

Zone 7-Semitropic Water Banking and Exchange Program. Under this agreement, Zone 7 purchased 43,000 af of groundwater storage capacity in the STWSD Groundwater Banking Program, to ensure sufficient dry year supplies for Dougherty Valley. In December 1998 the Zone 7-Semitropic Water Banking and Exchange Program agreement was amended to increase Zone 7's groundwater storage capacity in the Program by 22,000 af, from 43,000 af to 65,000 af, with corresponding increases in both the "pumpback" and "entitlement exchange" quantities.

Because Zone 7's actual SWP entitlement deliveries will vary depending on hydrologic conditions, during normal and wet years, water in excess of Zone 7's immediate needs to provide treated supplies to Dougherty Valley would be delivered to the STWSD Groundwater Banking Program for storage. According to the February 2000 Agreement Concerning Implementation of Water Service for the Dougherty Valley Project between DSRSD and Zone 7 (see Appendix C), Zone 7 shall, on an on-going basis, place water available from the Dougherty Valley water supply in the 43,000 af of storage acquired in the Zone 7-Semitropic Water Banking and Exchange Program agreement. In future years, particularly during dry hydrologic periods, the stored water would be used to supplement Dougherty Valley's available water supplies, or used for the benefit of Zone 7's other customers once Dougherty Valley demands were satisfied.

When requested by Zone 7, the STWSD Banking Program will allow minimum delivery of 3,870 afa (9 percent) of water back to Zone 7 during all dry years (including the critically dry year) as part of the "pumpback" program. In addition, in years when SWP deliveries exceed 15 percent of STWSD's annual entitlement, Zone 7 will receive some water from an "entitlement exchange" with STWSD. This quantity of entitlement exchange water will vary based on hydrologic conditions and actual SWP deliveries to STWSD, but the entitlement exchange could provide a maximum of 5,719 afa of additional supply during a 100 percent SWP supply allocation.

#### *4.1.3.7 Recycled Water*

In the early 1990's, Zone 7 undertook a Tri-Valley recycled water study and conducted a series of public workshops as a part of that process. That effort resulted in the issuance by the State Water Resources Control Board (SWRCB) of a Master Water Recycling Permit (Order No. 93-159) to Livermore, DSRSD and Zone 7 in December 1993. The permit established the requirements for recycled water irrigation, groundwater recharge and other Title 22 approved projects.

Recycled water is tertiary-treated wastewater. This water is currently used for irrigation at the Livermore Municipal Golf Course, the Dublin Sports Grounds and for certain other irrigation needs within the valley. The City of Livermore has been using recycled water since the mid-1960's and DSRSD started using recycled water for irrigation in 1999. Recycled water is a very reliable supply; however, the use of recycled water was historically discouraged due to the potential of salt buildup in the Main Basin. Zone 7's Salt Management Plan now provides tools and strategies for preventing salt buildup in the Main Basin. The current sustainable supply of recycled water of 500 afa is the current amount used for irrigation; however, this amount is expected to increase. Additional discussion of DSRSD's use of recycled water is provided below in Section 4.3 and in Section 10.0 of this UWMP.

A summary of the Zone 7 water supplies and available dry year storage is provided in Table 4-3.

**Table 4-3. Zone 7 Supplies and Available Dry Year Storage**

Supply Component	Annual Supply Quantity, afa
State Water Project Entitlements	
Original Entitlements	46,000
Additional Entitlements	
Berrenda Mesa Water District (1999)	7,000
Lost Hills Water District (1999)	15,000
Belridge Water Storage District (2000)	10,000
Tulare Lake Basin Water Storage District (2003)	400
Belridge Water Storage District (2004)	<u>2,219</u>
Subtotal SWP Entitlements	<u>80,619</u>
Long-term Yield from SWP (@ 75.6%)	60,948
Groundwater (Safe Yield of Main Basin)	13,400
Local Runoff from Del Valle Watershed	9,300
BBID Water Transfer	2,000
Recycled Water	500
Wet Year Water <sup>(a)</sup>	3,000
<b>Total of Long-Term Sustainable Supplies<sup>(b)</sup></b>	<b>86,148</b>
Dry Year Water Supplies	
Original storage acquired in Semitropic Groundwater Bank	43,000
Additional storage acquired in Semitropic Groundwater Bank	<u>22,000</u>
Subtotal Semitropic Groundwater Storage	65,000
Storage Capacity in the Chain-of-Lakes <sup>(c)</sup>	50,000
Total Storage Capacity in the Main Basin <sup>(d)</sup>	>240,000
Minimum Reserved Emergency Storage Available in the Main Basin <sup>(e)</sup>	127,000

<sup>(a)</sup> As a SWP Contractor, Zone 7 has in the past and will continue to have the opportunity to acquire excess, available water during wet hydrologic periods. Analysis by Zone 7 staff estimate these quantities to be 3,000 afa during wet years.

<sup>(b)</sup> Wet year water has not been included in the calculation of long-term sustainable supplies because it may not be available on an annual basis, although some portion of this supply could be distributed over the hydrologic period.

<sup>(c)</sup> Lakes H and I with a combined capacity of 45,000 af are currently available. Additional lakes with an additional capacity of at least 5,000 af are expected by the year 2020.

<sup>(d)</sup> Although the total storage capacity of the Main Basin is above 255,000 af, Zone 7 typically operates the Main Basin at around 240,000 af to minimize outflow losses.

<sup>(e)</sup> Based on historic minimum storage contained in the Main Basin in the fall of 1966.

## 4.2 DSRSD Groundwater

As described in Section 4.1.3.4, DSRSD, as well as the other water retailers in the Livermore-Amador Valley, have an agreement with Zone 7 to limit extraction of groundwater from the Main Basin to a maximum combined total of approximately 7,200 afa (about 54 percent of the long-term sustainable yield of the Main Basin (see Section 4.1.3.4)). DSRSD's independent pumping quota (also known as the IQ) is 645 afa (although DSRSD can pump in excess of its IQ if a recharge fee is paid to Zone 7). As stated in Section 4.1.3.4 above, this agreement (along with Zone 7's other groundwater management activities) keeps the groundwater budget essentially in balance under average hydrologic conditions.<sup>7</sup>

Currently, the DSRSD groundwater supply (IQ) is pumped by Zone 7 for DSRSD from a Zone 7 installed well in the Mocho well field, Mocho No. 4. Mocho No. 4 was constructed on DSRSD property (previously Camp Parks property) under a 2002 agreement between DSRSD and Zone 7 whereby DSRSD provided Zone 7 with access, Zone 7 paid all of the costs for the well, pump and building, and DSRSD has the annual option of requesting that Zone 7 pump and provide DSRSD's IQ at a cost of only power, chemical and some other incidental charges.

In addition to groundwater from the Main Basin, DSRSD can extract water above the 645 af/yr Main Basin IQ from areas outside the Main Basin (the Fringe Basin). Water can be pumped from the Fringe Basin as long as this groundwater extraction does not have adverse effects on the Main Basin. In the past, DSRSD pumped water from the Fringe Basin when it owned wells along Dublin Boulevard. However, pumping from the Fringe Basin was abandoned in 1980 due to water quality issues and pumping costs.

## 4.3 DSRSD Recycled Water

In August 1992, DSRSD adopted Resolution No. 42-92, which established policies for the use, promotion and priorities for recycled water service within and outside DSRSD's water service boundaries. The policies were intended to assist DSRSD with the following:

- Promoting, producing, selling and delivering recycled water to retail and wholesale customers;
- Managing the San Ramon Valley Recycled Water Program on an equitable and self-supporting basis;
- Working with others to develop ordinances and guidelines to encourage the use of recycled water;
- Developing local regulations and standards to ensure the safe and beneficial use of recycled water; and
- Conducting public information and customer service programs to ensure that the public has an appropriate understanding of recycled water, including the benefits of using recycled water.

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<sup>7</sup> DWR Bulletin 118, Livermore Valley Groundwater Basin Description, last updated February 27, 2004.

In 1993, DSRSD adopted the "Water Recycling Business Plan Framework." This was the first action taken by the DSRSD Board to establish the DSRSD Recycled Water Enterprise. Since that time, recycled water has been an important part of water planning at DSRSD. In 1993, the City of Dublin certified an EIR for the "*Eastern Dublin General Plan Amendment and Specific Plan.*" The DSRSD service plan for Eastern Dublin is predicated upon the use of recycled water for landscape irrigation as summarized in the EIR and subsequent annexation documentation. Water supply requests to Zone 7 by DSRSD for Eastern Dublin under the "*Contract between Zone 7 and DSRSD for a Municipal & Industrial Water Supply,*" are the net of the Eastern Dublin potable water demands less the recycled water to be provided by DSRSD.

In 1995, DSRSD and EBMUD formed a Joint Powers Authority entitled "DSRSD-EBMUD Recycled Water Authority" (DERWA). DERWA's mission is to provide a safe, reliable, and consistent supply of recycled water, and to maximize the amount of recycled water delivered for non-potable use. DERWA will operate the San Ramon Valley Recycled Water Program (SRVRWP), a multi-phased project to supply recycled water from DSRSD's Recycled Water Treatment Facility (RWTF) to portions of DSRSD's and EBMUD's service areas. Additional discussion of DERWA is provided in Section 10.2.2.

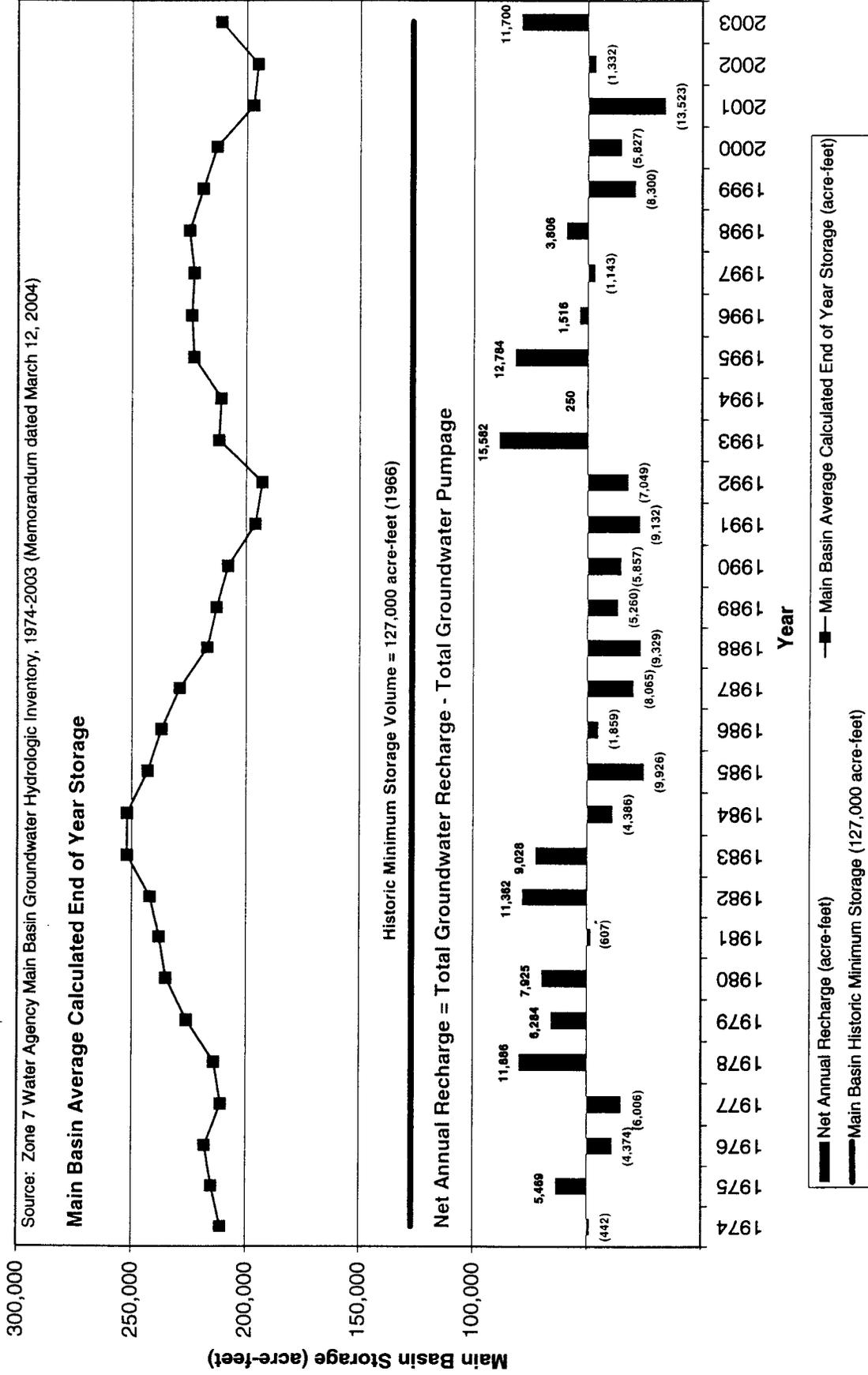
In 1995, DSRSD committed to providing water to Dougherty Valley. The DSRSD service plan for Dougherty Valley is also predicated upon the use of recycled water for landscape irrigation. The amount of water purchased for Dougherty Valley is the net of the Dougherty Valley potable water demands less the recycled water to be provided by DSRSD.

In April 1998, DSRSD adopted Ordinance No. 280 which established a Recycled Water Use Zone within DSRSD service area, consisting of all areas then served by potable water services of DSRSD and those additional areas designated for such service. In April 2004, this ordinance was repealed and replaced by Ordinance No. 301 which formally established the rules and regulations governing the use of recycled water within DSRSD. Additional discussion of this ordinance is provided in Section 8.5. A copy of Ordinance No. 301 is provided in Appendix D.

In 2000, DSRSD adopted a "Water Master Plan" that established Board policy as to the quantity of recycled water the District was looking to develop and deliver to customers within the District's water service area. The total quantity of recycled water that DSRSD planned to deliver through buildout was estimated to be approximately 3,700 afa (or 3.3 million gallons per day, mgd).

Additional discussion on DSRSD's recycled water program is provided in Section 10.0.

**Figure 4-1. Zone 7 Main Groundwater Basin Storage Levels (1974-2003)**



Last Revised: June 23, 2004  
 zone 7 gw storage  
 storage chart

## 5.0 RELIABILITY PLANNING

### 5.1 Reliability of Existing Supply Sources

#### 5.1.1 Zone 7 Water Supply

##### 5.1.1.1 Water Supply Reliability Policy

The actual quantity of water Zone 7's existing water supplies will yield will vary year-to-year depending on actual hydrologic conditions. Zone 7 has adopted a Reliability Policy for Municipal & Industrial Water Supplies<sup>8</sup>, which guides the management of Zone 7's M&I water supplies as well as its capital improvement program. The policy includes two goals:

- Goal 1: Meet 100 percent of its treated water customers water supply needs in accordance with Zone 7's most current Contracts for M&I Water Supply, including existing and projected demands for the next twenty years as specified in Zone 7's Urban Water Management Plan, (UWMP), which will be coordinated with Zone 7's M&I water Contractors. Zone 7 will endeavor to meet this goal during an average water year, a single dry water year, and multiple dry water years.
- Goal 2: Provide sufficient valley-wide groundwater production capacity (including Zone 7's and Contractors' wells) to meet at least 75 percent of the estimated maximum daily M&I water demand.

In July of 2004, Zone 7 proposed that Goal 2 of the Water Supply Reliability Policy be revised to apply specifically to Zone 7's contractually required M&I deliveries and to provide direction for the corollary planning, design and implementation of all of Zone 7's major water supply facilities and infrastructure. The revised goal is currently being reviewed by the Zone 7 Board of Directors and Zone 7's M&I Water Contractors.

##### 5.1.1.2 SWP Supply Reliability

Based on Zone 7's Reliability Policy, a continuous 71-year annual hydrologic analysis was conducted of projected, annual SWP deliveries and other Zone 7 supply sources to determine the ability of Zone 7 to meet the treated and untreated water demands under all hydrologic conditions, assuming projected buildout demands occurred today, with the currently available supply sources. Using the projected SWP deliveries determined by DWRSIM 411, the evaluation found that the minimum SWP delivery occurred during the critically dry year of 1977, when only 11 percent of the SWP entitlement could be delivered. It also found that the two historic six-year drought periods of 1929 to 1934 and 1987 to 1992, when the average SWP deliveries for both periods were approximately 42 percent, created the most difficult hydrologic supply conditions under which Zone 7 had to meet 100 percent of the projected demands. A summary of the SWP deliveries during drought conditions is provided in Table 5-1.

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<sup>8</sup> Zone 7 Water Agency Resolution No. 02-2382, Reliability Policy for Municipal & Industrial Water Supplies, adopted by the Zone 7 Board of Directors on May 15, 2002.

**Table 5-1. Historical Drought Conditions and SWP Deliveries**

Historical Drought Duration	Historical Drought Year(s)	Percent of SWP Water Entitlement Delivered During Period
Single Dry Year	1977	11%
Multiple Dry Years		
Two Years	1991-1992	35%
Three Years	1990-1992	36%
Six Years	1929-1934; 1987-1992	42%

In hydrologic years when SWP deliveries are reduced, supplemental water required to help meet 100 percent of Zone 7's treated water demands will be delivered from a combination of storage in the STWSD Groundwater Banking Program, the Chain-of-Lakes and the Main Groundwater Basin.

Each April, Zone 7 staff prepares a water supply assessment of the Livermore-Amador Valley sustainable water supply. Per the 2004 assessment, and as shown in Table 4-3, the current sustainable supply is 86,100 af. The current estimated buildout demand is 82,900 af. Operational studies used in Zone 7's assessment demonstrate that Zone 7 has sufficient water supply to meet this future demand for every hydrologic year on record. The capital facilities needed to convey, recharge, store, treat or pump and deliver this water have been identified and are incorporated into Zone 7's Capital Improvement Plans. Zone 7 has sufficient sustainable supplies to provide for all potable (treated) water demands through buildout of the cities current general plans and for all contracted non-potable (untreated) water demands<sup>9</sup>. Therefore, DSRSD has sufficient sustainable supplies to meet its anticipated potable water demands through buildout.

#### *5.1.1.3 Groundwater Reliability*

As discussed earlier, the Main Basin has a total storage capacity of over 255,000 af. During non-drought periods Zone 7 keeps the Main Basin essentially full, using only about 15,000 afa of water annually as seasonal working storage. The remainder of the storage in the Main Basin is drought and emergency storage. Drought storage is defined by Zone 7 as the removal of up to 110,000 af of water from the Main Basin. Zone 7 currently estimates that groundwater from the Main Basin could meet 75 percent of the maximum daily demand of all its water retailers for a period of up to six years. Extraction of this volume of water would drop groundwater levels to the historic low groundwater level in the Main Basin. Water contained below this historic low groundwater level is emergency storage, which is approximately 127,000 af.

Even if no SWP or other local supplies are available, this groundwater supply will be sufficient to meet water demands, without water rationing, for a drought with a duration of up to six years and an average supply deficiency similar to the deficiency experienced during the historic 1929-34 and 1987-92 droughts.

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<sup>9</sup> Zone 7 Water Agency, Annual Review of the Sustainable Water Supply, May 19, 2004.

#### 5.1.1.4 Water Quality

The water supply provided to DSRSD's customers meets all Federal and State drinking water requirements. Water quality parameters that are of particular interest to DSRSD and the other retailers relate to aesthetic issues, such as taste, odor and hardness. Taste and odor can come from total dissolved solids (TDS), the minerals in the water, but is generally associated with algae blooms in surface water supplies. Hardness, and a salty or bitter taste, is generally associated with minerals in the groundwater. The Tri-Valley's groundwater supply is generally consistent in mineral quality, whereas the surface water supply can see large excursions in quality due to such factors as high and low surface water runoff, algae blooms, etc. Another water quality concern of DSRSD and the other retailers is the variation in water quality between the eastern and western parts of the Zone 7 service area. The water quality variation is caused by the surface water supply being located in the eastern portion, and the groundwater supply being largely located in the western portion of the service area.

Beginning in 2000, the retailers participated in Zone 7's development of a Water Quality Management Program. An outcome of this cooperative effort was the Zone 7 Water Quality Policy. A consensus document prepared by the retailers and Zone 7, the water quality policy documents that the Tri-Valley retailers support the provision of equal water quality to all of Zone 7's treated water customers, and that programs and projects to accomplish this objective would not diminish current delivered water quality to east-side customers. The Zone 7 Board adopted the Water Quality Policy for Potable and Non-Potable Water<sup>10</sup> in April 2003. The Water Quality Policy has four goals.

- Goal 1: Zone 7 shall continue to meet all state and federal primary Maximum Contaminant Levels (MCLs) for potable water delivered to the M&I Contractors' turnouts, in accordance with existing supply agreements. In addition, Zone 7 shall deliver potable water of a quality that is as close as technically feasible and fiscally responsible to the Public Health Goals (PHGs) and/or Maximum Contaminant Level Goals (MCLGs). To ensure a margin of safety, the delivered water shall generally be of a quality that contains no greater than 80 percent of the applicable state or federal primary MCLs.
- Goal 2: Zone 7 shall meet all state and federal secondary MCLs in the potable water delivered to its M&I Contractors' turnouts. In addition, Zone 7 shall, within technical and fiscal constraints, proactively mitigate earthy-musty taste and odor events from surface water supplies and reduce hardness levels to "moderately hard", defined as 75 to 150 mg/L. Also, Zone 7 shall optimize its treatment processes to minimize chlorinous odors by maintaining consistent disinfectant dosage and residual.

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<sup>10</sup> Zone 7 Water Agency, Water Quality Policy for Potable and Non-Potable Water, adopted by the Zone 7 Board of Directors on April 16, 2003.

- Goal 3: Zone 7 shall endeavor to deliver to its non-potable Contractor turnouts, from a variety of sources, water of a quality that meets the irrigation needs of its Contractors and does not negatively impact vegetation, crops, or soils.
- Goal 4: In order to achieve Goals 1 through 3, Zone 7 shall continue to work to improve the quality of its source water. This may be achieved through Zone 7's Salt Management Plan, which will maintain or improve the water quality in the groundwater basin, and through advocacy of improvements in the State Water Project, its' facilities and their operations, which may improve the source water of Zone 7's surface water supplies. In addition, Zone 7 will encourage the retailers to take similar steps as those outlined in this policy to improve the quality of the retail customers' water.

In August 2002, DSRSD and the City of Livermore entered into the Tri-Valley Water Retailers Cooperation Agreement<sup>11</sup>. The City of Pleasanton and the California Water Service Company joined Livermore and DSRSD, and entered into the Agreement in April and September of 2003. The Agreement required the appointment of two representatives from each water retailer's governing body to a Committee of Valley Water Retailers. In June 2004, the Committee of Valley Water Retailers adopted Resolution No. 2004-01, which outlined the priorities of the water retailers. Identified as the top priority for action by Zone 7 is the immediate improvement to the taste, odor and hardness of Zone 7's delivered treated water. To achieve this, the resolution encourages Zone 7 to work cooperatively with the water retailers to:

1. Take immediate steps to design and construct the desired water quality improvements;
2. Take these steps while minimizing or eliminating future rate increases;
3. Review and update Zone 7's reliability goals to effectively balance water quality, cost and reliability; and
4. Find means acceptable to the retailers and Zone 7 to finance the needed water quality improvements:

#### *5.1.1.5 Planned Water Supply Projects*

Because Zone 7 has sufficient sustainable supplies to provide for all of DSRSD's treated water demands through buildout, no new water supply projects are planned. However, Zone 7 is currently working on several projects to improve water quality.

One project is the new Altamont Water Treatment Plant, which will provide Zone 7 with increased capacity to treat surface water supplies. The new Altamont Water Treatment Plant is currently being designed and is anticipated to be on-line by 2009. The initial capacity of the new treatment plant will be 12 to 24 mgd, with an ultimate buildout capacity of 42 mgd.

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<sup>11</sup> Tri-Valley Water Retailers Annual Report for Fiscal Year 2003/04, September 2004.

Another project is the Wellhead Demineralization (Demin) Project, which is intended to treat groundwater supplies (primarily lowering the TDS concentrations) before being delivered to customers. The Wellhead Demin Project is currently being designed and is scheduled to be constructed in three phases (3 mgd each) and be on-line within the next few years (Phases I and II by 2007 and Phase III by 2012).

### 5.1.2 DSRSD Recycled Water

Recycled water supplies act to enhance DSRSD's overall reliability. Recycled water supplies are essentially 100 percent reliable during drought events. An additional benefit of recycled water is the reduction in potable water demands within DSRSD's service area. A complete discussion of DSRSD's recycled water program is provided in Section 10.0.

### 5.1.3 Emergency Connections with EBMUD and City of Pleasanton

DSRSD currently has four emergency pipeline interties, two with EBMUD and two with the City of Pleasanton, for rapid emergency response. A third emergency intertie with EBMUD is also planned in the Dougherty Valley area. The interties are strictly for emergency conditions, such as a major pipeline break, supply contamination, or interruption of deliveries due to earthquake, flood, or other disaster. These connections would allow either agency to obtain water from the other agency during an emergency.

## **5.2 Need/Potential for Additional Water Supplies**

As discussed above, Zone 7 has sufficient sustainable supplies to provide for all of DSRSD's treated water demands through buildout. Therefore, the need for additional water supplies is based on improving supply reliability.

### 5.2.1 Demand Reduction/Water Conservation

Based on historic local water usage during the 1987 through 1992 credible worst-case drought, even though neither Zone 7 nor its retail water agencies initiated mandatory water conservation, due to a general heightened public awareness to conserve, the Valley's water customers conserved considerable quantities of water. During the critically dry year of 1991, when Zone 7 only received about 30 percent of its SWP supplies, the Tri-Valley reached a voluntary demand reduction of 25 percent. Therefore, even though demand management is not required for Zone 7 to meet its projected demands at buildout, including the credible worst-case drought scenarios, it is extremely likely that the public will voluntarily reduce its water demands. If this does occur, available supplies will be further conserved, saving additional water in the Main Basin and Chain-of-Lakes.

Additionally, Zone 7's retailers, including DSRSD, have all adopted demand management policies, which can be implemented during drought or emergency conditions. It is extremely likely that during a credible worst-case drought scenario (such as the historic six-year drought period) some form of voluntary demand reduction will be recommended and implemented. Since Zone 7 already has sufficient supplies to meet projected demands during a credible worst case drought scenario without the implementation of demand management, if voluntary demand reductions are implemented, these reductions in demand will only further increase Zone 7's available supplies to meet other potential emergency demand conditions without reducing available Main Basin storage quantities below the 127,000 af historic minimum storage volume.

DSRSD has established prohibitions, mandatory requirements and suggested water conserving guidelines for each of its water conservation stages. These are discussed in Section 9.0 of this UWMP.

## 5.2.2 Opportunities for Short-Term or Long-Term Water Exchanges

### *5.2.2.1 Zone 7: Cawelo Water District*

In April 2003, the Zone 7 Board of Directors authorized staff to investigate the potential to develop a groundwater banking program with the Cawelo Water District in Kern County. Zone 7 has evaluated the program and determined that no fatal flaws with the program exist. The Cawelo and Zone 7 staffs have negotiated Principles for an In-Lieu Water Banking Program. The Principles identify the relationship under which Cawelo and Zone 7 could develop a long term banking arrangement. Zone 7 would partner with Cawelo to build pipelines, wells, and pump stations to increase conjunctive use of the groundwater basin underlying Cawelo. The new infrastructure would enable Cawelo to increase surface water deliveries to its service area and therefore increase Cawelo's ability for in-lieu recharge. The new infrastructure would provide a minimum of 10,000 afa pump back capacity from Cawelo to the California Aqueduct, which would be available for return to Zone 7. Overall, Zone 7 would be able to store up to 120,000 acre-feet of water with Cawelo.

In July 2004, the Zone 7 Board unanimously approved the "Principles for In-Lieu Water Banking Program between Zone 7 and Cawelo Water District," and authorized staff to commence CEQA analysis and documentation, and participate in developing a monitoring program with Cawelo.

### *5.2.2.2 DSRSD: Berrenda Mesa Water District*

As reported in the 2000 UWMP, DSRSD previously signed an agreement with Berrenda Mesa Water District for the potential transfer of an additional 5,000 af of SWP water entitlements. The specific use or the need for the water entitlement transfer had not been identified at that time, and the actual transfer has not been executed. However, DSRSD still holds a "right of first refusal" for this 5,000 af of water and if an agreement is ever executed, this additional water allotment might be used to supplement existing supplies that may be cut back or serve future growth within and in the vicinity of the DSRSD service area. The additional water allotment might also be used for increased water supply reliability for the existing water service areas in the Livermore-Amador Valley, especially if SWP water supplies become less reliable in the future.

## 5.2.3 Opportunities for Development of Desalinated Water

Because of DSRSD's, and Zone 7's, location, there are no opportunities for the direct development of desalinated ocean water, brackish ocean water, or brackish groundwater as a long-term supply source, unless such a project were undertaken in partnership with another agency that is more geographically favorably situated.

### 5.2.4 Vulnerability to Drought Conditions

The nature of every drought is different and the way in which water supplies are limited during a drought is also different. During the drought of 1987-92, Zone 7 attempted to meet the demand of its customers by pumping local groundwater. Unfortunately, Zone 7 did not have the physical facilities in place to pump enough groundwater to meet maximum daily demand during this

drought. These groundwater pumping problems have since been corrected, which has increased the reliability of Zone 7's water system.

Zone 7 currently estimates that groundwater from the Main Basin could meet 75 percent of the maximum daily demand of all its water retailers for a period of up to six years. If SWP water deliveries begin to be curtailed due to a drought, Zone 7 will begin to pump additional groundwater to meet the demand of its customers. Even if no SWP supplies are available, this groundwater supply will be sufficient to meet water demands, without water rationing, for a drought with a duration of up to six years and an average supply deficiency similar to the deficiency experienced during the 1929-34 and 1987-92 droughts. However, if SWP water deliveries were curtailed for a longer period of time or if a larger average supply deficiency were experienced, voluntary or mandatory water rationing may become necessary as groundwater supplies were depleted.

#### 5.2.5 Drought Contingency Measures

As discussed in Section 9.0 of this UWMP, DSRSD has established a Water Use Reduction Plan to be implemented in the event of a drought condition or other water shortage condition. The Water Use Reduction Plan includes four conservation stages with mandated restrictions and suggested conservation guidelines for each stage. DSRSD declared a Stage I condition in 1991, which called for customers to voluntarily reduce consumption by 25 percent.

## 6.0 PAST, PRESENT AND PROJECTED WATER DEMAND

### 6.1 Historical and Current Water Demands

Table 6-1 and Figure 6-1 show the historical potable and recycled water use within DSRSD's service area from 1975 through 2004. As shown, since the mid-1970's water used within DSRSD's service area has more than tripled. Much of this increase has occurred over the last five years due to rapid growth in the service area. As shown, the 2004 potable water use was 10,978 afa and 2004 recycled water use was 737 afa. However, it should be noted that 496 afa of potable water was used in 2004 to supplement recycled water supplies to meet recycled water irrigation demands in Dublin and Dougherty Valley. This supplementation was required for two reasons: (1) operational practices at the RWTF exclude running the RWTF during the winter months and (2) Dougherty Valley customers, while piped for recycled water, still receive potable water. In the future, as recycled water demands increase, and when the Sand Filtration Treatment Facilities (SFTF) are completed (scheduled for fall 2005), the RWTF will be operated year-round, eliminating the need for use of potable water to meet winter irrigation recycled water demands. Further discussion regarding DSRSD's RWTF is provided in Section 10.0.

Figure 6-2 shows the historical per capita potable water use for the DSRSD service area for 1983 through 2004. As shown, based on 2004 total potable water use, the per capita water use was 210 gallons per capita per day (gpcd). This per capita use is down somewhat from the high of 241 gpcd experienced in 2001 (which was likely due to increased water demand for grading and other construction activities in the Dougherty Valley area and in Eastern Dublin), but is not as low as per capita use experienced in the early and mid 1990's which was below 150 gpcd. This trend may be due to recently renewed awareness of the need for conservation, however not to the extent demonstrated during and immediately after the 1987 to 1992 drought.

Table 6-2 shows the 2003 potable water use by customer type for Dublin and Dougherty Valley. As shown, about 43 percent of use is by residential customers (single family, condominium, multi-family and duplex), 16 percent is commercial, 17 percent is irrigation, 2 percent is schools and 10 percent is for construction purposes. Water use at Camp Parks, the FCI Federal Prison and Santa Rita Jail make up about 13 percent of the potable water use. Unaccounted for water is not shown in Table 6-2. Unaccounted for water was estimated to be about 8.8 percent of total water purchases in 2003 (see Section 8.3 of this UWMP for additional information).

### 6.2 Projected Water Demands

DSRSD projected water demands for the next five years (on a monthly basis) are provided to Zone 7 for water delivery and scheduling purposes. Longer term projections for the subsequent five years (on an annual basis) are also provided by DSRSD to Zone 7 as part of the rate study process.

The projected potable and recycled water demands for the DSRSD service area are summarized in Table 6-3 and illustrated on Figure 6-3. As shown, potable water demands are anticipated to increase from the current (2004) demand of 10,482 afa to 17,100 afa. Table 6-4 provides the detailed potable water demand at buildout (including estimated unaccounted for water) by planning area and land use designation. Recycled water demands are anticipated to increase from the current (2004) demand of 1,233 afa up to a maximum of 3,700 afa. Table 6-5 provides the detailed recycled water demand at buildout by planning area and land use designation. Buildout of the DSRSD water service area is estimated to occur at approximately 2020, hence the estimated demands for 2025 and 2030 shown in Table 6-3 are the same as those estimated for 2020.

**Table 6-1. Historic Water Use Within DSRSD Service Area (1975-2004)**

Calendar Year	Potable Water Use, afa <sup>(a)</sup>	Recycled Water Use, afa <sup>(b)</sup>
1975	2,621	
1976	2,698	
1977	1,961	
1978	2,066	
1979	2,271	
1980	2,425	
1981	2,560	
1982	2,422	
1983	2,612	
1984	2,977	
1985	3,084	
1986	3,615	
1987	3,585	
1988	3,701	
1989	3,852	
1990	4,002	
1991	3,299	
1992	3,419	
1993	3,517	
1994	3,855	
1995	4,054	
1996	4,113	
1997	4,634	
1998	4,054	
1999	6,535	
2000	7,369	34
2001	8,815	44
2002	8,728 <sup>(c)</sup>	98 <sup>(d)</sup>
2003	9,037 <sup>(e)</sup>	392 <sup>(f)</sup>
2004	10,978 <sup>(g)</sup>	737 <sup>(h)</sup>

- <sup>(a)</sup> Data provided by DSRSD based on metered data at turnouts. Includes Camp Parks Reserve Forces Training Area, Dublin Federal Correction Institution and Alameda County Santa Rita Jail.
- <sup>(b)</sup> Based on total annual recycled water production by DSRSD's RWTF.
- <sup>(c)</sup> Includes 211 af of potable water used to supplement recycled water demands in the City of Dublin.
- <sup>(d)</sup> Total recycled water demand in City of Dublin was 309 af. However, recycled water production at DSRSD's RWTF was only 98 af due to DSRSD operational practices. The balance of the demand (211 af) was met using potable water.
- <sup>(e)</sup> Includes 357 af of potable water used to supplement recycled water demands in the City of Dublin and Dougherty Valley.
- <sup>(f)</sup> Total recycled water demand in City of Dublin and Dougherty Valley was 749 af. However, recycled water production at DSRSD's RWTF was only 392 af due to DSRSD operational practices. The balance of the demand (357 af) was met using potable water.
- <sup>(g)</sup> Includes 496 af of potable water used to supplement recycled water demands in the City of Dublin and Dougherty Valley.
- <sup>(h)</sup> Total recycled water demand in City of Dublin and Dougherty Valley was 1,233 af. However, recycled water production at DSRSD's RWTF was only 737 af due to DSRSD operational practices. The balance of the demand (496 af) was met using potable water.

**Table 6-2. 2003 Potable Water Use by Customer Location and Type<sup>(a)</sup>**

Customer Type	Water Use (afa)			Percent of Total
	Dublin	Dougherty Valley	Total	
Single Family Residential	2,944	158	3,102	35%
Condominium	124	1	125	1%
Multi-Family/Duplex	213	-	213	2%
Commercial	1,267	4	1,271	14%
Irrigation	1,343	59	1,402	16%
Fireline	5	-	5	0%
Schools/Other Institutional	158	-	158	2%
Construction	790	1	791	9%
Subtotal	6,845	222	7,068	79%
Camp Parks RFTA			166	2%
FCI Federal Prison			278	3%
Alameda County Santa Rita Jail			682	8%
<b>Total Metered Water Use</b>			<b>8,193</b>	<b>91%</b>
Unaccounted for Water (estimated at 8.8% of total purchases) <sup>(b)</sup>			793	9%
<b>Total Water Use</b>			<b>8,986</b>	<b>100%</b>

<sup>(a)</sup> Based on 2003 revenue sales data from DSRSD.

<sup>(b)</sup> From Revised Unaccounted Water Calculations, Stanley Kolodzie, DSRSD Associate Engineer, May

Table 6-4. Projected Possible Water Demand at Buildout

Location	Land Use Designation	Area (acres) <sup>(a)</sup>	Area Advanced for Streets <sup>(b)</sup>	Assumed Density <sup>(c)</sup>	Units	Size of Interior Water Use	Units	Exterior Water Use Factor (gpd/acre) <sup>(d)</sup>	Interior Water Use Factor <sup>(e)</sup>	Units	Water Demand (acre-feet)	(20) Water Demand, all-year	Total Dwelling Units	Inclusive Unaccounted For (8.8%) acre-ft	
Camp Parks	Residential - Medium	41.4	33.1	10	DU/acre	331.0	DU	312.5	200	393	119				
	Mixed Use	98.7	98.7	0.25	FAR	1,074,633.5	ft <sup>2</sup>	312.5	0.1	155					
	Commercial - Office	184.1	184.1	0.25	FAR	2,096,260.1	ft <sup>2</sup>	312.5	0.1	289					
	Industrial - Business Park	49.2	49.2	0.28	FAR	599,593.7	ft <sup>2</sup>	312.5	0.1	84					
	Public - Public/Semi-Public	4.1	4.1	0.25	FAR	44,277.5	ft <sup>2</sup>	312.5	0.05	4					
	Public - Jail <sup>(f)</sup>	220.8	220.8	-	-	5,500.0	inmates	1325	100	944					
	Open Space - City Park/Community Center <sup>(g)</sup>	88.8	88.8	30	Visitors/acre/year	2,663.2	visitors	0	8	24		1,749	531.0	1,900.0	
	Contingency <sup>(h)</sup>														
	Residential - Low	946.8	1060.5	4	DU/acre	4,241.8	DU	3125	225	393	1,867				
	Residential - Medium	216.1	242.0	10	DU/acre	2,420.4	DU	3125	157	393	610				
Residential - Medium High	65.2	73.0	20	DU/acre	1,460.8	DU	3125	57	157	257					
Residential - High	4.1	4.1	35	DU/acre	142.4	DU	3125	18	57	22					
Mixed Use	10.2	10.2	0.25	FAR	111,402.0	ft <sup>2</sup>	3125	0.1	48	48					
Commercial - Retail	321.3	321.3	0.25	FAR	3,499,417.3	ft <sup>2</sup>	3125	0.1	157	157					
Industrial - Business Park	161.3	161.3	0.28	FAR	1,967,852.2	ft <sup>2</sup>	3125	0.1	785	785					
Public - Public/Semi-Public	80.2	80.2	0.25	FAR	873,584.7	ft <sup>2</sup>	3125	0.05	330	330					
Public - Elementary School <sup>(a)</sup>	24.7	24.7	37	Students/acre	914.3	Students	3125	10	109	19					
Public - Elementary School <sup>(a)</sup>	27.7	27.7	37	Students/acre	1,025.8	Students	3125	10	109	19					
Public - Middle School <sup>(a)</sup>	6.0	6.0	37	Students/acre	222.7	Students	3125	15	6	6					
Public - High School <sup>(a)</sup>	50.5	50.5	37	Students/acre	1,869.8	Students	3125	20	60	60					
Open Space - City Park/Community Center <sup>(g)</sup>	61.5	61.5	30	Visitors/acre/year	1,845.4	Visitors	0	8	17	17	5,646	8,265.4	6,100.0		
Residential - Low	599.8	638.2	5.7	DU/acre	3,616.4	DU	3125	393	393	1,922					
Residential - Low Medium	214.2	239.9	6.9	DU/acre	1,661.7	DU	3125	380	380	614					
Residential - Medium	98.9	111.8	9.1	DU/acre	1,022.8	DU	3125	280	280	276					
Residential - Medium High	81.5	91.3	12.4	DU/acre	1,131.9	DU	3125	190	190	165					
Residential - High <sup>(a)</sup>	60.3	67.6	31.6	DU/acre	2,132.8	DU	3125	299	125	299					
Commercial - Retail	36.9	36.9	0.25	FAR	401,740.5	ft <sup>2</sup>	3125	0.1	58	58					
Commercial - Public/Semi-Public	5.4	5.4	0.25	FAR	58,592.3	ft <sup>2</sup>	3125	0.05	5	5					
Public - Elementary School <sup>(a)</sup>	36.0	36.0	37	Students/acre	1,333.2	Students	3125	10	28	28					
Public - Middle School <sup>(a)</sup>	20.2	20.2	37	Students/acre	746.1	Students	3125	15	20	20					
Public - High School <sup>(a)</sup>	55.5	55.5	37	Students/acre	1,978.8	Students	3125	20	63	63					
Public - Community College	13.2	13.2	37	Students/acre	487.7	Students	3125	20	16	16					
Open Space - City Park/Community Center <sup>(g)</sup>	81.3	81.3	30	Visitors/acre/year	2,440.0	Visitors	0	8	22	22	3,114	9,565.7	3,400.0		
Open Space - Neighborhood Park	33.6	32.6	-	-	-	-	-	-	-	-					
Residential - Rural	180.3	146.2	0.01	DU/acre	1.5	DU	3125	0	1	1					
Residential - Low	752.6	842.9	4.0	DU/acre	3,371.5	DU	3125	0	730	730					
Residential - Medium	517.0	579.0	10.0	DU/acre	5,790.2	DU	3125	0	200	1,484					
Residential - Medium High	180.1	145.8	20.0	DU/acre	2,915.3	DU	3125	0	130	1,297					
Residential - High	89.8	89.8	35.0	DU/acre	3,142.8	DU	3125	0	125	440					
Commercial - Retail	312.6	312.6	0.25	FAR	3,404,037.4	ft <sup>2</sup>	3125	0.1	491	491					
Commercial - Office	399.3	399.3	0.25	FAR	3,694,741.1	ft <sup>2</sup>	3125	0.1	533	533					
Industrial - Business Park	57.1	57.1	0.28	FAR	696,140.6	ft <sup>2</sup>	3125	0.1	96	96					
Public - Public/Semi-Public	95.3	95.3	0.25	FAR	1,037,464.7	ft <sup>2</sup>	3125	0.05	91	91					
Public - Elementary School <sup>(a)</sup>	49.3	49.3	37	Students/acre	1,824.9	Students	3125	10	38	38					
Public - Middle School <sup>(a)</sup>	25.8	25.8	37	Students/acre	933.4	Students	3125	15	25	25					
Public - High School <sup>(a)</sup>	1.1	1.1	37	Students/acre	40.1	Students	3125	20	1	1					
Open Space - City Park/Community Center <sup>(g)</sup>	150.0	150.0	30	Visitors/acre/year	4,500.2	Visitors	0	8	40	40					
Open Space - Golf Course	179.5	179.5	-	-	-	-	-	-	2	2					
Open Space - Neighborhood Park	47.0	47.0	-	-	-	-	-	-	7	7					
Contingency <sup>(h)</sup>															
Residential - Low	94.0	108.2	2.6	DU/acre	315.0	DU	3125	0	393	393					
Residential - Medium	9.1	10.5	10.0	DU/acre	194.8	DU	3125	0	200	239					
Residential - High	6.1	6.1	35.0	DU/acre	213.8	DU	3125	0	130	31					
Commercial - Office	0.6	0.6	0.25	FAR	6,816.9	ft <sup>2</sup>	3125	0.1	3	3					
Public - Public/Semi-Public	2.5	2.5	0.25	FAR	27,381.9	ft <sup>2</sup>	3125	0.05	10	10					
Open Space - City Park/Community Center <sup>(g)</sup>	10.4	10.4	30	Visitors/acre/year	311.1	Visitors	0	8	36.3	36.3	243	315.0	260.0		
Contingency <sup>(h)</sup>															
TOTAL												15,800	33,900	17,100	

(a) Obtained from WYA's GIS System  
 (b) Acreage for Rural, Low, Low-Medium, Medium, and Medium High increased by 12% to account for streets; 12% based on estimates completed with WYA's GIS system  
 (c) Assumed densities obtained from the 2000 Water Master Plan, unless otherwise noted  
 (d) Interior and Exterior water use factors obtained from 2005 Water Master Plan (Table 3-13 of Chapter 3)  
 (e) Number of inmates obtained from Bureau of Prisons or Alameda County Sheriff facilities  
 (f) Number of visitors based on interior water use projected in the Eastern Dublin Facilities Plan and 8 gpd/visitor unit demand factor presented in the 2000 Water Master Plan  
 (g) Acreage for Residential High increased by 12% due to number of streets near this land use designation in Dougherty Valley  
 (h) Number of students per acre based on actual number of students reported for existing schools in the City of Dublin and acreage from WYA's GIS system

Table 6-5. Projected Recycled Water Demand at Buildout

Customer	Land Use	Gross Area, acres	Percentage of Area Irrigable <sup>(b)</sup>	Irrigable Area, acres <sup>(b)</sup>	Unit Demand, in/year <sup>(c)</sup>	Total Irrigation Demand, acre-feet	Percentage of Irrigation Demand met with Recycled Water <sup>(b)</sup>	Irrigation Factor Based on Plant Type <sup>(b)</sup>	Recycled Water Demand, acre-feet
Camp Parks - City Development	Mixed Use	99	15%	14.8	40.0	49.3	100%	0.9	44.4
	Public - Public/Semi-Public	4	25%	1.0	40.0	3.3	95%	0.9	2.9
	Open Space - Park	80	80%	63.7	40.0	212.3	100%	1.0	212.3
	Contingency <sup>(d)</sup>								65.0
Camp Parks - Proper	Residential - Medium	47	30%	14.2	40.0	47.4	30%	0.9	12.8
	Commercial - Office	184	15%	27.6	40.0	92.0	100%	0.8	73.6
	Industrial - Business Park	49	20%	9.8	40.0	32.8	100%	0.9	29.5
	Open Space - Park	9	80%	7.3	40.0	24.4	100%	1.0	24.4
Central Dublin	Residential - Medium High	6	30%	1.9	40.0	6.4	80%	0.9	4.6
	Commercial - Retail	54	15%	8.1	40.0	26.9	100%	0.8	21.5
	Industrial - Business Park	95	20%	19.1	40.0	63.5	100%	0.9	57.2
	Public - Elementary School	25	50%	12.4	40.0	41.2	95%	0.9	35.2
	Public - Middle School	6	30%	3.0	40.0	10.0	95%	0.9	8.6
	Public - High School	51	50%	25.3	40.0	84.2	95%	0.9	72.0
Eastern Dublin	Open Space - Park	41	80%	33.0	40.0	110.1	100%	1.0	110.1
	Residential - Medium	301	30%	90.2	40.0	300.8	30%	0.9	81.2
	Residential - Medium High	131	30%	39.3	40.0	131.1	80%	0.9	94.4
	Residential - High	91	25%	22.7	40.0	75.6	80%	0.9	54.4
	Commercial - Retail	316	15%	47.4	40.0	157.9	100%	0.8	126.3
	Commercial - Office	339	15%	50.8	40.0	169.3	100%	0.8	135.4
	Industrial - Business Park	57	20%	11.4	40.0	38.1	100%	0.9	34.2
	Public - Public/Semi-Public	95	25%	23.7	40.0	79.0	95%	0.9	67.5
	Public - Elementary School	57	50%	28.5	40.0	94.9	95%	0.9	81.1
	Public - Middle School	26	30%	12.9	40.0	43.0	95%	0.9	36.7
	Public - High School	1	50%	0.5	40.0	1.8	95%	0.9	1.5
	Open Space - Golf Course	177	95%	168.0	40.0	560.0	100%	1.0	560.0
	Open Space - Park	197	80%	157.5	40.0	525.1	100%	1.0	525.1
	Corridor	104	50%	52.2	40.0	174.0	100%	1.0	174.0
Contingency <sup>(d)</sup>								70.0	
Shapell	Residential - Medium	136	30%	40.7	40.0	135.5	30%	0.9	36.6
	Residential - Medium High	61	30%	18.2	40.0	60.7	80%	0.9	43.7
	Residential - High	24	25%	6.1	40.0	20.3	80%	0.9	14.6
	Commercial - Retail	37	15%	5.5	40.0	18.4	100%	0.8	14.8
	Public - Elementary School	16	50%	7.8	40.0	26.0	95%	0.9	22.2
	Median	109	10%	10.9	40.0	36.5	100%	1.0	36.5
	Open Space - Park	66	80%	52.6	40.0	175.5	100%	1.0	175.5
	Corridor	68	50%	34.1	40.0	113.8	100%	1.0	113.8
Windemere	Residential - Medium	13	30%	3.9	40.0	13.0	30%	0.9	3.5
	Residential - Medium High	34	30%	10.3	40.0	34.5	80%	0.9	24.8
	Residential - High	63	25%	15.7	40.0	52.4	80%	0.9	37.7
	Public - Elementary School	20	50%	10.2	40.0	34.1	95%	0.9	29.1
	Public - Middle School	20	50%	10.1	40.0	33.6	95%	0.9	28.7
	Public - High School	53	50%	26.7	40.0	89.1	95%	0.9	76.2
	Public - Community College	14	50%	6.9	40.0	23.1	95%	0.9	19.7
	Median	51	10%	5.1	40.0	17.0	100%	1.0	17.0
	Open Space - Park	53	80%	42.0	40.0	140.1	100%	1.0	140.1
	Corridor	29	50%	14.7	40.0	49.0	100%	1.0	49.0
<b>TOTAL</b>		<b>3,508</b>		<b>1,268</b>		<b>4,227</b>			<b>3,700</b>

<sup>(a)</sup> Obtained from WYA's GIS System (EstimRWUse.shp)

<sup>(b)</sup> Based on DERWA Factors, see 12/2003 Final Design Hydraulic Modeling TM by CDM

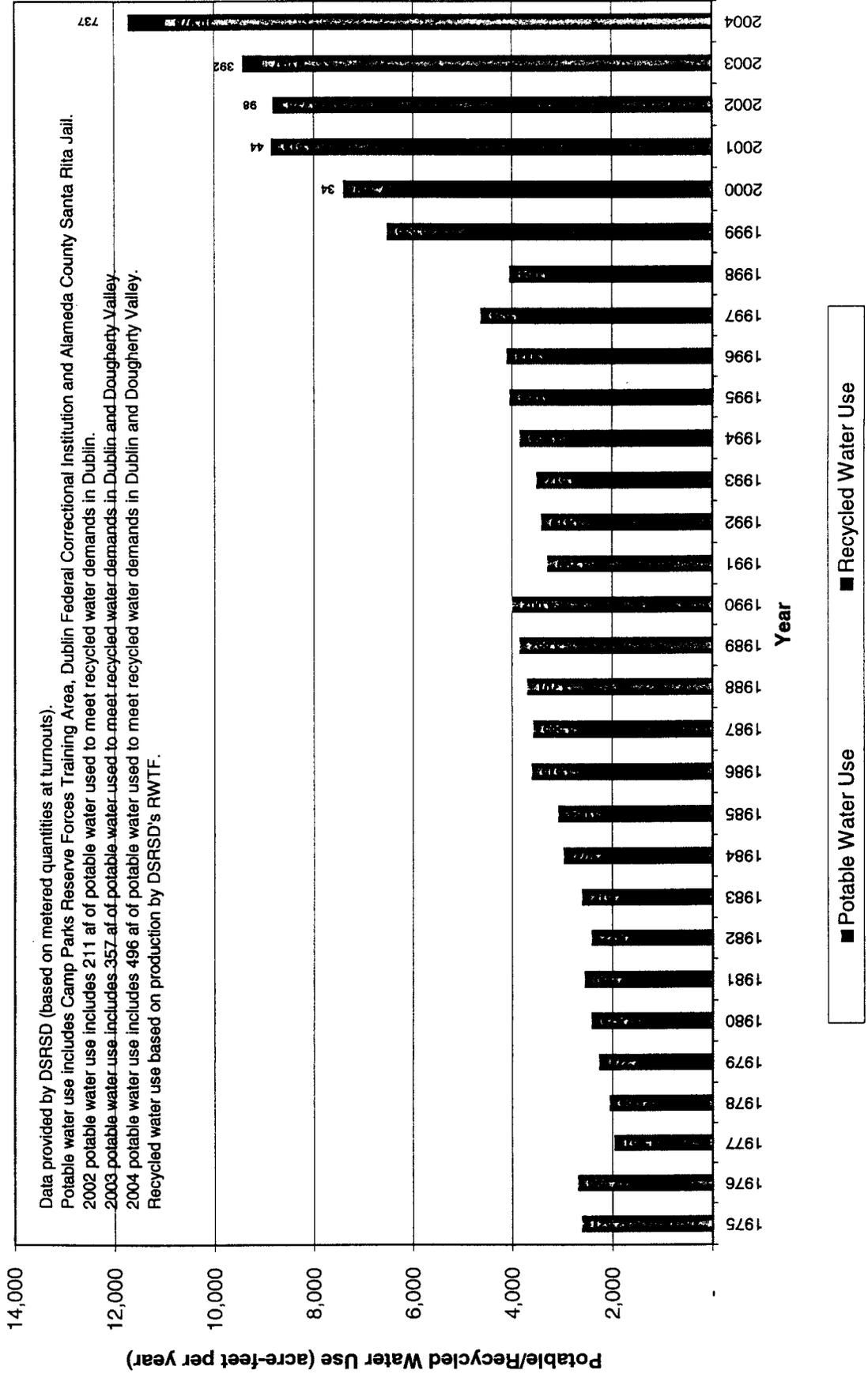
<sup>(c)</sup> Developed using meter records provided by DSRSD

<sup>(d)</sup> A contingency of 65 and 70 acre-feet was added to Camp Parks and Eastern Dublin, respectively, to account for potential land use changes, not fully defined, expected in the near future

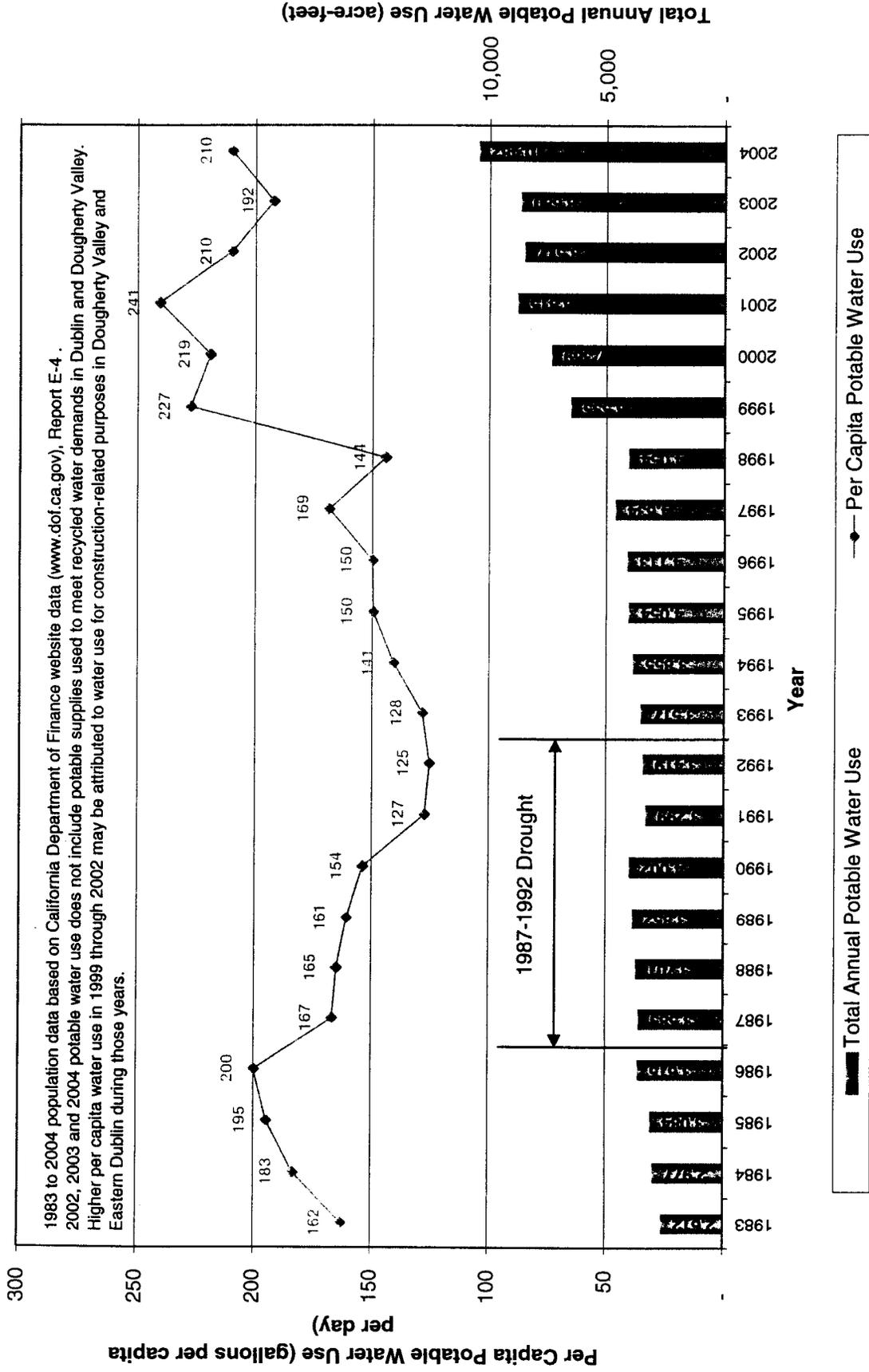
gpm = gallons per minute

mgd = million gallons per day

**Figure 6-1. DSRSD Historic Potable and Recycled Water Use (1975-2004)**

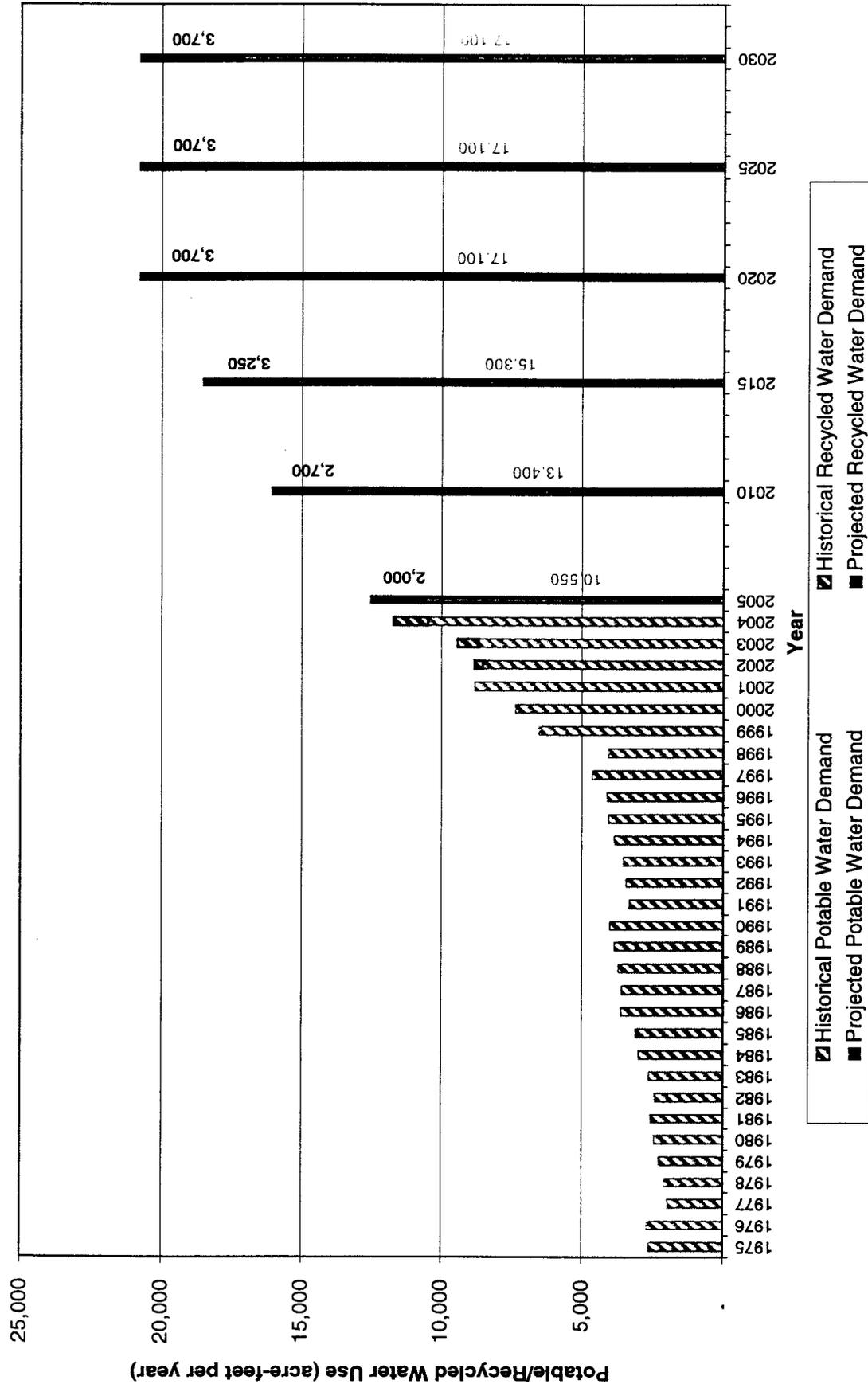


**Figure 6-2. DSRSD Per Capita Potable Water Use (1983-2004)**



Last Revised: March 22, 2005  
 DSRSD Demand  
 Per Capita Figure

Figure 6-3. DSRSD Historic and Projected Potable and Recycled Water Demand



Last Revised: March 22, 2005  
 DSRSD Demand  
 Hist & Proj Demand Figure

## **7.0 SUPPLY AND DEMAND COMPARISON**

### **7.1 Comparison of Historic Supply and Demand**

As described in Section 4.0, Zone 7, with its available SWP imported surface water supplies, local surface water supplies, local groundwater supplies and non-local groundwater storage, has historically been able to meet the demands of the four retail water agencies in normal, single dry years and multiple dry years. The only historic supply shortage occurred during the drought of 1987-92, when imported surface water supplies were limited and Zone 7 did not have the physical facilities in place to pump enough groundwater to meet the maximum day demand of its customers and water conservation was required. However, these groundwater pumping problems have since been corrected, which has increased the reliability of Zone 7's water system.

As such, DSRSD has historically been able to meet the demands of its customers. During the drought of 1987-92, DSRSD was required to impose Stage I of its Water Use Reduction Plan, which called for customers to voluntarily reduce water use. DSRSD's water customers were extremely responsive to this Stage I emergency and it was not necessary for DSRSD to impose more severe rationing during the drought. Additional discussion of DSRSD's Water Use Reduction Plan is provided in Section 9.0 of this UWMP.

### **7.2 Comparison of Normal, Dry and Multiple Dry Water Years**

Table 7-1 shows a comparison of DSRSD's current and projected water supply and demand assuming normal hydrologic conditions. Based on the Zone 7 water supply available to DSRSD and DSRSD's groundwater pumping IQ (pumped either by Zone 7 for DSRSD (see Section 4.2) or from future DSRSD wells), DSRSD will be able to meet the projected potable water demands of its customers under all hydrologic conditions (see previous discussion in Section 5.1).

Table 7-2 presents the DSRSD supply/demand comparison for a single dry year (assuming it occurs in 2005) and multiple dry years (assuming a three-year period beginning in 2005) assuming that demands are not reduced. As shown in Table 7-2, because of the Zone 7 supply available to DSRSD and DSRSD's groundwater pumping IQ, even in single and multiple dry years, DSRSD is able to meet the demands of its customers. Also shown are DSRSD's recycled water supplies meeting the projected recycled water demands. As discussed previously, recycled water is extremely reliable and is not susceptible to drought conditions.

Table 7-3, demonstrates the supply/demand conditions when water conservation measures are considered. A 25 percent water demand reduction has been assumed for City of Dublin customers, consistent with actual conservation savings achieved in 1991, at the height of the 1987-92 drought. Although Dougherty Valley customers will also likely conserve water during a drought condition, no demand reduction has been assumed for Dougherty Valley customers as the supply acquired for Dougherty Valley was designed to be 100 percent reliable under all hydrologic conditions. Also, no demand reduction is shown for the recycled water demand as recycled water supplies are generally considered to be drought resistant, with no reduction in supply (or corresponding reduction in demand) as a result of drought conditions. As shown, because the Zone 7 supply available to DSRSD is 100 percent reliable in single and multiple dry years, water conservation by DSRSD customers results in a net surplus of supply in single and multiple dry years, increasing overall supply reliability.

### 7.3 Future Supply Reliability in Single Dry and Multiple Dry Years

Table 7-4 shows the comparison of DSRSD future supply and demand for single dry years occurring in 2010, 2015, 2020, 2025 and 2030. As shown, because of the diversity of Zone 7's supply and the management of the Main Basin, the Zone 7 supply and the DSRSD groundwater IQ are 100 percent reliable in future single dry years, with availability the same as that for normal years (see Table 7-1). Demands for the future single dry years are assumed to be reduced for DSRSD's Dublin customers due to conservation measures that would likely be imposed by DSRSD as a result of dry year conditions. Even though some conservation will likely occur in the Dougherty Valley area due to customer awareness of a drought condition, no conservation has been assumed for Dougherty Valley customers as the supply which was obtained for them was designed to be 100 percent reliable during all hydrologic conditions. The overall reduction in DSRSD demand results in a surplus supply during these future single dry years, thus further increasing the reliability of the DSRSD supply.

Table 7-5 shows the comparison of DSRSD future supply and demand for multiple dry years ending in 2010, 2015, 2020, 2025 and 2030. As with the future single dry year scenario presented in Table 7-4, Table 7-5 shows that DSRSD supplies from Zone 7 and DSRSD's groundwater pumping IQ are 100 percent reliable, even in future multiple dry years. Again, demands are assumed to be reduced due to conservation by DSRSD's Dublin customers, resulting in a supply surplus in future multiple dry years.

Table 7-1. Comparison of Projected Water Supply and Demand in Normal Years

	Year						
	2004 (Current) <sup>(a)</sup>	2005	2010	2015	2020	2025	2030
<b>POTABLE WATER</b>							
Projected Potable Water Supply, afa							
Zone 7 Supply	10,978	9,905	12,755	14,655	16,455	16,455	16,455
DSRSD Groundwater <sup>(b)</sup>	0	645	645	645	645	645	645
Total Projected Potable Supply, afa	10,978	10,550	13,400	15,300	17,100	17,100	17,100
Projected Potable Water Demand, afa (see Table 6-3)	10,482	10,550	13,400	15,300	17,100	17,100	17,100
Supply Surplus or (Shortfall), afa	496	0	0	0	0	0	0
<b>RECYCLED WATER</b>							
Projected Recycled Water Supply, afa	737	2,000	2,700	3,250	3,700	3,700	3,700
Projected Recycled Water Demand, afa (see Table 6-3)	1,233	2,000	2,700	3,250	3,700	3,700	3,700
Supply Surplus or (Shortfall), afa	(496)	0	0	0	0	0	0

<sup>(a)</sup> Due to operational practices by DSRSD, recycled water production by DSRSD's RWTF in 2004 was only 737 afa; therefore, a portion of the recycled water demand for irrigation in Dublin and Dougherty Valley was met using potable water supplies (1,233 afa - 737 afa = 496 afa).

<sup>(b)</sup> As described in Section 4.2, DSRSD's groundwater IQ is pumped for DSRSD by Zone 7 from the Mocho No. 4 well. DSRSD pays Zone 7 for power, chemical and other incidental costs.

Table 7-2. Projected Water Supply and Demand in Dry Water Years  
(Assuming No Reduction in Demand)

	2004 (Current) <sup>(a)</sup>	Single Critically Dry Water Year (2005)	Multiple Dry Water Years		
			Year 1 (2005)	Year 2 (2006)	Year 3 (2007)
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7	10,978	9,905	9,905	10,475	11,045
DSRSD Groundwater	0	645	645	645	645
Total Potable Supply, afa	10,978	10,550	10,550	11,120	11,690
Projected Potable Water Demand, afa					
City of Dublin	--	9,300	9,300	9,560	9,820
Dougherty Valley	--	1,250	1,250	1,560	1,870
Total Potable Demand, afa	10,482	10,550	10,550	11,120	11,690
Potable Supply Surplus or (Shortfall), afa	496	0	0	0	0
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	737	2,000	2,000	2,140	2,280
Projected Recycled Water Demand, afa	1,233	2,000	2,000	2,140	2,280
Recycled Supply Surplus or (Shortfall), afa	(496)	0	0	0	0

<sup>(a)</sup> Due to operational practices by DSRSD, recycled water production by DSRSD's RWTF in 2004 was only 737 afa; therefore, a portion of the recycled water demand for irrigation in Dublin and Dougherty Valley was met using potable water supplies (1,233 afa - 737 afa = 496 afa).

Table 7-3. Projected Water Supply and Demand in Dry Water Years  
(Assuming Reduction in Demand)

	2004 (Current) <sup>(a)</sup>	Single Critically Dry Water Year (2005)	Multiple Dry Water Years		
			Year 1 (2005)	Year 2 (2006)	Year 3 (2007)
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7	10,978	9,905	9,905	10,475	11,045
DSRSD Groundwater	0	645	645	645	645
Total Potable Supply, afa	10,978	10,550	10,550	11,120	11,690
Projected Potable Water Demand, afa					
City of Dublin	--	9,300	9,300	9,560	9,820
Dougherty Valley	--	1,250	1,250	1,560	1,870
Water Conservation, afa					
City of Dublin (25 percent) <sup>(b)</sup>	--	(2,325)	(2,325)	(2,390)	(2,455)
Dougherty Valley (0 percent) <sup>(c)</sup>	--	0	0	0	0
Reduced Potable Water Demand with Conservation, afa	10,482	8,225	8,225	8,730	9,235
Potable Supply Surplus or (Shortfall), afa	496	2,325	2,325	2,390	2,455
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	737	2,000	2,000	2,140	2,280
Projected Recycled Water Demand, afa <sup>(d)</sup>	1,233	2,000	2,000	2,140	2,280
Recycled Supply Surplus or (Shortfall), afa	(496)	0	0	0	0

<sup>(a)</sup> Due to operational practices by DSRSD, recycled water production by DSRSD's RWTF in 2004 was only 737 afa; therefore, a portion of the recycled water demand for irrigation in Dublin and Dougherty Valley was met using potable water supplies (1,233 afa - 737 afa = 496 afa).

<sup>(b)</sup> A demand reduction of 25 percent is assumed for the City of Dublin based on actual conservation savings during the 1987-1992 drought.

<sup>(c)</sup> No demand reduction is assumed for Dougherty Valley as the supply was designed to be 100 percent reliable under all hydrologic conditions.

<sup>(d)</sup> Due to the nature of the recycled water supply and its resistance to drought conditions, no demand reduction is assumed for recycled water demand.

**Table 7-4. Comparison of Projected Water Supply and Demand in Single Dry Years**

	Year				
	2010	2015	2020	2025	2030
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	12,755	14,655	16,455	16,455	16,455
DSRSD Groundwater	645	645	645	645	645
<b>Total Projected Potable Supply, afa</b>	<b>13,400</b>	<b>15,300</b>	<b>17,100</b>	<b>17,100</b>	<b>17,100</b>
Projected Potable Water Demand, afa <sup>(a)</sup>	10,750	12,325	13,675	13,675	13,675
<b>Supply Surplus or (Shortfall), afa</b>	<b>2,650</b>	<b>2,975</b>	<b>3,425</b>	<b>3,425</b>	<b>3,425</b>
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	2,700	3,250	3,700	3,700	3,700
Projected Recycled Water Demand, afa <sup>(b)</sup>	2,700	3,250	3,700	3,700	3,700
<b>Supply Surplus or (Shortfall), afa</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

<sup>(a)</sup> Assumes 25 percent reduction in City of Dublin demands based on conservation measures that would be implemented during a dry year. No conservation is assumed for Dougherty Valley as the supply was designed to be 100 percent reliable under all hydrologic conditions.

<sup>(b)</sup> Due to the nature of the recycled water supply and its resistance to drought conditions, no demand reduction is assumed for recycled water demand.

Table 7-5. Comparison of Projected Water Supply and Demand in Multiple Dry Years

	2006 through 2010				
	2006	2007	2008	2009	2010
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	10,475	11,045	11,615	12,185	12,755
DSRSD Groundwater	645	645	645	645	645
Total Projected Potable Supply, afa	11,120	11,690	12,260	12,830	13,400
Projected Potable Water Demand, afa <sup>(a)</sup>	8,730	9,235	9,740	10,245	10,750
Supply Surplus or (Shortfall), afa	2,390	2,455	2,520	2,585	2,650
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	2,140	2,280	2,420	2,560	2,700
Projected Recycled Water Demand, afa <sup>(b)</sup>	2,140	2,280	2,420	2,560	2,700
Supply Surplus or (Shortfall), afa	0	0	0	0	0

	2011 through 2015				
	2011	2012	2013	2014	2015
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	13,135	13,515	13,895	14,275	14,655
DSRSD Groundwater	645	645	645	645	645
Total Projected Potable Supply, afa	13,780	14,160	14,540	14,920	15,300
Projected Potable Water Demand, afa <sup>(a)</sup>	11,065	11,380	11,695	12,010	12,325
Supply Surplus or (Shortfall), afa	2,715	2,780	2,845	2,910	2,975
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	2,810	2,920	3,030	3,140	3,250
Projected Recycled Water Demand, afa <sup>(b)</sup>	2,810	2,920	3,030	3,140	3,250
Supply Surplus or (Shortfall), afa	0	0	0	0	0

	2016 through 2020				
	2016	2017	2018	2019	2020
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	15,015	15,375	15,735	16,095	16,455
DSRSD Groundwater	645	645	645	645	645
Total Projected Potable Supply, afa	15,660	16,020	16,380	16,740	17,100
Projected Potable Water Demand, afa <sup>(a)</sup>	12,595	12,865	13,135	13,405	13,675
Supply Surplus or (Shortfall), afa	3,065	3,155	3,245	3,335	3,425
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	3,340	3,430	3,520	3,610	3,700
Projected Recycled Water Demand, afa <sup>(b)</sup>	3,340	3,430	3,520	3,610	3,700
Supply Surplus or (Shortfall), afa	0	0	0	0	0

	2021 through 2025				
	2021	2022	2023	2024	2025
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	16,455	16,455	16,455	16,455	16,455
DSRSD Groundwater	645	645	645	645	645
Total Projected Potable Supply, afa	17,100	17,100	17,100	17,100	17,100
Projected Potable Water Demand, afa <sup>(a)</sup>	13,675	13,675	13,675	13,675	13,675
Supply Surplus or (Shortfall), afa	3,425	3,425	3,425	3,425	3,425
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	3,700	3,700	3,700	3,700	3,700
Projected Recycled Water Demand, afa <sup>(b)</sup>	3,700	3,700	3,700	3,700	3,700
Supply Surplus or (Shortfall), afa	0	0	0	0	0

	2026 through 2030				
	2026	2027	2028	2029	2030
<b>POTABLE WATER</b>					
Projected Potable Water Supply, afa					
Zone 7 Supply	16,455	16,455	16,455	16,455	16,455
DSRSD Groundwater	645	645	645	645	645
Total Projected Potable Supply, afa	17,100	17,100	17,100	17,100	17,100
Projected Potable Water Demand, afa <sup>(a)</sup>	13,675	13,675	13,675	13,675	13,675
Supply Surplus or (Shortfall), afa	3,425	3,425	3,425	3,425	3,425
<b>RECYCLED WATER</b>					
Projected Recycled Water Supply, afa	3,700	3,700	3,700	3,700	3,700
Projected Recycled Water Demand, afa <sup>(b)</sup>	3,700	3,700	3,700	3,700	3,700
Supply Surplus or (Shortfall), afa	0	0	0	0	0

<sup>(a)</sup> Assumes 25 percent reduction in City of Dublin demands based on conservation measures that would be implemented during a dry year. No conservation is assumed for Dougherty Valley as the supply was designed to be 100 percent reliable under all hydrologic conditions.

<sup>(b)</sup> Due to the nature of the recycled water supply and its resistance to drought conditions, no demand reduction is assumed for recycled water demand.

## **8.0 WATER DEMAND MANAGEMENT MEASURES**

DSRSD is committed to reducing the demand for potable water through conservation. On September 17, 1991, DSRSD became an original signatory to and a member of the California Urban Water Conservation Council (CUWCC), when DSRSD's Board of Directors officially adopted the Memorandum of Understanding Regarding Urban Water Conservation in California. DSRSD has been implementing various Best Management Practices (BMPs) for water conservation since 1991 and has been submitting reports to the CUWCC since 1992. A copy of DSRSD's 2003/04 Best Management Report Filing to CUWCC is provided in Appendix F.

The fourteen water conservation BMPs required by CUWCC correspond with the fourteen Demand Management Measures (DMMs) contained in the Urban Water Management Planning Act (UWMPA). Table 8-1 provides an overview of DSRSD's current water conservation policies and programs as they relate to the fourteen DMMs. Descriptions of DSRSD's policies and programs follow.

### **8.1 DMM 1: Water Survey Programs for Single Family and Multi-Family Residential Customers**

#### Description:

Water survey programs typically involve residential interior and exterior water use reviews whereby staff assist homeowners in identifying potential leaks and areas for water savings. Interior fixtures are checked and leak tested and irrigation systems are evaluated. Residents are generally provided with recommendations for improvements, plumbing retrofit kits and water conservation literature. Such programs can be very labor intensive as they require time to set up appointments with residents, as well as the actual survey time and follow up time.

DSRSD has offered water audits to customers from the time of its first water deliveries. Through 2004, DSRSD has completed 84 single-family residential surveys and 10 multi-family residential surveys. However, to keep water rates reasonable, DSRSD audits customers only upon request. The availability of these audits is announced in DSRSD's newsletters.

#### Implementation Schedule:

- Water Survey Programs: On-going; As requested by the customer

### **8.2 DMM 2: Residential Plumbing Retrofit**

#### Description:

As the result of Assembly Bill 2325, which DSRSD supported during its passage, all new homes constructed as of January 1992 require the installation of ultra low flush toilets (1.6 gallons per flush). DSRSD has a two-fold interest in water conservation since it is both a water purveyor and an owner and operator of a wastewater treatment plant. In 1981, DSRSD commissioned Brown and Caldwell to complete a water conservation plan. A pilot water conservation program was completed in 1986 that showed about 50 gpd of water use reduction could be achieved through retrofitting pre-1979 homes with low flush toilets and water efficient showerheads. This earlier study was prompted more by wastewater treatment plant capacity restrictions as opposed to potable water limitations.

Table 8-1. Urban Water Management Planning Act Demand Management Measures

DMM Number	Demand Management Measure Description	DSRSD Conservation Program
1	Water Survey Programs for Single Family and Multi-Family Residential Customers	<ul style="list-style-type: none"> <li>Audits offered to customers upon request.</li> </ul>
2	Residential Plumbing Retrofit	<ul style="list-style-type: none"> <li>Ultra-Low Flow Toilet Rebate Program in place since 1994.</li> <li>High-Efficiency Washing Machine Rebate Program in place since 1998.</li> <li>Plumbing retrofit kits distributed during drought periods.</li> </ul>
3	System Water Audits, Leak Detection and Repair	<ul style="list-style-type: none"> <li>Water system audit conducted in 1994</li> <li>Unaccounted for water and system losses are tracked on a monthly basis by DSRSD engineering staff.</li> <li>Leak detection and repair program on-going by Field Operations staff.</li> </ul>
4	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections	<ul style="list-style-type: none"> <li>Two-tier rate structure based on water consumption in place since 1992 to encourage water conservation.</li> <li>Residential and Commercial Water Meter Replacement Program on-going.</li> </ul>
5	Large Landscape Conservation Programs and Incentives	<ul style="list-style-type: none"> <li>DSRSD Ordinance No. 301 requires use of recycled water for irrigation of large new landscaped areas.</li> <li>Recycled water available at discounted connection fees and rates as a financial incentive to connect to the recycled water system.</li> <li>City of Dublin Ordinance No. 18-92 Water Efficient Landscape Ordinance in place since 1992.</li> </ul>
6	High-Efficiency Washing Machine Rebate Programs	<ul style="list-style-type: none"> <li>High-Efficiency Washing Machine Rebate Program in place since 1998.</li> </ul>
7	Public Information Programs	<ul style="list-style-type: none"> <li>Bill inserts</li> <li>Speakers available for community groups</li> <li>Displays at public events</li> <li>Tours of wastewater treatment plant available upon request</li> </ul>
8	School Education Programs	<ul style="list-style-type: none"> <li>On-going DSRSD school education program by Public Information Department</li> <li>On-going Water Science Schools Program by Zone 7</li> </ul>
9	Conservation Programs for Commercial, Industrial and Institutional Accounts	<ul style="list-style-type: none"> <li>Requirements for use of low-flow fixtures, water efficient landscapes and recycled water for irrigation</li> <li>Audits performed upon request</li> <li>DSRSD staff participate in planning and development process for new commercial/industrial development</li> </ul>
10	Wholesale Agency Programs	<ul style="list-style-type: none"> <li>Not applicable</li> </ul>
11	Conservation Pricing	<ul style="list-style-type: none"> <li>Two-tier rate structure based on water consumption in place since 1992 to encourage water conservation</li> </ul>
12	Water Conservation Coordinator	<ul style="list-style-type: none"> <li>Operations Manager serves as the Water Conservation Coordinator; other employees are responsible for implementation of DMMs/BMPs</li> </ul>
13	Water Waste Prohibitions	<ul style="list-style-type: none"> <li>DSRSD Ordinance No. 242 establishes regulations and restrictions for water use</li> </ul>
14	Residential Ultra-Low Flush Toilet Replacement Programs	<ul style="list-style-type: none"> <li>Ultra-Low Flow Toilet Rebate Program in place since 1994.</li> </ul>

In an attempt to reduce water use, Zone 7 started a 10-year Ultra-Low Flow Toilet Rebate Program in conjunction with the four valley water retailers in 1994. The program offers a \$75 rebate per toilet to all customers that replace old toilets with new low flow devices. During the first few years of the program, rebates were offered only to residential customers; however, the program has been expanded to include commercial customers. The toilet rebate program has been quite successful in DSRSD's service area. Since July 1996, 1,298 toilet rebates have been issued by DSRSD. Zone 7 has estimated that almost 11,000 ultra-low flow toilets have been installed in the Tri-Valley area, for an annual water savings of 480 acre-feet<sup>12</sup>. Table 8-2 summarizes the number of rebates issued annually by DSRSD since 1996. As shown, since 1996, 1,298 toilet rebates have been issued by DSRSD. These rebates have totaled \$97,350 and have resulted in an estimated water savings of 73 afa.

Since 1998, Zone 7 has also had a Residential Clothes Washer Rebate Program for the purchase of high-efficiency, EnergyStar<sup>®</sup> labeled clothes washing machines (see DMM 6 for more information).

In the past, DSRSD has also offered plumbing retrofit kits free of charge to customers. The most recent program was in 1992 when DSRSD purchased 500 retrofit kits and offered these to customers. As mentioned earlier, retrofit kits include a showerhead on/off switch, a kitchen faucet aerator, a bathroom faucet aerator, a toilet tank dam, and a packet of two leak detecting dye tablets. These retrofit kits are particularly popular during drought periods when residents become actively involved with water conservation.

#### Implementation Schedule:

- Requirements for Low-Flow Fixtures: On-going
- Ultra-Low Flow Toilet Rebate Program: On-going
- Residential Clothes Washer Rebate Program: On-going
- Distribution of Retrofit Kits: As warranted during drought periods

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<sup>12</sup> Source: Zone 7 Water Agency Website [www.zone7water.com](http://www.zone7water.com) June 2004

**Table 8-2. DSRSD Annual Ultra-Low Flow Toilet Rebates<sup>(a)</sup>**

Year	Number of Ultra-Low Flow Toilet Rebates Issued by DSRSD	Total Rebates Issued by DSRSD, dollars	Estimated Annual Water Savings, afa
1996 (July through December)	60	\$4,500	3
1997	513	\$38,475	29
1998	145	\$10,875	8
1999	119	\$8,925	7
2000	118	\$8,850	7
2001	95	\$7,125	5
2002	80	\$6,000	4
2003	139	\$10,425	8
2004 (January through August)	29	\$2,175	2
<b>Total</b>	<b>1,298</b>	<b>\$97,350</b>	<b>73</b>

(a) Source: Tonia Gladden, DSRSD Customer Service Department, August 9, 2004.

(b) Based on \$75 rebate for each replaced toilet.

(c) Based on a 50 gallon per day savings for each replaced toilet.

### 8.3 DMM 3: System Water Audits, Leak Detection and Repair

#### Description:

A water system audit was completed by DSRSD in 1994. DSRSD's water distribution system is fairly new and the 1994 audit reflected this fact. Water losses associated with pipeline leaks accounted for only 0.5 percent of the total water use in the system. Since 1994, annual water losses due to leaks have on average been less than one percent of the annual water usage.

DSRSD has an Unaccounted For Water Loss Program currently in place, which includes a residential water meter replacement program (see DMM 4) and a leak detection program. Unaccounted for water is calculated and tracked on a monthly basis by DSRSD engineering staff by comparing total potable water purchases with potable water sales. For the twelve-month period ending December 2003, unaccounted for water was calculated to be about 8.8 percent of total potable water purchases<sup>13</sup>. This amount of unaccounted for water is down from previous years (14.7 percent in 2001 and 9.5 percent in 2002<sup>14</sup>) and is relatively low when compared to other water utilities. A recent survey of water agencies in the United States conducted by the American Water Works Association found that unaccounted for water in utilities across the country varied from 7.5 percent to 25 percent<sup>15</sup>. Older water systems typically have higher unaccounted for water due to an

<sup>13</sup> Revised Unaccounted Water Calculations, Stanley Kolodzie, DSRSD Associate Engineer, May 20, 2004.

<sup>14</sup> Lost Water Tracking Report, Stanley Kolodzie, DSRSD Associate Engineer, June 2004.

<sup>15</sup> Survey of State Agency Water Loss Reporting Practices, Final Report to the American Water Works Association, prepared by Janice A. Beecher, Ph.D., Beecher Policy Research, Inc., January 2002.

increased presence of leaks and higher occurrence of pipeline breaks due to older water distribution pipelines. Typically, water systems strive to keep the unaccounted for water at less than 10 to 12 percent.

Implementation Schedule:

- Water System Audit: On-going
- Accounting of Unaccounted For Water: On-going
- Leak Detection and Repair Program: On-going by Field Operations

**8.4 DMM 4: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections**

Description:

All connections within DSRSD are metered and all customer sectors are billed by volume of use. DSRSD uses an inclining block rate structure with two tiers, up to and greater than 3,000 cubic feet of consumption. For additional information on DSRSD's water rate structure, see DMM 11.

Also, as mentioned in DMM 3 above, DSRSD has a residential water meter replacement program. DSRSD had identified 5,600 residential and 162 commercial meters to be replaced under this program. As of June 2004, 5,538 residential meters had been replaced. Replacement of the remaining residential and commercial meters is on-going.

Implementation Schedule:

- Residential and Commercial Water Meter Replacement Program: On-going
- Billing at Commodity Rates: On-going (see DMM 11)

**8.5 DMM 5: Large Landscape Conservation Programs and Incentives**

Description:

In April 1998, DSRSD adopted Ordinance No. 280 Implementing the DSRSD Recycled Water Policy. Ordinance No. 280 was repealed and replaced with Ordinance No. 301 in April 2004. Ordinance No. 301 formally established the rules and regulations governing the use of recycled water within DSRSD. This ordinance requires, except for small isolated areas, all new irrigation systems serving parks, streetscapes, commercial landscaping and common area landscaping for multifamily to use recycled water. A copy of Ordinance No. 301 is provided in Appendix D. District policies related to recycled water use, including District Ordinance No. 301, include provisions that all new development areas must include dual distribution piping for recycled water deliveries, where feasible. The policy also includes provisions to convert existing potable water irrigation customers to recycled water customers where economically feasible. Rates for recycled water consumption are discounted as a financial incentive to customers that connect to the recycled water system.

The City of Dublin has enacted Ordinance No. 18-92 pertaining to water efficient landscaping. The purpose of the ordinance is twofold:

1. To reduce irrigation water consumption without a decline in the physical or visual quality of urban landscaping; and
2. To establish a sufficient but flexible structure for designing, installing, and maintaining water efficient landscapes in local projects.

The requirements in this ordinance apply to all building or development permits issued after December 31, 1992. A copy of Ordinance No. 18-92 is included in Appendix D.

DSRSD maintains a water conservation garden at its former administrative offices site to demonstrate water efficient landscaping. The 26,000 square foot garden utilizes a drip irrigation system and displays 27 different plants and trees. The City of Dublin has also installed water efficient gardens on median strips along Dublin Boulevard, to increase public awareness of water conservation.

#### Implementation Schedule:

- Use of Recycled Water for New Landscape Areas: On-going
- Water-Efficient Landscape Requirements: On-going
- Water Conservation Garden: On-going

### **8.6 DMM 6: High-Efficiency Washing Machine Rebate Programs**

#### Description:

High-efficiency washing machines use about 50 percent less water than conventional machines, using only 20 to 30 gallons of water per load, compared to 40 to 45 gallons for conventional top-loading washers. The estimated annual savings for a typical household is about 5,000 gallons per year.

As described in DMM 2, since 1998, Zone 7 has had a Residential Clothes Washer Rebate Program for customers in its service area. The rebate is for the purchase of high-efficiency, EnergyStar<sup>®</sup> labeled clothes washing machines. The program is administered for Zone 7 by the Electric & Gas Industries Association (EGIA). Approximately 4,000 rebates have been issued in the Zone 7 service area since the program began in 1998<sup>16</sup>. Since 2001, 769 rebates totaling \$57,675 have been issued to DSRSD water customers (672 in Dublin and 97 in Dougherty Valley)<sup>17</sup> (see Table 8-3) for a total estimated water savings of 12 afa. The program is a regional partnership with other Bay Area water agencies, including Alameda County, Contra Costa Water District, East Bay Municipal Utility District and Santa Clara Valley Water District.

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<sup>16</sup> Source: Zone 7 Water Agency Website [www.zone7water.com](http://www.zone7water.com) June 2004

<sup>17</sup> Source: Pat Matos, Electric & Gas Industries Association, August 17, 2004.

**Table 8-3. DSRSD Annual High-Efficiency Washing Machine Rebates<sup>(a)</sup>**

Year	Number of High-Efficiency Washing Machine Rebates to DSRSD Water Customers			Total Rebates Issued by DSRSD <sup>(b)</sup> , dollars	Estimated Annual Water Savings <sup>(c)</sup> , afa
	City of Dublin	Dougherty Valley	Total DSRSD Water Service Area		
2001	115	0	115	\$8,625	2
2002	230	16	246	\$18,450	4
2003	262	66	328	\$24,600	5
2004 (January through June)	65	15	80	\$6,000	1
<b>Total</b>	<b>672</b>	<b>97</b>	<b>769</b>	<b>\$57,675</b>	<b>12</b>

<sup>(a)</sup> Source: Pat Matos, Electric & Gas Industries Association (EGIA), August 17, 2004.

<sup>(b)</sup> Based on \$75 rebate for each high-efficiency washing machine.

<sup>(c)</sup> Based on a 5,000 gallon per year savings for each high-efficiency washing machine.

Implementation Schedule:

- High-Efficiency Washing Machine Rebate Program: On-going

**8.7 DMM 7: Public Information Programs**

Description:

DSRSD is involved with the public to encourage water conservation. Billing statements indicate the gallons of water used per day for the last billing period and include messages about wise water use. In addition, customers can, upon request, obtain a printout of water usage for the last three years. DSRSD also provides speakers when requested at public events and educates the public on water use through displays at popular events in the area. In the past, DSRSD has had displays at the Alameda County Fair, Dublin and San Ramon Chamber of Commerce events, and the San Ramon Wind Festival. These displays were aimed at educating the public about DSRSD and the projects it is pursuing such as the use of recycled water in the valley. Tours of the wastewater treatment plant are also available to interested public parties.

Implementation Schedule:

- Water Bill Inserts: On-going
- Speakers for Community Groups: As requested
- Displays at Public Events: On-going
- Facility Tours: As requested

## **8.8 DMM 8: School Education Programs**

### Description:

DSRSD has an active school education program. The District has recently embarked on a new comprehensive water recycling public information program, which includes a large commitment to education within the schools. A unique combination of representatives from several disciplines and District departments was assembled to create the Schools Program team for the District.

The Public Information Department undertakes the general school education program and the Engineering Department has undertaken management of the recycled water program. In addition, workbooks, videos, and books encouraging water conservation and awareness are available in schools and local libraries. DSRSD uses a combination of materials furnished by the Department of Water Resources, American Water Works Association, and custom created material for school education. DSRSD also funds an annual Project Water Education for Teachers (WET) seminar for teachers, promoting awareness, appreciation and knowledge of California's water resources.

Zone 7 also has a Water Science Schools Program designed to help local teachers meet statewide standards and bring environmental science to life. The programs are developed by credentialed teachers and are tailored to meet specific classroom and grade-level needs. The specific programs include:

- Watershed Education Program (Grades 4-12)
- Creek and Storm Drain Pollution Prevention Program (Grades K-5)
- Water Supply, Treatment and Distribution Program (Grades 4-12)
- Water Conservation Program (Grades K-8)

In addition, Zone 7 offers educational videos, facility tours, creek walks and science projects and mentoring to teachers and students in the Tri-Valley area.

### Implementation Schedule:

- School Education Programs: On-going by DSRSD and Zone 7

## **8.9 DMM 9: Conservation Programs for Commercial, Industrial and Institutional Accounts**

### Description:

The City of Dublin reviews proposed water uses for commercial and industrial water service and makes recommendations for improved water use efficiency. DSRSD provides potable water, recycled water, wastewater collection treatment and disposal services, but does not have direct land use planning jurisdiction. Therefore, to promote water use efficiency, DSRSD coordinates closely with the City of Dublin on planning and development issues. DSRSD works with developers and their architects directly during plan review to recommend water efficient landscaping. Furthermore, DSRSD staff regularly attend Project Review Committee meetings, Planning Commission Meetings, and Council Meetings on all projects with significance to water usage. DSRSD's comments and requirements are routinely sought by the City in order to adequately and accurately condition projects. DSRSD has assisted with the adoption of the City of Dublin's Water Efficient

Landscaping Ordinance, and has reviewed Landscape Concept Statements for water efficient compliance.

Implementation Schedule:

- Requirements for Low-Flow Fixtures: On-going
- Requirements for Water Efficient Landscape: On-going
- Requirements for Use of Recycled Water: On-going
- Specific Restrictions during Water Shortages: Implemented as needed
- Participation in Land Use Planning and Development Activities: On-going

**8.10 DMM 10: Wholesale Agency Programs**

This DMM applies to wholesale agencies only and therefore is not applicable to DSRSD.

**8.11 DMM 11: Conservation Pricing**

Description:

DSRSD has practiced conservation pricing since 1992. As discussed in DMM 4, for water service, all customer sectors are billed on an inclining block rate structure (see Tables 8-4 and 8-5).

**Table 8-4. DSRSD Current Residential Water Rates<sup>(a)</sup>**

Description	Cost
Bimonthly Fixed Service Charge	\$17.00
Bimonthly Water Quantity Charge	
Zone 7 (water wholesaler) charge	\$1.29/unit <sup>(b)</sup>
DSRSD Tier 1 Charge (applies to first 30 units of water)	\$1.77/unit <sup>(b)</sup>
DSRSD Tier 2 Charge (applies to consumption above first 30 units)	\$1.92/unit <sup>(b)</sup>

<sup>(a)</sup> Source: DSRSD Website [www.dsrdsd.com](http://www.dsrdsd.com) September 2004

<sup>(b)</sup> 1 unit of water = 100 cubic feet = 748 gallons

**Table 8-5. DSRSD Current Commercial Water Rates<sup>(a)</sup>**

Meter Size	Bimonthly Fixed Service Charge	Bimonthly Water Quantity Charge
5/8-inch	\$17.00	Zone 7 (water wholesaler) Charge = \$1.29/unit <sup>(b)</sup>  DSRSD Tier 1 Charge (applies to first 30 units of water) = \$0.48/unit <sup>(b)</sup>  DSRSD Tier 2 Charge (applies to consumption above first 30 units) = \$0.63/unit <sup>(b)</sup>
¾-inch	23.50	
1-inch	36.40	
1 ½-inch	68.70	
2-inch	107.50	
3-inch	230.30	
4-inch	650.50	
6-inch	1,297.00	
8-inch	2,267.60	

<sup>(a)</sup> Source: DSRSD Website [www.dsrdsd.com](http://www.dsrdsd.com) September 2004

<sup>(b)</sup> 1 unit of water = 100 cubic feet = 748 gallons

Sewer service for single family and multi-family residences is based on a flat rate (\$54.50 bimonthly which includes \$13.20 to cover collection and transportation of wastewater to the treatment plant and \$41.30 to treat and dispose of the wastewater). Commercial and public agencies are billed for sewer service on a uniform rate structure based on water usage, which further promotes water conservation by these customers (see Table 8-6).

**Table 8-6. DSRSD Current Commercial Wastewater Rates<sup>(a)</sup>**

Type of Business	Rate Per Unit <sup>(b)</sup> of Water Used
Bakery	\$4.45
Laundry	3.32
Restaurant	4.16
Steam Cleaning	5.20
School	1.53
Other Institutions	1.44
Markets with Garbage Disposals	4.17
Fast Foods	2.52
Delicatessen	2.52
Car Wash	2.52
Mortuaries	4.82
All Other Commercial	2.52

<sup>(a)</sup> Source: DSRSD Website [www.dsrdsd.com](http://www.dsrdsd.com) September 2004

<sup>(b)</sup> 1 unit of water = 100 cubic feet = 748 gallons

### Implementation Schedule:

- Conservation Pricing: On-going

## **8.12 DMM 12: Water Conservation Coordinator**

### Description:

The Operations Manager is the Water Conservation Coordinator for DSRSD and the Customer Service Division devotes approximately ten percent of their time to water conservation. Different DSRSD employees are responsible for the coordination and implementation of various DMMs/BMPs. The Operations Manager receives periodic updates from these staff members, and submits reports to the California Urban Water Conservation Council.

### Implementation Schedule:

- Water Conservation Coordinator: On-going

## **8.13 DMM 13: Water Waste Prohibitions**

### Description:

DSRSD instituted Ordinance No. 242 in April 1991 to prevent water waste. It established four water conservation stages and prohibitions, mandatory requirements and suggested water conserving guidelines for each conservation stage. DSRSD declared a Stage I condition in 1991, which called for customers to voluntarily reduce consumption by 25 percent. After the Stage I condition was declared in 1991, customers became actively involved with water conservation in an attempt to avoid more severe rationing during the drought. Annual water consumption was reduced by 18 percent in 1991, 14 percent in 1992, and 11 percent in 1993 compared with annual water consumption in 1990. Like the drought of 1976-77, conservation efforts of residents were very successful at reducing demand during the drought. A copy of Ordinance No. 242 is provided in Appendix D.

Also, as discussed in Section 9.0, DSRSD has established prohibitions, mandatory requirements and suggested water conserving guidelines for each conservation stage.

### Implementation Schedule:

- Water waste prohibitions: On-going
- Additional drought restrictions: Would be enacted by DSRSD if water supply conditions required additional conservation measures (see Section 9.0 Water Shortage Contingency Plan).

## **8.14 DMM 14: Residential Ultra-Low Flush Toilet Replacement Programs**

### Description:

As described for DMM 2, in an attempt to reduce water consumption, Zone 7 started a 10-year Ultra-Low Flow Toilet Rebate Program in conjunction with the four valley water retailers in 1994. The program offers a \$75 rebate per toilet to all customers that replace old toilets with new low

flow devices. During the first few years of the program, rebates were offered only to residential customers; however, the entire program has been expanded to include commercial customers. Almost 11,000 ultra-low flow toilets have been installed in the valley, for an annual savings of 480 acre-feet. Within the DSRSD service area, 1,298 toilet rebates have been issued (see Table 8-2) for a total estimated water savings of 73 afa. Each ultra-low flow toilet is estimated to save an average of 50 gallons of water per day.

Implementation Schedule:

- Residential Ultra-Low Flush Toilet Retrofit Program: On-going since 1994.

## 9.0 WATER SHORTAGE CONTINGENCY PLAN

### 9.1 Overview

During 1991, DSRSD adopted its current Water Use Reduction Plan (Reduction Plan) that will go into effect anytime the DSRSD Board of Directors, on the recommendation of DSRSD management and operations staff, agree that there is a water supply shortage which requires a reduction in water demand. Although percentage reduction goals can vary somewhat to meet particular Zone 7 deliveries, the Reduction Plan consists of four basic stages as described below.

Under conditions that interrupt delivery of water from the State Water Project, Zone 7 and Valley Retailers with access to groundwater must meet customer demand with groundwater. As described in Section 5.2.3, the Livermore-Amador Valley Main Basin aquifers contain a supply of groundwater capable of meeting 75 percent of the maximum daily demand of all of Zone 7's retailers for a period of up to six years; however, during the most recent drought, water could not be withdrawn fast enough to meet the maximum daily summer demand. Improvements have been made to Zone 7's groundwater pumping facilities since that time which have increased its reliability. Therefore, the more severe stages of this Reduction Plan may not be necessary in a future drought. Nevertheless, they may become necessary during an emergency such as an earthquake or a major pipeline break.

### 9.2 Stages of Action

As illustrated in Table 9-1, the Reduction Plan contains four stages. Stage I of the Reduction Plan will be declared when it is necessary to achieve up to a 25 percent reduction in water consumption. This stage will call for users to voluntarily reduce water consumption by up to 25 percent. It is most likely that this stage will be used to manage peak demands in the summer months (May-September).

**Table 9-1. DSRSD Water Use Reduction Plan<sup>(a)</sup>**

Stage	Shortage Condition	Customer Reduction Goal	Type of Rationing Program
I	Up to 25 percent	25 percent	Voluntary
II	25 to 40 percent	40 percent	Mandatory
III	40 to 50 percent	50 percent	Mandatory
IV	50 percent or more	Emergency Curtailment	Mandatory

<sup>(a)</sup> Source: DSRSD Ordinance No. 242, Section 4. Stages of Reduced Consumption, adopted June 1991.

If water supplies are reduced greater than 25 percent, mandatory reductions in water use will be required by DSRSD. Mandatory water use reduction will occur in Stages II and III of the Reduction Plan. Stage II will be triggered by a reduction in water supplies of up to 40 percent and Stage III will be triggered by a supply reduction of up to 50 percent.

Stage IV of this Reduction Plan will occur when there is an imminent threat to the safety or health of persons or property within the DSRSD service area. Such health threats include a reduced volume of water in reservoirs or reduced water pressures below the minimum required for

firefighting or other public safety purposes. During a Stage IV condition, mandatory emergency water curtailment will be required by DSRSD.

Successive stages of the Reduction Plan will be declared only after exhausting efforts to make a prior stage successful. In some cases, however, it may be necessary for DSRSD to skip stages of the Reduction Plan. This may occur during a natural disaster or when the health and safety of the persons within the DSRSD service area are jeopardized. The Reduction Plan is designed to be flexible so DSRSD can respond to the situation occurring at a particular time.

This approach to water use reduction proved to be very successful during the drought of 1987-1992. In 1991, DSRSD entered Stage I of its Reduction Plan, which called for consumers to voluntarily reduce water consumption. Water users were extremely responsive to this Stage I emergency and it was not necessary for DSRSD to impose more severe rationing during the drought.

Each stage of the Reduction Plan is triggered by a water shortage condition. The water shortage conditions are illustrated in Table 9-1. Although DSRSD was not required to implement Stages II, III, or IV during the drought of 1987-1992, the adoption of the four-stage plan did receive extensive public review and comment during a public hearing held on March 26, 1991. In the event of a future drought, DSRSD will use the Reduction Plan shown in Table 9-1 and tailor specific responses based on the water shortage condition.

The following summarizes key elements for each stage of the Reduction Plan and other basic plan features. Appendix D contains Ordinance No. 242, which was enacted by the DSRSD Board of Directors on June 4, 1991 in response to past Zone 7 delivery curtailments. Also contained in Appendix D is Ordinance No. 244 which amended Section 6 of Ordinance No. 242, relating to certain prohibitions on the use of water during a water shortage emergency. Ordinance No. 244 was adopted on November 5, 1991. Mandatory requirements and/or prohibitions in the following discussion are from Ordinance Nos. 242 and 244. Suggested guidelines are also provided. The Reduction Plan presented herein is not intended to be construed as a legal document, but rather a comprehensive summary of water use reduction criteria that are built upon Ordinance Nos. 242 and 244, Department of Water Resources references, and common water industry practices. During a future drought, Ordinance Nos. 242 and 244 will likely serve as models for the drought ordinance that is enacted.

### 9.2.1 Stage I - Voluntary Water Conservation

Stage I of the Reduction Plan calls for residential, commercial and municipal users to voluntarily reduce water consumption. To achieve an overall reduction of 25 percent, DSRSD estimates that households must save 1/3 of the water normally used during summer months, businesses and institutions must save 15 percent and irrigation use must be cut in half<sup>18</sup>. Water use reduction goals for various customer types for Stage I are shown in Table 9-2. The only mandatory prohibitions under Stage I are related to the use of water for construction purposes. The Reduction Plan requires recycled water to be used for compaction and dust control. Table 9-3 shows all prohibited water uses during Stage I, as well as suggested water conservation guidelines.

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<sup>18</sup> DSRSD Urban Water Management Plan, May 2000.

**Table 9-2. Water Use Reduction Goals by Customer Type<sup>(a)</sup>**

Customer Type	Reduction Stage	
	I	II and III
Residential	33 percent	50 percent
Commercial/Industrial	15 percent	25 percent
Irrigation	50 percent	67 to 75 percent
Overall Reduction Goal	25 percent	40 to 50 percent

<sup>(a)</sup> Source: DSRSD Urban Water Management Plan, May 2000.

### 9.2.2 Stages II, III and IV - Mandatory Water Use Reduction

Following declaration of a water shortage emergency, mandatory allocations are imposed to fairly share the inconvenience and expenses that result from a severe drought. To achieve an overall reduction of 40 percent in Stage II or 50 percent in Stage III during peak summer demand, residential use must be reduced approximately in half, irrigation use by two-thirds to three-quarters, and commercial use by about one-quarter. Water use reduction goals in Stages II and III among customer types are shown in Table 9-2.

Table 9-3 summarizes water use prohibitions as well as suggested water-conserving guidelines for Stages II, III, and IV. Residential prohibitions address: washing vehicles and boats, filling of swimming pools, and cleaning of paved areas. Commercial/municipal prohibitions address: serving water in restaurants, irrigation periods, construction water, sewer flushing, and cleaning of paved surfaces.

Because of groundwater pumping limitations during summer months, the main intent of the Reduction Plan developed in 1991 was to reduce peak daily flow rates. Since water meters are sized to meet the peak demand of customers, DSRSD developed water allocations based on meter size. The allocation limits developed in 1991 are contained in Table 9-4.

The water allocations shown in Table 9-4 were developed from a computer simulation of the DSRSD water distribution system. DSRSD considered the following criteria when developing its computer simulation:

- Constant inflow from Zone 7;
- Summertime diurnal use pattern;
- Peak 3-day and 30-day historical daily use patterns;
- A peak use period starting with reservoirs at only 10 percent reserves (above fire needs); and
- Allowing sufficient volume in reservoirs for fire storage.

A per capita water use was determined from this computer model. An allocation per household was then determined by assuming each household served by DSRSD had four persons. It was assumed the typical household would have four persons to allow for those households that exceed the average household size of approximately three persons. Larger households could apply for a

Table 9-3. Mandatory and Suggested Conservation Measures<sup>(a)</sup>

Conservation Measure/Restriction	Conservation Stage			
	I	II	III	IV
<b>RESIDENTIAL</b>				
<b>A. Prohibitions/Mandatory Requirements</b>				
1. Use of hose to wash vehicles/boats, etc. (use of water by bucket is allowed).		✓	✓	✓
2. Initial filling or complete replacement of water in swimming pools.		✓	✓	✓
3. Washing of paved areas or any use that results in run-off.		✓	✓	✓
<b>B. Suggested Water Conserving Guidelines</b>				
1. Use shut-off nozzle on hoses.	✓	✓	✓	✓
2. Use a bucket to convey water rather than a hose.		✓	✓	✓
3. Water lawns no more than twice weekly, before 11:00 am; avoid over-spray and run-off.	✓			
4. Water lawn no more than twice weekly and only before 8:00 am as follows: <ul style="list-style-type: none"> <li>• Odd street numbers: odd days of the month</li> <li>• Even street numbers: even days of the month</li> <li>• No watering on the 31<sup>st</sup> day of the month</li> <li>• Avoid over-spray and run-off.</li> </ul>		✓	✓	✓
5. Cover pools and hot tubs when not in use.	✓	✓	✓	✓
6. Sweep paved areas; do not wash down.	✓	✓	✓	✓
7. Begin water meter record to determine daily usage.	✓	✓	✓	✓
8. Inspect for leaks and repair immediately.	✓			
9. Inspect for leaks weekly and repair immediately.		✓	✓	✓
10. Use water conserving appliances and practices in the kitchen and bathroom.	✓	✓	✓	✓
<b>COMMERCIAL/MUNICIPAL</b>				
<b>A. Prohibitions/Mandatory Requirements</b>				
1. Restaurants to serve water only upon request.		✓	✓	✓
2. Irrigate no more than twice weekly and only before 8:00 am as follows: <ul style="list-style-type: none"> <li>• Odd street numbers: odd days of the month</li> <li>• Even street numbers: even days of the month</li> <li>• No watering on the 31<sup>st</sup> day of the month</li> <li>• Avoid over-spray and run-off.</li> </ul>		✓	✓	✓
3. Maintain water meter record to monitor usage.		✓	✓	✓
4. Use of potable water for compaction, moisture control or dust control is prohibited. Recycled water is available at the DSRSD's wastewater treatment plant for these uses.	✓	✓	✓	✓
5. Use of potable water for sewer flushing or street cleaning is prohibited by water district ordinance. Recycled water is available for these uses. An exception is allowed for City street cleaning.	✓	✓	✓	✓
6. Washing of paved areas or any use which results in run-off.		✓	✓	✓
<b>B. Suggested Water Conserving Guidelines</b>				
1. Restaurants to serve water only on request.	✓	✓	✓	✓
2. Display table signs informing patrons of the Water Emergency in all commercial food service areas.		✓	✓	✓
3. Perform water audit, prioritize uses.	✓	✓	✓	✓
4. Irrigate no more than twice weekly, and only before 11:00 am. Avoid over-spray and run-off.	✓			
5. Use recycled water for irrigation where permitted.		✓	✓	✓

<sup>(a)</sup> Source: DSRSD Ordinance No. 242, Section 6. Prohibitions, adopted June 1991.

**Table 9-4. Water Shortage Emergency Allocation Table<sup>(a)</sup>**

Meter Size (inches)	Meter Capacity Factor (relative to 5/8" Meter)	Allocation <sup>(b)</sup>									
		Stage II					Stages III and IV				
		Gal/Day	Irrigation	CCF/Month <sup>(c)</sup>	CCF Irrigation	Gal/Day	Irrigation	CCF/Month <sup>(c)</sup>	CCF Irrigation		
5/8	1.0	380	285	16	12	310	233	13	10		
3/4	1.5	570	428	24	18	465	349	19	15		
1	2.5	950	713	39	30	775	581	32	24		
1 1/2	5.0	1,900	1,425	79	59	1,550	1,163	64	48		
2	8.0	3,040	2,280	126	95	2,480	1,860	103	77		
3	17.5	6,650	4,988	276	207	5,430	4,073	225	169		
4	50	19,000	14,250	787	590	15,500	11,625	642	482		
6	100	38,000	25,800	1,570	1,178	31,000	23,250	1,280	960		

<sup>(a)</sup> Source: DSRSD Ordinance No. 242, Section 7 Stage II Allocations and Section 8 Stage III Allocations, adopted June 1991.

<sup>(b)</sup> Allocations assume the following:

- All residential water is supplied through a 5/8-inch size meter.
- Meters that provide water used solely for irrigation have an allocation 25 percent less than those for other uses.
- Businesses and public agencies that receive water through more than one meter may request the pooling of their allocation and use the water as they choose.
- During operation under Water Emergency conditions, all customers will be billed monthly, rather than bimonthly as is the normal DSRSD practice. This will allow improved monitoring of use by all customers and will allow a more prompt response to excess use.

<sup>(c)</sup> Hundred cubic feet (748 gallons) per month.

variance through an appeals process to acquire additional water. Users with several meters were also allowed to pool their water allocations during the last drought and use the water where desired.

Larger size meters, such as those used for commercial or institutional connections, received an allocation based on the peak flows possible through the meter as a factor. Therefore, since a one-inch meter would allow a peak flow of 2.5 times that of a 5/8-inch meter, the allocation was based on 2.5 times that of the residential meter.

Allocation limits for irrigation use were also established in 1992 and are shown in Table 9-4. Meters used solely for irrigation had an allocation of 25 percent less than meters for other uses. Curtailment or lockout of irrigation meters could be imposed during Stage IV, under conditions in which fire storage volumes or minimum health and safety supplies are seriously threatened.

The allocations developed in the Contingency Plan in 1992 provided customers with sufficient water. Even at Stage III of the Reduction Plan, the allocated per capita water exceeded the per capita amounts available to many drought-impacted water districts. This allocation further exceeds California Department of Water Resources projections for water supplies necessary to households without water saving fixtures. Allocation limits incorporated in the current Reduction Plan (as adopted by Ordinance No. 242) should remain as the operative allocations under Stages II, III and IV, unless numerical revisions are needed in response to the specific conditions of the next water shortage.

The practice of allocating water based on meter size should be re-evaluated during the next drought. Poor conservation could result from the lack of direct line of responsibility to individual customers served from multi-user meters. Additionally, some businesses may have meters sized for specific high-use periods of a limited duration. Allocating water use by meter size in this particular case would not encourage conservation throughout the day. Future refinements to the Reduction Plan may include allocations based on the number of connected dwellings for multi-family units. In commercial establishments, percent reductions based on the prior years water use may also be considered. Each method has its own inherent shortcomings and will require continual analysis and future refinement in response to the specific circumstances of a water shortage.

Under Stage IV, all provisions of Stage III of the Reduction Plan shall be in force. Anytime there is evidence that fire storage water volume is threatened in any reservoir or low water pressure may occur in any pressure zone DSRSD may, without notice, temporarily secure from service by lock-out any water service connection serving a non-essential use. Approval must be granted by the General Manager or his designated representative prior to a lockout. Lockouts will occur predominantly to irrigation services and DSRSD personnel will restore service as soon as an adequate water supply is assured. Efforts will be made to contact owners, based on available billing information, if it appears that non-essential service will be interrupted for more than 24 hours. Emergency public announcements will be made by local radio and television whenever emergency curtailment under Stage IV of this plan is found to be necessary.

### **9.3 Estimated Minimum Water Supply for Next Three Years**

As stated in Section 5.1.1, Zone 7's Water Reliability Policy (Goal 1) is to provide a 100 percent reliable water supply to its M&I water contractors, including existing and projected demands for the next twenty years. Zone 7 will endeavor to meet this goal during an average water year, a single dry water year (such as 1977), and multiple dry water years (such as 1990 through 1992). As such, it is not anticipated that DSRSD will experience a water supply shortfall within the next three years.

Water supply from Zone 7 is anticipated to meet DSRSD's projected water demands for the next three years, and beyond.

## **9.4 Drought/Emergency Planning Actions**

In addition to responding to drought conditions, DSRSD's Water Shortage Contingency Plan can be used to respond to emergency conditions that interrupt water supplies to the District. Water supplies may be interrupted in the future due to a regional power outage, a natural disaster such as an earthquake, or an accidental pipeline break. Actions DSRSD would take in these emergency conditions are outlined below.

### **9.4.1 No Water Available from the SWP**

DSRSD analyzed conditions in which no water was available from the SWP. This may occur if the South Bay Aqueduct were inoperable due to maintenance or damaged during an earthquake. Water supplies from the SWP may also be limited or unavailable during a future drought. If no water were available from the SWP, Zone 7 would need to meet customer demand with groundwater. Zone 7 can pump up to 75 percent of its customer's maximum daily demand with groundwater. By looking at daily water use records from the highest demand year on record, it was determined that this level of pumping would be sufficient to meet customer demands on most days. On days when there was a shortfall, DSRSD could enact Stage I of its Water Use Reduction Plan, which would ask customers to voluntarily reduce water consumption. DSRSD would likely target irrigation customers for water use reduction on these days.

### **9.4.2 No Water Available from Zone 7**

DSRSD's turnouts are fed by a single pipeline from Zone 7. This pipeline has been out of service two times in the recent past, once due to scheduled maintenance and once due to a pipeline break. If this pipeline were out of service for a significant duration in the future, DSRSD would need to receive water from its emergency interties with EBMUD, the City of Pleasanton or any future emergency interties. Depending on the availability of water from these sources, DSRSD may need to enact various stages of its Water Use Reduction Plan to deal with a shortfall.

### **9.4.3 Area-Wide Electrical Power Failure**

If electrical power were not available for a prolonged period of time, DSRSD would continue to receive water from a number of sources. DSRSD could receive treated water (by gravity flow) stored in Zone's clear wells located at the water treatment plants, gravity flow from treated and non-potable storage reservoirs owned and operated by the District, and water from its emergency interties with the City of Pleasanton and EBMUD. It should also be noted that a significant number of Zone 7's production wells and other District and Zone 7 pumping stations are equipped with back up diesel generators. Therefore, even if electrical power fails, back up power supplies are available to allow for the distribution of water supplies.

EBMUD's water system is at a higher pressure than DSRSD's and water would naturally flow into DSRSD's system. Pleasanton's system is at a lower pressure and a portable booster pump would be required to utilize the Pleasanton intertie. Water from these sources would enter DSRSD's Pressure Zone 1 and would be pumped, through existing pump stations with emergency generating equipment, into the higher elevations of DSRSD's service area. Again, DSRSD may need to enact

various stages of its Water Use Reduction Plan depending on the availability of supplies during a power outage.

#### 9.4.4 Earthquake

Water system infrastructure, including treatment plants, pump stations, storage tanks, and pipelines, can be damaged during a strong earthquake. DSRSD's facilities, as well as Zone 7's facilities, have been constructed in accordance with the applicable building codes to minimize potential damage during an earthquake. It is expected that some facilities may be damaged as the result of a strong earthquake; however, there are multiple turnouts from the Zone 7 supply system and distribution pipelines have been looped so that damaged portions of the DSRSD system can be quickly isolated and repaired. In addition, as discussed previously, DSRSD has four emergency interties (two with EBMUD and two with the City of Pleasanton) to provide supplies during an emergency.

#### 9.4.5 Emergency Water Supply for Dougherty Valley

Water stored in the Main Basin can be used for meeting demands in Dougherty Valley during emergency conditions. Operationally, Zone 7 is planning to store water in the Main Basin for use in the Dougherty Valley. This annual storage will allow Zone 7 to meet demands in the Dougherty Valley which do not match the diversion pattern of the Berrenda Mesa water entitlement transfer. No carry over of water stored annually in the Main Basin for Dougherty Valley will be allowed from year to year. Nevertheless, there will be water available in the Main Basin that can be used in Dougherty Valley during emergency conditions.

### **9.5 Mandatory Prohibitions and Restrictions**

As discussed above, Table 9-3 lists the mandatory and suggested conservation measures associated with each conservation stage for residential, commercial and municipal customers.

### **9.6 Water Rates and Penalties for Excessive Use**

As discussed earlier, DSRSD has a water rate structure which charges a bimonthly fixed service charge and a bimonthly water quantity charge. The bimonthly usage charge is based on the actual quantity of water used and has higher unit rates as the water use increases, providing incentive to conserve water since the charge is directly proportional to water use.

In addition to the water rates, DSRSD has established additional charges, not imposed as a penalty, but as a charge for excessive or improper use of water. The charges are necessary in order to recover the reasonable cost of enforcement of the mandatory water provisions and in order to attain the goals of the water conservation measures. The charges are summarized in Table 9-5.

**Table 9-5. Water Shortage Emergency Excess Use Charges<sup>(a)</sup>**

	Dollars per One Hundred Cubic Feet, ccf	Dollars per 100 Gallons
Water use within customer allocation	\$1.26	\$0.17
Next 10 percent	\$2.50	\$0.33
Next 10 percent	\$5.00	\$0.67
Next 10 percent	\$7.50	\$1.00
Water use in excess of 130 percent of customer allocation	\$10.00	\$1.34

<sup>(a)</sup> Source: DSRSD Ordinance No. 242, Section 9. Water Quantity Excess Use Charges – Stage II and III, Adopted June 1991.

Should the General Manager determine that a user has violated provisions of the DSRSD's enacted emergency water shortage ordinance, the following enforcement steps may occur:

- Step 1: A cease and desist warning letter will be issued.
- Step 2: A flow restrictor will be installed on violators refusing to cooperate and a letter of intent to terminate service will be issued.
- Step 3: Continued refusal to cooperate after Steps 1 and 2 will result in termination of service.

Tampering with flow restriction devices or service valve/meters is a misdemeanor punishable under the Government Code and violators will be prosecuted.

## **9.7 Revenue and Expenditure Analysis**

In 1991, DSRSD analyzed the impact water conservation had on revenue and expenditures. DSRSD utilized the most recent Water Rate Study to perform the analysis. The Water Rate Study projects expected revenues based on water use data from the preceding year and previous demand periods and expected expenditures based on anticipated personnel, materials and other costs. The Reduction Plan that went into effect in 1991 and the resulting water conservation measures were studied for their impact on revenue and expenditures. As a result of water conservation, revenues were expected to decrease due to the reduced use of water and associated reduced billings. Some expenditures were also expected to decrease due to the decreased demand for water; however, expenditures for customer service activities were anticipated to increase as a result of the implemented water conservation measures. The possible continuation of the drought and the low revenue conditions were considered in the viability of existing and proposed rates. The analysis in 1991 resulted in recommendations for new water rates. Due to changed conditions, during a future drought period, it will be necessary to again perform this type of analysis to determine fair water rates.

In January of 1992, DSRSD revised its water consumption rate structure to encourage conservation. This approach is reexamined annually by DSRSD. The rates are effective all year except for periods in which DSRSD declares a drought emergency. DSRSD water consumption rates are currently two-tiered. Residential, commercial, industrial and institutional customers are charged a

\$1.29 per ccf Zone 7 (water wholesaler) charge for all water consumed, a DSRSD Tier 1 charge of \$0.48 per ccf of water consumed up to and including 3,000 cubic feet per billing period, and a DSRSD Tier 2 charge of \$0.63 per ccf for all consumption in excess of 3,000 cubic feet per billing period (see Table 8-4)<sup>19</sup>.

In addition to a revised rate structure, DSRSD established excess use charges to be enacted in conjunction with the Water Use Reduction Plan and a drought surcharge. These are described below.

#### 9.7.1 Excess Use Charge

The Contingency Plan developed in 1991, invoked an inclining block rate structure whenever Stages II, III, or IV of the Reduction Plan were enacted. The inclining block rate structure would need to be updated in a future drought. These updates should examine percent increases in rates as use exceeds set allocation limits. In 1991/1992 the limits were as follows:

- First ten percent excess use was twice the base rate;
- Next ten percent excess was four times the base rate;
- Next ten percent was six times the base rate; and
- Greater than 130 percent of allocation was eight times the base rate.

#### 9.7.2 Drought Surcharge

Lost revenues from conservation efforts occur because fixed operating expenses (which do not decrease during a drought) are partially paid by quantity (use) billings (which do decrease during a drought). Additionally, increased costs occur from implementing conservation programs during a drought. To cover the increased cost of providing water service, a fixed monthly drought surcharge may be necessary. A drought surcharge was instituted with the Reduction Plan of 1991 and will need to be updated during subsequent drought events based on actual specific water supply and financial conditions at the time. Water conservation was encouraged in 1991 by waiving the drought surcharge for customers that used less than 80 percent of their water allocation.

#### 9.7.3 Zone 7 Drought Contingency Fund

In addition to the measures taken by DSRSD, Zone 7 has a Drought Contingency Fund, which is a rate stabilization fund which can be utilized during drought situations to minimize impacts on water rates as a result of drought conditions.

### **9.8 Mechanisms for Determining Actual Water Use Reductions**

Meters at each Zone 7 turnout are read daily to provide DSRSD with overall water consumption information. If stages of the DSRSD Reduction Plan are initiated during a drought, actual reductions in water use can be determined by comparing monthly water use totals during the drought with their corresponding totals from previous years. In addition, customers could monitor their personal water use by obtaining a three-year history of their water use from DSRSD. Some accounts within DSRSD's service area are normally metered and billed on a bi-monthly basis.

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<sup>19</sup> Source: DSRSD Website [www.dsrdsd.com](http://www.dsrdsd.com) June 2004

During Stages II, III and IV of the Reduction Plan, DSRSD could read meters on a monthly basis to provide customers with timely information on water use.

DSRSD billing personnel routinely perform computer searches on billings to identify customers that are beyond the normal use range. Excessive use customers are sent conservation notices and related information as part of this procedure. The DSRSD billing system also provides a means to determine consumption by basic user categories, which also can be used to monitor water use.

## 10.0 WATER RECYCLING PROGRAMS

### 10.1 Existing Wastewater Collection, Treatment and Disposal Systems

DSRSD owns and operates a wastewater treatment plant which treats wastewater from Dublin, South San Ramon, and Pleasanton. The wastewater treatment plant includes conventional secondary treatment facilities, as well as tertiary and advanced recycled water treatment facilities.

Conventional secondary treatment facilities include:

- Primary Sedimentation;
- Activated Sludge Secondary Treatment; and
- Chlorine Disinfection.

The secondary treatment facilities currently have an average dry weather flow (ADWF) capacity of 17.0 mgd. At projected buildout, the secondary facilities will have an ADWF capacity of 20.7 mgd, of which 10.4 mgd is projected to originate from the DSRSD service area. Flows originating within DSRSD's wastewater service area for 2000, 2005, 2010, 2015, 2020, 2025 and 2030, are projected to be 3.26, 5.1, 6.2, 7.7, 8.3, 9.28 and 9.47 mgd, respectively.

The District's Recycled Water Treatment Facilities (RWTF) consist of the existing Microfiltration Ultraviolet (MFUV) facilities and the Sand Filtration Treatment Facilities (SFTF) with Sand Filtration Ultraviolet (SFUV) facilities currently being constructed in conjunction with DERWA (see Section 10.2).

DSRSD's MFUV facilities were designed to provide advanced wastewater treatment to allow for non-potable reuse and the potential for future replenishment and improvement of local groundwater quality. Construction of the project was completed in 1999. The MFUV project is currently producing recycled water meeting California Title 22 requirements for unrestricted reuse and has received approval for groundwater recharge from the California Department of Health Services (DHS). In addition to this DHS approval, DSRSD has received approval from the Regional Water Quality Control Board. Legal action by outside parties resulted in a requirement that the RWQCB reconsider permit approval. However, DSRSD has determined that it will not ask for RWQCB reconsideration or proceed with the injection of highly treated recycled water into the groundwater basin at this time. The current capacity of the MFUV is 3.0 mgd. In 2004, the maximum day delivery of recycled water for irrigation purposes was 1.5 mgd. Once the SFTF facilities are completed (scheduled for fall 2005), the MFUV facilities will serve as backup facilities.

DSRSD has installed approximately 15.7 miles of recycled water pipelines<sup>20</sup>. These pipelines are currently used to deliver landscape irrigation water to customers in Dublin.

Wastewater that is not recycled is disposed of by the Livermore-Amador Valley Water Management Agency (LAVWMA), which is a joint powers agency created in 1974 by DSRSD and the Cities of Livermore and Pleasanton. Operations began in September 1979 with an expansion in 2005 for a current design capacity of 41.2 mgd. The wastewater is conveyed via a 16-mile pipeline

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<sup>20</sup> Source: DSRSD Website [www.dsrzd.com](http://www.dsrzd.com) May 2004.

from Pleasanton to San Leandro and enters the East Bay Dischargers Authority (EBDA) system for dechlorination and discharge through a deepwater outfall to the San Francisco Bay.

## 10.2 San Ramon Valley Recycled Water Program

In 1995, DSRSD and EBMUD formed a Joint Powers Authority entitled “DSRSD-EBMUD Recycled Water Authority” (DERWA). DERWA’s mission is to provide a safe, reliable, and consistent supply of recycled water, and to maximize the amount of recycled water delivered for non-potable use.

DERWA will operate the San Ramon Valley Recycled Water Program (SRVRWP), a multi-phased project to supply recycled water from DSRSD’s Recycled Water Treatment Facilities (RWTF) to portions of DSRSD’s and EBMUD’s service areas. The SRVRWP will serve customers in portions of Dublin, San Ramon, Blackhawk and Danville. Specifically, the program is planned to reach existing and new irrigation customers including golf courses, parks, common planted areas within homeowner associations, roadway medians and greenbelts, and landscaped areas of schools and office complexes. The program will provide up to 3,700 afa (3.3 mgd) of recycled water to DSRSD customers (see Tables 6-3 and 10-2) and 2,688 afa (2.4 mgd) of recycled water to EBMUD customers. Construction for the first phase of the project began in the spring of 2004, and includes a Sand Filtration Treatment Facility (SFTF) located at the DSRSD RWTF, 16 miles of transmission pipelines, two pump stations and two reservoirs. The first recycled water from this program is scheduled to be delivered in 2005.<sup>21</sup>

The primary DERWA distribution system will initially be limited to 9.7 mgd flow by the capacity of the SFTF. An expansion will be conducted in the future to expand the SFTF capacity to 16.5 mgd. The existing 3.0 mgd MFUV facilities located at the RWTF will provide backup capacity in case one of the SFTF sand filters is taken out of production. However, it is anticipated that after 2009, the SRVRWP recycled water demands during peak usage months will be greater than the total amount of secondary effluent collected from within the DSRSD wastewater collection system. Due to this potential shortage of secondary effluent, DERWA conducted a Supplemental Water Project Study to evaluate the available alternatives for water supply for the recycled water system. The alternatives selected for detailed development are:

- Secondary effluent at the DSRSD wastewater treatment plant derived from wastewater from the Pleasanton service area;
- Diversion of secondary effluent from the LAVWMA pipeline that conveys the Livermore WWTP effluent to the LAVWMA pumping station;
- Use of an abandoned gravel quarry for recycled water storage for use during peak demand periods; and
- Construction of a satellite treatment plant by DERWA to treat wastewater from the Central Contra Costa Sanitary District (CCCSD) San Ramon Pumping Station for use in the DERWA system.

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<sup>21</sup> Source: DERWA website [www.derwa.org](http://www.derwa.org) May 2004.

These alternatives are still being evaluated in more detail by DERWA<sup>22</sup>. In addition, the use of fringe basin groundwater or potable water is being evaluated for peak summer day demands.

### 10.3 Current and Potential Recycled Water Use

Prior to 1999, recycled water was used within the DSRSD water service area only for compaction, dust control, and sewer cleaning. DSRSD began using recycled water for landscape irrigation within its water service area in 1999 when it commenced delivery of recycled water to the Dublin Sports Grounds. Since then, recycled water use has been expanded to golf courses, parks, and other landscaped areas throughout the City of Dublin. DSRSD’s recycled water production since 2000 is presented in Table 10-1. As discussed previously in Section 6.1, currently DSRSD’s RWTF is shut down during the winter months due to low demand for recycled water. Once wintertime recycled water demands increase, the RWTF will be operated year-round to meet recycled water demands.

**Table 10-1. DSRSD Annual Recycled Water Production**

Year	Annual Recycled Water Production, afa
2000	34.4
2001	44.4
2002	98.3
2003	392.3
2004	737.4

In addition to recycled water use within its service area, DSRSD also furnishes recycled water for use outside its service area. Recycled water use outside of DSRSD’s water service area includes trucked use for compaction, dust control and sewer cleaning, and includes in-plant process water and landscape irrigation at the DSRSD wastewater treatment plant.

### 10.4 Projected Recycled Water Use

In 2000, DSRSD adopted a “Water Master Plan” that established Board policy as to the amount of recycled water the District plans to develop and deliver to customers within the District water service area at buildout. This amount was 3,700 afa (3.3 mgd), and directly replaced the need to provide 3,700 afa of potable water supplies. With DSRSD’s commitment to provide these recycled water supplies, not only were the quantities of potable water requested from Zone 7 reduced, but similarly, transmission pipelines, pump stations and other water system infrastructure capacities were also reduced to account for the lower potable water demands and peaking factors. The demand for recycled water within DSRSD’s service area has increased each year and is projected to continue increasing (see Table 10-2). In 2004, the demand for recycled water was 1,233 af, although only 737 af of recycled water was actually produced. The demand for recycled water exceeded the amount produced for two reasons: (1) operational practices at the RWTF exclude running the RWTF during the winter months; and (2) Dougherty Valley customers, while piped for

<sup>22</sup> DERWA Permanent Supplemental Water Supply Alternatives A-H, 2004.

recycled water, still receive potable water. This 2004 recycled water demand is slightly higher than what was projected in the 2000 UWMP (950 af). When the expansion of the RWTF is completed in late 2005, when existing Dougherty Valley customers are served, and when winter-time recycled water demands increase enough to make year-round operation of the RWTF economically feasible, it is anticipated that available recycled water supplies will increase to meet growing recycled water demands.

**Table 10-2. Projected Recycled Water Demands within DSRSD’s Service Area**

	Year						
	2004 (Current)	2005	2010	2015	2020	2025	2030
Projected Recycled Water Demand, afa	1,233	2,000	2,700	3,250	3,700	3,700	3,700
Projected Recycled Water Demand, mgd	1.1	1.8	2.4	2.9	3.3	3.3	3.3

**10.5 Actions to Encourage Use of Recycled Water**

In April 1998, DSRSD adopted Ordinance No. 280 Implementing the DSRSD Recycled Water Policy. In April 2004, Ordinance No. 280 was repealed and replaced with Ordinance No. 301 which formally established the rules and regulations governing the use of recycled water within DSRSD. This ordinance requires, except for small isolated areas, all new irrigation systems serving parks, streetscapes, commercial landscaping and common area landscaping for multifamily to use recycled water. A copy of Ordinance No. 301 is provided in Appendix D.

DSRSD policies related to recycled water use, including District Ordinance No. 301, include provisions that all new development areas must include dual distribution piping for recycled water deliveries, where feasible. The policy also includes provisions to convert existing potable water irrigation customers to recycled water customers where economically feasible. Recycled water is considered part of DSRSD’s water enterprise for customer service and financial operations. Connection fees and rates for recycled water consumption are discounted as a financial incentive to customers that connect to the recycled water system.

DSRSD has undertaken a proactive public outreach program. The on-going program includes newsletters, videos, speaker bureaus, brochures, special events, school educational and classroom programs and meetings with focus groups. The program is modified as each new area is about to receive recycled water service.

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