 years. This is because the District serves an area with little remaining developable land. Much of the new development is likely to involve the private redevelopment of existing parcels, plus some custom residential development on hillside lots. The number of new households is projected to increase at the rate of about 54 per year (0.5%/yr.). The rate of population and household growth will be similar over the coming 25 years, as household size is expected to remain relatively constant, ranging from 2.33 to 2.35 persons per household.

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[1]1980 U. S. Census data for Belmont plus 100 people for the San Carlos area served by the District.

[2] ABAG, *Projections 2005*, p. 194, Population of Belmont, plus an estimated 130 residents of San Carlos that are served by the District.

[3]City of Belmont, *General Plan*, 1982, Introduction, p. i.

TABLE 9
POPULATION AND EMPLOYMENT PROJECTIONS

YEAR:	2005	2010	2015	2020	2025	2030	INCREASE 2005 -2030		AVERAGE ANNUAL INCREASE	
							No.	%	No.	%
Population[a]	25,675	26,175	26,875	27,675	28,275	28,975	3,300	12.8%	132	0.5%
Households[b]	10,755	10,995	11,205	11,475	11,775	12,095	1,340	12.4%	54	0.5%
Jobs[c]	12,830	14,620	16,070	17,670	19,400	21,380	8,450	65.8%	338	1.7%

[a] Belmont Sphere of Influence projections, plus 130 people in San Carlos.

[b] Belmont Sphere of Influence projections, plus 56 households in San Carlos.

[c] Jobs in Belmont Sphere of Influence plus estimates for the Harbor Industrial Area and portions of San Carlos served by MPWD.

Source: ABAG, *Projections 2005*: Donaldson Associates

The job growth rate is expected to be significantly greater than both household and population growth, as the area recovers from the loss of jobs experienced in the first 3 years of this decade. Over time, an estimated 338 new jobs per year will be created, equivalent to an average annual growth rate of 1.7%. Although job formation does not always correlate well with water demand in the commercial and industrial sectors,[1] it is assumed in this report that water sales to these sectors will generally increase in proportion to job growth over the next 25 years. Currently about 20% of Mid-Peninsula's water sales go to these sectors.

In the past four years, the District has had a net gain of 149 new connections, for an average annual increase of about 37 new connections per year. This is slightly higher than the rate of growth in the 1990's, when there was an average of 32 new connections per year, but lower than the rate of increase that is projected in the coming 25 years.

[1]This is because there is a wide variation in water demand per employee, especially in the industrial and light industrial sectors.

Projected water sales and production requirements for the Mid-Peninsula Water District, in 5-year increments to 2030, are depicted in Table 10, below.

TABLE 10

PROJECTED PRODUCTION REQUIREMENTS

5-Year Increments, 2010 – 2030

in Acre-Feet per Year

Year	2010	2015	2020	2025	2030
Single Family Residential Sales[a]	2,198AF	2,257AF	2,315AF	2,352AF	2,385AF
Multi-Family Residential Sales[b]	591	607	631	654	686
Commercial Sales[c]	625	687	755	828	913
Industrial Sales[c]	237	261	286	314	347
Institutional Sales[d]	244	250	256	263	269
Plumbing Code Reduction (from 2001	- 2.6%	-3.9%	-5.2%	-6.5%	-7.8%
base year sales of 3,795 AF)	-99	-148	-197	-247	-296
Total Estimated Annual Sales	3,796	3,914	4,046	4,164	4,304
Unmetered Water[e]	1200	206	213	219	227
Estimated Annual Wholesale Purchases in AF	3,996 AF	4,120 AF	4,259AF	4,383 AF	4,531 AF
Equivalent Annual Wholesale Purchases in mgd	3.57 mgd	3.68 mgd	3.80 mgd	3.91 mgd	4.04 mgd

[a] Based on ABAG *Projections 2005* for population; a 70/30 SF/MF split, declining to 40/60 by 2030; 2.5 persons per SF household, and 270 gallons per SF unit per day.

[b] Based on ABAG *Projections 2005* for population; a 30/70 MF/SF split, increasing to 60/40 by 2030; 1.99 persons per MF household, and 134 gallons per MF unit per day.

[c] Assumes sales increase in proportion to ABAG *Projections 2005* for job growth from a base of average sales to the sector over the past 5 years.

[d] Assumes sales increase in proportion to projected population growth from a base of average sales to the sector over the past 5 years.

[e] Assumes unmetered water averages 5% of sales.

The projected growth rates for the residential sectors were derived from ABAG's projected population increases for the Belmont Sphere of Influence area. It was assumed that 70% of the

population growth will be in the single-family sector and 30% will be in the multi-family sector through 2015, after which the proportion of new residents choosing multi-family units will grow until it reaches 60% of the total population growth by 2030.[1]

Sales to institutional accounts, which includes substantial amount of irrigation water, vary widely from year to year. For this category, the projections assume that sales will grow in proportion to population growth.

The water sales projections derived from population and employment growth expectation were then reduced to account for the cumulative effects of plumbing code replacements[2], which were derived as part of the DSS model[3] developed by consultants to the SFPUC and described in the *Wholesale Customer Water Demand Projections* report.

Finally, to determine annual production requirements, an unmetered-water factor of 5% was added to the sales projections.

Table 11 compares the District's supply (maximum wholesale allocation) with the projected production requirements (demand). The District's production capability of 4,357 AFY is the maximum annual allocation available to the District under the terms of the contract with the San Francisco Water Department.

As can be seen in Table 11, the surplus of supply over demand is projected to become negative by 2025, after which time the District will have to make efforts to either increase the supply or reduce demand.

It should be noted that these projections are somewhat higher than the projections developed for the Mid-Peninsula Water District by the SFPUC in its *Water Demand Study*. The *Water Demand Study*

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[1] The current ratio of single-family to multi-family units is 70/30. It is projected to shift as land becomes scarcer in future years.

[2] Since 1992, all plumbing fixtures sold in California have had to meet certain conservation standards. As old fixtures are replaced by new ones reductions in demand will occur.

[3] DSS is short for *Demand Side Management Least-Cost Planning Decision Support System.* The model is a spreadsheet based end-use model in which water usage is broken down from total water production to specific water end uses such as toilets, faucets or irrigation.

projected that demand would reach 3.8 mgd by 2030.[1] The source of the discrepancy may be differing population and employment assumptions that were made in ABAG *Projections 2002* as compared to *Projections 2005*. In particular, the employment growth projections are now more optimistic. Sales to the commercial and industrial sectors are projected to grow by 36% between 2005 and 2025, increasing demand by an estimated 413 AFY. The proportional growth in all other sectors combined over the same time frame is projected to be much lower, at 11% (372 AFY additional demand).

TABLE 11

PROJECTED SUPPLY AND DEMAND COMPARISON

Normal Precipitation Scenario

5-Year Increments, 2010 - 2030

Year	2010	2015	2020	2025	2030
Production Capability (Normal year)[a]	4,357 AFY	4,357 AFY	4,357 AFY	4,357 AFY	4,357 AFY
Estimated Production Required to Meet Demand[b]	3,996 AFY	4,120 AFY	4,259 AFY	4,383 AFY	4,531 AFY
Difference	361	237	98	-26	-174

[a] From Table 4.

[b] From Table 10.

B. DRY YEARS

In dry years the yield of the District's sources of supply would decline. Tables 12 through 16 present the currently projected deliveries to the Mid-Peninsula Water District for single and multiple dry year scenarios under the SFPUC/BAWSCA agreements and the formulas that were developed to fairly allocate the potential cutbacks among San Francisco city and suburban areas, and among the 28 suburban wholesale purchasers. The allocation formulas consider a combination of supply assurances and a three-year rolling average of actual purchases.

[1] SFPUC, *Wholesale Water Demand Projections*, Table 5-1, Mid-Peninsula Water District

Two drought scenarios are assumed. The first is a single dry year with hydrology similar to that which occurred in 1988. The second scenario assumes multiple dry years with hydrology similar to the 1989 – 1991 three drought. The projected deliveries to Mid-Peninsula WD at the beginning of each five-year period starting in 2010 were modeled by the SFPUC based on historic hydrology and projected capabilities of the overall SFPUC system at the beginning of each respective milestone date.

As can be seen in Tables 12 through 16, the extent to which the District's customers would have to reduce their overall demand would vary depending on the capabilities of the regional system at the time the drought occurs. The greatest reduction in supplies is likely to occur if there is a severe drought between 2021 and 2025, although there is not a great difference between any of the scenarios after 2010. In all cases, the maximum demand reductions projected are approximately 20%.

TABLE 12

DROUGHT SCENARIOS: 2005 - 2009

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	Current Supply	Single Dry Year[b]	Multiple Dry Years[b]		
			Year 1	Year 2	Year 3
System-Wide Shortage (%)	0%	10%	10%	20%	20%
Production	3,746 AF[a]	3,528 AF	3,528 AF	3,069 AF	3,069 AF
	3.34 mgd	3.15 mgd	3.15 mgd	2.74 mgd	2.74 mgd
Mid-Peninsula Reduction (%)	0%	5.8%	5.8%	18.1%	18.1%

[a] 2005 Projected Demand
[b] Source: SFPUC Projections (June 1, 2005) based on 1988 – 1992 hydrology

If a drought were to occur in the near future, the SFPUC projections indicate that the District's customers would have to reduce their overall demand by 5.8% in a single dry year, (and the first year of a span of multiple dry years) and by 18.1% in the second and third years of a multiple dry

TABLE 13

DROUGHT SCENARIOS: 2010 - 2014

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	2010 Demand	Single Dry Year[b]	Multiple Dry Years[b]		
			Year 1	Year 2	Year 3
Projected Production	3,996 AF[a]	3,674 AF	3,674 AF	3,674 AF	3,192AF
	3.57 mgd	3.28 mgd	3.28 mgd	3.28 mgd	2.85 mgd
Mid-Peninsula Reduction (%)	0%	8.0%	8.0%	8.0%	20.1%

[a] See Table 11.
[b] Source: SFPUC Projections (June 1, 2005) based on 1988 – 1992 hydrology

TABLE 14

DROUGHT SCENARIOS: 2015 - 2019

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	2015 Demand	Single Dry Year[b]	Multiple Dry Years[b]		
			Year 1	Year 2	Year 3
Projected Production	4,120 AF[a]	3,730 AF	3,730 AF	3,730 AF	3,248 AF
	3.68 mgd	3.33 mgd	3.33 mgd	3.33 mgd	2.90 mgd
Mid-Peninsula Reduction (%)	0%	9.5%	9.5%	9.5%	21.2%

[a] 2005 Projected Demand
[b] Source: SFPUC Projections (June 1, 2005) based on 1988 – 1992 hydrology

TABLE 15

DROUGHT SCENARIOS: 2021 - 2025

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	2020 Demand	Single Dry Year[b]	Multiple Dry Years[b]		
			Year 1	Year 2	Year 3
Projected Production	4,259 AF[a]	3,842 AF	3,842 AF	3,842 AF	3,349 AF
	3.80 mgd	3.43 mgd	3.43 mgd	3.43 mgd	2.99 mgd
Mid-Peninsula Reduction (%)	0%	9.8%	9.8%	9.8%	21.4%

[a] 2005 Projected Demand
[b] Source: SFPUC Projections (June 1, 2005) based on 1988 – 1992 hydrology

TABLE 16

DROUGHT SCENARIOS: 2026 - 2030

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	2025 Demand	Single Dry Year[b]	Multiple Dry Years[b]		
			Year 1	Year 2	Year 3
Projected Production	4,383 AF[a]	3,965 AF	3,965 AF	3,965 AF	3,450AF
	3.91 mgd	3.54 mgd	3.54 mgd	3.54 mgd	3.08 mgd
Mid-Peninsula Reduction (%)	0%	9.5%	9.5%	9.5%	21.3%

[a] 2005 Projected Demand
[b] Source: SFPUC Projections (June 1, 2005) based on 1988 – 1992 hydrology

year scenario. See Table 12. According to the sample calculations, Mid-Peninsula's adjusted shortage allocation (in the event of a severe drought in the next five years) would be 2.74 mgd, under the formulas that would result in a 20% systemwide reduction by all Suburban users.

The District's Water Shortage Contingency Plan, which would be activated in the event of a drought or short term emergency, is described in Chapter VII of this report.

VI. URBAN WATER MANAGEMENT PLAN PROGRAMS

A. INTRODUCTION

This chapter describes and evaluates the District's Urban Water Management programs for the 2006 - 2010 period. It describes the water conservation programs that were in effect prior to preparation of the District's previous *Urban Water Management Plans,* as well as the programs that are being continued and refined in the present Plan. This chapter also draws upon the conservation programs described and developed in the SFPUC's *Wholesale Customer Conservation Program.*[1]

The Mid-Peninsula Water District is a signatory to the *Memorandum of Understanding regarding Urban Water Conservation in California* (MOU) and is therefore a member of the California Urban Water Conservation Council (CUWCC). The MOU contains 14 demand management measures that signatories to the MOU agree to implement as part of their good faith efforts to optimize water savings. The CUWCC calls these demand management measures Best Management Practices (BMPs). In the *Urban Water Management Planning Act* they are termed DMMs (Demand Management Measures).[2] The BMPs/DMMs are examples of sound water management practices that have been found to be cost effective and practicable in most instances throughout California. The BMPs are generally consistent with the water conservation practices that have been implemented by the Water District under the existing *Urban Water Management Plan* (and in some cases, for much longer). Accordingly, the District's water conservation programs presented later in this chapter have been organized in a format that is consistent with the list of BMPs that are being implemented statewide by the CUWCC.

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[1] SFPUC, *Wholesale Customer Water Conservation Potential,* 2005.

[2] In 1995, when the previous UWMP was prepared the MOU had 16 BMPs which were also listed in the *Urban Water Management Planning Act.* The CUWCC revised the BMPs in 1998. Senate Bill 553, adopted on September 28, 2000, revised the *Urban Water Management Planning Act* to again make the DMMs and BMPs consistent.

B. PREEXISTING WATER CONSERVATION PROGRAMS

A number of important water conservation policies and practices had been implemented by the District prior to the preparation of its 1995 *Urban Water Management Plan.* These measures include the following:

1. METERING

All District water connections are metered. This practice is recognized as sound urban water management practice as well as a basic water conservation measure (DMM 4). The District's sources of supply are also metered, and the supply meters can be cross-checked against sales data to allow the District to identify water lost in the transmission/distribution system.

2. SYSTEM PRESSURE CONTROL PROGRAM

The District operates with 9 pressure zones and has installed a number of pressure reduction stations at locations throughout the District so as to reduce high static pressures in its system and at individual water connections. Pressure management is particularly important for the District because of the steep topography in the service area. Pressure reducers help conserve water by reducing the quantities lost when fixtures leak or water is inefficiently applied.

3. LEAK REDUCTION

The amount of water lost in the transmission and distribution system has historically been very low and is expected to remain low as a result of the District's pipeline replacement, meter testing and leak detection programs.

Pipeline Replacements. The District has an on-going program to replace old and deteriorated pipelines, which account for most leaks. In the past few years the District has invested over $250,000 per year in small pipeline replacement projects yearly. Pipeline segments are selected for

replacement based on age and leakage records. The District expects to continue this program for the term of this Plan, and beyond.

Free Leak Detection Service. Upon request, District personnel will check for water leakage in a customer's own plumbing system. The District does not charge for this service.

Alerts by Meter Readers. The recorders used by the District's meter readers are set to signal when comparably high or low readings are entered. These alerts are investigated by a customer service technician who checks for meter malfunctions. If none are found, the technician pressure tests the customer's system to look for leaks, plumbing malfunctions, etc. and recommends corrective actions.

4. Home Retrofit of Plumbing Fixtures

The District has been providing free water service retrofitting devices since 1978 and continues to provide free kits to customers requesting them. The kits consist of low-flow showerheads, faucet aerators, toilet displacement devices, and dye kits for toilet leak detection. Thousands have been distributed since the program began. The availability of these home retrofit devices is publicized through bill stuffers and public events.

5. Leak Repairs

District staff repairs all distribution system leaks as quickly as possible after they are discovered.

6. Public Education

Since the 1977-78 drought, the District has had an on-going public relations campaign to encourage water conservation. Representatives of the District's management staff have spoken on water conservation at local service clubs, neighborhood association meetings, etc. In addition, the District's semi-annual Newsletter to customers typically includes one or more articles on water conservation topics, and water conservation information is provided on the District's web site.

For the Belmont Community Fair the District has developed a model of water system that shows how water flows through Belmont and how water is used productively and how it is wasted. The District also has give-away-bags with water tips, water bottles with water tips, a small ruler with leak information, and magnets with conservation messages.

The District has purchased and developed a number of pamphlets, flyers and information sheets containing water conservation information. These are available at the District office or can be mailed upon request. The following is a partial list of the brochures and leaflets that are currently available from the District:

- Water - A Vital Resource
- Water Conservation
- Sunset Magazine reprint on water conserving plants and garden care
- A bumper sticker: Rain or Shine, There's Never Enough Water to Waste
- About Water Emergencies
- Let's Learn About Water
- Why Waste Water?
- Water Conservation Hints

7. DEMONSTRATION GARDEN

In 1995 the District developed a demonstration garden featuring 17 examples of low water use plants from a palette of California native shrubs and flowers. When a new District Office was completed (at a new location) in 2000, it's landscaping was designed to serve as a demonstration site for water conserving landscape plantings.

C. DEMAND MANAGEMENT PROGRAMS — 2006 - 2010

1. DMM 1. WATER SURVEY PROGRAMS FOR SINGLE-FAMILY AND MULTI-FAMILY RESIDENTIAL CUSTOMERS (BMP 1)

PAST EFFORTS. The District routinely responds to customer concerns about possible leaks or high water bills. In addition, the District's meter readers and billing clerks have been trained to check for unusual changes in water consumption by comparing past water usage with the current billing data when it is being collected or processed. Customers are notified of any apparent anomalies and are offered free water conservation kits and/or assistance from District staff in checking for potential causes of the identified increases in water use.

As a result, operations personnel have visited many homes and business establishments to conduct pressure tests and plumbing inspections to determine if there is a leak or other source of wasted or misused water. A number of malfunctioning toilets, faucets and irrigation devices are discovered and repaired annually as a result of this program.

This program continues to be implemented on an on-going basis. Currently, it is felt that this ad hoc approach of focusing on customers with self-reported problems or unusually high consumption is the most efficient method of allocating the District's limited staff time that is available for water audits.

Residential water surveys were evaluated in the DSS Model for SFPUC Wholesale Customers, and for Mid-Peninsula, it was determined that the benefit-cost ratio would be 1.8 with a projected cost of $1,353 per million gallons of water saved. While positive, the benefit-cost ratio is marginal, especially when compared with some of the other water conversation programs the District could implement.

IMPLEMENTATION. During the term of this UWMP, the District will investigate the feasibility of designing a cost-effective residential water survey program. The District has a very small staff and would most likely have to engage a specialized outside contactor to design a program and perform the surveys. At the current cost of water, the benefits from a survey program may not be

sufficiently high to warrant the investment, particularly considering the benefits of investments in other DMMs, as described below.

Residential Water Survey programs will be considered in future Urban Water Management Plans, and, assuming that the cost of water from the regional system rises as projected, residential surveys will become more cost-effective in future years. The District will continue its efforts to maximize distribution efficiency and reduce the volume of lost and unmetered water, and will also continue to aggressively respond to all customer concerns regarding leaks and unusually high water usage. The District staff believes that the volume of un-metered water, which is already low by industry standards, will be further reduced during the term of this Plan as a result of continuing pipeline replacement programs, the current system-wide water audit (DMM 3, below), and anticipated meter upgrade programs.

2. DMM 2. Residential Plumbing Retrofit

Past Efforts. The District has operated a voluntary residential water conservation program almost continuously since the severe drought of 1976-77, although the program has been given extra emphasis during the years when mandatory conservation has been in effect.

The program consists of the distribution of water conservation kits containing informational packets, toilet displacement devices, low flow showerheads and dye tablets for toilet leak detection. It is thought that over 3,000 residential retrofit kits have been distributed since 1986.

Since 1992, all new and replacement plumbing fixtures sold in the state have been required to comply with applicable water conservation specifications. While the District has had relatively few new residential connections in the past 5 years (less than 120), homeowner remodeling work is common, and results in the replacement of many old plumbing fixtures with new water conserving fixtures for reasons of aesthetics, convenience and reduced water consumption. As noted above, in Table 9, the plumbing code changes are expected to lead to a 7.8% reduction in overall demand from the Suburban purchasers by 2030. This would translate into a 296 AFY cumulative conservation reduction in demand from the Mid-Peninsula Water District system.

FURTHER IMPLEMENTATION. During the term of this Plan, the District will continue the distribution of low flow showerheads, faucet aerators, toilet displacement devices (as needed) and toilet flappers (as needed) to all customers, (the majority of whom are residential users living in pre-1992 homes). This would be done in conjunction with DMM 7 (Pubic Information) and would be intended to also meet the compliance criteria established by the CUWCC for this BMP (BMP 2).

The DSS model Conservation Measures Evaluation for this DMM calculated a benefit-cost ratio for MPWD for this DMM of 2.6. The projected cost of implementation for each million gallons of water saved was calculated to be $799.

The District's program of distributing home water conservation kits in response to customer concerns about high water bills or in the course of investigations for potential residential leaks will be continued (DMM 1).

3. DMM 3. DISTRIBUTION SYSTEM AUDITS AND LEAK DETECTION AND REPAIR (BMP 3)

PAST EFFORTS. The District completes a leak detection survey of the entire distribution system every other year. Each survey requires about a month and is completed by an outside contractor working at night (when it is quieter) with highly sensitive listening technology. Any leaks found in the distribution system are repaired as quickly as possible.

Daily monitoring of system pressures from around the District's complex system of pressure zones and storage tanks allows the staff to identify anomalies in the operating parameters that may indicate new leaks. Suspect areas can be inspected and monitored to quickly identify leaks, which are then be repaired. Pipeline segments that show a history of multiple leaks are routinely replaced, either by District staff or by outside contractors.

The District also tests all large meters bi-annually and conducts random tests of small meters from various locations around the District annually.

The District has not had unmetered water volumes higher than 9% of production in any of the past 30 years; since 1990 unmetered water has ranged from a low of 1% in 1996 to a high of 7.7% in 2000. Over the past 6 years it has averaged 4.2%. Since a portion of unmetered water can be accounted for (i. e. fire fighting, hydrant flushing, etc.) the level of unaccounted-for water is even lower

IMPLEMENTATION: BMP 3 requires system audits when un-accounted for water exceeds 10% of production, a level the District has not exceeded in over 30 years. Because of the low level of unaccounted-for water the District is in full compliance with BMP 3.

The District recognizes the value of system audits and leak detection programs in reducing water losses and in minimizing the volume of unaccounted-for water. Leak detection efforts, pipeline replacements, and all related efforts to maintain a tight and efficient distribution system will be continued throughout the term of this Plan. In addition, the District is reviewing options for a meter replacement program, which could further reduce lost water, as well as operational costs. (See DMM 4, below.)

4. DMM 4. METERING WITH COMMODITY RATES (BMP 4)

CURRENT PROGRAM. The Mid-Peninsula Water District is fully metered and bills all customers by volume of use. The current rate structure provides financial incentives for conservation by its low volume residential customers. It provides for a low ("Lifeline") charge of $1.36 per unit for the first 2 units per monthly billing period, a higher rate of $3.24 per unit for 3-30 units, and a still higher charge of $3.84 per unit for 31 units or more per billing period. All non-residential (commercial) customers are billed on a uniform, volume of use, basis. Currently they pay $3.24 per unit.

IMPLEMENTATION. This BMP is being fully implemented. The inclining block rate structure applies to all single-family home residential customers, which account for almost 57% of the District's water sales.

5. DMM 5. LARGE LANDSCAPE CONSERVATION PROGRAMS AND INCENTIVES (BMP 5)

PAST EFFORTS. The largest irrigators in the District include the City of Belmont, with irrigation meters at Hallmark Park, Twin Pines Park, Island Park and others, Caltrans, with several irrigation meters for landscaped rights-of-way, and the College of Notre Dame with several water meters for landscape accounts. The cost of water has proven to be the primary incentive for these users to carefully manage their water usage and initiate water conservation efforts.

IMPLEMENTATION: The District will work with its largest irrigation water customers to support all efforts to improve efficiency and encourage conservation. The effort will start by identifying existing dedicated irrigation meters (now classified in the "Other" category). Subsequently, the staff will consider the feasibility of developing recommended water use budgets for the 10 largest use dedicated irrigation meters. The budgets would be equal to the reference evapotranspiration rate for the Belmont area (See Table 2) applied to the area irrigated from each meter. Customers could be notified of the water budgets through messages on water bills for irrigation accounts showing the relationship between the water budget and actual consumption.

For large commercial or institutional accounts without dedicated irrigation meters (but with large landscape irrigation use) the District will offer the following services when found to be cost effective:

a. Preparation of a voluntary water use budget;
b. Installation of a dedicated landscape water meter.

Implementation of this program would generally satisfy the implementation criteria for BMP 5. In addition, the District will continue to maintain the water efficient demonstration garden at the District's headquarters.

6. DMM 6. HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAM (BMP 6)

PAST EFFORTS. From 2001 through 2004, the District offered $75.00 rebates to residential customers purchasing high-efficiency clothes washers with a water use factor of 9.5 or less, in conformance with the CUWCC criteria for BMP 6. The rebate program was conducted jointly with BAWSCA and participating member agencies. Comparable rebates were available from PG&E, bringing the total rebate incentive to $150 for each clothes washer. During this time, the Mid-Peninsula awarded 330 rebates, with the number of rebates increasing with each year. The CUWCC BMP Cost and Savings

Study estimates that the average water savings for a high-efficiency clothes washer is approximately 5,100 gallons a year. Therefore, the District is receiving a conservation benefit of as much as 1.68 mg a year (5.16 AFY) with the rebates of the past 4 years. If the machines remain in service for 12 years, the incentives (which cost the District approximately $25,000) will have conserved over 62 acre-feet of water, for an investment cost of less than $403 per acre-foot – roughly $140 below the current SFPUC wholesale cost of water and $675 below the projected wholesale cost of SFPUC water in 2015.

IMPLEMENTATION. The District intends to continue offering High Efficiency Washing Machine Rebates through 2006. In 2005, BAWSCA stopped awarding rebates on machines with a 9.5 water factor, and increased the rebate level to $150 on machines with a 5.5 water factor. In January 2007, the California clothes washer standards tighten, and all new washing machines sold in the state will have to meet the 9.5 water factor standard. At that time the District, and other BAWSCA participants, will re-evaluate the current program and consider whether to continue to provide rebate incentives for the most efficient washing machines.

The DSS Model confirms that DMM 6 is cost-effective for the District. It indicates that the washing machine rebate program has a favorable 6.9 benefit-cost ratio for the Mid-Peninsula District with a projected cost of $304 for each million gallons saved, and a potential long-term demand reduction of 2.2 AFY.

7. DMM 7. PUBLIC INFORMATION (BMP 7)

The Mid-Peninsula Water District has an on-going public information program and has conducted community outreach and public education activities in past years. (See B, 7, above.) In the early 1990's the public information program efforts were aimed at motivating people to respond to the specific drought emergencies that were occurring, while in recent years the public information efforts have focused on general water conservation and wise water use.

IMPLEMENTATION: Activities that have been accomplished in past years and will be continued in the coming 5-year UWMP cycle include the following:

Brochures and Flyers. The District typically prepares and mails Newsletters to all customers on a semi-annual basis. The Newsletters have included articles and information on water conservation issues and have informed customers of the types of assistance the District can offer to help customers conserve. They have also included yearly water quality reports to customers.

Water conservation messages such as "Water Conservation Hints" and "Why Waste Water" are also routinely included in District communications with customers questioning bills, or raising other related questions.

Water conservation flyers and brochures have been kept at the reception desk in the District Office and made available to interested customers coming to pay bills or make inquiries. Many brochures have been distributed through this means.

In the event of a drought, or pending drought, the District will use general mailings, separate from the monthly billings, to announce water conservation programs, whether voluntary or mandatory, and to appeal to customers to reduce their water consumption. These efforts would be supported with stepped-up public information initiatives using a variety of local media outlets.

Bill Stuffer Inserts. The District has the ability to distribute informational water bill inserts. They can be obtained from BAWSCA, AWWA and other sources, or developed in-house. The District will continue to use bill stuffer inserts to communicate with customers throughout the term of this plan.

Past Usage Information. The District includes past usage information on customer bills and will continue to do so in coming years.

In past dry years, mandatory water conservation programs implemented by the District have been announced with ads in the *San Mateo Times* and *The Independent*. In the event of a future drought, the District will again implement an active advertising effort to reinforce the need for active citizen participation in the conservation effort.

Demonstration Gardens. The District maintains a demonstration garden at the District headquarters at 3 Dairy Lane, and a second demonstration garden at 1513 Folger Drive in Belmont

(the former District office). The gardens showcase drought tolerant landscape plantings that are appropriate for Belmont. All the plants are labeled so that customers can identify them for purchase at local nurseries.

Service Club Presentations. The General Manager and Board Members make presentations to local service clubs (Chamber of Commerce, Kiwanis, SIRS, etc.) whenever requested and are available to make presentations to homeowner and neighborhood associations or other community groups on water supply and water conservation related topics. These efforts will be continued through the term of this plan.

Web Site. The District maintained a web site has a section on Water Conservation. It provides information about the District's rebate programs, free water conservation kits, and water conserving landscaping and yard irrigation practices.

8. DMM 8. SCHOOL PROGRAMS (BMP 8)

PAST AND CURRENT ACTIVITIES. Beginning in 1999, Mid-Peninsula sponsored the participation of 20 students in Water Kollege, a week-long summer educational camp developed for the Water District by Kollage Community School For the Arts in Belmont as a creative and user-friendly approach to water conservation at the elementary school level.

From these roots the "Our Water" program was developed and adopted by the Bay Area Water Supply and Conservation Agency (BAWSCA). As a BAWSCA member, Mid-Peninsula has made the "Our Water" program available to students within the District. In the past year, the District and BAWSCA sponsored the "Our Water" program for fourth grade students in the Belmont/Redwood Shores School District, and provided scholarships for 15 students from Nesbit Elementary School to attend summer camps and Kollage Community School.

"Our Water" is an innovative curriculum for the fourth grade that combines visual, literary and performing arts instruction with water conservation lessons from the Water Education Foundation's "California Water Story." As the "Our Water" students learn valuable lessons in water conservation, they create original works in visual art, poetry, theater, music and dance. At the session's conclusion, children present their works in a live performance where parents and the

community can witness their accomplishments. Works of art are also displayed for the public to see. In June 2002, "Our Water" received the prestigious "Clair A. Hill Award for Excellence" from the Association of California Water Agencies.

Although the District is pleased with the "Our Water" program, it has been informed that it may not be available in future years, so other options for educational programs are being investigated.

IMPLEMENTATION. If the "Our Water" program continues to be offered, the District will work with BAWSCA and faculties of the Belmont/ Redwood Shores Elementary School District to support its continued implementation in the local schools. If it is not available, the District will then offer another option, such as WaterWise program, under which participating students are provided with kits containing water efficient products and educational materials, which they then install, monitor and evaluate under the guidance of the program staff. In any event, the District will continue to include a line item in the annual budget for funding public information and school programs (DMM 7 and 8).

9. DMM 9. CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL AND INSTITUTIONAL (CII) ACCOUNTS (BMP 9)

PAST EFFORTS. The District has only about 500 commercial accounts, 50 industrial accounts and 100 institutional/public authority accounts. However, in aggregate they average about 27% of total water sales. The District has responded to requests for water audits and conservation suggestions to all customers in these categories as they have been made. Many of the Institutional accounts are for irrigation meters, which are addressed in DMM 5.

The District reviews the landscape plans and inside water fixture appliances for all new commercial/industrial customers. This ensures landscaping and water fixtures that require low water use are installed before the new customer is connected to the District's system.

DESCRIPTION. The implementation program for BMP 9 is quite specific and very staff intensive. It would require the District to identify and rank all CII users by sector, contact the largest accounts and offer and conduct water surveys for them. BMP 9a calls for establishing a low flow toilet rebate program for these customers.

The SFPUC *Wholesale Customer Water Conservation Potential* study evaluated several commercial water conservation measures that are essentially equivalent to BMPs 9 and 9a. According to the DSS Model results, commercial water audits would have a favorable benefit-cost ratio (1.9), although other options for encouraging conservation in these sectors would have much greater benefits for comparable costs.

IMPLEMENTATION. Based on relatively unfavorable benefit-cost benefit ratio projected for CII water audits, the District will claim an exemption from BMP 9, and will focus on other, more cost-effective programs for the CII sector during the term of this UWMP.

A low flow toilet and urinal rebate program for CII customers, consistent with BMP 9a, will be developed in 2006 and continued though the term of this Plan. The DSS model predicts that this program would have a benefit-cost ratio of 12.5, costing the District an estimated $169 per mg saved ($519 per acre-foot saved).

The District will also continue its program of offering low-flow spray-rinse nozzles (1.6 gpm) to restaurants and commercial kitchens in its service area. The District initiated this program in 2004, and approximately 30 nozzles have been installed to date. According to the DSS Model, Mid-Peninsula would have a cost-benefit ratio of 15.1 for this conservation measure, with an implementation cost of $134 for each mg saved. The average long-term water savings would be as much as 5.6 AF a year.

Other conservation programs focused on the CII sectors that will be evaluated and implemented, as feasible, during the term of this Plan will include programs in the hotel/motel sectors such as the EPA's WAVE software, focused water audits and a financial incentive program for hotel retrofits. The District will also consider requiring 0.5 gallon per flush urinals in all new commercial buildings. All of these measures were reviewed in the DSS Model and resulted in benefit-cost ratios of 6 or greater.

10. DMM 10. WHOLESALE AGENCY ASSISTANCE PROGRAMS (BMP 10)

DESCRIPTION. This demand management BMP requires wholesale water suppliers to provide financial incentives, or equivalent resources, to their retail water agency customers for the advancement of water conservation efforts.

IMPLEMENTATION. Since the Mid-Peninsula Water District is not a wholesale water supplier, this BMP would not be applicable to the District. As a purchaser of water from the San Francisco Public Utilities Commission, the District has taken advantage of some of the programs offered in conjunction with BAWSCA, including the "Our Water" school program, and will continue to do so in the future.

11. DMM 11. CONSERVATION PRICING (BMP 11)

EXISTING RATE STRUCTURE. The Mid-Peninsula Water District has a 3-tier inclining block rate for all residential customers and a uniform rate for all commercial, institutional and irrigation accounts. The residential rates have a low lifeline fee of $1.36 per unit for the first 2 hcf units (1 unit = 100 cubic feet = 748 gallons) per month or an average of approximately 50 gallons/day per residence. The rates for higher usage are $3.24 for 3-30 units per month and $3.84 for any consumption in excess of 31 units per month. Commercial rates are $3.24 per unit. In addition, all customers are billed a monthly service charge determined by the size of the meter.

The Mid-Peninsula Water District has no jurisdiction over sewer rates, which are set by the Cities of Belmont and San Carlos. The City of Belmont charges by volume of use which is based on the Water District's sales to individual accounts during wet weather months. The current rate is $X .XX/hcf, based on the annualized average of water consumption in the winter months. The sewer charges are billed annually in conjunction with the collection of property taxes.

IMPLEMENTATION. The Water District will continue implementing a conservation pricing rate structure.

12. DMM 12. CONSERVATION COORDINATOR (BMP 12)

DESCRIPTION. This BMP calls for the agency to designate a water conservation coordinator and support staff (if necessary) whose duties are to include the coordination and oversight of conservation programs, the preparation and submittal of annual BMP Implementation Reports, the coordination of conservation programs with operations staff and with management, and related activities.

IMPLEMENTATION. The District's Operations Manager and the Office Manager share a variety of water conservation related responsibilities. The Office Manager has focused on the District's Public Information activities including the HEWS and ULFT rebate programs, the Belmont Community Fair, and the school programs, while the Operations Manager has been responsible for implementing the low-flow spray rinse valve retrofit program, filing the annual BMP compliance reports, and administering preparation of the UWMP.

Over the term of this Plan, the District will consider adding a Water Conservation staff position, so it can implement additional programs effectively.

13. DMM 13. WATER WASTE PROHIBITION (BMP 13)

DESCRIPTION. This BMP calls for water agencies to enact and enforce certain prohibitions against wasteful water use on an on-going basis, i.e. during drought and non-drought periods. The ordinances should prohibit, at a minimum, gutter flooding, non-recirculating fountains, non-recirculating systems in any new car wash or commercial laundry installations, and any new single-pass cooling systems.

PAST ACTIVITIES. The Mid-Peninsula Water District's Rule 21 has prohibited the waste of water, as well as certain non-essential uses of water, since 1991. Rule 21 provisions address both normal operating conditions and water shortage emergency conditions. The rule provides for potentially more stringent penalties for non-compliance during water shortage emergencies, up to and including citations for a misdemeanor violation. In non-emergency times the District still has the ability to issues warnings and, ultimately, to discontinue service if the provisions of Rule 21 are

violated. The wasteful water use practices, in both drought and non-drought times, that are prohibited by Rule 21 include the following:

a) Use of potable water for backfill consolidation or other non-domestic construction purposes when reclaimed water or water from other sources is available;

b) Use of water when the customer has been given notice to repair broken plumbing, sprinkler, or irrigation systems and has not done so after a warning setting a reasonable time for repair;

c) Use of water that results in flooding or runoff to gutters, streets, storm drains, watercourses, or other unlandscaped areas;

d) Use of water for washing vehicles, sidewalks, buildings, or other hard surfaced areas with a hose, unless the hose has a positive shutoff nozzle or valve.

In addition, Rule 21 expands the definition of prohibited water uses during declared water emergencies to include such uses as the filling of new swimming pools and installation of new water dependent landscaping.

IMPLEMENTATION. With Rule 21, the Mid-Peninsula Water District has appropriately implemented DMM 13.

14. DMM 14. RESIDENTIAL ULTRA LOW FLUSH TOILET REPLACEMENT (BMP 14)

PAST ACTIVITIES. The District has never instituted a program of rebates or other incentives to promote the installation of ultra-low-flow toilets.

IMPLEMENTATION. The SFPUC *Wholesale Customer Water Conservation Potential* study indicates that Mid-Peninsula's benefit-cost ratio for a residential ULFT rebate program would be 1.0 and the cost of water saved would be about $1,957 per mg. As noted above, in the discussion of DMM 9, the Benefit-cost ratio for rebating commercial toilet replacements would be much higher (12.5).

The District will consider developing a ULFT rebate program for both residential and commercial customers in 2006, and implementing it over the remaining term of this Plan. However, because there are many other, more cost effective conservation options, the District may choose to exempt itself altogether from Residential ULFT Rebate program specified as BMP 14.

15. Other Potential Conservation Measures

The SFPUC's *Wholesale Customer Water Conservation Potential* study identified 32 potential water conservation measures that could be potentially effective in the areas served by the Suburban purveyors. Some would not be cost effective for Mid-Peninsula, while others are included in the DMM's addressed above. However, several conservation measures that are not DMMs but may be cost effective and beneficial for the District were identified by the DSS model. In addition, the District is investigating the feasibility of a large-scale meter replacement project, which could have significant operational and conservation benefits. All of these measures are described below:

1. Meter Replacement Program

The purpose of calibrating and/or replacing water meters that have been in service for some time is to a) enhance revenue by ensuring payment for all water sold, b) encourage conservation by ensuring that customers pay for all water delivered, and c) increase the agency's ability to account for its distributed water. This program is an integral part of the District's water management strategy, but is not included on the list of BMPs.

Currently a substantial portion of the District's smaller meters are approaching the end of their useful life, and are obsolete, in that they require time-consuming visual reads and manual recording. The District is considering upgrading the meter stock to electronic touch read meters, which are also more accurate at very low levels of flow. If implemented, the Meter Replacement Program could further reduce the District's proportion of unaccounted-for water. Since unmetered water volumes are already very low, the conservation benefits of this program, relative to its cost, would not be very high. However, the program would greatly reduce meter-reading costs, which are among the District's highest operational expenses.

2. Require ULFT Retrofitting at Time of Sale of Existing Buildings.

This program would require that a certificate of compliance be filed with the District in conjunction with the sale of any residential or commercial building. The certificate would verify that a plumber has inspected the property and that ULF toilets are either present or were installed at the time of sale, or before close of escrow. The DSS model projected a cost-benefit ratio of 7.3 for this conservation measure with a cost of $274 per mg saved and a potential long-term conservation benefit of 56 AFY.

3. Xeriscape Education and Homeowner Irrigation Classes.

These conservation efforts involve sponsorship of staff training for stores where plants and irrigation equipment is sold to educate sales people about the benefits of low water use plants and efficient irrigation. In addition, the District would sponsor classes for homeowners at these stores or other suitable venues to provide tips and training on water efficient irrigation using drip systems, smart controllers, low volume sprinklers, and irrigation schedules appropriate to the local climate.

The DSS model calculates that these programs would have very favorable cost-benefit ratios of 12.7 and 6.2 respectively, and could result in conservation savings of up to 63 AFY with relative modest investments. The modeled costs were $146 per mg saved for Xeriscape Education and $295 per mg saved for Homeowner Irrigation Classes.

4. Require Sub-metering of Multi-Family Units. This conservation measure would involve adopting and enforcing a District ordinance that requires the installation of a separate water meters for each unit in a multi-family residential building. Research has indicated that indoor water use is about 10% lower when residents are responsible for paying their own water costs. The DSS model predicts a 6.1 benefit cost ratio for this program, with a cost of about $312 per mg saved, although the long-term average annual water savings would be only 1.1 AFY, because it is not expected that a large number of new multi-family buildings will be built in Belmont.

5. Enforce Landscape Requirements for New Landscaping Systems.

This conservation measure involves the active enforcement of requirements on the use of native or low-water-using plants for new landscaping. The enforcement procedures would require proof of compliance with existing State (AB 235) requirements in order to obtain a water connection on all new multi-family residential or commercial projects. Non-compliers would face a surcharge on their water bill until they complied.

Low water using landscaping can reduce irrigation water demand by 15% compared to traditional landscaping. The DSS Model computed a cost-benefit ratio for MPWD of 5.2 for this conservation measure, with an implementation cost of $336 for each mg saved. The estimated water savings for this measure was estimated to be 3.4 acre-feet per year.

6. City Department Water Use Reduction Goals

This program would involve working with the City of Belmont to identify ways to reduce water use for City operations including both indoor uses and irrigation uses. Financial assistant in the nature of rebates for installing ULFTs, low-water use urinals and Eto irrigation controllers rebates could be offered to encourage water use efficiency. In addition, staff assistance in developing and monitoring landscape irrigation budgets could be provided. Potentially, this program could be extended to the School District and to the landscaped areas in Redwood City and San Mateo that are served by MPWD.

The DSS Model predicted that this program could have a benefit-cost ratio of 7.9 and has the potential to achieve a long-term savings of 9 AFY at a cost of $246 per acre-foot.

D. WASTEWATER DISPOSAL AND WASTEWATER RECLAMATION OPPORTUNITIES

1. Wastewater Disposal Facilities and Available Supplies

The Cities and of Belmont and San Carlos are responsible for the collection of sewage in the District's service area. The South Bayside Systems Authority, a four member Joint Powers

Authority, undertakes treatment and disposal. The members include the cities of Belmont, San Carlos, and Redwood City, plus the West Bay Sanitary District. SBSA operates a major sub-regional treatment plant south of the San Mateo Bridge, providing sewage treatment service for over 200,000 people on the Peninsula from Belmont and Redwood Shores south to Menlo Park and west to Portola Valley.

The treatment plant has a designed capacity of 29 mgd (dry weather flows) and provides tertiary-level treatment. Almost all of the treated effluent is discharged to San Francisco Bay, although there is an ample surplus of reclaimed water available for non-potable uses such as irrigation and industrial applications.

In 1991, the Mid-Peninsula Water District joined several local water agencies and municipalities in the preparation of a Reclaimed Water Master Plan. The Master Plan identified 231 potential users, including a small number within the District's boundaries. The Master Plan concluded that these users could take about 4.0 mgd and estimated that the capital investment for pipelines and related facilities needed to transport the reclaimed water to all of these users would be $67 million (1991 dollars). Annual operations and maintenance costs were estimated at $1.1 million (1991).

Although it was concluded that the costs of implementing the full Master Plan would be too high, subsequent investigations indicated that less ambitious projects, in geographic proximity to the treatment plant would be feasible. In 2000, Redwood City and SBSA initiated the First Step project, which provided and distributed 0.25 mgd of non-potable unrestricted recycled water for landscape irrigation to customers at the eastern end of Redwood Shores peninsula in Redwood City. The project was successful and was extended for two additional two-year periods (2002-2004 and 2004 - 2006). In 2004 the project distributed 32.7 mg of recycled water for landscaping, a truck fill station for construction dust control and other uses.

The 2005, the City of Redwood City and SBSA initiated design and construction of permanent recycled water treatment and storage facilities at the treatment plant and an expanded distribution pipeline system. The permanent project will supply recycled water to customers in Redwood Shores, the "Greater Bayfront Area," the Port of Redwood City and portions of central Redwood City. By 2010, it is expected that the system will distribute over 900 AFY, increasing to 1,400AFY in 2020 and 2,000 AFY in 2030.

Consistent with the conclusions of the 1991 Master Plan, cost-effective delivery of recycled water from the SBSA plant to potential irrigation sites in Belmont is not feasible, and the District does not expect that reclaimed water will be available within the District boundaries within the foreseeable future.

IMPLEMENTATION: The District will continue to support SBSA and Redwood City in the development of a permanent and successful recycled water program serving areas closer to the treatment plant, and will welcome any potential future extensions of the distribution system into Belmont.

E. IMPLEMENTATION PROGRAM AND SCHEDULE

Table 17 summarizes the District's implementation program for the *Urban Water Management Plan*. The implementation program is based on a five-year time horizon, beginning in 2006. The schedule is intended to provide general guidance to the District for the enactment of the water conservation programs described in this report. The Board of Directors will maintain full flexibility in funding and scheduling the various programs, and the implementation schedule may be modified as a result of Board actions. As required by State law, the entire plan will be reviewed after five years.

TABLE 17

IMPLEMENTATION PLAN SUMMARY

DMM #	*Program*	*2006*	*2007*	*2008*	*2009*	*2010*
1	Residential Water Surveys	D	D	D	O	O
2	Residential Plumbing Retrofit	D	D	O	O	O
3	System Water Audit, Leak Repairs	O	O	O	O	O
4	Metering with Commodity Rates	O	O	O	O	O
5	Large Landscape Conservation	D	D	O	O	O
6	High-Efficiency Washing Machine Rebates	D	O	O	O	O
7.	Public Information Program	O	O	O	O	O
8.	School Programs	O	O	O	O	O
9.	CII Water Conservation	D	D	D	O	O
10.	Wholesale Agency Assistance	NA	NA	NA	NA	NA
11.	Conservation Pricing	O	O	O	O	O
12.	Water Conservation Coordinator	E	O	O	O	O
13.	Water Waste Prohibition	O	O	O	O	O
14	Ultra Low Flush Toilet Replacement	D	D	D	D	D
-	Meter Replacement	D	O	O	O	O
-	Wastewater Reclamation	NA	NA	NA	NA	NA
-	CII ULFT Program	D	O	O	O	O

Key to Symbols:
- = No Activity
O = Ongoing Program
D = Develop Program
E = Expand Program
NA = Not Applicable

VII. WATER SHORTAGE CONTINGENCY PLAN

A. INTRODUCTION

Section 10632 of the California Water Code requires *Urban Water Management Plans* to include the preparation of a water shortage contingency analysis. The first part of the *Water Shortage Contingency Plan* presented in this chapter describes the Mid-Peninsula Water District's plan for responding to a sudden water shortage or water quality emergency such as might occur during a prolonged power outage, a major fire, or in the event of significant system damage from a major earthquake. The second part of the plan describes the District's planning to address potential long-term water shortage conditions that could occur following one or more years of low precipitation (a drought), or in the event of a loss of a significant part of the District's source of supply.

B. WATER SUPPLY EMERGENCY RESPONSE

The District has a written Emergency Operating Plan, designed to provide guidance and direction for the activities of the District's staff both during an emergency and in mobilizing the post disaster response. Key provisions of the plan are summarized below:

Readiness. The District's primary emergency operations center is located at the District office, at 3 Dairy Lane in Belmont. The center is equipped with radios, telephones, emergency power equipment, and supplementary documents and supplies. Diagrams and summaries of exchange capacities at interconnections between adjoining water systems and information on designated emergency connections sites are is available. In addition, emergency pumps and equipment for portable hydrant systems are available at District Headquarters. The emergency operations center would be the central point of coordination for government services, communications, and emergency public information.

A secondary emergency operations center is located at the Hallmark Storage Station. It has emergency power, telephone and radio transmitters. System maps are also available and are stocked, as well, in all of the District's maintenance vehicles.

Communication protocols have been established and damage evaluation procedures have been defined. In the immediate period following a major disaster, such as an earthquake, the District's initial task would be to evaluate the water supply system and file a status report with the General Manager as quickly as possible.

The emergency operating center staffing would include the Field Manager or his designee plus additional staff to help coordinate disaster control activities and communicate with the public. Other key District personnel would be assigned specific roles depending on the magnitude of the emergency as well as the time of occurrence. On non-business days and after hours, the District has 24-hour response capability, which can be initiated by calls from the local Police Departments or the Fire District.

The District has assembled an inventory of equipment and spare parts, and maintains key vehicles in a "ready to respond" condition. The District also has arrangements with several local contractors for emergency backhoe and underground work, in the event there is more damage than the District's staff can manage.

Response. The goal of the District's post disaster response is to maintain the water transmission and storage system intact and operational to the greatest extent possible. Emergency response protocols specify the leadership role of the Field Manager (or his designee), procedures for activating the Emergency Operations Center, mobilization of necessary staff and other forces, and taking action to cope with the particular situation.

Procedures for maintaining communication with the on-site personnel and other emergency service workers such as fire and police operations are established, as are procedures for calling upon private underground contractors and requesting that other utility providers shut down services in affected areas, if necessary.

The Plan also calls for staff at the emergency operations center to assemble information logs on the service activities, equipment and material used, estimates of damage, records of mutual aid or assistance requested, financial expenditures, etc. If necessary, the Board of Directors would be assembled to make a Declaration of Emergency. The Board President and/or the General Manager would responsible for media contacts and press briefings, as necessary.

The repair or shut down work would be coordinated from the EOC and field crews would report progress to the emergency operations team. Regular progress reports would then be filed with the appropriate Police Department and/or Fire District.

The Emergency Operating Plan specifically addresses a number of plausible emergency response scenarios including loss of supply, electric service interruptions, bomb threats, riots, contamination of the water supply, earthquakes, and major fires.

C. STAGED RESPONSE PLAN FOR WATER SUPPLY SHORTAGES

1. INTRODUCTION

The Mid-Peninsula Water District has in the past, and will continue in the future, to respond to water supply shortages on an individual basis as they develop. Generally, for droughts or any other long-term water supply shortage, the District will implement a program of water conservation measures that will result in use restrictions proportional to the severity of the reductions needed. In the past, such use restrictions have been associated with droughts. Although the circumstances surrounding future droughts (or any other long-term supply shortages) may not be identical to the droughts that the District has faced in the past thirty years, the programs of voluntary and mandatory rationing developed in response to the increasingly severe actual or potential shortages in 1989 - 1992 provide the District with its model for planning future responses to severe water shortages.

As noted in Chapter V, B, above, the SFPUC is expected to request that the Suburban purchasers reduce their aggregate demand on the Hetch Hetchy system by 10% in a single dry year and by 20% in any subsequent dry years, assuming single and three-year drought scenarios. Tables 12 – 16, above, show the projected MPWD deliveries under single and multiple-year droughts should they occur in any of the future consecutive 5-year planning periods. These scenarios consider the projected delivery capabilities of the Hetch Hetchy system in any given planning period in conjunction with the SFPUC/BAWSCA agreements and formulas that were developed to fairly allocate the potential cutbacks between a) San Francisco city and suburban areas, and b) among the

28 suburban wholesale purchasers.[1] As noted, the Mid-Peninsula Water District's largest water supply reductions are likely to occur if there is a drought during the 2021 – 2025 planning period. These scenarios are shown in Table 15, and summarized below in Table 18.

TABLE 18

DROUGHT SCENARIOS: 2021 - 2025

SINGLE DRY YEAR AND MULTIPLE DRY YEARS

	Single Dry Year	Multiple Dry Years		
		Year 1	Year 2	Year 3
SFPUC System-Wide Shortage (%)	10%	10%	20%	20%
Projected Mid-Peninsula Supply Reduction (%)	8.8%	8.8%	8.8%	20.5%

Source: SFPUC Projections (June 1, 2005)

As can be seen in Table 18, it is unlikely that the District will have to ask its customers to respond as aggressively as they did during the 1989-92 drought, when they reduced demand by over 30%. However, the programs of voluntary and mandatory rationing developed in response to the increasingly severe shortages in 1989 - 1992 provide the District with its model for planning future responses to severe water shortages. The District's plan for addressing potential future water shortage contingencies is described below.

2. Four Stage Plan

The four stage plan of increasingly stringent rationing presented in Table 19 was developed for the District's 2000 *Water Shortage Contingency Plan.* Stage One is an example of the type of program that would be implemented if there were a 5% reduction in supplies, assuming the projected 2020 population. Stage Two is the same program except it is mandatory, and would result in higher compliance rates and a projected 10% reduction in demand.

[1] See Appendix A for a description of the Interim Water Shortage Allocation Plan

TABLE 19

WATER SHORTAGE RESPONSES

A Sample Program of Staged Responses

	Stage One[a]	*Stage Two*[b]	*Stage Three*[c]	*Stage Four*[d]
Type of Program	Voluntary	Mandatory	Mandatory	Mandatory
Residential Limits:				
One Person	100 gpd/ 4 hcf/mo.	100 gpd/ 4 hcf/mo.	75 gpd/ 3 hcf/mo.	50 gpd/ 2 hcf/mo.
Each Additional	75 gpd/ 3 hcf/mo.	75 gpd/ 3 hcf/mo.	50 gpd/ 2 hcf/mo.	50 gpd/ 2 hcf/mo.
Apartments	125 gpd/ 5 hcf/mo.	125 gpd/ 5 hcf/mo.	112 gpd/ 4.5 hcf/mo.	100 gpd/ 4 hcf/mo.
Commercial/Industrial/ Public Authority (Indoor)[e]	90%	90%	80%	67%
Outside Irrigation[e]	40%	40%	25%	10%

[a] Would respond to a supply reduction of 5% or less, assuming 2020 population levels.

[b] Would respond to a supply reduction of 5% - 10%, assuming 2020 population levels.

[c] Would respond to a supply reduction of up to 30%, assuming 2020 population levels.

[d] Would respond to a supply reduction of up to 45%, assuming 2020 population levels.

[e] Expressed in terms of percent of base year use. The base year would be a recent year with normal precipitation.

The Stage Three contingency program would result in an estimated water demand of 3,030AFY. (assuming 2020 population levels). This would be 30% lower than the projected 2020 demand and should be more than sufficient to respond to any projected SFPUC/BAWSCA supply reductions.

The Stage Four program is even more austere. It would result in a projected 2020 water demand of about 2,300 AFY. This would be 46% lower than the demand projected for a year of normal precipitation with 2020 population levels.

It is important to recognize that the programmatic responses in all the stages are planning guidelines; the District's actual response to a water shortage emergency will always require action by the Board of Director's and nothing in this Plan is intended to limit the District's available options in tailoring a unique and specific program to respond to any future water shortages.

D. MANDATORY PROVISIONS TO REDUCE WATER USE

In the past, the District has implemented a number of increasingly broad mandatory restrictions on water use in response to increasingly severe water shortages. The Stage One (voluntary) and Stages Two and Three (mandatory) water rationing programs would include prohibitions on wasteful use of water such as any use which results in runoff to gutters or streets, use of water to clean hard surfaces such as sidewalks, driveways, patios, etc., use of water for vehicle washing except with a positive-shutoff nozzle, service of water in restaurants except on request, use of water on new landscaping unless it consists of low water using, drought-tolerant plants. The Stage Four program would incorporate even more restrictive prohibitions such as total prohibitions on the use of water for certain construction purposes, for any swimming pools, for all car washing, or for any new landscaped areas.

As noted in the previous section, the District's response to a Stage Two through Stage Four water shortage would include mandatory reductions in water use specified by user category.

E. CONSUMPTION LIMITS

The District's response to any recognized water shortage requiring the adoption of a mandatory water rationing program would include consumption limits on a per capita basis for residential customers and a percentage reduction from a normal base year level of usage for non-residential customers. The District's program would involve higher limitations on water used outdoors than on indoor water use.

F. PENALTIES OR CHARGES FOR EXCESS USE

In past water shortages, the District's conservation pricing structure has added an extra tier with a much higher unit cost for water use higher than base year use in the comparable period. This is effectively an excess use charge. It is expected that in the future, any mandatory water rationing program adopted by the District would include similar modifications to the rate structure.

G. IMPACTS ON REVENUES AND EXPENDITURES

Successful water rationing programs lead to reduced water sales and revenues to the District. However, the District's expenditures do not decline in proportion to reduced sales, because such a large part of the expenditures are related to fixed capital costs or on-going maintenance and operations. Consequently, water rates must typically be increased during years of water shortages, when water rationing programs are implemented.

The administration of a water rationing program will also have a definite, but relatively small, impact on the District's general and administrative costs, which must be considered whenever the District's budget is adopted during a water short year.

Revenue from excess use charges is received whenever mandatory water rationing is in effect. These additional revenues can be applied toward administration of the program, or to other programs. Excess use charges, however, cannot make up for the lost revenue from reduced water sales.

H. DRAFT ORDINANCE

The Mid-Peninsula Water District has had actual experience in the implementation of programs very similar to the Stage One through Stage Three programs. The ordinances implementing the past water rationing programs will serve as the model ordinances for any future programs.

I. MECHANISM FOR DETERMINING ACTUAL REDUCTIONS

Since all Mid-Peninsula Water District customers are metered and the sources of supply are metered, the District is able to measure the effectiveness of any water shortage contingency plan that is implemented. As can be seen in Tables 5 and 6, the District collects sufficient data, in the normal course of operations, to determine actual reductions in sales, by user category, as compared to a given base year. In 1989, the District successfully administered questionnaires to determine the number of people served by each residential connection. The survey could be repeated in the future should it be necessary to implement a water-rationing program with allotments based on the number of people served per connection.

APPENDIX A

INTERIM WATER SHORTAGE ALLOCATION PLAN

APPENDIX A

INTERIM WATER SHORTAGE ALLOCATION

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

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

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

5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier Two component of the IWSAP allocates the collective wholesale customer share between each of the 29 wholesale customers. This allocation is based on a formula that takes three factors into account, the first two of which are fixed: (1) each agency's Supply Assurance from SFPUC,

with certain exceptions, and (2) each agency's purchases from SFPUC during the three years preceding adoption of the Plan. The third factor is the agency's rolling average of purchases of water from SFPUC during the three years immediately preceding the onset of shortage.

The IWSAP allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customer agencies. Also, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred.

The IWSAP will expire in June 2009 unless extended by San Francisco and the wholesale customers. The projected amount of water that Westborough, and the other suburban providers can expect to receive from SFPUC during dry years after 2010 have been calculated by SFPUC on the assumption that the Plan will in fact be extended.