Appendix I
Water Supply Assessment

ALAMEDA COUNTY WATER DISTRICT

43885 SOUTH GRIMMER BOULEVARD • P.O. BOX 5110, FREMONT, CALIFORNIA 94537-5110
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

May 26, 2009

Mr. Terrence Grindall
Community Development Director
City of Newark
37101 Newark Boulevard
Newark CA 94560-3796

Dear Mr. Grindall:

Subject: Housing Element Update & General Plan Amendments/Zoning Ordinance Amendments Draft Program Environmental Impact Report

The Alameda County Water District (ACWD) wishes to thank you for the opportunity to comment on the "Housing Element Update & General Plan Amendments/Zoning Ordinance Amendments Draft Program Environmental Impact Report."

ACWD supplies water to a population of over 330,000 in the cities of Fremont, Newark, and Union City. ACWD was formed in 1914 by an act of the California Legislature for the purpose of protecting the water in the Niles Cone Groundwater Basin and conserving the water of the Alameda Creek Watershed. Local runoff along with imported water is percolated into the Niles Cone Groundwater Basin through recharge in Alameda Creek itself and through recharge ponds within the Quarry Lakes Regional Recreational Area and adjacent areas. The water is subsequently recovered through groundwater production wells and provided as potable supply to ACWD's customers. ACWD's other supplies include imported water from the State Water Project and San Francisco Regional Water System.

A detailed discussion of ACWD's water supplies can be found in ACWD's 2006-2010 Urban Water Management Plan (UWMP) and in the Water Supply Assessment for the Newark Areas 3 and 4 Specific Plan EIR Project (WSA), provided to the City of Newark in November, 2008. The Newark Areas 3 & 4 identified the key uncertainties facing ACWD's water supplies. Since November 2008, ACWD has received additional information regarding factors that may affect ACWD's future water supply availability. A summary of the most recent information available to ACWD regarding water supply uncertainties, ACWD's plans to address these uncertainties, and potential impacts on the conclusions of the November 2008 WSA is provided in Attachment A to this letter.

ACWD conducts groundwater management and protection activities under the statutory authority granted to ACWD under the County Water District Law (commencing with Section 30000 of the Water Code); the Replenishment Assessment Act of the Alameda County Water District (Section 4, Chapter 1942 of the Statutes of 1961, as amended in 1970 and 1973), which grants additional powers to ACWD to prevent pollution, contamination, or diminution in quality of the groundwater supply; local well ordinances (Fremont No. 950, as amended; Newark No. 136; and Union City No. 109-73); agreements with other agencies; and local hazardous materials ordinances.

ACWD has reviewed the Draft Program Environmental Impact Report (DPEIR) and would appreciate your consideration of the following comments:

1. Access to ACWD Facilities: A number of ACWD's facilities and monitoring wells are located in the City of Newark. Some of these facilities and wells have been identified in Areas 2, 3, and 4 through ACWD's comments to Notice of Preparation of Environmental Impact Reports for these areas. ACWD requests that the PEIR address maintaining access to ACWD's facilities.

2. Groundwater Well Protection/Destruction: A major portion of ACWD's water supply is obtained from the Niles Cone Groundwater Basin that approximately coincides with ACWD's boundaries and extends west under the San Francisco Bay. Therefore, it is imperative that ACWD protects the water quality and ensures the continued use of the groundwater basin for water supply for ACWD's customers.

   In order to protect the groundwater basin, each well located within the project area must be either protected or properly destroyed prior to or during construction activities. If the wells are to remain, a letter so indicating must be sent to ACWD. In addition, any abandoned wells located within the project area must be properly destroyed prior to construction activities. If a well is damaged or the surface seal is jeopardized in any way during construction activities, the wells must be destroyed in compliance with the City of Newark Well Ordinance or any future regulations enacted by the City or ACWD.

3. Drilling Permit Requirement: As the enforcing agency for the City of Newark's Well Ordinance, ACWD requests that the DPEIR include the requirement of obtaining a drilling permit from the Alameda County Water District prior to the start of any subsurface drilling activities. Application for a permit may be obtained from ACWD's Engineering Department, at 43885 South Grimmer Boulevard, Fremont or online at http://www.acwd.org/engineering/drilling_permit.php5. Before a permit is issued, the applicant is required to deposit with ACWD, cash or check in a sufficient sum to cover the fee for issuance of the permit or charges for field investigation and inspection. All permitted work requires scheduling for inspection; therefore, all drilling activities must be coordinated with ACWD prior to the start of any field work.

4. Groundwater:
   a. The area of the City of Newark located near San Francisco Bay, including portions of Area 2 and the majority of Area 4, is low elevation land. Our records indicate that some of this land was a former marsh area that existed prior to the early 1900's. In addition, there is documentation of a large historical spring area near the flood control channel that may be currently active in Area 4. Since these facts indicate that groundwater is near the surface and may be impacted by any proposed development, the DPEIR should include a detailed evaluation of the potential impact on groundwater resources.

   b. Since groundwater is very shallow within the project area, the DPEIR should address temporary and permanent dewatering activities and the potential impact of projects on the local drinking water supply. In addition, ACWD requests that the following potentially significant impacts related to dewatering activities be addressed by the DPEIR:

      i. The project area includes properties that are known Leaking Underground Fuel Tank (LUFT) and Spills, Leaks, Investigation, and Cleanup (SLIC) sites. The DPEIR should address the potential impacts that dewatering activities and construction may have on the investigation and cleanup of those sites.

      ii. Since groundwater is an important component of ACWD's water resources, it is critical that the amount of water that may be extracted by dewatering be estimated and documented. Alternative designs should be evaluated that would minimize the amount of dewatering required during and subsequent to construction. Groundwater losses due to dewatering should be measured and may be subject to a replenishment assessment fee. Mitigation measures should be proposed to replace all significant losses of ACWD's water supplies.

      iii. ACWD regulates the installation and destruction of dewatering wells by working with licensed drilling contractors and agencies that require dewatering wells for the installation of their facilities. ACWD permits are required for dewatering well installations and destructions within the City of Newark; however, dewatering wells are exempt from permit fees.

5. Section 4.6, Hazardous Materials, pages 55 & 56: The DPEIR states that there are four properties that have open contaminated cases as a result of a leaking underground storage tank or other sources of contamination. The DPEIR also states that a Phase 1 Environmental Site Assessment conducted ten years ago for Area Two identified three additional active contamination cases that may have been subsequently closed.

   The DPEIR should acknowledge that as part of ACWD's Groundwater Protection Program, ACWD entered into Cooperative Agreements with the California Regional Water Quality Control Board – San Francisco Bay Region (Regional Board) and the City of Newark which allow ACWD to provide the technical oversight of investigation and remediation at Leaking Underground Fuel Tank (LUFT) and the majority of the Spills, Leaks, Investigation, and

Cleanup (SLIC) sites. There are 38 LUFT cases and 44 SLIC cases in the City of Newark. However, 13 of the LUFT cases and 12 of the SLIC cases have been closed resulting in 25 open LUFT cases and 32 SLIC cases in the City of Newark. The three SLIC cases identified in Area Two are still active SLIC cases and are included in the 32 open SLIC cases. Therefore, any proposed changes to the properties of open LUFT and SLIC cases should be coordinated with ACWD and the Regional Board (when the Regional Board is the lead agency at SLIC sites).

6. Mitigation Measure 4.6-2a (hazardous materials), page 58: The DPEIR states that if contaminated soil or water is identified in a Phase I Environmental Site Assessment, a Soil and Water Management Plan will be prepared to describe procedures for sampling, removing, and disposing of the contaminated material. The Soil and Water Management Plans must be submitted and approved by ACWD since ACWD is both the permitting agency for drilling activities and the lead agency for all LUFT and many SLIC cases as described above.

7. Mitigation Measure 4.6-3 (impacts related to contaminated groundwater), pages 58 & 59: The DPEIR states that one or more housing sites are likely located over historic groundwater contamination plumes associated with former uses of the properties. Therefore the applicants for development of these sites will be required to prepare a plan to deal with dewatering of the site, safe disposal of contaminated groundwater, and potential vapor intrusion issues. The plan should address dewatering issues identified in the Groundwater section above.

8. Water Supply Impacts, page 114: The DPEIR does not provide sufficient information to quantify the total increase in demands as a result of the implementation of the proposed Housing Element Update. For instance, information is not provided for water demands associated with office or commercial space that could be constructed as part of a mixed use development project.

9. Mitigation Measure 4.12-1a, page 114: The DPEIR states that, as a water supply mitigation measure, developers will be required to secure a "will serve" letter from ACWD. It is not clear how this proposed measure will provide mitigation for the increased water demands associated with the Housing Element Update.

10. Mitigation Measure 4.12-1b, page 114: The DPEIR states that, as a mitigation measure, all future housing projects will be required to install low flow plumbing features, install drought tolerant landscaping and install automatic irrigation systems. However, the DPEIR does not provide sufficient information to confirm that this mitigation measure will reduce the water supply impacts to "less than significant" as stated in the DPEIR.

11. Water Supply Mitigation Measures, page 114: As part of the Housing Element, some development projects may occur along a recycled water pipeline route identified in ACWD's Recycled Water Master Plan. ACWD recommends as a mitigation measure for Impact 4.12-

1 that any development project along ACWD's recycled water pipeline route which has an account eligible to use recycled water be required to use recycled water for that account.

12. ACWD Contacts: The following ACWD contacts are provided so that the City can coordinate with ACWD as needed during the CEQA process:

- Eric Cartwright, Water Resources Planning, at (510) 668-4206, or by email at eric.cartwright@acwd.com, for coordination regarding water supply issues.
- Steven Inn, Groundwater Resources Manager at (510) 668-4441, or by email at steven.inn@acwd.com, for coordination regarding ACWD's groundwater resources.
- Michelle Myers, Well Ordinance Supervisor, at (510) 668-4454, or by email at michelle.myers@acwd.com for coordination regarding groundwater wells and drilling permits.
- Ed Stevenson, Development Services Manager, at (510) 668-4472, or by email at ed.stevenson@acwd.com, for coordination regarding public water systems and water services.

Thank you for the opportunity to comment on the project at this time. Please provide copies of the Final PEIR document to ACWD when available.

Sincerely,

Paul Piraino
General Manager

ATTACHMENT A: UPDATE ON ACWD WATER SUPPLY PLANNING ISSUES

MAY 2009

ACWD Sources of Water of Water Supply

As described in ACWD's 2006-2010 Urban Water Management Plan, ACWD currently has three primary sources of water supply: (1) the State Water Project (SWP), (2) San Francisco's Regional Water System and (3) local supplies. The SWP and San Francisco Regional Water Supplies are imported into the District service area through the South Bay Aqueduct and Hetch-Hetchy Aqueduct, respectively. Local supplies include fresh groundwater from the Niles Cone Groundwater Basin (underlying the District service area), desalinated brackish groundwater from portions of the groundwater basin previously impacted by seawater intrusion, and surface water from the Del Valle Reservoir. The primary source of recharge for the Niles Cone Groundwater Basin is from percolation of runoff from the Alameda Creek watershed. To a lesser degree, a portion of ACWD's SWP supplies are also used for local groundwater percolation. Infiltration of rainfall and applied water also contribute to local groundwater recharge.

On average, the SWP provides approximately 40% of the District's supplies, San Francisco Regional Water System provides approximately 20%, and local supplies provide approximately 40%. However, the actual amounts utilized from these sources can vary significantly from year to year depending on hydrologic conditions, environmental restrictions and other factors. Chapter 3 of the UWMP provides additional details on each of these supply sources.

ACWD Water Supply Planning

ACWD's long-term water supply strategy was developed as part of the District's Integrated Resources Planning Study (IRP), and adopted by the ACWD Board in 1995. ACWD's 2006-2010 Urban Water Management Plan (UWMP) incorporates this water supply strategy. An integrated resource planning approach was adopted by ACWD to ensure that the most appropriate facility and resource decisions be made in the planning process. The IRP is based on an inclusive process that begins with the premise that a wide range of traditional and innovative supply-side and demand-side (i.e. water conservation) resources must be considered in developing water supply strategies.

Demand Forecast: A key component to developing and updating the IRP is the forecasting of future water demands in the service area. ACWD's approach to water demand forecasting for the UWMP is to: 1) evaluate existing water demands of lands already developed in the service area; 2) estimate future demands of currently undeveloped lands that are designated for development (and redevelopment plans); and 3) combine the existing and future demands to estimate the overall District-wide future demands. This demand forecasting is done for six primary land use categories: single family residential, multi-family residential, commercial, industrial, institutional, and "other". In order to estimate future demands of currently undeveloped lands in each of these categories, ACWD obtains the most recent zoning information for these lands. The land use information is provided by the cities' planning staff, and includes general plan land use designations and, when available, more detailed information from specific plans or other planning documents. A District-wide water demand forecast for each land use category is then developed by multiplying the planned land use under each land use category by a District-wide average unit water use specific to that land use category. Additional potential future land use is also accounted for in the demand projections, and is based on city-approved plans for redevelopment and/or intensification of specific areas. The demand forecast also considers future demands associated with Association of Bay Area Governments (ABAG) Smart Growth projections.

Water Supply Strategy: As part of the 1995 IRP process, the District evaluated a wide range of water supply and water conservation options. These options were packaged into nine alternative water supply strategies, each of which was evaluated with the goal of meeting policy objectives including: (1) improving water supply reliability; (2) improving aesthetic quality of the water by reducing hardness; and (3) minimizing costs and rate impacts to ACWD's customers. The recommended water supply strategy, chosen because it best met the District's objectives, called for supplementing the District's then-existing supplies (i.e. State Water Project, San Francisco Regional and local supplies) with desalination, recycled water, additional conservation, groundwater management and off-site banking/transfers. A summary of the implementation status of the IRP's recommendations is provided in Table 1 below.

Table 1
Recommended IRP Strategies and Implementation Status as of May 2009

IRP COMPONENT	1995 IRP RECOMMENDATION, by Year				IMPLEMENTATION STATUS (As of May 2009)
	2000	2010	2020	2030	
Demand Management	Implement cost-effective conservation measures with focus on outdoor water use (IRP Package 2)				All cost-effective water conservation best management practices (BMPs) are being implemented. New programs focused on landscape irrigation in place.
Brackish Groundwater Desalination	5 mgd	10 mgd	10 mgd	10 mgd	Phase 1 Desal (5 mgd) completed and in operation. Grant funding secured for Phase 2 (10 mgd), with construction scheduled for 2009/2010.
	Note: 1995 IRP recommendation of 3 mgd and 8 mgd was revised to 5 mgd and 10 mgd as part of the 1996-2001 Engineer's Report.				
Off-Site Storage/Banking Capacity	65,000 AF	95,000 AF	100,000 AF	140,000 AF	Secured 150,000 AF of off-site banking storage capacity at Semitropic Groundwater Banking Program.
Groundwater Management (Minimum inland groundwater elevation)	+1 ft, msl	-5 ft, msl	-5 ft, msl	-5 ft, msl	Completed the Quarry Lakes rehabilitation project to enhance groundwater recharge capacity. Additional groundwater modeling confirms these levels would not adversely impact the groundwater basin under temporary, drought conditions.
Recycled Water			Phase 1: 1,600 AF/Yr	Phase 2: 1,000 AF/Yr	ACWD/USD Recycled Water Master Plan updated and satellite treatment plant feasibility study completed. Installed 1.8 miles of distribution main and 14 service lines.

10-Year IRP Review: In 2006, ACWD completed a 10-year review of the District's IRP and the status of the implementation of the recommended strategy. As part of this process, the District updated the long-term water demand forecast (based on the most recent data available from the cities in the service area

and ABAG projections). The District also updated assumptions on water supply availability for its water sources, based on information provided by the California Department of Water Resources (for SWP supplies), San Francisco Public Utilities Commission (for San Francisco Regional Water supplies) and most recent hydrologic modeling analyses by ACWD (for local supplies). The results of this review confirmed that, as of 2006 conditions, ACWD was on track to meeting its near-term and long-term water supply reliability goals through the year 2030.

Water Supply Uncertainties

The 1995 IRP identified key areas of uncertainty which could impact ACWD's ability to meet its planning goals. Both the 2006-2010 UWMP and 2006 IRP 10-Year Review provided an update of uncertainties potentially impacting ACWD's water supply reliability. However, since these reports were finalized in 2006, there has been additional information related to water supply uncertainties, most significantly regarding environmental restrictions on Delta export pumping which impact SWP supply reliability. As part of the water supply assessments provided to the Cities of Fremont, Newark and Union City in 2008 (2008 WSAs), ACWD provided an update on uncertainties, including recent information on factors affecting SWP reliability. The following discussion of uncertainties is largely from these 2008 WSAs (see References for complete list of 2008 WSAs), with additional updates per the most recent information available to ACWD as of May 2009.

Climate Change

Climate change may result in less snowfall, more local rainfall and rising sea-levels. Under current conditions, much of ACWD's imported water supplies are held in "storage" in winter and spring snowpack in the Sierra Nevada Mountains. With a diminished snowpack, the yield of the State Water Project and San Francisco Regional System may be significantly impacted. The magnitude of the impact of climate change on water supplies is not known. However, the following provides an overview of recent studies that have evaluated potential impacts on surface water and groundwater supplies in California.

Surface Water: In 2006 DWR released a report on climate change and its potential impact on California's water resources. Entitled *Progress on Incorporating Climate Change into Management of California's Water Resources* (*2006 Climate Change Report*), the report summarizes recent research into change in precipitation, air temperatures, snow levels, and snowmelt runoff. The report also evaluates possible future impact on California water supply through model simulations which reflect four climate change scenarios. Each scenario applies one of two weather conditions (weak temperature warming and weak precipitation increase or modest warming and modest drying) to one of two geopolitical conditions (high population growth and regional based economic growth coupled with slow technological advances or low population growth, global based economic growth coupled with sustainable development).
The main results of the *2006 Climate Change Report* relate to climate change's estimated impacts on the State Water Project around the year 2050:

- Estimated changes in annual average SWP south-of-Delta Table A deliveries range from a slight increase of about 1 percent for a wetter scenario to about a 10 percent reduction for one of the drier climate change scenarios.
- Estimated increased winter runoff and lower Table A allocations resulting in slightly higher average annual Article 21 deliveries in the three drier climate change scenarios[1]. However, the

[1] Article 21deliveries refer to Article 21 of the SWP contracts which allows for contractors to receive additional water deliveries only under specific conditions. These conditions include: 1) Article 21 water is available only when excess water is available in the Delta, and 2) Article 21water is available only when conveyance capacity through the SWP facilities is available. Due to the uncertainties

increases in Article 21 deliveries do not offset the losses to Table A. The wetter scenario with higher Table A allocations results in fewer Article 21 delivery opportunities and slightly lower annual Article 21 deliveries.

- Estimated SWP carryover storage is reduced in the drier climate change scenario and is somewhat increased in the wetter climate change scenario.

The *2006 Climate Change Report* notes that there are a number of factors for which the models do not account that could significantly impact delivery capability, ranging from change in water management practices, levels of rainfall, changes in evapotranspiration, and increased Delta salinity. The report also notes that there are no technical tools available currently to model these issues.

In August of 2008, DWR released its *State Water Project Delivery Reliability Report,* 2007 *(2007 SWP Reliability Report).* The *2007 SWP Reliability Report* considered the potential impacts of climate change on SWP supplies by including the same four scenarios of future climate change that were simulated in the *2006 Climate Change Report.* The *2007 SWP Reliability Report* estimated the impact of climate change on SWP deliveries by interpolating between future studies which assumed no climate change and studies which assumed 2050-level emissions. The report estimates that, under future conditions, average annual SWP Table A deliveries will be 66% to 69% of the maximum Table A amount[2]. Further, though the estimated average annual amount of future SWP Table A deliveries increases when compared to current conditions, the amount of Article 21 deliveries decrease. Also, the amount of SWP Table A deliveries during multiple dry year periods in the future tend to decrease compared to current conditions. The *2007 SWP Reliability Report* finds that this decrease could be significant, but that such an outcome depends on which of the various climate change scenarios is considered.

Groundwater: In 2003, and then again in an update prepared in August of 2005, the Pacific Institute for Studies in Development, Environment and Security prepared a literature search report for DWR, which summarized recommendations for coping with and adapting to climate change from key peer-reviewed publications and specifically considered the potential impacts of climate change on groundwater. The Pacific Institute's report is entitled, *Climate Change and California Water Resources: A Survey and Summary of the Literature,* by Michael Diparsky and Peter H. Gleick, Pacific Institute (*Climate Change and Water Resources*).

Climate Change and Water Resources found that little work has been done on the impacts of climate changes for specific groundwater basins, or for general groundwater recharge characteristics or water quality. As the following conclusions from the report illustrate, the potential impacts of climate change on groundwater resources are divided, with some potentially resulting in increased availability of groundwater and others potentially resulting in less.

- Changes in recharge will result from change in effective rainfall as well as a change in the timing of the recharge season. Increased winter rainfall could lead to increased groundwater recharge.
- Higher evaporation or shorter rainfall seasons could mean that soil deficits persist for longer periods of time, shortening recharge seasons.
- Because a significant portion of winter recharge comes from deep percolation of precipitation below the rooting zone, warmer winter temperatures between storms would be expected to

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regarding the availability of Article 21 water, ACWD does not include this supply in its water supply planning and Urban Water Management Plan.

[2] As described below, the *2007 Draft SWP Reliability Report* also includes an analysis of SWP deliveries operating under a recent court ruling to protect endangered fish in the Delta ("Wanger Decision").

increase and dry out the soil between storms. A greater amount of rain in subsequent storms would then be required to wet the root zone and provide water for deep percolation.

- Sea-level rise could affect coastal aquifers through saltwater intrusion.
- Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. However this additional runoff would be occurring at a time when some basins are either being recharged at their maximum capacity or are already full.
- Reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge.

Local Supplies

In addition to potential climate change impacts, the availability of ACWD's local supplies may be influenced by a variety of other factors, including operational and facility modifications to accommodate Alameda Creek steelhead fishery restoration efforts. The restoration efforts are an on-going process which includes multiple stakeholders in the Alameda Creek Watershed. ACWD's participation in this effort is focused on providing fish passage past the District's facilities in the Alameda Creek Flood Control Channel, such that in-migrating steelhead can access spawning and rearing grounds in the upper watershed, and out-migrating steelhead can return through the flood control channel to San Francisco Bay. ACWD existing facilities in the flood control channel include three inflatable rubber dams and seven off-stream diversions. These facilities are critical for the groundwater recharge operations for the District's local supplies from the underlying Niles Cone Groundwater Basin.

In order to provide for the needed fish passage in the flood control channel, ACWD is planning to remove one barrier (ACWD's lower inflatable dam) and install two fish ladders (one at the middle inflatable dam and an adjacent flood control structure and one at the upper rubber dam). ACWD has recently installed a fish screen at one of the District's off-stream diversions, and plans are underway to install screens at the remaining diversions. As part of the permitting process for these restoration projects, ACWD will need to secure the appropriate permits from the regulatory agencies including the California Department of Fish and Game, U.S. Army Corps of Engineers and National Marine Fisheries Service. It is likely that ACWD will need to make operational changes in order to accommodate fish passage at the fish ladders, and downstream in the flood control channel. As of May 2009, the extent of these operational changes at the groundwater recharge facilities is not known. It is anticipated that over the next 6 to 12 months (as part of the permitting process for ACWD's fish ladder projects) ACWD will be working with the resource agencies to determine these future operating conditions. However, the overall impact, if any, of these changes on ACWD's water supplies is not currently known.

Upstream land use, flood control and water supply projects in the Alameda Creek Watershed may also impact the supply and quality of water available at ACWD's groundwater recharge facilities. Similarly, efforts to develop groundwater supplies by agencies in the South East Bay Plain (north of ACWD) may also impact ACWD's groundwater supply availability. However, the extent of these impacts on ACWD's local supplies, if any, is not currently known.

San Francisco Regional Supplies

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). Completion of the projects in the WSIP is critical to ensuring the reliability of the San Francisco Regional supplies. Towards that end, on October 30, 2008 the Program

EIR for the Water Supply Improvement Program was certified by the San Francisco Planning Commission. The SFPUC adopted the "phased variant" alternative of the EIR, which included all planned system reliability projects. However, due to concerns regarding the development of new supplies, under the adopted alternative, the SFPUC will be limiting the amount of water delivered to its wholesale customers to 184 mgd for the next ten years (i.e. through 2018).

In addition, the SFPUC water supply contract with ACWD, as well as those with other SFPUC wholesale customers, will expire in June 2009. A new Master Water Sales Agreement between San Francisco and its wholesale customers (including ACWD) has recently been negotiated with San Francisco. This new agreement was approved by the SFPUC on April 28, 2009. The new agreement has a term of 25 years and provides a commitment from San Francisco to provide, collectively, up to 184 mgd to its wholesale customers. ACWD's existing contractual purchase amount (13.76 mgd) will remain the same under the new agreement. ACWD is currently scheduled to approve both the Master Water Sales Agreement and the corresponding individual Water Sales Contract in June of 2009.

State Water Project Supplies

Delta Export Pumping Restrictions: The reliability of ACWD's State Water Project supplies will continue to remain uncertain due to the on-going concerns regarding the sustainability of the Delta. These concerns include the Delta ecosystem and potential future environmental regulations, levee stability and the potential for catastrophic failure of these levees, urban encroachment within the Delta, and water quality within the Delta due to urban and agricultural discharges.

On December 14, 2007, Federal District Court Judge Oliver Wanger issued a final court order which put into place an operational plan requiring the State Water Project (SWP) and Central Valley Project (CVP), the state's two largest water delivery systems, to reduce Delta export pumping operations ("Wanger Decision"). The operational plan, formalized a preliminary framework issued by Judge Wanger on August 31, 2007, reduced Delta exports from the SWP and CVP to protect an endangered fish species, the Delta smelt. The California Department of Water Resources (DWR) released a report estimating the reliability of the SWP supplies if operated under the Wanger Decision over the long-term (*2007 SWP Reliability Report).* The report estimated that, under the Wanger Decision, the long-term average delivery reliability of the State Water Project would be reduced from 77% to 66%-69% (under 2025 conditions). As described in the 2008 WSAs, this represents a potential reduction in ACWD supplies of approximately 4,600 AF, representing an overall decrease in ACWD's average year supplies of approximately 5%.

The interim order was in place until federal agencies could develop a revised federal biological opinion (BO) for Delta smelt to ensure the projects' compliance with Endangered Species Act requirements. This revised federal biological opinion was delivered on December 15, 2008. The revised BO outlines certain physical conditions that must exist in the Delta to protect this species; those conditions are translated into flow quantities and temperatures which directly influence the timing and quantity of water that can be routed through the Delta. These are complex calculations which the Department of Water Resources (DWR) must analyze through operations and hydrologic modeling in order to estimate just how much water it can deliver to State Water Contractors (SWC). To date, the DWR has not released a modeling analysis reflecting the SWP reliability under the revised BO. However, based on information provided by DWR as part of a press release on the revised BO (DWR, December 15, 2008), under a "most likely" scenario, the water supply impacts under the revised BO would be similar to that of the Wanger Decision. However, under a "worst case" scenario, the revised BO would have significantly greater water supply impacts.

Factors other than protection of the endangered Delta smelt may also impact the future reliability of the SWP supplies. For instance, the California Fish and Game Commission recently decided to accept the longfin smelt as a candidate species under the California Endangered Species Act (CESA). Under CESA, candidate species receive the same legal protection as listed threatened and endangered species. Also notable, a new biological opinion is currently being prepared for Delta salmonids, which is expected to be released in June of 2009. State Water Contractors staff has indicated that within several weeks of the release of the BO, modeling analyses of the water supply impacts will be made publically available. Until that information becomes available, ACWD will not be able to quantify the potential impacts of this decision on its SWP supplies. Lastly, the DWR is scheduled to release a 2009 update of the SWP Delivery Reliability Report in October of 2009. It is anticipated that this report will contain a complete modeling analyses of the impacts on SWP reliability due to the recent environmental restrictions for protection of the Delta smelt, longfin smelt and salmonids.

In addition to the environmental restrictions described above, State, Federal and other agencies are currently in the process of developing a Bay Delta Conservation Plan with the goal of providing long-term Federal and State Endangered Species Act compliance for Delta export operations. In addition, the State Water Contractors and others have recently filed suit over the Delta smelt biological opinion. Similarly, the DWR has recently (May 7, 2009) requested that the U.S. Fish and Wildlife Service reinitiate the consultation process on Delta smelt (as a result of new scientific information on smelt habitat and other stressors). It is currently not known how the Bay Delta Conservation Plan, the SWC law suit or a reconsultation will impact the reliability of SWP supplies.

Semitropic Water Banking Program: As described in the District's UWMP, ACWD has secured 150,000 AF of groundwater storage capacity at Semitropic under this program. The purpose of ACWD's participation in this program is to improve the dry year reliability of ACWD's SWP water supplies. In wet years, ACWD delivers its unused (excess) SWP supplies to Semitropic for storage in their groundwater basin. In dry years, ACWD can recover these supplies through: (1) an "in-lieu" exchange whereby ACWD will receive a portion of Semitropic's SWP supplies (and Semitropic will utilize groundwater previously stored by ACWD in the Semitropic groundwater basin); and (2) a "pumpback" program where Semitropic directly pumps stored groundwater into the California Aqueduct. The groundwater pumped into the aqueduct flows downstream to southern California SWP contractors, and through exchanges, ACWD receives a like amount of SWP water that otherwise would have been delivered to the southern California SWP contractors. As with local groundwater storage in the Niles Cone Groundwater Basin, the Semitropic Groundwater Banking Program does not provide a new source of supply for the District. Rather, it provides a means to store the District's unused SWP supplies in wet years for use during dry years when the delivery of SWP supplies may be significantly curtailed.

Since ACWD first began participating in the Semitropic Water Banking Program in 1996, ACWD has placed over 120,000 AF of SWP supplies in storage at Semitropic. In addition, because of the on-going drought conditions and recent Delta export pumping restrictions, over the past three years ACWD has withdrawn approximately 20,000 AF from storage to make up for reduced allocation of SWP supplies.

ACWD's participation in the Semitropic Banking Program is formalized through long-term contracts with the Semitropic Water Storage District that provide for water storage and withdrawal capacity through the year 2035 (consistent with ACWD's SWP contracts). Key uncertainties regarding the Semitropic Water Banking Program include: 1) the quality of the groundwater that is pumped from the Semitropic groundwater basin into the California Aqueduct does not adversely impact downstream SWP contractors; and 2) the adequacy of SWP supplies delivered to southern California SWP contractors in the fall months

(when the Semitropic pumpback program would be operational) to provide exchange capacity for ACWD and other Bay Area water agencies to recover their stored water through exchanges.

In order to address the groundwater quality issues, Semitropic has operated their pumpback facilities in conjunction with other Kern County pump-in programs, which when evaluated on the whole, have met the DWR's criteria for pump-in water quality. In addition, over the past year Semitropic has implemented a pilot water treatment program, which has successfully demonstrated the capability to treat groundwater prior to pumping into the California Aqueduct. With regards to the future availability of SWP supplies for exchanges (as needed to recover water through the pumpback program), ACWD and the other participating Bay Area water agencies are working closely with DWR and southern California SWP contractors to ensure that these exchanges can be accomplished in dry years. Over the past three dry years, there has been sufficient exchange water available for all Semitropic Banking Program participants. However, in the future, there may be limitations on the availability of exchange water that could adversely impact ACWD's ability to recover water from Semitropic. In this event, ACWD may need to rely on either 1) water stored in local reserves (e.g. Lake Del Valle, Niles Cone Groundwater Basin, or San Luis Reservoir); or 2) additional water purchases through programs such as the DWR Drought Water Bank. It should be noted that the uncertainties with the Semitropic Banking Program would only affect ACWD's dry year water supplies, and would not adversely impact supplies under normal or wet year conditions.

Uncertainties: Quantification of Water Supply Impacts

As described above, ACWD's water supplies are facing numerous uncertainties due to a variety of factors. At this time, ACWD does not have sufficient information to quantify the range of impacts, if any, on either the District's local or imported supplies that may occur as a result of these uncertainties. Because of these uncertainties, the November 2008 WSA for the Newark Area 3 and 4 Specific Plan included two scenarios for the comparison of water supplies and projected demands (based on the demand forecast developed for the 2006-2010 UWMP). The first scenario assumed that the long-term SWP reliability would be addressed through the Bay Delta Conservation Plan and other planning efforts, and the long-term SWP reliability would be similar to that prior to the Wanger Decision ("Pre-Wanger" conditions). The second scenario assumed that the Wanger Decision would continue to govern the long-term Delta export operations, and the long-term average SWP reliability would be reduced from 77% to 66% ("Post-Wanger" conditions).

Under the "Post-Wanger" scenario, ACWD's water supply "buffer" (i.e. supplies in excess of demands) is reduced substantially from 5000 AF to approximately 400 AF under normal year conditions. Given that ACWD is facing additional water supply uncertainties that were not factored into the November 2008 WSA scenarios (e.g. Delta smelt BO, salmonid BO, etc.), there is a high likelihood that there may be further reductions in ACWD water supplies which, without the implementation of additional water management measures beyond ACWD's existing IRP strategy, could result in a water supply/demand imbalance (demands greater than supply availability). The magnitude of this potential imbalance, if any, is not currently known, and will be largely be dependent on the outcome of environmental regulations that are outside the control of ACWD.

Planning Update

Because of the water supply uncertainties facing ACWD, the District is currently in the process of evaluating its water supply management strategy. As part of this process, ACWD will be evaluating the ability of the District to meet its long-term planning objectives, including water supply reliability, given the

changing regulatory conditions affecting ACWD's SWP and local supplies. Key components of this planning update will include, as necessary:

1. Update of the District's demand forecast (based on the most recent land use planning information from the Cities of Fremont, Newark, and Union City and ABAG);

2. Evaluation of projected water supply availability (based on information to be provided by the DWR on SWP reliability given the recent and upcoming biological opinions)

3. Comparison of water supply and demands to determine the potential water supply/demand imbalance, if any, as a result of additional reductions in ACWD's water supplies.

4. Evaluation of potential additional water management alternatives in order to: 1) offset any potential water supply/demand imbalances, and 2) address future water supply uncertainties.

5. Recommendations for revisions to ACWD's existing water management strategy, if needed, to ensure that ACWD's planning objectives for water supply reliability can be met.

It is currently anticipated that this planning effort will be accomplished over the next nine to twelve months, and the results of which will be incorporated in the next update to the District's Urban Water Management Plan (due by December 2010). However, as described above, key information regarding future water supply reliability (most notably the SWP reliability under the existing and upcoming biological opinions) is not yet available. Based on information provided by the DWR and State Water Contractors, ACWD anticipates that preliminary information will be available in the summer of 2009, followed by an update to the DWR's SWP Delivery Reliability Report in October 2009. Once this information becomes available, ACWD will include it in the District's planning update.

Potential Additional Water Management Alternatives

In anticipation of the need for additional water management measures to offset the potential SWP supply impacts as a result Delta pumping export restrictions, ACWD together with other Bay Area water agencies that rely on SWP supplies (Santa Clara Valley Water District and Zone 7 Water Agency), recently completed a study of potential water supply options (CDM, May 2009). This study evaluated a range of regional water storage, water banking and water supply opportunities, and provided comparisons of these alternatives based on costs, water supply benefits, key issues and uncertainties, and timing. The evaluation of these alternatives was based on information available at the time of the study, and did not include detailed design, cost analysis or environmental analyses of these alternatives. Of the seven alternatives evaluated, the study recommended that several of the alternatives merited further investigation as potential water management opportunities for ACWD and the other Bay Area agencies:

- Expanded Los Vaqueros Reservoir Project: The Contra Costa Water District (CCWD), in conjunction with the U.S. Bureau of Reclamation, is currently evaluating the expansion of the Los Vaqueros Reservoir (in eastern Contra Costa County) from 100,000 AF to 275,000 AF. As part of this effort, CCWD has identified the potential for Bay Area water supply agencies, including ACWD, to participate in the project. Potential benefits to ACWD include additional water supplies, improved dry year water supply reliability, and emergency water storage. A draft EIR/EIS was

recently completed for the project and it is anticipated that a finalized EIR/EIS will be completed by the fall of 2010. ACWD's participation in this project will be dependent on a variety of factors including actual water supply benefits, costs, and consistency of the project with a long-term Delta solution.

- Bay Area Regional Desalination Projects: Currently Bay Area water agencies are in the process of developing desalination projects in the Bay Area: 1) the Bay Area Regional Desalination Project (BARDP) sponsored by a variety of agencies including Contra Costa Water District, Santa Clara Valley Water District, East Bay Municipal Utility District, and the San Francisco PUC; and 2) the Delta-Diablo Sanitation District Desalination Project. Both projects are in the early phases of implementation, and both projects would provide a new, reliable supply regardless of the hydrologic conditions. Both desalination projects are located in Contra Costa County, and would require agreements with neighboring agencies (e.g. EBMUD, SFPUC) to wheel water through their systems to ACWD

- Semitropic Groundwater Banking Program - Stored Water Recovery Unit: Although not a new source of supply, groundwater storage provides the potential to improve water supply reliability by storing water when it is available for later use. ACWD is already participating in the Semitropic Groundwater Banking Program, and has the opportunity to expand its off-site groundwater banking by participation in the Stored Water Recovery Unit (SWRU) program recently developed by Semitropic Water Storage District. Semitropic has completed the necessary environmental documentation for this program, and portions of the SWRU have already been constructed. However, as with the existing Semitropic banking program, ACWD faces similar uncertainties with regard to recovering stored water (e.g. pumpback water quality and sufficient SWP deliveries for exchanges).

In addition to the regional water supply options described above, ACWD has other local water management alternatives that may be available to offset the impacts of reduced water supplies. As described below, these opportunities include additional water conservation and additional recycled water.

- Additional Water Conservation: The implementation of a comprehensive water conservation program is a key component of ACWD's adopted IRP water management strategy. As such, ACWD has implemented a conservation program that includes a broad range of conservation measures for its residential, commercial, industrial and landscape customers. As part of its planning update, ACWD will consider the implementation of additional measures to further reduce demands. Examples of potential additional measures include: 1) additional incentives for residential and landscape customers to further reduce landscape irrigation water use, and 2) additional incentives for businesses and industries to improve efficiencies through installation of water efficient plumbing fixtures and on-site water recycling.

- Additional Recycled Water: ACWD's existing water management strategy includes plans for providing up to 1,600 AF/Yr of recycled water by the year 2020. A potential option available to ACWD may be to accelerate and/or expand the planned recycled water program. In addition, ACWD may provide incentives for large industrial customers to develop their own, on-site recycled water systems to reduce their need for potable supplies from the ACWD distribution system.

Potential Impacts on the Conclusions of the November 2008 WSA for the Newark Areas 3 & 4 Specific Plan Project

Based on the results of the planning update (and the potential need to secure additional water supplies), ACWD may incorporate one or more of the above alternatives into its water supply strategy. As a next step after the IRP is updated, the District's Capital Improvement Plan (CIP), as well as financial planning model, will be updated. In addition, because of the potential reduction in ACWD's water supplies, ACWD may be requiring additional mitigation for the water supply impacts associated with Areas 3 & 4 Specific Plan Project. The requirements for additional mitigation have not yet been determined, and will be dependent on the magnitude of the water supply shortages that ACWD may be facing. Consistent with the provisions in the November 2008 WSA, the implementation of these additional mitigation measures may be a condition for providing a water supply verification and/or as a condition of providing water service to the Newark Areas 3 & 4 Specific Plan Project.

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ALAMEDA COUNTY WATER DISTRICT

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Vice President
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ARTHUR LAMPERT

43885 SOUTH GRIMMER BOULEVARD • P.O. BOX 5110, FREMONT, CALIFORNIA 94537-5110
(510) 668-4200 • FAX (510) 770-1793 • www.acwd.org

MANAGEMENT
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General Manager
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Finance Manager/Treasurer
ROBERT SHAVER
Engineering Manager
WALTER L. WADLOW
Operations Manager

November 14, 2008

Terrence Grindall
Community Development Director
City of Newark
37101 Newark Blvd.
Newark, CA 95020

Dear Mr. Grindall:

Subject: Water Supply Assessment for Newark Area 3 & 4 Specific Plan EIR Project

As requested by the City of Newark, Alameda County Water District (ACWD) has prepared a water supply assessment for the Newark Area 3 & 4 Specific Plan EIR Project (enclosed). The water supply assessment was adopted by the ACWD Board of Directors on November 13, 2008 (resolution enclosed).

The water supply assessment was prepared pursuant to California Water Code Section §10910 which requires that a water supply assessment be provided to cities and counties for a project that is subject to the California Environmental Quality Act (CEQA), and which surpasses a threshold for the number of housing units and/or square feet of commercial/industrial buildings. The water supply assessment documents sources of water supply, quantifies water demands, evaluates drought impacts, and provides a comparison of water supply and demand that is the basis for an assessment of water supply sufficiency. The water supply assessment also includes provisions for irrigation of the golf course as well as water conservation measures to be implemented by the Project applicant. As noted in the assessment, these provisions will be a condition of water service to the Project.

Please contact Thomas Niesar, ACWD's Senior Water Resources Engineer at (510) 668-4210, with any questions regarding this assessment.

Sincerely,

Paul Piraino
General Manager

Attachment

RESOLUTION NO. 08-070

OF BOARD OF DIRECTORS OF ALAMEDA COUNTY WATER DISTRICT ADOPTING THE NOVEMBER 2008 NEWARK AREA 3 & 4 SPECIFIC PLAN EIR PROJECT WATER SUPPLY ASSESSMENT

WHEREAS, California Water Code Section §10910 requires that a city or county that receives an application for a project that is subject to the California Environmental Quality Act (CEQA), and that exceeds a threshold for the number of housing units and/or square feet of commercial/industrial buildings request the public water system that would supply water to the project to provide a water supply assessment;

WHEREAS, the City of Newark (City) has received an application for the Newark Area 3 & 4 Specific Plan EIR Project (Project) that involves the construction of an 18-hole golf course, up to 1,400 housing units of mixed density, an elementary school, open space wetland mitigation areas, and three acres of office/public space ;

WHEREAS, the Project exceeds the statutory thresholds;

WHEREAS, on August 18, 2008 the Alameda County Water District (District) received a request from the City to prepare a water supply assessment for the Project;

WHEREAS, staff has prepared a water supply assessment for the Project which includes a water supply and demand comparison under a range of hydrologic conditions;

WHEREAS, Water Code Section 10910 requires the District's Board of Directors to approve the water supply assessment.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Alameda County Water District that the November 2008 Newark Area 3 & 4 Specific Plan EIR Project Water Supply

Assessment is hereby approved and the General Manager is authorized and directed to submit it to the City of Newark.

PASSED AND ADOPTED this 13th day of November 2008, by the following vote:

AYES: Directors Gunther, Koller, and Weed

NOES: None

ABSTAIN: Director Huang

ABSENT: Director Lampert

/s/ JOHN H. WEED
John H. Weed, President
Board of Directors
Alameda County Water District

ATTEST:

/s/ GINA MARKOU
Gina Markou, District Secretary
Alameda County Water District
(Seal)

APPROVED AS TO FORM:

/s/ PATRICK T. MIYAKI for
Ray McDevitt, Attorney
Alameda County Water District

CERTIFICATE

I, the undersigned District Secretary of ALAMEDA COUNTY WATER DISTRICT, do hereby certify that the foregoing is a full, true and correct copy of a Resolution of the Board of Directors of ALAMEDA COUNTY WATER DISTRICT, a political subdivision, which said Resolution was duly adopted at a meeting of said Board regularly held on November 13, 2008, that a copy of said Resolution was forthwith duly entered in the minutes of said meeting of said Board, and that the same is in full force and effect.

Dated: November 14, 2008

Gina Markou

Gina Markou, District Secretary
Alameda County Water District

WATER SUPPLY ASSESSMENT

FOR

NEWARK AREAS 3 & 4

SPECIFIC PLAN EIR

PROJECT

NOVEMBER 2008

PREPARED FOR

CITY OF NEWARK,
NEWARK CALIFORNIA

Prepared by:

ALAMEDA COUNTY WATER DISTRICT
43885 S. Grimmer Blvd.
Fremont, CA 94538

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SECTION 1
INTRODUCTION

BACKGROUND

The City of Newark has requested a Water Supply Assessment for the Newark Area 3 & 4 Specific Plan EIR Project ("Project")[1]. The Specific Plan includes an 18-hole golf course, up to 1,400 housing units of mixed density, an elementary school, open space wetland mitigation areas, and three acres of office/public space. Areas 3 and 4 cover approximately 950-acres and are located in southwest Newark, bounded by Mowry Avenue on the north, Cherry Street on the east, Stevenson Boulevard on the south, and salt flats on the west (Figure 1). The Project includes all of Area 4 and only 86 acres of Area 3. Most of Area 3 has already been developed and includes the Newark Ohlone Campus, a Technology Park and the Silliman Center (see Figure 2.) The current schedule anticipates ground breaking in 2010 with build out by 2016; the golf course would be completed by 2012.

Development of this site was included in the most recent Demand Forecast and Urban Water Management Plan (UWMP). Area 4 had previously been planned as a combination golf-course and residential development and Alameda County Water District (ACWD, "District") has long planned for this project to form an anchor demand for the development of a non-potable, reclaimed water distribution system ("purple pipe"). The portion of Area 3 included in the Project had previously been planned as a high-tech park. The section of Area 3 will require a General Plan amendment to be consistent with the proposed Specific Plan Project.

The Project will require water supplies for the golf-course, new homes, school and additional building areas. The existing water provider in the area is the Alameda County Water District. ACWD is a retail water purveyor with a service area that includes the cities of Fremont, Newark and Union City. ACWD provides water primarily to urban customers: approximately 70% of supplies are used by residential customers, with the balance (approximately 30%) utilized by commercial, industrial, institutional and large landscape customers. Total distribution system water use (excluding system losses) was approximately 49,100 acre-feet (AF), or an average of 43.8 million gallons per day (mgd) in fiscal year 2007-08. The District's primary sources of supply come from the California State Water Project (SWP), the San Francisco Regional Water System, and local supplies from the Alameda Creek Watershed and Niles Cone Groundwater Basin (underlying the ACWD service area).

California Water Code Section §10910 requires that a water supply assessment be provided to cities and counties for a project that is subject to the California Environmental Quality Act (CEQA), and which surpasses a threshold for the number of housing units and/or square feet of commercial/industrial buildings. The City of Newark has confirmed that, while titled a Specific Plan, the EIR will encompass a Development Agreement with the major property owner in the Project Area, Newark Partners LLC, and will be the only environmental review necessary for the

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1 The City of Newark has confirmed that, while titled a Specific Plan, the EIR will encompass a Development Agreement with the major property owner in the Project Area, Newark Partners LLC, and will be the only environmental review necessary for the development of the housing and recreational project in Areas 3 and 4

development of the housing and recreational project in Areas 3 and 4. The cities and counties are mandated to identify the public water system that might provide water supply to the project and then to request a water supply assessment. The water supply assessment documents sources of water supply, quantifies water demands, evaluates drought impacts, and provides a comparison of water supply and demand that is the basis for an assessment of water supply sufficiency.

PURPOSE

The purpose of this Water Supply Assessment is to document ACWD's existing and future water supplies for its service area and compare them to the area's future water demands, including the future water demands of the Project. This comparison, conducted for both normal hydrologic conditions and drought conditions, is the basis for an assessment of water supply sufficiency in accordance with the requirements of California Water Code Section §10910.

METHODOLOGY

ACWD's long-term water supply strategy was developed as part of the District's Integrated Resources Planning Study (IRP), and adopted by the ACWD Board in 1995. ACWD's 2006-2010 Urban Water Management Plan (UWMP) incorporates this water supply strategy. The UWMP (included as Attachment A) documents ACWD's existing and future water supplies, projected future demands in the service area, and provides a comparison of water supplies and demands under normal and dry year conditions. The UWMP provides the basis for this water supply assessment.

This assessment does differ slightly from the UWMP in that it includes an additional increment of forecast demand, specifically 560 acre-feet per year (AF/Yr) for the Patterson Ranch Development Project in Fremont. These demands were determined and analyzed in a water supply assessment completed in April of 2008 and are now considered part of ACWD's baseline demand forecast. While Patterson Ranch may be built in phases, the demand is assumed to be fully in place as early as year 2010. Also changed from the UWMP is the addition of 600 acre-feet per year of recovery capacity from the Semitropic Groundwater Banking Program. Acquisition of this additional dry year recovery capacity is a condition for ACWD to provide water service to the Patterson Ranch Project (as documented in the April 2008 Patterson Ranch Water Supply Assessment).

Finally, this water supply assessment also considers uncertainties in the future reliability of ACWD's water supplies, specifically supplies from the SWP that are conveyed through the Sacramento-San Joaquin Delta. As a result of a recent court ruling imposing restrictions on the SWP operations in order to protect endangered fish, the future reliability of SWP supplies may be decreased from that which was assumed at the time of the preparation of the UWMP. Given this uncertainty, this water supply assessment provides supply-demand comparisons under two scenarios for future SWP reliability. The first scenario assumes that the future long-term reliability will be similar to that estimated by the State Department of Water Resources prior to the court ruling, and the second assumes that the court's restrictions placed on Delta export pumping will remain in place for the foreseeable future.

SECTION 2
WATER DEMAND

This section provides an overview of historical and current water use in the District, and a summary of future projected water demands for the Project and ACWD's service area.

WATER USE CATEGORIES

Water use in the ACWD service area is divided into two categories: 1) distribution system use, and 2) groundwater system use. The distribution system use includes all water uses supplied by ACWD's treatment and production facilities, and conveyed to ACWD customers via the District's distribution system. This use is further subdivided into the categories of single family residential (SFR), multi-family residential (MFR), commercial, industrial, institutional, landscape and other use.

Groundwater system use includes private (non-ACWD) groundwater pumping (primarily for industrial and municipal landscape irrigation uses), ACWD's Aquifer Reclamation Program pumping, and saline groundwater outflow to San Francisco Bay. The Aquifer Reclamation Program (ARP) pumping is an ongoing ACWD program to pump saline groundwater out of the aquifer system and replace it with fresh water recharged at the District's groundwater recharge facilities. Saline groundwater outflow to San Francisco Bay represents the groundwater outflow required to maintain groundwater flow in a bayward direction necessary to prevent seawater intrusion into the local aquifer system and to flush saline groundwater back to San Francisco Bay.

The District's groundwater system use is not anticipated to change significantly in the future. Therefore, the following discussions of water use are focused on the District's distribution system water use.

HISTORICAL AND CURRENT WATER USE

Table 1 provides a summary of the last ten years of water use within the District. As shown in the table, residential water use comprises approximately 70% of District water use, with the remaining 30% used by commercial, industrial and institutional customers.

Water consumption patterns in the ACWD service area are a function of many independent factors including growth, weather conditions, economic conditions and water conservation behaviors. The District saw dramatic declines in consumption during the 1987-1992 drought due to voluntary conservation and District-sponsored demand management efforts. However, during the drought recovery period since 1992, several significant consumption-influencing factors have occurred. From 1993-2001 accelerated growth of both residential and business customers (including the high technology industry) occurred due to a strong economy. During this period, vacancy rates decreased and water consumption rose. From 2001 to 2007 the overall consumption in the District has been relatively flat, attributed primarily to less robust local economic conditions, mild weather and on-going water conservation programs.

WATER DEMANDS - ACWD SERVICE AREA

ACWD's approach to water demand forecasting for the UWMP is to: 1) evaluate existing demands of lands already developed in the service area; 2) estimate future demands of currently undeveloped lands that are designated for development; and 3) combine the existing and future demands to estimate the overall District-wide future demands. This demand forecasting is done for six primary land use categories: single family residential, multi-family residential, commercial, industrial, institutional, and "other". In order to estimate future demands of currently undeveloped lands in each of these categories, ACWD obtains the most recent zoning information for these lands. The land use information is provided by the cities' planning staff, and includes general plan land use designations and, when available, more detailed information from specific plans or other planning documents. A District-wide water demand forecast for each land use category is then developed by multiplying the planned land use under each land use category by a District-wide average unit water use specific to that land use category. Additional potential future land use is also accounted for in the demand projections, and is based on city-approved plans for redevelopment and/or intensification of specific areas. The demand forecast also considers future demands associated with Association of Bay Area Governments (ABAG) Smart Growth projections.

It should be noted that the actual unit water use for any specific land use project may vary significantly from the District-wide average. However, determining the actual unit water use for each specific development project in the service area is beyond the scope of ACWD's UWMP demand forecast. Rather than providing demand forecasts for specific land use projects, the UWMP provides an aggregated, District-wide demand forecast for each land use category, as well as the total District-wide demand. This approach is considered by ACWD to provide sufficient accuracy for long-term, District-wide demand forecasting and is consistent with the California Water Code requirements for urban water management planning. However, if the District has detailed information about the water demands of a specific project during the time it is preparing the UWMP, the District will account for the specific project's water demands in the UWMP in lieu of the District-wide average.

The projected future demands in the ACWD service area are summarized in Table 2 (for the years 2010, 2015, 2020, 2025 and 2030). The water demand forecast also includes projected savings due to water conservation, both District-sponsored water conservation and "natural" conservation due to plumbing code requirements (i.e. savings due to the replacement of non-conserving plumbing fixtures with low flow fixtures). ACWD is a signatory to the California Urban Water Conservation Council's MOU on Urban Water Conservation and is committed to the implementation of all locally cost-effective water conservation best management practices. A complete description of ACWD's water conservation program, as well as water saving assumptions, is provided in Chapter 7 of the attached UWMP.

As described in the following section, the Project's demands are considered to be consistent with the District's UWMP demand forecast, and therefore, are not listed separately in Table 2. However, the demand forecast for the Patterson Ranch Development Project, which was not previously accounted for in the UWMP, has been included in Table 2, per the April 2008 Patterson Ranch Development Project Water Supply Assessment. Demands associated with other projects requiring water supply assessments, already adopted or scheduled to be adopted in the

near future (i.e. Union City Intermodal Station District Mixed Use Project, Solyndra Solar Panel Manufacturing Facility, Creekside Landing Project, and Ballpark Village Specific Plan) are all considered to be included in the UWMP demand forecast and will not change the conclusions of this assessment.

WATER DEMANDS - NEWARK AREA 3 & 4 SPECIFIC PLAN EIR PROJECT

Estimation of Project Water Demands

The Newark Area 3 & 4 Specific Plan EIR Project includes an 18-hole golf course, 1,400 housing units of mixed density, an elementary school, open space wetland mitigation areas, and three acres of office/public space. The Project area is located in southwest Newark, bounded by Mowry Avenue on the north, Cherry Street on the east, Stevenson Boulevard on the south, and salt flats on the west (Figure 1 and Figure 2). The Project includes all of Area 4 and only 86 acres of Area 3. Most of Area 3 is already developed and includes the Newark Ohlone Campus, a Technology Park and the Silliman Center. The current schedule anticipates ground breaking in 2010 with build out by 2016; the golf course would be completed by 2012.

Development of this site was included in the most recent Demand Forecast and Urban Water Management Plan (UWMP). Area 4 had previously been planned as a combination golf-course and residential development and ACWD has long planned for this project to form an anchor demand for the development of a non-potable, reclaimed water distribution system ("purple pipe"). The portion of Area 3 included in the Project had previously been planned as a high-tech park. The section of Area 3 will require a General Plan amendment to be consistent with the proposed Project.

Information on the Project's proposed land use was provided by the City of Newark. The City also provided a water demand estimate with their letter of request for a water supply assessment. The estimate, included as Attachment C, was prepared by Kier & Wright (Consultant), a civil engineering consultant to the City for the project. ACWD reviewed the demand estimate and found certain elements to be inconsistent with demand data for our service district and opted to replace those values with the standard unit demands developed by ACWD for the UWMP. These elements include the residential unit demands and the office space demands.

ACWD retained elements of the Consultant's demand estimate which were based on refined project detail including artificial turf athletic fields, xeriscaped open spaces, parks and landscape buffers and irrigation demands for the golf course. The revised project demand estimate was shared with the City and Consultant on 10/01/2008 and were discussed and accepted in a meeting held on 10/13/2008. The revised Project water demand estimate analyzed in this WSA is 1,100 AF/Yr[2] (see Table 3.)

[2] Including an 8% distribution system loss, which is calculated as the difference between the total water produced at ACWD's treatment and production facilities and the total measured water use by the District's distribution system customers. Distribution system losses include non-metered water used for fire suppression, distribution system flushing, distribution piping and service line leaks, etc.

The Consultant's analysis provided by the City states that the landscaping and golf course will use reclaimed water when such a supply becomes available. Once a reclaimed supply is available, the demand for potable system water will be reduced to roughly 550 AF/yr (see Table 4). Prior to the availability of reclaimed water, the golf course will be irrigated with an existing private onsite well. This well will draw from ACWD's managed groundwater resources in the Niles Cone, however it will not burden ACWD's potable distribution system and production facilities.

Comparison with the UWMP Demand Forecast

As described above, ACWD's UWMP does not include a demand forecast for specific land use projects, such as the proposed development outlined in the Project. Rather, at the time of the UWMP demand forecast (2004), the then-current information for Areas 3 & 4 was utilized to develop a forecast for aggregated, District-wide demand. The currently proposed Project for the site is very little changed from the previously planned development, save that Area 3 was intended for a high-tech industrial park but will now be converted to additional housing. Despite the change in proposed land use, the projected demands of the Project are consistent with the range of demands that were anticipated during the development of the UWMP demand forecast. Therefore, for the purpose of this water supply assessment, the Project's forecasted demands are considered to be consistent with the current UWMP demand forecast, and do not represent a new, or additional demand in the ACWD service area, beyond what was forecast for the UWMP. However, because of the change in land use assumptions at the Project site, the Project will result in a slightly different breakdown in the aggregated demands for the land use categories reported in the UWMP. The next update to the UWMP (scheduled to be completed by 2010) will include a revised breakdown of the forecast demands in each land use category based on changes to the land use assumptions that have occurred in the service area since the current UWMP was adopted.

IMPACTS OF DROUGHT ON DEMANDS

Dry periods may impact water demands in the ACWD service area in several ways. Because approximately 40% of the District's residential demand is for landscape irrigation, dry periods may result in an increase in demands due to less local rainfall available to meet the evapotranspiration requirements of lawns and other landscaping. However, demands may also be reduced due to customer efforts to be more water efficient during dry periods. As an example, during the 1987-1992 drought, ACWD customers reduced overall water use by approximately 20%. This response to the drought was due both to voluntary efforts as well as mandatory restrictions imposed by ACWD. However, because many customers have retained a "water conservation ethic" since the 1987-92 drought, and because of increased efficiencies of plumbing fixtures and the implementation of on-going District-sponsored water conservation programs, the ability to reduce overall water use during future droughts by similar levels may be lessened.

For planning purposes, it is assumed that during drought periods water demands for ACWD's distribution system customers (including the proposed Newark Area 3 & 4 Specific Plan EIR Project) do not change from those during normal years. However, the groundwater system demands may be reduced during dry years as a result of reduced ARP pumping and reduced

saline groundwater outflows (as groundwater levels are temporarily lowered due to increased reliance on local groundwater reserves during drought conditions). Summaries of projected demands under single dry year and multiple dry year conditions (based on a five year drought under 2026-2030 demand conditions) are provided in Table 5 and Table 6, respectively.

SECTION 3
WATER SUPPLY

ACWD's three primary sources of water supply are: 1) the State Water Project (SWP); 2) San Francisco's Regional Water System; and 3) local supplies. The SWP and San Francisco Regional Water Supplies are imported into the District service area through the South Bay Aqueduct and Hetch-Hetchy Aqueduct, respectively. Local supplies include fresh groundwater from the Niles Cone Groundwater Basin (underlying the District service area), desalinated brackish groundwater from portions of the groundwater basin previously impacted by seawater intrusion, and surface water from the Del Valle Reservoir. The primary source of recharge for the Niles Cone Groundwater Basin is percolation of runoff from the Alameda Creek watershed. To a lesser degree, a portion of ACWD's SWP supplies are also used for local groundwater percolation. Infiltration of rainfall and applied water within the ACWD service area also contribute to local groundwater recharge.

ACWD's planned future water supplies also include recycled water. As described below, ACWD anticipates implementing a recycled water program to provide up to 1,600 AF/Yr for non-potable uses (i.e. irrigation and industrial uses) by the year 2020.

Due to the configuration of ACWD's water production facilities and the interconnection with the District's distribution system, the proposed Project may receive water supplies from all three primary sources of supplies, and would not be dependent on any single source of supply. Therefore, a description of all of ACWD's water supplies is provided below. Table 7 provides a summary description of the contracts and permits for these supplies and Table 8 provides a summary of the historical use of these supplies by ACWD.

WHOLESALE WATER SUPPLIES

As described above, ACWD's wholesale water supplies are: 1) State Water Project supplies purchased from the California Department of Water Resources; and 2) San Francisco Regional Water System supplies purchased from San Francisco. ACWD's contracts for these wholesale supplies are provided in Attachment B and each supply is described in greater detail below.

State Water Project

In 1961, the District signed a contract with the State Department of Water Resources (DWR) for a maximum annual amount of 42,000 acre-feet from the State Water Project (SWP). The SWP, managed by the DWR, is the largest state-built, multi-purpose water project in the country. The SWP facilities include 28 dams and reservoirs, 26 pumping and generating plants, and approximately 660 miles of aqueducts. The water stored in the SWP storage facilities originates from rainfall and snowmelt runoff in Northern and Central California watersheds. The SWP's primary storage facility is Lake Oroville in the Feather River Watershed. Releases from Lake Oroville flow down the Feather River to the Sacramento River, which subsequently flows to the Sacramento-San Joaquin Delta. The SWP diverts water from the Delta through the Banks Pumping Plant which lifts water from the Clifton Court Forebay (in the Delta) to the California Aqueduct and Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts

water into the South Bay Aqueduct, which delivers State Water Project supplies to ACWD and other Bay Area water agencies in Alameda and Santa Clara Counties.

Semitropic Banking of ACWD's SWP Supplies: Because of the variability in the SWP supply availability, ACWD's 1995 IRP identified the need to secure 140,000 AF of off-site storage capacity to improve the dry year reliability of this supply source. Based on this IRP recommendation, ACWD has contracted with Semitropic Water Storage District for participation in the Semitropic Groundwater Banking Program in Kern County. In wet years, ACWD delivers its unused (excess) SWP supplies to Semitropic for storage in their groundwater basin. In dry years, ACWD can recover these supplies through: (1) an "in-lieu" exchange whereby ACWD will receive a portion of Semitropic's SWP supplies (and Semitropic will utilize groundwater previously stored by ACWD in its basin); and (2) a "pumpback" program where Semitropic directly pumps stored groundwater into the California Aqueduct and ACWD recovers this supply through SWP exchanges.

The rate at which ACWD can recover stored water in dry years is constrained by contractual limitations and limitations on the capacity of the Semitropic pumpback facilities. Based on the terms of the agreements with Semitropic, the amount of return capacity is based on the amount of storage capacity purchased. Because of these limitations, ACWD secured a total of 150,000 AF of storage capacity at Semitropic (in excess of the IRP's recommendation of 140,000 AF), in order to provide sufficient dry year return capacity to meet ACWD's projected needs in all but the most severe drought conditions.

As with local groundwater storage in the Niles Cone Groundwater Basin, the Semitropic Groundwater Banking Program does not provide a new source of supply for the District. Rather, it provides a means to store the District's unused SWP supplies in wet years for use during dry years when the delivery of SWP supplies may be significantly curtailed.

San Francisco's Regional Water System

ACWD also receives water from the San Francisco Regional Water System, operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Sierra Nevada, delivered through the Hetch-Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River.

In 1984, ACWD along with 29 other Bay Area water suppliers signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in June 2009, provide for a 184 mgd Supply Assurance to the SFPUC's wholesale customers collectively. ACWD's individual Supply Assurance is 12 mgd (or approximately 13,400 acre feet per year). In 1994, the District and SFPUC executed an amendment to the contract which provides an additional supply of 1.76 mgd (approximately 2,000 AF), effectively increasing the maximum annual delivery of San Francisco Regional Water System supplies to ACWD to 13.76 mgd (approximately 15,300 AF/Yr). Although the Master Contract and accompanying Water Supply Contract expire in

2009, the Supply Assurance (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

LOCAL SOURCES

As described above, ACWD's local sources include fresh groundwater from the Niles Cone Groundwater Basin, brackish groundwater desalination, and surface water supplies from the Del Valle Reservoir. Each of these supplies is described in greater detail below.

Niles Cone Groundwater Basin

The principal source of local supply for the District is the local aquifer system known as the Niles Cone Groundwater Basin. The primary source of recharge for the Niles Cone Groundwater Basin is local runoff from the Alameda Creek Watershed, which is captured, diverted and recharged at the District's groundwater recharge facilities. To a lesser extent, infiltration of rainfall and applied water within the ACWD service area also provide a local source of recharge for the groundwater basin. ACWD also uses a portion of its imported State Water Project supplies for groundwater recharge.

The water quality in the groundwater system is characterized by fresh groundwater in the eastern portion of the groundwater basin transitioning into brackish groundwater in the western portion of the basin. The brackish groundwater is a result of historical seawater intrusion from the adjacent San Francisco Bay. Since the 1960's ACWD has managed the groundwater basin to prevent any additional seawater intrusion and has an on-going program to pump trapped brackish groundwater back to San Francisco Bay through the District's Aquifer Reclamation Program wells.

The Niles Cone Groundwater Basin has capacity to store water from year to year ("local groundwater storage"). However, the usable storage capacity of the groundwater basin is significantly limited by the potential for seawater intrusion if groundwater levels are maintained too low. Although local groundwater storage (i.e. groundwater supplies in excess of recharge) provides a short term source of supply during dry years, it is not a supply that is available every year because the groundwater system will require replenishment from freshwater sources, without which seawater intrusion would occur.

Chapter 4 of the UWMP (attached) provides a comprehensive description of the Niles Cone Groundwater Basin, including groundwater quality, groundwater levels, historical and projected groundwater pumping, and ACWD's groundwater management activities. A copy of ACWD's groundwater management policy is also provided in the UWMP. The Niles Cone Groundwater Basin is also described in DWR Bulletin 118 – Update 2003: *California's Groundwater*, and is not listed as in "overdraft" or "potentially overdraft condition" by the DWR.

Brackish Groundwater Desalination

In 2003 ACWD commissioned the Newark Desalination Facility. This 5-mgd facility utilizes the reverse osmosis process to remove salts and other impurities from the brackish groundwater

pumped at ACWD's Aquifer Reclamation Program wells. Treated water from the Newark Desalination Facility is blended with untreated local groundwater and provided as a supply for the distribution system demands. ACWD plans call for an expansion of this facility from 5-mgd to 10-mgd by the year 2010.

Del Valle Reservoir

The District and Zone 7 Water Agency of the Alameda County Flood Control and Water Conservation District (hereafter referred to as "Zone 7"), have equal rights on Arroyo Del Valle to divert water to storage. When the California Department of Water Resources (DWR) constructed Del Valle Dam in the upper Alameda Creek Watershed, those rights were recognized in an agreement among DWR, the District, and Zone 7. Consequently, DWR typically makes a total of 15,000 AF of storage available annually in Del Valle Reservoir for use by ACWD and Zone 7. ACWD and Zone 7 equally share this storage capacity, thereby providing up to 7,500 AF of storage capacity annually to ACWD.

Recycled Water

Although ACWD does not currently have a recycled water supply, the District's long-term supply strategy includes a recycled water program to be implemented by 2020, which will provide up to 1,600 AF/yr of non-potable supply (e.g. landscape irrigation and industrial process water). A potential source of recycled water is from a joint project with Union Sanitary District (USD). Similar to ACWD, USD's service area includes the cities of Fremont, Union City and Newark. USD currently treats approximately 28 mgd (approximately 31,000 AF/Yr) of wastewater, the majority of which is discharged to San Francisco Bay via the East Bay Dischargers Authority pipeline facilities. Because ACWD's planning is based on providing 1,600 AF/Yr of recycled water, it is anticipated that there will be a sufficient source of wastewater supply available for a future recycled water project in the ACWD service area.

Recycled water distribution pipelines will be separate from the District's existing potable distribution system and, therefore, would not adversely affect existing potable supply operations. The volume of recycled water produced would be the same in drought years as in normal years, thus providing a firm source of supply. Demand for recycled water for irrigation purposes is highest in the summer months. Therefore, in addition to increasing water supply, use of recycled water would help meet peak monthly and daily production capacity needs.

ACWD and USD have evaluated two potential sources of recycled water: In 1993 and in 1999 ACWD and USD evaluated a potential program whereby the recycled water would originate at USD's Alvarado Wastewater Treatment Plant (Alvarado WWTP), located at the north end of the service area in Union City. As an alternative to constructing a recycled water treatment facility at the Alvarado WWTP, in 2003 ACWD and USD completed an evaluation of the feasibility of constructing a satellite recycled water treatment facility in southern Fremont at USD's Irvington Pump Station. In addition, ACWD will continue to consider the potential use of other regional recycled water supplies, should such supplies become available. The ultimate decision on the source of a recycled water supply will likely be based on a variety of factors including costs, permitting issues, environmental constraints and location of recycled water customers.

WATER SUPPLY UNCERTAINTIES

The purpose of this section is to identify factors which may impact current planning assumptions, the significance and magnitude of which are currently unknown. As described below, the potential impacts of global warming are a key uncertainty which may impact all of ACWD supplies. In addition, each of ACWD's supplies face uncertainties which may be unique to the source of supply. A summary of water supply uncertainties facing ACWD's supplies is provided in Table 9 and discussed in greater detail below.

Climate Change

Climate change may result in less snowfall, more local rainfall and rising sea-levels. Under current conditions, much of ACWD's imported water supplies are held in "storage" in winter and spring snowpack in the Sierra Nevada Mountains. With a diminished snowpack, the yield of the State Water Project and San Francisco Regional System may be significantly impacted. The magnitude of the impact of climate change on water supplies is not known. However, the following provides an overview of recent studies that have evaluated potential impacts on surface water and groundwater supplies in California.

Surface Water: In 2006 DWR released a report on climate change and its potential impact on California's water resources. Entitled *Progress on Incorporating Climate Change into Management of California's Water Resources* (*2006 Climate Change Report*), the report summarizes recent research into change in precipitation, air temperatures, snow levels, and snowmelt runoff. The report also evaluates possible future impact on California water supply through model simulations which reflect four climate change scenarios. Each scenario applies one of two weather conditions (weak temperature warming and weak precipitation increase or modest warming and modest drying) to one of two geopolitical conditions (high population growth and regional based economic growth coupled with slow technological advances or low population growth, global based economic growth coupled with sustainable development).

The main results of the *2006 Climate Change Report* relate to climate change's estimated impacts on the State Water Project around the year 2050:

- Estimated changes in annual average SWP south-of-Delta Table A deliveries range from a slight increase of about 1 percent for a wetter scenario to about a 10 percent reduction for one of the drier climate change scenarios.

- Estimated increased winter runoff and lower Table A allocations resulting in slightly higher average annual Article 21 deliveries in the three drier climate change scenarios[3]. However, the increases in Article 21 deliveries do not offset the losses to Table A. The

[3] Article 21deliveries refer to Article 21 of the SWP contracts which allows for contractors to receive additional water deliveries only under specific conditions. These conditions include: 1) Article 21 water is available only when excess water is available in the Delta, and 2) Article 21water is available only when conveyance capacity through the SWP facilities is available. Due to the uncertainties regarding the availability of Article 21 water, ACWD does not include this supply in its water supply planning and Urban Water Management Plan.

wetter scenario with higher Table A allocations results in fewer Article 21 delivery opportunities and slightly lower annual Article 21 deliveries.

- Estimated SWP carryover storage is reduced in the drier climate change scenario and is somewhat increased in the wetter climate change scenario.

The *2006 Climate Change Report* notes that there are a number of factors for which the models do not account that could significantly impact delivery capability, ranging from change in water management practices, levels of rainfall, changes in evapotranspiration, and increased Delta salinity. The report also notes that there are no technical tools available currently to model these issues.

In August of 2008, DWR released its *State Water Project Delivery Reliability Report, 2007 (2007 SWP Reliability Report).* The *2007 SWP Reliability Report* considered the potential impacts of climate change on SWP supplies by including the same four scenarios of future climate change that were simulated in the *2006 Climate Change Report.* The *2007 SWP Reliability Report* estimated the impact of climate change on SWP deliveries by interpolating between future studies which assumed no climate change and studies which assumed 2050-level emissions. The report estimates that, under future conditions, average annual SWP Table A deliveries will be 66% to 69% of the maximum Table A amount[4]. Further, though the estimated average annual amount of future SWP Table A deliveries increases when compared to current conditions, the amount of Article 21 deliveries decrease. Also, the amount of SWP Table A deliveries during multiple dry year periods in the future tend to decrease compared to current conditions. The *2007 SWP Reliability Report* finds that this decrease could be significant, but that such an outcome depends on which of the various climate change scenarios is considered.

Groundwater: In 2003, and then again in an update prepared in August of 2005, the Pacific Institute for Studies in Development, Environment and Security prepared a literature search report for DWR, which summarized recommendations for coping with and adapting to climate change from key peer-reviewed publications and specifically considered the potential impacts of climate change on groundwater. The Pacific Institute's report is entitled, *Climate Change and California Water Resources: A Survey and Summary of the Literature,* by Michael Diparsky and Peter H. Gleick, Pacific Institute (*Climate Change and Water Resources*).

Climate Change and Water Resources found that little work has been done on the impacts of climate changes for specific groundwater basins, or for general groundwater recharge characteristics or water quality. As the following conclusions from the report illustrate, the potential impacts of climate change on groundwater resources are divided, with some potentially resulting in increased availability of groundwater and others potentially resulting in less.

- Changes in recharge will result from change in effective rainfall as well as a change in the timing of the recharge season. Increased winter rainfall could lead to increased groundwater recharge.

[4] As described below, the *2007 SWP Reliability Report* also includes an analysis of SWP deliveries operating under a recent court ruling to protect endangered fish in the Delta ("Wanger Decision").

- Higher evaporation or shorter rainfall seasons could mean that soil deficits persist for longer periods of time, shortening recharge seasons.

- Because a significant portion of winter recharge comes from deep percolation of precipitation below the rooting zone, warmer winter temperatures between storms would be expected to increase and dry out the soil between storms. A greater amount of rain in subsequent storms would then be required to wet the root zone and provide water for deep percolation.

- Sea-level rise could affect coastal aquifers through saltwater intrusion.

- Warmer, wetter winters would increase the amount of runoff available for groundwater recharge. However this additional runoff would be occurring at a time when some basins are either being recharged at their maximum capacity or are already full.

- Reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge.

Local Supplies

In addition to potential climate change impacts, the availability of ACWD's local supplies may be influenced by a variety of other factors including operational and facility modifications to accommodate on-going Alameda Creek fishery restoration efforts. Upstream land use, flood control and water supply projects in the Alameda Creek Watershed may also impact the supply and quality of water available at ACWD's groundwater recharge facilities. Similarly, efforts to develop groundwater supplies by agencies in the South East Bay Plain (north of ACWD) may also impact ACWD's groundwater supply availability. However, the extent of these impacts on ACWD's local supplies, if any, is not currently known.

San Francisco Regional Supplies

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC is undertaking a Water System Improvement Program (WSIP). Completion of the projects in the WSIP is critical to ensuring the reliability of the San Francisco Regional supplies. However, it is currently uncertain if the SFPUC will be successful in implementing this program, and if it will be accomplished in a timely manner. In addition, the SFPUC water supply contract with ACWD, as well as those with other SFPUC wholesale customers, will expire in 2009. It is not clear what the terms of the re-negotiated contracts will be, or how they may impact ACWD's planning assumptions. However, SFPUC's Supply Assurance (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

State Water Project Supplies

The reliability of ACWD's State Water Project supplies will continue to remain uncertain due to the on-going concerns regarding the sustainability of the Delta. These concerns include the Delta

ecosystem and potential future environmental regulations, levee stability and the potential for catastrophic failure of these levees, urban encroachment within the Delta, and water quality within the Delta due to urban and agricultural discharges.

Most recently, on December 14, 2007, Federal District Court Judge Oliver Wanger issued a final court order which put into place an operational plan that requires the State Water Project and Central Valley Project (CVP), the state's two largest water delivery systems, to reduce Delta export pumping operations ("Wanger Decision"). The operational plan, formalizing a preliminary framework issued by Judge Wanger on August 31, 2007, calls for a reduction in Delta exports from the SWP and CVP to protect an endangered fish species, the Delta smelt. The court had specified that reduced operations will last until September 15, 2008, while federal agencies develop a revised federal biological opinion for Delta smelt that will ensure the projects' compliance with Endangered Species Act requirements. The Federal Defendant in the case has requested an extension until December 15, 2008.

In addition to the revised federal biological opinion, state, federal and other agencies are currently in the process of developing a Bay Delta Conservation Plan with the goal of providing long-term Federal and State Endangered Species Act compliance for Delta export operations. It is currently not known how the revised federal biological opinion or the subsequent Bay Delta Conservation Plan will impact the reliability of SWP supplies. However, the DWR has recently released a report which estimates the reliability of the SWP supplies assuming that the Delta export restrictions under the Wanger Decision remain in effect over the long-term (*2007 SWP Reliability Report*). This report provides an update to the SWP reliability assumptions provided by the DWR in 2005 (*2005 SWP Reliability Report*). Information from the *2005 SWP Reliability Report* is incorporated in ACWD's UWMP.

Factors other than protection of the endangered Delta smelt may also impact the future reliability of the SWP supplies. For instance, the California Fish and Game Commission recently decided to accept the longfin smelt as a candidate species under the California Endangered Species Act (CESA). Under CESA, candidate species receive the same legal protection as listed threatened and endangered species. However, at the time of the preparation of this water supply assessment no information is available on the impacts that this listing (or other potential future listings under the ESA or CESA) may have on SWP operations.

WATER SUPPLY IN NORMAL AND DRY YEAR CONDITIONS

The projected availability for each of ACWD's water supplies under normal, critical dry year and multiple dry year conditions are provided in Table 10 through Table 15. As documented in the District's 2006-2010 UWMP, information on the projected availability of ACWD's local supplies is based on the long-term historical hydrologic conditions in the Alameda Creek Watershed. Information on the projected reliability of ACWD's wholesale supplies from the State Water Project and San Francisco Regional Water System supplies were provided by the DWR and San Francisco Public Utilities Commission, respectively.

Because of the uncertainties in the future management of Delta export operations, this water supply assessment considers two scenarios for SWP reliability. The first scenario (2005 SWP Reliability scenario) assumes that long-term SWP reliability will be addressed through the Bay

Delta Conservation Plan and other planning efforts, and that the long-term reliability will be similar to that provided by the DWR under the 2005 SWP Reliability Study. The second scenario (2007 SWP Reliability scenario) is provided as a sensitivity analyses and assumes that the Wanger Decision will continue to govern the long-term Delta export operations, as assumed under the DWR's *2007 SWP Reliability Report*[5].

As described below, the second scenario (2007 SWP Reliability scenario) would have a significant impact on ACWD's water supplies. Because of the reductions in the SWP supplies under the Wanger Decision, ACWD would likely have significantly less flexibility in the use and management of its water supplies. Therefore, it is likely that if the revised biological opinion (due in December 2008) results in Delta pumping restrictions similar to the Wanger Decision, ACWD would likely need to revise and update the District's Integrated Resources Plan and Urban Water Management Plan to reflect the changes in the long-term SWP reliability assumptions. These revisions would likely include a review of ACWD's planning and operating criteria, water quality, facility needs and costs. However, the analyses provided in this water supply assessment, while including a Wanger Decision scenario, are primarily focused on the comparison of water supply and demands under a variety of hydrologic conditions (i.e. normal year, critical dry year and multiple dry year conditions).

Water Supply under Normal Year Conditions

In order to be consistent with the recommendations by the DWR in the use of SWP reliability information, this water supply assessment characterizes long-term average conditions as normal year conditions. As shown in Table 10, under normal year conditions and under the 2005 SWP Reliability assumptions, supplies from the SWP and San Francisco Regional Water System comprise approximately 60% of the water available to ACWD, with the balance coming from local supplies. All of the supplies listed in Table 10, with the exception of recycled water, are existing supplies available to ACWD, and have been historically utilized by the District. Recycled water, not currently available to ACWD, is anticipated to add approximately 1,600 AF/Yr to the District's normal year water supplies by the year 2020. Supplies from local groundwater storage and the Semitropic Groundwater Banking Program are not included as normal year supplies because these supplies are intended for dry year conditions (or other water shortages) and are not intended to meet normal year demands.

The projected availability of ACWD's normal year water supplies under the 2007 SWP Reliability assumptions (with Wanger Decision restrictions on SWP supplies) is provided in Table 11. Under this scenario, ACWD's SWP supplies may be reduced by approximately 4,600 AF/Yr (under 2030 conditions), as compared with the 2005 SWP Reliability scenario. This reduction in SWP supplies would result in an overall decrease in ACWD total supplies during normal years of over 5%.

5 The 2007 SWP Reliability Report provides four scenarios for future (2027) delivery reliability. Each of these scenarios includes SWP pumping restrictions due to the Wanger Decision, but has different assumptions for the impacts of climate change on SWP supplies. This water supply assessment utilizes the most conservative scenario ("GFDL Model with B1 Emissions") that results in the lowest average annual SWP deliveries (66%).

Water Supply under Critical Dry Year Conditions

As shown in Table 12 and Table 13, the availability of ACWD's overall water supplies under a critically dry year may be significantly reduced. Results from the 2007 Reliability scenario (Table 13) indicate that the Wanger Decision does not significantly differ from the 2005 SWP Reliability assumptions for critically dry years (Table 12). Under both of these SWP supply reliability assumptions, during critically dry conditions the SWP deliveries would be reduced to 4-6% of the maximum contractual amounts (referred to as the "Table A" amounts in the SWP contracts). In addition, ACWD's other supplies from the San Francisco Regional Water System and local supplies from the Alameda Creek Watershed may also be substantially reduced during a critically dry year.

In order to mitigate these potentially severe water supply cut-backs, ACWD would rely on groundwater reserves stored in the local Niles Cone Groundwater Basin, and reserves stored at the Semitropic Groundwater Banking Program. As described above, the amount of storage in the local Niles Cone Groundwater Basin is limited (due to seawater intrusion concerns when groundwater elevations are lowered below sea-level). ACWD has therefore invested in additional off-site storage at the Semitropic Groundwater Banking Program. Under two separate agreements with Semitropic, ACWD has contracted for a combined total of 150,000 AF of storage capacity. The District currently has approximately 113,000 AF of water in storage at the Semitropic banking program. However, the maximum rate at which stored water can be returned to ACWD from Semitropic is constrained by ACWD-Semitropic contractual limitations. As shown in Table 12 and Table 13, under the most severe drought conditions, the maximum rate at which water can currently be returned to ACWD is 13,500 AF/Yr[6].

Water Supply under Multiple Dry Year Conditions

Table 14 and Table 15 provide summaries of the projected supply availabilities under a long-term (5 year) drought for 2026-2030 demand conditions. This multiple year drought sequence is based on the 1929-1933 historical hydrologic conditions, which represents the most severe 5-year drought on record (based on projected availability of ACWD's supplies over the 1922-94 hydrologic period). The results from these analyses indicate that, under both the 2005 and 2007 SWP Reliability assumptions (Table 14 and Table 15, respectively), ACWD's water supplies may be significantly reduced during a multiple year drought. However, the supply reduction would not be as severe as during a single, critically dry year condition. As with the single dry year condition, both local groundwater storage and off-site groundwater storage in Semitropic will play key roles in offsetting shortfalls in the District's other local and imported supplies.

6 ACWD's maximum rate of recovery from the Semitropic Groundwater Banking Program during critically dry years will increase by 600 AF/Yr (from 13,500 AF/Yr to 14,100 AF/Yr) as a condition of ACWD providing water service to the Patterson Ranch Development Project in Fremont, per the April 2008 Patterson Ranch WSA.

SECTION 4
WATER SUPPLY AND DEMAND ANALYSES

The following provides a comparison of ACWD water supplies and projected future demands, including the demands associated with the proposed Project. The supply/demand comparisons are provided for normal, single year dry, and multiple dry year conditions under both the 2005 and 2007 SWP Reliability scenarios.

NORMAL YEAR WATER SUPPLY

Table 16 and Table 17 provide a comparison of normal year water supply and demands under future levels of development (in five-year increments from 2010 through 2030) under the 2005 and 2007 SWP Reliability scenarios, respectively, with the proposed Project. As shown in the tables, ACWD's projected supply under normal year conditions is anticipated to exceed demand under either SWP reliability assumption.

SINGLE DRY YEAR WATER SUPPLY

Table 18 and Table 19 document the comparison of water supply and demand under a single critical dry year condition (based on 1977 hydrologic conditions), assuming the 2005 and 2007 SWP reliability estimates, respectively. As with the normal year conditions, the single dry year supply/demand comparison is provided in five year increments between 2010 and 2030.

As shown in the tables, the assumptions for ACWD total available supplies under both SWP reliability scenarios are similar, and under both scenarios ACWD would be facing water supply shortages of similar magnitude. For instance, ACWD has previously determined in the UWMP that shortages of up to 11,000 acre-feet (approximately 15% of dry year demands) may be expected during a single, critically dry year. Because of the relative infrequency of a drought of this severity (approximately 1 in 35 years), ACWD has not secured the supplies to fully mitigate for the potential impacts. Rather, ACWD would likely attempt to mitigate the shortage impacts through a combination of demand management measures (including rationing) and purchases of dry year water through programs such as the Drought Water Bank (initiated during the 1987-92 drought by the DWR).

MULTIPLE DRY YEAR WATER SUPPLY

Table 20 and Table 21 document projected water supply and demand under an extended dry period (multiple year drought) assuming the 2005 and 2007 SWP reliability estimates respectively. As documented in the UWMP, ACWD recognizes the hydrology of 1929 to 1933 to be most severe five-year period for the District's imported and local supplies. The multiple year dry period was reviewed for build-out level of demand anticipated between the years of 2026 and 2030.

Similar to the single dry year analysis, ACWD has already determined in the UWMP that shortages may be expected during a multiple year drought. However, the magnitude of the shortages (approximately 4% under 2005 SWP Reliability assumptions, and approximately 7%

under 2007 SWP Reliability assumptions) is significantly less that which would occur during a single critically dry year.

WATER EFFICIENCY AND RECYCLING REQUIREMENTS TO BE INCORPORATED IN PROJECT

The water supply and demand comparison analyses provided in this WSA indicates that ACWD has sufficient supplies to meet the District's projected demands as well as the Project's demands under normal year conditions. However, during critically dry or multiple dry years the service area may be facing water supply shortages. Because the Project's demands are already factored into the UWMP, the development of the Project will not result in increased shortages from those which are already factored into ACWD's planning under current and foreseeable conditions.

However, ACWD's water supplies face several future uncertainties with the potential for long-term reduction in supplies as outlined in the WATER SUPPLY UNCERTAINTIES section of this WSA. The current Project timeline suggests a somewhat protracted build-out period of eight years which could conceivably be extended given the current housing and economic downturn. This only increases the exposure to uncertainties in water supply. The determination of the water supply sufficiency in this WSA is based on the commitments made by the City that the Project will be developed with the following water efficiency measures:

i. The Project will be developed with the latest water conservation technologies that we describe below.

ii. The Project will be developed with a separate non-potable distribution system to utilize recycled water for non-potable purposes as described below

These water efficiency measures must be included in the environmental analysis for this project and in the conditions for the approval of the Project.

Even with the implementation of these measures, the water supplies provided to the Project may be cut back under future dry year conditions. However, the level of cutback would be consistent with the rest of ACWD's customers, and would depend on the magnitude of the shortage facing the entire District.

Water Conservation Measures

The Project shall be developed with the latest technology in water efficient plumbing fixtures and irrigation systems at both residential and non-residential developments, including but not limited to the following:

For residential applications:

- High efficiency (1.3 gallons per flush or less) and dual flush toilets,
- High efficiency clothes washers with a water factor of 6 or less,
- High efficiency dish washers,
- Water efficient bathroom and kitchen fixtures

For commercial applications:

- High efficiency (1.3 gallons per flush or less) and dual flush toilets,
- High efficiency urinals (1/2 gallon per flush or less),
- High efficiency clothes washers with a water factor of 6 or less,
- High efficiency dish washers, where feasible, sensor driven c-line, or rack conveyor machines that recycle final rinse water,
- Low flow pre-rinse spray nozzles,
- Air-cooled ice machines,
- Water efficient bathroom and kitchen fixtures (e.g. faucets with auto shut-off mechanisms)

Water efficient irrigation systems include weather-based irrigation-controllers, drip irrigation systems for non-turf areas and the installation of drought-tolerant landscaping in-lieu of irrigated turf, wherever possible.

All decorative fountains shall recycle water. The latest water efficient technologies for commercial car washing and cooling shall be used.

Many, if not most, of these technologies will actually be legal requirements under the pending Plumbing Code revisions expected in 2010.

Recycled Water Measures

ACWD's water management planning, as documented in ACWD's 2006-2010 Urban Water Management Plan (UWMP), includes provisions for supplying recycled water to golf courses and other large landscaped areas in Area 3 and Area 4. ACWD is reviewing several options for providing recycled water to the service area, however, recycled water is not currently available. The Project shall accommodate the future use of recycled water for large landscape areas by installing a separate, non-potable distribution system (i.e. "purple pipe") for the golf course and other non-residential landscape needs. This distribution system shall, at a minimum, include a non-potable water transmission main extending through the site with at least two points of connection to Cherry Street (for connection with a future recycled water main) at the northern and southern limits of the site's frontage with Cherry Street. The on-site system shall also include non-potable distribution mains extending to areas where recycled water could be used.

SECTION 5
SUMMARY AND CONCLUSIONS

1. The City of Newark has proposed the Newark Area 3 & 4 Specific Plan EIR Project that includes an 18-hole golf course, up to 1,400 housing units of mixed density, an elementary school, open space wetland mitigation areas, and three acres of office/public space.

2. The total projected demands for the Project are approximately 1,100 AF/Yr. Half of this demand will eventually be met with non-potable (recycled) water once a reclaimed source is available at the site. In the interim, groundwater from a local, private well will be used for all irrigation needs of, at least, the golf course.

3. The Project demands are consistent with the level of demand previously assumed for the Project area. Thus, the Project's demands do not represent a new, or additional demand in the ACWD service area, beyond what was forecast for the UWMP.

4. ACWD has diverse sources of supply that include imported water from the State Water Project and San Francisco Regional Water System, as well as local supplies from the Alameda Creek Watershed and underlying Niles Cone Groundwater Basin. Due to the configuration of ACWD's water production facilities, the proposed Project would not be dependent on any single source of supply.

5. ACWD's imported and local water supplies may be significantly cut back during droughts. In order to improve ACWD's dry year reliability, ACWD has secured 150,000 AF of off-site storage capacity at the Semitropic Groundwater Banking Program in Kern County. ACWD currently has approximately 113,000 AF in storage at the Semitropic Program.

6. Key uncertainties facing ACWD's supplies include the effects of climate change as well as supply restrictions due to endangered species and environmental protection. The restrictions on Delta export pumping imposed by a recent federal district court decision (Wanger Decision) on SWP supplies would significantly impact ACWD's water supplies, if maintained over the long-term. Based on DWR projections, ACWD's SWP supplies may be reduced by approximately 4,600 AF/Yr under normal year conditions, representing a 5% decrease in ACWD's total water supplies. In order to account for future Delta pumping restrictions, this water supply assessment includes scenarios for SWP reliability with and without the Wanger Decision pumping restrictions.

7. Under normal year conditions, ACWD's water supplies are projected to be sufficient to meet the future demands in the service area, including the Project's demands. These supplies are projected to be sufficient in either SWP supply reliability assumption (with and without the Wanger Decision pumping restrictions).

8. ACWD's UWMP identifies that ACWD may face water supply shortages during a critically dry year, or during a multiple year drought. As described in the UWMP, ACWD would look to secure additional supplies through a DWR drought water bank or similar water

purchase/transfer program under these severe drought conditions. ACWD may also implement a drought contingency plan, which includes provisions for ACWD customers to cut back on water use, the magnitude of which would depend on the severity of the shortage. Because the Project's demands are consistent with the UWMP demand forecast, the development of the Project will not result in increased shortages from that which is already factored into ACWD's planning. However, because ACWD anticipates potential future shortages under severe drought conditions, water supplies to the Project may be cut back during these severe dry year conditions. The level of cut back to the Project would be consistent with the rest of ACWD's customers, and would depend on the magnitude of the dry-year shortage facing the entire District.

9. As part of the Project description, the Project shall be developed with the latest technology in water efficient plumbing fixtures and irrigation systems at both residential and non-residential development. Water efficient plumbing fixtures include high efficiency toilets, washers, water heaters, showerheads, and faucet aerators. Water efficient irrigation systems include weather-based irrigation-controllers and drip irrigation systems for non-turf areas.

10. Project demand estimates include assumptions for athletic fields, open space, park and landscape buffer areas being xeriscaped or using artificial turf. These demand reducing measures are considered by ACWD to part of the project description and any change in these plans may change the determination of water supply sufficiency in this water supply assessment.

11. As part of the Project description, the Project shall be constructed to accommodate the future use of recycled water for large landscape areas by installing a separate, non-potable distribution system (i.e. "purple pipe") for the golf course and other non-residential landscape needs. This distribution system shall, at a minimum, include a non-potable water transmission main extending through the site with at least two points of connection to Cherry Street (for connection with a future recycled water main) at the northern and southern limits of the site's frontage with Cherry Street. The on-site system shall also include non-potable distribution mains extending to areas where recycled water could be used.

12. The determination of water supply sufficiency is based on the construction and implementation of the water efficiency measures set forth in paragraphs 9-11 above and these water efficiency measures must be included in the environmental analysis for this Project and in the City's conditions of Project approval.

13. Under Government Code §66473.7 ACWD will be required to issue a written verification ensuring sufficient water supply for the Project prior to approval of the Project's final subdivision map. ACWD will re-evaluate the assumptions, and conclusions of this water supply assessment at that time. If these assumptions have changed significantly ACWD may require additional mitigation measures as a condition of providing a water supply verification and/or as a condition of providing water service to the Project.

14. This water supply assessment is based on the proposed land use of the Newark Area 3 & 4 Specific Plan EIR Project, as provided to ACWD by the City of Newark (as documented in

Table 3). If, prior to Project approval, the proposed land use within the Project area changes from what is currently incorporated in this water supply assessment, ACWD will evaluate the impacts that these changes may have on ACWD's water supplies. In the event that the land use changes impact the conclusions of this water supply assessment, ACWD may require additional mitigation measures as a condition of providing water service to the Project. If the proposed land use changes occur after Project approval and approval of the final subdivision maps, ACWD will evaluate the potential water supply impacts of these changes, and may require additional mitigation as a condition of providing water service to those areas with the changed land use condition.

15. The determination made in this water supply and demand analysis is based on the circumstances as of the date this water supply assessment was approved. ACWD reserves the right to impose conditions that go beyond the conditions that the City of Newark may impose as part of the environmental analysis at the time ACWD provides a verification of sufficient supply for the Project and/or enters into a water service agreement with the developer to provide water service to the Project.

Table 1 ACWD Past and Current Water Use (Acre-Feet)

Water Use Category	Fiscal Year										
	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07
Distribution System											
Single Family Residential	24,700	22,900	24,100	25,000	25,700	25,200	25,300	26,000	23,700	24,900	25,200
Multi-Family Residential	8,600	8,300	8,500	8,600	8,900	8,200	8,500	8,100	8,200	8000	8,100
Commercial	5,100	5,300	5,600	5,800	5,600	5,200	5,000	5,200	5,300	5,500	5,300
Industrial	5,200	4,700	4,600	4,700	4,600	4,300	4,100	4,100	3,400	3,500	3,400
Institutional	2,200	2,000	2,000	2,100	2,300	2,200	2,200	2,300	2,000	2,100	2,100
Landscape	4,600	3,900	4,500	5,200	5,300	5,600	5,600	6,300	5,700	5,200	5,700
Other	300	300	200	200	200	200	200	200	100	100	100
Total Consumption	50,900	47,400	49,400	51,700	52,600	50,800	50,700	52,300	48,400	49,300	49,900
System Losses	4,200	4,100	4,200	4,200	3,600	4,300	3,700	4,100	3,200	3,800	5,000
Distribution System Total	55,100	51,500	53,600	55,900	56,200	55,100	54,400	56,400	51,600	53,100	54,900
Groundwater System											
Private Groundwater	5,000	3,900	3,200	3,100	3,800	3,100	3,400	3,600	3,800	3,000	3,000
Groundwater Reclamation											
-ARP Pumping	7,800	3,800	10,600	6,300	4,300	7,400	7,700	11,100	9,400	11,600	9,900
-Saline Outflow	2,300	3,900	6,100	7,400	6,600	6,300	5,800	7,200	6,600	7,500	6,800
Groundwater System Total	15,100	11,600	19,900	16,800	14,700	16,800	16,900	21,900	19,800	22,100	19,700
Grand Total	70,200	63,100	73,500	72,700	70,900	71,900	71,300	78,300	71,400	75,200	74,600

Notes:

1. Annual consumption is based on units billed during the Fiscal Year (July 1 to June 30). ACWD uses a bi-monthly billing cycle.
2. All values rounded to the nearest 100.
3. Total Consumption values may not equal sum of individual components due to rounding.
4. Multi-Family Residential, Commercial, Industrial, and Institutional categories do not include dedicated landscape irrigation water use within these categories.
5. Landscape water use includes all dedicated landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers.
6. Distribution System Total represents total water production, as reported in ACWD's Annual Groundwater Survey Reports.
7. System Losses are calculated as the difference between Distribution System Total (total production) and Total Measured Consumption and include water for fire suppression, distribution system flushing, distribution system and service line leaks, etc.
8. Groundwater System demands are based on annual reported values in ACWD's Annual Survey Report on groundwater conditions.
9. Groundwater Reclamation demands represents groundwater system demands to protect and reclaim the groundwater system from seawater intrusion.
10. Groundwater System demands do not include "Other Outflows" as reported in ACWD's Annual Survey Report on Groundwater Conditions.

Table 2 Estimated Future Water Demands in the ACWD Service Area – Normal Year (AF/yr)

Water Use Category	Year				
	2010	2015	2020	2025	2030
Distribution System (source: UWMP)					
Single Family Residential	27,300	28,300	28,600	28,600	28,600
Multi-Family Residential	9,800	10,100	10,500	10,900	11,200
Commercial	6,500	6,600	6,800	6,900	7,000
Industrial	7,700	8,400	8,700	9,000	9,200
Institutional	3,800	3,900	4,700	4,700	4,700
Other	300	300	300	300	300
Sub-Total	*55,400*	*57,600*	*59,600*	*60,400*	*61,000*
Adjustment for plumbing code savings	(700)	(1,100)	(1,500)	(1,700)	(1,900)
Sub-Total Distribution System Demand (without losses)	*54,800*	*56,500*	*58,100*	*58,600*	*59,100*
Sub-Total Distribution System Demand (with losses)	*59,500*	*61,400*	*63,200*	*63,700*	*64,300*
Adjustments for water conservation savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
Total Distribution System Demand (source: UWMP)	**58,800**	**59,900**	**61,000**	**61,500**	**62,100**
Groundwater System Demand (source: UWMP)	**14,800**	**14,800**	**14,800**	**14,800**	**14,800**
2008 Patterson Ranch WSA - Demands	**600**	**600**	**600**	**600**	**600**
Total ACWD Forecast Demands	**74,200**	**75,300**	**76,400**	**76,900**	**77,500**

Notes:
1. Total ACWD Forecast Demands reflects sum of UWMP demands and 2008 Patterson Ranch WSA Demands
2. All values rounded to the nearest 100. Total values may not equal sum of individual components due to rounding errors.
3. Landscape Irrigation included within Multi-Family Residential, Commercial, Industrial, and Institutional categories.
4. Adjustment for conservation includes savings due to District-sponsored water conservation programs.
5. Total Distribution System Demand (with losses) includes estimated system losses of 8%. Distribution system losses are calculated as the difference between total production and total measured consumption and include water for fire suppression, distribution system flushing, distribution system and service line leaks, etc.
6. Groundwater System demands include: (1) private pumping, (2) ARP pumping and (3) saline groundwater outflows.

Table 3 Newark Area 3 & 4 Specific Plan EIR Project Demand Estimate

Element	Number of Planned Units		GPD / planning unit	Demand Estimate (AF/yr)	Notes
Area 4					
Residential	500	Dwelling units	440	246	*1*
Open space	10.8	Acres	849	10	*2*
Golf Course	130	Acres	3,371	491	*3*
			Area 4 Subtotal	*748*	
Area 3					
Single Family Residential	760	Dwelling units	250	213	*4*
Multiple Family Residential	158	Dwelling units	150	27	*5*
School	600	Students	15.7	11	*6*
Parks and Open Space	14.0	Acres	849	13	*2*
Office	3	Acres	1,894	6	*3*
			Area 3 Subtotal	*270*	
			Subtotal	*1,017*	
			8% Unaccounted for water	88	*7*
			Estimated Project Demand (rounded to nearest 100 AF)	1,100	

Notes:

1. Assumes 6,000 to 7,000 sq ft lots and unit demands from ACWD's '04 Demand Forecast
2. Demand units provided by City in WSA request letter of 8/14/2008, "Athletic fields, open space, parks and landscape buffers are assumed to be xeriscape or artificial turf supplied by reclaimed water"
3. Demand units provided by City in WSA request letter of 8/14/2008
4. Assumes half of units are townhomes and half are high density SFR residential on 2,000 to 5,000 sq ft lots and unit demands from ACWD's '04 Demand Forecast
5. Assumes podium style condominiums and unit demands from ACWD's '04 Demand Forecast
6. 15.7gpd/student based 07/08 demands for all FUSD schools and an approximate 32,000 enrollment (FY 06-07 32,087 students)
7. Long-term average 8% unaccounted for water (UAW) assumed.

Table 4 Potable and Non-Potable Water Demands for Newark Area 3 & 4 Specific Plan EIR Project

Element	Demand Estimate (AF/yr)
Non-potable Water Demand	
Area 3 Open space	10
Area 4 Open space	13
Golf Course	491
Future Non-Potable Water Demand with 8% UAW	*560*
Potable Water Demand	
All other project elements	503
Future Potable Water Demand with 8% UAW	*550*

Notes:

1. Demand units provided by City in WSA request letter of 8/14/2008, "Athletic fields, open space, parks and landscape buffers are assumed to be xeriscape or artificial turf supplied by reclaimed water"
2. Demand units provided by City in WSA request letter of 8/14/2008

Table 5 Estimated Future Water Demands in the ACWD Service Area – Critical Dry Year (AF/Yr)

Water Use Category	Year				
	2010	2015	2020	2025	2030
Distribution System (source: UWMP)					
Single Family Residential	27,300	28,300	28,600	28,600	28,600
Multi-Family Residential	9,800	10,100	10,500	10,900	11,200
Commercial	6,500	6,600	6,800	6,900	7,000
Industrial	7,700	8,400	8,700	9,000	9,200
Institutional	3,800	3,900	4,700	4,700	4,700
Other	300	300	300	300	300
Sub-Total	*55,400*	*57,600*	*59,600*	*60,400*	*61,000*
Adjustment for plumbing code savings	(700)	(1,100)	(1,500)	(1,700)	(1,900)
Sub-Total Distribution System Demand (without losses)	*54,800*	*56,500*	*58,100*	*58,600*	*59,100*
Sub-Total Distribution System Demand (with losses)	*59,500*	*61,400*	*63,200*	*63,700*	*64,300*
Adjustments for water conservation savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
Total Distribution System Demand (source: UWMP)	**58,800**	**59,900**	**61,000**	**61,500**	**62,100**
Groundwater System Demand (source: UWMP)	**10,500**	**10,500**	**10,500**	**10,500**	**10,500**
2008 Patterson Ranch WSA - Demands	**600**	**600**	**600**	**600**	**600**
Total ACWD Forecast Demands	**69,900**	**71,000**	**72,100**	**72,600**	**73,200**

Notes:
1. Total ACWD Forecast Demands reflects sum of UWMP demands and 2008 Patterson Ranch WSA Demands
2. All values rounded to the nearest 100. Total values may not equal sum of individual components due to rounding errors.
3. Landscape Irrigation included within Multi-Family Residential, Commercial, Industrial, and Institutional categories.
4. Adjustment for conservation includes savings due to District-sponsored water conservation programs.
5. Total Distribution System Demand (with losses) includes estimated system losses of 8%. Distribution system losses are calculated as the difference between total production and total measured consumption and include water for fire suppression, distribution system flushing, distribution system and service line leaks, etc.
6. Groundwater System demands include: (1) private pumping, (2) ARP pumping and (3) saline groundwater outflows.

Table 6 Estimated Future Water Demands in the ACWD Service Area – Multiple Dry Years (AF/Yr)

Water Use Category	Year				
	2026	2027	2028	2029	2030
Distribution System (source: UWMP)					
Single Family Residential	28,600	28,600	28,600	28,600	28,600
Multi-Family Residential	10,960	11,020	11,080	11,140	11,200
Commercial	6,920	6,940	6,960	6,980	7,000
Industrial	9,040	9,080	9,120	9,160	9,200
Institutional	4,700	4,700	4,700	4,700	4,700
Other	300	300	300	300	300
Sub-Total	*60,520*	*60,640*	*60,760*	*60,880*	*61,000*
Adjustment for plumbing code savings	(1740)	(1,780)	(1,820)	(1,860)	(1,900)
Sub-Total Distribution System Demand (without losses)	*58,780*	*58,860*	*58,940*	*59,020*	*59,100*
Sub-Total Distribution System Demand (with losses)	*64,000*	*64,000*	*64,100*	*64,200*	*64,300*
Adjustments for water conservation savings	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
Total Distribution System Demand (source: UWMP)	**61,800**	**61,800**	**61,900**	**62,000**	**62,100**
Groundwater System Demand (source: UWMP)	**10,800**	**9,900**	**5,600**	**5,500**	**6,400**
2008 Patterson Ranch WSA - Demands	**600**	**600**	**600**	**600**	**600**
Total ACWD Forecast Demands	**73,000**	**72,200**	**68,000**	**68,000**	**69,100**

Notes:
1. Total ACWD Forecast Demands reflects sum of UWMP demands and 2008 Patterson Ranch WSA Demands
2. All values rounded to the nearest 100. Total values may not equal sum of individual components due to rounding errors.
3. Landscape Irrigation included within Multi-Family Residential, Commercial, Industrial, and Institutional categories.
4. Adjustment for conservation includes savings due to District-sponsored water conservation programs.
5. Total Distribution System Demand (with losses) includes estimated system losses of 8%. Distribution system losses are calculated as the difference between total production and total measured consumption and include water for fire suppression, distribution system flushing, distribution system and service line leaks, etc.
6. Groundwater System demands include: (1) private pumping, (2) ARP pumping and (3) saline groundwater outflows.

Table 7 Overview of Contracts and Permits for ACWD's Existing Water Supplies

SUPPLY COMPONENT	Category	Description	Maximum Quantity (AF/Yr)	Ever Used
Imported Supplies				
- State Water Project	Contract	In 1961, ACWD signed an agreement with the California State Department of Water Resources for a maximum annual amount of 42,000 AF/Yr from the State Water Project (SWP). SWP water is delivered to ACWD via the South Bay Aqueduct. This contract expires in the year 2035.	42,000	Yes
- San Francisco Regional Water System	Contract	In 1984 ACWD (and other Bay Area agencies) signed a Settlement Agreement and Master Water Sales Agreement with San Francisco. ACWD supply assurance under an individual water supply contact is 12 mgd (approx. 13,400 AF/Yr). In 1994 ACWD and San Francisco executed an amendment to the contract which provides an additional 1.76 mgd (approx. 2000 AF/Yr). Although the Master Contract and accompanying Water Supply Contract expire in 2009, the Supply Assurance (which quantified San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.	15,344	Yes
Local Supplies				
- Alameda Creek Diversions for Groundwater Recharge	Water-rights permit	ACWD received a water rights permit from the SWRCB in 1949 (permit no. 8428) to appropriate up to 40,000 AF/Yr of unappropriated water from the Alameda Creek for groundwater storage and replenishment.	40,000	Yes
- Del Valle Reservoir	Water-rights permit	ACWD received a water rights permit in from the SWRCB in 1958 (permit no. 11320) to appropriate up to 60,000 AF/Yr of unappropriated water from Arroyo Del Valle in the Alameda Creek Watershed for storage and later beneficial use.	60,000	Yes
- Groundwater Storage in Niles Cone Groundwater Basin - Desalination of Brackish Groundwater	Other	ACWD manages and protects the Niles Cone Groundwater Basin for water supply under its Groundwater Management Policy (adopted 1989, amended 2001). This Policy is based on the statutory authority granted to ACWD under the County Water District Law; the Replenishment Assessment Act of ACWD; and local well ordinances.	N/A	Yes
Banking / Transfers				
- Semitropic Groundwater Banking Program	Contract	In 1996 and in 2001 entered into agreements with Semitropic Water Storage District for 150,000 AF of combined groundwater storage capacity for banking of ACWD's excess SWP supplies in wet years. The banked water is to be returned to ACWD in dry years via a series of exchanges. These banking agreements expire in the year 2035.	13,500 (maximum return quantity during critically dry years)	Yes

Table 8 Historical Water Supply Utilization by ACWD (AF/Yr)

Fiscal Year	SWP supplies used at ACWD facilities	Del Valle	San Francisco Regional Water	Newark Desal Facility	Net Local Groundwater Recharge (less evaporation and other losses)	Total In-District Water Supply	SWP Supply delivered to Semitropic for Storage
93-94	21,600	5,000	12,200	-	28,500	67,300	-
94-95	16,100	4,200	13,000	-	35,900	69,200	-
95-96	18,600	5,300	12,200	-	27,600	63,700	-
96-97	7,700	15,900	14,700	-	25,300	63,600	6,200
97-98	12,900	10,600	13,700	-	58,000	95,200	10,000
98-99	20,800	5,300	13,600	-	33,200	72,900	18,780
99-00	25,200	3,800	13,800	-	26,900	69,700	7,230
00-01	26,400	200	13,000	-	31,000	70,600	7,250
01-02	21,900	4,600	13,500	-	32,100	72,100	83
02-03	17,600	7,400	14,000	-	31,400	70,400	20,800
03-04	18,500	6,700	13,700	2,600	30,700	72,200	4,000
04-05	18,800	6,000	11,800	3,900	38,700	79,200	9,300
05-06	15,600	7,700	11,700	2,100	31,100	68,200	41,540
06-07	13,800	11,000	15,300	2,800	26,000	68,900	11,936

Table 9 Summary of Potential Future Factors that may Influence ACWD Water Supply Reliability

SUPPLY	Factor		
	Legal/Environmental	Water Quality	Climatic
Imported Supplies			
-State Water Project	ESA* requirements may constrain Delta pumping	Potential seawater intrusion impacts if Delta Levees fail.	Supply is dependent on hydrologic conditions
- San Francisco Regional Supply	ESA requirements may require additional reservoir releases	None anticipated	Supply is dependent on hydrologic conditions
Local Supplies			
- Groundwater Recharge	ESA requirements may impact groundwater recharge operations	None anticipated	Supply is dependent on hydrologic conditions
- Groundwater Storage	None anticipated	None anticipated	Supply is dependent on availability of water to store in wet years
- Del Valle Release	ESA requirements may require downstream flow releases	None anticipated	Supply is dependent on hydrologic conditions
- Desalination	None anticipated	None anticipated	Supply is dependent on local groundwater conditions
- Recycled Water	None anticipated	None anticipated	None anticipated
Banking/Transfers			
- Semitropic Banking	None anticipated	Banked groundwater may require treatment	Supply is dependent on availability of water to store in wet years

* Endangered Species Act

Table 10 Projected Normal Year Supply – 2005 SWP Reliability Assumptions

SUPPLY	2010	2015	2020	2025	2030
Imported Supplies					
- State Water Project	28,800	30,000	31,100	32,300	32,300
- San Francisco Regional	15,000	15,000	15,000	15,000	15,000
Total Imported Supplies	**43,800**	**45,000**	**46,100**	**47,300**	**47,300**
Local Supplies					
- Groundwater Recharge	21,400	21,400	21,400	21,400	21,400
- Groundwater Storage	0	0	0	0	0
- Del Valle Release	7,100	7,100	7,100	7,100	7,100
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	1,600	1,600	1,600
Total Local Supplies	**33,600**	**33,600**	**35,200**	**35,200**	**35,200**
Banking/Transfers					
- Semitropic Banking	*N/A – Not intended or needed to meet normal year demands*				
TOTAL SUPPLY	*77,400*	*78,600*	*81,300*	*82,500*	*82,500*

Table 11 Projected Normal Year Supply – 2007 SWP Reliability Assumptions

SUPPLY	2010	2015	2020	2025	2030
Imported Supplies					
- State Water Project	26,600	26,900	27,200	27,500	27,700
- San Francisco Regional	15,000	15,000	15,000	15,000	15,000
Total Imported Supplies	**41,600**	**41,900**	**42,200**	**42,500**	**42,700**
Local Supplies					
- Groundwater Recharge	21,400	21,400	21,400	21,400	21,400
- Groundwater Storage	0	0	0	0	0
- Del Valle Release	7,100	7,100	7,100	7,100	7,100
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0	0	1,600	1,600	1,600
Total Local Supplies	**33,600**	**33,600**	**35,200**	**35,200**	**35,200**
Banking/Transfers					
- Semitropic Banking	*N/A – Not intended or needed to meet normal year demands*				
TOTAL SUPPLY	*75,200*	*75,500*	*77,400*	*77,700*	*77,900*

Table 12 Projected Critical Year Supply – 2005 SWP Reliability Assumptions

SUPPLY	2010	2015	2020	2025	2030
Imported Supplies					
- State Water Project	1,700	1,800	1,800	1,900	1,900
- San Francisco Regional	11,700	13,700	14,100	12,700	13,100
Total Imported Supplies	**13,400**	**15,500**	**15,900**	**14,600**	**15,000**
Local Supplies					
- Groundwater Recharge	15,600	15,600	15,600	15,600	15,600
- Groundwater Storage	10,000	10,000	10,000	10,000	10,000
- Del Valle Release	100	100	100	100	100
- Desalination	5,600	5,600	5,600	5,600	5,600
- Recycled Water	0		1,600	1,600	1,600
Total Local Supplies	**31,300**	**31,300**	**32,900**	**32,900**	**32,900**
Banking/Transfers					
- Semitropic Banking	14,100	14,100	14,100	14,100	14,100
TOTAL SUPPLY	*58,800*	*60,900*	*62,900*	*61,600*	*62,000*

Notes:
1. Critical Dry Year conditions are based on projected water supply availability under 1977 drought conditions.
2. Semitropic Banking assumes ACWD's existing recovery capacity increased by 600 AF/Yr (from 13,500 AF/Yr to 14,100 AF/Yr), per 2008 Patterson Ranch Development Project Water Supply Assessment.

Table 13 Projected Critical Year Supply – 2007 SWP Reliability Assumptions

SUPPLY	2010	2015	2020	2025	2030
Imported Supplies					
- State Water Project	2,600	2,700	2,800	2,900	2,900
- San Francisco Regional	11,700	13,700	14,100	12,700	13,100
Total Imported Supplies	**14,300**	**16,400**	**16,900**	**15,600**	**16,000**
Local Supplies					
- Groundwater Recharge	15,600	15,600	15,600	15,600	15,600
- Groundwater Storage	10,000	10,000	10,000	10,000	10,000
- Del Valle Release	100	100	100	100	100
- Desalination	5,600	5,600	5,600	5,600	5,600
- Recycled Water	0		1,600	1,600	1,600
Total Local Supplies	**31,300**	**31,300**	**32,900**	**32,900**	**32,900**
Banking/Transfers					
- Semitropic Banking	**14,100**	**14,100**	**14,100**	**14,100**	**14,100**
TOTAL SUPPLY	*59,700*	*61,800*	*63,900*	*62,600*	*63,000*

Notes:
1. Critical Dry Year conditions are based on projected water supply availability under 1977 drought conditions.
2. Semitropic Banking assumes ACWD's existing recovery capacity increased by 600 AF/Yr (from 13,500 AF/Yr to 14,100 AF/Yr), per 2008 Patterson Ranch Development Project Water Supply Assessment.

Table 14 Projected Multiple Dry Year Supply – 2005 SWP
Reliability Assumptions

SUPPLY	2026	2027	2028	2029	2030
Imported Supplies					
-State Water Project	11,400	27,800	10,900	16,000	13,600
- San Francisco Regional	15,300	15,300	13,100	15,300	15,300
Total Imported Supplies	26,700	43,100	24,000	31,300	28,900
Local Supplies					
- Groundwater Recharge	12,700	12,100	9,900	19,800	14,000
- Groundwater Storage	9,100	0	10,000	0	3,300
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	2,000	1,900	2,600
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	29,300	23,900	24,500	26,700	22,500
Banking/Transfers					
- Semitropic Banking	16,800	26,000	16,500	19,400	18,000
TOTAL SUPPLY	*72,800*	*93,000*	*65,000*	*77,400*	*69,400*

Notes:
1. Critical Dry Year conditions based on projected water supply availability under 1929-33 drought conditions.
2. Semitropic Banking assumes ACWD's existing recovery capacity increased by 600 AF/Yr (from 13,500 AF/Yr to 14,100 AF/Yr), per 2008 Patterson Ranch Development Project Water Supply Assessment.

Table 15 Projected Multiple Dry Year Supply – 2007 SWP
Reliability Assumptions

SUPPLY	2026	2027	2028	2029	2030
Imported Supplies					
-State Water Project	8,200	21,800	10,500	13,700	16,400
- San Francisco Regional	15,300	15,300	13,100	15,300	15,300
Total Imported Supplies	23,500	37,100	23,600	29,000	31,700
Local Supplies					
- Groundwater Recharge	12,700	12,100	9,900	19,800	14,000
- Groundwater Storage	9,100	0	10,000	0	3,300
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	2,000	1,900	2,600
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	29,300	23,900	24,500	26,700	22,500
Banking/Transfers					
- Semitropic Banking	15,000	22,700	16,300	18,100	19,600
TOTAL SUPPLY	*67,800*	*83,700*	*64,400*	*73,800*	*73,800*

Notes:
1. Critical Dry Year conditions based on projected water supply availability under 1929-33 drought conditions.
2. Semitropic Banking assumes ACWD's existing recovery capacity increased by 600 AF/Yr (from 13,500 AF/Yr to 14,100 AF/Yr), per 2008 Patterson Ranch Development Project Water Supply Assessment.

Table 16 Water Supply and Demand Comparison: Normal Year – 2005 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
Total Supply with 2005 SWP	77,400	78,600	81,300	82,500	82,500
Forecast Demands	74,200	75,300	76,400	76,900	77,500
Difference	3,200	3,300	4,900	5,600	5,000

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.

Table 17 Water Supply and Demand Comparison: Normal Year – 2007 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
Total Supply with 2007 SWP	75,200	75,500	77,400	77,700	77,900
Forecast Demands	74,200	75,300	76,400	76,900	77,500
Difference	1,000	200	1,000	800	400

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.

Table 18 Water Supply and Demand Comparison: Critical Dry Year – 2005 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
Total Supply with 2005 SWP	*58,800*	*60,900*	*62,900*	*61,600*	*62,000*
Forecast Demands	69,900	71,000	72,100	72,600	73,200
Difference	(11,100)	(10,100)	(9,200)	(11,000)	(11,200)

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.
3. Critical Dry Year conditions are based on projected water supply availability under 1977 drought conditions.

Table 19 Water Supply and Demand Comparison: Critical Dry Year – 2007 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
Total Supply with 2007 SWP	59,700	61,800	63,900	62,600	63,000
Forecast Demands	69,900	71,000	72,100	72,600	73,200
Difference	(10,200)	(9,200)	(8,200)	(10,000)	(10,200)

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.
3. Critical Dry Year conditions are based on projected water supply availability under 1977 drought conditions.

Table 20 Water Supply and Demand Comparison: Multiple Dry Year – 2005 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2026	2027	2028	2029	2030
Total Supply with 2005 SWP	72,800	93,000	65,000	77,400	69,400
Forecast Demands	73,000	72,200	68,000	68,000	69,100
Difference	(200)	20,800	(3,000)	9,400	300

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.
3. Multiple Dry Year conditions are based on projected water supply availability under 1929-1933 drought conditions.

Table 21 Water Supply and Demand Comparison: Multiple Dry Year – 2007 SWP Reliability Assumptions

SUPPLY/DEMAND	Year				
	2026	2027	2028	2029	2030
Total Supply with 2007 SWP	67,800	83,700	64,400	73,800	73,800
Forecast Demands	73,000	72,200	68,000	68,000	69,100
Difference	(5,300)	11,500	(3,600)	5,800	4,700

Notes:

1. All values rounded to the nearest 100 AF.
2. Forecast Demands include Project demands.
3. Multiple Dry Year conditions are based on projected water supply availability under 1929-1933 drought conditions.

Figure 1 ACWD Service Area and Newark Area 3 & 4 Specific Plan EIR Project Location Map

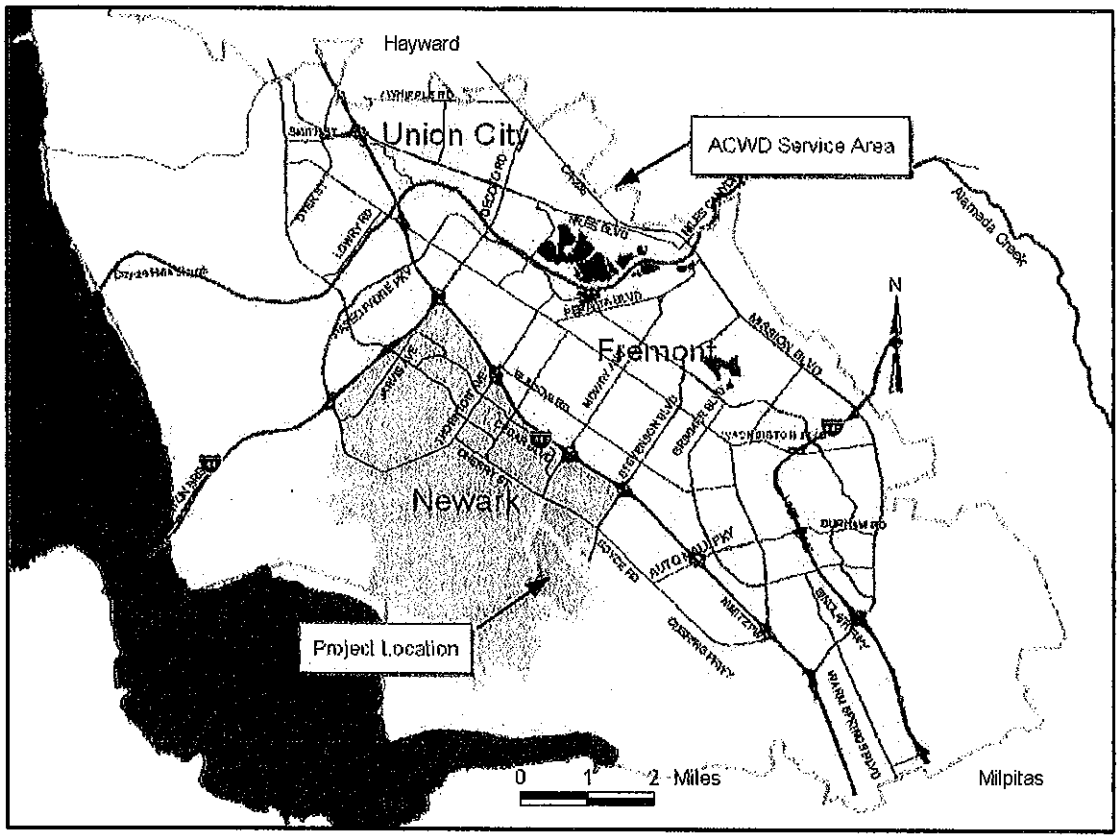
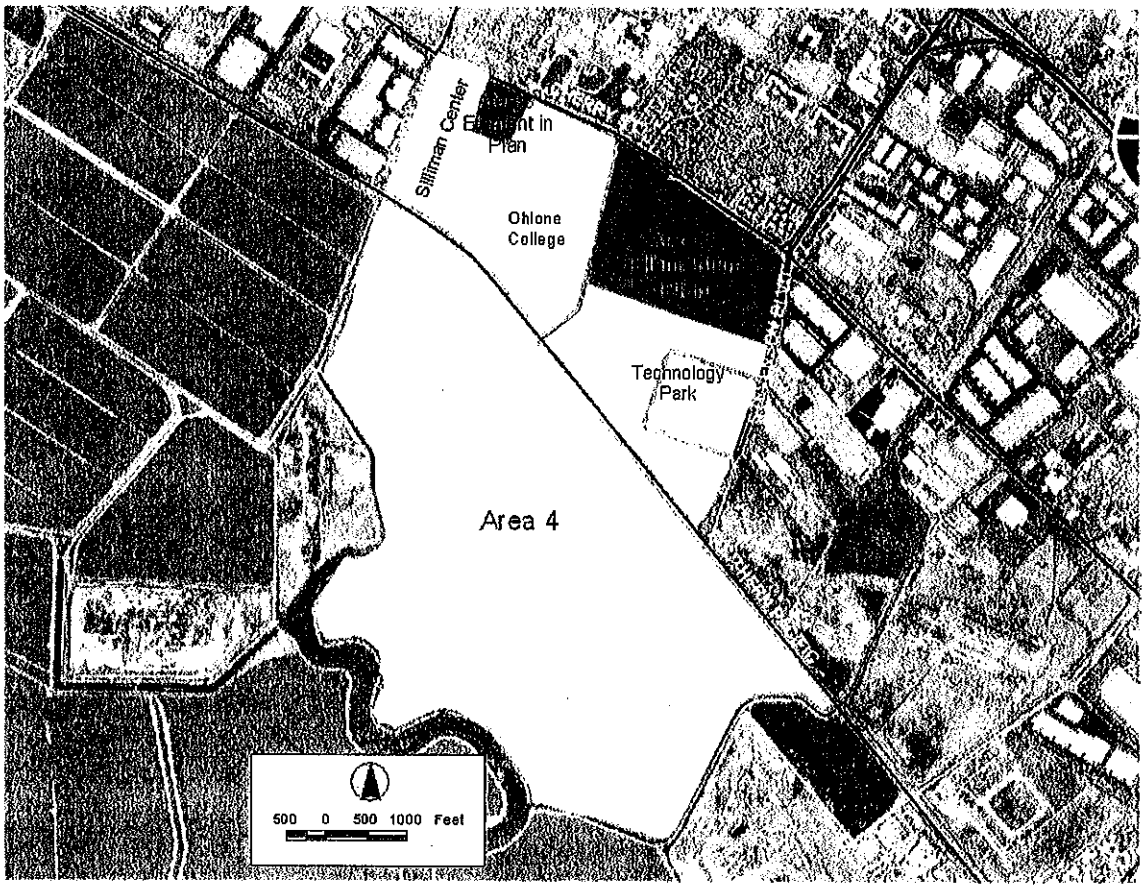


Figure 2 Newark Area 3 & 4 Project Site



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ATTACHMENT A
ACWD URBAN WATER MANAGEMENT PLAN 2006-2010

Alameda County
Water District

URBAN WATER MANAGEMENT PLAN 2006-2010

ACWD
ALAMEDA COUNTY WATER DISTRICT

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ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
ACWD	Alameda County Water District
ADWF	average dry-weather flow
AF	acre-foot (325,900 gallons)
AF/Yr	acre-feet per year
AHF	above the Hayward Fault (aquifer)
ARP	Aquifer Reclamation Program
BHF	below the Hayward Fault (aquifer)
BMP	Water Conservation Best Management Practices
ccf	hundred cubic feet (748 gallons)
cfs	cubic foot (feet) per second
CII	Commercial, Industrial and Institutional
CUWA	California Urban Water Agencies
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
DWR	(California) Department of Water Resources
EBDA	East Bay Dischargers Authority
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Committee
GIS	Geographic Information System
gpd	gallons per day
gpm	gallons per minute
IRP	integrated resources planning
IRPM	(District's) Integrated Resources Planning Model
MCL	Maximum Contaminant Level
mg/l	milligrams per liter
mgd	million gallons per day
MOU	Memorandum of Understanding on Urban Water Conservation
MSJWTP	(District's) Mission San Jose Water Treatment Plant
MFR	multi-family residential
NUMMI	New United Motors Manufacturing, Inc.
ppm	part per million
RWQCB	Regional Water Quality Control Board
SBA	South Bay Aqueduct
SBP	Salinity Barrier Program
SDWA	Safe Drinking Water Act
SEP	Salt Evaporator Pond
SFPUC	San Francisco Public Utilities Commission
SFR	single-family residential
SFWD	San Francisco Water Department
sq. ft.	square foot (feet)
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	1,000 acre-feet
TDS	total dissolved solids
ULFT	ultra low flow toilet
USBR	U.S. Bureau of Reclamation
USD	Union Sanitary District
USGS	U.S. Geological Survey
UWMP	Urban Water Management Plan
WTP	water treatment plant
WTP 2	(District's) Water Treatment Plant Number 2
WWTP	Wastewater Treatment Plant
Zone 7	Zone 7 of the Alameda County Flood Control and Water Conservation District

CHAPTER 1
INTRODUCTION

1.1 PURPOSE

This update to Alameda County Water District's (ACWD or District) Urban Water Management Plan (UWMP or Plan) has been prepared in response to the State of California's Urban Water Management Planning Act, Water Code Sections 10610 through 10657. The Act requires that every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually to prepare and adopt an urban water management plan. The Act also requires that water suppliers provide updates to their Plan every five years.

1.2 PLAN PREPARATION

This UWMP Update covers the period from 2006 through 2010, and is the fifth plan adopted by the ACWD Board of Directors (the four prior plans covered the periods from 1986-1990, 1991-1995, 1996-2000 and 2001-2005). Several changes have occurred since ACWD's first UWMP was adopted in 1985, which have resulted in the need for a broader, more sophisticated representation of the District's water supply, demand management and operational alternatives. Accordingly, in 1992, the District began implementation of a planning effort that would apply the approaches and techniques of integrated resources planning (IRP) to ensure that appropriate facility and resource decisions are made. IRP is an inclusive process that begins with the premise that a wide range of traditional and innovative supply-side and demand-side (conservation) resources must be considered. The process also provides information on potential consequences and aids in judging the value of trade-offs among resource strategies.

In August 1995, the ACWD Board of Directors adopted the recommendations of ACWD's Integrated Resources Planning Study as its road-map for both supply and demand-side planning through the year 2030. Because this planning process involves assessment and treatment of conservation as a resource that is evaluated as rigorously as supply-side options, the IRP process and results form the foundation for this and future urban water management plans. In addition, because the process applied is inclusive of both supply and demand-side options, it generally goes beyond the statutory requirements outlined the Urban Water Management Planning Act in its analysis of resource management options. ACWD is currently in the process of updating the assumptions and implementation status of the 1995 IRP and the IRP water supply strategy recommendations. As such, the District's adopted 1995 Integrated Resources Plan and the on-going 2005 update to the IRP form the core of this report. Table 1-1 provides a comparison of the key components of the District's IRP and 2006-2010 UWMP Update.

A key policy criterion used in the formulation and evaluation of water supply strategies in the IRP process is to maximize local control of resources while maintaining a high level of service reliability. This is especially important for ACWD because of the reliance on imported water supplies from the State Water Project and San Francisco Regional Water Supply System for approximately half of the District's total supplies. As described in this UWMP, ACWD's water supply strategy includes maximizing the use of local water supplies (local groundwater and surface water, brackish groundwater desalination and recycled water), together with off-site groundwater banking of SWP supplies and a strong demand management program to minimize dependency on imported supplies.

Table 1-1
Comparison of UWMP and
ACWD's Integrated Resources Plan (IRP)

Item	*UWMP*	*IRP*
Planning Horizon	2025 (20 Years)	2030
Planning Criteria	* Reliability * Water Quality * Environmental Impacts	*Reliability *Water Quality *Cost *Environmental Impacts *Local Control
Demand Projections	Yes	Yes
Existing Water Supply Availability	Yes	Yes
Supply Opportunities: -Demand Management -Recycled Water -Water Transfers	Yes	Yes
Long-Term Water Supply Strategy	Yes	Yes
Water Quality Considerations	Yes	Yes
Treatment & Production Facilities	No	Yes
Shortage Contingency Plan	Yes	No

ACWD has coordinated with all appropriate agencies in the development of the District's IRP and this Urban Water Management Plan Update. Table 1-2 below provides a summary of the agencies that ACWD has coordinated with and the relevant information incorporated in this UWMP.

Table 1-2
Agency Coordination

Agency ACWD has coordinated with	*Relevant information incorporated in the UWMP*
California Department of Water Resources	Estimated future reliability of State Water Project supplies
San Francisco Public Utilities Commission	Estimated future reliability of San Francisco Regional Water System supplies
Bay Area Water Supply and Conservation Agency	Estimated future reliability of San Francisco Regional Water System supplies
Union Sanitary District	Potential future recycled water supplies and projects
City of Fremont	Projected future land use conditions (City General Plan) in Fremont
City of Union City	Projected future land use conditions (City General Plan) in Union City
City of Newark	Projected future land use conditions (City General Plan) in Newark

As per section 10621 (b) of the Urban Water Management Planning Act, all cities within the District's service area were notified of ACWD's UWMP planning process. The Cities of Fremont, Newark and Union City were notified, as was the County of Alameda.

1.3 PUBLIC REVIEW AND ADOPTION OF PLAN

Section 10642 of the Urban Water Management Planning Act requires urban water suppliers to make the Plan available for public review and hold a public hearing prior to adopting the Plan. The Draft Plan was distributed for review and comment beginning on October 27, 2005. In order to encourage the involvement of ACWD's customers, including both residential and non-residential customers, ACWD made copies of the Draft Plan available on the District's web-site, as well as provided copies for review at the District's headquarters and city libraries. Copies of the Draft Plan were also provided to the Cities of Newark, Union City and Fremont, as well as the San Francisco Public Utilities Commission, California Department of Water Resources and Union Sanitary District. A public hearing was also held on the Plan on November 10, 2005 and comments were received through December 15, 2005. This Plan was adopted on December 15, 2005 by ACWD Board of Directors Resolution No. 05-055.[1]

As per the requirements in Water Code Section 10644 (a) a copy of ACWD's Urban Water Management Plan was provided to the following agencies: the California Department of Water Resources, the California State Library, the City of Fremont, the City of Newark and Union City, California on or before January 15, 2006, within 30 days of the Plan's adoption.

ACWD will periodically review its Urban Water Management Plan to ensure that it accurately reflects the District's management activities. Changes will be adopted and incorporated into the plan via amendments or other appropriate means as set forth in Water Code sections 10640 through 10645.

1.4 REPORT FORMAT AND ORGANIZATION

This UWMP provides an update of the elements contained in the District's Integrated Resources Planning Study, and discusses the status of projects, programs, and studies in water supply planning, water conservation and recycled water that were recommended as part of the IRP. This Plan also meets the requirements of the Urban Water Management Planning Act. Table 1-3 provides an index of the required components of the UWMP, and their location within this ACWD 2006-2010 UWMP Update, respectively.

Chapter 1: Introduction - This chapter provides an overview of the Urban Water Management Planning Act requirements, the preparation and organization of this report, and background information on ACWD.

Chapter 2: Past, Current & Future Water Use - This chapter provides an overview of historical and current water use in the District, as well as a summary of future projected water demands.

Chapter 3: Sources of Supply - This chapter provides a summary of the District's sources of supply and their availability, as well as an overview of the management of these supplies.

Chapter 4: Groundwater - This chapter describes the Niles Cone Groundwater Basin, the District's reliance on it as a source of water supply, and the District's policy and activities for managing it.

Chapter 5: Desalination – This chapter describes the Newark Desalination Facility and the District's plans for expanding capacity to augment this source of water supply.

Chapter 6: Water Recycling - This chapter describes the Union Sanitary District's wastewater system (which serves the ACWD service area), and the opportunities for the use of recycled.

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[1] The Plan has been amended to include additional information on projected water accounts and wastewater flows. The amended Plan was adopted on April 27, 2006 by the ACWD Board of Directors Resolution No. 06-030.

Table 1-3
2005 Urban Water Management Plan Checklist

Section of Water Code	*Section in Plan*	*Items to Address*
§ 10620 (d)(1) (2)	1.2	Coordination with Appropriate Agencies
§ 10620 (e)	1.2	Urban Water Management Plan Preparation
§ 10620 (f)	8.1,8.2	Describe resource maximization/import minimization plan
§ 10621 (a)	1.3	Plan Updated in Years Ending in Five and Zero
§ 10621 (b)	1.2	City and County Notification and Participation
§ 10621 (c)	1.3	Periodic Review, Adoption of Changes or Amendments
§ 10630	1.2	Appropriate Level of Planning for Size of Agency
§ 10631 (a)	1.6	Service Area Information
§ 10631 (b)	3.1,8.2	Water Sources
§ 10631 (b) (1-4)	4.1-4.4, 8.3	Groundwater as an Existing or Planned Source (see Appendix A)
§ 10631 (c) (1-3)	3.1,8.2, 8.3	Reliability of Supply
§ 10631 (c)	3.1	Water Sources Not Available on a Consistent Basis
§ 10631 (d)	3.1, 8.2	Transfer or Exchange Opportunities
§ 10631 (e) (1) (2)	2.2, 2.3	Water Use Provisions
§ 10631 (f)	7.1, 7.2	Description of Water Demand Management Measures (DMMs)
§ 10631 (g)	7.2	Non-Implemented DMMs
§ 10631 (h)	8.2, 8.3	Planned Water Supply Projects and Programs
§ 10631 (i)	5.2,5.3	Opportunities for Desalinated Water
§ 10631 (j)	7.1	District is a CUWCC Signatory and submits the bi-annual BMP status reports (see Appendix B)
§ 10631 (k)	3.1	Wholesale supplier agencies information
§ 10631.5	7.1, 7.2	Determination of DMM Implementation
§ 10632	9.1-9.5	Water Shortage Contingency Plan
§ 10632 (a)	9.3	Water Shortage Contingency Plan - Stages of Action
§ 10632 (b)	9.2	Three-Year Minimum Water Supply
§ 10632 (c)	9.5	Preparation for catastrophic water supply interruption
§ 10632 (d)	9.3	Prohibitions
§ 10632 (e)	9.3	Consumption Reduction Methods
§ 10632 (f)	9.3	Penalties
§ 10632 (g)	9.4	Revenue and Expenditure Impacts
§ 10632 (h)	9.3, 9.4	Water Shortage Contingency Ordinance/Resolution
§ 10632 (i)	9.3, 9.4	Reduction Measuring Mechanism
§ 10633	6.1	Recycling Plan Agency Coordination
§ 10633 (a-b)	6.2	Wastewater System Description
§ 10633 (d)	6.4	Recycled Water – Potential Uses
§ 10633 (e) (f)	6.4	Projected use of Recycled Water/Incentives to Use
§ 10633 (f-g)	6.5	Plan to Optimize Use of Recycled Water (with Incentives)
§ 10634	3.3	Water Quality Impacts on Availability of Supply
§ 10635 (a)	8.3	Supply and Demand Comparison to 20 Years
§ 10635 (a)	8.3	Supply and Demand Comparison: Single Dry Year Scenario
§ 10635 (a)	8.3	Supply and Demand Comparison: Multiple Dry Year Scenario
§ 10635 (b)	1.2	Provision of Water Service Reliability to Cities/Counties within Service Area
§ 10642	1.3	Public Participation and Plan Adoption
§ 10643	8.2	Review of Implementation of 2000 UWMP
§ 10644 (a)	1.3	Provision of 2005 UWMP to Local Governments
§ 10645	1.3	Availability for Public Review

Chapter 7: Demand Management - This chapter provides an overview of the District's demand management strategy (adopted as part of the IRP process) and a summary of the implementation of the District's water conservation programs.

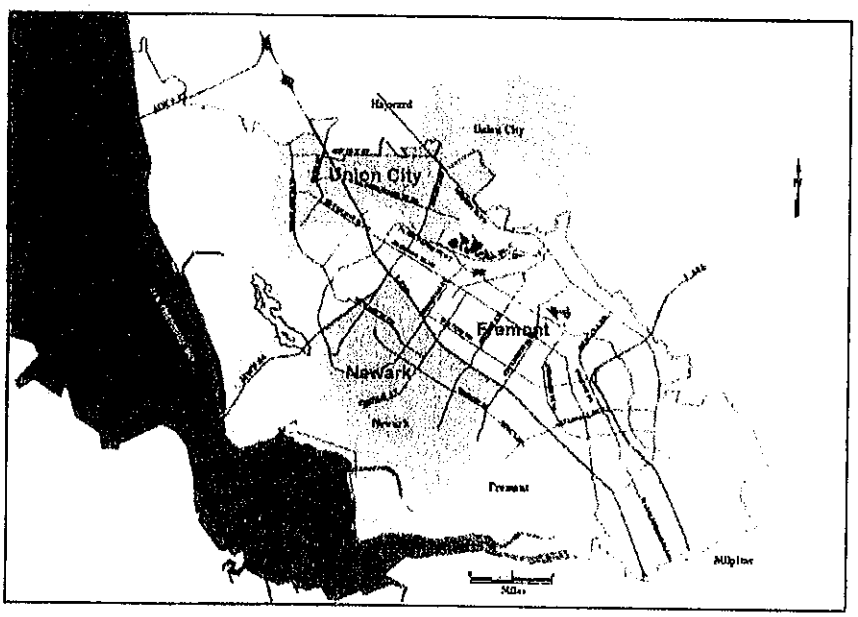
Chapter 8: Water Supply Strategy - This chapter summarizes the planning criteria utilized by the District in developing the District's water supply strategy (as part of the IRP process), followed by a summary of the recommended water supply strategy for the District and the implementation status of key IRP programs.

Chapter 9 - Water Shortage Contingency Plan - This chapter provides the District's water shortage contingency plan, as required under the Urban Water Management Planning Act. This contingency plan includes scenarios for shortages of up to 50%.

1.5 ACWD BACKGROUND

The Alameda County Water District is a retail water purveyor with a service area of approximately 100 square miles encompassing the Cities of Fremont, Newark and Union City (Figure 1-1). The District was established in 1914 under the California County Water District Act and is governed by a five-member Board of Directors. It was originally created to protect the groundwater basin, conserve the waters of the Alameda Creek Watershed and develop supplemental water supplies, primarily for agricultural use. In 1930, urban distribution became an added function of the District. Today, the District provides water primarily to urban customers: approximately 70% of supplies are used by residential customers, with the balance (approximately 30%) utilized by commercial, industrial, institutional and large landscape customers. Total distribution system water use (excluding system losses) was approximately 48,400 Acre-Feet (43 million gallons per day, mgd) in fiscal year 2004-2005.

Figure 1-1
ACWD Service Area



The Niles Cone Groundwater Basin was the principal source of water supply for the District until 1962. Up to that time, groundwater use by the District and numerous private pumpers exceeded recharge, and this imbalance permitted salt water from the Bay to intrude into the basin, severely limiting its use. In 1962, the District was the first state contractor to receive water from the State Water Project (SWP). State water was used to recharge the groundwater basin. As a result, groundwater levels rose and prevented additional saltwater intrusion. However, certain areas within the groundwater basin remain brackish due to past years of seawater intrusion.

Today, the District's primary sources of supply come from the Bay-Delta (via the SWP); the San Francisco Regional Water System; and local supplies including groundwater from the Niles Cone Groundwater Basin.

1.6 SERVICE AREA DESCRIPTION AND POPULATION PROJECTIONS

As part of the San Francisco Bay Area, the District's service area of Fremont, Newark and Union City ("Tri-Cities") is home to a population of over 324,000, and over 7,500 businesses. As indicated in Table 1-4, the projections provided by the Association of Bay Area Governments indicate that the population in the service area may grow to over 400,000 by the year 2030 (see Table 1-4).

Table 1-4
Projected Population in the ACWD Service Area
(source: ABAG, 2003)

City	Year				
	2010	2015	2020	2025	2030
Fremont	221,600	228,700	236,700	245,500	257,100
Newark	47,000	48,500	50,000	51,700	53,500
Union City	77,200	81,500	86,000	91,100	95,300
Total	345,800	358,700	372,700	388,300	405,900

California's only automobile manufacturing plant (New United Motor Manufacturing Incorporated) is located in the District's service area, as well as numerous high-tech, bio-tech and other industries. The Tri-Cities is also home to numerous retail and commercial businesses that support the Tri-Cities and surrounding communities. The 2003-04 assessed valuation (land, improvements and personal property) of the Tri-Cities area was over $36 billion.

The District's service area is located approximately 20 miles southeast of San Francisco on the southeastern shores of the San Francisco Bay. The District is bounded by San Francisco Bay on the west, by the hills of the Diablo Range on the east, by the Hayward Plain to the north and by Coyote Creek Slough to the south. The western portion of the District area consists primarily of salt evaporation ponds and saltwater marshes. These ponds and marshes extend from one to four miles inland and cover an area of approximately 35 square miles.

Most of the District area is relatively flat with an average elevation of approximately 20-50 feet above mean-sea-level (MSL). The highest elevations (1,500 feet MSL) occur on the eastern boundary of the District, along the easterly slopes of the Diablo Range. In addition, elevations in the Coyote Hills, located adjacent to the salt evaporation ponds are up to 300 feet MSL.

The mean annual precipitation within the District is geographically variable due to the Diablo Range on the eastern boundary of the District. Along the Diablo Range the mean annual precipitation is the highest with approximately 20 inches. However, along the western boundary, adjacent to San Francisco Bay, the mean annual precipitation is approximately 13 to 15 inches. The mean annual precipitation at the Niles precipitation gauging station is approximately 19 inches. The precipitation in the area is highly seasonal with over 75% of the rainfall occurring in the winter months between November and March. Climate data for the ACWD service area is provided in Table 1-5.

Table 1-5
Climate Data for ACWD Service Area

Climate Data (monthly average)	November - March	April-June	July - Aug	Sept-October	Annual
Evapotranspiration (in)	1.9"	5.4"	6.0"	3.9"	41.5"
Rainfall (in)	3.6"	1.3"	0.2"	0.7"	20 2"
Temperature (°F)	51.0° F	59.1° F	64.8° F	61.9° F	57 7° F
Maximum Daily Temperature (°F)	62 4° F	69.3° F	74.8° F	75.1° F	68.6° F

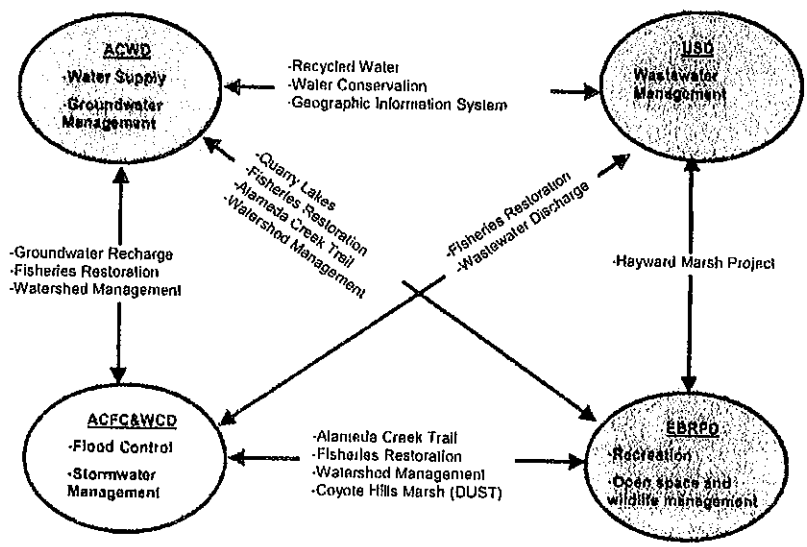
Note: Data represents period of record for CIMIS Station #171 (Union City), Feb 2001 to July 2005.

1.7 REGIONAL INTEGRATED PLANNING

ACWD water supply planning is coordinated with other agencies throughout the Bay Area region. Examples of ACWD's participation in regional integrated planning include the following:

Integrated Regional Water Management Planning in the Niles Cone Groundwater Basin: In June 2005, ACWD, together with the Union Sanitary District (USD), East Bay Regional Park District (EBRPD), and Alameda County Flood Control and Water Conservation District (ACFC&WCD) completed an integrated regional plan which documents the coordinated planning efforts of these agencies in the Niles Cone Groundwater Basin (contiguous with the ACWD service area). This report included the numerous existing and planned water management activities that are closely coordinated to provide for water supply, wastewater treatment and disposal, stormwater management, flood control, recreation and habitat protection and enhancement in the region. An example of the coordination among the agencies in the Niles Cone Groundwater Basin is shown in Figure 1-2.

Figure 1-2
Integrated Regional Planning in the Niles Cone Groundwater Basin



Bay Area Integrated Regional Water Management Plan: Water Quality and Water Supply Element: ACWD is participating with ten other Bay Area water agencies (serving a combined population of over 5 million) to develop a Bay Area integrated regional water management plan. The purpose of this Bay Area planning effort is to (1) facilitate regional cooperation in water management planning and (2) foster coordination, collaboration, and communication among the participating agencies to achieve greater efficiencies, enhance public services and build public support for vital plans and projects.

Alameda Creek Watershed Planning: ACWD participates in several stakeholder-based Alameda Creek Watershed management planning efforts including: (1) a watershed management planning effort to develop a comprehensive management plan for the watershed; and (2) the Alameda Creek Fisheries Restoration Workgroup, which is focused on restoring steelhead trout, a federally listed threatened species, to the Alameda Creek Watershed.

CHAPTER 2
PAST, CURRENT AND FUTURE WATER USE

This chapter provides an overview of historical and current water use in the District, as well as a summary of future projected water demands.

2.1 WATER USE CATEGORIES

Water use in the ACWD service area is divided into two categories: 1) distribution system use, and 2) groundwater system use. The distribution system use includes all water uses supplied by ACWD's treatment and production facilities, and this use is further subdivided into the categories of single family residential (SFR), multi-family residential (MFR), commercial, industrial, institutional, landscape and other use.

Groundwater system use includes private (non-ACWD) groundwater pumping (primarily for industrial, agricultural and municipal landscape irrigation uses), ACWD's Aquifer Reclamation Program pumping, and saline groundwater outflow to San Francisco Bay. The Aquifer Reclamation Program (ARP) pumping is an ongoing ACWD program to pump saline groundwater out of the aquifer system and replace it with fresh water recharged at the District's groundwater recharge facilities. Saline groundwater outflow to San Francisco Bay represents the groundwater outflow required to maintain a bayward groundwater flow direction to prevent seawater intrusion into the local aquifer system and to flush saline groundwater back to San Francisco Bay.

The District's groundwater system use is not anticipated to change significantly in the future. Therefore, the following discussions of water use are focused on the District's distribution system water use.

2.2 HISTORICAL AND CURRENT WATER USE

Table 2-1 provides a summary of the last ten years of water use within the District. Table 2-2 provides a summary of the active water accounts by customer classification in the ACWD service area. Figure 2-1 provides a summary of water consumption by customer classification. As indicated in Figure 2-1, residential water use comprises approximately 70% of District water use, with the remaining 30% used by commercial, industrial and institutional customers.

Water consumption patterns are a function of many independent factors including growth, weather conditions, economic conditions and water conservation behaviors. The District saw dramatic declines in consumption during the 1987-1992 drought due to voluntary and District-sponsored demand management efforts. However, during the drought recovery period since 1992, several significant consumption-influencing factors have occurred. From 1993-2001 accelerated growth of both residential and business customers (including the high technology industry) occurred due to a strong economy. During this period, vacancy rates decreased and water consumption rose. From 2001 to 2005 the overall consumption in the District has been relatively flat, attributed primarily to weak local economic conditions and mild weather.

As indicated in Figure 2-2, average residential water use from 1993 - 2005 has not rebounded to pre-drought conditions (1986-87), indicating that a water efficiency "ethic" has been retained by the District's residential customers. In addition, beginning in January 1992, California legislation required all new construction to be done with low-flow plumbing devices. Also, starting in 1994 all new toilets sold in the State of California were required to be low-flow models. Therefore, the District anticipates water savings will continue to occur via "natural conservation" (as older plumbing fixtures are replaced with water efficient fixtures).

Table 2-1
ACWD Past and Current Water Use (Acre-Feet)

Water Use Category	Fiscal Year										
	94-95	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05
Distribution System											
Single Family Residential	21,000	23,100	24,700	22,900	24,100	25,000	25,700	25,200	25,300	26,000	23,700
Multi-Family Residential	7,700	8,300	8,600	8,300	8,500	8,600	8,900	8,200	8,500	8,100	8,200
Commercial	4,400	4,900	5,100	5,300	5,600	5,800	5,600	5,200	5,000	5,200	5,300
Industrial	4,000	4,800	5,200	4,700	4,600	4,700	4,600	4,300	4,100	4,100	3,400
Institutional	1,700	1,900	2,200	2,000	2,000	2,100	2,300	2,200	2,200	2,300	2,000
Landscape	3,200	3,800	4,600	3,900	4,500	5,200	5,300	5,600	5,600	6,300	5,700
Other	200	200	300	300	200	200	200	200	200	200	100
Total Consumption	42,300	46,900	50,900	47,400	49,400	51,700	52,600	50,800	50,700	52,300	48,400
System Losses	2,900	4,100	4,200	4,100	4,200	4,200	3,600	4,300	3,700	4,100	3,200
Distribution System Total	45,200	51,000	55,100	51,500	53,600	55,900	56,200	55,100	54,400	56,400	51,600
Groundwater System											
Private Groundwater	4,200	5,700	5,000	3,900	3,200	3,100	3,800	3,100	3,400	3,600	--
Groundwater Reclamation											
-ARP Pumping	9,400	17,000	7,800	3,800	10,600	6,300	4,300	7,400	7,700	11,100	--
-Saline Outflow	7,800	2,400	2,300	3,900	6,100	7,400	6,600	6,300	5,800	7,200	--
Groundwater System Total	21 400	25,100	15,100	11,600	19,900	16,800	14,700	16,800	16,900	21,900	--
Grand Total	66,600	76,100	70,200	63,100	73,500	72,700	70,900	71,900	71,300	78,300	--

Notes:
1. Annual consumption is based on units billed during the Fiscal Year (July 1 to June 30). ACWD uses a bi-monthly billing cycle.
2. All values rounded to the nearest 100
3. Total Consumption values may not equal sum of individual components due to rounding
4. Mulli-Family Residential, Commercial, Industrial, and Institutional categories do not include dedicated landscape irrigation water use within these categories
5. Landscape water use includes all dedicated landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers.
6. Distribution System Total represents total water production, as reported in ACWD's Annual Groundwater Survey Reports
7. System Losses are calculated as the difference between Distribution System Total (total production) and Total Measured Consumption.
8. Groundwater System demands are based on annual reported values in ACWD's Annual Survey Report on Groundwater Conditions.
9. Groundwater Reclamation demands represents groundwater system demands to protect and reclaim the groundwater system from seawater intrusion.
10. Groundwater System demands do not include "Other Outflows" as reported in ACWD's Annual Survey Report on Groundwater Conditions.
11. Groundwater System demand for FY2004/05 was not available at the time of preparation of this UWMP Update.

Table 2-2
ACWD Water Accounts by Customer Classification
(Number of Accounts)

Water Use Category	Historical (Fiscal Year)						Projected			
	99-00	00-01	01-02	02-03	03-04	04-05	2010	2015	2020	2025
Single Family Residential	67,061	67,820	68,365	68,623	68,805	68,994	72,679	74,992	75,439	75,439
Multi-Family Residential	2,012	2,013	2,016	2,017	2,017	2,020	2,265	3,226	4,832	6,306
Commercial	2,317	2,317	2,337	2,348	2,314	2,310	2,368	2,396	2,421	2,432
Industrial	667	696	718	715	716	726	767	862	903	939
Institutional	429	431	439	446	447	448	456	467	472	476
Landscape	1,649	1,704	1,773	1,804	1,816	1,833	1,915	2,172	2,543	2,882
Other	1,648	1,722	1,789	1,795	1,792	1,823	1,947	2,338	2,941	3,489
Grand Total	**75,783**	**76,703**	**77,437**	**77,748**	**77,907**	**78,154**	**82,396**	**86,453**	**89,551**	**91,963**

Notes:
1. Number of historical accounts represents accounts at mid-point of fiscal year
2 Multi-Family Residential, Commercial, Industrial, and Institutional categories do not include dedicated landscape irrigation accounts within these categories
3. Landscape includes all dedicated landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers.
4. Other accounts include fire lines and hydrant meters.
5. Assumptions for projected future accounts are include: (a) current ratio of equivalent 2" meter per acre of development for non-residential use; (b) current ratio of landscape to non-landscape accounts for Multi-Family Residential, Commercial, Industrial and Institutional customers; (c) one account per 1.25 residential dwelling units forecast; and (d) current ratio of Other accounts to sum of Multi-Family Residential, Commercial and Industrial accounts

Figure 2-1
Relative Water Consumption by Customer Classification, FY04/05

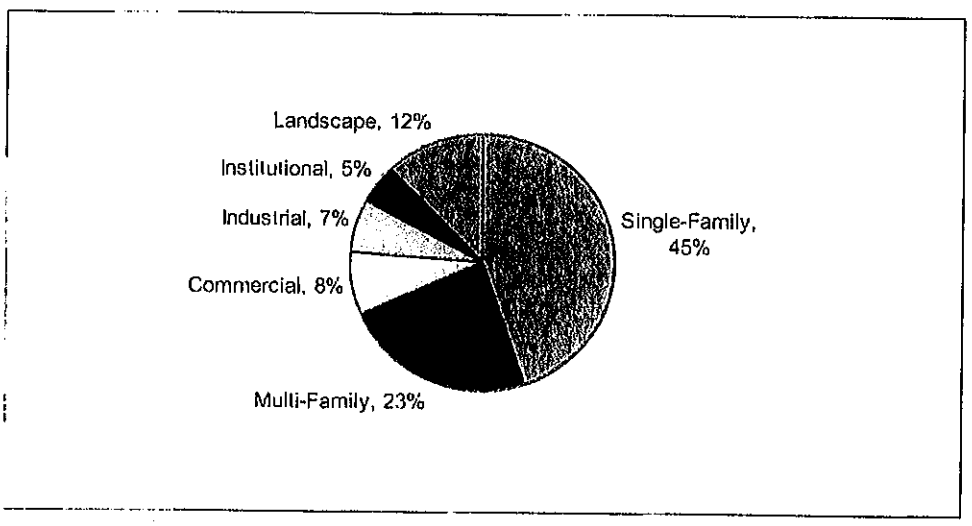
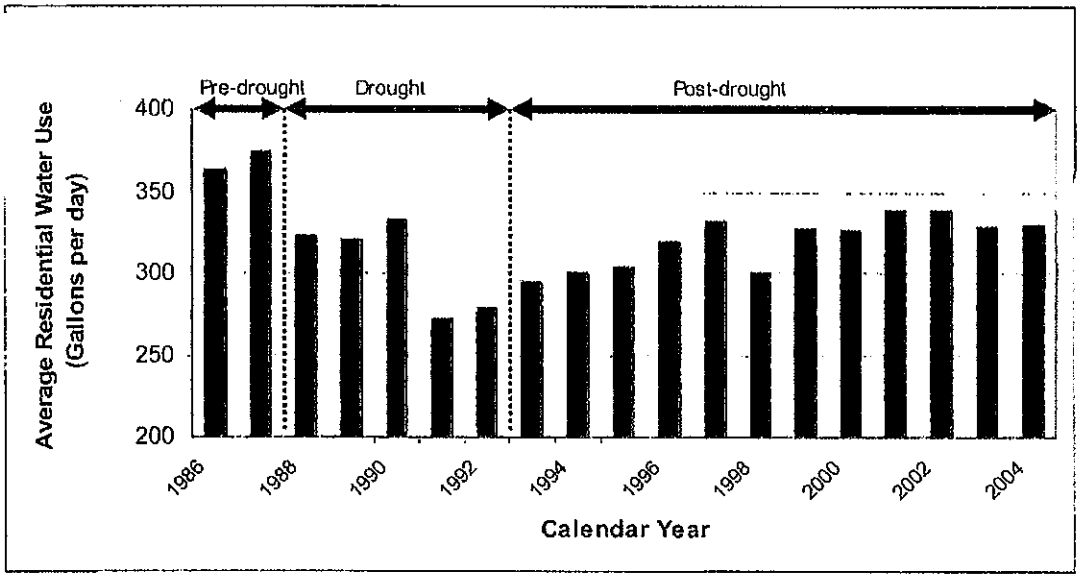


Figure 2-2
Water Use Trends - Single Family Residential



2.3 PROJECTED FUTURE WATER DEMANDS

The forecast of future water demands is an integral part of ACWD planning for water supplies and water production facilities. In 1993, ACWD completed a comprehensive investigation of projected water demands to the year 2030 (1993 Forecast). The water demand projections from this investigation served as the basis for the District's Integrated Resources Plan which was completed in 1995. In 1999, District staff refined the 1993 Forecast with updated information on land use and water use trends (1999 Forecast).

The 1999 Forecast utilized a similar methodology to develop demand projections as was developed in the 1993 Forecast. These water demand forecasts were developed by first analyzing and relating current and historical land and water use trends. From this analysis, unit water use equations were developed that relate water use to the specific land use (i.e., gallons per day per housing unit for residential land use, and gallons per day per building square footage for commercial and industrial land uses). Unit water use equations were developed for each of the District's customer classifications. The demand forecast was then developed by relating these unit water use equations to the projected buildout conditions for each of the cities in ACWD's service area - Newark, Union City and Fremont. Buildout conditions were based on each of the three cities' General Plans.

2004 Demand Forecast

The Tri-City area is rapidly approaching build-out of existing undeveloped land. State level and regional planning objectives are now influencing local government general plans through the implementation of Smart Growth policies. These policies are expected to result in reclassification of some undeveloped land from non-residential to residential uses. More significantly, Smart Growth will likely see the reclassification and redevelopment of existing developed lands to create more housing. This will result in replacing an existing water demand (typically non-residential) with a new demand (residential) as existing developed areas are replaced with new residential housing. Smart Growth projections anticipate accelerated growth in housing beyond city planning levels beginning in around the year 2015.

To address these issues as well as to develop a means of serving ACWD's engineering and financial planning needs, ACWD again updated the demand forecast analysis in 2004 (2004 Demand Forecast). A new forecast method was developed for the 2004 Demand Forecast that uses an additive approach, one that considers future demand on-top of existing demands. This approach utilized a GIS database of available and developable lands as well as direct input of city-planned development. Through the GIS, this model allows tracking of development and more frequent revision to the demand forecast as needed.

The 2004 Demand Forecast projected future water use is based on planned future land usage in the service area. This future land use is based on vacant, undeveloped lands which are zoned for development. Additional potential future land use was also included in the 2004 Demand Forecast and is based on city-approved plans for redevelopment and/or intensification of specific areas. Future water demands associated with proposed, but not city-approved, development projects on lands currently zoned for agriculture and open space, such as Patterson Ranch in Fremont, are not included in this 2004 Demand Forecast.

For all three cities, general plans, amendments and planned redevelopments were reviewed, including:

City of Union City
- 2002 General Plan Policy Document
- 2002 DEIR for the General Plan Update

Newark City
- General Plan Update 1992 (governing planning document)
- Area Two Specific Plan, 1999
- Redevelopment Plan for the Newark 2001 Redevelopment Project
- Housing Element of the General Plan 2002

City of Fremont
- General Plan, 1991
- Housing Element 2001-2006

Close coordination with city planning staff from Fremont, Newark, and Union City was maintained throughout this process including an initial and final meeting to review all potential areas for development and new water demands. Details for all large new and redevelopment plans (e.g. Area Two in Newark, Pacific States Steel in Union City, and Pacific Commons in Fremont) were provided during these meetings in order to capture the most up-to-date planning information available. Additional details on land use assumptions provided by the cities are included in ACWD's documentation of the 2004 Demand Forecast (ACWD, 2004).

The 2004 Demand Forecast also considers future demands associated with the Association of Bay Area Government Smart Growth projections (ABAG, 2003). These ABAG projections are based on appreciably higher new development than is currently included in the cities' existing plans. The ABAG projections begin to diverge from city projections between the years 2015 and 2020. The 2004 Demand Forecast assumes that 50% of the difference between city and ABAG projections will occur in housing, starting in

the year 2015. It is assumed that this new housing is only multi-family residential and thus adds a relatively small incremental water demand. It is also assumed that, given the limited availability of land, this additional housing will be more in the form of redevelopment and will thus replace a portion of existing water demands.

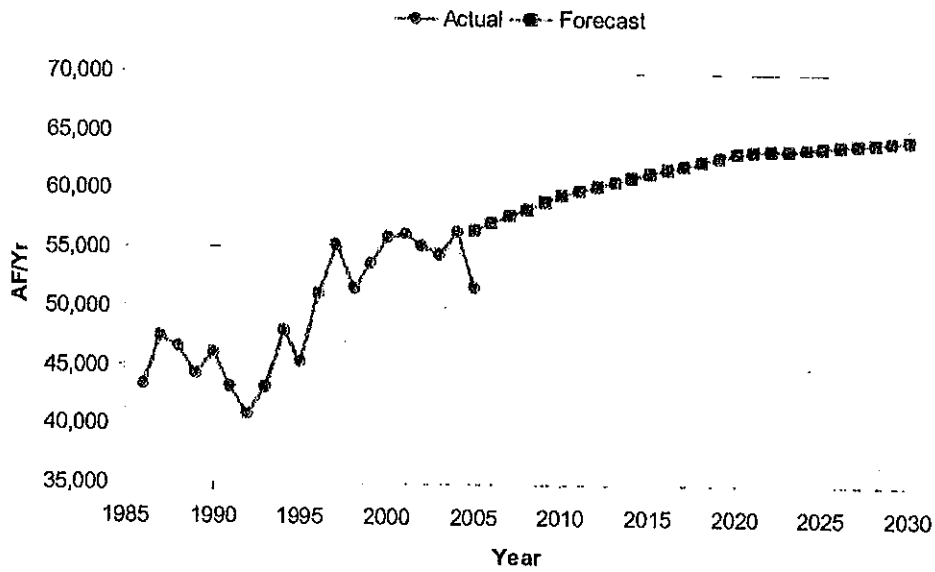
Results of the 2004 Demand Forecast form the basis for this Urban Water Management Plan Update, and are summarized in Table 2-3 (for the years 2010, 2015, 2020, 2025 and 2030) and in Figure 2-3. This forecast is provided for the single-family residential, multi-family residential, commercial, industrial, institutional and other water use categories. Landscape water use is included within the multifamily, commercial, industrial and institutional categories, and is not estimated separately. The water demand forecast also includes projected savings due to "natural" water conservation (i.e., savings due to the replacement of non-conserving plumbing fixtures with low flow fixtures). Water savings attributed to new, District-sponsored conservation programs are considered separately in Chapter 8 of this report.

Table 2-3
ACWD Estimated Future Water Demands from the 2004 Demand Forecast (AF/Yr)

Water Use Category	*Year*				
	2010	***2015***	***2020***	***2025***	***2030***
Distribution System					
Single Family Residential	27,300	28,300	28,600	28,600	28,600
Multi-Family Residential	9,800	10,100	10,500	10,900	11,200
Commercial	6,500	6,600	6,800	6,900	7,000
Industrial	7,700	8,400	8,700	9,000	9,200
Institutional	3,800	3,900	4,700	4,700	4,700
Other	300	300	300	300	300
Sub-Total	***55,400***	***57,600***	***59,600***	***60,400***	***61,000***
Adjustment for natural conservation	(700)	(1,100)	(1,500)	(1,700)	(1,900)
Total Distribution System Demand (without losses)	**54,800**	**56,500**	**58,100**	**58,600**	**59,100**
Total Distribution Sytem Demand (with losses)	**59,500**	**61,400**	**63,200**	**63,700**	**64,300**
Groundwater System Demand	**14,800**	**14,800**	**14,800**	**14,800**	**14,800**
Grand Total	**74,300**	**76,200**	**78,000**	**78,500**	**79,100**

Notes:
1. All values rounded to the nearest 100.
2. Total values may not equal sum of individual components due to rounding errors.
3. Landscape Irrigation included within Multi-Family Residential, Commercial, Industrial, and Institutional categories.
4. Adjustment for natural conservation represents estimated savings due to retrofit of pre-1994 plumbing fixtures (showerheads, toilets) with water efficient models.
5. Total Distribution System Demand (with losses) includes estimated system losses of 8%.
6. Groundwater System demands include: (1) private pumping, (2) ARP pumping and (3) saline groundwater outflows.

Figure 2-3
Historical and Projected Distribution System Demands (with System Losses)



SFPUC Wholesale Customer Water Demand Projections

In addition to the 2004 Demand Forecast prepared by ACWD, water demand projections for the ACWD service area were also developed as part of a series of technical studies performed in support of the Capital Improvement Program for the SFPUC Regional Water System: SFPUC Wholesale Customer Water Demand Projections (URS 2004); SFPUC Wholesale Customer Water Conservation Potential (URS 2004); SFPUC Wholesale Customer Recycled Water Potential (RMC 2004); and SFPUC 2030 Purchase Estimates (URS 2004).

The SFPUC's water demand projections ("SFPUC Projections") for the ACWD service area were developed independently of, and prior to, ACWD's 2004 Demand Forecast. The SFPUC Projections are based on the development and use of an "End Use" model to forecast future demands. Two main steps are involved in developing an End Use model: (1) establishing base-year water demand at the end-use level (such as toilets, showers) and calibrating the model to initial conditions; and (2) forecasting future water demand based on future demands of existing water service accounts and future growth in the number of water service accounts.

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

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

A comparison of the 2004 Demand Forecast and SFPUC Projections is provided in Table 2-4. In general, the two approaches provided similar results. For instance, the ACWD 2004 Demand Forecast is within 3% of the SFPUC's projections under 2030 conditions. The differences are attributed to the differences in methodologies and assumptions regarding the implementation of ABAG's "Smart Growth" projections. However, for the purpose of this UWMP, ACWD's 2004 Demand Forecast results are utilized for all supply/demand comparisons (see Chapter 8).

Table 2-4
Comparison of ACWD's 2004 Demand Forecast and SFPUC Forecast for ACWD service area (Distribution Demands only)

Water Demand Forecast (Distribution System Demands)	*Year*				
	2010	*2015*	*2020*	*2025*	*2030*
ACWD 2004 Demand Forecast	**59,500**	**61,400**	**63,200**	**63,700**	**64,300**
SFPUC Forecast for ACWD Service Area	61,000	62,100	63,300	64,400	66,400
Difference (%)	(2.5%)	(1.1%)	0%	(1.1%)	(3.2%)

CHAPTER 3
SOURCES OF SUPPLY

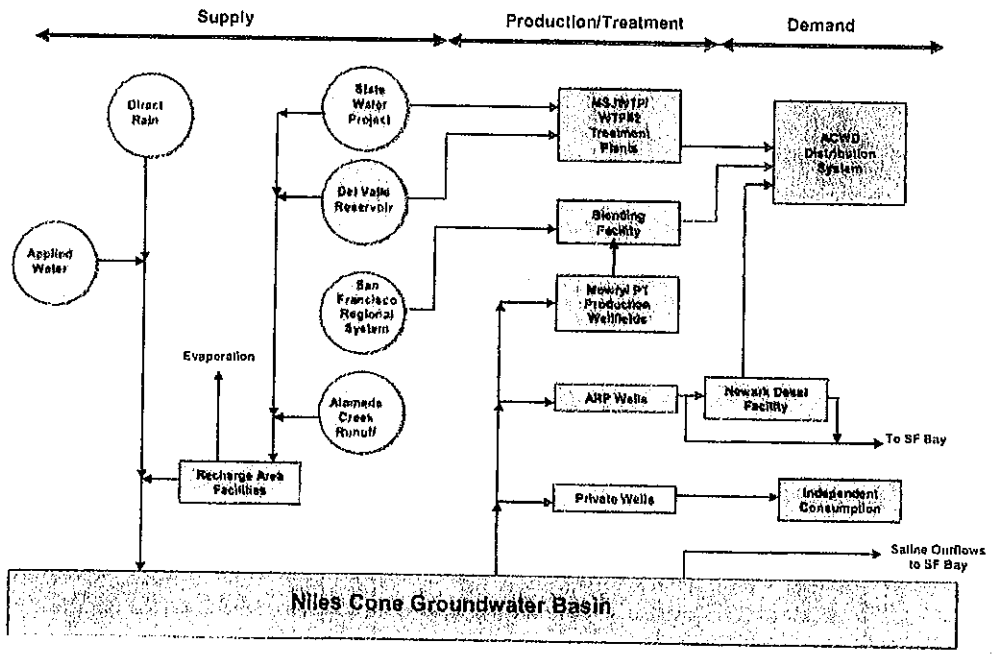
This chapter provides a summary of the District's sources of supply and their availability, as well as an overview of the management of these supplies and how water quality may impact future water supply reliability. A summary of ACWD's water supply strategy is provided in Chapter 8 – Water Supply Strategy.

3.1 SOURCES OF SUPPLY AND SUPPLY AVAILABILITY

ACWD currently has three primary sources of water supply: (1) the State Water Project (SWP), (2) San Francisco's Regional Water System and (3) local supplies. The SWP and San Francisco Regional Water Supplies are imported into the District service area through the South Bay Aqueduct and Hetch-Hetchy Aqueduct, respectively. Local supplies include fresh groundwater from the Niles Cone Groundwater Basin (underlying the District service area), desalinated brackish groundwater from portions of the groundwater basin previously impacted by seawater intrusion, and surface water from the Del Valle Reservoir. The primary source of recharge for the Niles Cone Groundwater Basin is from percolation of runoff from the Alameda Creek watershed. To a lesser degree, a portion of ACWD's SWP supplies are also used for local groundwater percolation. Infiltration of rainfall and applied water also contribute to local groundwater recharge.

Before being supplied to ACWD's customers, the source water supplies are treated to meet and surpass all state and federal drinking water standards. ACWD operates two surface water treatment plants that treat SWP and local surface water from Del Valle Reservoir. The Newark Desalination Facility treats brackish groundwater to remove salts and other impurities, and the Blending Facility blends high quality San Francisco water with local fresh groundwater (with higher hardness) to provide a blended supply with lower overall hardness. Figure 3-1 provides a schematic of the District's sources of supply and production facilities.

Figure 3-1
ACWD Water Supply and Production Schematic



Over the 1994-2004 period, 27% of the total in-District water demands (distribution system and groundwater system demands) have been met by State Water Project supplies, 19% from San Francisco Regional supplies and 54% from local supplies (Del Valle Reservoir and groundwater recharge from local runoff and infiltration of rainfall and applied water). When considering only the distribution system demands (potable water), over the same time period, about 36% of the District's distribution system water supply was from the State Water Project. This water was either purified at one of ACWD's two water treatment plants or used to recharge local aquifers. Water from the San Francisco Regional System provided approximately 25% of the distribution system water supply and local supplies from Del Valle Reservoir and groundwater (recharged from runoff from the Alameda Creek Watershed and infiltration of rainfall and applied water) accounted for the balance (about 39%) of the distribution system supplies. Figures 3-2 and 3-3 provide a summary of the District's sources of supply.

Figure 3-2
Average Sources of Supply (1994-2004)
for Combined Distribution System and Groundwater System Demands

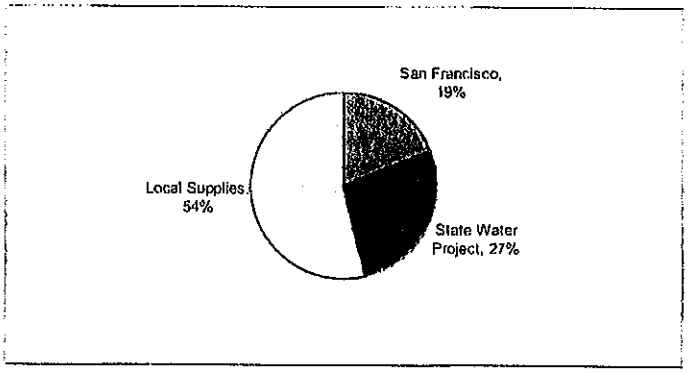
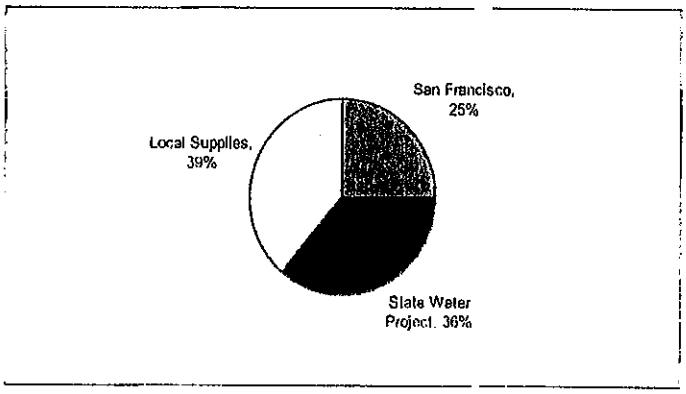


Figure 3-3
Average Sources of Supply (1994-2004)
for Distribution System Demands Only



Each of the District's water supply sources is discussed in greater detail below. Table 3-1 provides a summary of the estimated availability of each of these supplies and Table 3-2 provides a summary of the factors that may affect the existing and future reliability of these supplies. Tables 3-3 and 3-4 provide a summary of the availability of wholesale water supplies from the SWP and San Francisco Regional System.

Table 3-1
Summary of Water Supply Availability for Existing Supplies (AF/Yr)

SUPPLY COMPONENT	Estimated Water Supply Availability			
	Median Year[1] (1944 Conditions)	Long-Term Average[2]	Maximum Availability[3]	Minimum Availability[4]
Imported Supplies				
State Water Project	31,600	28,800	42,000	1,600
San Francisco Regional	15,300	15,000	15,300	11,700
Local Supplies				
Groundwater Recharge[5]	23,200	21,400	40,000	7,600
Groundwater Storage	N/A	N/A	10,000	0
Del Valle Release	3,500	7,100	20,200	0
Desalination[6]	5,100	5,100	5,600	5,100
Banking/Transfers				
Semitropic Banking	N/A	N/A	33,450	13,500
TOTAL SUPPLY	*78,700*	*77,400*	*N/A*	*N/A*

N/A Not Applicable

Notes:

1 Median Year values represent the median projected supply availability considering the sum of all of ACWD existing supplies and are based on the 1922-1994 historical hydrologic conditions (assuming 2005 operating conditions). The water supply availability under the year 1944 hydrologic conditions is utilized for the Median Year. Local Groundwater Storage and Semitropic Banking are not included in the Median Year because these supply components are used solely for dry year supplies and not under Median Year conditions.

2 Long-term Average values represent the average water supply availability based on the 1922-94 historical hydrologic conditions. Local Groundwater Storage and Semitropic Banking are not included in the Long-term Average because these supply components only provide dry year supplies and are based on a balanced "put" and "take" over the long-term.

3. Maximum Availability represents the maximum quantity of supply from each supply component. For the imported supplies, these quantities represent the maximum contractual amount that ACWD can receive from these sources. For local supplies, the maximum quantities represent the maximum amount projected to be available based on the 1922-94 historical hydrologic conditions. For Groundwater Storage, the maximum assumes that the groundwater basin is within normal operating levels in the beginning of the year. For Semitropic Banking, the maximum amount is based on maximum contractual return capacity to ACWD assuming 100% SWP allocation. The Maximum supply quantities listed above are not additive because the availability of these individual supplies may not occur under the same year/hydrologic condition.

4. Minimum Availability represents the minimum quantity of supply from each supply component. These quantities represent the minimum projected supply availability based on the 1922-94 historical hydrologic conditions. For Groundwater Storage, the minimum quantity assumes that the groundwater basin was at the minimum operating groundwater elevation in the beginning of the year and there is no usable groundwater storage available. For Semitropic Banking, the minimum quantity assumes that only Semitropic "pumpback" capacity is available to return banked water to ACWD. The Minimum Availability quantities are not additive because the availability of these individual supplies may not occur under the same year/hydrologic condition.

5. Groundwater Recharge is calculated as recharge from deep percolation of rainfall and applied water plus recharge at ACWD's groundwater percolation facilities (with local runoff from the Alameda Creek Watershed) less "Other Outflows" (as described in ACWD's annual Groundwater Survey Reports). Groundwater Recharge values in Table 3-1 do not include recharge from State Water Project or Del Valle Reservoir supplies.

6. Maximum Availability of Desalination based on Phase I Newark Desalination Facility capacity of 5 mgd operated year-round. Median Year availability based on 10% outage. Minimum Availability based on modeling analyses with 2005 supply/demand conditions and long-term hydrologic conditions (1922-1994). Minimum Availability under future demand conditions may be less due to Aquifer Reclamation Program pumping limitations if groundwater elevations are lowered during extended dry periods.

Table 3-2
Summary of Potential Future Factors that may Influence ACWD Water Supply Reliability

SUPPLY	Factor			
	Legal	*Environmental*	*Water Quality*	*Climatic*
Imported Supplies				
-State Water Project	None anticipated	ESA* requirements may constrain Delta pumping	Potential seawater intrusion impacts if Delta Levees fail	Supply is dependent on hydrologic conditions
- San Francisco Regional Supply	None anticipated	ESA requirements may require additional reservoir releases	None anticipated	Supply is dependent on hydrologic conditions
Local Supplies				
- Groundwater Recharge	Potential constraints on future groundwater management operations	ESA requirements may impact groundwater recharge operations	None anticipated	Supply is dependent on hydrologic conditions
- Groundwater Storage	Potential constraints on future groundwater management operations	None anticipated	None anticipated	Supply is dependent on availability of water to store in wet years
- Del Valle Release	None anticipated	ESA requirements may require downstream flow releases	None anticipated	Supply is dependent on hydrologic conditions
- Desalination	None anticipated	None anticipated	None anticipated	Supply is dependent on local groundwater conditions
- Recycled Water	None anticipated	None anticipated	None anticipated	None anticipated
Banking/Transfers				
- Semitropic Banking	None anticipated	None anticipated	Banked groundwater may require treatment	Supply is dependent on availability of water to store in wet years

* Endangered Species Act

Table 3-3
ACWD Supply Request and Projected Availability of SWP Supplies (AF/Yr)

Supply Request and Projected Availability	*Year*					
	2005	*2010*	*2015*	*2020*	*2025*	*2030*
ACWD Forecast Delivery Request	42,000	42,000	42,000	42,000	42,000	42,000
DWR Projected Supply Availability						
Maximum	42,000	42,000	42,000	42,000	42,000	42,000
Median Year	31,600	32,700	33,800	34,900	36,000	36,000
Single Dry Year	1,600	1,700	1,800	1,800	1,900	1,900
Multiple Dry Year						
-Year 1	11,300	11,300	11,400	11,400	11,400	11,400
-Year 2	29,200	28,900	28,500	28,200	27,800	27,800
-Year 3	10,400	10,500	10,700	10,800	10,900	10,900
-Year 4	14,400	14,800	15,200	15,600	16,000	16,000
-Year 5	13,600	13,600	13,600	13,600	13,600	13,600

Source: California Department of Water Resources, Notice to State Water Project Contractors, May 25, 2005

Table 3-4
ACWD Supply Request and Projected Availability of San Francisco Regional Supplies (AF/Yr)

Supply Request and Projected Availability	*Year*					
	2005	*2010*	*2015*	*2020*	*2025*	*2030*
ACWD Forecast Delivery Request	15,300	15,300	15,300	15,300	15,300	15,300
SFPUC Projected Supply Availability						
Maximum	15,300	15,300	15,300	15,300	15,300	15,300
Median Year	15,300	15,300	15,300	15,300	15,300	15,300
Single Dry Year	11,700	11,700	13,700	14,100	12,700	13,100
Multiple Dry Year						
-Year 1	15,300	15,300	15,300	15,300	15,300	15,300
-Year 2	15,300	15,300	15,300	15,300	15,300	15,300
-Year 3	13,500	13,500	13,700	14,100	14,600	13,100
-Year 4	15,300	15,300	15,300	15,300	15,300	15,300
-Year 5	15,300	15,300	15,300	15,300	15,300	15,300

Source: San Francisco Public Utilities Commission, Transmittal Letter to ACWD, June 1, 2005

State Water Project

In 1961, the District signed a contract with the State Department of Water Resources (DWR) for a maximum annual amount of 42,000 acre-feet from the State Water Project (SWP). The SWP, managed by the DWR, is the largest state-built, multi-purpose water project in the country. The SWP facilities include 28 dams and reservoirs, 26 pumping and generating plants, and approximately 660 miles of aqueducts. The water stored in the SWP storage facilities originates from rainfall and snowmelt runoff in Northern and Central California watersheds. The SWP's primary storage facility is Lake Oroville in the Feather River Watershed. Releases from Lake Oroville flow down the Feather River to the Sacramento River, which subsequently flows to the Sacramento-San Joaquin Delta. The SWP diverts water from the Delta through the Banks Pumping Plant which lifts water from the Clifton Court Forebay (in the Delta) to the California Aqueduct and Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct, which delivers State Water Project supplies to ACWD and other Bay Area water agencies in Alameda and Santa Clara Counties.

State Water Project Availability

DWR planning studies provide data for the projected supply availability for the District's State Water Project supply. The DWR has developed a State Water Project Delivery Reliability Report which provides an analysis of the projected availability of SWP supplies. The DWR is responsible for updating this report every two years. At the time of the preparation of this Urban Water Management Plan, the DWR was in the process of developing the 2005 Delivery Reliability Report, and therefore a final version of the 2005 report was not available for use in the preparation of this UWMP. However, in a May 25, 2005 Notice to State Water Project Contractors, the DWR provided relevant sections from the working draft of the 2005 Reliability Report for use in the preparation of the UWMP, including the most recent modeling analyses of SWP availability under current and future demand conditions. For purposes of the preparation of the ACWD's UWMP, DWR scenarios 6 and 7 have been utilized by ACWD. Both of these scenarios assume the 2004 Long Term Central Valley Project Operations and Criteria Plan (OCAP) is in place. Scenario 6 is projected deliveries under 2005 conditions and Scenario 7 is based on 2025 conditions. As provided by the DWR, supply availability for the intervening years is interpolated from the 2005 and 2025 conditions. A summary of the projected supply availability is provided in Table 3-3.

In order to assist the DWR in its water supply planning, on an annual basis ACWD submits its forecasted use (through the year 2035) of its SWP supplies to the DWR. For planning purposes, ACWD requests the full delivery of its maximum contractual amount of 42,000 acre-feet. Currently, SWP water that is not directly used by ACWD within the service area (to meet distribution and/or groundwater system demands) is stored within the local groundwater basin or at the Semitropic Groundwater Bank for later dry year use (see discussion below).

Semitropic Banking of ACWD's SWP Supplies

Because of the variability in the SWP supply availability, ACWD's 1995 IRP identified the need to secure storage to improve the dry year reliability of the District's SWP supplies. Based on this IRP recommendation, ACWD has contracted with Semitropic Water Storage District for participation in the Semitropic Groundwater Banking Program. ACWD has secured 150,000 AF of groundwater storage capacity at Semitropic under this program. In wet years, ACWD delivers its unused (excess) SWP supplies to Semitropic for storage in their groundwater basin. In dry years, ACWD can recover these supplies through: (1) an "in-lieu" exchange whereby ACWD will receive a portion of Semitropic's SWP supplies (and Semitropic will utilize groundwater previously stored by ACWD in its basin); and (2) a "pumpback" program where Semitropic directly pumps stored groundwater into the California Aqueduct. As with local groundwater storage in the Niles Cone Groundwater Basin, the Semitropic Groundwater Banking Program does not provide a new source of supply for the District. Rather, it provides a means to store the District's unused SWP supplies in wet years for use during dry years when the delivery of SWP supplies may be significantly curtailed.

San Francisco's Regional Water System

ACWD also receives water from the San Francisco Regional Water System, operated by the San Francisco Public Utilities Commission (SFPUC). This supply is predominantly from the Sierra Nevada, delivered through the Hetch-Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

In 1984, ACWD along with 29 other Bay Area water suppliers signed a Settlement Agreement and Master Water Sales Contract (Master Contract) with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in June 2009, provide for a 184 mgd Supply Assurance to the SFPUC's wholesale customers collectively. ACWD's individual Supply Assurance is 12 mgd (or approximately 13,400 acre feet per year). In 1994, the District and SFPUC executed an amendment to the contract which provides an additional supply of 1.76 mgd (approximately 2,000 AF), effectively increasing the maximum annual delivery of San Francisco Regional Water System supplies to ACWD to 13.76 mgd (approximately 15,300 AF/Yr). Although the Master Contract and accompanying Water Supply Contract expire in 2009, the Supply Assurance (which quantified San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

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

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

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

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

San Francisco Regional Water System Supply Availability

Table 3-4 provides a summary of the projected supply availability of San Francisco Regional Water System supplies under median (normal), and dry year conditions. These projections are based on the delivery requests of the SFPUC's wholesale customers, including ACWD's supply requests of its full contractual amounts from the SFPUC through the year 2030. Water supply reliability information provided by the SFPUC indicates that the SFPUC can meet the demands of its retail and wholesale customers, including ACWD, in years of average and above average precipitation. However, the Master Contract allows the SFPUC to reduce water deliveries during droughts, emergencies and for scheduled maintenance activities. The SFPUC and all wholesale customers adopted an Interim Water Shortage Allocation Plan in 2000 to address the allocation of water between San

Francisco and wholesale customers in aggregate and among individual wholesale customers during water shortages of up to 20% of system-wide use. This plan also expires in June 2009. Under the Master Contract, reductions to wholesale customers are to be based on each agency's proportional purchases of water from the SFPUC during the year immediately preceding the onset of shortage, unless this formula is supplanted by a water conservation plan agreed to by all parties. The Master Contract's default formula discouraged SFPUC's wholesale customers from reducing purchases from SFPUC during periods of normal water supply through demand management programs or development of alternative supplies. To overcome this problem, SFPUC and its wholesale customers adopted an Interim Water Shortage Allocation Plan (IWSAP) in calendar 2000. This IWSAP applies to water shortages up to 20% on a system-wide basis and will remain in effect through June 2009.

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

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

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

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

The IWSAP will expire in June 2009 unless extended by San Francisco and the wholesale customers. The projected amount of water which ACWD expects to receive from SFPUC (as shown in Table 3-4) has been calculated by SFPUC on the assumption that the Plan will in fact be extended.

Local Sources

As described above, ACWD's local sources include fresh groundwater from the Niles Cone Groundwater Basin, brackish groundwater desalination, and surface water supplies from the Del Valle Reservoir. Each of these supplies is described in greater detail below.

Niles Cone Groundwater Basin: The principal source of local supply for the District is the local aquifer system known as the Niles Cone Groundwater Basin. The primary source of recharge for the Niles Cone Groundwater Basin is local runoff from the Alameda Creek Watershed, which is captured, diverted and recharged at the District's groundwater recharge facilities. Alameda Creek annual runoff at the USGS Alameda Creek near Niles stream gage (located near ACWD's recharge facilities) has varied from a recorded minimum of 650 AF/Yr in 1960-1961, to a recorded maximum in 1982-1983 of 360,000 AF/Yr. Typically, ACWD diverts only a small portion of the local runoff flowing in Alameda Creek. The majority of local runoff flows downstream through the

Alameda Creek Flood Control Channel to San Francisco Bay. To a lesser extent, infiltration of rainfall and applied water also provide a local source of recharge for the groundwater basin. ACWD also uses a portion of its imported State Water Project supplies for groundwater recharge.

The water quality in the groundwater system is characterized by fresh groundwater in the eastern portion of the groundwater basin transitioning into brackish groundwater in the western portion of the basin. The brackish groundwater is a result of historical seawater intrusion from the adjacent San Francisco Bay. Since the 1960's ACWD has managed the groundwater basin to prevent any additional seawater intrusion and has pumped the trapped brackish groundwater back to San Francisco Bay through the District's Aquifer Reclamation Program wells.

The Niles Cone Groundwater Basin has capacity to store water from year to year ("local groundwater storage"). However, the usable storage capacity of the groundwater basin is significantly limited by the potential for seawater intrusion if groundwater levels are maintained too low. Although local groundwater storage (i.e. groundwater supplies in excess of recharge) provides a short term source of supply during dry years, it is not a supply that is available every year because the groundwater system will require replenishment from freshwater sources, without which seawater intrusion would occur.

Brackish Groundwater Desalination: In 2003 ACWD commissioned the Newark Desalination Facility. This 5-mgd facility utilizes the reverse osmosis process to remove salts and other impurities from the brackish groundwater pumped at ACWD's Aquifer Reclamation Program wells. Treated water from the Newark Desalination Facility is blended with untreated local groundwater and provided as a supply for the distribution system demands. Chapter 6 provides additional information on ACWD's existing and planned desalination facilities.

Del Valle Reservoir: The District and Zone 7 Water Agency of the Alameda County Flood Control and Water Conservation District (hereafter referred to as "Zone 7"), have equal rights on Arroyo Del Valle to divert water to storage. When the California Department of Water Resources (DWR) constructed Del Valle Dam in the upper Alameda Creek Watershed, those rights were recognized in an agreement between DWR, the District, and Zone 7. Consequently, DWR typically makes a total of 15,000 AF of storage available annually in Del Valle Reservoir for use by ACWD and Zone 7. ACWD and Zone 7 equally share this storage capacity, thereby providing up to 7,500 AF of storage capacity annually to ACWD.

Local Water Supply Availability

A summary of the estimated water supply availability from ACWD's local supplies is provided in Tables 3-1 and 3-2. As indicated in these tables, the amount of local water supplies available to ACWD from Del Valle Reservoir and fresh groundwater sources varies widely from year to year, depending primarily on hydrologic conditions and availability of local runoff. In general, desalination of brackish groundwater provides a more reliable water source than other local supplies. However, there may be limitations to this source if groundwater levels are lowered to the extent that a reduction in Aquifer Reclamation Program pumping is required to prevent new seawater intrusion. Other potential factors that may affect local supply availability include: (1) competition for local water supplies with environmental needs, such as the on-going efforts to restore a steelhead fishery to the Alameda Creek Watershed and (2) concerns regarding groundwater levels and land development in the western service area. ACWD is currently working to address both of these issues. However, it is not clear whether or not these issues will ultimately impact ACWD's local supplies. Any future changes to ACWD's local water supplies due to these or other currently unforeseen factors will be reflected in future updates to this Urban Water Management Plan.

3.2 MANAGEMENT AND DISTRIBUTION OF WATER SUPPLIES

With local water and two sources of imported water, the District has the flexibility to change the timing and use of supplies to best meet its water management objectives, which include:

- Maximizing total usable supply
- Maximizing water quality/providing uniform water quality
- Protecting groundwater resources from degradation due to previously intruded seawater
- Protecting groundwater resources from further seawater intrusion

District customers receive water from one or more production sources: the San Francisco Regional Water System, the District's Mission San Jose Water Treatment Plant (MSWTP), the District's Water Treatment Plant Number 2 (WTP 2), the District's Blending Facility which blends local groundwater (from the Mowry and Peralta-Tyson Wellfields) with San Francisco Regional supplies, and the Newark Desalination Facility.

Flow from the SBA and releases from Del Valle Reservoir may be diverted into either of the two treatment plants, diverted into Alameda Creek, or both. Depending on the water quality and flow in Alameda Creek, water can also be diverted into percolation ponds for groundwater recharge. San Francisco Regional Water System supplies are either routed to the Blending Facility for blending with local groundwater supplies or, under certain conditions, directly supplied to users.

Groundwater Management and Protection

Groundwater is an important component of the District's supply, as demonstrated in Tables 3-1 and 3-2. ACWD has had a Groundwater Management Policy in place since 1989. This management policy outlines the District's protection and management activities for the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies current and future water needs in the ACWD service area. Chapter 4 in this UWMP describes the District's groundwater management and protection policy in more detail.

Groundwater Recharge

During wet periods, local runoff from the Alameda Creek Watershed is diverted into the groundwater percolation ponds. When local runoff is not available, water may be released from either Del Valle Reservoir or from the SBA for groundwater recharge. Currently, the District operates three inflatable dams to capture and divert Alameda Creek flow into the percolation ponds. Diversions typically take place when Alameda Creek flow at the diversion point is less than about 700 cubic feet per second (cfs). The dams are deflated for protection from debris when creek flow is above 700 cfs and no off-stream diversions occur during these high flow conditions.

The District is currently pursuing fish passage improvement projects that will eliminate the need for some of these groundwater recharge structures; however, these projects are not anticipated to adversely affect the District's groundwater recharge capability.

Del Valle Supplies

Typically, all stored Del Valle water is used by the fall to maximize the capture of local runoff during the winter and spring seasons. In decreasing order of priority, Del Valle water is delivered to ACWD:

- Via the SBA to the District's treatment facilities (MSJWTP and WTP2).
- Via the SBA and released into Alameda Creek at Vallecitos Takeoff for groundwater recharge.
- Into Arroyo Del Valle Creek, where it flows to Arroyo de la Laguna and eventually into Alameda Creek for groundwater recharge.

State Water Project Water

Water from the SWP (delivered via the SBA) can either be taken at Vallecitos Takeoff and discharged to Alameda Creek for groundwater basin recharge or taken at the Alameda-Bayside Takeoffs for delivery to the treatment plants. By October 1 of every year, the District must submit its anticipated requests for monthly water deliveries for the upcoming year. The State confirms the District's request or provides the District with the anticipated percentage allocation by December 1. The estimated percentage delivery is then adjusted during the spring based on estimated runoff.

Blending of San Francisco Regional System Water with Groundwater

San Francisco Regional Water System supplies can be taken at any of nine takeoffs throughout the District's distribution system. This water supply is significantly lower in hardness than ACWD's local groundwater supplies. The District blends the San Francisco Regional water with higher hardness groundwater at ACWD's Blending Facility with the objective of providing a uniform water quality with hardness levels similar to those of other sources of supply. Since the Blending Facility has come on-line, most of the San Francisco Regional System water has been taken at the Fremont connection for direct delivery to the Blending Facility. The New United Motors Manufacturing, Inc. (NUMMI) plant and a few industrial, business and residential customers receive San Francisco Regional water directly.

3.3 SOURCE WATER QUALITY

As required by law, Drinking Water Source Assessments are conducted to determine the vulnerability of ACWD's drinking water sources to contamination. As described below, assessments have been completed for all of ACWD's water sources:

- The San Francisco Public Utilities Commission, which administers the San Francisco Regional Water System, completed its assessment in 2000. It was found that the SFPUC's watersheds are vulnerable to contaminants associated with wildlife and, to a limited extent, human recreational activity. Historically, the levels of contamination have been very low in the watersheds.

- The South Bay Aqueduct Source Assessment was completed in 2002 to evaluate potential vulnerabilities to ACWD's State Water Project supplies. This source is most vulnerable to agricultural drainage, wastewater treatment plant discharges, urban runoff, recreational usage of the water, and cattle grazing. In addition, seawater intrusion in the Delta contributes salt and bromide to the water supply.

- ACWD's assessment of local groundwater sources was also completed in 2002. This assessment concluded that local groundwater is most vulnerable to gas stations, known contaminant plumes, confirmed leaking underground storage tanks, dry cleaners, metal plate/finishing/fabricating, and sewer collection. The potential for saltwater intrusion into the aquifer system is also of concern to ACWD.

Although ACWD raw water sources are vulnerable to potentially contaminating activities, ACWD treatment and blending facilities ensure that all potable water delivered by ACWD meets the strict standards set by state and federal regulatory agencies. In addition, ACWD's groundwater management program (see Chapter 4) has been developed to protect the local groundwater supplies from contamination. As such, under most future scenarios, it is not anticipated that future changes to source water quality will adversely impact the long-term availability or reliability of these supplies. However, catastrophic events (i.e. levee failures in the Delta resulting in seawater intrusion impacts on Delta supplies) or other unforeseen circumstances may impact ACWD supplies and their reliability, resulting in water supply shortages. Chapter 9 (Water Shortage Contingency Plan) addresses potential future shortages.

CHAPTER 4
GROUNDWATER

This chapter describes the Niles Cone Groundwater Basin, the District's reliance on it as a source of water supply and the District's policy and activities for managing it.

4.1 BACKGROUND

As described in Chapter 3 (Sources of Supply), the Niles Cone Groundwater Basin provides a significant source of water supply for the ACWD service area. ACWD manages the basin both in conjunctive use mode (most recharge of surface water occurs in the wet season, with most groundwater extraction occurring during the dry season) as well as in a groundwater banking mode (excess water is stored in the basin during wet years for recovery during dry years when local and imported supplies may be significantly cut back). Because of its importance as a local supply, the protection of this valuable local resource has long been a high priority for ACWD.

Niles Cone Groundwater Basin Hydrogeology

The Niles Cone Groundwater Basin, as delineated by the Department of Water Resources (DWR), exists almost exclusively within the District's boundaries. The groundwater basin is an alluvial aquifer system consisting of unconsolidated gravel, and, silt, and clay. The groundwater basin is divided by the Hayward Fault which is an active fault with low permeability that impedes the lateral flow of groundwater. Large differences in water levels on either side of the fault demonstrate the relatively impermeable nature of the fault. ACWD manages both the Above Hayward Fault (AHF) and the Below Hayward Fault (BHF) sub-basins. The AHF sub-basin on the east side of the Hayward Fault is composed of highly permeable sediments referred to as the AHF Aquifer. The BHF sub-basin is composed of a series of relatively flat lying aquifers separated by extensive clay aquitards. The location of the Hayward Fault is shown in Figure 4-1. Figure 4-2 provides a cross-section based on a DWR conceptual figure (DWR, 1968).

Figure 4-1
ACWD Groundwater Management Facilities

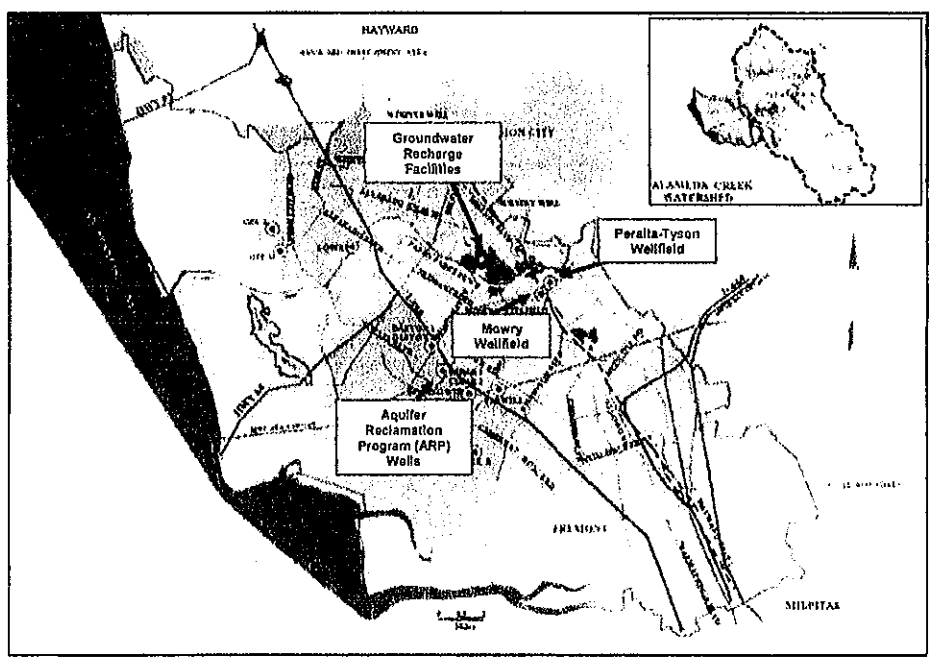
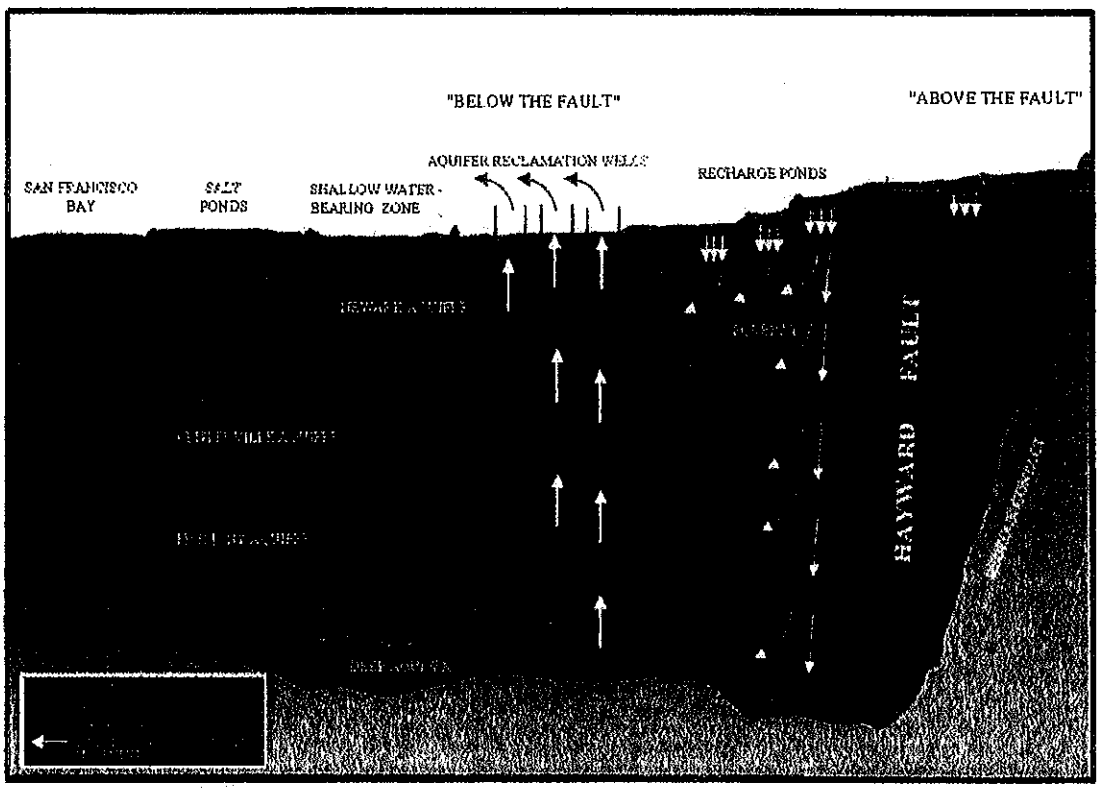


Figure 4-2
Niles Cone Groundwater Basin Schematic



The shallowest regional aquifer in the BHF sub-basin, the Newark Aquifer, is an extensive permeable gravel and sand layer between 40 and 140 feet below ground surface (bgs), except in the forebay (inland) area where it begins at the surface. The thickness of the Newark Aquifer ranges from less than 20 feet at the western edge of the basin to more than 140 feet at the Hayward Fault (DWR, 1968). The Newark Aquifer is overlain in most of the sub-basin by a thick layer of silt and clay called the Newark Aquiclude (DWR, 1968). The Newark Aquiclude is absent in the forebay area, allowing direct recharge to the Newark Aquifer from Alameda Creek and the recharge ponds. Within the Newark Aquiclude, discontinuous layers of sand and silt comprise a non-regional hydrogeologic unit known commonly as the shallow water-bearing zone.

An extensive thick clay aquitard separates the Newark Aquifer from the Centerville Aquifer. The Centerville Aquifer, the top of which lies at an average depth of 180 to 200 feet bgs, overlies a thick clay aquitard, which in turn overlies the Fremont Aquifer which exists in the interval of 300 to 390 feet bgs. The Centerville and Fremont Aquifers are considered as one combined aquifer (Centerville-Fremont Aquifer) in some parts of the basin based on lithology and water level data that indicate that they are in good hydrogeologic connection. However, water level and water chemistry results from recently installed wells indicate that, in some areas of the basin, these two aquifers are isolated from each other.

The deepest water-bearing units, referred to collectively as the Deep Aquifers, are present at approximately 400 and 500 feet bgs (and possibly deeper) and are separated from the overlying Fremont Aquifer by a competent regional aquitard. Also, based on ACWD's lithologic data and DWR (1967), these deep aquifers are both hydraulically separated and connected by the presence or absence of intervening clays dependent on the location in the basin, and extend beyond the limits of the Niles Cone Groundwater Basin to act as conductive layers for the migration of groundwater out of the basin.

Groundwater Quality

Groundwater quality in the AHF Aquifer is acceptable for potable use; however, groundwater quality in certain areas of the BHF aquifers has been degraded by salt water intrusion. The salt water intrusion was first noticed in the 1920's and occurred due to historical pumping from the basin that was in excess of recharge (i.e. overdraft). Many years of this chronic overdraft caused the groundwater levels in the Newark Aquifer to drop below sea level. This relative elevation difference between the groundwater in the basin and the saline water from San Francisco Bay caused a landward direction of groundwater flow through the Newark Aquifer and intrusion of salt water into the groundwater basin. Several decades of salt water intrusion occurred and saline water migrated as far as the forebay area. The piezometric heads in the deeper aquifers are generally lower than that of the Newark Aquifer, and the aquitards separating the aquifers are thin to absent in the Forebay area. As a result, saline water in the forebay area migrated downward from the Newark Aquifer and into the lower aquifers. Also, saline water may have migrated downward from the Newark Aquifer to the deeper aquifers through abandoned and improperly sealed water wells.

Since 1962, ACWD has purchased State Water Project water supplies to supplement local recharge and raise groundwater levels. This has resulted in bringing the water table above sea level and returning the hydraulic gradient to its natural bayward direction in the Newark Aquifer. Although there has been substantial improvement in the basin, a considerable volume of saline water still remains in the aquifers. As described below, ACWD has also implemented an Aquifer Reclamation Program (ARP) to pump out brackish groundwater from the impacted areas of the aquifer system. Historically, this brackish water has been discharged back to San Francisco Bay through local flood control channels. However, a portion of it is now treated at the Newark Desalination Facility for potable use.

In order to protect the Basin from further seawater intrusion the District's operational goals are to maintain groundwater levels above sea-level in the Newark Aquifer system. During critically dry periods the District may temporarily reduce groundwater levels slightly below sea-level (no lower than -5 feet mean sea-level), in the Newark Aquifer in the Forebay area. Groundwater modeling analysis has indicated that temporarily drawing the aquifer down in this inland area can provide additional supply in critically dry years without impacting the integrity of the Basin.

Groundwater Facilities

ACWD's groundwater management activities include groundwater recharge as well as production. As shown on Figure 4-1, ACWD groundwater facilities include production wellfields and groundwater recharge facilities. Currently, 16 wells are available for production in the Forebay area. Eight of the wells are located in the Peralta-Tyson Wellfield in the AHF sub-basin. The remaining eight wells are located in the Mowry Wellfield in the BHF sub-basin.

The Niles Cone Groundwater Basin is recharged through (1) deep percolation of rainfall and applied water, and (2) percolation of water in Alameda Creek received at ACWD's groundwater recharge facilities. Most of the water for this artificial recharge program is from Alameda Creek Watershed runoff and the remainder is imported supplies released to tributaries of Alameda Creek. Water percolates into the groundwater basin through the stream channel bed and through the District's off-stream recharge ponds. The District utilizes inflatable rubber dams in the channel to divert water from the creek into the ponds.

As described below, ACWD's Aquifer Reclamation Program, which is designed to remove and control the movement of intruded saline water, has been in operation since 1974. The program facilities consist of nine wells. These wells also provide the source water for the Newark Desalination Facility. This facility removes salts and other impurities from the brackish groundwater and provides the treated water as a source for the District's distribution system.

Aquifer Reclamation

High volume pumping in the 1920's through the early 1960's without adequate recharge for replenishment of the basin led to lower water levels in the Newark Aquifer and salt water intrusion. The District, concerned with this salt water intrusion, began importing water from the SWP to artificially recharge the groundwater basin. The District's aggressive artificial recharge program and its use of imported water in lieu of groundwater have caused water levels to slowly rise above sea-level. Thus, further seawater intrusion has been prevented and saline water in the Newark Aquifer is now flushed towards San Francisco Bay. However, because the Centerville-Fremont and Deep Aquifers are not in direct hydraulic connection with San Francisco Bay, saline water in those deep aquifers cannot be easily flushed back by simply raising groundwater levels. Consequently, there are trapped pockets of saline water in these deeper aquifers.

In 1974, the District initiated its Aquifer Reclamation Program (ARP) to restore water quality in the groundwater basin by removing the saline water trapped in the aquifer system. Nine wells are utilized for reclamation pumping: three in the Newark Aquifer, five in the Centerville-Fremont Aquifer, and one in the Deep Aquifer. This brackish groundwater is the source water for ACWD's Newark Desalination Facility, with any excess pumped brackish groundwater discharged to San Francisco Bay through flood control channels. The quality of groundwater in the basin is improved as recharge water replaces the pumped brackish groundwater. ARP pumping also prevents the plume of brackish water in the Centerville-Fremont and Deep Aquifers from further migrating toward ACWD's Mowry Wellfield.

Groundwater Elevations

ACWD actively manages the Niles Cone Groundwater Basin to prevent groundwater overdraft conditions that could lead to future seawater intrusion and groundwater overdraft. In order to monitor the groundwater basin conditions, since 1961 ACWD has conducted the Spring/Fall Groundwater Monitoring Program to visit wells, obtain water level measurements and collect water samples. The data collected is summarized in an annual groundwater monitoring report prepared by ACWD.

The groundwater elevations throughout the basin fluctuate seasonally due to seasonal changes in groundwater pumping and recharge. In general, the groundwater elevations are the highest in the late winter and early spring (in response to high recharge and lower groundwater pumping) and are the lowest in the fall months (in response to peak groundwater pumping during the warmer summer and fall months). However, throughout the year groundwater elevations in the Newark Aquifer are maintained above sea-level with a positive groundwater gradient from the inland area (at the recharge ponds) towards San Francisco Bay. The groundwater elevations in the Centerville/Fremont and Deep Aquifers are generally lower than that of the Newark Aquifer, thereby allowing percolation from the Newark Aquifer to these deeper aquifers. Because ACWD operates the groundwater basin in a balanced "put and take" mode, groundwater elevations over the past thirty years have remained fairly consistent (within a typical operating range), and there have been no long-term trends that suggest the basin is in overdraft condition.

4.2 GROUNDWATER MANAGEMENT AND PROTECTION POLICY

In 1989 ACWD adopted a Groundwater Management Policy to protect and manage the Niles Cone Groundwater Basin. This Groundwater Management Policy was last updated in 2001, and effectively serves as ACWD's groundwater management plan for the Niles Cone Groundwater Basin. This Groundwater Management Policy is based on the statutory authority granted to ACWD under the County Water District Law (commencing with Section 30000 of the Water Code); the Replenishment Assessment Act of the Alameda County Water District (Chapter 1942 of the Statutes of 1961, as amended in 1970 and 1973), which grants additional powers to ACWD to prevent pollution, contamination, or diminution in quality of the groundwater supply; local well ordinances (Fremont No. 950, as amended; Newark No. 136; and Union City No. 109-73); agreements with other agencies; and local hazardous materials ordinances.

A copy of ACWD's Groundwater Management Policy is provided in Appendix A.

Groundwater Management Policy Statement

ACWD's groundwater management policy statement is as follows:

> *"It is the policy of the Alameda County Water District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area. ACWD will develop and implement appropriate programs within the ACWD service area to protect and manage the groundwater basin as a long-term source of water supply for ACWD. ACWD will also actively protect the groundwater basin from activities outside the ACWD service area that may negatively impact the water quality and/or water supply of the basin.*
>
> *This Policy is intended to serve as a guide to ACWD management in the continued development and implementation of programs to manage and protect ACWD water resources and as a nontechnical document to explain ACWD groundwater programs to members of the public. This Policy is not intended to create legal rights in any person or organization, or to impose legal obligations on ACWD. It may be amended or repealed by the Board of Directors at any time."*

Policy Objectives

The purpose of the Groundwater Management Policy is to protect and improve ACWD's groundwater resources for the benefit of both ACWD's customers and private well owners by taking actions designed to meet the following objectives:

- Increase groundwater replenishment capability.
- Increase the usable storage capacity of the groundwater basin.
- Operate the basin to provide:
  - A reliable water supply to meet baseload and peak distribution system demands,
  - An emergency source of supply, and
  - Reserve storage to augment dry year supplies.
- Protect groundwater quality from degradation from any and all sources including: saline water intrusion, wastewater discharges, recycled water use, urban and agricultural runoff, or chemical contamination.
- Improve groundwater quality by:
  - Removing salts and other contaminants from affected areas of the basin, and
  - Improving the water quality of source water used for groundwater recharge.

4.3 GROUNDWATER MANAGEMENT PROGRAMS

The following eight major groundwater management programs have been developed and implemented by ACWD to achieve ACWD's Groundwater Management Policy objectives:

- Water Supply Management
- Groundwater Replenishment
- Watershed Protection and Monitoring
- Basin Monitoring
- Wellhead Protection Program
- Aquifer Reclamation Program
- Groundwater Protection Program
- Well Ordinance Administration

A brief summary of each of these programs is provided in Table 4-1. A detailed description of each program is included in the Groundwater Management Policy which is attached in Appendix A.

4.4 GROUNDWATER RECHARGE AND PRODUCTION

The primary components of the groundwater budget for the Niles Cone Groundwater Basin are: (1) pumping; (2) recharge; and (3) saline groundwater outflows. Groundwater pumping includes pumping at ACWD's Peralta-Tyson and Mowry Wellfields), private (non-District) pumping; and pumping from the District's Aquifer Reclamation Program (ARP) wells. Groundwater recharge occurs primarily through percolation at ACWD's recharge facilities and natural percolation of rainfall and applied water. Saline groundwater outflows represent the groundwater outflows from the Newark Aquifer to San Francisco. As is typical in coastal groundwater basins, groundwater outflows are required to prevent seawater intrusion from occurring.

As required by the District's Replenishment Assessment Act, the District meters all active wells in the District, and prepares an annual Groundwater Survey Report which summarizes the total well production, estimated recharge, and changes in groundwater storage. A summary of groundwater pumping, recharge and change in storage is provided in Table 4-2. As indicated in the table, annual groundwater supply from ACWD's production wells has ranged from 17,800 AF/Yr to 20,900 AF/Yr over the past eight years. Over the same period aquifer reclamation pumping has ranged from 4,300 to 11,100 AF/Yr and private groundwater pumping has ranged from 3,100 to 5,000 AF/Yr. Annual groundwater recharge has ranged from 34,000 AF to 52,500 AF/Yr.

Future Use of Groundwater

As described in ACWD's Integrated Resources Planning Study, ACWD will continue to rely on the Niles Cone Groundwater Basin as a source of supply for the service area. ACWD's plans are to continue to manage the groundwater basin in a balanced "put and take" mode whereby groundwater pumping and saline outflows are balanced with groundwater recharge. Year to year variations in recharge, pumping and saline outflows will occur due to variations in local hydrologic condition and other factors. Therefore, in some years recharge may exceed the sum of pumping and saline outflows resulting in a temporary imbalance. Similarly, in some years pumping and saline outflows may exceed groundwater recharge, also resulting in a temporary imbalance. However, over the long-term, the operation of the basin will be balanced to ensure that the basin is protected from seawater intrusion and that reclamation of the basin from previous seawater intrusion continues. It is anticipated that ACWD's future groundwater pumping will continue to occur at the Mowry Wellfield, Peralta-Tyson Wellfield, and the Aquifer Reclamation Program wells. ACWD's projected future use of groundwater under normal and dry year conditions is summarized in Chapter 8 – Water Supply Strategy.

Table 4-1
Summary of ACWD Groundwater Management Programs

Groundwater Program	*Description*
Water Supply Management	Planning, managing, and optimizing ACWD's sources of supply: watershed runoff, SWP water for recharge, SWP water for treatment, SFPUC water for blending, and water banking.
Groundwater Replenishment	Operation of ACWD groundwater recharge facilities to optimize 1) capture of local runoff, 2) replacement of water extracted from production and ARP wells, and 3) maintenance of groundwater levels to prevent salt water intrusion.
Watershed Protection and Monitoring	Assisting in the protection and monitoring of the watershed to optimize the quality of runoff water available for ACWD water supply.
Basin Monitoring	Sampling and measuring wells to assess and evaluate 1) groundwater quality, 2) water pressures within the basin, and 3) the direction of groundwater flow.
Wellhead Protection Program	Identify sensitive recharge and groundwater areas, maintain an inventory of potential threats within these areas, assess the vulnerability of source water, and develop management strategies to minimize the potential for groundwater quality impacts.
Aquifer Reclamation Program	Pump brackish water from degraded aquifers in order to 1) increase useable basin storage, 2) improve overall water quality, 3) prevent movement of brackish water toward ACWD production wells, and 4) provide (future) supply augmentation through treatment to potable water standards.
Groundwater Protection Program	Maintain an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites.
Well Ordinance Administration	As enforcing agency for municipal ordinances governing construction, repair, or destruction of wells, ACWD provides inspection services, collects fees, and performs field searches for abandoned wells which could act as a conduit for contamination of groundwater.

Table 4-2
Groundwater Budget for the Niles Cone Groundwater Basin (AF/Yr)
(source: ACWD Annual Groundwater Survey Reports)

Groundwater Budget Item	Fiscal Year							
	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Total Net Recharge[1]	34,500	52,500	38,300	34,000	35,200	35,200	36,900	35,900
Pumping								
Production Wells	19,300	17,800	19,000	20,200	20,800	18,200	20,900	20,100
ARP Wells	7,800	3,800	10,600	6,300	4,300	7,400	7,700	11,100
Other Pumping[2]	6,700	1,000	0	0	0	0	0	0
Private (non-ACWD) Wells	5,000	3,900	3,200	3,100	3,800	3,100	3,400	3,600
Total Pumping	38,800	26,500	32,800	29,600	28,900	28,700	32,000	34,800
Saline Groundwater Outflows	2,300	3,900	6,100	7,400	6,600	6,300	5,800	7,200
Change in Storage	-6,600	22,100	-600	-3,000	-300	200	-900	-6,100

Notes:

(1) Total Net Recharge is calculated as recharge from deep percolation of rainfall and applied water plus recharge at ACWD's groundwater percolation facilities less the sum of evaporation losses and "Other Outflows" (as described in ACWD's annual Groundwater Survey Reports).

(2) Other Pumping represents Quarry Pits dewatering that took place as part of the recharge ponds' rehabilitation project from 1996-1998.

CHAPTER 5
DESALINATION

This chapter describes local opportunities for desalination, including ACWD's Newark Desalination Facility and the District's plans for expanding capacity to augment this source of water supply.

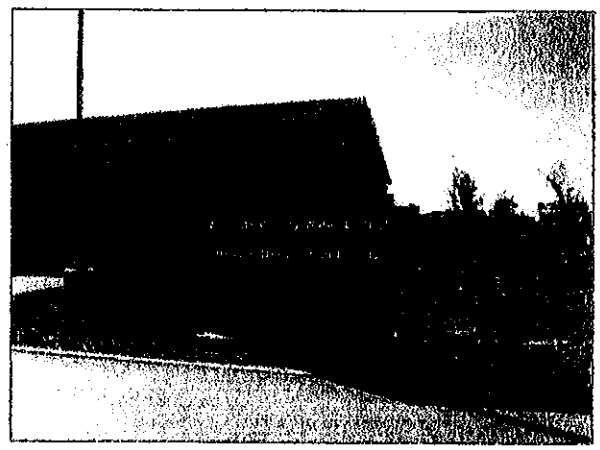
5.1 DESALINATION FACILITY PLANNING AND BACKGROUND

As part of the development of the District's 1995 Integrated Resources Plan, the District evaluated an extensive list of potential water supply alternatives. This included supply-side alternatives (i.e. supplemental sources, facilities, and operational modifications) and demand-side (i.e. conservation) alternatives. ACWD's goal was to end up with a manageable number of the most effective resource options. Included within the potential supply-side alternatives was brackish groundwater desalination and seawater desalination. However, because of the high costs of seawater desalination and potential issues with concentrate disposal, the seawater desalination alternative was eliminated from further consideration during the screening process of the IRP alternatives.

After careful consideration, ACWD adopted an IRP strategy that consists of a mix of conservation, operational alternatives, new supplies and facilities. This included implementation of a Phase 1 (5 mgd) and Phase 2 (increase to 10 mgd) brackish groundwater desalination facility.

5.2 CURRENT DESALINATION CAPACITY AND USE

On September 19, 2003, the Alameda County Water District dedicated the first brackish water desalination facility in northern California (Figure 5-1). The Newark Desalination Facility (Desal Facility) produces potable water by removing salts and other minerals from brackish groundwater. The Newark Desalination Facility has an existing capacity of 5 mgd, and provides up to 10% of the District's water supply.



The source of water for the Newark Desalination Facility is from portions of the Niles Cone Groundwater Basin that contain brackish groundwater due to previous years of seawater intrusion (see Figure 5-2). The District operates a series of wells that remove brackish water (approximate TDS range of 1,100 to 2,400 mg/l from the groundwater basin).

This program, called the Aquifer Reclamation Program (ARP), was developed to stop the spread of saltwater already in the groundwater basin and to reclaim the aquifers of the basin for future potable use. Brackish water from some of these wells is treated at the Newark Desalination Facility rather than being allowed to flow back into San Francisco Bay. The Newark Desalination Facility utilizes reverse osmosis to convert brackish water to potable water.

The soft water produced by the Desalination Facility is blended with the harder groundwater to maintain a more uniform water hardness throughout the year. So in addition to being a relatively new local source of water, the Desalination Facility improves both the quality and reliability of the ACWD water supply.

Figure 5-1
Newark Desalination Facility and Associated Facilities

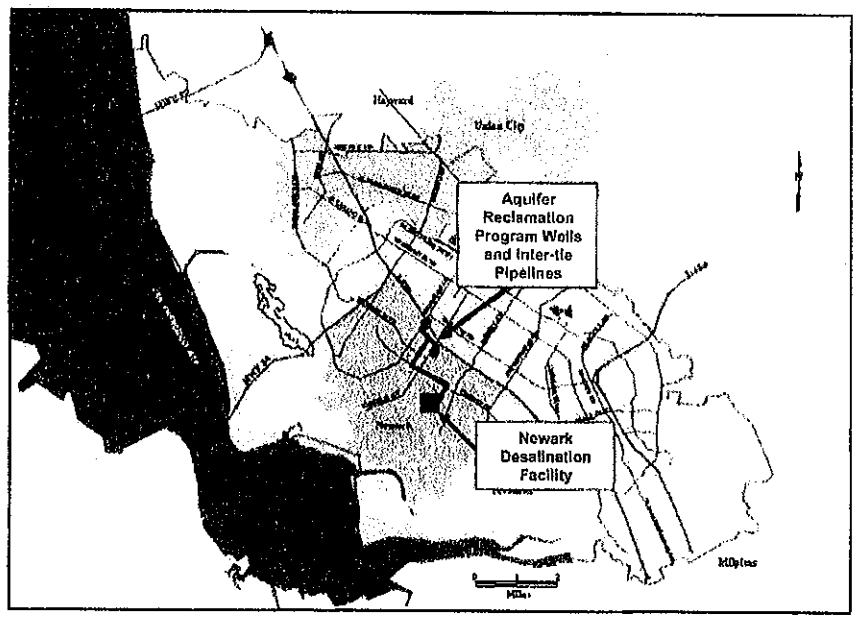
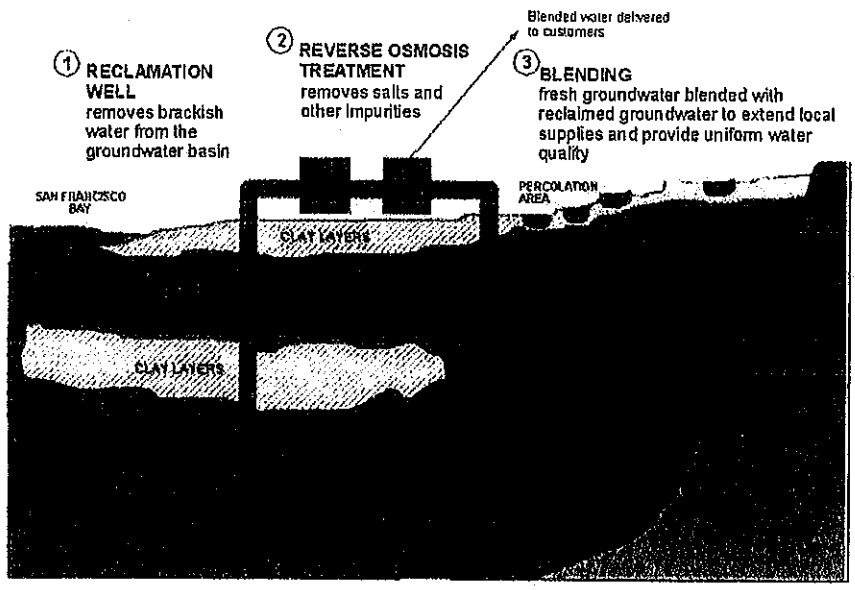


Figure 5-2
Newark Desalination Facility and Aquifer Reclamation Program Schematic



The Newark Desalination Facility provides the following water supply and water quality benefits:

- **Improved dry year water supply reliability:** The District's IRP identified potential dry year water supply shortages of up to 53% (37,400 AF) in 2030 without further action. To improve dry year supply reliability, the District-adopted water management strategy includes conservation, reclamation, off-site groundwater banking and desalination. The desalination facility improves ACWD's dry year supply reliability by providing a new source of potable supply for the service area.

- **Improved water system reliability and security:** The Newark Desalination Facility improves the overall reliability and security of the District's supplies by providing a source of supply west of the Hayward Fault and Calaveras Fault. ACWD's imported water supplies are conveyed via aqueducts (South Bay Aqueduct and Hetch-Hetchy Aqueduct) that are susceptible to failure due to earthquakes along these faults. The Newark Desalination Facility provides ACWD with increased local production capacity, which is key for the District in the event of temporary loss of imported water supplies or production facilities east of the Hayward Fault due to a seismic event.

- **Increased water production capacity:** In addition to the District's dry year reliability needs, the District's IRP also identified the need for additional water production capacity to meet peak summer demands. Although water conservation (targeting outdoor use) and recycled water programs identified in the IRP will help to reduce some of the additional peak demands, additional production capacity in the service area is also needed. The Newark Desalination Facility helps meet the existing and future peak summer demands by providing additional production capacity.

- **Improved water quality:** Because the District's existing potable groundwater supplies are relatively high in hardness, the District blends these groundwater supplies with San Francisco Regional Water System supplies to reduce the overall hardness and improve water quality. Implementation of the desalination facility has allowed the District to further improve water quality for its customers and to provide a supply that meets the District-adopted hardness goals.

- **Reduced future reliance on imported supplies:** The Newark Desalination Facility allows ACWD to reclaim local, brackish groundwater for potable use, reducing the District's need for additional reliance on imported water supplies from the Delta to meet increasing demands in the service area.

- **Groundwater basin protection and reclamation:** The source of the brackish groundwater comes from ACWD's Aquifer Reclamation Program (ARP) in the local Niles Cone Groundwater Basin. The ARP program is an on-going program in which ACWD has been reclaiming to freshwater conditions the portions of the local groundwater basin that have previously been impacted by seawater intrusion from San Francisco Bay. Historically, ACWD has pumped the brackish groundwater out of the basin and disposed of it back to San Francisco Bay. However, the desalination facility now treats this brackish water and allows it to be used as a potable supply.

5.3 PLANNED INCREASED CAPACITY AND USE

ACWD's current plans are to expand the capacity of the desalination facility from 5 mgd to 10 mgd. The expansion is planned to be completed by 2009. This Phase 2 Desalination Project will utilize the most advanced reverse osmosis technology currently available to treat brackish groundwater. Given the high quality of the treated water, the expanded Desal Project treated water will be blended with harder groundwater to improve the overall quality of the water delivered to customers and to the extent possible, extend the local supplies.

CHAPTER 6
WATER RECYCLING

This chapter describes the Union Sanitary District's wastewater system (which serves the ACWD's service area), and the opportunities for the use of recycled water in the ACWD service area.

6.1 AGENCY COORDINATION

As described below, Union Sanitary District (USD) provides wastewater transport, treatment and effluent disposal for the Cities of Fremont, Newark and Union City (encompassing the ACWD service area). ACWD has coordinated with USD in the development of a recycled water master plan (1993) which served as the basis for ACWD's recommended recycled water use plans, as outlined in the District's Integrated Resources Plan. Since 1993, ACWD and USD have jointly updated the master plan, most recently in 2003 with a feasibility study of a satellite recycled water treatment facility in southern Fremont.

6.2 WASTEWATER SYSTEM DESCRIPTION

The following provides a description of USD's facilities and operations, as previously summarized in USD's District-Wide Master Plan.

Wastewater Transport

Wastewater generated within the USD service area is collected and conveyed by gravity sewers to three major pump stations. The Irvington Pump Station serves the southern portion of the service area, the Newark Pump Station serves the central portion and the Alvarado Pump Station serves the northern portion. Wastewater collected in the southern and central areas is transported to the Alvarado Wastewater Treatment Plant (Alvarado WWTP) in Union City via dual 33-inch and 39-inch force mains. The northern drainage area wastewater is pumped directly to the WWTP headworks from the Alvarado Pump Station.

Wastewater Treatment

The Alvarado WWTP uses activated sludge as the biological liquid treatment process to meet the National Pollutant Discharge Elimination System (NPDES) permit requirements for secondary treatment. Additional treatment processes include primary and secondary clarification, and chlorination. The capacity of the WWTP is 33 mgd.

Solids handling at the WWTP includes: sludge thickening, digestion and dewatering. Sludge thickening is accomplished by gravity thickeners that are equipped with odor scrubbers. After thickening, the sludge is stabilized by anaerobic digestion and dewatered to about 20 percent solids using belt filter presses. Dewatered sludge is then transported by truck to approved agricultural fields in Sacramento County, (also Solano and Alameda Counties) where biosolids are surface applied and incorporated into the soil.

Effluent Disposal

All wastewater generated within the USD service area, including peak wet weather flows, receives full secondary treatment and is discharged to the East Bay Dischargers Authority's (EBDA) system for disposal in San Francisco Bay. Currently, there are no wet weather bypasses or overflows from the District's facilities. The EBDA system conveys treated effluent for discharge to the Bay from several local agencies. The facilities consist of approximately 58,000 feet of pipeline ranging in diameter from 60 inches, where USD discharges into the system, to 96 inches at the outfall. USD's contractual discharge capacity is about 43 mgd.

A portion of the USD's effluent is diverted from the EBDA pipeline to supply fresh water to the Hayward Marsh, a constructed wetland located just north of the San Mateo Bridge. In 1991, USD assumed responsibility for the Hayward Marsh Project. Located just north of the San Mateo Bridge, the marsh consists of 145 acres of fresh and brackish wetland, with wide-ranging environmental benefits. Before the marsh was restored from abandoned salt ponds, there was no wildlife habitat at the site. Now the marsh is a popular stop for migratory waterfowl and includes a preserve for the endangered Salt Marsh Harvest Mouse. High quality treated effluent supplied by USD is the fresh water source for this marsh ecosystem.

Existing and Projected Dry Weather Flows

The current average dry weather flows treated at the Alvarado WWTP is approximately 29 mgd. As part of its 1993 District-Wide Master Plan, USD developed dry weather flow projections of 31.8 mgd, 33.1mgd, 34.3 mgd and 35.6 mgd for the years 2010, 2015, 2020 and 2025, respectively. These dry weather flow projections were based on a review of existing and planned growth in the service area (based on the cities' General Plans) and were used for the sizing and phasing of future planned wastewater conveyance and treatment facilities.

6.3 CURRENT USES OF RECYCLED WATER

As described above, as part of USD's effluent disposal program, a portion of USD's effluent is provided to the Hayward Marsh Project (located within the ACWD service area) as a fresh water source for the marsh ecosystem. Approximately 3.5 mgd (approximately 3,900 AF/Yr) of high quality, treated effluent are provided to the marsh annually from USD's Alvarado WWTP. However, currently there are no uses of recycled water in the ACWD service area that are off-setting potable water demands. ACWD's water supply strategy, documented in the District's 2001-2005 Urban Water Management Plan and Integrated Resources Plan (IRP), includes plans for a recycled water project in the service area by the year 2020. As described in the IRP, a brackish groundwater desalination facility was implemented prior to a recycled water project because the desalination project was determined to be more cost-effective while also providing a high-quality potable source of supply (as opposed to a non-potable recycled water supply).

6.4 FUTURE RECYCLED WATER OPPORTUNITIES

The use of recycled water to offset the distribution system demand is included as part of ACWD's long-term water supply strategy in the District's Integrated Resources Plan. Recycled water in the service area is planned solely for non-potable use, primarily for landscape irrigation and industrial use. The District is not considering the use of recycled water as a potable water supply. ACWD's IRP strategy includes a phased approach to developing a recycled water supply with the first phase providing up to 1,600 AF/Yr by the year 2020. A potential second phase providing up to an additional 1,000 AF/Yr is also considered in the District's IRP (see Chapter 8 for ACWD's planned use of recycled water in 5-year increments).

ACWD and USD have evaluated several opportunities for recycled water use as a non-potable water supply in the service area. Potential sources of recycled water include treated wastewater from either the USD Alvarado Wastewater Treatment Plant or from a satellite treatment facility located in the southern service area. Each of these opportunities is described in greater detail below.

Recycled Water Treatment at USD's Alavarado Waste Water Treatment Plant

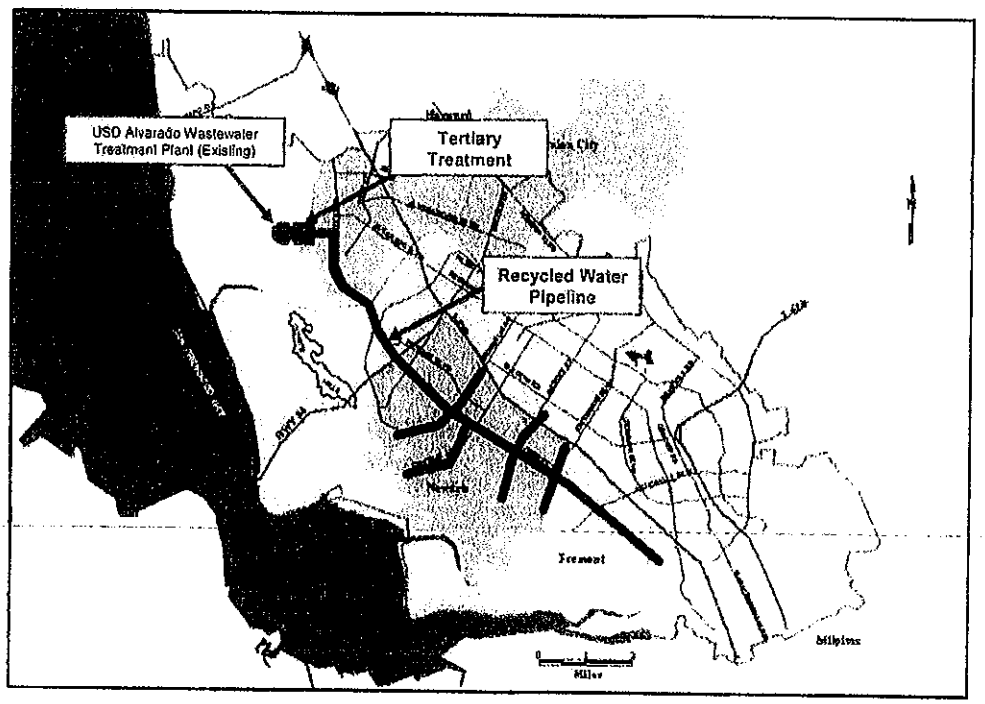
In 1993 ACWD and USD completed a Nonpotable Recycled Water Master Plan (1993 Master Plan) for the development of a recycled water program within the ACWD/USD service area. The 1993 Master Plan identified a total non-potable recycled water demand (primarily for landscape irrigation purposes) of approximately 4,000 AF/Yr. The recycled water source would be from a new tertiary treatment facility at USD's existing Alvarado WWTP in Union City. The 1993 Master Plan recommended a three phase implementation plan which allows for the most cost-effective users (i.e. those in the northern service and

central service areas, known as the Phase 1 and Phase 2 service areas, respectively) to be connected to the system first.

Since 1993, a number of changes have occurred which prompted a Recycled Water Master Plan Update in 1999, including potential new demands and new regulatory requirements. The 1999 Master Plan Update identified potential demands in the Phase 1 and 2 service areas of 2.4 mgd or approximately 2,700 AF/Yr. Because of the large landscape irrigation component, the demand peaks during the summer irrigation season and is minimal during the winter. The maximum day demand during the summer is projected to be 6.8 mgd compared to a typical winter demand of about 0.3 mgd.

The recycled water would originate at the Alvarado WWTP, located at the north end of the service area (Figure 6-1). For a system such as that proposed for ACWD and USD, the recycled water must be suitable for application on unrestricted use sites such as schoolyards, parks, playgrounds and food crops. This requires a high level of treatment that Title 22 designates as "disinfected tertiary recycled water." Following secondary treatment of the wastewater, this treatment level requires chemical addition, flocculation/coagulation, filtration and disinfection.

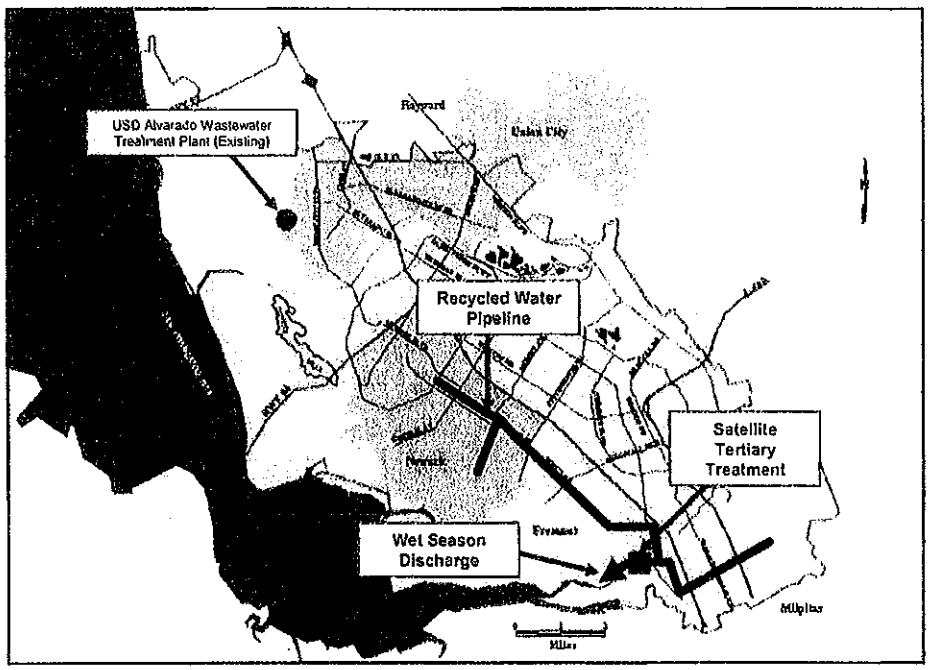
Figure 6-1
1993 & 1999 Recycled Water Master Plan - Proposed Recycled Water Facilities



Recycled Water Treatment at a Satellite Treatment Facility

As an alternative to constructing a recycled water treatment facility at the Alvarado WWTP, in 2003 ACWD and USD completed an evaluation of the feasibility of constructing a satellite recycled water treatment facility in southern Fremont at USD's Irvington Pump Station (Figure 6-2). This satellite facility would benefit ACWD by providing a recycled water source for customers in southern and central Fremont, and would benefit USD by providing advanced treatment for a potential new wet-season outfall, thereby addressing some of the wet-weather disposal issues facing USD. This feasibility study identified a potential future recycled water demand of approximately 1,600 AF/Yr in ACWD's southern service area. However, much of this projected demand is for two planned golf courses, which have not yet been constructed. Therefore, prior to moving forward with this project, primary customers' (i.e. golf courses) demands must be in place.

Figure 6-2
2003 Recycled Water Satellite Treatment Feasibility Study - Proposed Recycled Water Facilities



6.5 OPTIMIZATION OF RECYCLED WATER SUPPLIES

As described above, ACWD has plans to develop a recycled water project with USD to provide up to 1,600 AF/Yr of recycled water supply by the year 2020. Because the planned implementation of a recycled water project in the ACWD service area is still at least ten years away, ACWD has not developed a detailed recycled water optimization plan. Future updates to this Urban Water Management Plan will include the documentation of an optimization plan as the recycled water project planning continues. However, potential actions that may be taken by ACWD and USD to encourage customers to accept the use of recycled water include the following:

- Financial Incentives: This would provide an incentive by offering customers a lower rate for recycled water than for potable supplies from the distribution system. Other financial incentives may include reduced connection charges and service charges.

- Guarantee of Firm Supply: This would provide an incentive for recycled water use by guaranteeing that the recycled water supplies would not be subject to voluntary or mandatory cutbacks during droughts and/or water supply shortages.

- Requirements for New Developments: As a condition for ACWD service, the District may require that developers install separate distribution systems for the use of recycled water for landscape irrigation purposes. Requirements may also be put in place for these new developments to accept the recycled water for landscape irrigation in-lieu of potable water.

The actions described above have not been formally adopted by ACWD or USD but represent potential actions that may be taken in the future as recycled water becomes available. In addition, projections of the quantities of recycled water that may be utilized as a result of these potential actions have not yet been developed. As with the recycled water optimization plan discussed above, these projections will be developed as recycled water planning in the service area progresses and will be included in future updates to this Urban Water Management Plan. However, based on discussion with many of the potential recycled water customers, including city parks, schools, planned golf courses and industrial parks, there is a high degree of acceptance for the use of recycled water in the service area, and no significant obstacles to the full utilization of the planned recycled water quantities is anticipated.

CHAPTER 7
DEMAND MANAGEMENT

Demand management is an integral part of ACWD's long term water management strategy. As part of ACWD's IRP process, potential demand management programs were evaluated at the same level of detail as other supply-side options. In some instances, it may be more cost-effective to implement demand management programs than it would be to secure additional supplies and production/treatment facilities to meet existing and growing demands. A discussion of the District's water supply strategy and how demand management plays a key role in this strategy is provided in Chapter 8.

In addition to implementing demand management measures as part of its IRP program, ACWD is a signatory to the Memorandum of Understanding (MOU) on Urban Water Conservation, and as such, is committed to implementing those water conservation Best Management Practices (BMPs) which are cost effective for the District. As a signatory to the MOU, ACWD is also committed to providing bi-annual reports to the California Urban Water Conservation Council (CUWCC) on the status of the District's BMP implementation. A copy of the most recent report (submitted to the CUWCC in December 2004) covering FY02/03 - FY03/04 is presented in Appendix B.

The following is a summary of ACWD's demand management strategy developed as part of the District's IRP process, followed by a summary of the implementation status of the District's demand management program.

7.1 ACWD DEMAND MANAGEMENT STRATEGY

As is the case with supply-side options, a systematic approach was applied to develop the conservation options as part of the District's IRP process. The conservation analysis included the following steps:

- Disaggregate demand data to determine water-use patterns in the District;
- Carefully screen conservation measures to determine the ones that are appropriate for use in the District;
- Target specific water uses with cost effective conservation measures;
- Design appropriate delivery mechanisms, including incentives and marketing approaches;
- Characterize the programs, including participation levels, program costs, water savings, revenue impacts, demand hardening impacts (a term used to describe the diminished ability or willingness of customers to reduce demand during a supply shortage), and staffing requirements; and
- Package conservation programs into logical groups for integration with supply options.

The IRP recommended a water conservation program that focuses on reducing seasonal (outdoor) demands (thereby reducing the need for additional production and storage facilities to meet peak summer demands) while still addressing indoor water demands. Specific conservation programs included under the recommended conservation program include: residential audits, conservation kit distribution, business/industrial audits and incentives, water efficiency workshops, and large landscape audits and incentives.

7.2 IMPLEMENTATION STATUS OF DEMAND MANAGEMENT PROGRAM

Based on IRP recommendations and commitments to implementing BMPs, ACWD has a multi-faceted demand management program that includes a variety of activities that reach out to residential, business, industrial and landscape customers. A summary of the BMP requirements, and ACWD's progress in meeting our commitments to the MOU, is also provided in Table 7-1. In general, the District is on track in meeting both our IRP demand management recommendations and BMP implementation commitments. The following describes each of ACWD's key water conservation activities and their implementation status; these programs are also summarized in Table 7-2.

Residential Conservation Kit Distribution Program

In 1997, the District initiated an aggressive program to market and distribute free water conservation kits to its residential customers in pre-1992 homes (i.e., homes built prior to the implementation of laws requiring the use of low flow plumbing fixtures). Free conservation kits (including high quality low-flow showerheads) were offered through bill inserts and direct mailings. To date, over 21,400 conservation kits have been provided to SFR customers. The District continues to offer free kits to customers through our web site and periodic advertisements in the District's newsletter.

In addition, free water conserving fixtures have also been provided to qualifying multi-family complexes that have participated in the District's survey program. To date, the District has provided over 2,100 showerheads and over 1,700 faucet aerators to 24 apartment complexes. ACWD has also developed a program to market and distribute free water conservation kits to townhouse and condominium owners in the Tri-Cities area. Over 2,700 kits have been distributed through this program.

Residential Surveys

The District initiated a pilot residential survey program in 1995. The purpose of the program is for a trained water auditor to conduct an onsite review of water use practices and fixtures, check for leaks, and provide recommendations for improving water efficiency (both indoor and outdoor). To date, the District has conducted surveys for over 850 single-family residences (SFR) and 49 multi-family (MFR) apartment complexes (representing over 7,100 apartment units). Free water conservation kits are also provided on an as-needed basis. In 1997 the District evaluated the cost-effectiveness of continuing a large-scale SFR survey program. Based on actual water savings and costs of the program, it was determined to not be cost-effective. However, the MFR survey program was continued. The District continues to offer MFR surveys through its commercial survey program (see below).

Residential Clothes Washer Rebate Program

Since 1997, the District has participated in a rebate program for water and energy efficient clothes washers. These water conserving washers are estimated to save over 5,000 gallons per year, compared with non-conserving washers. This program is conducted in partnership with other local water agencies. To date, ACWD has provided over 9,800 rebates to District residential customers who purchased new water efficient washers.

Table 7-1
Summary of District Water Conservation BMP Implementation

BMP	*District Progress*
1. Residential Water Surveys	· Surveys covering more than 7,900 residential units completed since 1996 · Multi-family program exceeds 10-year BMP targets · Single-family program cost-effectiveness exemption · *Meets BMP Requirements*
2. Residential Plumbing Retrofit	· Distributed over 21,400 kits to residential units since 1991. · *Meets BMP Requirements*
3. System Water Audits	· Annual system audits indicated unaccounted for flows at less than 9% (below industry average) · Over 100 miles of distribution system checked for leaks annually · *Meets BMP Requirements*
4. Metering	· All accounts are metered · *Meets BMP Requirements*
5. Large Landscape Programs	· Landscape budget program implemented for dedicated landscape accounts · Landscape survey program for mixed use accounts meets BMP targets · *Partially Meets BMP Requirements*
6. Washing Machine Rebates	· Over 9,800 rebates provided since 1996. · *Meets BMP Requirements*
7. Public Information Programs	· Program includes billing newsletters, newspaper ads, postcard reminders, press releases, web-site, and participation at community events. · *Meets BMP Requirements*
8. School Education Programs	· Program includes classroom presentations, free resource material, teacher training/workshops, grants, and field trips. · *Meets BMP Requirements*
9. Commercial, Industrial, Institutional Programs	· Over 300 accounts surveyed since 1998 · Commercial ULFT and washing machine rebate programs offered in conjunction with Union Sanitary District · *Meets BMP Requirements*
10. Wholesale Assistance	· Not applicable to ACWD
11. Conservation Pricing	· Currently using uniform rate structure · Implemented inverted block rate structure during drought · *Meets BMP Requirements*
12. Conservation Coordinator	· Conservation Coordinator position is staffed · *Meets BMP Requirements*
13. Water Waste Prohibition	· Implemented ordinance during drought *Meets BMP Requirements*
14. Residential ULFT Replacement	Program in place for low-income multi-family · Large scale rebate program cost-effectiveness exemption · *Meets BMP Requirements*

Table 7-2
Summary of District Water Conservation Programs

Program Name	*Program Description*
Residential Programs	
Conservation Kit Distribution Program	Distribute water efficient plumbing fixtures to SF/MF residents whose homes were built prior to 1992.
Residential Clothes Washer Program	Provide a rebate to individuals who install a qualifying Energy Star clothes washer in the ACWD service territory.
Seasonal Irrigation Postcard Program	Postcards are sent on a seasonal basis to SF residents to update them on current landscape irrigation requirements; all SF residents, three times a year since 1998.
Residential Leak Detection Program	Customer Service notifies customers of non-typical water usage at their address with suggested remedies for the problem. Approximately 1,200 customers are contacted annually.
Residential High Water Use Notification Program	Utilizing GIS, letters are sent to a residence where water consumption is significantly higher than average compared to others in their area with similar lot sizes. Analysis is conducted and letters are mailed out once per year.
Bay Friendly Garden Tour	ACWD's Drought Tolerant Garden is a lecture stop on a tour of Bay Area residential landscape gardens that meet and exceed Bay-Friendly Gardening standards. During the tour conservation staff spends time discussing water conservation and the use of drought tolerant plants with visitors.
Commercial, Industrial, Institutional (CII) Programs	
CII Water Use Efficiency Survey Program	Conduct on-site visits to service area businesses to evaluate water use practices and fixtures. A written report of findings and recommendations is sent out to the customer after the site visit.
Commercial ULFT Rebate Program	Conduct outreach to CII and low-income MF markets to accelerate the rate of toilet replacement. Currently a $150 rebate is being offered in partnership with USD.
Commercial Clothes Washer Rebate Program	A statewide program providing tiered rebates for qualifying commercial clothes washing machines of up to $450. Current funding includes matching funds from USD and a grant from the California PUC. Over 160 rebates have been approved since program inception.
Alameda County Green Business Program	A partnership program for conducting CII surveys that qualify Alameda County businesses as 'green' or environmentally friendly. ACWD uses these survey opportunities to conduct more comprehensive CII surveys.
Spray and Rinse Valve Installation Program	A statewide grant program that partners water agencies with their energy providers to install water and energy efficient spray valve nozzles in service area restaurants at no cost to the restaurant. The program is co-funded by the California PUC and local water agencies. To date over 440 nozzles have been installed at restaurants throughout ACWD's service area.
Alameda County Stop Waste Program	An in-kind partnership between the Bay Area utilities, government agencies and non-profit organizations to promote resource conservation. Sponsored by the Alameda County Waste Management Authority

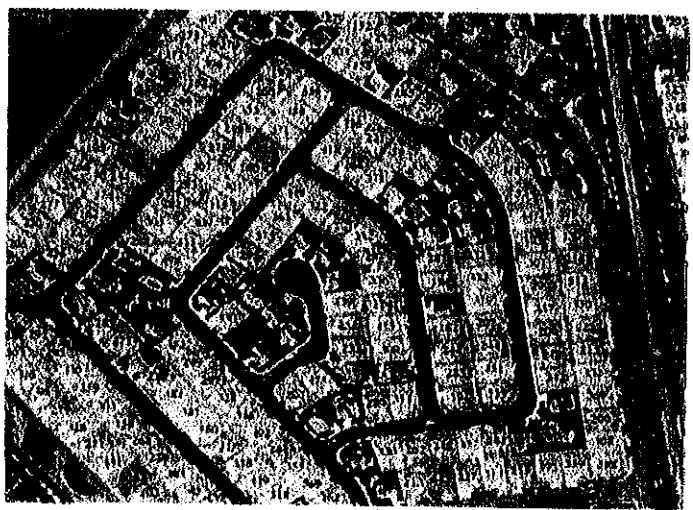
Table 7-2 (continued)
Summary of District Water Conservation Programs

Large Landscape Programs	
Dedicated Landscape Partnership (DLP)	A large landscape survey and water budget program offered to CII and MF customers with dedicated landscape accounts. Through a site survey or GIS analysis turf and non-turf areas are measured to establish an irrigation budget based on square footage and climate conditions. Water use reports are issued to customer and their landscape contractor three times a year.
Irrigation System Audits	Irrigation audits are provided as a component of the DLP. DLP participants that are over-budget are provided with an irrigation system walk-through to determine the efficiency of the system. Recommendations to improve system efficiency and a suggested irrigation schedule are provided to the customer at the end of the audit.
Conservation Business of the Year Recognition Program	Those DLP Participants that remain within their water budget for the previous year are recognized. Participants and their landscape contractors receive an award certificate and their business name and landscape contractor are placed on a list and published in Argus one Sunday in May during Water Awareness Month.
Weather-based Irrigation Controller Grant	Installation of weather-based irrigation controllers at pre-selected large landscape sites within the service area.
Public Information & School Education Programs	
Avenues for Public Outreach	ACWD website, Aqueduct newsletter, newspaper advertisements, public appearances, brochures, etc.
School Education Programs	Program to work with children in the service area to better equip them for understanding and practicing water conservation techniques. ACWD's classroom programs reach over 7,000 students annually, and the ACWD sponsored assembly program reaches approximately 18,000 students annually.
Customer Service and Conservation Material Distribution	Addressing customer questions about water conservation whether in person, via phone or email. Mailing print materials to assist customers in achieving conservation goals.
Other Conservation Activities at ACWD	
Leak Detection and Repair	ACWD's on-going program for evaluating the distribution system for leaks and implementation of necessary repairs to the system. ACWD surveys approx. 165 miles of pipeline each year (five year cycle).
Metering	All ACWD accounts are metered to account for actual water usage by customers.
Billing	Each of ACWD's accounts is billed to the customer based on amount of water used.

Residential Seasonal Irrigation Reminders

Residential landscape irrigation represents one of the single largest uses of water in the District's service area, and also provides an opportunity for one of the largest sources of water savings through improved efficiency. In 1998, the District implemented a program to provide residential customers with landscape irrigation guidelines. As part of this program, the District provides seasonal notices through postcards and/or our web site for adjusting irrigation rates depending on the season. These seasonal notices have been sent to all single-family customers in the fall (to indicate that watering times can be reduced in half from summer schedules), in the winter (to indicate that sprinkler systems can be turned off) and in the spring (to provide efficient watering tips).

Single Family High Water Use Notification



(Aerial photo showing water use at single family homes, in gallons per day)

Utilizing GIS data linked with our customer service database, customer water use is compared to similar households' water use (based on parcel size and location). Those customers in the top 0.5 % for water consumption are sent high water use alert letters. A list of possible reasons for their much higher than average water use are suggested, along with conservation tips, and they are encouraged to call to discuss their water use practices with a conservation staff member. On-site surveys are also offered to customers through this program. The program has been run three times since early 2004. Consumption is monitored annually to confirm program effectiveness.

Residential Ultra Low Flow Toilet Replacement

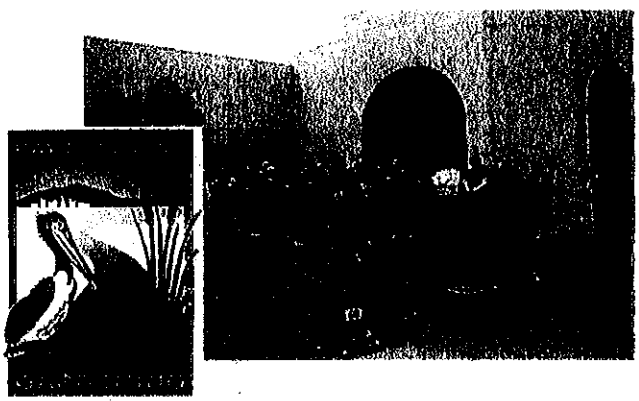
The District has completed a comprehensive evaluation of a large scale residential ultra low flow toilet (ULFT) rebate program. This analysis indicated that such a program would not be cost-effective for the District because 1) legislation enacted in 1992 requires that all new toilets sold in the State be ULFTs (therefore, older toilets are "naturally" replaced with ULFTs even without a rebate program), and 2) the ACWD service area does not face the wastewater disposal restrictions that other areas in the State face. As such, ACWD has submitted a cost-effectiveness exemption for a large scale ULFT rebate program to the CUWCC. However, as described below, ACWD does offer rebates for ULFTs to multi-family residential facilities through the District's CII ULFT Rebate Program.

Residential Leak Detection and Notification Program

Leak detection is an on-going part of ACWD's bi-monthly meter reading program. If an abnormally high water consumption is detected, the meter reader is alerted (through their handheld devices) to check for a leak – and an abnormal read is noted on a report. The meter reader looks at the meter to see if the instruments are spinning. If they are, the meter reader will knock on the door to check and see if anyone is home. If no one answers they assume there is no one home (and thus no one using water) so they leave a door hanger that states there might be a leak and the customer should contact customer service with any questions. If someone is home they have them turn off all water in the house, look at the meter again, and if it is still moving they inform the owner in person that they most likely have a leak.

For billing purposes, the meter reader enters a leak report code indicating whether or not the abnormal read may be the result of a leak at that residence. Two weeks later a re-check is performed. If there is still an indication of a leak, a leak letter is sent to the customer. Another check is performed 2 weeks later, followed by a second leak letter if needed.

Residential Landscape Workshops

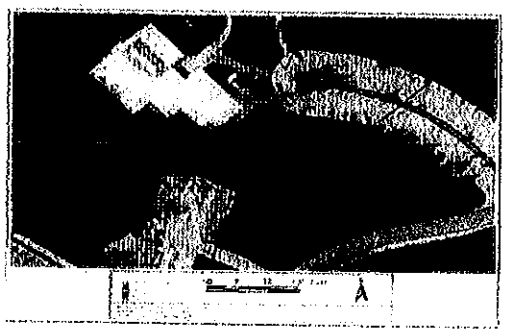


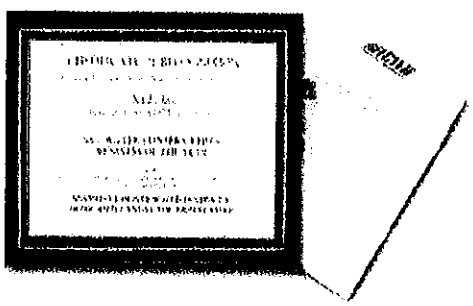
ACWD regularly hosts and co-sponsors garden tours and workshop series for service area residents through a partnership with Alameda County Waste Management Authorities' StopWaste Program and the Bay-Friendly Gardening Program. ACWD's Drought Tolerant Garden is a lecture stop on a tour of Bay Area residential landscape gardens that meet and exceed Bay-Friendly Gardening standards. During the tour, conservation staff spends time discussing water conservation and the use of drought tolerant plants with visitors.

Large Landscape Program: Dedicated Landscape Partnership (DLP)

The District has over 1,800 dedicated irrigation accounts at multi-family, commercial, industrial and institutional sites. In order to ensure that these sites are being irrigated efficiently, the District initiated a survey and water budget program in 1999. As part of this program, the District offers all customers with designated landscape accounts a free survey to determine the landscaped area (turf and non-turf). After the survey is completed, an individual report comparing actual water use with calculated landscape water needs is issued every four months to the customer and their landscape contractor.

ACWD has also utilized GIS to identify turf and non-turf areas and to match parcels to meter numbers to create water budgets for customers with dedicated landscape accounts and for large municipal parks in the service area. To date, 532 large landscape sites are participating in the DLP program (representing over 90% of the total landscape water consumption).





ACWD also recognizes those Dedicated Landscape Partners that remain within their annual water budget through a "Water Conservation Business of the Year" awards program. In 2004, 126 DLP participants qualified to receive the award. These recipients were listed in a Sunday edition of the local newspaper during May, Water Awareness Month.

Future plans include expanding the DLP program to all large landscape customers and continuing to offer detailed irrigation audits to over-budget participants to identify efficiency issues and to make ET-based and site-specific scheduling recommendations. ACWD will also be offering financial incentives for the installation of weather-based irrigation controllers through a DWR funded grant program.

Commercial, Industrial, and Institutional Surveys

The District's commercial, industrial and institutional survey program is tailored to meet the specific needs of our customers. The commercial survey program is targeted at hotels, restaurants and other commercial customers with high indoor use from facilities such as restrooms, laundry, and food preparation/clean up. Some of the surveys are coordinated through a partnership with the Alameda County Green Business program and the statewide Rinse & Save spray valve replacement program. The industrial survey program is tailored towards industrial customers such as high-tech and other manufacturing facilities that utilize large quantities of process water and water for cooling towers. Approximately 300 CII surveys have been conducted to date. Some surveys have been conducted by staff while the larger commercial and industrial surveys have been conducted by consultants. On-site surveys include a comprehensive review of existing water use, identification of areas for improvement, and water use efficiency recommendations outlined in a report provided to the customer. These recommendations include an analysis of potential water and cost savings, as well as a payback analysis. Free conservation devices and follow-up assistance are offered to participating CII customers.

Spray Valve Replacement Program

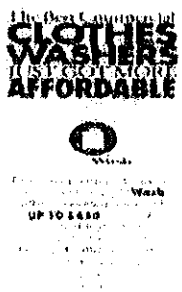
ACWD participates in this statewide grant program that partners water agencies and their energy providers (i.e. PG&E) to install water and energy efficient spray valve nozzles in service area restaurants. These spray valves are water and energy efficient and are installed at no cost to the restaurant. The program is co-funded by the California Public Utilities Commission and local water agencies. To date over 440 nozzles have been installed at restaurants throughout ACWD's service area.

Commercial Ultra Low Flow Toilet Rebate Program

In 2000, ACWD together with Union Sanitary District initiated a pilot program to provide rebates of up to $150 to commercial and low-income homes for the replacement of non-conserving toilets with water conserving ULFTs. The purpose of this program is to target District customers that have the highest potential water savings when older, non-conserving toilets are replaced with ULFTs. Analysis by the CUWCC and others has indicated that commercial customers such as restaurants and gas stations, as well as multi-family residential units have the highest potential water savings. To date over 360 non-conserving toilets have been replaced with ULFTs within the ACWD service area. The program is marketed through the CII survey program.

Commercial Clothes Washer Rebate Program

ACWD participates in a statewide program which provides tiered rebates for qualifying commercial clothes washing machines of up to $450. Current funding includes matching funds from Union Sanitary District and a grant from the California Public Utilities Commission. Over 160 rebates have been approved since the program inception. Participants have included laundromats and apartment complexes with on-site laundry facilities.



School Education Program

ACWD's school education program was established prior to 1991. The school education program includes the following:

Classroom Instruction: ACWD provides trained staff to conduct water supply and conservation programs at public and private schools in ACWD's service area. Programs are available for kindergarten through 12th grade and are aligned with California education content standards. They are taught as special classes (in which an ACWD instructor substitutes for the regular teacher) and are activity-based. ACWD provides all of the necessary resource materials required for these programs (see below for description). Each year, ACWD reaches approximately 7,000 students through these classroom presentations.

School Assembly Program: Each year, ACWD sponsors a water conservation school assembly program for 40 schools in its service area. The program stresses the various facets of water conservation through the use of music, storytelling, and drama and is appropriate for kindergarten through 6th grade. The school assembly program reaches approximately 18,000 students each year.

Educational Resource Materials: ACWD provides resource materials for teachers to use in teaching about water supply and water conservation. These materials include workbooks, lesson plans, curriculum guides, brochures, pamphlets, videos, posters, maps, games, stickers, pencils, rulers, and magnets. All materials are provided to schools and teachers upon request. Each year, approximately 70,000 pieces of material are distributed to local schools.

Tours: ACWD offers tours of the District's facilities to local schools. These tours include visits to our water treatment and groundwater recharge facilities. All tours are led by District staff.

Water Conservation Poster and Slogan Contest: Each year, ACWD sponsors its extremely popular Water Conservation Poster and Slogan Contest. First through 6th grade students are invited to enter posters and slogans that encourage water conservation. Winning entries are included in a Water Conservation Calendar that is distributed to the over 1,200 teachers in the District's service area. Approximately 1,800 students enter the contest each year.

Other: Students who participate in ACWD sponsored activities are encouraged to visit our home page (http://www.acwd.org) which includes educational material and water conservation material. In addition, ACWD participates in Water Awareness Month by providing teachers with free water conservation lesson plans developed by the California Water Awareness Campaign. ACWD also sponsors a mini-grant program for local teachers and conducts free educational workshops (Project WET, etc.).

Public Information Program

ACWD's public information program was also established prior to 1991. The public information program includes the following:

Demonstration garden: ACWD maintains a drought resistant demonstration garden and provides brochures of the garden and irrigation system for our customers. ACWD has also assisted Union City with the development of a demonstration garden at their City offices.

Bill inserts: Bill inserts for ACWD customers are included approximately every two months. These inserts include information about water conservation, leak detection, water quality, water rates and other District related information.

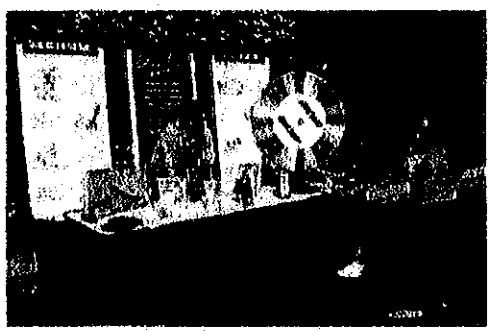
New customer packet: All new ACWD customers receive a packet from ACWD that includes information on water conservation and leak detection.

Brochures: ACWD has a wide variety of water conservation brochures on such topics as leak detection, water conservation devices and measures, irrigation guidelines and drought resistant landscaping

Previous use shown on bill: The customer's consumption from the previous year is provided on all customer billing statements.

Community Events: ACWD routinely participates in a wide variety of community events and other local events.

Internet home page: ACWD maintains a home page on the Internet (http://www.acwd.org), which provides a wide variety of information on water conservation measures such as leak detection, water saving fixtures and drought resistant landscaping.



Conservation Accomplishments and Future Plans

ACWD has successfully worked with other water agencies on large scale conservation programs and has actively pursued conservation grant opportunities. The District has developed the in-house capacity to conduct commercial and landscape water use efficiency surveys and has creatively utilized new technologies, such as GIS, to advance conservation programming.

In addition to the programs detailed above, ACWD conservation staff will continue to seek grant funding to maintain, identify, develop and implement projects that contribute toward meeting the District's demand management goals. ACWD will continue to creatively use new technologies to maximize program effectiveness (e.g. weather-based irrigation (ET) controllers, the use of GIS and other applications, higher efficiency appliances), work with other agencies and participate in regional and statewide conservation programming.

CHAPTER 8
WATER SUPPLY STRATEGY

ACWD's Integrated Resources Plan recommended a water supply strategy to meet the District's planning objectives for water supply reliability, costs, water quality, environmental protection and risk. Included in the District's water supply strategy are programs for additional conservation, recycled water, brackish groundwater desalination and water banking/transfers. This chapter summarizes the planning criteria utilized by ACWD in developing the District's water supply strategy as part of the IRP process, followed by a summary of the recommended water supply strategy for the District and the implementation status of key IRP recommended programs.

8.1 PLANNING CRITERIA

The IRP utilized the following planning criteria in the formulation and evaluation of potential water supply strategies:

Costs: In addition to avoiding rate shocks, key IRP objectives related to costs are to 1) minimize resource costs, and 2) maintain low average customer bills. The District believes that keeping costs, and therefore customer bills, low is a paramount objective.

Reliability: The District intends to maintain a high level of service reliability for its current and future customers. The IRPs' primary focus was long-term water supply reliability because the District has contingency plans and internal standards (e.g., storage standards and peak-day spare capacity for pumps and tanks) to address short-term reliability issues. Through public and stakeholder input during the IRP process, the District determined that a shortage of greater than 10% in 1 out of every 30 years is unacceptable. Likewise, frequent small shortages have also been deemed unacceptable. Hence, resource strategies that result in shortages of greater than 10% or chronic shortages were not considered.

Water Quality: In addition to maximizing the health-related treated water quality, the District's IRP objectives also included avoiding sudden changes in water taste or appearance. Aesthetics, especially taste, are extremely important to District customers. Major fluctuations in aesthetics are noticeable to customers and may generate customer inquiries. One determinant of taste is hardness, expressed as mg/L, or parts per million (ppm) as $CaCO_3$. A key criterion used in the IRP process was to provide uniform hardness levels and limit the maximum monthly hardness.

Environmental Impacts: The District's planning objective was to avoid or mitigate environmental impacts. For a resource option to be considered viable, appropriate mitigation needs to be provided such that any significant environmental impacts are reduced to levels that are less than significant.

Local Control: In light of the current uncertainties associated with the District's imported supplies, the District determined that local control of future resources is desirable. Factors considered in evaluating local control include:

1. The number of entities involved in developing or acquiring the supply options;
2. The firmness of the District's water rights or contractual allocations;
3. The amount of water that the District would have to share with other contractors; and
4. Whether state or federal agencies are involved in allocating water deliveries.

Risk: The last key planning objective was to minimize risks due to future uncertainty. These risks include:

- ***Financial risk:*** The likelihood of spending more money than expected or spending money unnecessarily. This rating is affected by factors such as the ratio of fixed to variable cost, construction and permitting lead times and resource size. For example, resources with high capital cost are more financially risky than resources characterized by variable costs.

- ***Water quality regulatory risk:*** The likelihood of being unable to comply with future health-related water quality regulations. Even though the cost of treatment needed to comply with current standards is included for all source options, some sources have an inherently higher risk of not meeting future standards with existing treatment facilities.

- ***Availability risk:*** The likelihood that a supply source is not available due to external legal or regulatory changes or uncertainties in the quantity of supply provided or saved. For example, agricultural transfers may be risky because of contractual and through-Delta delivery issues.

8.2 WATER SUPPLY STRATEGY AND IMPLEMENTATION STATUS

As part of ACWD IRP process, the District evaluated a wide range of water supply and water conservation options. These options were packaged into nine alternative water supply strategies, each of which was evaluated against the District's planning objectives (described above). The recommended water supply strategy, chosen because it best met the District's objectives, included desalination, recycled water, conservation, groundwater management and off-site banking/transfers. Table 8-1 provides a summary of the key projects incorporated in the District's water supply strategy and their current implementation status.

Table 8-1
Recommended IRP Strategy and Implementation Status

IRP Component	*2000*	*2010*	*2020*	*2030*	*Implementation Status*
Conservation	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	Package 2 (IRP)	All cost-effective BMPs are being implemented. New programs focused on landscape irrigation in place.
Desalination (mgd)	5	10	10	10	Phase 1 Desal (5 mgd) completed and in operation. Grant funding secured for Phase 2 (10 mgd).
Off-Site Storage/Banking Capacity (1,000 AF)	65	95	100	140	Secured 150,000 AF of off-site banking storage capacity at Semitropic Groundwater Banking Program.
Groundwater Management (Min. Inland GW Elev., ft mean sea-level)	1	-5	-5	-5	Completed the Quarry Lakes rehabilitation project to enhance groundwater recharge capacity.
Treatment Plant Upgrades (mgd)	---	---	---	4	Added 2 mgd of treatment capacity to MSJWTP during plant upgrade and conversion to ultra-filtration.
Recycled Water	---	---	Phase 1 (1,600 AF/Yr)	Phase 2 (1,000 AF/Yr)	ACWD/USD Recycled Water Master Plan updated and satellite treatment plant feasibility study completed.

ACWD's previous Urban Water Management Plan (2000-2005) was based on the same IRP water supply strategy that is included in this 2006-2010 Plan. Since the 2000-2005 Plan was adopted by the ACWD Board in 2001, ACWD has made significant progress in the implementation of this strategy. This progress includes: (1) on-going implementation of the District's water conservation program; (2) securing of an additional 100,000 AF of off-site storage capacity at the Semitropic Groundwater Banking Program (2001); (3) completion of the Phase 1 (5 mgd) Newark Desalination Facility (2003); (4) completion of upgrades to the District's Mission San Jose Water Treatment Plant (2005); and (5) completion of a joint ACWD/USD feasibility study for a recycled water satellite treatment facility (2003).

Each of the key components of ACWD water supply strategy are discussed in greater detail below:

Desalination

As described in Chapter 5, the IRP recommended developing a brackish groundwater desalination facility which would provide a new local source of water supply for the District. The desalination facility would produce potable water by removing salts and other minerals from brackish (slightly salty) groundwater in the local aquifer system.

ACWD completed construction of the first phase of the Newark Desalination Facility in 2003. This desalination facility has a capacity of 5 mgd, and was constructed to allow for future expansion to 10 mgd. The Newark Desalination Facility utilizes state-of-the-art reverse osmosis technology to convert brackish water to potable water. This process forces water under pressure across a semi-permeable membrane. The membrane allows water molecules to pass through but stops dissolved minerals such as salts and iron. The soft water produced by the Desalination Facility is blended with the harder groundwater to provide a supply with lower overall hardness.

The source water for the desalination facility comes from a series of wells that remove brackish water from the Niles Cone Groundwater Basin. This program, called the Aquifer Reclamation Program, was developed to stop the spread of saltwater already in the groundwater basin and to reclaim the aquifers of the basin for future potable use. With the start-up of the Newark Desalination Facility in 2003, a portion of the brackish groundwater pumped from these wells has been treated for subsequent potable use rather than being allowed to flow to San Francisco Bay, as was previously the case. This represents a new source of supply to the extent that this brackish groundwater would be pumped regardless (through the District's Aquifer Reclamation Program) in order to improve water quality in the basin and to protect the District's Mowry Wellfield.

ACWD plans on expanding the capacity of this desalination facility to 10 mgd by the year 2010. ACWD was recently awarded a $2.8 million grant from the California Department of Water Resources for this expansion. ACWD is currently evaluating various operational strategies for this expanded facility as part of the update to the District's IRP. Alternative strategies include the use of this expanded facility to meet peak summer production needs during normal and dry years (i.e. providing 5,100 AF/Yr supply), and base-loading the facility (10 mgd year-round) during above-normal and wet years. For the purpose of this UWMP, it is assumed that the expanded desalination facility will provide 5,100 AF/Yr of treated water supplies under normal year conditions. This assumption will be reviewed in future updates to this Urban Water Management Plan.

Recycled Water

The District's long-term supply strategy includes a recycled water program to be implemented by 2020, which will provide up to 1,600 AF/yr of non-potable supply (e.g. landscape irrigation and industrial process water). As described in Chapter 6 of this report, the source of recycled water will be from a joint project with ACWD and Union Sanitary District (USD). Reclaimed water distribution pipelines will be separate from the District's existing potable distribution system and, therefore, would not adversely affect existing potable supply operations. The volume of reclaimed water produced would be the same in drought years as in normal years, thus providing a firm source of supply. Demand for reclaimed water for irrigation purposes is highest in the summer months. Therefore, in addition to increasing water supply, use of reclaimed water would help meet peak monthly and daily production capacity needs.

In 2003 ACWD and USD completed an evaluation of the feasibility of constructing a satellite recycled water treatment facility in southern Fremont at USD's Irvington Pump Station. This satellite facility would benefit ACWD by providing a recycled water source for customers in southern and central Fremont, and would benefit USD by providing advanced treatment for a potential new wet-season outfall, thereby addressing some of the wet-weather disposal issues facing USD. As described in Chapter 6, prior to moving forward with this project, primary customers (i.e. golf courses) demands must be in place.

Demand Management

As discussed in Chapter 7, demand management is a key component of ACWD's long-term water supply and management strategy. The IRP recommended program ("Package 2") includes components to reduce both indoor and outdoor use for all customer groups within the District's service area. However, the focus of the recommended program is to reduce peak summer demands in order to reduce the need for additional production and storage facilities. In addition, as a signatory to the MOU on Urban Water Conservation, ACWD is committed to implementing locally cost-effective water conservation best management practices ("BMPs"), as developed by the California Urban Water Conservation Council (CUWCC). A summary of ACWD's water conservation program is presented in Chapter 7 and Appendix B (BMP Implementation Report).

As part of the IRP process, the District estimated that the total long-term savings from District sponsored conservation measures would range from approximately 1,600 AF/Yr to 4,900 AF/Yr. A range in potential savings was developed due to the uncertainties in actual savings associated with water conservation programs. For planning purposes, an average annual projected savings of 2,900 AF/Yr by the year 2020 is utilized. This quantity of savings is based on year 2000 base conditions. Of this total quantity of savings, it is estimated that approximately 700 AF/Yr of savings has occurred to date (i.e. from the 2000 baseline conditions through 2005) due to conservation measures already implemented, and another 2,200 AF/Yr of annual savings will be achieved by the year 2020. It should be noted that these projected conservation savings do not include savings that would occur due to "natural conservation" (i.e., savings due to the retrofit of non-conserving plumbing fixtures with low flow fixtures). Rather, savings from natural conservation are accounted for in the District's water demand projections as are savings from pre-2005 District sponsored conservation programs.

Groundwater Management

As stipulated in the District's Groundwater Management Policy (adopted on January 26, 1989, and amended on March 22, 2001), it is the policy of the District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational and agricultural water needs in the ACWD service area (see Chapter 4 for a more detailed discussion of local groundwater management). In order to protect the Basin from seawater intrusion, the District's operational goals are to maintain groundwater levels above sea-level in the Newark Aquifer system (the upper aquifer which is hydraulically connected to San Francisco Bay). However, during critically dry periods the District may temporarily reduce groundwater levels slightly below sea-level (-5 feet mean sea-level minimum level), in the Newark Aquifer in the Forebay (inland) area. Detailed modeling analysis has indicated that temporarily drawing the aquifer down in this inland area could provide additional supply in critically dry years without impacting the integrity of the Basin. This analysis assumes that (1) there are no new parties pumping from the Basin, and (2) that groundwater outflows from the Basin are not increased due to increased pumping in adjacent groundwater basins that are hydraulically connected with the Niles Cone Groundwater Basin.

A key component of ACWD's management of the Niles Cone Groundwater Basin is the capability to recharge the groundwater system through the District's groundwater percolation ponds. In order to maintain the recharge capacity at these ponds, the District completed a rehabilitation of these percolation ponds in 1997. Under an agreement with the East Bay Regional Park District, the Quarry Lakes rehabilitation project also allowed for joint use of these percolation ponds for recreation and wildlife purposes.

Off-Site Banking and Transfers/Exchanges

Even with new programs for water conservation, recycled water and desalination, the District identified the need for additional supplies during dry and critically dry years. Analyses performed during the development of the IRP indicated that the District will require up to 20,000 AF/Yr in critically dry years and up to 100,000 AF over an extended 7-year drought. In 1999, the District completed an evaluation of a wide-range of alternatives to meet our dry year water needs. The report identified the potential methods to secure dry year supplies through both off-site banking and transfers/exchanges.

Off-site storage involves storing excess ACWD SWP supplies during wet and above normal years, for use during dry years. Since ACWD has limited local storage in the Niles Cone Groundwater Basin, storage needs to take place at off-site surface reservoirs or groundwater basins. The IRP shows a total need of 100,000 AF of off-site storage capacity by the year 2020, and 140,000 AF by the year 2030. To meet these goals, in 1997 ACWD secured 50,000 AF of storage capacity at the Semitropic Groundwater Banking Program and in 2001 secured an additional 100,000 AF, for a total combined storage capacity of 150,000 AF. As of December 2005, ACWD has stored approximately 100,000 AF at the Semitropic Groundwater Bank

A key limitation to the Semitropic Banking Program is the capacity to return water to ACWD during dry years. Under ACWD's water banking agreements with Semitropic, the amount of return (or "take" capacity) from the program is based on the total amount of storage capacity. Because of this limitation, the amount of storage capacity ACWD has secured at Semitropic has exceeded the IRP recommended quantity. ACWD water supply analyses has indicated that in most dry years this groundwater banking capacity, in combination with the District's other water supplies, will be sufficient to meet the District's water needs. However, during the most critical droughts (e.g. 1977 conditions), ACWD may still not have adequate take capacity from the Semitropic Banking Program to meet all in-District water demands.

Another option to meet dry year water supply needs is for ACWD to enter into exchange agreements for dry year supplies or to purchase raw water supplies in dry years. Typically, these options would involve purchasing Delta water supplies from an entity which could temporarily use a local groundwater supply in-lieu of surface water supplies provided to ACWD. ACWD currently participates with the Department of Water Resources and State Water Contractors on an annual basis to evaluate potential water transfer opportunities.

Treatment Plant Upgrades

The District's IRP recommended that, by the year 2030, an additional 4 mgd of treatment plant capacity should be added to help meet peak summer day demands and to ensure that ACWD water quality goals could be met. In 2003 ACWD began construction at the District's Mission San Jose Water Treatment Plant (MSJWTP) to convert the treatment plant to ultrafiltration. In this process, water is forced through porous membranes. Due to the small size of the membrane pores, ultrafiltration provides a very effective barrier against the passage of particulate matter, protozoan cysts, bacteria and viruses. An advantage of this technology is that it reduces the amount of chemical disinfection that is required to kill disease-causing agents. As part of this upgrade, the overall peak summer capacity of the treatment plant was also increased by 2 mgd.

8.3 WATER SUPPLY AND DEMAND COMPARISONS

A key recommendation in the District's 1995 Integrated Resources Planning Study was that the implementation status and planning assumptions be reviewed every ten years. As of December 2005, ACWD is in the process of completing this update to the IRP. As part of the update process, ACWD has completed its analysis of the projected water supply availability and demands under average year, single dry year, and multiple dry year conditions. These analyses are based on the most recent water supply availability projections (as described in Chapter 3) provided by the DWR and the SFPUC for ACWD's imported water supplies. Projections of local water supply reliability are based on modeling analyses under long-term local hydrologic conditions (1922-1994 historical rainfall and runoff in the Alameda Creek Watershed). These analyses also assume implementation of the ACWD water supply strategy as detailed in the IRP and ACWD's Capital Improvement Plan.

The results of these analyses are presented in Table 8-2 and indicate that under normal year water supply conditions (representing median-year water supply availability based on 1922-1994 historical hydrologic conditions) ACWD will have sufficient supplies to meet projected future water demands, as adjusted for estimated future water conservation savings. As indicated in Table 8-2, this analysis also indicates that during these hydrologic conditions, ACWD would have sufficient supplies available (in excess of the projected demands) for placing into groundwater storage (locally or at the off-site Semitropic Groundwater Bank) for later use in the service area in dry years.

Table 8-2
Projected Normal Year Water Supply and Demand Comparison (AF/Yr)

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	32,700	33,800	34,900	36,000	36,000
- San Francisco Regional	15,300	15,300	15,300	15,300	15,300
Total Imported Supplies	48,000	49,100	50,200	51,300	51,300
Local Supplies					
- Groundwater Recharge	25,700	25,700	25,700	25,700	25,700
- Groundwater Storage	0	0	0	0	0
- Del Valle Release	3,400	3,400	3,400	3,400	3,400
- Desalination	5,100	5,100	5,100	5,100	5,100
- Recycled Water	0		1,600	1,600	1,600
Total Local Supplies	34,200	34,200	35,800	35,800	35,800
Banking/Transfers					
- Semitropic Banking	0	0	0	0	
TOTAL SUPPLY	*82,200*	*83,300*	*86,000*	*87,100*	*87,100*
DEMAND COMPONENT					
- Distribution System Demand	59,500	61,400	63,200	63,700	64,300
- Estimated Conservation Savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	14,800	14,800	14,800	14,800	14,800
TOTAL DEMAND	*73,600*	*74,700*	*75,800*	*76,300*	*76,900*
SUPPY & DEMAND COMPARISON					
- Supply Totals	82,200	83,300	86,000	87,100	87,100
- Demand Totals	73,600	74,700	75,800	76,300	76,900
- Difference	8,600	8,600	10,200	10,800	10,200
- Difference as % of Supply	10%	10%	12%	12%	12%
- Difference as % of Demand	12%	12%	13%	14%	13%

Notes:

1. Normal Year conditions are based on the median supply availability based on a review of 1922-1994 historical hydrologic conditions. The year 1944 was selected as it is the closest year to the statistical median for current and future total water supply availability.

2. Groundwater System Demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows.

3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. Under Normal Year conditions, ACWD does not anticipate utilizing Groundwater Storage (groundwater use in excess of recharge) or Semitropic Groundwater Banking. These supplies would be used under dry year conditions when imported and local supply availability would be reduced.

5 As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-3 provides a summary of the supply availability under the most severe single-year drought on record (1977). This drought year represents the projected minimum water supply availability considering all of ACWD's water supplies (i.e. State Water Project, San Francisco Regional and local supplies). This analysis indicates that ACWD would experience a shortage of approximately 15% during a similar critical drought under all future demand conditions (2010, 2015, 2020, 2025 and 2030). Under this dry year scenario, ACWD's SWP supplies would be cutback by approximately 95%, and ACWD would need to rely on local and off-site groundwater storage for approximately 24,000 acre-feet to help make up for this shortfall. Under such severe critical drought conditions (1 in 70 year occurrence), ACWD would look to secure additional supplies through a DWR drought water bank or similar water purchase/transfer program. In addition, ACWD would also likely implement the drought contingency plan described in Chapter 9 of this Plan.

Tables 8-4 through 8-8 provide summaries of the projected supply availabilities under a long-term (5 year) drought for 2006-2010, 2011-2015, 2016-2020, 2021-2025, and 2026-2030 demand conditions. This multiple year drought sequence is based on the 1929-1933 historical hydrologic conditions, which represents the most severe 5-year drought on record (based on projected availability of ACWD's supplies over the 1922-94 hydrologic period). The results from these analyses indicate that ACWD will have sufficient supplies to withstand a similar long-term drought. The maximum shortage projected (4% in the third year of the drought sequence) is well within the District's reliability goals of no more than a 10% shortage on a one in thirty year basis. As with the single dry year condition, both local groundwater storage and off-site groundwater storage in Semitropic will play key roles in offsetting shortfalls in the District's other local and imported supplies.

Table 8-3
Projected Single Dry Year Water Supply and Demand Comparison (AF/Yr)

SUPPLY/DEMAND	Year				
	2010	2015	2020	2025	2030
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	1,700	1,800	1,800	1,900	1,900
- San Francisco Regional	11,700	13,700	14,100	12,700	13,100
Total Imported Supplies	13,400	15,500	15,900	14,600	15,000
Local Supplies					
- Groundwater Recharge	15,600	15,600	15,600	15,600	15,600
- Groundwater Storage	10,000	10,000	10,000	10,000	10,000
- Del Valle Release	100	100	100	100	100
- Desalination	5,600	5,600	5,600	5,600	5,600
- Recycled Water	0	0	1,600	1,600	1,600
Total Local Supplies	31,300	31,300	32,900	32,900	32,900
Banking/Transfers					
- Semitropic Banking	13,500	13,500	13,500	13,500	13,500
TOTAL SUPPLY	*58,200*	*60,300*	*62,300*	*61,000*	*61,400*
DEMAND COMPONENT					
- Distribution System Demand	59,500	61,400	63,200	63,700	64,300
- Estimated Conservation Savings	(700)	(1,500)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,500	10,500	10,500	10,500	10,500
TOTAL DEMAND	*69,300*	*70,400*	*71,500*	*72,000*	*72,600*
SUPPY & DEMAND COMPARISON					
- Supply Totals	58,200	60,300	62,300	61,000	61,400
- Demand Totals	69,300	70,400	71,500	72,000	72,600
- Difference	(11,100)	(10,100)	(9,200)	(11,000)	(11,200)
- Difference as % of Supply	-19%	-17%	-15%	-18%	-18%
- Difference as % of Demand	-16%	-14%	-13%	-15%	-15%

Notes:

1. Single Dry Year conditions are based on the projected supply availability under 1977 drought conditions.

2. Groundwater system demands include (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered

3 ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010 Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-4
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2006-2010 (AF/Yr)

SUPPLY/DEMAND	*Year*				
	2006	*2007*	*2008*	*2009*	*2010*
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	11,300	28,900	10,500	14,800	13,600
- San Francisco Regional	15,300	15,300	13,500	15,300	15,300
Total Imported Supplies	26,600	44,200	24,000	30,100	28,900
Local Supplies					
- Groundwater Recharge	12,900	13,000	9,000	20,900	13,700
- Groundwater Storage	8,800	0	10,000	0	4,100
- Del Valle Release	900	5,100	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,600	4,500
- Recycled Water	0	0	0	0	0
Total Local Supplies	27,600	23,100	24,500	29,900	23,300
Banking/Transfers					
- Semitropic Banking	16,100	2,300	15,600	17,900	17,400
TOTAL SUPPLY	*70,300*	*69,600*	*64,100*	*77,900*	*69,600*
DEMAND COMPONENT					
- Distribution System Demand	57,300	57,800	58,300	58,900	59,500
- Estimated Conservation Savings	(100)	(300)	(400)	(600)	(700)
- Groundwater System Demands	11,900	10,400	8,800	13,800	8,700
TOTAL DEMAND	*69,100*	*67,900*	*66,700*	*72,100*	*67,500*
SUPPY & DEMAND COMPARISON					
- Supply Totals	70,300	69,600	64,100	77,900	69,600
- Demand Totals	69,100	67,900	66,700	72,100	67,500
- Difference	1,200	1,700	(2,600)	5,800	2,100
- Difference as % of Supply	2%	2%	-4%	7%	3%
-Difference as % of Demand	2%	3%	-4%	8%	3%

Notes:

1. Mulliple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.

2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.

3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-5
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2011-2015 (AF/Yr)

SUPPLY/DEMAND	*Year*				
	2011	*2012*	*2013*	*2014*	*2015*
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	11,400	28,500	10,700	15,200	13,600
- San Francisco Regional	15,300	15,300	13,700	15,300	15,300
Total Imported Supplies	26,700	43,800	24,400	30,500	28,900
Local Supplies					
- Groundwater Recharge	12,800	12,300	9,800	19,800	14,100
- Groundwater Storage	9,300	0	10,000	0	3,100
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	0	0	0	0	0
Total Local Supplies	28,000	22,500	25,300	28,700	22,700
Banking/Transfers					
- Semitropic Banking	16,100	5,400	15,900	18,700	17,400
TOTAL SUPPLY	*70,800*	*71,700*	*65,600*	*77,900*	*69,000*
DEMAND COMPONENT					
- Distribution System Demand	59,800	60,200	60,500	60,900	61,400
- Estimated Conservation Savings	(900)	(1,000)	(1,200)	(1,300)	(1,500)
- Groundwater System Demands	11,300	10,000	8,700	10,100	8,700
TOTAL DEMAND	*70,200*	*69,200*	*68,000*	*69,700*	*68,600*
SUPPY & DEMAND COMPARISON					
- Supply Totals	70,800	71,700	65,600	77,900	69,000
- Demand Totals	70,200	69,200	68,000	69,700	68,600
- Difference	600	2,500	(2,400)	8,200	400
- Difference as % of Supply	1%	3%	-4%	11%	1%
- Difference as % of Demand	1%	4%	-4%	12%	1%

Notes:

1. Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.

2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.

3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-6
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2016-2020 (AF/Yr)

SUPPLY/DEMAND	Year				
	2016	2017	2018	2019	2020
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	11,400	28,200	10,800	15,600	13,600
- San Francisco Regional	15,300	15,300	14,100	15,300	15,300
Total Imported Supplies	26,700	43,500	24,900	30,900	28,900
Local Supplies					
- Groundwater Recharge	12,600	12,100	9,700	19,600	14,100
- Groundwater Storage	8,100	0	10,000	0	2,600
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	0	0	0	0	1,600
Total Local Supplies	26,600	22,300	25,200	28,500	23,800
Banking/Transfers					
- Semitropic Banking	16,100	5,400	15,900	18,700	17,400
TOTAL SUPPLY	*69,400*	*71,200*	*66,000*	*78,100*	*70,100*
DEMAND COMPONENT					
- Distribution System Demand	61,600	61,900	62,200	62,400	63,200
- Estimated Conservation Savings	(1,600)	(1,700)	(1,900)	(2,000)	(2,200)
- Groundwater System Demands	10,900	10,000	8,700	10,200	8,700
TOTAL DEMAND	*70,900*	*70,200*	*69,000*	*70,600*	*69,700*
SUPPY & DEMAND COMPARISON					
- Supply Totals	69,400	71,200	66,000	78,100	70,100
- Demand Totals	70,900	70,200	69,000	70,600	69,700
- Difference	(1,500)	1,000	(3,000)	7,500	400
- Difference as % of Supply	-2%	1%	-5%	10%	1%
- Difference as % of Demand	-2%	1%	-4%	11%	1%

Notes:

1. Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.

2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.

3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-7
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2021-2025 (AF/Yr)

SUPPLY/DEMAND	*Year*				
	2021	*2022*	*2023*	*2024*	*2025*
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	11,400	27,800	10,900	16,000	13,600
- San Francisco Regional	15,300	15,300	14,600	15,300	15,300
Total Imported Supplies	26,700	43,100	25,500	31,300	28,900
Local Supplies					
- Groundwater Recharge	12,600	12,000	9,700	19,700	14,100
- Groundwater Storage	6,900	0	10,000	0	3,100
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	4,500	5,500	4,500
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	27,000	23,800	26,800	30,200	24,300
Banking/Transfers					
- Semitropic Banking	16,200	5,400	15,900	18,700	17,400
TOTAL SUPPLY	*69,900*	*72,300*	*68,200*	*80,200*	*70,600*
DEMAND COMPONENT					
- Distribution System Demand	63,300	63,400	63,500	63,600	63,700
- Estimated Conservation Savings	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,700	9,900	8,700	10,200	8,700
TOTAL DEMAND	*71,800*	*71,100*	*70,000*	*71,600*	*70,200*
SUPPY & DEMAND COMPARISON					
- Supply Totals	69,900	72,300	68,200	80,200	70,600
- Demand Totals	71,800	71,100	70,000	71,600	70,200
- Difference	(1,900)	1,200	(1,800)	8,600	400
- Difference as % of Supply	-3%	2%	-3%	11%	1%
- Difference as % of Demand	-3%	2%	-3%	12%	1%

Notes.

1. Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.

2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.

3 ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

Table 8-8
Projected Multiple Dry Year Period Water Supply and Demand Comparison for 2026-2030 (AF/Yr)

SUPPLY/DEMAND	Year				
	2026	2027	2028	2029	2030
SUPPLY COMPONENT					
Imported Supplies					
-State Water Project	11,400	27,800	10,900	16,000	13,600
- San Francisco Regional	15,300	15,300	13,100	15,300	15,300
Total Imported Supplies	26,700	43,100	24,000	31,300	28,900
Local Supplies					
- Groundwater Recharge	12,700	12,100	9,900	19,800	14,000
- Groundwater Storage	9,100	0	10,000	0	3,300
- Del Valle Release	900	5,200	1,000	3,400	1,000
- Desalination	5,000	5,000	2,000	1,900	2,600
- Recycled Water	1,600	1,600	1,600	1,600	1,600
Total Local Supplies	29,300	23,900	24,500	26,700	22,500
Banking/Transfers					
- Semitropic Banking	16,200	6,200	15,900	18,700	17,400
TOTAL SUPPLY	*72,200*	*73,200*	*64,400*	*76,700*	*68,800*
DEMAND COMPONENT					
- Distribution System Demand	63,800	63,900	64,000	64,100	64,300
- Estimated Conservation Savings	(2,200)	(2,200)	(2,200)	(2,200)	(2,200)
- Groundwater System Demands	10,800	9,900	5,600	5,500	6,400
TOTAL DEMAND	*72,400*	*71,600*	*67,400*	*67,400*	*68,500*
SUPPY & DEMAND COMPARISON					
- Supply Totals	72,200	73,200	64,400	76,700	68,800
- Demand Totals	72,400	71,600	67,400	67,400	68,500
- Difference	(200)	1,600	(3,000)	9,300	300
- Difference as % of Supply	0%	2%	-5%	12%	0%
- Difference as % of Demand	0%	2%	-4%	14%	0%

Notes:

1. Multiple Dry Year conditions are based on the projected supply availability under 1929-33 drought conditions.

2. Groundwater system demands include: (1) ARP groundwater production, (2) private groundwater pumping, and (3) saline groundwater outflows. Under dry year conditions ACWD's groundwater system demands may be reduced from Normal Year conditions due to a reduction in saline groundwater outflows as local groundwater elevations are temporarily lowered.

3. ACWD anticipates expanding the Newark Desalination Facility from 5 mgd to 10 mgd by the year 2010. Depending on groundwater conditions, the expanded desalination facility may provide up to 11,200 AF/Yr of supply.

4. As documented in ACWD's 2001-2005 UWMP, ACWD's long-term planning is based on conservation savings of 2,900 AF/Yr to be achieved by the year 2020. Of the 2,900 AF/Yr estimated savings, it is estimated that 700 AF/Yr of savings has already been achieved due to conservation program implementation between the years 2000 and 2005. This existing level of conservation savings (700 AF/Yr) is already accounted for in the demand projections. Therefore, this 2006-2010 Urban Water Management Plan assumes that the remaining balance of 2,200 AF/Yr savings (or 2,900 AF/Yr minus 700 AF/Yr) will be achieved by the year 2020.

CHAPTER 9
WATER SHORTAGE CONTINGENCY PLAN

This chapter provides the District's water shortage contingency plan, as required under the Urban Water Management Planning Act. Although it is the District's water supply reliability goal to sustain a shortage of no more than 10% during dry and critically dry conditions, the potential exists for interruptions to either our imported or local water supplies (due to earthquakes, etc.) that may result in significantly greater shortages. As such, this contingency plan includes scenarios for shortages of up to 50%.

9.1 CONTINGENCY PLAN OVERVIEW

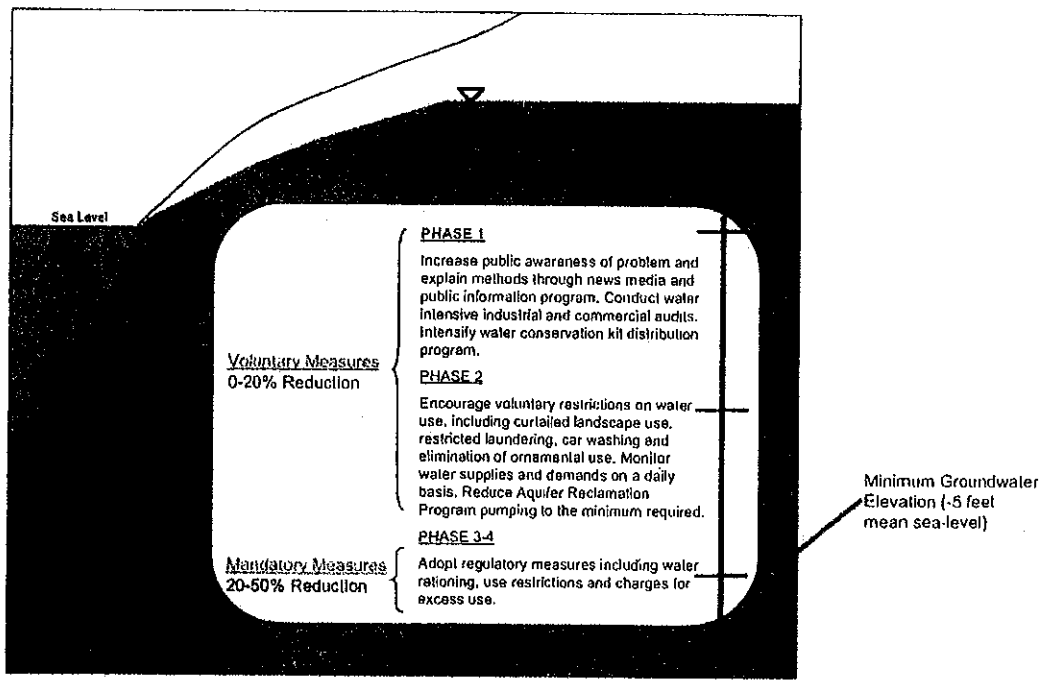
The District has sufficient water supplies to meet demands in most years, but deficiencies can occur as a result of dry winter weather or through extended interruption of imported supplies. Under normal circumstances the Niles Cone Groundwater Basin provides the storage capacity needed to protect against short-term water supply deficiencies or disruptions. ACWD will also utilize off-site storage at the Semitropic Water Storage District's Groundwater Banking Program to help meet dry year water supply needs. However, long-term shortfall between available water supply and demand will eventually appear in the form of lower water levels in the upper aquifer (Newark Aquifer) of the Niles Cone Groundwater Basin.

The Newark Aquifer is subject to saltwater intrusion particularly if inland groundwater levels remain at or near sea-level for a protracted period of time, or if inland groundwater levels drop further than five feet below sea level for any period of time. For this reason the District has been operating the basin to maintain a water level in the Newark Aquifer of at least five feet above sea level. ACWD has an ongoing program to assess water supply and demand imbalances. Each year during the months of December, January and February, the impacts of demand and supply balance are assessed, including the effects of potential reductions in imported San Francisco Regional supplies and State Water Project supplies, (*Annual Survey Report on Groundwater Conditions*). On the basis of this assessment, the groundwater levels in the Niles Cone Groundwater Basin for the following September can be estimated. These September levels are generally the lowest of the year due to high summer consumption and low rainfall. As such, they are key indicators of the presence of potential shortage. A change in the water level of five feet represents about 5,000 acre-feet of water or roughly one average month of District water supplies at current consumption levels. Figure 9-1 summarizes the management measures that go into effect at the various levels of projected reduction. Based on the anticipated September groundwater levels, Figure 9-2 summarizes the steps the District would take to implement a Water Deficiency Action Plan in response to determining that a water supply shortfall exists.

9.2 THREE YEAR DROUGHT ANALYSIS

An estimate of the minimum water supply available to ACWD over the next three years (2006-2008) was developed based on the driest three year sequence that is incorporated in ACWD's planning model, and is summarized in Table 9-1. The planning model utilizes the 72-year historical hydrologic conditions of 1922-94 for projections of local and imported supply availability. A review of the projected local and imported supply availability over the 72-year planning period indicates that the minimum cumulative imported and local water supply available to ACWD over a three-year sequence occurs under the 1931-1933 drought conditions. Modeling analysis indicates that this three year drought, if it occurred in the next three years would not result in significant shortages to ACWD. ACWD's ability to withstand a severe, three year drought without shortages is a result of: (1) the recent completion of the Newark Desalination Facility which provides up to 5,600 AF/Yr of supply; (2) the investment in off-site groundwater banking at Semitropic which could provide a total estimated supply of over 50,000 AF during the three-year drought sequence; and (3) the use of local groundwater storage in the Niles Cone Groundwater Basin which could provide over 14,000 AF of total supply over the three year drought scenario.

Figure 9-1
District Water Deficiency Response



9.3 WATER SHORTAGE MITIGATION OPTIONS

The following is a discussion of options that ACWD can utilize to offset the impacts of water supply shortages:

Augmentation of Supply

In any given year ACWD strives to achieve a balance between basin supply and overall demand requirements. The goal of this effort is to maintain a basin level that is either at or above sea level, to prevent overdraft and/or saltwater intrusion. In order to meet ACWD's water supply reliability goals, the District's water supply strategy includes the development of desalination, recycled water, and off-site groundwater banking programs. In addition, the temporary drawdown of the groundwater basin to below sea-level (-5 feet, minimum level) may be allowed to meet short term demands. All aspects of supply management are discussed in Chapter 8.

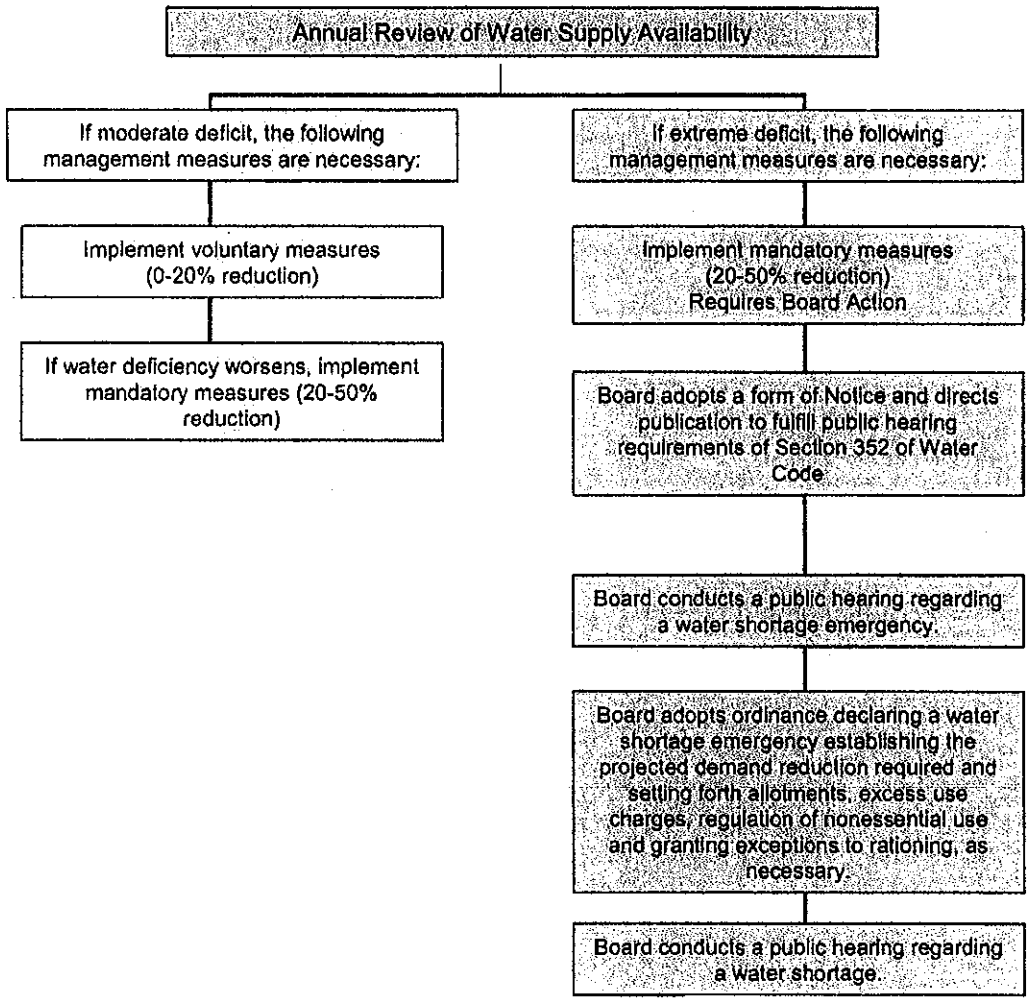
Evaporation

All District distribution reservoirs are covered to minimize evaporation while protecting the water from contamination.

Percolation

ACWD has percolation ponds which are necessary for the replenishment of its groundwater supply. Since the District's service area covers roughly the same area as the Niles Cone Groundwater Basin, recharge through the District's percolation facilities is an important District supply.

Figure 9-2
District Water Deficiency Action Plan



System Audits

The District has conducted an annual leak detection and repair program since 1987. This program will continue as a regular part of our operations.

Modifications to Operations

A blending facility which blends softer San Francisco Regional Water System supplies with harder groundwater has been in operation since 1992. This facility, along with other planned facilities, will help to meet ACWD's hardness goals and to help insure an equalized level of taste and hardness for all ACWD customers. However, under severe drought or emergency situations when sufficient San Francisco supplies are not available, the hardness criteria may be relaxed and additional, higher hardness groundwater may be utilized.

Table 9-1
Estimated Worst Case Three Year Drought Scenario

SUPPLY/DEMAND	*Drought Year 1 - 2006*	*Drought Year 2 - 2007*	*Drought Year 3 - 2008*
Supply			
Imported Supplies			
-State Water Project	10,400	14,400	13,600
-San Francisco Regional	13,500	15,300	15,300
Local Supplies			
- Groundwater Recharge	9,000	20,900	13,700
- Local Groundwater Storage	10,000	0	4,100
- Del Valle Release	1,000	3,400	1,000
- Desalination	5,600	5,600	5,600
Banking/Transfers			
- Semitropic Banking Program	15,600	17,900	17,400
Total Supplies	*65,100*	*77,500*	*70,700*
Demand			
Distribution System Demand	57,300	57,800	58,300
Estimated Conservation Savings	(100)	(300)	(400)
Groundwater System Demand	8,800	13,800	8,700
Total Demand	*66,000*	*71,300*	*66,600*
% Short to Meet Demand	1%	0%	0%

Notes:

1. Under critically dry conditions, the groundwater system demands may be reduced from Normal Year conditions, which would occur as a result of temporarily lowering groundwater levels in the Newark Aquifer (in the Forebay area) to slightly below sea-level (minimum elevation of -5 feet mean sea-level). This temporary drawdown of the Newark Aquifer may subsequently reduce the quantity of saline groundwater outflows to San Francisco Bay, thereby reducing the overall groundwater system demands.

Emergency Inter-ties

ACWD also has water distribution system pipeline interconnections with the City of Hayward and the City of Milpitas. These have been planned to be used during emergencies such as earthquakes. If appropriate, these interconnections could be used during a water supply emergency. In addition, as a SFPUC wholesale customer, ACWD may also receive emergency supply benefits from a recent inter-tie between the EBMUD system and the San Francisco Regional System.

Drawing from Reserve Supplies

ACWD is participating in the Semitropic Groundwater Banking Program. ACWD has 150,000 AF of storage capacity reserved at Semitropic, with over 100,000 AF currently in storage. In a drought situation, ACWD can retrieve water previously stored at Semitropic to help meet service area demands.

In addition, groundwater modeling of the Niles Cone Groundwater Basin has indicated that the basin groundwater levels may be temporarily drawn down to below sea-level without causing long-term water quality impacts to the Basin. In a severe drought or water shortage emergency, as documented in ACWD's Integrated Resources Planning Study, ACWD may allow the Basin groundwater elevation to be temporarily drawn down as low as 5 feet below sea-level.

Reduction of Demand

ACWD is committed to providing a reliable supply of water to its customers. The District strives to provide the highest standard of service possible to all customers within its service area. During a time of water supply shortage, first priority is given to meeting health, safety and human consumption requirements.

Since the options for supply augmentation are limited, the District's need to reduce demand during the drought emergency is very important. By adhering to the BMPs in the water conservation MOU, we are working to reduce demand in all customer categories. Chapter 7 provides a detailed description of these programs.

It is also important that business and industry be allowed to continue to operate, therefore, some consideration is made for these customer classes when demand reduction levels are developed. These levels extend to a potential 50 percent shortfall, in compliance with the requirements of Water Code Section 10631. However, it should be noted that if this level of reduction were to actually occur, there is a potential for major economic impacts among the more water intensive industries in the District's service area. Table 9-2 shows billed water consumption by customer class for FY 2003/04. Using these figures as a base, Table 9-3 shows a typical sensitivity analysis for demand reduction by customer category.

Once the demand reduction level has been determined, ACWD will enact a program that will include actions required by each customer group. The Drought Management Action Plan for various levels of supply shortage is described in Tables 9-4a through 9-4d.

Table 9-2
FY 2003/04 Consumption by Customer Class

Customer Class	*Consumption (AF)*
Residential	34,100
Industry	4,100
Business	5,200
Institutional	2,300
Landscape	6,300
Total	***52,000***

Table 9-3
Example Sensitivity Analysis for Reduction in Levels of Consumption

Water Consumption	*No Deficiency*		*10% Deficiency*		*20% Deficiency*		*30% Deficiency*		*50% Deficiency*	
	%	*Amt. (AF)*	%	*Amt. (AF)*	%	*Amt. (AF)*	%	*Amt. (AF)*	%	*Amt. (AF)*
1. Total FY03/04 consumption *(excludes hydrants/firelines)*		52,000		52,000		52,000		52,000		52,000
2. Required overall reduction	0	0	10	5,200	20	10,400	30	15,600	50	26,000
3. Required level of consumption		52,000		46,800		41,600		36,400		26,000
4. Example level of reduced consumption:										
Residential[1]	100	34,100	90	30,690	80	27,280	68	23,188	57	19,437
Industrial[1]	100	4,100	90	3,690	85	3,485	85	3,485	70	2,870
Business[1]	100	5,200	90	4,680	85	4,420	85	4,420	50	2,600
Institutional[1]	100	2,300	90	2,070	85	1,955	85	1,955	50	1,150
Landscape	100	6,300	90	5,670	70	4,410	54	3,402	0	0
Total		*52,000*		*46,800*		*41,550*		*36,450*		*26,057*
5. Residential level of consumption-										
Avg. gpd per units served[2]		293		264		234		199		167
Avg. gpd per capita[3]		94		84		75		Lifeline 64		Lifeline 53

Notes:
[1] Does not include water use for dedicated landscape accounts (i.e. residential, industrial, business and institutional landscape accounts). This water use is listed separately under the "Landscape" category.
[2] Based on a total of 103,970 single-family and multi-family residential units in 2005 (source: ABAG).
[3] Based on January 2005 Department of Finance population estimate of 324,838 for Fremont, Union City and Newark.

Table 9-4a
Drought Management Action Plan
Minimal Shortage (5-10%)

ACWD Action

- Initiate public information campaign.
- Explain drought situation to the public and governmental bodies.
- Explain other stages and forecast future actions.
- Request voluntary water conservation.
- Prepare and disseminate educational brochures, bills inserts, etc.
- Send technical information to specific customer types on ways to save water.
- Display information at Public Programs.
- Notify media.
- Begin advertising campaign.

Requested Customer Actions

Residential

- Implement voluntary water use reductions.
- Adhere to water waste ordinance.

Business/Industrial

- Research reuse options.
- Improve cooling tower efficiency.

Cities/Schools

- Request water conservation measures be instituted.

Enforcement

1. Educational letter, call or visit.
2. Educational visit and warning.

Table 9-4b
Drought Management Action Plan
Moderate Shortage (10-20%)

ACWD Actions

- Adopt ordinance banning water waste such as: hosing of paved surfaces, irrigation during daylight hours, unrepaired leaks water running into the street, fountains, except those using recirculated water.
- Set Allocations by customer type.
- Accelerate public information program.
- Disseminate technical information.
- Institute rate program to support conservation.
- Ask consumers for water use reductions at proscribed levels.
- Lobby for passage of drought ordinances by cities in service area.
- Encourage use of ET rate for landscape watering.
- Train staff for more interaction with the public especially leak detection and irrigation problems.
- Increase efficiency of ACWD operation to ensure supply.
- Increase advertising.
- Minimize hydrant flushing.
- Conduct water audit program.

Requested Customer Actions

Residential

- Adhere to water waste ordinance.
- Remain within water allocation or request an exception.
- Urge use of water saving plumbing devices in the home.

Commercial/Industrial

- Adhere to ordinance.
- Stay within allocation, or request an exception.
- Recycle wherever possible.
- Water served to restaurant customers on request only.
- Use of ET for watering of landscaping.

Cities/Schools

- Reduce landscape watering.

Enforcement

1. Educational letter, call or visit.

Table 9-4c
Drought Management Action Plan
Severe Shortage (20-30%)

ACWD Actions

- Adopt Base Consumption Allowance for each customer class and establish use charges.
- Advise area planning staffs of possible short-term inability to supply new developments/ annexations due to shortages to existing customers.
- Continue public information program at accelerated pace.
- Implement rate program to include fines for water wasters.
- Require all homes and businesses to adhere to mandatory regulations.
- Main flushing for emergencies only.
- Water audit program expanded.

Customer Actions

Residential

- Adhere to allocations, and restrictions as stated in ordinance.
- Use of ET for landscape watering needs.
- Use of greywater encouraged for landscape.

Business/Industrial

- Limit landscape watering.
- Submit audit of company water use demonstrating conservation efforts.

Cities/Schools

- Limit landscape watering.
- Cover pools.
- All fountains turned off.

Enforcement

1. Educational letter and visit. Fine for overuse/waste.
2. Final warning. Fine for overuse/waste.
3. Installation of flow restrictor. Fine for overuse/waste.
4. Shutoff, and reconnection fee.

Table 9-4d
Drought Management Action Plan
Critical Shortage (30-50%)

ACWD Actions

- All steps intensified.
- No potable water used by landscape meters.
- Reassess allocation plan for possible per capita residential allowance.

Customer Actions

Residential

- Adhere to ordinance.
- Remain within allocation.
- Car washing prohibited.
- Suggest monitoring water meter.
- Pools filled with water from tank truck services.
- Drip irrigation, greywater or reclaimed water used for landscaping.

Business/Industry

- Landscape watering limited to tank truck services or reclaimed water.
- Recycling of water required wherever feasible in process.
- Fountains turned off.

Cities/Schools

- Landscape watering limited to tank truck services or reclaimed water for playing fields.
- Pools filled with tank truck water only.
- All public water not required for health or safety prohibited, except if tank truck water can be used.

Enforcement

1. Educational letter and visit. Fine for overuse/waste.
2. Final Notice. Fine for overuse/waste.
3. Flow restrictor. Fine for overuse/waste.
4. Shutoff and reconnection fee.

9.4 ADMINISTRATION OF PROGRAM

In keeping with ACWD's Water Deficiency Action Plan, after comprehensive study the Board will enact, and staff will implement, a water demand management plan based on actual conditions. As done in 1991, a drought rate structure would be developed to augment and support the demand reduction program. Shown in Table 9-5 is an example of drought rate structures based on the four levels of supply deficit.

Table 9-5
Example Rate Structures Based on Deficit

Residential				
Cutback	***10%***	***20%***	***30%***	***50%***
Base Consumption Allowance (gpd)	N/A	350	250	200
Base Rate ("BR")	BR	Up to 350	Up to 250	Up to 200
2 x Base Rate		351 to 475	251 to 350	201 to 300
3 x Base Rate		476 to 600	351 to 500	310 to 400
4 x Base Rate		601+	501+	400+
Greater than 4 x Base Rate			*Flow restrictor Threat to shut off*	
Business/Industrial Governmental/Multi-Family Residential				
Base Consumption Allowance (BCA)			Base Rate	
20% above BCA			2x Base Rate	
30% above BCA			3x Base Rate	
40% above BCA			4x Base Rate	
Above 40%, full audit and possible flow restrictors or shut off.				

Note: Actual rate structure and base consumption allowance to be set by ACWD Board at the time the water demand management plan is implemented.

Impacts on Revenues/Expenditures

In 1987, the District's Board of Directors established a Dry Year Contingency Reserve that was designed to minimize the impacts of future short-term demand reduction on rates. The reserve was based on the assumption that two out of every ten years could be expected to require demand reduction efforts due to drought. When fully funded, it would be able to maintain the District in a revenue-neutral position through two successive years of 25 percent reductions below normal demand levels. The reserve was applied during fiscal year 1991-92 to offset the effects of the drought emergency, and rates did not have to be raised to offset revenue losses caused by the demand reduction.

In 1996 the District replaced the Dry Year Contingency Fund with a Dry Year Water Supply component in the District's Capital Improvement Program. The purpose of this CIP component is to provide funding for the District's dry year water supply program, including the costs of the Semitropic Banking Program, and other potential programs such as purchases from a Drought Water Bank. This CIP component is currently funded at approximately $2.8 million per year, with a provision for unused funds being carried over from year to year. This fund will help to reduce impacts on rates during dry years that occur as a result of reduced revenue due to reduced water sales, and additional costs of securing supplies during shortages.

In addition, the adoption of the District's water supply emergency plan (Ordinance #30, see below) would also include the implementation of excess use charges. The revenue from the excess use charges would help to offset impacts from reductions in revenues due to cutbacks in water supplies.

Adoption of Plan

During a water supply shortage, the ACWD Board would take action to declare a water supply emergency and enact appropriate ordinances as required by California Water Code Section 350-358. In May of 1991, Ordinance #30 (Appendix C) was put into effect. This Drought Emergency Ordinance delineated the elements of the mandatory conservation program for the ACWD service including waste restrictions and excess use charges. The ordinance is updated as base rates change.

Impact on the Billing System

In order to implement a comprehensive billing program that could include differing rate levels for the drought, a new computerized system was installed. This system is capable of making changes in billing, and allows maximum flexibility for data retrieval.

Monitoring Use

The District monitors water use in two ways: total water production at each of the District's production facilities is monitored daily and monthly by the Operations Department, and billed consumption is monitored monthly through the Finance Department. The District reads each customer's water meter, and provides a water bill (with consumption information) on a bi-monthly basis.

Coordination with Other Agencies

ACWD serves the Cities of Fremont, Newark, and Union City. During the 1991 Drought Emergency, Union City enacted an ordinance that supported ACWD's restrictions, and the City of Fremont set forth a Resolution that supported the District's actions. During a future water emergency, ACWD will coordinate with the three cities to help resolve the situation. The District also has developed emergency inter-ties with the City of Hayward and the City of Milpitas.

Customer Notification and Assistance

ACWD has an active Public Information Program that shares information with the public in a variety of forms. The District's web-site, bill insertions, direct mailings, newspaper articles, a speaker's bureau, school materials, and purchased brochures are examples of this program. All District departments assist customers in need of help. Leak detection, service verification, bill adjustments, and engineering support are all offered to our customers at no extra charge.

9.5 CATASTROPHIC INTERRUPTION OF WATER SUPPLIES

Emergency Response Planning

In addition to preparation for water supply shortages due to droughts, ACWD's planning also includes preparation for catastrophic loss of supplies due to earthquakes, power outages, hazardous material spills, fire emergencies, water quality emergencies and malevolent acts and events. ACWD has in place an emergency response procedure that documents the responsibilities and response procedures for these types of events. These procedures are documented in detail in the District's Emergency Response Manual, and the key actions are summarized below:

- Mobilize using the Standardized Emergency Management System/Incident Command System.
- Assess damage to water system and its infrastructure.
- Evaluate damage and develop remedial action plan.
- Initiate repair and restore water service.
- Monitor progress of repairs and restoration.
- Communicate with health officials, the media, and water users on supply status.
- Coordinate with local, county and State in accordance with established emergency management guidelines.
- Document damage and repairs.

Evaluation of Catastrophic Loss of SWP Water Supplies

In 2004 ACWD completed an analysis of the potential water supply impacts of the loss of SWP supplies due to a catastrophic failure of Delta levees. This evaluation focused on the District's SWP supplies because the SWP provides the greatest quantity of imported supplies to the District service area. The emergency supply scenario evaluated by ACWD was based on concerns surrounding the 2004 Jones Tract levee failure that threatened use of the Harvey O. Banks Pumping Plant to provide ACWD its SWP supplies. Under the scenario evaluated, it is assumed the South Bay Aqueduct is functional with its sole supply coming from Del Valle Reservoir (i.e. no supplies from the Delta are available). Thus, the analysis evaluated ACWD's ability to provide water to its customers considering no State Water Project or Semitropic/transfer water supply available and all applicable production and hydraulic constraints. The analysis assumes the current (2005) distribution system demands and no emergency conservation benefit.

The analysis assumed existing conditions from May 2004, specifically average groundwater levels, median SFPUC allocation, and 6,000 AF of emergency storage from Del Valle with no additional ACWD storage. The following rain year replenishment of local supplies assumed 2003 conditions for ground water and available diversions as well as 3,000 AF of inflow to Del Valle with no additional emergency storage. Median SFPUC supply is assumed for the following year as well.

Findings from the analysis show that ACWD could continue to provide full water deliveries to its customers for over 12 months, including the projected annual increase in water demand, before supply and production constraints limit further deliveries. ACWD's estimates of its ability to withstand an extended outage of its SWP supplies is attributed to the projected availability of its local supplies (groundwater, desalination), emergency storage from Del Valle Reservoir in the Alameda Creek Watershed, and continued purchases of San Francisco Regional Water System supplies.

Appendix A

ACWD's Groundwater Management Policy

ALAMEDA COUNTY WATER DISTRICT

GROUNDWATER MANAGEMENT POLICY

(Adopted January 26, 1989)
(Amended March 22, 2001)

TABLE OF CONTENTS

GROUNDWATER MANAGEMENT POLICY
ADOPTED JANUARY 26, 1989
Amended March 22, 2001

BACKGROUND

The Alameda County Water District (ACWD) was created by a vote of area residents in December 1913, thereby becoming the first water district in California to be formed under the County Water District Act enacted earlier that year. It is governed by a five-member board of directors, elected at large.

In the years preceding the vote, local farmers and residents had become concerned about water companies and agencies exporting water from both Alameda Creek and local groundwater to nearby communities such as Oakland and San Francisco. The result of these exports was that the groundwater table was falling at a rapid rate. The voters hoped, in establishing ACWD, to regain control over local water supplies, to protect the underground water in the Niles Cone Groundwater Basin, and to conserve the waters of Alameda Creek.

ACWD now has several sources of supply, including water purchased from the State Water Project (via the South Bay Aqueduct) and the San Francisco Public Utilities Commission (via the Hetch Hetchy aqueduct system). But groundwater remains an important component of its supply, currently furnishing 35% of the water ACWD distributes. In dry years, groundwater has contributed over 60% of the supply. Thus, conservation and preservation of the groundwater basin continues to be a vitally important program for ACWD.

AUTHORIZATION

This Groundwater Management Policy is based on the statutory authority granted to ACWD under the County Water District Law (commencing with Section 30000 of the Water Code); the Replenishment Assessment Act of the Alameda County Water District (Section 4, Chapter 1942

of the Statutes of 1961, as amended in 1970 and 1973), which grants additional powers to ACWD to prevent pollution, contamination, or diminution in quality of the groundwater supply; local well ordinances (Fremont No. 950, as amended; Newark No. 136; and Union City No. 109-73); agreements with other agencies; and local hazardous materials ordinances.

POLICY STATEMENT

It is the policy of the Alameda County Water District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area. ACWD will develop and implement appropriate programs within the ACWD service area to protect and manage the groundwater basin as a long-term source of water supply for ACWD. ACWD will also actively protect the groundwater basin from activities outside the ACWD service area that may negatively impact the water quality and/or water supply of the basin.

OBJECTIVES

The purpose of this policy is to protect and improve ACWD's groundwater resources for the benefit of both ACWD's customers and private well owners by taking actions designed to meet the following objectives:

- Increase groundwater replenishment capability.
- Increase the usable storage capacity of the groundwater basin.
- Operate the basin to provide: (1) a reliable water supply to meet baseload and peak distribution system demands, (2) an emergency source of supply, and (3) reserve storage to augment dry year supplies.
- Protect groundwater quality from degradation from any and all sources including: saline

water intrusion, wastewater discharges, recycled water use, urban and agricultural runoff, or chemical contamination.

- Improve groundwater quality by (1) removing salts and other contaminants from affected areas of the basin, and (2) improving the water quality of source water used for groundwater recharge.

The specific groundwater management programs that have been developed and implemented by ACWD to achieve these policy objectives are listed in Table 1and are described in greater detail in Attachment 1 to this Policy.

This Policy is intended to serve as a guide to ACWD management in the continued development and implementation of programs to manage and protect ACWD water resources and as a nontechnical document to explain ACWD groundwater programs to members of the public. This Policy is not intended to create legal rights in any person or organization, or to impose legal obligations on ACWD. It may be amended or repealed by the Board of Directors at any time.

TABLE 1 - SUMMARY OF ACWD GROUNDWATER MANAGEMENT PROGRAMS

Groundwater Program	Description
Water Supply Management	Planning, managing, and optimizing ACWD's sources of supply: watershed runoff, SWP water for recharge, SWP water for treatment, SFPUC water for blending, and water banking.
Groundwater Replenishment	Operation of ACWD groundwater recharge facilities to optimize 1) capture of local runoff, 2) replacement of water extracted from production and ARP wells, and 3) maintenance of groundwater levels to prevent salt water intrusion.
Watershed Protection and Monitoring	Assisting in the protection and monitoring of the watershed to optimize the quality of runoff water available for ACWD water supply.
Basin Monitoring	Sampling and measuring wells to assess and evaluate 1) groundwater quality, 2) water pressures within the basin, and 3) the direction of groundwater flow.
Wellhead Protection Program	Identify sensitive recharge and groundwater areas, maintain an inventory of potential threats within these areas, assess the vulnerability of source water, and develop management strategies to minimize the potential for groundwater quality impacts.
Aquifer Reclamation Program	Pump brackish water from degraded aquifers in order to 1) increase useable basin storage, 2) improve overall water quality, 3) prevent movement of brackish water toward ACWD production wells, and 4) provide (future) supply augmentation through treatment to potable water standards.
Groundwater Protection Program	Maintain an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites.
Well Ordinance Administration	As enforcing agency for municipal ordinances governing construction, repair, or destruction of wells, ACWD provides inspection services, collects fees, and performs field searches for abandoned wells which could act as a conduit for contamination of groundwater.

ATTACHMENT 1

ACWD GROUNDWATER MANAGEMENT PROGRAMS

(March 22, 2001)

Eight major groundwater management programs have been developed and implemented by ACWD to achieve the objectives identified in ACWD's Groundwater Management Policy:

- Water Supply Management
- Groundwater Replenishment
- Watershed Protection and Monitoring
- Basin Monitoring
- Wellhead Protection Program
- Aquifer Reclamation Program
- Groundwater Protection Program
- Well Ordinance Administration

Water Supply Management

_____ACWD has three primary sources of water: (1) runoff from the Alameda Creek Watershed, (2) treated surface water purchased from the San Francisco Public Utilities Commission (SFPUC) and delivered through the Hetch Hetchy aqueduct system, and (3) untreated surface water purchased from the State Water Project (SWP) and delivered through the South Bay Aqueduct. Alameda Creek watershed runoff and imported water from the State Water Project are used for replenishment of the Niles Cone Groundwater Basin.

The groundwater basin is used conjunctively with surface water supplies. Generally, surface water production facilities are operated throughout the year to meet distribution system demands. Groundwater production facilities are operated to meet a portion of the base load demand and to meet peak and emergency demands. A desalination facility is planned to be operational in 2002 to treat some of the brackish groundwater currently being discharged to the San Francisco Bay from the Aquifer Reclamation Program wells (see Aquifer Reclamation Program section) and produce a new source of high quality water.

ACWD conducts an annual survey of groundwater conditions to determine the amount of imported water needed to maintain groundwater levels within an acceptable range and to determine a replenishment assessment rate. Groundwater levels are also used to trigger dry year water management response programs, including additional water conservation and utilization of off-site water banking and/or exchange programs.

Owners of wells who pump water from the groundwater basin are required to pay a replenishment assessment to reimburse ACWD for a portion of the cost of imported water used to recharge the depleted groundwater basin and to help offset ACWD's groundwater basin operations and management costs. Currently, the owners or operators of 234 wells receive annual registration forms as part of the replenishment assessment program.

Reclaimed wastewater is a potential alternative source of supply for ACWD. ACWD will cooperate with the Union Sanitary District to explore appropriate and beneficial uses of reclaimed wastewater within ACWD's service area in locations where there is very little risk of percolation into the aquifers used for potable water production.

Groundwater Replenishment

ACWD utilizes sections of the Alameda Creek Flood Control Channel behind three inflatable rubber dams and recharge ponds (abandoned quarry pits) to store and percolate

water into the aquifers of the Niles Cone Groundwater Basin. The groundwater replenishment program serves two major roles:

(1) Replenishment of groundwater extracted to meet local demands and to replace brackish water extracted as part of the Aquifer Reclamation Program.

(2) Maintenance of groundwater flow toward San Francisco Bay, in order to prevent future saline water intrusion from the bay and to displace brackish water remaining from historic saline water intrusion.

Through ACWD's long range Capital Improvement Program, a major portion of the recharge ponds below (i.e., west of) the Hayward Fault were rehabilitated in 1997 and 1998 and resulted in greater storage capacity within the ponds and increased the rate at which water is recharged to replace water pumped from the groundwater basin.

Recharge facilities are operated to maximize the capture of local runoff. The operating criteria for the recharge facilities and the groundwater basin are continuously evaluated to optimize the use of these resources.

Watershed Protection and Monitoring

ACWD plays a major role in coordinating and communicating with other state and local agencies to influence policy decisions related to activities within the watershed of Alameda Creek which could have a negative effect on ACWD water supplies and the groundwater basin. This includes review of environmental impact reports, technical evaluation of National Pollutant Discharge Elimination System (NPDES) permits, emergency response to surface spills, participation in watershed planning and technical committees, and participation in planning studies for expansion of wastewater export facilities in the Livermore-Amador Valley.

As part of ACWD's watershed protection program, ACWD will require (to the extent

ACWD has legal authority to do so) and in all cases will request that lead agencies for future development projects within the Upper Alameda Creek Watershed that may affect water quality in Alameda Creek determine the extent and significance of those impacts, and will request such lead agencies to require adequate mitigation of any significant impacts to Alameda Creek and ACWD. Specific mitigation measures will depend on the particular features of individual projects including their location, size, volume of water applied and/or discharged, and the physical/chemical/biological composition of such water. Mitigation may include either or both implementation of on-site source control measures or contributions to off-site mitigation projects, such as reimbursement of a portion of ACWD's cost of constructing and operating a demineralization facility. The goal of whatever mitigation measures are employed is to prevent individual project or cumulative effects of development (or other projects within the Alameda Creek Watershed) from adversely changing the quality of groundwater in the Niles Cone Groundwater Basin.

ACWD is working in coordination with other agencies to implement a watershed monitoring program consisting of sampling surface water, measuring water quality parameters, and estimating water flow rates at key locations in the watershed. ACWD also patrols Alameda Creek performing visual inspections and collecting samples for water quality analysis. ACWD has constructed and maintains an automated monitoring station located adjacent to Alameda Creek at the west end of Niles Canyon which provides continuous information and signals an alarm to ACWD when there are significant changes in water flow or quality that may affect the operation of ACWD's recharge facilities.

Basin Monitoring

The District performs weekly water level measurements of representative wells in each major aquifer to monitor changes in groundwater levels. A more comprehensive

monitoring program consisting of sampling and measuring water levels is performed in the spring and fall of each year to assess the groundwater quality, water pressures within the basin, and direction of groundwater flow. Production wells are monitored regularly for a wide variety of water quality parameters specified by state and federal regulations. The groundwater recharge area is monitored daily for water level fluctuations to track percolation rates and to schedule water imports.

Because of development, many privately owned water wells that ACWD has utilized in the past for monitoring basin water levels and saline water intrusion have been destroyed. Since these wells are critical to the management of ACWD's groundwater basin, replacement monitoring wells have been included in the Capital Improvement Program. From 1997 through 1999, 32 monitoring wells have been installed as part of the Monitoring Well Construction Project. A total of approximately 60 wells are expected to be installed by 2007 to provide additional geologic information, to replace destroyed wells, and to improve water sample and water level data acquisition through efficiently located and appropriately designed wells.

Wellhead Protection Program

The 1986 Amendments to the Safe Drinking Water Act require each state to establish a Wellhead Protection Program which "protects the wellhead areas of all public water systems from contaminants that may have adverse human health effects." California is relying on local agencies to plan and implement this program. ACWD has initiated the identification of surface and recharge areas vulnerable to contamination for the protection of ACWD's groundwater facilities. The program also includes the identification of potential contaminant sources, development of management practices to reduce the contamination risk, identification of areas to be monitored, and preparation of a contingency/emergency

response plan in the event of a contamination incident. As an example of a management practice, ACWD has worked with the City of Fremont to require a "Do Not Pollute" decal at each storm drain inlet within a development adjacent to the recharge facilities and has mailed a stormwater runoff public education brochure to all houses on streets with storm drains that discharge directly into a recharge pond.

The groundwater portion of the Source Water Assessment Program (SWAP) that is now being required by the California Department of Health Services (DHS) has a similar focus to that of the Wellhead Protection Program. SWAP requires the identification of sensitive surface water and groundwater areas, an inventory of potential threats within those areas, and an assessment of source vulnerability. The primary difference between the programs is that the Wellhead Protection Program additionally identifies management strategies to minimize the potential for groundwater quality impacts. Because of the overlap between these programs, development of the programs will be closely coordinated. Since DHS is requiring a SWAP for all new sources of water, a "pilot" SWAP is currently being prepared for Aquifer Reclamation Program wells that will serve as supply wells for ACWD's future desalination facility. This pilot SWAP will serve as a model for developing a SWAP for all ACWD facilities in the future.

Both of these programs are expected to benefit from the results of the American Water Works Association Research Foundation project being jointly conducted by ACWD and the Lawrence Livermore National Laboratory. The project, titled "Predicting Water Quality Changes from Artificial Recharge Sources to Nearby Wellfields," began in the spring of 1997 and is expected to be completed in 2001. The scope of work includes the characterization and evaluation of groundwater flowing between the percolation ponds and ACWD's production wells using isotopic tracers, age-dating techniques, and production and monitoring well sampling. A major objective of the study is determining groundwater and

chemical travel times within the fastest flow paths between the recharge facilities and the production wells.

ACWD's efforts in developing a Wellhead Protection Program and maintaining a strong public education program have been recognized as a Groundwater Guardian Affiliate by the Groundwater Foundation, a private non-profit educational organization that is dedicated to educating the public about the conservation and protection of groundwater. The Groundwater Guardian Affiliate designation is awarded to entities at the regional level that work to promote shared responsibility for groundwater protection.

Aquifer Reclamation Program

The goal of this program is to remove entrapped saline water from degraded portions of aquifers in the Niles Cone Groundwater Basin in order to increase usable basin storage, to improve overall water quality, and to prevent the movement of this saline water toward production wells. Pumped water from a combination of nine Aquifer Reclamation Program (ARP) wells is discharged to flood control channels in accordance with a NPDES permit issued by the Regional Water Quality Control Board. Operation of this program depends on the annual availability of water supplies to replace the water that is pumped out of the aquifers. In the future, some of the wells used in this program will be converted to supply water to the brackish groundwater desalination facility planned for Newark to supplement ACWD's drinking water supply.

Five other wells are being evaluated as possible additions to the Aquifer Reclamation Program. These wells are former Salinity Barrier Project wells. The Salinity Barrier Project (SBP) was initiated in the late 1970's by ACWD in cooperation with the Department of Water Resources. The plan was to install 14 extraction wells strategically located to create an alignment just inland of the salt evaporator ponds, running parallel

along the entire stretch of ACWD's shoreline. Simultaneous pumping of the wells would create a trough along the alignment to prevent inland migration of saline water originating from the bay and evaporator ponds during drought periods. In addition to preventing new sea water intrusion, SBP operation was planned as a potential augmentation of the Aquifer Reclamation Program during non-drought periods for mitigating historic sea water intrusion in the interior part of the basin. By the late 1980's, five of the fourteen wells were constructed. However, the project was postponed pending further evaluation.

In the course of comprehensive water supply and facilities planning in the 1990's, ACWD determined that operation of the basin below sea level during drought periods is no longer a necessary or desirable strategy relative to other water supply options that have since become available to ACWD. Because the basin is not likely to be operated significantly below sea level during drought periods, SBP is not needed to prevent new sea water intrusion. Although ACWD's groundwater basin strategy no longer includes a salt water barrier, groundwater modeling indicates that pumping these wells may help to improve water quality in the inland portions of the groundwater basin (which is the goal of the Aquifer Reclamation Program), especially if they are pumped during wet periods with high piezometric head. More groundwater modeling work is needed to determine whether their contribution to water quality improvement would justify their activation.

Groundwater Protection Program

ACWD takes an active role in (1) assisting regulatory agencies and industry in identifying sources of potential groundwater contamination, (2) implementing monitoring systems at hazardous materials storage sites, and (3) providing technical oversight for the investigation and cleanup operations at Leaking Underground Fuel Tank (LUFT) and Spills, Leaks, Investigation, and Cleanup (SLIC) sites to assure the protection of the groundwater

basin. Coordination with federal, state, county, and city agencies similarly involved is a key to the success of this program. This program's objectives are to protect the basin from future water quality degradation by ensuring that existing tanks have not leaked and that future chemical releases are quickly identified and controlled.

Since 1988, ACWD informally provided assistance to the California Regional Water Quality Control Board - San Francisco Bay Region (Regional Board) in overseeing the investigation and remediation at LUFT and SLIC sites. In order to memorialize the terms of this participation and to further strengthen the coordination between the Regional Board and ACWD, the agencies entered into a Cooperative Agreement on June 27, 1996. ACWD entered into similar Cooperative Agreements with the Cities of Fremont, Newark, and Union City on March 25, 1997, June 26, 1997, and August 12, 1997 to further strengthen the interagency coordination and cost-effective implementation of groundwater protection within the cities. ACWD also entered into an agreement with the City of Hayward on July 27, 2000 to work cooperatively on sites which threaten or affect water quality in the portion of the City of Hayward that is within ACWD's service area (Hayward Detachment areas).

Well Ordinance Administration

Ordinances to regulate the construction, repair, reconstruction, destruction or abandonment of wells with the boundaries of the Cities of Fremont, Newark, and Union City were adopted by each city (City of Fremont Ordinance No. 950 on June 26, 1973, as amended by Ordinance No. 963 on October 16, 1973; City of Newark Ordinance No. 136 on July 12, 1973; and City of Union City Ordinance No. 109-73 on June 18, 1973). The purpose of the ordinances is:

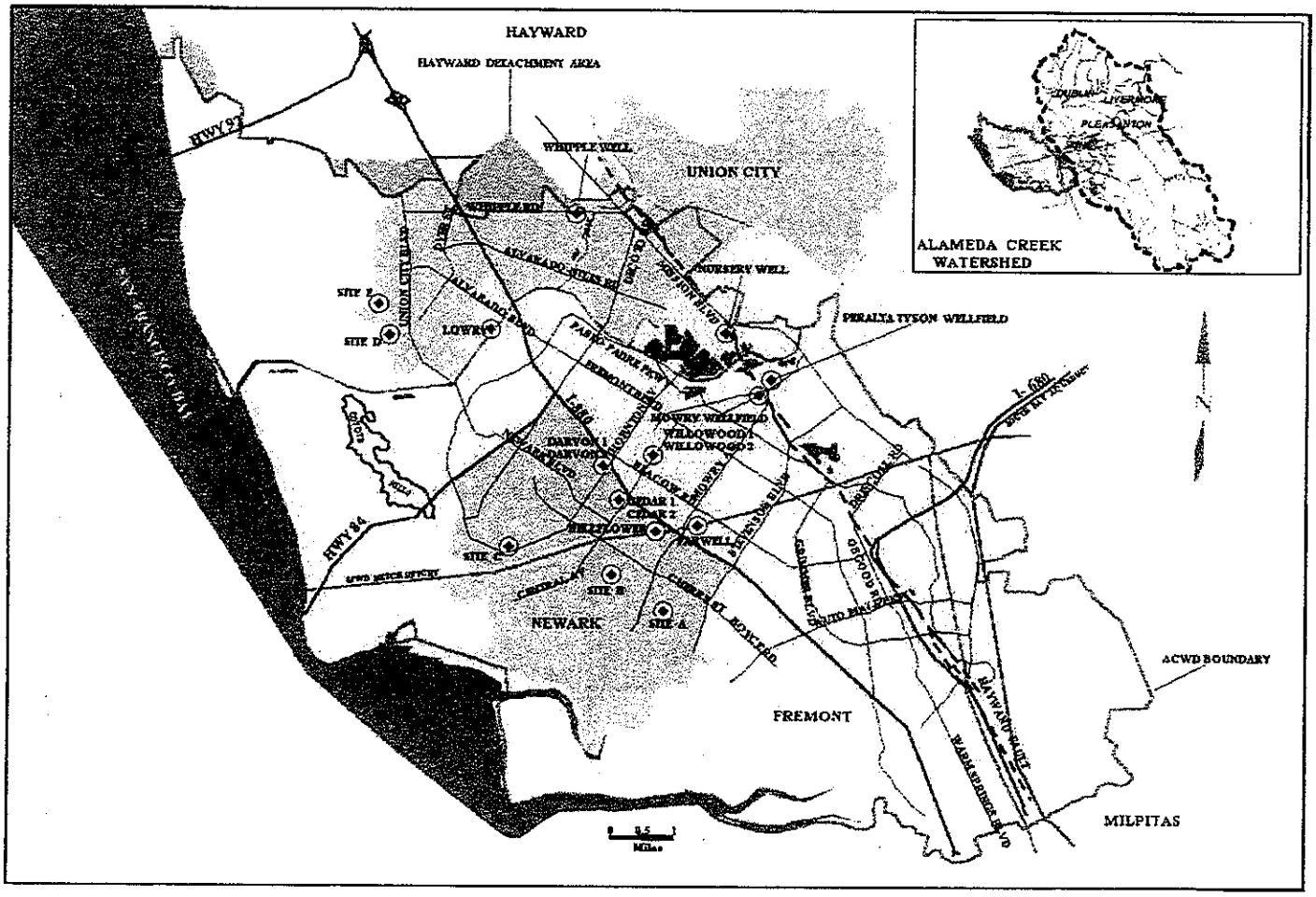
> "to provide for the construction, repair, reconstruction, and destruction of wells, including cathodic protection wells and exploratory holes, to the end

that the groundwater found wholly or partially within the area of the [cities] will not be polluted or contaminated and that water obtained from water wells will be suitable for the beneficial uses intended and will not jeopardize the health, safety or welfare of the people of the said city, and for the destruction of abandoned wells or wells found to be public nuisances, including cathodic protection wells and exploratory holes, to the end that such wells will not cause pollution or contamination of groundwater or otherwise jeopardize the health, safety or welfare of the people of the said city."

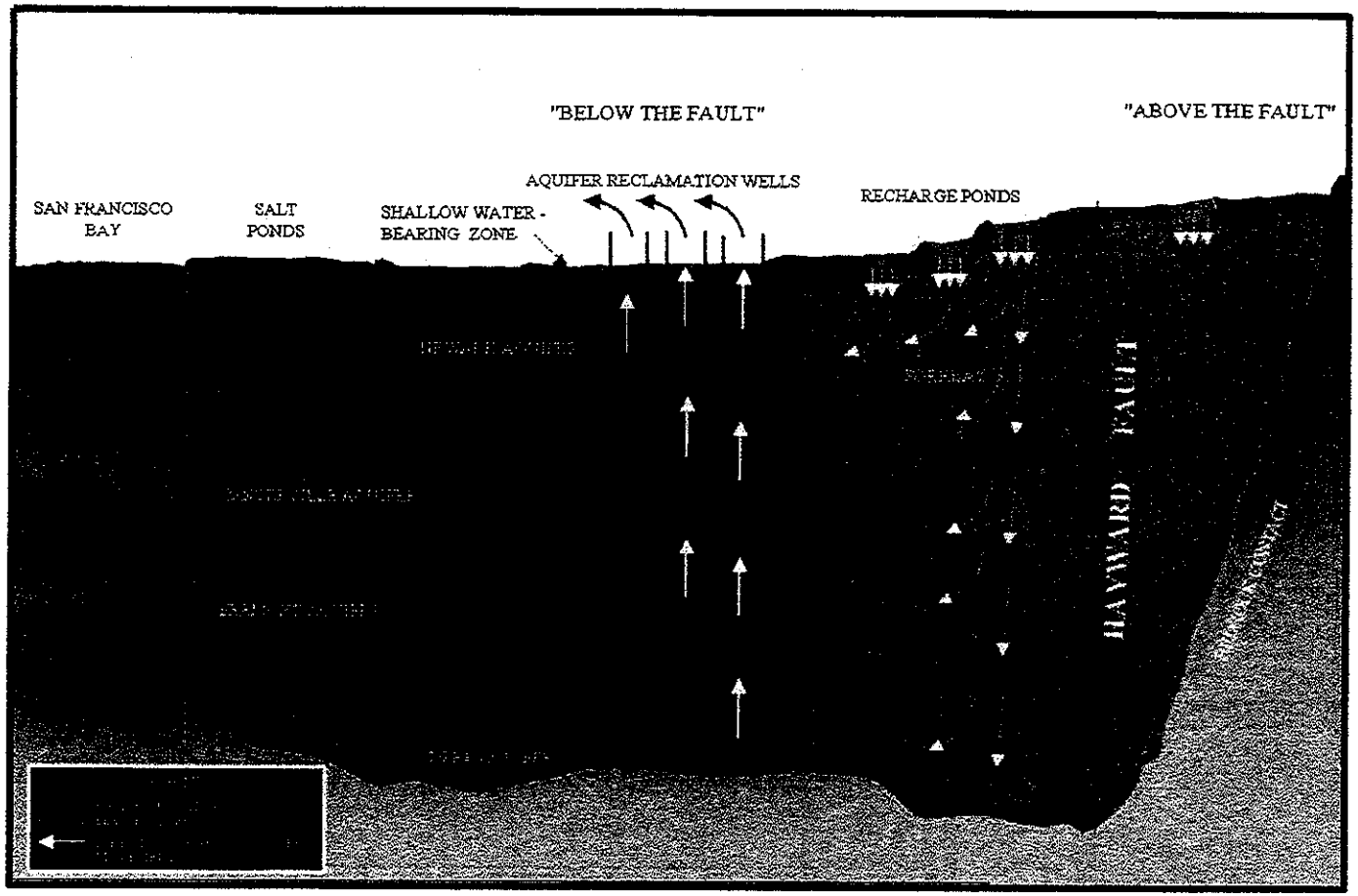
Each of the ordinances designates ACWD as the enforcing agency as defined by the Department of Water Resources and requires that a written permit be obtained from ACWD prior to conducting any of the work described above in each of the cities. By separate resolutions on January 10, 1974, ACWD agreed to implement the city ordinances and authorized the collection of fees to defray the expenses of enforcing them (Resolution No. 74-002 to implement Ordinance No. 950 as amended by Ordinance No. 963 of the City of Fremont; Resolution No. 74-003 to implement Ordinance No. 136 of the City of Newark; Resolution No. 74-004 to implement Ordinance No. 109-73 of the City of Newark). ACWD has also worked with the City of Hayward to amend the City Well Ordinance to require ACWD's approval prior to the construction, operation, or destruction of wells in Hayward Detachment areas.

ACWD has developed a well destruction program in cooperation with the cities. When land use changes are proposed, the cities require the property owners or developers to obtain a letter from ACWD indicating whether wells are located within the boundaries of the development. This process gives ACWD the opportunity to conduct a record and field search for wells before development occurs. If wells are located within the development,

the city and appropriate parties are notified. The destruction of abandoned wells then become a condition for approval of the proposed development or land use change by the city building or planning departments. ACWD also maintains a process to insure that abandoned wells are properly destroyed before water service improvements are accepted.



ATTACHMENT 2 - ALAMEDA COUNTY WATER DISTRICT GROUNDWATER FACILITIES



ATTACHMENT 3 - NILES CONE GROUNDWATER BASIN SCHEMATIC

Appendix B

CUWCC Best Management Practices Annual Reports: 2002-2003 & 2003-2004

Accounts & Water Use

Reporting Unit Name: **Alameda County Water District**
Submitted to: CUWCC **12/01/2004**
Year: **2003**

A. Service Area Population Information:

1. Total service area population: 323250

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	68623	25239	0	0
2. Multi-Family	2017	8528	0	0
3. Commercial	2348	4965	0	0
4. Industrial	715	4048	0	0
5. Institutional	446	2178	0	0
6. Dedicated Irrigation	1814	5583	0	0
7. Recycled Water	0	0	0	0
8. Other	1795	172	0	0
9. Unaccounted	NA	3672	NA	0
Total	77758	54385	0	0
	Metered		**Unmetered**	

Reported as of 9/19/05

Accounts & Water Use

Reporting Unit Name: **Alameda County Water District**
Submitted to: CUWCC **06/27/2005**
Year: **2004**

A. Service Area Population Information:

1. Total service area population: 323250

B. Number of Accounts and Water Deliveries (AF)

Type	Metered		Unmetered	
	No. of Accounts	Water Deliveries (AF)	No. of Accounts	Water Deliveries (AF)
1. Single-Family	68805	25955	0	0
2. Multi-Family	2017	8121	0	0
3. Commercial	2314	5347	0	0
4. Industrial	716	4072	0	0
5. Institutional	447	2295	0	0
6 Dedicated Irrigation	1816	6300	0	0
7. Recycled Water	0	0	0	0
8 Other	1792	179	0	0
9 Unaccounted	NA	4158	NA	0
Total	77907	56427	0	0
	Metered		**Unmetered**	

Reported as of 9/19/05

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Base Year Data

Reporting Unit:	Submitted to CUWCC
Alameda County Water District	11/01/2000

INSTRUCTIONS: This form MUST BE completed and submitted to the CUWCC prior to filing any BMP reports. The data provided on this form is used in determining coverage requirements for specific BMPs as indicated. If some of the data requested is not available, make reasonable estimates. You can update and edit values, if more precise information becomes available in the future.

For Customer Classification Definitions (i.e. Single Family, Multi-Family) click HERE.

◈	1. Your **BASE YEAR is 1997.** NOTE: Many calculations in determining credit history and coverage requirements are contingent on your BASE YEAR, which is calculated based on the following criteria: If a Signatory signed the MOU in 1997 or earlier, then the Base Year is 1997. If a Signatory signed the MOU after 1997, then the Base Year is the year the MOU was signed. The same holds true for USBR Contractors, except the date their Base Year is calculated from is the date that their Plan was noticed in the Federal Register.	
◈	**BMP 1**	
	2. Number of single-family customers in 1997	64671
	3. Number of multi-family units in 1997	33850
◈	**BMPs 2 and 14**	
	4. Number of single-family housing units constructed prior to 1992	63068
	5. Number of multi-family units prior to 1992	32733
◈	**BMP 4**	
	6. Number of unmetered accounts in 1997	0
◈	**BMPs 5 and 9**	
	7. Number of commercial accounts in 1997	2245
	8. Number of industrial accounts in 1997	614
	9. Number of institutional accounts in 1997	415
◈	10. Total water use (AF) by commercial, industrial and institutional accounts in 1997	12567
◈	**BMP 14**	
	11. Average number of toilets per single-family household	2
	12. Average number of toilets per multi-family household	1.3
	13. Five-year average resale rate of single-family households	3.5
	14. Five-year average resale rate of multi-family households	3.5
	15. Average persons per single-family household	3
	16. Average persons per multi-family household	3

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http://bmp.cuwcc.org/bmp/onetime/showform.lasso?whichform=baseyear&1533117 9/19/2005

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BMP Activity History: Multiple-Year Overview

Reporting Unit:
Alameda County Water District

INSTRUCTIONS: Exhibit 1 allows Signatories to credit BMP activity completed prior to 1998 against BMP coverage requirements. To obtain credit for this past activity you must complete the information summarized below. Choose a year and click "Go" to ADD or EDIT BMP activity data for that specific year. If you do not enter previous BMP activity, the system will have no way to calculate credit toward coverage requirements for this activity.

Choose A [1991] Go

Year: Select the YEAR where you would like to enter new data or edit existing data

A. Number of RESIDENTIAL Water Use Surveys by Year

Year	No. Single-Family Surveys	No. Multi-Family Surveys
1991 Submitted on 11/01/2000	0	0
1992 Submitted on 11/01/2000	0	0
1993 Submitted on 11/01/2000	40	0
1994 Submitted on 11/01/2000	0	0
1995 Submitted on 11/01/2000	6	0
1996 Submitted on 11/01/2000	531	0
1997 Submitted on 11/01/2000	143	0
1998 Submitted on 11/01/2000	40	1722
Total	760	1722

B. Number of LANDSCAPE Surveys Completed by Year

Year	Surveys Receiving Follow-up	Surveys Not Receiving Follow-up
1991	0	0
1992	0	0
1993	50	0
1994	0	0
1995	0	0
1996	0	0
1997	0	0
1998	32	0
Total	82	0

C. Number of CII Surveys Completed by Year

Year	Commercial		Industrial		Institutional	
	Follow-Up	No Follow-Up	Follow-Up	No Follow-Up	Follow-Up	No Follow-Up
1991	0	0	0	0	0	0
1992	0	0	0	0	0	0
1993	0	0	10	0	10	0
1994	0	0	0	0	0	0
1995	0	0	0	0	0	0
1996	0	0	0	0	0	0
1997	0	0	0	0	0	0
1998	12	0	5	0	4	0
Total	12	0	15	0	14	0

D. Estimated WATER SAVINGS (AF/Yr) from CII Programs by Year

Year	Site Verified	Site Not Verified
1991	0	0
1992	0	0
1993	330	590
1994	330	590
1995	330	590
1996	330	590
1997	330	590
1998	330	590
Total	1980	3540

E. (Part I) Historical CII Ultra-Low-Flush Toilet Installations by CII Sector by Year

Year	Auto	Food	Health	Hotel	Manuf'g	Membership	Multi-Use
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

E. (Part II) Historical CII Ultra-Low-Flush Toilet Installations by CII Sector by Year

Year	Office	Religious	Restaurant	Retail	School	Wholesale	Unknown
1991	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

F. Number of Residential ULFT Rebates / Installations by Year:

Year	Single-Family	Multi-Family
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	0
1996	0	0
1997	0	0
1998	0	0
Total	0	0

G. Number of Residential Low-Flow Showerhead Distributions / Installations by Year:

Year	Single-Family	Multi-Family
1991	0	0
1992	0	0
1993	0	0
1994	0	0
1995	0	0
1996	0	0
1997	0	0
1998	0	0
Total	0	0

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BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Based on your signed MOU date, 09/12/1991, your Agency STRATEGY DUE DATE is:	09/11/1993
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	01/01/1993
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	01/01/1997

B. Water Survey Data

Survey Counts:	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	0	0
2. Number of surveys completed:	0	0
Indoor Survey:		
3. Check for leaks, including toilets, faucets and meter checks	no	no
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	no	no
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as necessary; replace leaking toilet flapper, as necessary	no	no
Outdoor Survey:		
6. Check irrigation system and timers	no	no
7. Review or develop customer irrigation schedule	no	no
8. Measure landscaped area (Recommended but not required for surveys)	no	no
9. Measure total irrigable area (Recommended but not required for surveys)	no	no
10. Which measurement method is typically used (Recommended but not required for surveys)		None
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	no	no
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	no	no
a. If yes, in what form are surveys tracked?		None
b. Describe how your agency tracks this information.		

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

ACWD has met the Multi-Family BMP 1 requirement, and has filed an exemption for the Single-Family BMP 1 requirement. As an alternative to the residential audit program, ACWD has implemented a residential irrigation notification program which reaches all of ACWD's SFR customers. Over the past 5 years, ACWD has notified all single-family residents seasonally (three times per year) to adjust their irrigation systems. With the coming of each seasonal change in the weather, ACWD sends all single-family residents custom designed Irrigation Reminder Post Cards with instructions on how to adjust their watering schedules in the spring, fall and winter with the incentive that customers can reduce their water bills by preventing over watering, as well as produce a healthier yard or garden. Irrigation guides are offered free of charge to all single-family residents, and customers are also directed to our website for further landscape irrigation tips. ACWD has also launched a pilot SFR High Water Use Alert letter program. Utilizing GIS data linked with our customer service data, customers water use is compared to similar/like households' water use. Those higher than 3 standard deviations above the norm are issued high water use alert letters. A list of possibilities for higher than normal use are provided along with conservation tips. Customers are also directed to call in and discuss their water use practices with a conservation staff memeber. Consumption at these notified residences will be monitored annually to determine effectiveness of program.

Reported as of 9/19/05

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1. Based on your signed MOU date, 09/12/1991, your Agency STRATEGY DUE DATE is:	09/11/1993
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	01/01/1993
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	yes
a. If YES, when was it implemented?	01/01/1997

B. Water Survey Data

Survey Counts:	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	0	0
2. Number of surveys completed:	0	0
Indoor Survey:		
3. Check for leaks, including toilets, faucets and meter checks	no	no
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	no	no
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	no	no
Outdoor Survey:		
6. Check irrigation system and timers	no	no
7. Review or develop customer irrigation schedule	no	no
8. Measure landscaped area (Recommended but not required for surveys)	no	no
9. Measure total irrigable area (Recommended but not required for surveys)	no	no
10. Which measurement method is typically used (Recommended but not required for surveys)		None
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	no	no
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	no	no
a. If yes, in what form are surveys tracked?		None
b. Describe how your agency tracks this information.		

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2 Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

ACWD has met the Multi-Family BMP 1 requirement, and has filed an exemption for the Single-Family BMP 1 requirement. As an alternative to the residential audit program, ACWD has implemented a residential irrigation notification program which reaches all of ACWD's SFR customers. Over the past 5 years, ACWD has notified all single-family residents seasonally (three times per year) to adjust their irrigation systems. With the coming of each seasonal change in the weather, ACWD sends all single-family residents custom designed Irrigation Reminder Post Cards with instructions on how to adjust their watering schedules in the spring, fall and winter with the incentive that customers can reduce their water bills by preventing over watering, as well as produce a healthier yard or garden. Irrigation guides are offered free of charge to all single-family residents, and customers are also directed to our website for further landscape irrigation tips. ACWD has also launched a pilot SFR High Water Use Alert letter program. Utilizing GIS data linked with our customer service data, customers water use is compared to similar/like households' water use. Those higher than 3 standard deviations above the norm are issued high water use alert letters. A list of possibilities for higher than normal use are provided along with conservation tips. Customers are also directed to call in and discuss their water use practices with a conservation staff memeber. Consumption at these notified residences will be monitored annually to determine effectiveness of program.

Reported as of 9/19/05

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **Alameda County Water District** BMP Form Status: **100% Complete** Year: **2003**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? no

a. If YES, list local jurisdictions in your service area and code or ordinance in each:

2. Has your agency satisfied the 75% saturation requirement for single-family housing units? yes

3. Estimated percent of single-family households with low-flow showerheads: 80%

4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? no

5. Estimated percent of multi-family households with low-flow showerheads: 73%

6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

A saturation study was conducted in the Spring of 2000. Based on that study, saturation rates for showerheads in ACWD service area were 55% for single families and 46% for multi-families. These rates were accomplished over a 5 year period, or since plumbing standards changed flow rates for shower heads. Based on these 2000 percentages, single-family replacements rates equal 11% per year and multi-family rates equal 9% per year. ACWD feels confident in these percentages since they are substantially more conservative than the 20-30% decay rate listed in the CUWCC BMP Costs and Savings Study, July 2000. A second saturation study will be completed in the near future to determine actual saturation. However, until such time that a second study can be completed, ACWD will assume saturation does not exceed 80%.

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes

a. If YES, when did your agency begin implementing this strategy? 07/01/1996

b. Describe your targeting/ marketing strategy.

All pre-1992 residential units are identified. 2. ACWD offers conservation kits through direct mailing (post cards), through our website (800 number to call), distribution at community events, as well as advertising through bill inserts.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	150	0
3. Number of toilet-displacement devices distributed:	75	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	225	0

6. Does your agency track the distribution and cost of low-flow devices? yes

a. If YES, in what format are low-flow devices tracked? Database

b. If yes, describe your tracking and distribution system .

MS Access database is used to track all customers who receive kits. Data includes customer name, address, phone, account #, pre 1992 construction, if fixture is needed (i.e. if no kit ordered in past) and date distributed.

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1 Budgeted Expenditures	0	0
2. Actual Expenditures	4500	

D. "At Least As Effective As"

1 Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

ACWD provides free conservation devices to all SFR and MFR customers with fixtures installed prior to 1992. These devices are offered to the customer via ACWD's website order form, phone order or as part of our Notice of High Water Use pilot program.

Reported as of 9/19/05

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2004**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts? no

a. If YES, list local jurisdictions in your service area and code or ordinance in each

2. Has your agency satisfied the 75% saturation requirement for single-family housing units? yes

3. Estimated percent of single-family households with low-flow showerheads: 80%

4. Has your agency satisfied the 75% saturation requirement for multi-family housing units? yes

5. Estimated percent of multi-family households with low-flow showerheads: 80%

6. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.

A saturation study was conducted in the Spring of 2000. Based on that study, saturation rates for showerheads in ACWD service area were 55% for single families and 45% for multi-families. These rates were accomplished over a 5 year period, or since plumbing standards changed flow rates for shower heads. Based on these 2000 percentages, single-family replacements rates equal 11% per year and multi-family rates equal 9% per year. ACWD feels confident in these percentages since they are substantially more conservative than the 20-30% decay rate listed in the CUWCC BMP Costs and Savings Study, July 2000. A second saturation study will be completed in the near future to determine actual saturation. However, until such time that a second study can be completed, ACWD will assume saturation does not exceed 80%.

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices? yes

a. If YES, when did your agency begin implementing this strategy? 07/01/1996

b. Describe your targeting/ marketing strategy.

All pre-1992 residential units are identified. 2. ACWD offers conservation kits through direct mailing (post cards), through our website (800 number to call), distribution at community events, as well as advertising through bill inserts.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed	194	0
3. Number of toilet-displacement devices distributed:	97	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	291	0

6. Does your agency track the distribution and cost of low-flow devices? yes

a. If YES, in what format are low-flow devices tracked? Database

b. If yes, describe your tracking and distribution system :

MS Access database is used to track all customers who receive kits. Data includes customer name, address, phone, account #, pre 1992 construction, if fixture is needed (i.e. if no kit ordered in past) and date distributed.

C. Low-Flow Device Distribution Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	5000
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

ACWD provides free conservation devices to all SFR and MFR customers with fixtures installed prior to 1992. These devices are offered to the customer via ACWD's website order form, phone order or as part of our Notice of High Water Use pilot program. Clarification for C1 and C2. ACWD purchases conserveration kits in bulk. ACWD had sufficient inventory remaining to cover orders for kits in FY 03/04; there was no need to purchase additional kits. Therefore, no expenditures were required.

Reported as of 9/19/05

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2003**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year? yes

2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:

a. Determine metered sales (AF) 50541

b. Determine other system verifiable uses (AF) 172

c. Determine total supply into the system (AF) 54385

d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. 0.93

3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production? no

4. Did your agency complete a full-scale audit during this report year? no

5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit? yes

6. Does your agency operate a system leak detection program? yes

a. If yes, describe the leak detection program:

Survey approximately 165 miles of pipeline per year (5 year cycle)

B. Survey Data

1. Total number of miles of distribution system line. 830

2. Number of miles of distribution system line surveyed. 32

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	37265	57000
2. Actual Expenditures	24484	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 9/19/05

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	52090
b. Determine other system verifiable uses (AF)	179
c. Determine total supply into the system (AF)	56427
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.93
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	yes
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	yes

a. If yes, describe the leak detection program:

Survey approximately 83 miles of pipeline per year (10 year cycle)

B. Survey Data

1. Total number of miles of distribution system line.	834
2. Number of miles of distribution system line surveyed	78

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	57000	84000
2. Actual Expenditures	35486	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 9/19/05

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Does your agency require meters for all new connections and bill by volume-of-use?	yes
2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use?	no

a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?

b. Describe the program:

All accounts within the ACWD service area are metered. Therefore, the need for a retrofit program of unmetered connections does not exist

3. Number of previously unmetered accounts fitted with meters during report year.	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	no

a. If YES, when was the feasibility study conducted? (mm/dd/yy)

b. Describe the feasibility study.

2. Number of CII accounts with mixed-use meters.	3509
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

All accounts within the ACWD service area are metered. Therefore, the need for a retrofit program of unmetered connections does not exist

Reported as of 9/19/05

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	100% Complete	2004

A. Implementation

1. Does your agency require meters for all new connections and bill by volume-of-use?	yes
2. Does your agency have a program for retrofitting existing unmetered connections and bill by volume-of-use?	no
a. If YES, when was the plan to retrofit and bill by volume-of-use existing unmetered connections completed?	
b. Describe the program.	
All accounts within the ACWD service area are metered. Therefore, the need for a retrofit program of unmetered connections does not exist.	
3. Number of previously unmetered accounts fitted with meters during report year.	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	no
a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
b. Describe the feasibility study:	
2. Number of CII accounts with mixed-use meters.	3477
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0

C. Meter Retrofit Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

All accounts within the ACWD service area are metered. Therefore, the need for a retrofit program of unmetered connections does not exist.

Reported as of 9/19/05

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	100% Complete	2003

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	812
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	763
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	2755
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	3429
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	yes

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	yes
a. If YES, when did your agency begin implementing this strategy?	01/01/1999
b. Description of marketing / targeting strategy:	

Print material describing the program is mailed to targeted top users based on annual consumption records. Personalized letters are included with the print material indicating they have been selected to participate, giving a date that staff will be on-site to measure landscaped area for budgeting purposes. Follow-up phone calls are placed to ensure customer received information. ACWD has also partnered with the Alameda County Green Business Program to provide surveys to those customers applying for Green Business Certification. ACWD is now using GIS and aerial photo interpretation to calculate landscape square-footage for large landscape customers. Field verifications are performed to ensure accuracy.

2. Number of Surveys Offered.	229
3. Number of Surveys Completed.	229
4. Indicate which of the following Landscape Elements are part of your survey.	
a. Irrigation System Check	no
b. Distribution Uniformity Analysis	no
c. Review / Develop Irrigation Schedules	no
d. Measure Landscape Area	yes
e. Measure Total Irrigable Area	yes
f. Provide Customer Report / Information	yes
5. Do you track survey offers and results?	yes
6. Does your agency provide follow-up surveys for previously completed surveys?	yes
a. If YES, describe below.	

Accounts that are continually over-budget are offered detailed irrigation surveys to check for inefficiencies. During these follow-up surveys all irrigation clock schedules are noted, a station-by-station walk through is completed, and a cup test is performed to calculate average DU. A report follows each survey with findings and recommendations, as well as an estimated irrigation schedule customized for the site. During FY 02/03,

two detailed surveys were performed.

C. Other BMP 5 Actions

1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program Does your agency provide mixed-use accounts with landscape budgets?	yes
2. Number of CII mixed-use accounts with landscape budgets.	2
3. Do you offer landscape irrigation training?	yes
4. Does your agency offer financial incentives to improve landscape water use efficiency?	no

Type of Financial Incentive:	Budget (Dollars/ Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates	0	0	0
b. Loans	0	0	0
c. Grants	0	0	0

5. Do you provide landscape water use efficiency information to new customers and customers changing services?	No
a. If YES, describe below	
6 Do you have irrigated landscaping at your facilities?	yes
a. If yes, is it water-efficient?	yes
b. If yes, does it have dedicated irrigation metering?	yes
7. Do you provide customer notices at the start of the irrigation season?	yes
8. Do you provide customer notices at the end of the irrigation season?	yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	207000	0
2. Actual Expenditures	1250	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

A1 Clarification: Due to the thoroughness of ACWD's metering program, many small sites have been fitted with dedicated landscape meters. Due to the small size of these sites, they do not fit the parameters constituting large landscape for the purposes of this BMP. Therefore, all dedicated landscape accounts with >1,000 units per year of consumption are targeted for inclusion in the large landscape water budget program. The acceptable lot size for the purposes of large landscape is anything greater than 1 acre. Calculations done using the 1,000 unit per year cut-off statistically show that this breaking point covers landscapes of 2/3 acre and greater; this is more conservative than current accepted practices. A5 Clarification: Every four months, water budget reports are mailed to all participants and their landscape contractors. Included in these reports are reminders to adjust irrigation systems with the changing of seasons and weather patterns. Customers are directed to either call a conservation staff member or visit our website for further tips on conservation and proper irrigation scheduling.

Reported as of 9/19/05

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2004**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	876
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	771
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	3116
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	3273
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	yes

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	yes
a. If YES, when did your agency begin implementing this strategy?	01/01/1999

b. Description of marketing / targeting strategy:

ACWD uses GIS and aerial photo interpretation to calculate landscape square-footage for large landscape customers. Field verifications are performed to ensure accuracy. ACWD has also partnered with the Alameda County Green Business Program to provide surveys to those customers applying for Green Business Certification.

2. Number of Surveys Offered.	351
3. Number of Surveys Completed.	351
4. Indicate which of the following Landscape Elements are part of your survey:	
a. Irrigation System Check	no
b. Distribution Uniformity Analysis	no
c. Review / Develop Irrigation Schedules	no
d. Measure Landscape Area	yes
e. Measure Total Irrigable Area	yes
f. Provide Customer Report / Information	yes
5. Do you track survey offers and results?	yes
6. Does your agency provide follow-up surveys for previously completed surveys?	yes

a. If YES, describe below.

Accounts that are continually over-budget are offered detailed irrigation surveys to check for inefficiencies. During these follow-up surveys all irrigation clock schedules are noted, a station-by-station walk through is completed, and a cup test is performed to calculate average DU. A report follows each survey with findings and recommendations, as well as an estimated irrigation schedule customized for the site. During FY 03/04, six detailed surveys were performed.

C. Other BMP 5 Actions

1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program.	yes

Does your agency provide mixed-use accounts with landscape budgets?	
2. Number of CII mixed-use accounts with landscape budgets.	2
3. Do you offer landscape irrigation training?	yes
4. Does your agency offer financial incentives to improve landscape water use efficiency?	no

Type of Financial Incentive:	Budget (Dollars/ Year)	Number Awarded to Customers	Total Amount Awarded
a. Rebates	0	0	0
b. Loans	0	0	0
c. Grants	0	0	0

5. Do you provide landscape water use efficiency information to new customers and customers changing services?	No

a. If YES, describe below:

6. Do you have irrigated landscaping at your facilities?	yes
a. If yes, is it water-efficient?	yes
b. If yes, does it have dedicated irrigation metering?	yes
7. Do you provide customer notices at the start of the irrigation season?	yes
8. Do you provide customer notices at the end of the irrigation season?	yes

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	25000
2. Actual Expenditures	4000	

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

A1 Clarification: Due to the thoroughness of ACWD's metering program, many small sites have been fitted with dedicated landscape meters. Due to the small size of these sites, they do not fit the parameters constituting large landscape for the purposes of this BMP. Therefore, all dedicated landscape accounts with >1,000 units per year of consumption are targeted for inclusion in the large landscape water budget program. The acceptable lot size for the purposes of large landscape is anything greater than 1 acre. Calculations done using the 1,000 unit per year cut-off statistically show that this breaking point covers landscapes of 2/3 acre and greater, this is more conservative than current accepted practices. A2 Clarification: ACWD surveyed 351 accounts during FY 03/04 for the purposes of water budget reporting using GIS and aerial photo interpretation. However, not all sites that required field verifications were ground-truthed. Therefore, only eight accounts surveyed with GIS were included in the budget reports for this FY. The remaining 343 accounts will be included in the next reporting cycle. A5 Clarification: Every four months, water budget reports are mailed to all participants and their landscape contractors. Included in these reports are reminders to adjust irrigation systems with the changing of seasons and weather patterns. Customers are directed to either call a conservation staff

member or visit our website for further tips on conservation and proper irrigation scheduling.

Reported as of 9/19/05

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

   a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

   During portions of the reporting cycle, PG&E offered finacial incentives/rebates for the purchase of an Energy Star rated clothes washing machines. ACWD's waste water utility, Union Sanitary District, did not offer rebates on residential washers although they do partner with ACWD on commercial clothes washer rebates.

2. Does your agency offer rebates for high-efficiency washers? yes
3. What is the level of the rebate? 75
4. Number of rebates awarded. 1996

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	180000	150000
2. Actual Expenditures	189166	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

During a portion of the of reporting period (FY02/03) a part of the rebate was supplied from a matching funds grant with DWR. This would have altered ACWD's $75 contribution to a rebate of $150.

Reported as of 9/19/05

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1. Do any energy service providers or waste water utilities in your service area offer rebates for high-efficiency washers? yes

   a. If YES, describe the offerings and incentives as well as who the energy/waste water utility provider is.

   During portions of the reporting cycle, PG&E offered finacial incentives/rebates for the purchase of an Energy Star rated clothes washing machines. ACWD's waste water utility, Union Sanitary District, did not offer rebates on residential washers although they do partner with ACWD on commercial clothes washer rebates.

2. Does your agency offer rebates for high-efficiency washers? yes

3. What is the level of the rebate? 75

4. Number of rebates awarded. 1784

B. Rebate Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	150000	125374
2. Actual Expenditures	147002	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

All program funding for this past fiscal year has been generated solely by ACWD. Although DWR grant funding could have started during the fiscal year the Bay Area Regional Washer program was delayed and did not start until July 1, 2004.

Reported as of 9/19/05

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

   a. If YES, describe the program and how it's organized.

   ACWD's public information program includes publications which are mailed to customers on a regular basis; special brochures stressing water conservation; a drought tolerant demonstration garden; attendance at special events in our service area; hosting a web-site with on-line conservation information; workshops held for both single-family residents and landscape professionals; and display ads in the local newspaper encouraging customers to use water wisely. In addition, we have developed a water conservation postcard program in which postcards containing water conservation tips are mailed to customers four times a year. We also participate in Water Awareness Month in May by submitting press releases to the local paper, placing ads in the paper, conducting special tours, and distributing water conservation materials to the schools in our area. The public information program is a budgeted program within the Water Resources Planning Department.

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	4
b. Public Service Announcement	no	0
c. Bill Inserts / Newsletters / Brochures	yes	8
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	5
g. Speaker's Bureau	no	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	157376	168893
2. Actual Expenditures	154911	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

   a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

ACWD's public information program includes publications which are mailed to customers on a regular basis; special brochures stressing water conservation; a drought tolerant demonstration garden; attendance at special events in our service area; hosting a web-site with on-line conservation information; workshops held for both single-family residents and landscape professionals; and display ads in the local newspaper encouraging customers to use water wisely. In addition, we have developed a water conservation postcard program in which postcards containing water conservation tips are mailed to customers four times a year. We also participate in Water Awareness Month in May by submitting press releases to the local paper, placing ads in the paper, conducting special tours, and distributing water conservation materials to the schools in our area. The public information program is a budgeted program within the Water Resources Planning Department.

2 Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	5
b. Public Service Announcement	no	0
c. Bill Inserts / Newsletters / Brochures	yes	9
d. Bill showing water usage in comparison to previous year's usage	yes	
e. Demonstration Gardens	yes	1
f. Special Events, Media Events	yes	5
g. Speaker's Bureau	no	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1 Budgeted Expenditures	168893	172641
2 Actual Expenditures	171956	

C. "At Least As Effective As"

1 Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2 Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	218	11837	1
Grades 4th-6th	yes	163	9884	1
Grades 7th-8th	yes	11	330	1
High School	yes	18	720	1

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 10/1/1991

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	96149	102370
2. Actual Expenditures	97837	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	216	13217	0
Grades 4th-6th	yes	139	11782	0
Grades 7th-8th	yes	12	360	0
High School	yes	6	240	0

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 10/1/1991

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	102370	104314
2. Actual Expenditures	100650	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 09: Conservation Programs for CII Accounts

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use? yes

2. Has your agency identified and ranked INDUSTRIAL customers according to use? yes

3. Has your agency identified and ranked INSTITUTIONAL customers according to use? yes

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? yes

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	73	0	8
b. Number of New Surveys Completed	73	0	8
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	47	15	7

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes

Agency CII Customer Incentives	Budget ($/Year)	No. Awarded to Customers	Total $ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this no

option?

6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? no

7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991.

8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991.

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	11250	30000
2. Actual Expenditures	9300	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2004**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use? yes

2. Has your agency identified and ranked INDUSTRIAL customers according to use? yes

3. Has your agency identified and ranked INSTITUTIONAL customers according to use? yes

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option? yes

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	63	2	0
b. Number of New Surveys Completed	63	2	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	72	25	3

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts
e. Site Visit	yes	yes	yes
f. Evaluation of all water-using apparatus and processes	yes	yes	yes
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	yes	yes	yes

Agency CII Customer Incentives	Budget ($/Year)	No. Awarded to Customers	Total $ Amount Awarded
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this no

option?

6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings? no

7. Estimated annual savings (AF/yr) from site-verified actions taken by agency since 1991.

8. Estimated annual savings (AF/yr) from non-site-verified actions taken by agency since 1991.

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	30000	12500
2. Actual Expenditures	27500	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 09a: CII ULFT Water Savings

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2003**

1. Did your agency implement a CII ULFT replacement program in the reporting year? Yes
If No, please explain why on Line 8. 10

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? CII Sector or subsector
Check all that apply.

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

During this reporting cycle, ACWD used its CII surveys as the method of choice for recruiting customers to participate in the program. This has proven to be the most effective method, as well as most cost effective, for encouraging participation. Personal contact seems to be a key ingredient for success in this area.

2. How does your agency advertise this program? Check all that apply. Direct letter
Web page

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

No one method was more effective than another.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.) Yes

2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency? Yes

3. What is the total number of customer accounts participating in the program during the last year ? 22

CII Subsector	Number of Toilets Replaced			
4.	Standard Gravity Tank	Air Assisted	Valve Floor Mount	Valve Wall Mount
a. Offices	39	0	0	0
b. Retail / Wholesale	0	0	0	0
c. Hotels	0	0	0	0
d. Health	0	0	0	0
e. Industrial	0	0	0	0
f. Schools K to 12	0	0	0	0
g. Eating	0	0	0	0
h. Govern-ment	0	0	0	0
i. Churches	0	0	0	0
j. Other	0	0	0	0

5. Program design.

Rebate or voucher

6. Does your agency use outside services to implement this program? Yes

a. If yes, check all that apply.

Plumbing contractors/subcontracts

7. Participant tracking and follow-up.

No follow-up

8. Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

a. Disruption to business	5
b. Inadequate payback	3
c. Inadequate ULFT performance	2
d. Lack of funding	3
e. American's with Disabilities Act	1
f. Permitting	1
g. Other. Please describe in B. 9.	5

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other isues affecting program implementation or effectiveness.

This program hasn't been well accepted because of lack of motivation to customer to change out toilets. The $150 rebate doesn't offer enough incentive to a customer to disrupt their business and go through the headaches they associate with the toilet change out. It really is an example of "if it ain't broke don't fix it."

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

ACWD has not found this program to be effective in reaching the number of customers it is charged in getting to change out toilets. The current marketing of the program meets ACWD staffing constraints and allocated budget for this program. In order to make this program as effective as it could be it will mean outsourcing the program to a vendor who will market the program and do a direct install for the customer

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program: Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor	0	0
b. Materials	0	0
c. Marketing & Advertising	0	0
d. Administration & Overhead	0	0
e. Outside Services	18750	6675
f. Total	18750	6675

2. CII ULFT Program. Annual Cost Sharing

a. Wholesale agency contribution	0
b. State agency contribution	0
c. Federal agency contribution	0
d. Other contribution	2925
e. Total	2925

D. Comments

This CII ULFT program offers a $150 rebate. $75 of that amount is supplied by Union Sanitary District.

Reported as of 9/19/05

BMP 09a: CII ULFT Water Savings

Reporting Unit: **Alameda County Water District** | BMP Form Status: **100% Complete** | Year: **2004**

1. Did your agency implement a CII ULFT replacement program in the reporting year? If No, please explain why on Line 8. 10. — Yes

A. Targeting and Marketing

1. What basis does your agency use to target customers for participation in this program? Check all that apply. — CII Sector or subsector

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended

During this reporting cycle, ACWD used its CII surveys as the method of choice for recruiting customers to participate in the program. This has proven to be the most effective method, as well as most cost effective, for encouraging participation. Personal contact seems to be a key ingredient for success in this area.

2. How does your agency advertise this program? Check all that apply. — Direct letter; Web page

a. Describe which method you found to be the most effective overall, and which was the most effective per dollar expended.

No one method was more effective than another.

B. Implementation

1. Does your agency keep and maintain customer participant information? (Read the Help information for a complete list of all the information for this BMP.) — Yes

2. Would your agency be willing to share this information if the CUWCC did a study to evaluate the program on behalf of your agency? — Yes

3 What is the total number of customer accounts participating in the program during the last year ? — 17

4.

CII Subsector	Number of Toilets Replaced: Standard Gravity Tank	Air Assisted	Valve Floor Mount	Valve Wall Mount
a. Offices	0	0	0	0
b. Retail / Wholesale	0	0	0	0
c. Hotels	174	0	0	0
d Health	24	0	0	0
e Industrial	0	0	0	0
f. Schools: K to 12	0	0	0	0
g. Eating	1	0	0	0
h. Govern-ment	0	0	0	0
i. Churches	0	0	0	0
j. Other	0	0	0	0

5. Program design. — Rebate or voucher

6. Does your agency use outside services to implement this program? — Yes

a. If yes, check all that apply. — Plumbing contractors/subcontracts

7. Participant tracking and follow-up. — No follow-up

8 Based on your program experience, please rank on a scale of 1 to 5, with 1 being the least frequent cause and 5 being the most frequent cause, the following reasons why customers refused to participate in the program.

a. Disruption to business	5
b. Inadequate payback	3
c. Inadequate ULFT performance	2
d. Lack of funding	3
e. American's with Disabilities Act	1
f. Permitting	1
g. Other. Please describe in 8. 9.	5

9. Please describe general program acceptance/resistance by customers, obstacles to implementation, and other issues affecting program implementation or effectiveness.

This program hasn't been well accepted because of lack of motivation to customer to change out toilets. The $150 rebate doesn't offer enough incentive to a customer to disrupt their business and go through the headaches they associate with the toilet change out. It really is an example of "if it ain't broke don't fix it."

10. Please provide a general assessment of the program for this reporting year. Did your program achieve its objectives? Were your targeting and marketing approaches effective? Were program costs in line with expectations and budgeting?

ACWD has not found this program to be effective in reaching the number of customers it is charged in getting to change out toilets. The current marketing of the program meets ACWD staffing constraints and allocated budget for this program. In order to make this program as effective as it could be it will mean outsourcing the program to a vendor who will market the program and do a direct install for the customer.

C. Conservation Program Expenditures for CII ULFT

1. CII ULFT Program Annual Budget & Expenditure Data

	Budgeted	Actual Expenditure
a. Labor	0	0
b. Materials	0	0
c. Marketing & Advertising	0	0
d. Administration & Overhead	0	0
e Outside Services	18750	29850
f. Total	18750	29850

2. CII ULFT Program. Annual Cost Sharing

a. Wholesale agency contribution	0
b. State agency contribution	0
c. Federal agency contribution	0
d. Other contribution	14925
e. Total	14925

D. Comments

This CII ULFT program offers a $150 rebate. $75 of that amount is supplied by Union Sanitary District.

Reported as of 9/19/05

BMP 11: Conservation Pricing

Reporting Unit: **Alameda County Water District**
BMP Form Status: **100% Complete**
Year: **2003**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$22487156
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$4103537
2. Commercial	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$3260198
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$308936
3. Industrial	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$2964929
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$164981
4. Institutional / Government	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$1432219
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$140319
5. Irrigation	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$3583056
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$266629
6. Other	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$122540
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$76527

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 11: Conservation Pricing

Reporting Unit: **Alameda County Water District**

BMP Form Status: **100% Complete**

Year: **2004**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$24158218
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$4170504
2. Commercial	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$3557841
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$304509
3. Industrial	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$2793725
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$159948
4. Institutional / Government	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$1564271
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$138465
5. Irrigation	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$3785649
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$260989
6. Other	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$138226
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$77219

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

1. Does your Agency have a conservation coordinator? yes
2. Is this a full-time position? no
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ? no
4. Partner agency's name:
5. If your agency supplies the conservation coordinator:
   - a. What percent is this conservation coordinator's position? 100%
   - b. Coordinator's Name: Vana N. Phibbs
   - c. Coordinator's Title: Water Conservation Specialist
   - d. Coordinator's Experience and Number of Years: Marketing/Public Relations 15 years, Water Conservation 5 years
   - e. Date Coordinator's position was created (mm/dd/yyyy): 9/1/1988
6. Number of conservation staff, including Conservation Coordinator: 2

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	72068	167000
2. Actual Expenditures	167000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	no
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	no
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	100%
b Coordinator's Name	Vana N. Phibbs
c. Coordinator's Title	Water Conservation Specialist
d Coordinator's Experience and Number of Years	Marketing/Public Relations 15 years, Water Conservation 6 years
e. Date Coordinator's position was created (mm/dd/yyyy)	9/1/1988
6. Number of conservation staff, including Conservation Coordinator.	2

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	167000	167000
2. Actual Expenditures	167000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 9/19/05

BMP 13: Water Waste Prohibition

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area?	yes

a. If YES, describe the ordinance:

Odrinance 30 was passed by ACWD Board of Directors on March 25, 1991. This ordinance prohibits wasteful water use by all customers in the service area through restrictions on non-essential uses to maximize potable water supply. Warnings, site inspections and tiered rate structures are in place to minimize waste, with exceptions for special needs cases.

2. Is a copy of the most current ordinance(s) on file with CUWCC?	yes

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Fremont, City of Newark, City of Union City, Union Sanitary District	none, none, none, none

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	yes
b. Single-pass cooling systems for new connections	no
c. Non-recirculating systems in all new conveyor or car wash systems	yes
d Non-recirculating systems in all new commercial laundry systems	yes
e. Non-recirculating systems in all new decorative fountains	yes
f. Other, please name hosing sidewalks, potable water for filling new swimming pools, restaurants serving water unless requested, using potable water to irrigate medians, water lawns in a way that results in excessive flooding or runoff	yes

2 Describe measures that prohibit water uses listed above:

Warnings are issued to wasteful water users, with follow-up, visits to ascertain if excessive use continued. Continued abuse of these restrictions could lead to the installation of a flow restrictor and/or termination of service. Cancellation of permits for hydrant water use may occur if user is in violation of the emergency regulations and restrictions in this ordinance. A tiered rate structure is in place to discourage wasteful use.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	no
b Develop minimum appliance efficiency standards that:	
i) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per	no

pound of common salt used.

ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced. no

c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. no

4. Does your agency include water softener checks in home water audit programs? no

5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 9/19/05

BMP 13: Water Waste Prohibition

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2004**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area? yes

a. If YES, describe the ordinance:

Odrinance 30 was passed by ACWD Board of Directors on March 25, 1991. This ordinance prohibits wasteful water use by all customers in the service area through restrictions on non-essential uses to maximize potable water supply. Warnings, site inspections and tiered rate structures are in place to minimize waste, with exceptions for special needs cases

2. Is a copy of the most current ordinance(s) on file with CUWCC? yes

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Fremont, City of Newark, City of Union City, Union Sanitary District — none, none, none, none

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding yes

b. Single-pass cooling systems for new connections no

c. Non-recirculating systems in all new conveyor or car wash systems yes

d. Non-recirculating systems in all new commercial laundry systems yes

e. Non-recirculating systems in all new decorative fountains yes

f. Other, please name
hosing sidewalks, potable water for filling new swimming pools, restaurants serving water unless requested, using potable water to irrigate medians, water lawns in a way that results in excessive flooding or runoff yes

2. Describe measures that prohibit water uses listed above:

Warnings are issued to wasteful water users, with follow-up, visits to ascertain if excessive use continued. Continued abuse of these restrictions could lead to the installation of a flow restrictor and/or termination of service. Cancellation of permits for hydrant water use may occur if user is in violation of the emergency regulations and restrictions in this ordinance. A tiered rate structure is in place to discourage wasteful use.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models. no

b. Develop minimum appliance efficiency standards that:

i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per no

pound of common salt used.

ii.) implement an identified maximum number of gallons discharged per gallon of soft water produced. no

c. Allow local agencies, including municipalities and special districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply. no

4. Does your agency include water softener checks in home water audit programs? no

5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models? no

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 9/19/05

BMP 14: Residential ULFT Replacement Programs

Reporting Unit:	BMP Form Status:	Year:
Alameda County Water District	**100% Complete**	**2003**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	no	no

Number of Toilets Replaced by Agency Program During Report Year

Replacement Method	SF Accounts	MF Units
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
Total	0	0

6. Describe your agency's ULFT program for single-family residences.

See Cost Effectiveness Exemption filed for this reporting period.

7. Describe your agency's ULFT program for multi-family residences.

See Cost Effectiveness Exemption filed for this reporting period.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

ACWD filed a cost effectiveness exemption with CUWCC for BMP 14.

Reported as of 9/19/05

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: **Alameda County Water District**

BMP Form Status: **100% Complete**

Year: **2004**

A. Implementation

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets?	no	no

Number of Toilets Replaced by Agency Program During Report Year

Replacement Method	SF Accounts	MF Units
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
Total	0	0

6. Describe your agency's ULFT program for single-family residences.

See Cost Effectiveness Exemption filed for this reporting period.

7. Describe your agency's ULFT program for multi-family residences.

See Cost Effectiveness Exemption filed for this reporting period.

8. Is a toilet retrofit on resale ordinance in effect for your service area? no

9. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

B. Residential ULFT Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

ACWD filed a cost effectiveness exemption with CUWCC for BMP 14

Reported as of 9/19/05

Appendix C

ACWD Water Shortage Ordinance

ORDINANCE NO. 30

AN ORDINANCE OF ALAMEDA COUNTY WATER DISTRICT REGULATING THE NONESSENTIAL USE OF WATER, AND PROVIDING FOR THE CONSERVATION OF THE WATER SUPPLY OF THE DISTRICT.

BE IT ORDAINED by the Board of Directors of ALAMEDA COUNTY WATER DISTRICT as follows:

Section 1. Declaration of a Water Shortage Emergency.

This Board of Directors does hereby find and declare as follows:

(a) Pursuant to Resolution No. 91-014, duly adopted by this Board, a public hearing was held on March 25, 1991, on the matter of whether this Board of Directors should declare a water shortage emergency condition exists within the water service area of this District.

(b) Notice of said hearing was published pursuant to law in the Argus, a newspaper of general circulation, printed and published within said water service area of the District.

(c) At said hearing all persons present were given an opportunity to be heard and all persons desiring to be heard were heard.

(d) Said hearing was called, noticed and held in all respects as required by law.

(e) This Board heard and has considered each protest against the declaration and all evidence presented at said hearing.

(f) Pursuant to Resolution No. 91-016, adopted by this Board on March 25, 1991, a water shortage emergency condition exists and prevails within the water service area of this District. Said water shortage exists by reason of the fact that the ordinary demands and requirements of the water consumers in the Alameda County Water District service area cannot be met and satisfied by the water supplies now available to this District without depleting the water supply or diminishing its quality to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

Section 2. Purpose and Authority.

The purpose of this ordinance is to conserve the water supply of the District for the greatest public benefit with particular regard to public health, fire protection and domestic use; to conserve water by reducing waste; and to the extent necessary by reason of drought and the existing water shortage emergency condition, to reduce water use fairly and equitably. This ordinance is adopted pursuant to Sections 350 to 358, 31026 to 31029 and 31035 of the California Water Code.

Section 3. Effect of Ordinance.

This ordinance shall take effect May 1, 1991, shall supersede and control over any other ordinance or regulation of the District in conflict herewith, and shall remain in effect until the Board of Directors declares that the water shortage emergency has ended.

Section 4. Water Use Limitations.

(a) Restrictions on Water Use.

During the water shortage emergency condition, and to preserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection, the following uses of water have been determined to be wasteful and are hereby prohibited:

(1) Using water in an irresponsible manner for any purpose resulting in wastage.

(2) Watering lawns or any other irrigation in a manner which results in excessive flooding or runoff into streets, gutters or other waterways.

(3) Using hoses to clean sidewalks, driveways, patios, parking lots, walkways, or other hard surface areas, except when necessary for public health or safety.

(4) Use of hoses for any purpose without a positive shutoff nozzle.

(5) Flushing sewers, hydrants or washing streets, except in cases of emergency and for essential operations.

(6) Restaurants serving water to customers unless requested.

(b) Enforcement of Restrictions.

(1) The District may, after two warnings, order that special follow-up visits be made to ascertain whether wasteful use of water is continuing to occur.

(2) In the event the District determines that water waste is still occurring at a customer's premises in violation of the restrictions on water use set forth in this ordinance, installation of a flow-restrictor, or termination of service may occur. Charges for reconnection and/or removal of flow-restrictor shall be the responsibility of the customer.

(3) The District may immediately cancel a permit to use water from a hydrant when the customer is observed using water in violation of the regulations set forth in this ordinance.

(c) Water Use Guidelines.

During the water shortage emergency condition, customers are urged to adhere to the following guidelines to conserve the limited water supply available:

(1) Utilize systems which recycle water when possible.

(2) Use water for whatever purpose in a manner which minimizes waste, ınd repair leaks as soon as possible.

(3) Avoid draining and refilling of existing swimming pools and/or spas vhere possible.

(4) Use non-potable water for construction purposes unless it is not ıppropriate and/or not available. If reclaimed water is used, the proposed conditions of ıse must meet the requirements of the San Francisco Bay Regional Water Quality Control Board.

(5) Landscape Guidelines:

Irrigate early in the morning (before 10:00 a.m.), to minimize evaporation.

Use of Evapotranspiration Rate to determine plant water needs is encouraged. The Evapotranspiration Rate is available at (510) 659-1970, ext. 200.

Installation of new landscaping should utilize best known irrigation and horticultural practices for efficient water use.

Existing systems should be evaluated and repaired to maximize efficiency.

Use of reclaimed water for landscaping is encouraged.

Use drought tolerant plant species wherever possible for replacement and at all new landscape installations.

Section 5. Customer Conservation Rate Schedules.

(a) Single-Family Detached Dwelling Units.

Single-family detached dwelling units shall receive a base consumption allocation (BCA) of 400 gallons per day. This allocation may be increased by an additional 50 gallons per day (4 ccf units bi-monthly) for each person in the household over four. For water uses at or above this level, the following rate schedule shall apply:

Billing Units	Approx. gpd Maximum	Rate $ Per Unit
0-30	400	1.008 BCA (4 persons*)
31-48	600	1.25 x base
49-64	800	1.50 x base
65-80	1000	1.75 x base
Over 80		2.00 x base

* An additional 4 units (50 gpd) is provided for each additional person over the BCA. One billing unit equals one hundred cubic feet, or approximately 748 gallons.

(b) Multi-Family Residential and Non-Residential Customers.

All master-metered multi-family residential accounts and all commercial, industrial and public agency accounts will receive a BCA of 90 percent of average 1990 use, with the following charges for use above the BCA:

Up to Baseline Consumption Allocation (BCA)	$1.008/unit base
Up to 20% above BCA	1.25 x base rate
20.01 - 40% above BCA	1.50 x base rate
40.01 - 60% above BCA	1.75 x base rate
Above 60% of BCA	2.00 x base rate

(c) Landscape Irrigation Only Accounts.

Multi-family residential, commercial, industrial or public agency/institutional accounts classified for landscape irrigation-only will receive a Base Consumption Allocation that represents 80 percent of average 1990 use, with use over this level charged pursuant to the schedule in Section 5(b) above.

New accounts with significant landscape needs with no prior history will apply for a Base Consumption Allocation based on the regional evapotranspiration rate and size of project. Use over the level provided by this allocation will be charged pursuant to the schedule in Section 5 (b) above. This formula will also be applied to those customers seeking exceptions pursuant to Section 7 below who have landscape irrigation requirements exceeding one-quarter of an acre in size.

Section 6. Water Banking.

The District will utilize water banking during the drought emergency period. This will allow customers who do not use their total base allotment of water in a given billing period to supplement their water usage up to the amount banked in a subsequent billing period. All water bank balances will be zeroed out at the end of the drought emergency program.

Section 7. Exceptions.

Pursuant to the procedures set forth in Section 8, exceptions to increase the amount of water which may be used without exceeding the basic allotments may be granted upon written request, including, but not limited to the following:

(a) Verified medical requirements.

(b) Incorrect customer classification based on predominant use. Allowance will also be made to adjust a residential BCA for home businesses for which the customer has a valid business license, (e.g., a child care provider).

(c) Accounts classified as single family which provide water for livestock.

(d) Unnecessary and undue hardship to the Applicant, including, but not limited to, adverse economic impacts, such as loss of production or jobs.

(e) Emergency conditions, such as impairment of health, sanitation, fire protection or safety of the applicant or public.

Section 8. Application Procedure for Exceptions.

Consideration of written applications for exceptions regarding restrictions on water use set forth in Section 4 or Base Consumption Allocations set forth in Section 5, shall be as follows:

(a) Written applications for exceptions shall be accepted, and may be granted by the District's Drought Management Coordinator;

(b) Denials of applications may be appealed in writing to the General Manager.

Section 9. Exemption from CEQA.

The District Board of Directors finds that this ordinance is exempt from provisions of the California Environmental Quality Act of 1970 because it is immediate action necessary to prevent or mitigate an emergency, as described in Section 15269(c) of the Guidelines promulgated under said Act.

PASSED AND ADOPTED this 23rd day of April, 1992, by the following vote:

AYES: Directors Damas, Redeker, Rollisson, Strandberg and Borghi

NOES: None

ABSENT: None

/s/ FRANK BORGHI, JR.
Frank Borghi, Jr., President
Board of Directors
Alameda County Water District

ATTEST:

/s/ RUTH R. EVANS
Ruth R. Evans, District Secretary
Board of Directors
Alameda County Water District
(SEAL)

APPROVED:

/s/ GENE RHODES
Gene Rhodes, Attorney
Alameda County Water District

CERTIFICATE

I, the undersigned Secretary of ALAMEDA COUNTY WATER DISTRICT, do hereby certify that the foregoing is a full, true and correct copy of an Ordinance of the Board of Directors of ALAMEDA COUNTY WATER DISTRICT, a political subdivision, which said Ordinance was duly adopted at a meeting of said Board regularly held on April 25, 1991 as revised by the Board at their regular meetings held on September 26, 1991, January 9, 1992, and April 23, 1992, and that a copy of said Ordinance was forthwith duly entered in the minutes of said meeting of said Board, and that the same is in full force and effect.

Dated: April 29, 1996

Marvell L. Herren, District Secretary
Alameda County Water District

REFERENCES

ASSOCIATION OF BAY AREA GOVERNMENTS, 2003. *Projections 2003; Forecasts for the San Francisco Bay Area to the Year 2030.*

AVILA AND ASSOCIATES, 2004. *Integrated Regional Water Management Planning in the Niles Cone Groundwater Basin.*

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CALIFORNIA DEPARTMENT OF WATER RESOURCES, 2005. *Notice to State Water Project Contractors, dated May 25, 2005.*

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CH2M HILL, 2003. *Recycled Water Feasibility Study, Alameda County Water district/Union Sanitary District.*

ENVIRONMENTAL SCIENCE ASSOCIATES, INC., 1994. *Union Sanitary District District-Wide Master Plan, Program Environmental Impact Report.*

RMC, 2004. *Bay Area Integrated Regional Water Management Plan: Water Quality and Water Supply*

RMC, 2004. *SFPUC Wholesale Water Customer Recycled Water Potential*

SAN FRANCISCO PUBLIC UTILITIES COMMISSION, 2005. *Transmittal Letter to ACWD, June 1, 2005.*

SAN FRANCISCO PUBLIC UTILITIES COMMISSION, 2000. *Water Supply Master Plan, A Water Resource Strategy for the SFPUC System.*

URS, 2004. *SFPUC Wholesale Customer Water Conservation Potential.*

URS, 2004 *SFPUC Wholesale Customer Water Demand Projections.*

URS, 2004. *SFPUC 2030 Purchase Estimates.*

WATER TRANSFER ASSOCIATES, 1999. *Technical Memorandum No. 3, Analysis of Most Feasible Supplemental Supply Options.*

ATTACHMENT B
ACWD WATER SUPPLY CONTRACTS

- State Water Project Water Supply Contract (partial)
- San Francisco Water Supply Contract

(note: Complete State Water Project Supply Contract is available on DWR website: http://www.swpao.water.ca.gov/wsc/index.cfm)

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

WATER SUPPLY CONTRACT
BETWEEN

THE STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

AND

ALAMEDA COUNTY WATER DISTRICT

Disclaimer: This document integrates Alameda County Water District's State Water Project water supply contract with the many amendments to the contract entered into since 1961. It is intended only to provide a convenient reference source, and the Department of Water Resources is unable to provide assurances that this integrated version accurately represents the original documents. For legal purposes, or when precise accuracy is required, users should direct their attention to original source documents rather than this integrated version.

(as of May 28, 2003)

IN WITNESS WHEREOF, the parties hereto have executed this contract on the date first above written.

Approved as to legal form and sufficiency:

Chief Counsel (Acting)
Department of Water Resources

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By B. Abbott Goldberg
Acting Director

ALAMEDA COUNTY WATER DISTRICT

By Manuel J. Bernardo
Manuel J. Bernardo, President

Phyllis J. Kettering
Countersigned:
Phyllis J. Kettering, Secretary

APPROVED AS TO TERMS AND CONDITIONS:

M. P. Whitfield, General Manager and Chief Engineer
Alameda County Water District

APPROVED AS TO FORM:

Morris Hyman, Attorney
Alameda County Water District

APPENDIX A

TABLE A

AS SHOWN IN THE CONTRACT
BETWEEN
THE STATE OF CALIFORNIA
THE DEPARTMENT OF WATER RESOURCES AND
ALAMEDA COUNTY WATER DISTRICT
AND
AMENDMENT NO. 20

TABLE A
ANNUAL AMOUNTS OF WATER TO BE MADE AVAILABLE FOR DELIVERY TO ALAMEDA COUNTY WATER DISTRICT

<As shown in the original Contract>

Year	Total Annual Amount In Acre-feet
1	16,900
2	17,600
3	18,100
4	18,800
5	19,400
6	14,300
7	15,000
8	15,500
9	16,200
10	17,000
11	17,900
12	18,800
13	19,600
14	20,500
15	21,300
16	22,200
17	23,100
18	23,900
19	24,800
20	26,000
21	27,200
22	28,400
23	29,600
24	30,800
25	32,100
26	33,300
27	34,500
28	35,700
29	36,900
30	38,400
31	39,900
32	41,400
33	42,000
and each succeeding year thereafter, for the term of this contract:	42,000

TABLE A
ANNUAL AMOUNTS OF WATER TO BE MADE AVAILABLE FOR DELIVERY TO ALAMEDA COUNTY WATER DISTRICT DISTRICT

<As shown in Amendment No. 20>

Year	Total Annual Amount In Acre-feet
1962	16,900
1963	17,600
1964	18,100
1965	18,800
1966	19,400
1967	14,300
1968	15,000
1969	15,500
1970	16,200
1971	17,000
1972	17,900
1973	18,800
1974	19,600
1975	20,500
1976	21,300
1977	22,200
1978	23,100
1979	23,900
1980	24,800
1981	26,000
1982	27,200
1983	28,400
1984	29,600
1985	30,800
1986	32,100
1987	33,300
1988	34,500
1989	35,700
1990	36,900
1991	38,400
1992	39,900
1993	41,400
1994	42,000
and each succeeding year thereafter, for the term of this contract:	42,000

In any year, the amounts designated in this Table A shall not be interpreted to mean that the State is able to deliver those amounts in all years. Article 58 describes the State's process for providing current information for project delivery capability.

WATER SUPPLY CONTRACT

This Contract, dated as of August 8, 1984, is entered into by and between the City and County of San Francisco ("City") and the Alameda County Water District ("Customer").

ALAMEDA COUNTY WATER DISTRICT
AGREEMENT #2139

RECITALS

The City and the Customer have entered into a Settlement Agreement and Master Water Sales Contract ("Master Agreement"), which sets forth the terms and conditions under which the City will continue to furnish water for domestic and other municipal purposes to Customer and to other suburban purchasers. The Master Agreement contemplates that the City and each individual suburban purchaser will enter into individual contracts describing the location or locations at which water will be delivered to each purchaser by the San Francisco Water Department ("SFWD"), the purchaser's service area within which water so delivered is to be sold and other similar provisions unique to the individual purchaser. This Water Supply Contract is the Individual Contract contemplated by the Master Agreement.

AGREEMENTS OF THE PARTIES

1. Incorporation of the Master Agreement

The terms and conditions of the Master Agreement are

incorporated into this Contract as if set forth in full herein.

2. Term

Except as provided to the contrary in Article IX of the Master Agreement, the term of this Contract shall be that provided in Section 3.01 of the Master Agreement.

3. Service Area

Water delivered by the City to the Customer may be used or sold within the service area shown on the map designated Exhibit A attached hereto. Except as provided in Section 7.05 of the Master Agreement, Customer shall not use or sell any water delivered by the City outside this service area without the prior written consent of the City.

4. Location and Description of Service Connections

Sale and delivery of water to Customer will be made through a connection or connections to the SFWD system at the location or locations shown on Exhibit A attached hereto and with the applicable present account number, description, connection size, and meter size as shown on Exhibit B attached hereto.

5. Interties With Other Water Systems.

As of the commencement date of this Contract, Customer maintains no interties with other water systems.

6. Billing and Payment

The City shall compute the amounts of water delivered and bill Customer therefor on a monthly basis consistent with existing practice. Beginning July 1, 1986, the bill shall show the separate components of the charge (e.g., service, consumption, demand). Customer shall pay the amount due within thirty (30) days after receipt of the bill.

If Customer disputes the accuracy of any portion of the water bill it shall (a) notify the General Manager of the SFWD in writing of the specific nature of the dispute and (b) pay the undisputed portion of the bill within thirty (30) days after receipt. Customer shall meet with the General Manager of the SFWD or a delegate to discuss the disputed portion of the bill.

7. Minimum and Maximum Water Delivery Levels

a. The City will deliver and Customer will pay for a minimum annual supply of 8.051 mgd.

b. Customer's average annual usage shall not exceed 12.0 mgd. Customer's usage during any day shall not exceed 24.0 mgd. Customer's usage during any hour shall not exceed 28.8 mgd.

c. The water delivery and usage levels set forth above in subsections 7(a) and (b) shall become effective on December 1, 1985. Annual refers to the City's fiscal year.

d. The maximum quantities set forth above in subsection 7(b) shall not obligate the City to supply Customer with any water in addition to the quantities to which Customer otherwise is entitled under Sections 7.02 and 7.03 of the Master Agreement. Nor shall those maximum quantities obligate the City to supply the peak monthly, daily, or hourly demands of Customer, except as provided in Section 7.01 of the Master Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Contract, to become effective upon the effectiveness of

the Master Agreement, by their duly authorized representatives.

DATED: August 8, 1984.

CITY AND COUNTY OF SAN FRANCISCO

By _____
Rudolf Nothenberg
General Manager of
Public Utilities

Authorized by Public Utilities Commission Resolution No. 84-0144 Adopted April 10, 1984.

_____
Romaine A. Boldridge, Secretary

Approved by Board of Supervisors ~~Resolution~~ Ordinance No. 320-84

Adopted June 28, 1984.

_____
John L. Taylor Clerk

DATED: MAY 10, 1984.

APPROVED AS TO FORM:
GEORGE AGNOST
CITY ATTORNEY
BY _____
UTILITIES GENERAL COUNSEL

ALAMEDA COUNTY WATER DISRICT

By _____
Harry D. Brumbaugh
Its President

_____
Countersigned: Ruth R. Evans, Secretary

Authorized by Resolution No. 84-038 of the Board of Directors

050884/11-196603Qg

FIRST AMENDMENT TO WATER SUPPLY CONTRACT

THIS FIRST AMENDMENT, dated as of October 25, 1994, is entered into by and between the **City and County of San Francisco** ("City") and the **Alameda County Water District** ("Customer").

RECITALS

1. The City and Customer entered into a Settlement Agreement and Master Water Sales Contract ("Master Agreement") in 1984. Concurrently, the City entered into identical Master Agreements with 29 other cities, water districts and other water agencies in San Mateo, Santa Clara and Alameda Counties, collectively called the "Suburban Purchasers."

2. The Master Agreement contemplated that the City and each of the Suburban Purchasers would enter into separate companion agreements describing the location at which water is to be delivered, the purchaser's service area, and other similar provisions unique to the individual purchaser. The City and Customer entered into this companion agreement, entitled "Water Supply Contract," dated as of August 8, 1984.

3. The 1984 Master Agreement contains a "Supply Assurance" for 184 million gallons a day, expressed on a collective, aggregate basis. The Master Agreement does not fully allocate the Supply Assurance among the Suburban Purchasers. Instead, the Master Agreement provides that the amount of the Supply Assurance not already allocated on the basis of historical usage as of 1984 may, after taking into account water used by the City of Hayward

and the Estero Municipal Improvement District, be allocated among the Suburban Purchasers by an agreement reached among the Suburban Purchasers themselves. In the absence of such an agreement, Section 7.02(b)(3) of the Master Agreement provides for a periodic allocation of the Supply Assurance based on current usage over successive three year periods.

4. The City and the Suburban Purchasers have both recognized that the triennial "vesting" formula in Section 7.02(b)(3) of the Master Agreement acts as a disincentive to Suburban Purchasers limiting their use of San Francisco Water Department ("SFWD") water, since long-term entitlements to such water would be based on each agency's current, continuing use of SFWD water.

5. The San Francisco Public Utilities Commission has adopted Resolution No. 93-0085, which makes the removal of contractual disincentives to water conservation a part of the City's overall water conservation program.

6. All Suburban Purchasers who are affected by the vesting procedures in Section 7.02(b)(3) have agreed, through formal, binding action of their legislative bodies or authorized chief executive officers, to an allocation of the Supply Assurance. The effectiveness of that allocation is conditioned on the City and two Suburban Purchasers, including Customer, amending their individual Water Supply Contracts to conform the limits on those Suburban Purchasers' annual average usage to those agreed on by all Suburban Purchasers.

7. Consistent with Resolution No. 93-0085, the City wishes to support the actions of the Suburban Purchasers, which are seen as positive steps towards the removal of contract incentives tending toward increased use of SFWD water in the short term.

NOW, THEREFORE, IN CONSIDERATION OF THE FOREGOING, and for other good and valuable consideration, the parties agree as follows:

1. The Water Supply Contract is amended by revising the first sentence of Section 7.b to read:

> "Customer's average annual usage shall not exceed 13.760 mgd, in accordance with the allocation of residual water effected by the Suburban Purchasers pursuant to Section 7.02(b) of the Master Agreement"

2. Nothing in this First Amendment to Water Supply Contract is intended to, or shall be construed to, waive or compromise any of the claims reserved by the City or the Suburban Purchasers in the Master Agreement. Except as expressly provided herein, the Water Supply Contract is unchanged and remains in full force and effect.

IN WITNESS WHEREOF, the parties hereto have executed this First Amendment to Water Supply Contract, by their respective duly authorized representatives.

ALAMEDA COUNTY WATER DISTRICT

By: _____
President, Board of Directors

Countersigned: Marvell L. Herren
Marvell L. Herren,
Secretary

Authorized by Resolution No. 94-062
of the Board of Directors

CITY AND COUNTY OF SAN FRANCISCO

By: _____
Anson Moran
General Manager of Public Utilities

Authorized by Public Utilities Commission
Resolution No. 94-0250, adopted
October 25, 1994

Romaine A. Boldridge
Romaine A. Boldridge, Secretary

Approved As To Form
Louise Renne, City Attorney

By: _____
FOR Thomas M. Berliner
Utilities General Counsel

ATTACHMENT C
KIER & WRIGHT MEMORANDUM
"NEWARK AREAS 3 & 4 SPECIFIC PLAN EIR - WATER DEMAND ESTIMATES"

KIER & WRIGHT CIVIL ENGINEERS & SURVEYORS, INC.

3350 Scott Boulevard, Bldg. 22 • Santa Clara, California 95054 • 408-727-6665 • 408-727-5641

Memorandum

To: **Judy Shanley, David Powers & Associates, Inc.**
From: **John Noori**
Date: **July 3, 2008**
Re: **Newark Areas 3 & 4 Specific Plan EIR - Water Demand Estimates**

Alameda County Water District (ACWD) has asked for an estimate of total water demand for the proposed development project. In response to this request, we have prepared the following summary concerning the estimated water demand as well as provided a description of the methodology used.

Estimated Demand

The overall estimate for water demand from the proposed development is 1014.7 acre-feet per year (AFY)[a]. This is for potable water demand using specific assumptions and published use rates based on the various uses of the proposed development. Of this demand, a total of 514.6 AFY could be served by future reclaimed water service to the site. The methodology for these assumptions and use rates is described below. A breakdown of the individual use demands is presented in Table 1.

Methodology Used (Rates are based on the various types of uses provided by David Powers & Associates.)

Schools

In order to determine a use rate for the proposed school in Area 3 we reviewed the Water Supply Assessment prepared for the Santana Ranch Project in San Benito County in February 2008. This established a water demand of 30 gpd/person for a school. Based on 600 students this translates to 0.0503[b] gallons per day per square foot.

Landscape

For any athletic fields, open space, park and landscape buffer areas we are basing the rates on xeriscape or artificial turf demands, which are much more efficient and significantly less than standard landscape planting. Based on the 2nd Edition of the Land Development Handbook, the water use rate for xeriscape or artificial turf is 850 gallons per day per acre. This translates to 0.0195[c] gallons per day per square foot.

Residential

For the single-family residential portion of the development we used a rate of 85.71 gpd/person. Based on an average of 3.5 persons per dwelling unit, this translates to 300[d] gallons per day per dwelling unit. For the multi-family portion, assuming occupancy of 2.00 persons per dwelling unit and the same use rate of 85.71 gpd/person, we come up with a use rate of 171[e] gallons per day per dwelling unit.

Office/Miscellaneous

Due to the undetermined nature of the office/public-use space it's difficult to base water demand on a specific use type that has yet to be determined. Therefore we used an 85th percentile standard for water demand based on sanitary sewer load. This means that sewer load is equivalent to 85% of water demand. Using the sanitary sewer discharge rates established by the Industrial Waste Division of the San Jose Water Pollution Control Plant (WPCP), the sewer rates chosen are based on the following chart:

Project Use	Equivalent Use by WPCP	WPCP Sewer Rate* (gpd/sf)	Converted Water Rate (gpd/sf)
Office (miscellaneous)	Office (miscellaneous)	0.140	0.165
Public Agency	Public Agency	0.210	0.247
Public Hall	Hall (Civic/Social/Fraternal)	0.110	0.129
Average		0.153	0.180

*Sewer rate equals 85% of Water rate.

Therefore an average of the demand rates for the possible uses has been taken as 0.180 gallons per day per square foot.

Golf Course

The golf course irrigation will be provided via a well on the property. At some point in the future when facilities are available, the irrigation will be switched over to a public reclaimed water system. Russell D. Mitchell and Associates, Inc. is a private irrigation design consulting firm who specialize in designing golf course irrigation systems supplied with reclaimed water. Based on information provided by them, the typical consumption in the Newark region for a golf course's needs would be 45 inches per year. Based on this conservative estimate the projected seasonal irrigation water demand for a 130 acre golf course would be:

Winter	Spring	Summer	Fall	Total
8,320,000	41,056,000	69,568,000	41,056,000	160,000,000

(Units shown in gallons per year)

Therefore the total demand for the golf course would be 160 million gallons per year. This converts to a use rate of 0.0774[f] gallons per day per square foot.

Calculation Footnotes

a) Gallons per day times 365 (days per year) divided by 325,851 (gallons in one acre-foot of water) equals AFY.

b) 600 (students) x 30 (gpd/person) = 18,000 gpd. Therefore:
18,000 (gpd) / 357,600 (campus sf.) = 0.0503 gpd/sf.

c) 850 (gpd/acre) / 43,560 (sf in one acre) = 0.0195 gpd/sf.

d) 85.71 (gpd/person) * 3.5 (capita per unit) = 300 gpd/du.

e) 85.71 (gpd/person) * 2.0 (capita per unit) = 171 gpd/du.

f) 160,000,000 (gpd/year) / 365 (days per year) = 438,356 gpd. Therefore:
438,356 (gpd) / 130 (acres total) = 3,372 gpd/ac. Therefore:
3,372 (gpd/ac) / 43,560 (sf in one acre) = 0.0774 gpd/sf.

Table 1 – Summary of Water Use Estimates

AREA 4	Units	Area (acres)	GPD/DU	GPD/SF	WU Coefficient (AFY/unit)	Water Use Estimate (AFY)
Single-Family Residential	500		300		0.33604	168.0
Open Space/Park*		10.79		0.0195	0.95147	10.3
18-hole Golf Course		130.00		0.0774	3.77661	491.0
Area 4 Subtotal						669.2
AREA 3	**Units**	**Area (acres)**	**GPD/DU**	**GPD/SF**	**WU Coefficient (AFY/unit)**	**Water Use Estimate (AFY)**
Single-Family Residential	760		300		0.33604	255.4
Multi-Family Residential**	158		171		0.19154	30.3
Elementary School		8.21		0.0503	2.45431	20.1
Open Space/Park*		13.97		0.0195	0.95147	13.3
Office/Public Use		3.00		0.1800	8.78282	26.3
Area 3 Subtotal						345.4
Project Total						**1014.7**
Possible Reclaimed Water allocation (currently included in Project Total)						**23.6**
Golf-course total to be served from existing on-site well (currently included in Total Demand)						**491.0**

*Athletic Fields, open space, parks and landscape buffers are assumed to be xeriscape or artificial turf supplied by reclaimed water.

**Based on 40 du/acre on 3.95 acre area.