City of Daly City 2010 Urban Water Management Plan

Prepared for

City of Daly City

June 29, 2011

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2010 Urban Water Management Plan

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Brown and Caldwell Project No: 139705

Brown AND Caldwell
201 North Civic Drive, Suite 115
Walnut Creek, California 94596

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List of Abbreviations

ABAG	Association of Bay Area Governments
Act	Urban Water Management Act
AF	acre-feet
AFY	acre-feet per year
BARWRP	Bay Area Regional Water Recycling Program
BAWSCA	Bay Area Water Supply and Conservation Agency
BAWUA	Bay Area Water Users Association
BDPL	Bay Division Pipeline
BMP	Best Management Practice
BPS	booster pump station
ccf	hundred cubic feet
cfs	cubic feet per second
CII	commercial/industrial/institutional
CIMIS	California Irrigation Management Information System
City	City of Daly City
CUWCC	California Urban Water Conservation Council
CWS	California Water Service Company
DMM	Demand Management Measure
DSS	Demand Side Management Least-Cost Planning Decision Support
DWR	California Department of Water Resources
DWWR	City of Daly City's Department of Water and Wastewater Resources
EIR	Environmental Impact Report
ET_o	evapotranspiration
gpcd	gallons per capita per day
gpm	gallons per minute
HET	high efficiency toilet
HTWPT	Harry Tracy Water Treatment Plant
ISA	Interim Supply Allocation
ISL	Interim Supply Limitation
MCL	maximum contaminant level
MF	multi-family
MG	million gallons
mgd	million gallons per day
mg/L	milligrams per liter
MSL	mean sea level
MOU	Memorandum of Understanding
NSMCSD	North San Mateo County Sanitation District
NO_3	nitrate
PCCP	pre-stressed concrete cylinder pipe
PEIR	Program Environmental Impact Report
ppm	parts per million
PS	pump station
RMF	residential multi-family
RO	reverse osmosis
RSF	residential single family
SB7	Senate Bill x7-7
SF	single family
SFPUC	San Francisco Public Utilities Commission
SVWTP	Sunol Valley Water Treatment Plant
ULFT	ultra low flow toilet
UWMP/Plan	Urban Water Management Plan
WCIP	Water Conservation Implementation Plan
WSA	Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County
WSIP	Water System Improvement Program
WWTP	wastewater treatment plant

Professional Engineer's Certification

This is to certify that this 2010 Urban Water Management Plan by Brown and Caldwell for the City of Daly City, California has been prepared under my direction and supervision.

June 29, 2011

Jennifer L. Gain, P.E. Date

California Civil Engineer, C72430

Expires 06/30/2012

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Section 1

Plan Preparation

This Urban Water Management Plan (UWMP or Plan) addresses the water system operated by the Department of Water and Wastewater Resources (DWWR) of the City of Daly City (City) and describes the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to demands during normal, single-dry, and multiple-dry years. The City pumps local groundwater and also receives water from the San Francisco Public Utilities Commission (SFPUC), which provides water principally from Hetch Hetchy Reservoir to retail water customers in San Mateo, Santa Clara, and Alameda Counties, California.

This section provides background information on the Plan, an overview of coordination with other agencies, and a description of public participation and Plan adoption.

1.1 Urban Water Management Planning Act

This Plan has been prepared in accordance with the Urban Water Management Planning Act (Assembly Bill–AB797 as amended). The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit UWMPs every five years to the California Department of Water Resources (DWR). This Plan serves as a long-range planning document for the City's water supply. SFPUC's UWMP should be consulted for details regarding SFPUC's water supplies. In November 2009, the State most recently amended the Act with the adoption of SB7. The most significant revision is the requirement for establishing per capita water use targets and an option to delay Plan adoption to July 1, 2011.

Appendix A includes the DWR checklist of components required for UWMPs with cross-referencing to indicate where each requirement is addressed in this UWMP.

1.2 Resource Maximization and Import Minimization

The City has used water management tools to maximize local water resources (i.e., groundwater and recycled water) and minimize imports. The City has and continues to participate with the Bay Area Water Supply and Conservation Agency (BAWSCA), formerly known as the Bay Area Water Users Association (BAWUA), to implement some water conservation measures as part of a Regional Program.

1.3 Coordination

City DWWR staff communicated and coordinated this Plan's development with the City Manager, City Economic and Community Development and Fire Departments.

In addition, the Act requires the City to coordinate its Plan preparation with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies.

The City coordinated the development of this Plan with the following agencies:

- Bay Area Water Supply and Conservation Association (BAWSCA) and all its member agencies
- San Francisco Public Utilities Commission

In addition, the City coordinated the development of this plan with Agencies they share interconnections with including:

- California Water Service Company (CWS)
- Brisbane Water
- North Coast Water
- Westborough Water
- North San Mateo County Sanitation District (NSMCSD)

BAWSCA was created on May 27, 2003 to represent the interests of the 26 agencies that include cities, water districts, a water company, and a university that are located in Alameda, Santa Clara and San Mateo counties and that purchase water on a wholesale basis from the San Francisco Regional Water System (RWS). Collectively, the Plan refers to the BAWSCA agencies as the Wholesale Customers.

BAWSCA is the only entity that has the authority to represent directly the needs of the wholesale customers that depend on the RWS. Through BAWSCA, the wholesale customers can work with SFPUC on an equal basis to ensure the RWS is vv rehabilitated and maintained and to meet local responsibilities collectively and efficiently.

BAWSCA has the authority to coordinate water conservation, supply and recycling activities for its agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the regional water system; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes.

Compliance with the Urban Water Management Planning Act lies with each agency that delivers water to its customers. In this instance, the responsibility for completing an UWMP lies with the individual BAWSCA member agencies. BAWSCA's role in the development of the 2010 UWMP updates is to work closely with its member agencies and SFPUC to maintain consistency among the multiple documents under development.

Table 1-1 summarizes the efforts the City has taken to include various agencies and citizens in its planning process.

Table 1-1. Coordination with Appropriate Agencies (DWR Table 1)

	Participated in developing the Plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft Plan	Was sent a notice of intention to adopt	Not Involved / No Information
BAWSCA Member Agencies					✓	✓	
BAWSCA		✓			✓	✓	
SFPUC					✓	✓	
Water management agencies	✓			✓	✓	✓	
Relevant public agencies	✓			✓	✓	✓	
Wastewater Agency	✓			✓	✓	✓	
Public Library					✓	✓	

Table 1-1. Coordination with Appropriate Agencies (DWR Table 1)							
	Participated in developing the Plan	Commented on the draft	Attended public meetings	Was contacted for assistance	Was sent a copy of the draft Plan	Was sent a notice of intention to adopt	Not Involved / No Information
Special Interest Groups					✓*	✓*	
Citizen Groups					✓*	✓*	
General Public					✓*	✓*	
Other					✓*	✓*	

** When requested.*

1.4 Public Participation and Plan Adoption

The *DWR Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan* (dated March 2011) includes a description of the requirements for public participation and Plan adoption. The requirements include the following:

- At least 60 days prior to the public hearing, water suppliers must notify any city or county within which the supplier provides water supplies that the supplier is in process of updating their Plan.
- Water suppliers must encourage the involvement of diverse social, cultural, and economic elements of the population within the service area.
- Water suppliers must make the UWMP available for public inspection prior to adoption. Prior to the public hearing, the water supplier must provide public notification of the time and place for the hearing. The water supplier must provide such notification in two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates.
- If a water supplier makes changes to the UWMP after plan adoption, the supplier must hold another public hearing and have the UWMP readopted.
- A copy of the UWMP adoption resolution must be included in the UWMP.
- The water supplier must provide information on how it will implement the UWMP.
- No later than 30 days after submitting a UWMP to DWR, water suppliers must provide a copy of the UWMP to the California State Library and any city or county within which the supplier provides water supplies and must make the UWMP available for public review during normal business hours

For this update to the UWMP, the City Council noticed the public hearing on May 9, 2011 and then held a formal public hearing on June 13, 2011, to receive public comment on the draft Plan.

The City posted notice of the public hearing on the City's homepage on the Internet. The City arranged to publish legal public notices for the hearing in the local newspaper and posted them at City facilities. Copies of the draft Plan were available at City offices, libraries and the DWWR.

The hearing provided an opportunity for the City's water service customers and all residents, employers, and employees in the service area to learn about the water supply system and the plans incorporated to provide a reliable, safe, high-quality water supply into the future. The hearing also allowed people to ask questions regarding the current system and the viability of future plans. Upon City Council's approval at the conclusion of the public hearing, the City adopted its Plan.

The City Council held a public hearing for the adoption of the updated Plan on May 23, 2011 and submitted the revised Plan to the California Department of Water Resources in June 2011. Appendix B includes copies of the signed Resolution of Plan Adoption and the cover letter addressed to the DWR.

1.5 Plan Organization

This section provides a summary of the sections in the Plan.

- Section 2 provides a description of the service area, climate, water supply facilities, and distribution system.
- Section 3 presents historical and projected water use.
- Section 4 describes water supplies.
- Section 5 describes recycled water.
- Section 6 provides a comparison of future water supply to demand.
- Section 7 addresses water conservation.
- Section 8 provides information related to water shortage contingency.
- Appendices A through N provide relevant supporting documents.

1.6 Assumptions

In part, the City depended on assumptions made by SFPUC and BAWSCA regarding their water supply, to develop the evaluation and conclusions in this Plan. The read should consult SFPUC's UWMP for information about these assumptions.

1.7 Previous Reports

This Plan updates incorporated findings from reports completed since the 2005 Plan, including the following:

- 2009 SFPUC supply agreements
- General Plan Update Water Resources Section (in progress)
- Westside Basin Flow Model Draft Report, Version 2.2 and 3.1
- Draft Groundwater Storage and Recovery Agreement, dated June 5, 2011

Regional studies conducted by BAWSCA also serve as a basis for this Plan, including the following:

- BAWSCA Water Conservation Implementation Plan, September 2009
- Revised Demand Side Management Least-Cost Planning Decision Support (DSS) models – updated in 2009 (Dated November 2010 for the purposes of this UWMP[1])
- Long Term Regional Water Supply Strategy
- Drought Regional Implementation Plan (DRIP) – Tier 2 Regional Drought Plan
- Water Conservation Database 2010/11

[1] A training version of the DSS model dated May 2010 includes example data that are completely unrelated to the City. Because this version has a later date than the City's actual DSS model (dated December 2009), UWMP preparers assigned a new date to it when development of the 2010 UWMP began.

Section 2

System Description

This section describes the City's service area, climate, water supply facilities, water rates, and demographics. Figure 2-1 presents the City's service.

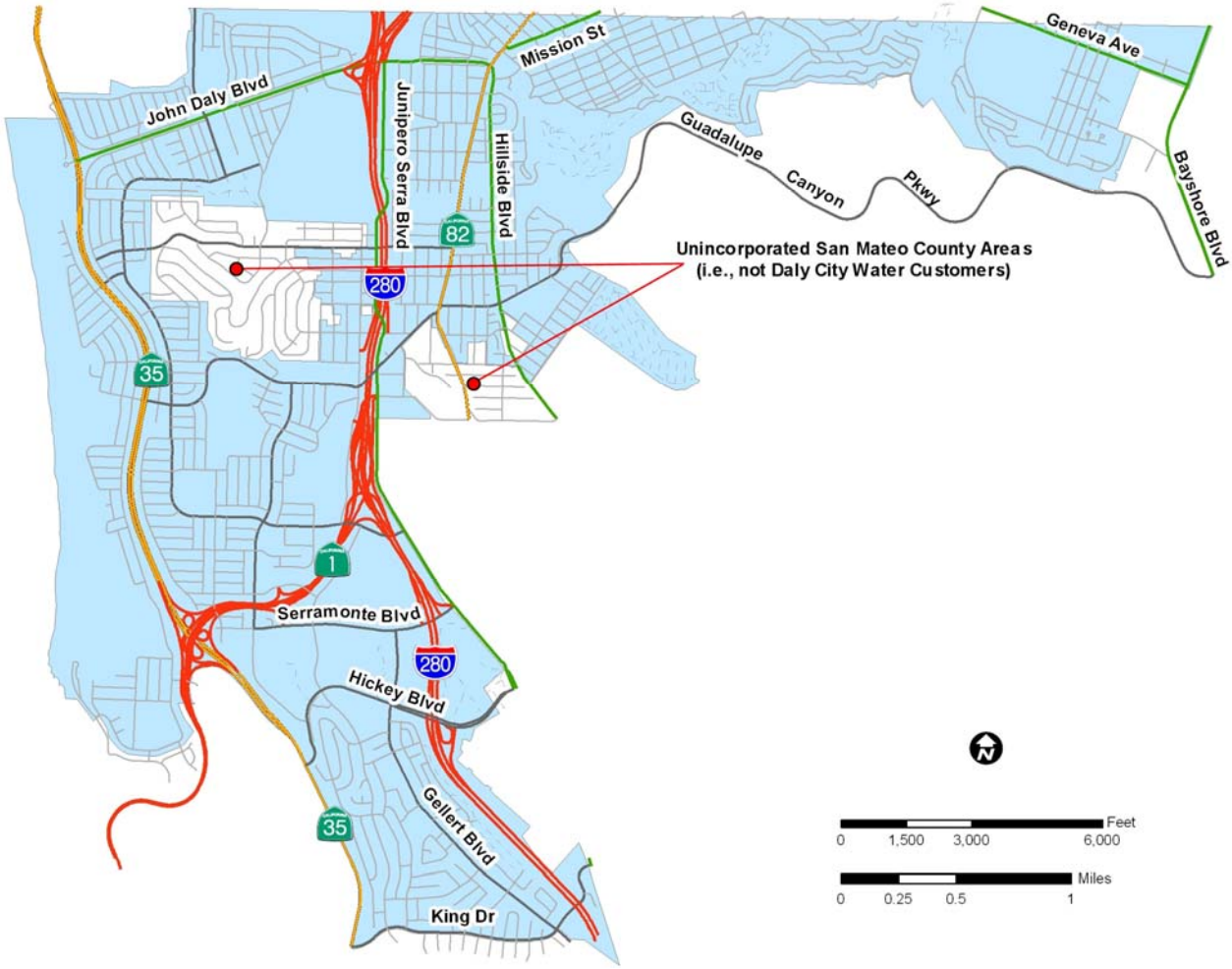

Figure 2-1. Water Service Area Boundary for Daly City

2.1 Climate

The Pacific Ocean moderates the City's climate. Precipitation typically occurs from October through April. No direct-measured precipitation data were available for Daly City proper; however, the City's standard average evapotranspiration (ET_o), rainfall, and temperature can be assumed to be relatively close to the data from a California Irrigation Management Information System (CIMIS) station located in Castroville. The Castroville CIMIS Station is located in the Monterey Bay Region, about 100 miles from Daly City, and is representative of Daly City's climate from the ocean side of San Francisco. Coastal fog during the summer months and relatively mild winter temperatures produce mean monthly minimum temperatures between 39 and 54 degrees F and mean monthly maximum temperatures between 60 and 67 degrees F.

Table 2-1 summarizes the standard average ET_o, rainfall, and temperature for Daly City, using the representative Castroville CIMIS station.

Table 2-1. Climate

Month	Standard Average ET_o (in.) [a]	Average Rainfall (in.)	Average Temperature (°F)
January	1.61	2.92	48.9
February	1.98	3.26	50.7
March	3.13	2.13	52.1
April	4.12	1.06	52.9
May	4.73	0.47	54.7
June	4.85	0.28	56.8
July	4.31	0.18	58.4
August	3.85	0.46	58.7
September	3.25	0.44	58.1
October	2.72	0.72	55.7
November	1.80	1.62	52.0
December	1.49	2.45	48.6
Annual	37.8	16.0	54.0

[a] Reference evapotranspiration (ET_o), average rainfall, and average temperature data for the 1982 to 2010 period were obtained from the California Irrigation Management Information System (CIMIS) website for Station 19 (Castroville) on September 8, 2010 http://www.cimis.water.ca.gov/cimis/frontMonthlyEToReport.do).

2.2 Water Supply Facilities

As discussed in detail later in the Plan, the City receives a large portion of its water supply from SFPUC and supplements the SFPUC supply with groundwater pumped from six local wells. During dry periods, groundwater makes up a larger proportion (up to 45 percent) of the City's supply. The City also uses tertiary recycled water from the North San Mateo County Sanitation District wastewater treatment plant (WWTP) wherever feasible, to offset potable/aquifer water demands.

Table 2-2 summarizes the capacity and characteristics of the active wells.

Table 2-2. Daly City Wells – Active Capacity

Well	Actual capacity gallons per minute (gpm)	Actual capacity million gallons per day (mgd)
Westlake	410	0.59
No. 4	426	0.62
Junipero Serra	550	0.79
Jefferson	340	0.49
Vale	693	1.0
'A' Street (Inactive) [a]	524	0.76
Well water supply	2,943	4.25 [b]

[a] *"A" Street well is currently out of service owing to elevated nitrate levels. A plan has been devised using screening techniques to lower the nitrate levels. Preliminary results are promising.*

[b] *Although the capacity is 4.25 million gallons per day (mgd),Daly City is considering a self imposed pumping limitation of 3.43 mgd or 3,842 acre-feet, which has been identified as Daly City's safe yield for the Westside Basin Aquifer. The City is currently planning to replace Well No. 4 as it has exceeded its useful life.*

2.3 Distribution System

Figure 2-2 shows a system diagram of the City's distribution system. Daly City divides its water system into six separate sections, generally divided into two areas:

Westside

1. Westlake
2. Hickey

Eastside

3. Bayshore
4. Citrus
5. "A" Street Well Booster Zones
6. Reservoir 8 Booster Pump Station

2.3.1 Westlake Section

The Westlake Section has five pressure zones, as follows:

1. Zone 4
2. Zone 5
3. Zone 6
4. Zone 6 Reduced
5. Skyline Hydropneumatic Zone

In the Westlake section, the Westlake Well discharges into the Westlake Pump Station (PS) sump for disinfection and for blending with water from SFPUC. The SFPUC supply is from the Park Plaza turnout (60-inch-diameter Sunset aqueduct) and the Sullivan/87th Street turnout (54-inch- diameter San Andreas #2 aqueduct). The City adds sodium hypochlorite and ammonia to the well water to achieve a residual range of 0.6 to 1.0 milligrams per liter (mg/L) as chloramine. The City also adds fluoride to its well water to match the fluoride concentration in SFPUC water. By blending well water with SFPUC water, the City achieves a nitrate (as NO_3) range of 9 to 19 mg/L.

The Westlake Pump Station pumps blend water to Zone 4, where Reservoir 4 provides storage. Located adjacent to Reservoir 4, the Reservoir 4 Pump Station pumps water to Zone 5. In Zone 5, Reservoir 5 and Reservoir 5b provide storage; a connecting water main between the reservoirs maintains Zone 5 at the same hydraulic grade line. The Reservoir 5 Pump Station pumps water to Zone 6 where Reservoir 6 and Reservoir 6B provide storage; a connecting water main between the reservoirs maintains Zone 5 at the same hydraulic grade line. Zone 6 gravity feeds a pressure-reduced zone.

2.3.2 Hickey Section

At the Reservoir 6 site, the Skyline Hydropneumatic PS supplies water for the area too high in elevation for Reservoir 6 to maintain adequate pressure and fire flow.

In the Hickey section, there are five separate pressure zones:

1. Zone 5b
2. Zone 6B
3. Zone 6B Reduced “A”
4. Zone 6B Reduced “B”
5. Zone 7

Hickey Pump Station supplies Zone 5b/Reservoir 5b and, through hydraulic connection, from Reservoir 5. The SFPUC Hickey Boulevard meters turnout (San Andreas # 2) provides water for the Hickey Pump Station. Reservoir 5b floats with Reservoir 5 (Westlake section) by system hydraulics. The Reservoir 5b Pump Station supplies Zone 6B/Reservoir 6B. Reservoir 6B floats with Reservoir 6 (Westlake section) in the same concept as 5/5b. Zone 6B gravity feeds two reduced pressure zones: Zone 6B Reduced “A”, and Zone 6B Reduced “B”. Zone 6B Reduced “A” is a pressure reduced zone of 6B, and Zone 6B Reduced “B” is a pressure reduced zone of 6B reduced “A”. The Reservoir 6B Pump Station supplies Zone 7/Reservoir 7. In Zone 7, the City uses the Higate Hydropneumatic Station only as a pressure surge tank in a zone pocket of Zone 7 susceptible to pressure surges. Higate can be supplied with Zone 6B, discharging to Zone 7; however, pump output is too low for any supplemental flow in the event of insufficient Zone 7 flow/pressure.

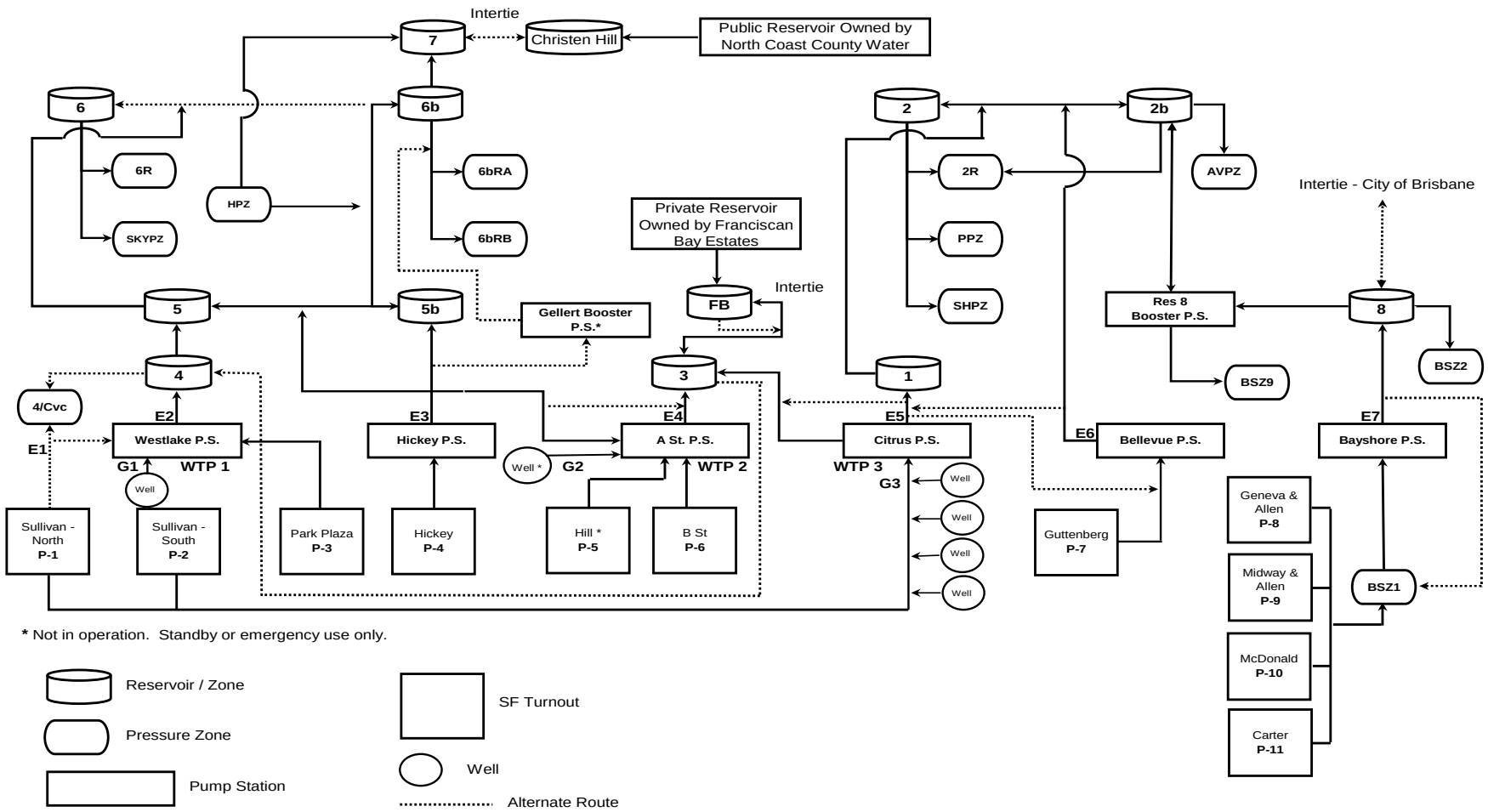

Figure 2-2. City of Daly City Water Distribution Diagram

2.3.3 Bayshore Section

In the Bayshore Section, there are four separate pressure zones:

1. Bayshore Zone 1
2. Bayshore Zone 2
3. Zone 8
4. Zone 9 Check
5. Reservoir 8 Booster Pump Station

Zone 1 receives its supply by the head off the SFPUC Allan and Midway Meters turnout at Bayshore (60-inch-diameter Crystal Springs aqueduct). Bayshore Zone 1 supplies the Bayshore Heights Booster Station, which delivers water to Zone 8/Reservoir 8. Bayshore Zone 2 is a pressure-reduced zone of Reservoir 8. Zone 2B Reduced (Citrus Section) can supply Reservoir 8 when needed for reserve capacity. Reservoir 8 Booster Pump Station can supply Reservoir 2B and is our east to west redundancy.

2.3.4 Citrus Section

The Citrus Section has eight separate pressure zones:

1. Zone 1
2. Pointe Pacific Hydropneumatic Zone
3. Zone 2
4. Zone 2B
5. Zone 2/2B Reduced
6. South Hill Hydropneumatic Zone
7. Alta Vista Hydropneumatic Zone
8. Zone 3

In the Citrus Section, Wells No. 4, Junipero Serra, Jefferson and Vale pump directly into the Citrus PS sump for disinfection with sodium hypochlorite and ammonia, and blending with SFPUC water from the Sullivan/87th Street turnout (54-inch diameter San Andreas #2 aqueduct). The City adds sodium hypochlorite and ammonia to the well water to achieve a residual range of 1.8 to 2.2 mg/L as chloramine. The City also adds fluoride sufficient to match the fluoride concentration in SFPUC water. Blending for NO_3 reduction yields a range of 19 to 41 mg/L NO_3.

Citrus PS pumps directly to both Zone 1 and Zone 3, where Reservoir 1 and Reservoir 3 provide storage for the respective zones. Reservoir 1 Pump Station pumps water into Zone 2. Bellevue Pump Station also discharges into Zone 2. The Bellevue Pump Station is usually fed by SFPUC Guttenberg Street meters turnout, as it is supplemental to Citrus PS production. It is possible to change the suction valving to a Zone 1 feed at Bellevue when needed. Zone 2B has a gravity pressure reduced zone. The Reservoir 8 Pump Station feeds Zone 2B. Zone 2B can feed water to Zone 2 during normal operation by gravity. Zone 2 can feed Zone 2B if the water level in Reservoir 2B drops sufficiently. Reservoir 2B can also back feed into Reservoir 8 and Zone 9, the higher elevations of the Bayshore. At the Reservoir 2 site, the Pointe Pacific Hydropneumatic Station draws water from Reservoir 2, to serve homes at elevations above Reservoir 2 service elevation. Zone 2 supplies the South Hill Hydropneumatic Station, to serve homes at elevations above Reservoir 2 service elevation. Zone 2B supplies the Alta Vista Hydro pneumatic Station that maintains adequate pressure and fire flow to serve homes at elevations above Reservoir 2B service elevation. Since 2005, the City added Reservoir 8 BPS to transfer water from the Bayshore Area to Zone 2B and new pipelines to increase the transfer capability from Zone 2B to Reservoir 8 and Zone 9.

2.3.5 "A" Street Section

The SFPUC "B" Street Meter turnout (54-inch-diameter San Andreas #2 aqueduct) and/or the D Street Meter (60-inch-diameter Crystal Springs # 2 aqueduct) and the "A" Street Well are three sources that supply the "A" Street Booster Pump Station. Historically, the City has blended water from the "A" Street Well with SFPUC water, disinfected with sodium hypochlorite and ammonia, fluoridated with sodium fluoride and then pumped from the "A" Street Booster Station into Zone 5 and/or Zone 3. Chloramine residuals for disinfection range between 2.0 to 2.4-mg/L total chlorine. Blending for nitrate reduction yields a range of 24 to 38 mg/L NO_3. Recently due to elevated nitrate levels, the City have taken the "A" Street well temporarily offline and is assessing options for nitrate control and/or removal.

2.4 Storage

Table 2-3 summarizes existing reservoirs and their volumes. On the Eastside, water from the Citrus PS pumps to both Reservoir 1 and Reservoir 3. To facilitate equalization of system demand, there is an intertie between these two reservoirs. Reservoir 2, 2B, and 8 also store water for the Eastside. On the Westside, the Westlake PS pumps water to Reservoir 4. Reservoirs 5, 5B, 6, 6B, and 7 also store water for the Westside.

Table 2-3. Existing Reservoir Characteristics

Reservoir	Volume capacity, million gallons	Overflow elevation, feet	Base elevation, feet
East Side			
1	0.70	637	624
2	2.30	779	754
2B	2.0	788	748
3	0.98	474	454
8	0.63	438	410
Franciscan Bay Park (private)	0.29	514	481
Subtotal	6.9		
West Side			
4	1.37	405	384
5	1.53	555	533
5B	10.4	550	530
6	1.50	685	655
6B	1.45	684	655
7	1.49	768	723
Subtotal	17.7		
Total	24.58		

Notes: Since 2005, the City replaced the original 0.5 MG Reservoir 2B with a new 2 MG reservoir.

2.4.1 Pump Stations

Table 2-4 shows booster pump station (BPS) characteristics, together with the relative locations and functions of the BPSs.

Table 2-4. Booster Pump Station Capacity

Eastside			Westside		
Pump Station	Capacity, gpm		Pump Station	Capacity, gpm	
	Total [a]	Firm [b]		Total [a]	Firm [b]
Citrus (for Zone1)	3,074	1,554	Westlake	3,010	2,230
Citrus (for Zone 3)	2,777	1,534	Reservoir 4	2,100	1,377
Reservoir 1	877	274	Reservoir 5	2,677	934
Bellevue	427	197	Reservoir 5B	2,132	1,027
Alta Vista	1,131	565	Reservoir 6B	2,215	1,066
Pointe Pacific	5,177	2,677	'A' Street	2,400	1,500
Bayshore	1,098	537	Gellert	605	276
South Hill	1,900	400	Hickey	3,626	1,701
Reservoir 8	1,130	572	Higate	560	280
			Skyline	1,784	234

[a] *All pumps operational.*

[b] *Capacity with largest pump out of service.*

2.5 Water Rates

Meter charges by size and volume charges based on type of use form the basis for water rates. Effective July 1, 2010 Daly City's Council approved a five-year rate adjustment beginning in 2010 to keep up with SFPUC increases in the future. Single-family residential, commercial and industrial accounts are billed a monthly base rate of $10.39 to $1,259.21 (depending upon service line size) plus a volume charge above six units of water used. As shown below in Table 2-5, the City bills for usage above six units per month on an inclining block rate structure.

Table 2-5. Water Rates 2010 to 2015–Monthly Base and Volume Charges

Water Rates – Effective July 1, 2010, 9% Increase										
Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$10.39	$20.78	$8.31	$10.39	$10.39	0	6	$0	$0	$0
3/4"	$10.39	$20.78	$8.31	$10.39	$10.39	7	10	$3.92	$7.84	$3.14
1"	$28.96	$57.92	$23.17	$14.48	$10.39	11	14	$4.01	$8.02	$3.21
1-1/2"	$50.49	$100.98	$40.39	$25.25	$10.39	15	20	$4.11	$8.22	$3.29

Table 2-5. Water Rates 2010 to 2015–Monthly Base and Volume Charges

2"	$80.19	$160.38	$64.15	$40.10	$10.39	21	50	$4.19	$8.38	$3.35
3"	$132.90	$265.80	$106.32	N/A	$10.39	51	70	$4.29	$8.58	$3.43
4"	$239.07	$478.14	$191.26	N/A	$10.39	71	100	$4.38	$8.76	$3.50
6"	$420.97	$841.94	$336.78	N/A	$10.39	101	200	$4.48	$8.96	$3.58
8"	$658.76	$1,317.52	$527.01	N/A	$10.39	201	500	$4.57	$9.14	$3.66
10"	$952.57	$1,905.14	$762.06	N/A	$10.39	501	1,000	$4.68	$9.36	$3.74
12"	$1,259.21	$2,518.42	$1,007.37	N/A	$10.39	1,001	and up	$4.77	$9.54	$3.82
Water Rates – Effective November 1, 2010, Adjustment Single-family Residential with Fire Sprinklers										
Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$10.39	$20.78	$8.31	$10.39	$10.39	0	6	$0	$0	$0
3/4"	$10.39	$20.78	$8.31	$10.39	$10.39	7	10	$3.92	$7.84	$3.14
1"	$28.96	$57.92	$23.17	$10.39	$10.39	11	14	$4.01	$8.02	$3.21
1-1/2"	$50.49	$100.98	$40.39	$10.39	$10.39	15	20	$4.11	$8.22	$3.29
2"	$80.19	$160.38	$64.15	$10.39	$10.39	21	50	$4.19	$8.38	$3.35
3"	$132.90	$265.80	$106.32	N/A	$10.39	51	70	$4.29	$8.58	$3.43
4"	$239.07	$478.14	$191.26	N/A	$10.39	71	100	$4.38	$8.76	$3.50
6"	$420.97	$841.94	$336.78	N/A	$10.39	101	200	$4.48	$8.96	$3.58
8"	$658.76	$1,317.52	$527.01	N/A	$10.39	201	500	$4.57	$9.14	$3.66
10"	$952.57	$1,905.14	$762.06	N/A	$10.39	501	1,000	$4.68	$9.36	$3.74
12"	$1,259.21	$2,518.42	$1,007.37	N/A	$10.39	1,001	and up	$4.77	$9.54	$3.82
Water Rates – Effective July 1, 2011, 12% Increase										
Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$11.64	$23.28	$9.31	$11.64	$11.64	0	6	$0	$0	$0
3/4"	$11.64	$23.28	$9.31	$11.64	$11.64	7	10	$4.39	$8.78	$3.51
1"	$32.44	$64.88	$25.95	$11.64	$11.64	11	14	$4.49	$8.98	$3.59
1-1/2"	$56.55	$113.10	$45.24	$11.64	$11.64	15	20	$4.60	$9.20	$3.68
2"	$89.81	$179.62	$71.85	$11.64	$11.64	21	50	$4.69	$9.38	$3.75
3"	$148.85	$297.70	$119.08	N/A	$11.64	51	70	$4.80	$9.60	$3.84
4"	$267.76	$535.52	$214.21	N/A	$11.64	71	100	$4.91	$9.82	$3.93
6"	$471.49	$942.98	$377.19	N/A	$11.64	101	200	$5.02	$10.04	$4.02
8"	$737.59	$1,475.18	$590.07	N/A	$11.64	201	500	$5.12	$10.24	$4.10

Table 2-5. Water Rates 2010 to 2015–Monthly Base and Volume Charges

10"	$1,066.88	$2,133.76	$853.50	N/A	$11.64	501	1,000	$5.24	$10.48	$4.19
12"	$1,410.32	$2,820.64	$1,128.26	N/A	$11.64	1,001	and up	$5.34	$10.68	$4.27

Water Rates – Effective July 1, 2012, 12% Increase

Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$13.04	$26.08	$10.43	$13.04	$13.04	0	6	$0	$0	$0
3/4"	$13.04	$26.08	$10.43	$13.04	$13.04	7	10	$4.92	$9.84	$3.94
1"	$36.33	$72.66	$29.06	$13.04	$13.04	11	14	$5.03	$10.06	$4.02
1-1/2"	$63.34	$126.68	$50.67	$13.04	$13.04	15	20	$5.15	$10.30	$4.12
2"	$100.59	$201.18	$80.47	$13.04	$13.04	21	50	$5.25	$10.50	$4.20
3"	$166.71	$333.42	$133.37	N/A	$13.04	51	70	$5.38	$10.76	$4.30
4"	$299.89	$599.78	$239.91	N/A	$13.04	71	100	$5.50	$11.00	$4.40
6"	$528.07	$1,056.14	$422.46	N/A	$13.04	101	200	$5.62	$11.24	$4.50
8"	$826.10	$1,652.20	$660.88	N/A	$13.04	201	500	$5.73	$11.46	$4.58
10"	$1,194.91	$2,389.82	$955.93	N/A	$13.04	501	1,000	$5.87	$11.74	$4.70
12"	$1,579.56	$3,159.12	$1,263.65	N/A	$13.04	1,001	and up	$5.98	$11.96	$4.78

Water Rates – Effective July 1, 2013, 12% Increase

Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$14.60	$29.20	$11.68	$14.60	$14.60	0	6	$0	$0	$0
3/4"	$14.60	$29.20	$11.68	$14.60	$14.60	7	10	$5.51	$11.02	$4.41
1"	$40.69	$81.38	$32.55	$14.60	$14.60	11	14	$5.63	$11.26	$4.50
1-1/2"	$70.94	$141.88	$56.75	$14.60	$14.60	15	20	$5.77	$11.54	$4.62
2"	$112.66	$225.32	$90.13	$14.60	$14.60	21	50	$5.88	$11.76	$4.70
3"	$186.72	$373.44	$149.38	N/A	$14.60	51	70	$6.03	$12.06	$4.82
4"	$335.88	$671.76	$268.70	N/A	$14.60	71	100	$6.16	$12.32	$4.93
6"	$591.44	$1,182.88	$473.15	N/A	$14.60	101	200	$6.29	$12.58	$5.03
8"	$925.23	$1,850.46	$740.18	N/A	$14.60	201	500	$6.42	$12.84	$5.14
10"	$1,338.30	$2,676.60	$1,070.64	N/A	$14.60	501	1,000	$6.57	$13.14	$5.26
12"	$1,769.11	$3,538.22	$1,415.29	N/A	$14.60	1,001	and up	$6.70	$13.40	$5.36

Table 2-5. Water Rates 2010 to 2015–Monthly Base and Volume Charges

Water Rates – Effective July 1, 2014, 10% Increase										
Base Monthly Charge						Volume Charge				
Meter Size	Regular	Outside City	Government	Single-family Residential with Fire Sprinklers	Dedicated Fire Protection Services	Water Use in Units (ccf)		Rate per Unit (ccf)		
						From	To	Base Amount	Outside	Government
5/8"	$16.06	$32.12	$12.85	$16.06	$16.06	0	6	$0	$0	$0
3/4"	$16.06	$32.12	$12.85	$16.06	$16.06	7	10	$6.06	$12.12	$4.85
1"	$44.76	$89.52	$35.81	$16.06	$16.06	11	14	$6.19	$12.38	$4.95
1-1/2"	$78.03	$156.06	$62.42	$16.06	$16.06	15	20	$6.35	$12.70	$5.08
2"	$123.93	$247.86	$99.14	$16.06	$16.06	21	50	$6.47	$12.94	$5.18
3"	$205.39	$410.78	$164.31	N/A	$16.06	51	70	$6.63	$13.26	$5.30
4"	$369.47	$738.94	$295.58	N/A	$16.06	71	100	$6.78	$13.56	$5.42
6"	$650.58	$1,301.16	$520.46	N/A	$16.06	101	200	$6.92	$13.84	$5.54
8"	$1,017.75	$2,035.50	$814.20	N/A	$16.06	201	500	$7.06	$14.12	$5.65
10"	$1,472.13	$2,944.26	$1,177.70	N/A	$16.06	501	1,000	$7.23	$14.46	$5.78
12"	$1,946.02	$3,892.04	$1,556.82	N/A	$16.06	1,001	and up	$7.37	$14.74	$5.90

[a] *Ccf - hundred cubic feet or one unit equals 748 gallons.*

[b] *Example calculation as follows: 10 units – 6 units = 4 units @ $3.92 = $15.68*

2.6 Employment, Land Use, and Population

Daly City is located in the northern part of San Mateo County, adjacent to the southern boundary of the City and County of San Francisco. The City is bounded on the east by the cities of South San Francisco, Colma, Brisbane, the San Bruno Mountains, and state and county parks; on the south by the cities of Pacifica and South San Francisco; and on the west by the Pacific Ocean. Topography of the area is typical of the Northern California coast. Near Daly City, the Coast Range rises to an elevation of 600 feet above mean sea level (MSL). A 2-mile-wide valley separates the Coast Range from the San Bruno Mountains, which rise to a peak elevation of 1,300 feet above MSL at San Bruno Mountain.

Interstate 280 (I-280), running north and south, divides the City into two geographically distinct areas with different development characteristics. Older neighborhoods of medium-density, comprised of single-family housing, are located on the eastern side of I-280. Small corner markets and strip developments characterize businesses in this area. West of I-280 development is newer, primarily built after 1949. In this area, lower-density, single-family homes are concentrated around shopping centers often dedicated to serving a regional rather than a local population. The limited manufacturing enterprises in the City are located near the Cow Palace in the Bayshore neighborhood on the eastside of I-280.

The City is a center for retail trades, primarily home furnishings and appliances, apparel, general merchandise, and eating and drinking establishments. Major shopping areas include Serramonte Shopping Center, Westlake Shopping Center, Pacific Plaza, and the Mission Street retail corridors.

Daly City is the most populous city in San Mateo County. It reached a population exceeding 110,000 in 2010. Table 2-6 shows the current and projected population growth calculated through the DSS model.

This population includes Broadmoor Village and unincorporated Colma, which surrounds Daly City's land but are not in Daly City's jurisdictional boundary. Furthermore, these two areas do not receive water from the City DWWR; but from the California Water Service Company that serves these areas. Therefore, the population presented in Table 2-6 is slightly larger than the population served by the City's DWWR because the City has no direct way to define the populations in the areas it does not serve.

Table 2-6 Population – Current and Projected (DWR Table 2)

	2010	2015	2020	2025	2030	2035
ABAG Service Area Population Projections [a]	108,884	112,455	117,079	119,908	122,717	125,800
Bayshore Development Population Projections [b]	1,714	4,286	4,286	4,286	4,286	4,286
Total Service Area Population [c]	110,598	116,741	121,365	124,194	127,003	130,086

[a] *Source: Association of Bay Area Governments (ABAG), Projections 2007, Forecasts for the San Francisco Bay Area to the Year 2035.*

[b] *Source: Cynthia Royer (City of Daly City) personal communication on 10/21/08.*

[c] *Total populations as included in the 11/30/10 Daly City DSS model.*

Table 2-7 lists the population breakdown for households and employees for the years 2005 to 2035.

Table 2-7. Population, Housing, and Employment Estimates and Projections

Year	Households [a]	Population [b, c]	Employees [b, c]
2005	32,079	107,145	27,902
2010	33,113	110,598	30,825
2015	34,952	116,741	45,092
2020	36,337	121,365	62,639
2025	37,184	124,194	66,071
2030	38,025	127,003	69,762
2035	38,948	130,086	73,668

[a] *Calculated using population projections and average number of people per household (3.34), obtained from the 2000 U.S. Census.*

[b] *Source: Association of Bay Area Governments (ABAG), Projections 2007, Forecasts for the San Francisco Bay Area to the Year 2035*

[c] *Source: Cynthia Royer (City of Daly City) personal communication on 10/21/08.*

Current and future population projections form the basis for the City's future water use projections presented in Section 3.1 of this report.

Daly City's population expectations would see it continue to experience the largest absolute gains in the number of households between 2005 and 2035 of any city in San Mateo County. Between 2005 and 2035, the population estimates show an increase of 17.6 percent to 130,086 persons.

According to the City's Draft General Plan, Daly City's predominant land use remains lower-density residential development. Although this will remain true for quite some time, the density of new development approved by the City has increased markedly. Of the ten largest projects approved by the City since 2000, eight have exceeded 50 dwelling units per acre.

Increasing development pressures and regional land use policies intended to promote more Bay Area residents living closer to where they work will place additional pressures on the City to allow private redevelopment of older buildings and increases in residential densities, all with fewer regulatory hurdles. The City has, for example, been identified by the ABAG as having two Priority Development Areas – places in the Bay Area which are transit-proximate and therefore targeted for higher density housing.

In an effort to determine the potential impacts this future development will have on the City's traffic patterns and infrastructure needs, the City has developed an inventory of properties that are either vacant or possess significant potential for private redevelopment. According to this inventory, the City can expect to add over 4,200 new housing units, 700,000 square feet of retail, and 1,100,000 square feet of office uses between now and the time period known as "build-out", a future point in time when the City will be completely developed.

Because the build-out year is unknown, the City estimates that roughly 50 percent of the City's development potential will occur between now the year 2035. A significant portion this projected growth will occur in the Bayshore neighborhood where the City projects the construction of 1,500 new housing units, nearly 400,000 square feet of new retail uses, and a 190,000 square foot research and development center.

Due to current market conditions, most of the development projected by the City is not expected to occur until after the year 2015.

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Section 3

System Demands

This section presents information regarding projections of future City water demands.

3.1 Per Capita Water Use Targets

With the goal of reducing California's urban water use by twenty percent by year 2020, recently passed Senate Bill x7-7 (SB7) requires water providers to establish per capita water use targets, measured in terms of gallons per capita per day (gpcd) water use, following one of four methods:

- **Method 1:** Eighty percent of the urban retail water supplier's baseline per capita daily water use using a 10-year average;
- **Method 2:** The estimated per capita daily water use using the sum of several defined performance standards. This method requires quantifying the landscaped area and the baseline commercial, industrial, and institutional use
- **Method 3:** Ninety-five percent of the applicable state hydrologic region targets, as set forth in the state's draft 20x2020 Water Conservation Plan (refer to the DWR *Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan*, dated March 2011). The City, located in DWR's San Francisco Bay Hydrologic Region 2 as shown on Figure 3-1, has a year 2020 target of 124 gpcd; and
- **Method 4:** Method 4 considers differences within the state related to climate and population density and differences in regions related to levels of per capita water use according to plant water and levels of commercial, industrial, and institutional (CII) water use. DWR intends that Method 4 provides flexibility to communities and regions in meeting the targets and avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low. Urban water use and baseline water use are first calculated. Baseline water use is categorized as residential indoor, CII, or landscape use and water loss. A calculation tool called the best management practice (BMP) Calculator calculates water savings.

The target for the San Francisco Bay Hydrologic Region 2 is 95 percent of 131 gpcd, or 124 gpcd. The City's water use on a gpcd basis is substantially lower than the Hydrologic Region 2 target. Thus, the City has selected Method 3 for establishing the 2020 water use target.

Regardless of the method selected, DWR's Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, dated October 2010, requires that water suppliers confirm that the selected target is less than 95 percent of a continuous five-year baseline (ending no sooner than December 2007). However, water suppliers with a five-year baseline less than 100 gpcd are not subject to applying the 0.95 multiplier for the minimum water use reduction, which is the case for Daly City.

Table 3-1 provides information related to the base period ranges for calculations related to SB7 baseline water use and future water use targets. Tables 3-2 and 3-3, respectively, present data used to calculate the City's 10 and 5-year baseline water use.

Table 3-4 summarizes the City's baseline water use, the interim 2015 water use target, and the 2020 water use target. Based on the SB7 goals, Daly City does not need to reduce per capita water use further. However, in the 2015 and 2020 UWMPs, Daly City will need to report its per capita water use and will need to continue complying with the established water use targets.

Table 3-1. Base Period Ranges (DWR Table 13)			
Base	Base Period Ranges		
	Parameter	Value	Units
10- to 15-year Base Period	2008 total water deliveries	2,722,121,100	Gallons
	2008 total volume of delivered recycled water	196,210,000	Gallons
	2008 recycled water as a percent of total deliveries	7.2	Percent
	Number of years in base period	10	Years
	Year beginning base period range	January 1995	
	Year ending base period range	December 2004	
5-year Base Period	Number of years in base period	5	Years
	Year beginning base period range	January 2003	
	Year ending base period range	December 2007	

Table 3-2. Base Gross Daily per Capita Water Use – 10- to 15-year Range (DWR Table 14)				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Gross Per Capita Water Use (gpcd)
Sequence Year	Calendar Year Ending			
Year 1	December-95	97,637	7.6	78
Year 2	December -96	98,962	7.8	79
Year 3	December-97	100,683	8.1	81
Year 4	December-98	102,024	8.1	79
Year 5	December-99	102,769	8.3	81
Year 6	December-00	103,621	8.5	82
Year 7	December-01	104,019	7.9	76
Year 8	December-02	103,909	7.9	76
Year 9	December-03	104,011	7.7	74
Year 10	December-04	104,162	7.9	76
Base Daily Per Capita Water Use				**78**

Table 3-3. Base Gross Daily per Capita Water Use – 5-year Range (DWR Table 15)				
Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Gross Water Use (gpcd)
Sequence Year	Calendar Year Ending			
Year 1	December-03	104,011	7.7	74
Year 2	December-04	104,162	7.9	76
Year 3	December -05	104,194	6.8	65
Year 4	December -06	104,560	6.4	61
Year 5	December -07	105,256	6.9	66
Base Daily Per Capita Water Use				68

Table 3-4. Baseline Gross Water Use and SB7 Targets	
Parameter	Per Capita Gross Water Use (gpcd)
Baseline (1994-2005)	78
Interim Target (2015) for Hydrologic Region 2	144 x 0.95 = 137
Interim Target (2015) for Daly City	137
Target (2020) for Hydrologic Region 2	131 x 0.95 = 124
Target (2020) for Daly City	124

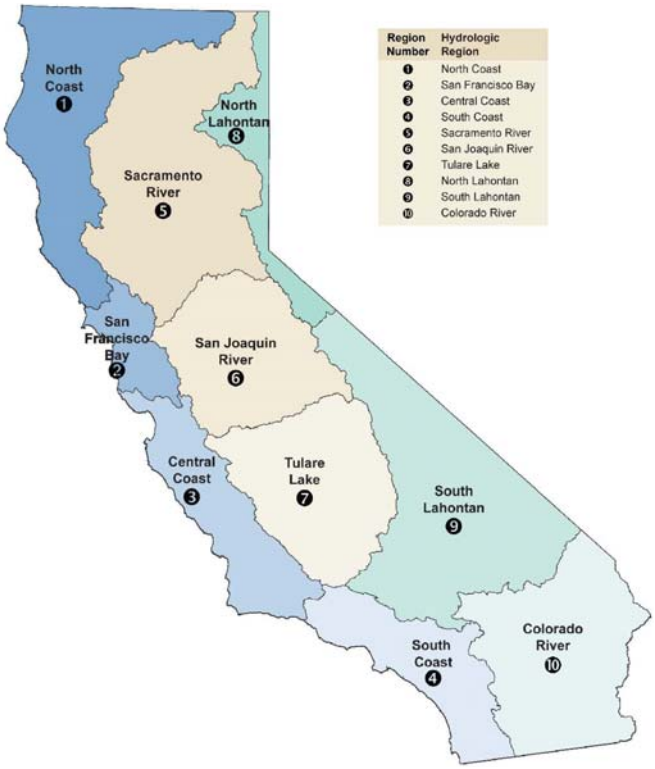

Figure 3-1. California Hydrologic Regions for SB7 Analysis

3.2 Water Use

This section discusses the past, current and projected water use. Water demand projections are based on the DSS model and were confirmed to be less than the SB7 water use targets when combined with the population projections. Demand projections provide the basis for sizing and staging future water facilities to ensure adequate supply. Water consumption and production records, combined with projections of population, employment, and urban development, provide the basis for estimating future water requirements. This section identifies the usage among water use sectors including single-family residential, multifamily residential, commercial, industrial, institutional/governmental, irrigation use, and others based on the DSS model that was used for the City's projections.

3.2.1 Historical Water Production

The service area produces an average of about 45 percent of its water from wells. With the replacement of Well 10 with the new Junipero Serra Well, groundwater can now supply an average of 50 percent of the water needs.,. Since 1999, groundwater supplies have provided as much as 44 percent in drought years and as little as 8 percent in wet years. Table 3-5 shows the breakdown between groundwater production and surface water purchases for the Daly City System from 1999 to 2009.

Table 3-5. Historical Well Production and Water Purchases (AFY)

Year	Groundwater Wells	Water Purchases	Total
1999	4,101	5,199	9,300
2000	3,960	5,534	9,494
2001	3,880	5,001	8,881
2002	2,190	6,678	8,868
2003	1,500	7,142	8,642
2004	1,018	7,843	8,860
2005	726	7,380	8,106
2006	862	6,795	7,657
2007	2,603	5,796	8,399
2008	3,564	4,791	8,354
2009	1,667	6,067	7,734
Average from 1999 to 2009	2,370	6,202	8,572

From 2002 to the present, a pilot conjunctive use program was in place, distorting the surface water supply purchases. Supply sources for 2008 reflect a more accurate account of purchases and pumping, as conjunctive use was in the "put "mode.

3.2.2 Historic Water Use by Customer Type

Metered customers are classified as single-family residential, multifamily residential, commercial, industrial, institutional, governmental, landscape irrigation, and agriculture. Tables 3-6 and 3-7 list the water use and customer account profile percentages for each water use sector. These classifications form the basis to analyze current consumption patterns among various types of customers. The DSS model base year comes from the City's water use profile (i.e., water use by customer category) for the

year 2001. In 2001, the largest number of customers (55 percent) was single-family residences, including attached dwelling units with individual meters. The second largest customer group was the multifamily with connections comprising about 30 percent of total accounts.

Table 3-6. Water Use Profile Percents Used for DSS Model (based on 2001 water use data)

Category	Use profile percent
Single Family	54.50
Multifamily	30.26
Commercial	8.65
Industrial	0.13
Institutional	2.47
Governmental	2.35
Irrigation	1.64
Agricultural	N/A

Table 3-7. Customer Type Profile Percents Used for DSS Model (based on 2001)

Customer Type	Accounts	Percentage [a]
Single Family	18,683	83
Multifamily	2,840	13
Commercial	668	3
Industrial	3	0.01
Institutional	80	0.36
Governmental	112	0.50
Irrigation	123	0.55
Total No. of Accounts in 2001	22,509	100

[a] *The percentages included as whole numbers have been rounded. As such, the total of the numbers as shown exceeds 100 percent.*

The relative proportion of demand that each of these customer types exerts on the water system is not the same. Although comprising 5 percent of the total connections, nonresidential customers represent 16 percent of the average annual demand. Multifamily connections account for another 30 percent of the annual water demand leaving 55 percent of the metered demand originating from single-family residential units.

Table 3-8 and Table 3-9 show the past actual water use and the number of connections in each category in 2005 and 2010, respectively.

Table 3-8. Water Deliveries, Actual 2005 (DWR Table 3)					
Water Use Sector	2005				
	Metered [a]		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	18,774	4,401	0	0	4,401
Multi-family	2,850	1,933	0	0	1,933
Commercial	672	892	0	0	892
Industrial	3	127	0	0	--
Institutional	--	--	0	0	--
Governmental	235	239	0	0	239
Landscape Irrigation	216	244	0	0	244
Agriculture	0	0	0	0	0
Total	22,750	7,836	0	0	7,836

[a] Source: This table includes potable water demands from Daly City metered water sales data. Recycled water demands are not included in this table; however, recycled water demands are included in Table 3-15.

Table 3-9. Water Deliveries, Actual 2010 (DWR Table 4)					
Water Use Sector	2010				
	Metered [a]		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	18,307	3,908	0	0	3,908
Multi-family	2,785	1,708	0	0	1,708
Commercial	610	976	0	0	976
Industrial	--	--	0	0	--
Institutional	--	--	0	0	--
Governmental	113	223	0	0	223
Landscape Irrigation	95	131	0	0	131
Agriculture	0	0	0	0	0
Total	21,910	6,946	0	0	6,946

[a] Source: This table includes potable water demands from Daly City metered water sales data. Recycled water demands are not included in this table; however, recycled water demands are included in Table 3-15.

3.2.3 Future Water Use by Customer Type

Water demand projections in this report are from the DSS model developed by Maddaus Water Management and dated November 30, 2010[2]. The DSS model is the most appropriate tool for developing

[2] A training version of the DSS model dated May 2010 includes example data that are completely unrelated to the City. Because this version has a later date than the City's actual DSS model (dated December 2009), UWMP preparers assigned a new date to it when development of the 2010 UWMP began. Thus, the official DSS model date is November 30, 2010.

water demand projections in the wholesale service area (URS 2004). Population projections for Daly City were calculated based on the growth rate determined by ABAG 2007 projections. Employment population was calculated using the same model and source data. The DSS model used 2001 as the base-year for projections. Projected water use by water use sector are summarized for 2015 in Table 3-10, 2020 in Table 3-11, and 2025, 2030, and 2035 in Table 3-12.

Table 3-10. Water Deliveries, Projected 2015 (DWR Table 5)

Water Use Sector	2015				
	Metered [a]		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	20,554	4,894	0	0	4,894
Multi-family	3,124	2,740	0	0	2,740
Commercial	1,115	1,013	0	0	1,013
Industrial	3	13	0	0	13
Institutional	134	366	0	0	366
Governmental	123	231	0	0	231
Landscape Irrigation	135	139	0	0	139
Agriculture	0	0	0	0	0
Total	25,188	9,396	0	0	9,396

[c] *Source: Note that this table includes potable water demands from the 11/30/10 Daly City DSS model. Recycled water demands are not included in this table; however, recycled water demands are included in Table 3-15.*

Table 3-11. Water Deliveries, Projected 2020 (DWR Table 6)

Water Use Sector	2020				
	Metered [a]		Unmetered		Total Volume (AFY)
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	
Single family	21,368	4,943	0	0	4,943
Multi-family	3,248	2,765	0	0	2,765
Commercial	1,548	1,351	0	0	1,351
Industrial	3	13	0	0	13
Institutional	186	509	0	0	509
Governmental	128	240	0	0	240
Landscape Irrigation	141	144	0	0	144
Agriculture	0	0	0	0	0
Total	26,622	9,965	0	0	9,965

[c] *Source: Note that this table includes potable water demands from the 11/30/10 Daly City DSS model Recycled water demands are not included in this table; however, recycled water demands are included in Table 3-15..*

Table 3-12. Water Deliveries, Projected 2025, 2030, and 2035 (DWR Table 7)						
Water Use Sector	2025		2030		2035	
	Metered [a]		Metered [a]		Metered [a]	
	# Accounts	Volume (AFY)	# Accounts	Volume (AFY)	# Accounts [a]	Volume (AFY)
Single family	21,866	4,931	22,360	4,945	22,903	4,952
Multi-family	3,324	2,757	3,399	2,763	3,481	2,767
Commercial	1,632	1,406	1,723	1,469	1,820	1,483
Industrial	4	13	4	14	4	14
Institutional	196	537	207	567	219	573
Governmental	131	245	134	251	137	252
Landscape irrigation	144	147	147	150	151	151
Agriculture	0	0	0	0	0	0
Total	27,297	10,036	27,974	10,158	28,715	10,192

[c] *Source: Note that this table includes potable water demands from the 11/30/10 Daly City DSS model. Recycled water demands are not included in this table; however, recycled water demands are included in Table 3-15.*

3.2.4 Low Income Projected Water Demands

One new requirement of the Urban Water Management Planning Act is projected water demands for low-income single family and multi-family residential water uses. The City is currently in process of updating the City's General Plan, which includes a description of planned development within the City. Part of the planned development includes lower income housing related to multi-family accounts.

Table 3-13 summarizes low-income projected water demands. The future housing projections as included in the City's updated General Plan only include planned development through the year 2013. The City anticipates that the low-income water demands may increase beyond the projections shown in Table 3-13.

Table 3-13. Low-Income Projected Water Demands (DWR Table 8)					
Water Use Sector	Low Income Water Demands (AFY)				
	2015	2020	2025	2030	2035
Single family	0	0	0	0	0
Multi-family	68	68	68	68	68
Total	68	68	68	68	68

3.2.5 Water Sales to Other Agencies

The City normally does not sell water to any other agencies and does not plan to sell water to other agencies during the next 25 years (Table 3-14). The amount of such transfers is diminishingly small and hence Table 3-14 shows zero values.

Table 3-14. Sales to Other Agencies (DWR Table 9)

Water Distributed	Sales to Other Agencies (AFY)						
	2005	2010	2015	2020	2025	2030	2035
None	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

3.2.6 Non-Revenue Water and Additional Water Uses

The Plan defines non-revenue water as the amount of resulting from unauthorized connections or use, leaks, meter inaccuracies, fire protection and training, system and street flushing, sewer cleaning, and construction uses. The City has identified that an average of 5 percent of water is lost annually; however, it only tracks only a small percentage (see Table 3-15). Though the DSS model has set the default to 7 percent water losses within the City, the data in Table 3-15 show that the City has a relatively low percentage (i.e., approximately 5 percent) of unaccounted for water, due to the City's proactive leak detection and repair program.

Table 3-15. Additional Water Uses and Losses (DWR Table 10)

Water use	Additional Water Uses and Losses [a] (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Saline barriers	---	---	---	---	---	---	---
Groundwater recharge	---	---	---	---	---	---	---
Conjunctive use	3,071	2,204	---[a]	---[a]	---[a]	---[a]	---[a]
Raw Water	---	---	---	---	---	---	
Recycled [b]	476	547	3,103	6,911	6,911	6,911	6,911
Sewer Flushing	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Hydrant Flushing	38	38	38	38	38	38	38
Traveling Meter (contractor)	0.3	0.4	1	1	1	1	1
System losses [c]	405	365	560	609	627	645	665
Total	3,992	3,156	3,704 [d]	7,561 [d]	7,579 [d]	7,597 [d]	7,617 [d]

[a] *Under a conjunctive use program, the City will increase its groundwater pumping to augment supply during drought conditions or system interruptions. The conjunctive use agreement with SFPUC is currently in negotiations and is expected to be finalized in June 2011.*

[b] *The current tertiary facilities maximum production capacity is 3102.80 acre-ft per year. Note: Most of the recycled water distributed does not replace a potable water supply. Increase in out years is contingent on an additional recycled water facility being constructed and rated at 3.4 mgd for watering cemeteries in Colma and/or for groundwater regeneration.*

[c] *The City estimates an average of 5% water is lost. Future unaccounted-for system losses (2015 through 2035) were calculated as 5% of Daly City's annual production as included in the DSS model.*

[d] *The total amount of additional water uses and losses is lower than 2005 and 2010 because conjunctive use is dependent on finalizing the pending agreement with SFPUC.*

3.2.7 Total Water Use

Total water use within the City is the sum of the water use by customer type and water losses. Through water conservation designed to save 0.82 million gallons per day (mgd) by 2035, the City's water use is estimated to remain consistent with current use. Table 3-16 summarizes the total water use for the City through 2035 and reflects the sum of Tables 3-10 through 3-14 and Table 4-1 (DWR Tables 3 through 7, DWR Table 9, and DWR Table 10) and is consistent with the range of loss the City has experienced.

Table 3-16. Total Water Use (DWR Table 11)

Water Distributed	Total Water Use (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Total Water Deliveries (from DWR Tables 3 through 7)	7,836	6,946	9,396[a]	9,965[a]	10,036[a]	10,159[a]	10,192[a]
Sales to Other Water Agencies (from DWR Table 9)	-	-	-	-	-	-	-
Additional Water Uses and Losses (from DWR Table 10)	3,992	3,156	3,704[d]	7,561[d]	7,579[d]	7,597[d]	7,617[d]
Total	11,828	10,102	13,100[b]	17,526[b]	17,615[b]	17,756[b]	17,809[b]

[a] *Source: DSS model dated 11/30/10*

[b] *The total amount of additional water uses and losses is lower than 2005 and 2010 because conjunctive use is dependent on finalizing negotiations with SFPUC*

3.3 Demand on Wholesale Supply

Table 3-17 provides the projected amount of water that the City is expecting to purchase from the Agency to meet water demands in the future. The City will use local groundwater and recycled water supplies to supply the difference between demand and the purchased water supply from SFPUC.

Table 3-17. City Demand Projections to Wholesale Suppliers (DWR Table 12)

Water Distributed	Contracted Volume (AFY)	City Demand Projections to Wholesale Suppliers (AFY)					
		2010	2015	2020	2025	2030	2035
SFPUC	4,808	5,560[a]	4,808[b]	4,808[b]	5,142	5,478	6,016

[a] *The 2010 SFPUC purchases exceeded the City's Individual Supply Guarantee of 4.292 mgd due to the effects of the pilot conjunctive use program.*

[b] *Purchases from SFPUC are based on the City's Individual Supply Guarantee of 4.292 mgd and beyond purchase projections submitted to SFPUC via BAWSCA on March 23, 2011. Please note that after 2018, it is not possible to predict with any certainty what actions will be taken in regards to future Individual Supply Guarantees. For planning purposes, future SFPUC supplies will remain the same as 2015 and 2020.*

3.4 Water Use Reduction Plan

As described in Section 7, the City began implementing a more aggressive water conservation program in 2000 and has had a consistently low per capita water demand (i.e., less than 100 gpcd) since 1977, as shown in Figure 3-2.

It is also important to note that conservation practices instituted in the past three decades during two major droughts and, most recently, during two dry years have contributed to the below average gpcd use. Figure 3.2 also shows that the current gross water production is at an all time low (since 1972 when recordkeeping began), despite an approximate 55 percent increase in population (Year/US Census Population: 1970/66,722; 1972/69,700 [estimated]; 1980/78,519; 2000/103,621; 2010/108,383 [estimated])

During emergencies, conservation is a more limited option in Daly City as the City's current use is already at 48 gpcd for residential uses and 62 gpcd for gross use[3]. Daly City's per capita use is less than the regional use among the BAWSCA agencies (excluding Stanford) of 78 gpcd for residential uses and 130 gpcd for gross use, as reported in the BAWSCA 2009/2010 Final Draft Annual Survey. The City anticipates that a 10 to 15 percent reduction to be the most achievable without affecting public health and safety.

The City's gross gpcd indicate that the City may be approaching demand hardening; although, the most recent update of the DSS model and the completion of BAWSCA's Water Conservation Implementation Program study concluded that the conservation potential, while low, does lend itself to additional conservation opportunities. Currently the updated version of the DSS model predicts an estimated 0.82 mgd of savings by 2035. The City believes this may not be attainable, but will continue to implement its water conservation programs, per the description included in Section 7. However, the regulations do not require that the City reduce per capita water demands further (refer to Section 3.1).

[3] BAWSCA's 2009-2010 Annual Survey

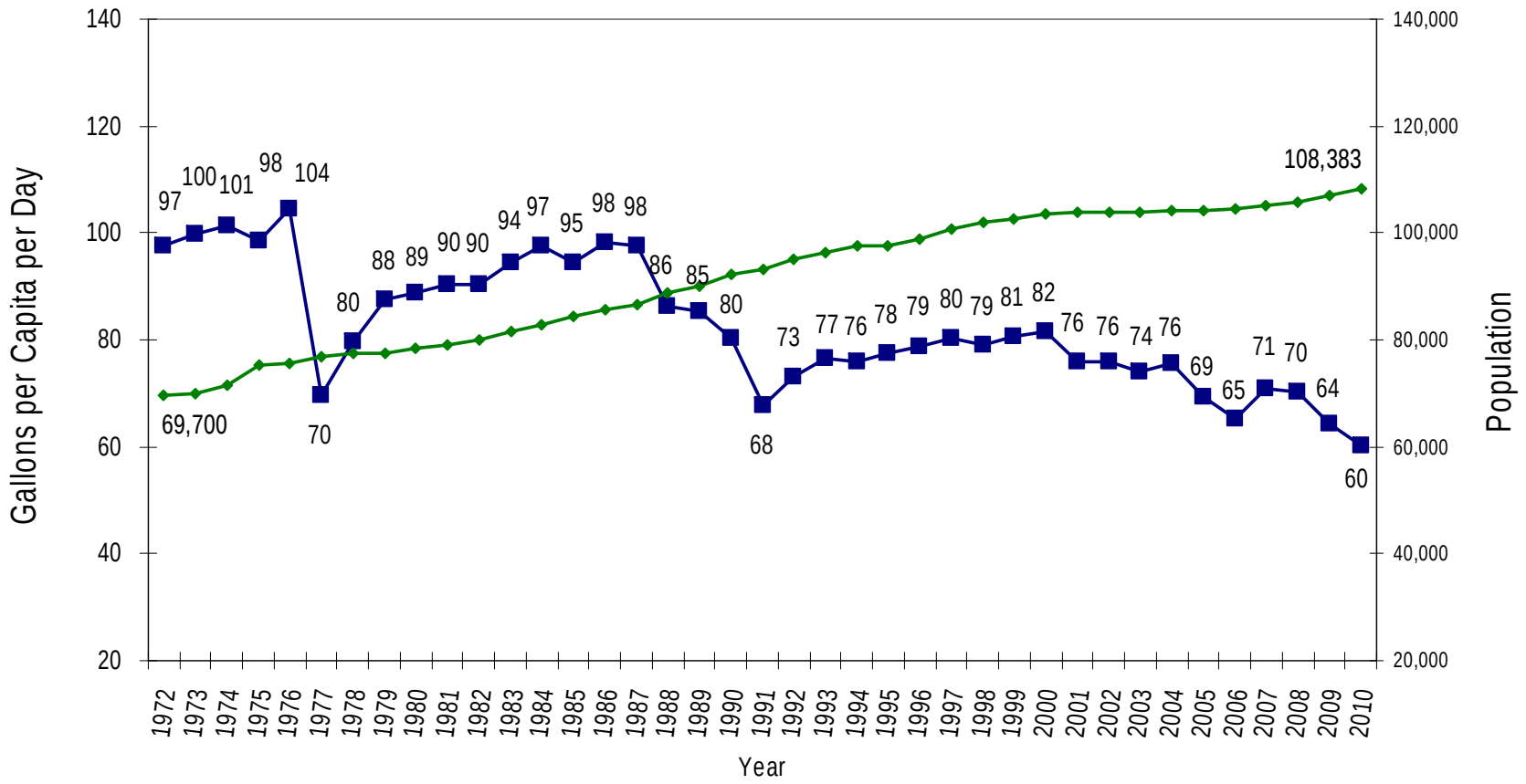

Figure 3-2. Historic Gross Per Capita Water Demands and Population

Please Note: These numbers represent production per capita use, which includes water losses and non-revenue accounts.

Section 4

System Supplies

This section describes the surface water and groundwater sources, quantities, supply constraints, and the water quality of the water supply sources. In addition, this section describes current and projected water supplies, existing supplies, and water rates.

As described within this section, the City's DWWR has three water sources including groundwater, water purchased from SFPUC, and recycled water.

4.1 Surface Water

The City receives water from the City and County of San Francisco's Regional Water System (RWS), operated by SFPUC. The RWS draws its supply predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by SFPUC from its local watersheds and treatment facilities in Alameda and San Mateo Counties.

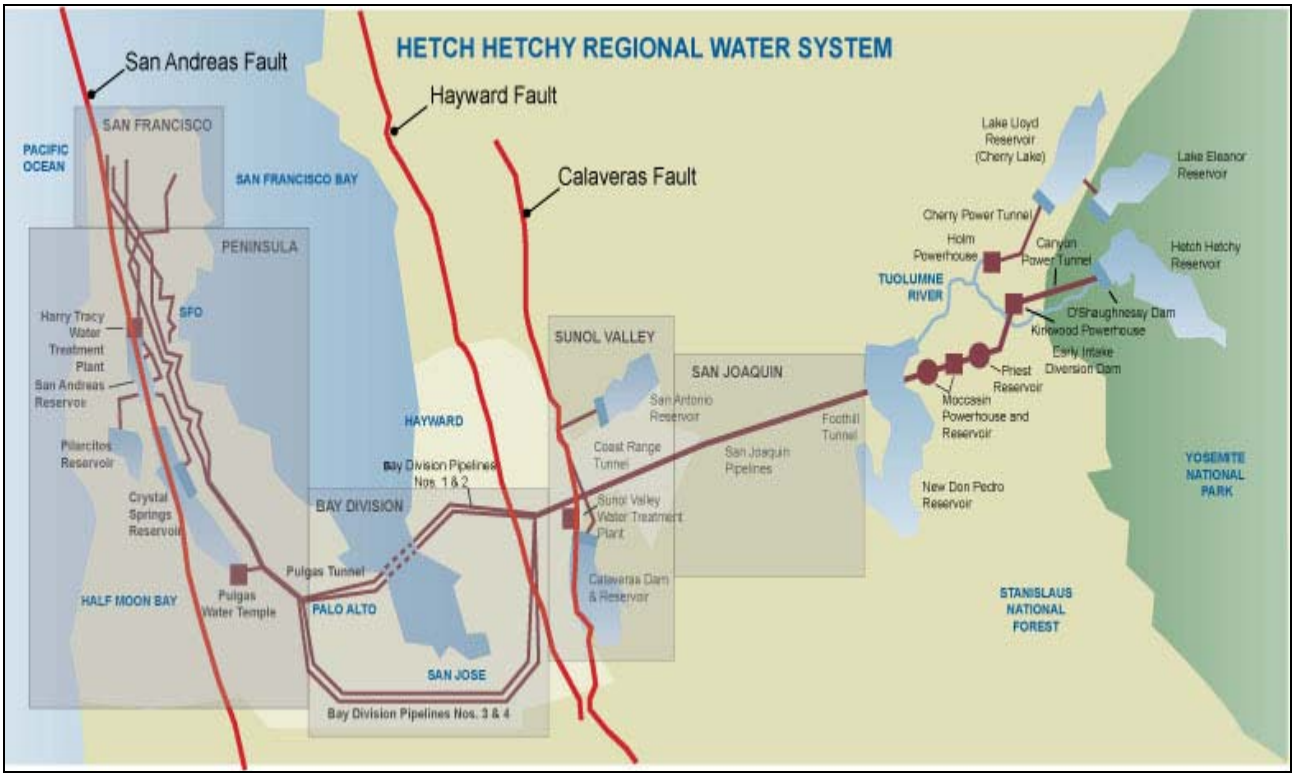

Figure 4-1. Diagram of City and County of San Francisco's Regional Water System

Source: www.sfwater.org

4.1.1 Description

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 although SFPUC retains additional water rights. In October 2009, SFPUC's Commission made a unilateral decision to limit supply to San Francisco and its wholesale customers. In addition, the Commission also included interruptible customers into the total wholesale customers Interim Supply Allocations of 184 mgd until 2018. Due to these constraints, SFPUC is very dependent on reservoir storage to firm up its water supplies. The City of Daly City is dependent on aggressive water conservation to firm up its supplies to at least 2018 at which time the Commission will again consider regional supply issues

SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy, which accounts for 80 percent of the regional water system supply. In practice, the local watershed facilities operate to capture local runoff.

The Alameda and Peninsula watersheds provide the remaining 20 percent of the SFPUC water system. The Alameda watershed, located in the East Bay, represents about 10 percent of the total water supply, with water captured and stored in two reservoirs; Calaveras and San Antonio. The Peninsula watershed captures runoff in three reservoirs; Crystal Springs, San Andreas and Pilarcitos and represents the remaining 10 percent of the SFPUC supply.

SFPUC treats these local supplies at the Sunol Valley Water Treatment Plant (SVWTP) in Alameda County and the Harry Tracy Water Treatment Plant (HTWTP) in San Mateo County, which contribute 60 to 65 mgd and 40 to 45 mgd, respectively.

4.1.2 Physical Constraints

SFPUC has identified 285 mgd as the operational amount of water that can be delivered to the service area without affecting power revenues. From this amount, San Francisco reserves 101 mgd and the remaining 184 mgd becomes the contractual supply guarantee provided to the wholesale customers. The City and County of San Francisco use about 32 percent and the remaining 68 percent serves cities, water districts and other private water companies located in Alameda, Santa Clara and San Mateo Counties. The "Settlement Agreement and Master Water Sales Contract" executed in 1984 and expired on June 30, 2009. Section 4.1.4 describes details related to the legal agreements between the City and SFPUC in the new 2009 Water Sales Agreement.

Daly City has eleven SFPUC pipeline connections called turnouts. In total, the turnouts can supply approximately 33.79 mgd at a rate of about 23,400 gallons per minute (gpm). Table 4-1 identifies the design capacity of each connection. During normal well operation the purchases from SFPUC contribute up to 45 percent of the City's annual water supply. However, Daly City has been involved in a pilot conjunctive use program in the past (see Section 4.2.1; beginning in 2002 and ending April 1, 2011), and water purchases from SFPUC could contribute up to 91 percent of the City's annual water supply. Daly City also has emergency interconnections with the following water agencies:

- Westborough County Water District
- California Water Service Company (CWS)
- North Coast County Water District.
- Brisbane/Guadalupe Valley Municipal Improvement District

Note that all four of these agencies depend on SFPUC for most, if not all, of their water supply. Some participated in the pilot conjunctive use program as well. Daly City can draw upon supply from these entities if the loss of supply emergency is local to the Daly City water system, but these supplies will not be available if a SFPUC system-wide emergency should occur.

Table 4-1. Daly City Connections with SFPUC		
SFPUC source	Design capacity, gpm	Design capacity, mgd
Geneva/Allen	1,740	2.5
Guttenberg	340	0.49
Hickey	3,600	5.2
Hill	400	0.60
Midway Village	1,940	2.8
Park Plaza	1,780	2.6
Sullivan		
North	2,900	4.2
South	1,200	1.7
"B" Street	2,500	3.6
McDonald Ave	5,000	7.2
Carter Street	2,000	2.9
Total connection capacity	23,400	33.79

4.1.3 San Francisco Water Supply System Possible Limitations on Delivery Capacity

SFPUC faces several limitations on its water facilities that now or in the near future will limit its ability to deliver water to its wholesale customers including the City. These limitations, made unilaterally by SFPUC, until 2018, occur during wet, average and drought conditions on water supply availability.

Wet and Average Conditions. During wet and average conditions, there may be enough water available from rainfall and Sierra snow pack, but physical limitations shortly will prevent SFPUC from delivering such water to its customers in the City of San Francisco as well as its wholesale customers. These limitations result from hydraulic bottlenecks in its pipelines and tunnels, as well as fixed water treatment plant capacity at Sunol. Hydraulic limitations mean simply that pipelines and appurtenant facilities can only carry so much flow—you can only force water through so fast. To relieve these bottlenecks, SFPUC must replace existing pipelines or tunnels with larger diameter conduits or build new, parallel conduits. Ranked by limitation (i.e., the facility with the least capacity listed first), the bottlenecks are as follows:

- Pipelines west of Irvington Tunnel. These pipelines are the most significant and immediate constraints. The existing pipelines will be unable to carry peak flows well before the collective demands of the wholesale agencies reaches the level of the contractual supply assurance. A new pipeline is critical in any event to replace other aging pipelines.
- Pipelines in Sunol Valley. These pipelines connect several sources of water to the Bay Area, and are too small to meet future demands reliably.
- Pipelines across the San Joaquin Valley. Capacity constraints along these pipelines would restrict the ability to meet future demands during droughts.
- Irvington Tunnel. This is a single pipeline through the Coast Range west of Sunol where there is no redundant capacity. A new parallel tunnel or pipeline is required now to provide reliability of operations. The system also would need added future capacity to accommodate planned growth.

These facilities are generally critical during periods of peak demand (i.e., a series of hot summer or fall days). There is also a problem with conveyance systems across the Bay. The SFPUC system uses storage in its Peninsula reservoirs to accumulate water in the winter and early spring, then treat it and distribute it in the summer. Because of continued growth within the service area, the window during which such cross bay transfers is becoming smaller. Therefore, there is a developing need to add parallel or replacement pipelines.

The limitations described above also point to the fact that there is no redundancy in the existing facilities. In some cases such as the Irvington Tunnel, SFPUC cannot take the facility out of service even for inspection. In other cases, facility inspection can occur when demands are lower, but if a major component failed during maximum demand, the system's ability to deliver required flows would be immediately impaired. Many of these facilities are also at risk during emergencies, since their design conformed to earlier, less stringent, seismic standards and do cross major earthquake faults features.

Drought Conditions. During drought conditions, the hydraulic limitations in the SFPUC delivery system may fade into the background and the problem becomes one of relative supply. In most years, the system can meet required deliveries. If local runoff is low, and Bay Area storage reservoirs are low, then SFPUC must bring more Sierra water than normal into the Bay Area to augment local supplies. During such periods, the existing conveyance capacity across the San Joaquin Valley could be limiting.

4.1.4 Legal Constraints

A number of legal agreements limit the amount of water that the City can receive from SFPUC, as follows:

2018 Interim Supply Limitation. As part of its adoption of the Water System Improvement Program (WSIP) in October 2008, discussed in Section 4.6, the Commission adopted a water supply element, the Interim Supply Limitation (ISL), to limit sales from the Regional Water System's (RWS) watersheds to an average annual of 265 mgd through 2018. The wholesale customers' collective allocation under the ISL is 184 mgd and San Francisco's is 81 mgd. The "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" entered into in July 2009 (WSA) provides a framework for administering the ISL.

BAWSCA has developed a strategy to address each of its member agencies' unmet needs flowing from the ISL through its Water Conservation Implementation Plan (WCIP) and the Long-term Reliable Water Supply Strategy, as discussed in Sections 6.2.2 and 4.6 respectively.

Interim Supply Allocations. The Interim Supply Allocations (ISAs) refers to each individual wholesale customer's share of the Interim Supply Limitation (ISL). On December 14, 2010, the Commission established each agency's ISA through 2018. In general, the Commission based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or Individual Supply Guarantees. The ISAs are effective only until December 31, 2018 and do not affect the Supply Assurance or the Individual Supply Guarantees, both discussed separately herein. San Francisco's Interim Supply Allocation is 81 mgd and the wholesale agencies are 184 mgd.

The City's ISA is 4.292 mgd totals 4,808 acre-feet per year).

As stated in the Water Supply Agreement, the wholesale customers do not concede the legality of the Commission's establishment of the ISAs and Environmental Enhancement Surcharge, discussed below, and expressly retain the right to challenge either or both, when and if imposed, in a court of competent jurisdiction.

2009 Water Supply Agreement. The SFPUC business relationship between San Francisco and its wholesale customers is, in large, defined by the WSA. The new WSA replaced the Settlement Agreement and Master Water Sales Contract that expired June 2009. The WSA addresses the ratemaking methodology used by the SFPUC in setting wholesale water rates for its wholesale customers in addition to

addressing water supply and water shortages for the RWS. The WSA has a 25-year term with an option to extend its term.

In terms of water supply, the WSA provides for a 184-mgd (expressed on an annual average basis) "Supply Guarantees" to the SFPUC's wholesale customers, subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the regional water system. The WSA does not guarantee that SFPUC will meet peak daily or hourly customer demands when their annual usage exceeds the Supply Guarantees. The SFPUC's wholesale customers have agreed to the allocation of the 184 mgd Supply Guarantees among them, with each entity's share of the Supply Assurance set forth on Attachment C to the WSA. The Supply Assurance survives termination or expiration of the WSA and the City's Individual Water Sales Contract with San Francisco.

The Water Shortage Allocation Plan between SFPUC and its wholesale customers, adopted as part of the WSA in July 2009, addresses shortages of up to 20 percent of system-wide use. The Tier 1 Shortage Plan allocates water from the RWS between San Francisco Retail and the wholesale customers during system-wide shortages of 20 percent or less (Appendix G). The WSA also anticipated a Tier 2 Shortage Plan adopted by the wholesale customers, which would allocate the available water from the RWS among the wholesale customers (Appendix F).

Individual Supply Guarantee. In 2009, Daly City, along with 25 other Bay Area water suppliers, signed a WSA with San Francisco, supplemented by an individual Water Supply Contract. These contracts, which expire in 25 years, provide for a 184-mgd (expressed on an annual average basis) Supply Assurance to the SFPUC's wholesale customers collectively. The City's Individual Supply Guarantee (ISG) is 4.292 mgd (or approximately 4,808 AFY). Although the WSA and accompanying Water Supply Contract expire in 2034, the Supply Assurance (which quantifies San Francisco's obligation to supply water to its individual wholesale customers) survives their expiration and continues indefinitely.

4.1.5 Environmental Enhancement Surcharge

The SFPUC is scheduled to establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process. This surcharge will be imposed by SFPUC on individual wholesale customers, and SFPUC retail customers, when an agency's use exceeds their Individual Supply Guarantee or Individual Supply Allocation and when sales of water to the wholesale customers and San Francisco retail customers, collectively, exceeds the Interim Supply Limitation of 265 mgd.

SFPUC is in the process of developing the methodology and amount of this volume-based charge. The Environmental Enhancement Surcharge will become effective beginning fiscal year 2011-12.

4.2 Groundwater

From 1999 through 2009, an average of 28 percent of the City's water supply was from groundwater produced from City wells. The City extracts groundwater from the basin locally known as the Westside Basin (Basin 5-35). This section describes the City's groundwater supply/capacity, current use, water rights, and projected use.

Groundwater is one of the two primary sources of water for Daly City. The City has five active wells with a combined capacity of 2,943 gpm, 4.25 mgd, and 4,760 AFY available. During an emergency or drought scenario, well water can contribute approximately 45 percent of the Daly City water supply.

4.2.1 Description

The aquifer that underlies most of Daly City is within the Westside Groundwater Basin (Westside Basin). The Westside Basin underlies parts of San Francisco and northern San Mateo counties. The basin extends from Golden Gate Park in the north and past the San Francisco Airport in the south. The basin

extends to the west beneath the Pacific Ocean at least as far as the San Andreas Fault and to the east an unknown distance beneath San Francisco Bay. The cities of San Francisco, Daly City, South San Francisco, Colma, San Bruno, Millbrae and parts of Burlingame and Hillsborough lie above the basin.

The Westside Basin is a buried valley, where the walls and floor of the valley are formed by rock with a mixture of coarse and fine-grained sediments as much as 3,700 feet thick in parts of the basin fill this rock-bordered valley. The coarse-grained sediments consist of sand and gravel and the fine-grained sediments consist of silt and clay. Sand and gravel can transmit substantial quantities of water to wells, whereas silt and clay impede the movement of groundwater. Where silt and clay deposit form semi-continuous beds, they can effectively isolate the water table from underlying aquifer. Groundwater in the shallow water table aquifer is referred to as "unconfined" and the underlying aquifer separated from the water table by continuous and semi-continuous fine-grained beds are referred to as "confined." Both unconfined and confined conditions occur in the Westside Basin.

The Westside Basin has been a primary and reliable source of municipal and irrigation water supply for over a century. Groundwater pumping currently supplies approximately 30 percent of the total water used in the basin. Groundwater pumping supplies water for the communities of Colma, South San Francisco, San Bruno, as well as Daly City. Groundwater can supply as much as 60-70 percent of the City's supply during times of an emergency or drought scenario. With the exception of Olympic, San Francisco and Lake Merced Golf Courses that irrigate with recycled water, water for one golf course in South San Francisco and numerous cemeteries in Colma also draw from the aquifer.

DWR released a report of California's Groundwater (Bulletin 118), most recently updated in 2003. Based on Bulletin 118, the Westside Basin (Basin 5-35) is not in critical condition of overdraft (DWR, 2003).

The Westside Basin is not an adjudicated basin as shown in Table 4-2. In adjudicated basins, the landowners and other parties turn to the courts to allocate how much groundwater each party rightfully can extract. In 1992, the California Legislature passed Assembly Bill 3030, which declared that groundwater is a valuable natural resource, and authorized local agencies to develop groundwater management plans voluntarily to ensure water quality and maximize supply. Each of the municipal and private agency's that have a direct stake in the process have been involved in an ongoing bi-annual testing program measuring well levels and groundwater quality. The participants were also involved in an intensive review of groundwater usage and conditions as part of the development of a regional groundwater model. Daly City acted in the capacity of the lead agency in developing a unified groundwater model. This model serves as the basis for providing a meaningful tool for decision makers on the management of the Westside Basin including pursuit of a formalized basin management program. Although the City does not have a formalized groundwater management plan that has been adopted or implemented, Daly City along with San Bruno, Cal-Water and SFPUC as participating in a joint effort under AB303 grant secured by San Bruno to address plan details.

Table 4-2. Groundwater Pumping Rights, AFY

Basin Name	Pumping Right, AFY
Westside Basin (Basin 5-35)	Not adjudicated
Total	N/A

Without management plans, increasing competition for water in California may negatively affect groundwater basins and could result in saltwater intrusion, groundwater contamination, or land subsidence. In 1997, in order to respond to the benefits of managing the basin and ensure local control of the process,

the cities of San Francisco, San Bruno and Daly City together with the California Water Service Company formed a partnership to develop a Groundwater Management Plan for the Westside Basin. The Plan elements include the following:

- Groundwater Storage and Quality Monitoring
- Control of Saltwater Intrusion
- Conjunctive Use
- Recycled Water
- Source Water Protection

On December 23, 2010 the City's consultant, Hydro Focus, on behalf of partner agencies, delivered a groundwater flow model and Draft Report; and essentially modeled the aquifer and established safe yields for all agencies that pump from the aquifer. The amounts stated in the tables throughout this document are consistent with Version 3.1 of the model and the final report dated May 6, 2011. The model is intended to be updated every two years.

The participating parties have not yet developed operational details of all these elements. Activity is implemented in two stages in order to develop the details of the Groundwater Management Plan. These plan elements focus on water supply reliability. To the greatest extent possible, related elements of this Urban Water Management Plan conform to the goals of the Westside Basin Groundwater Management Plan. Until more information is available on groundwater recharge and supply reliability and until a conjunctive use plan is adopted, Daly City does not plan to increase its total long-term groundwater pumping above the modeled safe yield values.

4.2.2 Conjunctive Use

Daly City entered into a pilot conjunctive use program with SFPUC with the goal of enhancing regional water resource management. The first phase of the project, which concluded in November 2003, took advantage of the availability of surplus SFPUC system water at a reduced cost. The basic exchange is Daly City agreed to use more SFPUC system water and reduce pumping groundwater from the Westside Basin. This action provided the opportunity to observe basin response from recharge that takes place because of the reduced groundwater pumping. The second phase of conjunctive use began in March 2004 and has continued into 2011, and the results are promising.

The demonstration project was to assess, in part, the feasibility of a permanent program. As tentatively outlined, the program would:

1. Increase groundwater levels in the Westside Basin
2. Reduce the potential for seawater intrusion
3. Develop increased SFPUC system yield from the overall surface and groundwater system
4. Potentially improve conditions at Lake Merced

Initial results from this project show that groundwater levels have increased within the basin. Daly City has an added benefit of saving its local resource, resulting in enhanced emergency and drought protection.

The pilot conjunctive use program not only provides a significant benefit to Daly City for a water supply insurance policy, but also envisions a system-wide benefit as well. During the pilot program, SFPUC determined that a theoretical storage of up to 61,000 AF of additional water is available in the Westside Basin. An assessment of the available groundwater yield for extended periods on the South Westside Basin is complete. Daly City's safe yield, as identified by the Westside Basin Groundwater Modeling effort, is 3.43 mgd. The City would continue to blend at a ratio of four parts groundwater to one part SFPUC water, to maintain acceptable water quality (Brown and Caldwell, March 1998). The City is

currently negotiating the terms of an agreement for a permanent conjunctive use program with the SFPUC, and once completed will explore the expanded use of golf course wells to bolster emergency supplies..

The WSA describes "put" and "take" concepts associated with conjunctive water use. SFPUC proposes installation of new wells as a system-wide asset of SFPUC (thereby becoming a joint asset), the terms for which can be found in the 2009 WSA, Section 3.17. Under this section, the City would defer payment of stored conjunctive use system water until actual extraction of that water occurs; the City would pay SFPUC at the then-applicable wholesale rate of SFPUC system surface water.

The next step in formalizing an agreement is that SFPUC and the conjunctive use program participants establish an operating committee. The operating committee would develop annual plans in the program, understanding that any conjunctive use program developed is subject to review and approval under the California Environmental Quality Act as a condition of implementation, which is now underway by the SFPUC.

4.2.3 Groundwater Reliability

The City anticipates continued groundwater reliability as part of its ongoing efforts. During the past five years the amount of groundwater pumped has decreased due to the implementation of the pilot conjunctive use program, see Table 4-3.

Table 4-3. Groundwater – Volume Pumped (DWR Table 18)

Basin Name(s)	Volume Pumped (AFY)				
	2006	2007	2008	2009	2010
Westside Basin	862	2,603	3,564	1,668	1,743
Total	862	2,603	3,564	1,668	1,743
Groundwater as a percent of total water supply [a]	11%	33%	45%	21%	22%

Note: 2008 is the only year that did not have a "put" cycle for conjunctive use because of multiple dry years.

[a] Based on 2010 water supply of 7,846 AFY.

Table 4-4 follows from the results of the Hydro Focus Study (Appendix F). As part of its review associated with San Francisco's preparation of a Program Environmental Impact Report on its Water System Improvement Plan, Daly City proposed two put/take scenarios that it considered appropriate for future droughts. Daly City's scenarios specify at least two wells remain in operation during "put" cycles. During "take" cycles, emergency or drought scenarios Daly City would maximize the use of existing wells and any future emergency wells as options for short-term relief. As noted above the modeling study identified that Daly City's sustainable yield is 3.43 mgd as reflected below.

Table 4-4. Groundwater – Volume Projected to be Pumped (DWR Table 19)

Basin Name(s)	Volume Projected to be Pumped				
	2015	2020	2025	2030	2035
Westside Basin	3,349	3,842	3,842	3,842	3,842
Total	3,349	3,842	3,842	3,842	3,842
Groundwater as a percent of total water supply	30%	25%	24%	24%	23%

4.3 Transfer and Exchange Opportunities

Subject to the Wheeling Statute[4], SFPUC will not deny use of Regional Water System unused capacity for wheeling when such capacity is available for wheeling purposes during periods when SFPUC has declared a water shortage emergency under Water Code Section 350 if the following conditions are met:

1. The transferor pays reasonable charges incurred by SFPUC because of the wheeling, including capital, operation, maintenance, administrative and replacement costs (defined in the Wheeling Statute).
2. Wheeled water that is stored in the Regional Water System spills first.
3. Wheeled water will not unreasonably: (1) impact fish and wildlife resources in Regional Water System reservoirs; (2) diminish the quality of water delivered for consumptive uses; or (3) increase the risk of exotic species impairing Regional Water System operations. The transferor, may at its own expense, provide for treatment to mitigate these effects.
4. Wheeling priority will be to the Wholesale Customers or BAWSCA over arrangements for third-party public entities.

Table 4-5 summarizes transfer and exchange opportunities.

Table 4-5. Transfer or Exchange Opportunities, AFY (DWR Table 20)

Transfer Agency	Transfer or Exchange Opportunities (AFY)		
	Transfer or Exchange	Short Term or Long Term	Proposed Quantities
N/A	0	0	0
Total	0	0	0

4.4 Desalination

Since desalination is still a developing technology with major operational challenges (e.g., brine disposal), the City currently has no plans for desalination. Furthermore, the City's future water supply does not anticipate desalination implementation. However, because the City is on a peninsula, desalination of Pacific Ocean or San Francisco Bay water may be a future possibility.

The installation of a reverse osmosis system for the desalting of seawater could ensure the City a limited but continuous future water supply. Reverse osmosis is expensive and energy intensive; it would probably be cost effective only if the Cities other water supplies were greatly reduced or not available at all. Desalinated salt water would probably only be made available to meet health and safety needs and not for general water use. Given the high cost of reverse osmosis (RO), potential environmental concerns regarding RO implementation, and the availability of other supplies, the City is not pursuing this option now (see Table 4-6).

[4] "Wheeling Statute" refers to Article 4 of Chapter 11 of the California Water Code, as amended from time to time.

Table 4-6. Opportunities for Desalinated Water	
Sources of Water	Check if Yes
Water purchased	N/A
Ocean water	N/A
Brackish ocean water	N/A
Brackish groundwater	N/A
Other (such as impaired groundwater)	N/A

Although the City has not identified any sources of desalinated water within its boundaries, the Bay Area's four largest water agencies, East Bay Municipal Utility District, the San Francisco Public Utilities Commission, Contra Costa Water District and the Santa Clara Valley Water District, are jointly exploring developing regional desalination facilities. If successful that could benefit 5.4 million Bay Area residents and businesses served by these agencies. The Bay Area Regional Desalination Project may consist of one or more desalination facilities, with an ultimate total capacity of up to 71 mgd, which could enhance the purchased water supply for Daly City.

4.5 Recycled Water

This chapter describes the wastewater collection and treatment system, evaluates wastewater disposal and recycled water uses, and presents a recycled water optimization plan. The City is a member of the California WateReuse Association, which helps implement water recycling in California.

4.5.1 Participation in Regional Recycled Water Planning

The North San Mateo County Sanitation District's (NSMCSD) collection, treatment and disposal systems serve the majority of Daly City residents, along with Broadmoor Village, a portion of the town of Colma and under contract, the Westborough County Water District in South San Francisco and the San Francisco County jail in San Bruno. The City Council of Daly City serves as the Board of Directors for the NSMCSD.

A relevant planning study is the 1999 Bay Area Regional Water Recycling Program (BARWRP). The BARWRP Master Plan presents an assessment of potential recycled water use in 2010, 2025 and 2040. The BARWRP Master Plan is the only existing comprehensive study on the recycled water potential of the Bay Area.

In 2005, SFPUC and its wholesale water customers completed a study that documents on-going recycled water use and estimates of future recycled water potential for the SFPUC wholesale customer service area (RMC 2004, URS 2004b, URS 2004c). BAWSCA updated the study in 2009 (BAWSCA 2009b).

Along with other SFPUC wholesale customers and members of the Westside Basin Partners, Daly City has participated in discussions of an expanded recycled water plant. Such a plant could potentially contribute to irrigating cemeteries in Colma and/or groundwater recharge. For these reasons, the conceptual plan is developed. Table 4-7 includes the participating agencies in the regional recycled water planning.

Table 4-7. Participating Agencies	
Participating Agencies	**Role in Development**
City of Daly City	Project lead on discussions of regional recycled water plan, Installed recycled water lines
North San Mateo County Sanitation District (a subsidiary of the City of Daly City)	Modified wastewater treatment plant to include tertiary facilities
Westside Basin Partners	Discussions of regional recycled water plan & benefits
Other Wholesale water Customers of the San Francisco Public Utilities Commission	Discussions of regional recycled water plan & benefits

4.5.2 Wastewater Quantity and Disposal

The NSMCSD manages wastewater collection and treatment for a majority of Daly City. All of the wastewater flows from the City (excluding storm water runoff and a small part of the City that is tributary to the City of San Francisco sewers) and is collected and treated at the NSMCSD Wastewater Treatment Plant (WWTP). Dry weather flow to the WWTP averaged 6.3 mgd in 2009. Table 4-8 includes the volume of wastewater collected and treated from the City. Table 4-9 shows the volume of non-recycled wastewater that is flows to the Ocean outfall.

Table 4-8. Recycled Water – Wastewater Collection and Treatment (DWR Table 21)

Type of wastewater	Wastewater Collection and Treatment (AFY)						
	2005	2010	2015	2020	2025	2030	2035
Wastewater collected & treated in service area	8,265	8,036	10,870	11,527	11,609	11,750	11,790
Volume that meets recycled water standards	8,265	8,036	10,870	11,527	11,609	11,750	11,790
Secondary Disinfected 23 MPN[a]	7,789	7,489	7,767	4,615	4,697	4,838	4,878
Disinfected Tertiary	476	547	3,103	6,911 [b]	6,911 [b]	6,911 [b]	6,911 [b]

[a] *Although the WWTP effluent meets the Title 22 secondary disinfected standards, it is not being reused at this time.*

[b] *This is contingent on an additional recycled water facility being constructed and rated at 3.4 mgd for irrigating cemeteries in Colma and/or for groundwater recharge.*

Table 4-9. Recycled Water –Non-Recycled Wastewater Disposal (DWR Table 22)

Method of Disposal	Treatment Level	Non-Recycled Wastewater Disposal (AFY)					
		2010	2015	2020	2025	2030	2035
Outfall Diffuser	Secondary	7,489	7,767	4,615 [a]	4,697 [a]	4,838 [a]	4,878 [a]
Total		7,489	7,767	4,615 [a]	4,697 [a]	4,838 [a]	4,878 [a]

[a] *This is contingent on an additional recycled water facility being constructed and rated at 3.4 mgd for irrigating cemeteries in Colma and/or for groundwater recharge.*

4.5.3 Wastewater Treatment Processes

Currently wastewater treatment at the NSMCSD WWTP includes full biological secondary treatment for all flow and disinfects all effluent. The WWTP's permit allow for tertiary treatment of up to 2.77 mgd, including coagulation, filtration, chlorination and stringent disinfection, to produce recycled water that meets the standards of California's Title 22, for full public contact unrestricted reuse. The City treats

captured solids and ultimately disposes of the biosolids through alternative daily cover, land spreading on crops or in the future by composting.

4.5.4 Recycled Water Current Uses

In 2004, the City completed a $7.5 million tertiary treatment project at the WWTP. The upgrades provided the City with an unrestricted tertiary recycled water capacity of approximately 3,100 AF. Based on the June 2005 golf course use, annual golf course recycled water use is approximately 517 AF, City use is approximately 12 AF, and in-plant use is 550 AF. The City estimates that an additional 12 AF of water use for landscape irrigation of median strips on Junipero Serra Boulevard and at Marchbank Park.

The recycled water program currently pumps recycled water for irrigation of three golf courses (Olympic, San Francisco and Lake Merced), two city parks (Westlake and Marchbank) and median strips along John Daly Boulevard, Junipero Serra Boulevard and Westlake off ramp. Wherever possible, the WWTP uses recycled water internally to displace possible potable water use, approximately 550 AFY.

Based on historical use, June 2007 was the month of peak demand. The June 2007 use at the golf courses was metered by the City to be approximately 123 AF, and City uses were calculated to be approximately 2 AF. In the 2002-2003 fiscal year, the City installed a 12-inch-diameter recycled water line over Highway I-280 and along Junipero Serra Boulevard to Citrus Avenue. It then branches an 8-inch-diameter line through the new Pacific Plaza Development just north of Westlake Avenue and into Marchbank Park, where the City initiated irrigation with recycled water in the summer of 2010. A newly installed recycled water booster pump station provides adequate line pressure for the remainder of the recycled water infrastructure. The addition of this line segment increases recycled water use about 4 AF/month.

The remaining unrestricted recycled water potential of approximately 1,900 AFY is currently under evaluation. The WWTP, along with an outside consultant, conducted a recycled water master plan to identify and evaluate alternatives and feasibility. The study demonstrated that Harding Park Golf Course was feasible to construct. The first phase of expansion of the recycled water system to bring a recycled water pipeline to the Harding Park golf course in San Francisco currently underway and expected to be on-line by Spring 2012.

Table 4-10 shows the actual use of recycled water in 2010 compared to the projected 2010 use as documented in the 2005 Plan.

Table 4-10. Recycled Water – 2005 UWMP Use Projection Compared to 2010 Actual (DWR Table 24)		
User Type	2010 Actual Use (AFY)	2005 Projection for 2010 (AFY)
Agricultural Irrigation	0	0
Landscape Irrigation	30	24
Commercial Irrigation	0	0
Golf Course Irrigation	517	600
Wildlife Habitat	0	0
Wetlands	0	0
Industrial Reuse	0	0
Groundwater Recharge	0	0
Seawater Barrier	0	0
Geothermal/ Energy	0	0
Indirect Potable Reuse	0	0
In-plant Reuse	550	550
Total	1,097	1,174

4.5.5 Recycled Water Potential Uses

Other potential uses that the City could consider in the recycled water master planning effort are:

- Expanding distribution lines to other high irrigation areas such as schools, parks, cemeteries and other golf courses. The conceptual plan for such an expansion would be to optimize distribution and use in close proximity to the WWTP and distribution lines. As part of the recycled water master plan, the City will conduct feasibility and cost benefit analyses of potential recycled water uses. A feasibility study was completed in 2009 to determine the feasibility of expanding the facility to provide recycled water to nearby cemeteries.
- Evaluate the feasibility and cost effectiveness of using recycled water to recharge groundwater or maintain the water level of Lake Merced.

The City has the current ability and the permits to produce a maximum of 3,100 AF of tertiary treated recycled water. Currently the City distributed less recycled water than its capacity, producing approximately 547 AF of tertiary treated recycled water in 2010. Table 4-11 summarizes potential future recycled water uses, while Table 4-12 includes methods to encourage recycled water use.

Table 4-11. Recycled Water – Potential Future Use (DWR Table 23)							
User type	Description	Feasibility	Potential Future Use (AFY)				
			2015	2020	2025	2030	2035
Agriculture			0	0	0	0	0
Landscape	Tertiary		30	3,808[a]	3,808[a]	3,808[a]	3,808[a]
Commercial			0	0	0	0	0
Golf course irrigation	Tertiary		3,073	3,103	3, 103	3, 103	3, 103
Wildlife habitat			0	0	0	0	0
Wetlands			0	0	0	0	0
Industrial reuse			0	0	0	0	0
Groundwater recharge			0	0	0	0	0
Seawater barrier			0	0	0	0	0
Geothermal/energy			0	0	0	0	0
Indirect potable reuse			0	0	0	0	0
Reuse within plant [b]	Secondary 23 MPN		0	0	0	0	0
Other			0	0	0	0	0
Total			3,103	6,911	6,911	6,911	6,911

Note: Based on June 2005 use data extrapolated to annual use from a very wet winter. May vary annually due to climate and precipitation

[a] The feasibility of this additional recycled water use is dependent on financial and regulatory factors as well as demands for recycled water.

[b] Reuse within plant accounts for 550 AFY. Because water recycled within the WWTP was never drawn from potable water, the "reuse within plant" amount of 550 AFY is excluded from this table.

Table 4-12. Methods to Encourage Recycled Water Use (DWR Table 25)						
Actions	Projected Results (AFY)					
	2010	2015	2020	2025	2030	2035
Financial Incentives (cost per unit incentive)	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]
Public Outreach	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]
Local Legislative Lobbying	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]
Total	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]

[a] It is impossible to predict public acceptance at this time.

4.6 Projected Water Supplies

Table 4-13 summarizes the current and projected water supplies.

Table 4-13. Water Supplies – Current and Projected (DWR Table 16)

Water supply sources	Wholesale supplied volume (yes/no)	Current and Projected Water Supplies (AFY)					
		2010	2015	2020	2025	2030	2035
Water purchased from:							
San Francisco PUC [b]	Yes	5,560[a]	4,808[b]	4,808[b]	5,141	5,478	6,015
City produced groundwater:		1,743	3,349	3,842	3,842	3,842	3,842
City produced surface water		0	0	0	0	0	0
Transfers in or out		0	0	0	0	0	0
Exchanges in or out		0	0	0	0	0	0
Recycled Water [c]		547	3,103	6,911	6,911	6,911	6,911
Desalinated Water		0	0	0	0	0	0
Total		7,850	11,260	15,561	15,894	16,231	16,768

[a] *The 2010 SFPUC purchases exceeded the City's Individual Supply Guarantee of 4.292 mgd due to the effects of the pilot conjunctive use program. The Water Supply Agreement dictating the City's Individual Supply Guarantee is included as Appendix C.*

[b] *Purchases from SFPUC are based on the City's Individual Supply Guarantee of 4.292 mgd and beyond purchase projections submitted to SFPUC via BAWSCA on March 23, 2011. Please note that after 2018, it is not possible to predict with any certainty what actions will be taken in regards to future Individual Supply Guarantees, For planning purposes future SFPUC supplies will remain the same as 2015 and 2020*

[c, d] *The current tertiary facilities maximum production capacity is 2.77 mgd (3103 AFY). Most of the recycled water distributed does not replace a potable water supply. Increase in out years is contingent on an additional recycled water facility being constructed tp produce an additional 3.4 mgd for irrigating cemeteries in Colma and/or for groundwater recharge.*

SFPUC has estimated the frequency and severity of anticipated shortages given projected demands and system configuration for the period 2010 through 2035. For this analysis, SFPUC assumed that the historical hydrological period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historical period 1920 through 2010. Again, this hydrological analysis is consistent with the planning efforts adopted to date by SFPUC and that is currently ongoing with the development of the Water System Improvement Program.

Other supply alternatives include water conservation (discussed in Section 6), emergency wells, acquisition of dry year supplies, conjunctive use and WSIP projects. These alternatives are below. Table 4-14 summarizes future water supply projects.

Table 4-14. Future Water Supply Projects (DWR Table 26)

Project Name	Projected Start Date	Projected Completion Date	Potential Project Constraints	Future Water Supply Projects (AFY)				
				Normal-Year Supply	Single-Dry Supply	Multiple-Dry Year First Year Supply	Multiple-Dry Year Second Year Supply	Multiple-Dry Year Third Year Supply
Water Conservation	2002	Still continuing	Funding	918 (by year 2030)	826 (by year 2030)	826 (by year 2030)	734 (by year 2030)	734 (by year 2030)
Emergency Wells	2012	2013	Financing, Source Availability and/or Regulatory Compliance	3,842	3,842	3,842	3,842	3,842
Total				4,760	4,668	4,668	4,576	4,576

Water Conservation. Potential demand hardening aside, recent studies concluded that the conservation potential, while low, does lend itself to additional conservation opportunities beyond potential water efficiency improvements in residential plumbing fixtures, appliances, landscapes, and in the commercial, industrial, and institutional sectors. However, improved water use efficiency does mean that water supply reserves are critical and must be large enough to meet the demand and water shortage responses early on to prevent severe economic and environmental impacts.

During emergencies, conservation is a more limited option in Daly City as the City's current use is already low. Section 6 provides a more detailed water conservation discussion.

Emergency Wells. Daly City will embark upon a program of assessing sites that it could develop additional wells for emergency and/or drought/shortage water supply uses. The activity could include the purchase of vacant parcels, or other properties adjacent to transmission mains/wells that feed into existing pump stations, as well as the potential conversion of irrigation wells to potable use. Assessment of available parcels would also include an evaluation of on site water treatment and disinfection in order to put the supply directly into the City's distribution system.

Acquisition of Dry Year Supplies. As a member of BAWSCA, the City of Daly City would join in efforts aimed at securing dry years contracts with irrigation districts in the San Joaquin Valley. The Modesto Irrigation District and the Turlock Irrigation District have senior water rights on the Tuolumne River Basin. BAWSCA could independently assess, negotiate and secure contracts with the districts to transfer and wheel water into the wholesale service area.

SFPUC records the driest 6-year hydrology period as 1986 through 1992. Based on experiences during the most recent two-year dry period, the community recognized that it is better to enter into a water shortage alert early, at a minimal level, to establish necessary rationing programs and policies, to gain public support and participation, and to reduce the likelihood of more severe shortage levels later.

Annually, the City forecasts 3-year minimum water supply availability for each of its sources of water, and projects its total water supply for the current and three subsequent years. For the 2010 UWMP, the City must project four years of minimum water supply. Based on water availability and projected demand, SFPUC may declare a water shortage condition. Additionally, SFPUC annually evaluates its water supply and determines whether or not a shortage condition exists. A shortage condition exists if SFPUC determines that the available water supply is less than projected system-wide water purchases in the upcoming Supply Year. If the system-wide water shortage is 20 percent or less, SFPUC implements the Tier 1 Shortage Plan. See Appendix G (which is Attachment H from the Master Water Supply Agreement) regarding details on the Tier 1 water shortage allocation plan. Appendix H includes the Tier 2 Drought Implementation Plan (DRIP).

When a shortage exists, SFPUC will determine if voluntary actions are sufficient. If so, SFPUC will forego the imposition of excess use charges and may suspend banking privileges described below. If SFPUC determines that mandatory actions are required, SFPUC may implement excess use charges. SFPUC will allocate the annual water supply to the collective wholesale customers, including Daly City based on methods approved by the member agencies. SFPUC will adjust annual allocations to account for shortage allocation transfers and transfers of banked water.

Conjunctive Use. The on-going conjunctive use program discussions with San Francisco is premised on increased surface (purchased) water use during ample supply periods and a corresponding decrease in pumping to recharge the aquifer, with corresponding greater dependency on groundwater source during drought/emergency periods to free up available surface water supplies. Refer to Section 4.2.1 for more information on the City's pilot conjunctive use program.

Water System Improvement Program. In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, SFPUC has undertaken the WSIP, approved October 31, 2008. The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. Many of the water supply and reliability projects evaluated in the WSIP were in the SFPUC's Water Supply Master Plan (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 approved Assembly Bill No. 1823, the Wholesale Regional Water System Security and Reliability Act. San Francisco has indicated to its wholesale customers that the WSIP project will be complete in 2016. Figure 4-2 indicates the locations of the various capital improvement projects that comprise the WSIP.

A Program Environmental Impact Report (PEIR) was prepared in accordance with the California Environmental Quality Act for the WSIP. The PEIR, certified in 2008, analyzed the broad environmental effects of the projects in the WSIP at a program level and the water supply impacts of various alternative supplies at a project level. Individual WSIP projects are also undergoing individual project specific environmental review as required.

In approving the WSIP, SFPUC adopted a Phased WSIP Variant for water supply. In comparison to the other WSIP projects, this Variant's analysis was brief in the PEIR. This Phased WSIP Variant established a mid-term water supply planning milestone in 2018, when the SFPUC would reevaluate water demands through 2035. At the same meeting, the Commission also imposed the Interim Supply Limitation, which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 MGD until at least 2018. Although the Phased WSIP Variant included a mid-term water supply planning milestone, it did include full implementation of all proposed WSIP facility improvement projects, to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

As of July 1, 2010, the WSIP was 27 percent complete overall with the planning and design work over 90 percent complete. SFPUC has scheduled the WSIP for completion no later than December 2015.

Under the WSIP, SFPUC has planned and completed a number of projects. The SFPUC/East Bay Municipal Utility District Intertie project is currently in close-out. Completed projects completed included the following projects (organized by region):

- Sunol Valley Region
  - Standby Power Facilities – Various Locations
  - Pipeline Repair & Readiness Improvements
  - Calaveras Reservoir Upgrades
- Bay Division Region
  - Bay Division Pipeline (BDPL) Nos. 3 & 4 Crossover/Isolation Valves
  - BDPL Reliability Upgrade – Relocation of BDPL Nos. 1 &2
  - BDPL No. 4 Condition Assessment Pre-stressed Concrete Cylinder Pipe (PCCP) Sections
- Peninsula Region
  - Adit Leak Repair – Crystal Springs/Calaveras
  - Pulgas Balancing – Inlet/Outlet Work
  - Pulgas Balancing – Discharge Channel Modifications

  - Cross Connection Controls
  - HTWTP Short-Term Improvements (Demo Filters)
  - HTWTP Short-Term Improvements – Coagulation & Flocculation/Remaining Filters
  - Capuchino Valve Lot Improvements
- San Francisco Regional Region
  - Sunset Reservoir – North Basin
- System-Wide Region
  - Programmatic EIR

Current WSIP pipeline projects in construction are listed below by region and described in greater detail in Appendix E:

- San Joaquin Region
  - Lawrence Livermore Laboratory and PHII Thomas Shaft Improvement Project
  - San Joaquin Pipeline System – Crossovers
  - Roselle Crossover Improvements
  - Tesla Treatment Facility
- Sunol Valley Region
  - New Irvington Tunnel
  - Alameda Siphon No. 4
  - SVWTP Expansion & Treated Water Reservoir
  - San Antonio Pump Station Upgrade
- Bay Division Region
  - SCADA System Phase II
  - BDPL Reliability Upgrade – Bay Tunnel
  - BDPL 5 Reliability Upgrade East Bay
  - BDPL 5 – Peninsula Reaches
  - Bay Division Pipelines 3&4 Crossover
- Peninsula Region
  - New Crystal Springs Bypass (Polhelmus) Tunnel
  - Pulgas Balancing Reservoir Structural Rehabilitation and Roof Replacement
  - Pulgas Balancing – Modification of the Existing Dechloramination Facility
  - Crystal Springs/San Andreas Transmission Upgrade
  - San Andreas Pipeline No. 3 Installation
  - Baden and San Pedro Valve Lot Improvements
- San Francisco Regional Region
  - University Mound Reservoir North Basin Seismic Upgrades

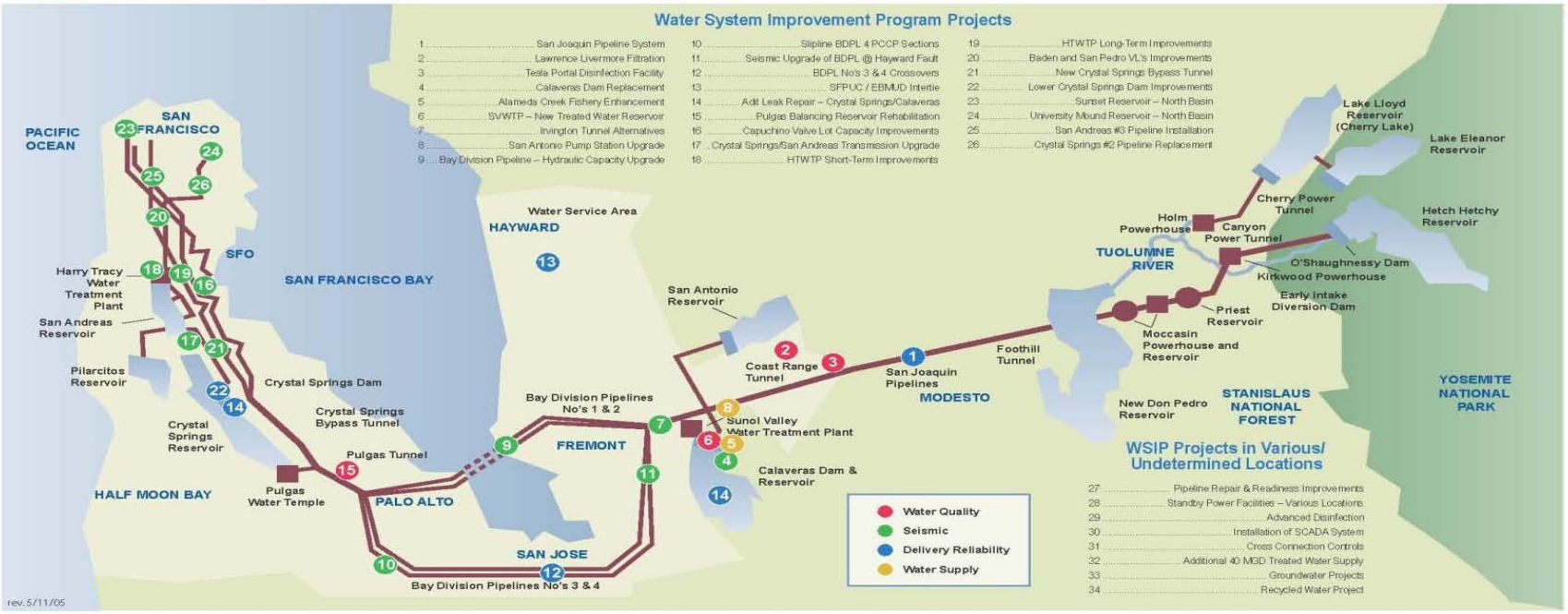

Figure 4-2. WSIP Projects Map

Long-Term Reliable Water Supply Strategy. BAWSCA's water management objective is to ensure that a reliable, high quality supply of water is available where and when people within the BAWSCA service area need it. A reliable supply of water is required to support the health, safety, employment, and economic opportunities of the existing and expected future residents in the BAWSCA service area and to supply water to the agencies, businesses, and organizations that serve those communities. BAWSCA is developing the Long-Term Reliable Water Supply Strategy (Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions.

The Strategy is proceeding in three phases. Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the Strategy. Phase II of the Strategy is currently under development and will result in a refined estimate of when, where, and how much additional supply reliability and new water supplies are needed throughout the BAWSCA service area through 2035, as well as a detailed analysis of the water supply management projects, and the development of the Strategy Implementation Plan. Phase II will be complete by 2013. Phase III will include the implementation of specific water supply management projects. Depending on cost-effectiveness, as well as other considerations, the projects may be implemented by a single member agency, by a collection of the member agencies, or by BAWSCA in an appropriate timeframe to meet the identified needs. Project implementation may begin as early as 2013 and will continue throughout the Strategy planning horizon, in coordination with the timing and magnitude of the supply need.

The development and implementation of the Strategy will be coordinated with the BAWCSA member agencies and will be managed adaptively to ensure that the goals of the Strategy, i.e., increased normal and drought year reliability, are efficiently and cost-effectively being met.

Appendix I includes more information on the Long-Term Reliable Water Supply Strategy.

Long-Term Additional Water Supply Options. SFPUC and BAWSCA have identified projects associated with the Water Supply Agreement that intend to increase the surface water supply to meet year 2050 demands. These, in turn, will enable the City to make additional purchases in normal year and ensure adequate supply in drought years. The City is also planning to increase its groundwater pumping capacity appropriately and expand its recycled water program.

Section 5

Water Supply Reliability and Water Shortage Contingency Planning

5.1 Water Supply Reliability

This section presents the projected supplies available during single and multiple-dry water years. The City's surface water supply from SFPUC is subject to reductions during dry years. Based on historic conditions and water use, the reliability of the City's water sources is summarized in Table 5-1.

Table 5-1. Supply Reliability – Historic Conditions (DWR Table 28)

Average/ Normal Water Year (AFY)	Single Dry Year (AFY)	Multiple Dry Years (AFY)		
		Year 1	Year 2	Year 3
8,860 [a]	9,465 [a]	7,657 [a]	8,399 [a]	8,354 [a]
Percent of Average/Normal Year:	107	86	94	94

[a] *Based on historic water use records.*

Table 5-2 lists the basis for the years in Table 5-1.

Table 5-2. Basis of Water Year Data (DWR Table 27)

Water Year Type	Base Year(s)
Average Water Year	2004
Single-Dry Water Year	1987
Multiple-Dry Water Years	2006 to 2008

As a community becomes more water efficient, it may become more difficult for customers to reduce their water use during water shortages (i.e., demand hardening). Staff does think that City customers are approaching demand hardening and as a result will be looking to augment this deficit with alternative supplies as deemed prudent.

The costs of demand management or supply augmentation options to reduce the frequency and severity of shortages are now high enough that water supply agencies must look more carefully at the costs of unreliability to make the best possible estimate of the net benefit of taking specific actions, hence the term "reliability planning." Reliability is a measure of a water service system's expected success in managing water shortages. In addition to climate, other factors that can cause water supply shortages

are earthquakes, fires, chemical spills, aqueduct or reservoir failures, along with energy outages at treatment and pumping facilities. The City included the probability of catastrophic outages in reliability planning. To plan for long-term water supply reliability, the City examined an increasingly wide array of supply augmentation and demand reduction options to determine the best courses of action for meeting water service needs. Table 5-3 lists factors that may result in an inconsistency of the City's water supply.

Table 5-3. Factors Resulting in Inconsistency of Supply (DWR Table 29)

Name of supply	Legal	Environment	Water quality	Climatic
SFPUC	*Institutional parameters that allocate the water supply of the Tuolumne River. *Possibility of removing O'Shaughnessy Dam	Downstream Flows	Treatment facilities	Hydrology
Groundwater	Adjudication of basin pumping	Salt Water Intrusion	Nitrate levels above MCL (45 ppm)	Multiple dry years that lower groundwater table
Recycled Water	Regulatory mandates that cannot be met with current operational technology	None	None	None

Reliability planning requires information about:

1. The expected frequency and severity of shortages
2. How additional water management measures are likely to affect the frequency and severity of shortages
3. How available contingency measures can reduce the impact of shortages when they occur

For the City, reliability planning involves coordination with other users of both the Westside Groundwater Basin (Westside Basin) and the wholesale purchasers of the SFPUC water supply. Therefore, the Plan used the following planning documents to prepare the reliability comparison section:

- City of Daly City Water Master Plan, Brown and Caldwell, August 1991.
- Water Supply Master Plan, SFPUC and BAWSCA, April 2000.
- Draft Wholesale Customer Contingency Plan for Daly City, Olivia Chen Consultants, June 2000.
- Water Quality and Supplies Corrective Action Plan, City of Daly City Department of Water and Wastewater Resources, 1995.
- Tier 1 and 2 Water Shortage Allocation Plans 2009 and 2010
- Westside Basin Groundwater Flow Model and Draft Report Version 3.1, Hydro Focus April 6, 2011

Additionally, there are ongoing planning processes and regulatory initiatives such as Delta Stewardship Committee, Federal Energy Regulatory Commission licensing, implementation of the Central Valley Project Improvement Act. Furthermore, the unilateral decision by SFPUC to defer any increases in supply to its customers until at least 2018 all of which may adversely affect supply availability or make increased demands on SFPUC water supplies in the future. The impact of these factors is uncertain. More water could be directed to the Delta or the Central Valley and reduce supply to the SFPUC wholesale customers.

BAWSCA monitors water supply projects whose study area encompasses BAWSCA's entire regional service area, of which the City is a part. Such planning included SFPUC's preparation of a Vulnerability Study that led to prioritization of projects designed to reduce the vulnerability of San Francisco's regional

water delivery system. The projects address repair or replacement of SFPUC system components that are old and not up to current seismic standards. In addition, they address the need for constructing some redundancy in the SFPUC system so that the water delivery systems will not be subject to prolonged disruption following an earthquake or other natural occurrences such as rainstorms and windstorms. The improvements will add reliability to the City's water supply.

BAWSCA is also monitoring many other ongoing planning studies, customer agency general plans, and Integrated Resource Plans (IRPs). IRPs comprehensively examine water supply reliability, future service demands, local supplies, reliability objectives, alternative supply and demand management alternatives. SFPUC, Alameda County Water District, City of Palo Alto, and the Santa Clara Valley Water District are currently preparing IRPs that could influence reliability of the City's surface water supply. Decisions on water supply and reliability objectives for these districts could be at conflict with Daly City's objectives and reduce the availability of water supply and reliability for Daly City.

5.1.1 Drought Conditions

During drought conditions, the hydraulic limitations in the SFPUC delivery system may fade into the background and the problem becomes one of relative supply. In most years, deliveries have been met and rarely if at all, have not been met. If local runoff is low, and Bay Area storage reservoirs are low, then SFPUC must bring more Sierra water than normal into the Bay Area to augment local supplies. During such periods, the existing conveyance capacity across the San Joaquin Valley could be limiting.

5.1.2 Plans to Assure a Reliable Water Supply

This section addresses the plans to assure reliability of all of the existing and feasible water supplies for the City including groundwater, water purchases and water recycling, aggressive water conservation detailed in Section 6. It also addresses reliability of the distribution system including the booster pump stations and reservoirs.

Groundwater. The Westside Groundwater Basin has proven to be a very reliable water supply in the past. This reliability should be better understood through implementation of the Westside Basin Groundwater Management Plan (Appendix F). Physical conditions in the Westside Basin provide opportunities for conjunctive use—the coordinated use of surface water and groundwater to ensure reliable water supply. For example, during wet years when surface supplies are plentiful, SFPUC would delver surface water to water users that otherwise rely on greater quantities of groundwater. The groundwater users would decrease their groundwater pumping, allowing the aquifer to recharge naturally. During dry years when runoff is reduced and surface water supplies are scarce, water users would place greater reliance on groundwater storage. See Section 4, for a description of the City's pilot conjunctive use program.

The aquifer within the Westside Basin represents a potential means for storing imported surface water to increase the reliability of water supply within the basin as well as conjunctive use to increase the long-term yield of the SFPUC system. The Westside Basin Groundwater Management Plan includes a program to continue monitoring groundwater storage, conduct yield analyses, establish cooperative agreements, and develop facilities for aquifer storage and recovery (ASR) and delivery.

Saline water intrusion has not been a documented problem with the groundwater quality in the Westside Basin. Ongoing work by SFPUC consultants on the conceptualization of the Westside Basin notes that the most likely pathway for seawater intrusion would be north of Daly City's city limits through the Sunset District of San Francisco. Several sentinel monitoring wells are installed through DWR's AB 303 grant program and from local agency resources as a means to provide early detection should such an occurrence take place. The monitoring proposed in the Westside Basin Groundwater Management Plan will produce technical data with which to develop appropriate management response if intrusion is occurring. Such planning will improve further reliability of the aquifer resource.

Water Recycling. The Westside Basin Groundwater Management Plan promotes a water-recycling program. Section 10 – Water Recycling addresses further details on the City's Water Recycling program.

Surface Water Purchases. SFPUC estimates that it will have system wide reductions of 10 percent in single dry years and 10, 20, and 20 percent during multiple dry years. These reductions represent what SFPUC will reduce overall to all of its wholesaler customers. These reductions help facilitate what supplies Daly City should expect. SFPUC and BAWSCA have supplied all the wholesaler cities with tables that document what their deliveries will be during multiple dry years. Surface water purchases are subject to Tier 1 and Tier 2 Drought Allocations, as further described below.

Tier 1 Drought Allocations. In July 2009, in connection with the WSA, the wholesale customers and San Francisco adopted a Water Shortage Allocation Plan (WSAP) to allocate water from the regional water system to retail and wholesale customers during system-wide shortages of 20 percent or less (the "Tier 1 Plan"). The Tier 1 Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20 percent. The Tier 1 Plan also allows for voluntary transfers of shortage allocations between SFPUC and any wholesale customer and between wholesale customers themselves. In addition, wholesale customers who have banked water through reductions in usage greater than required may transfer banked water to other wholesale customers. The Tier 1 Plan, which allocates water between San Francisco and the wholesale customers collectively, distributes water based on the level of shortage:

Table 5-4. SFPUC and Wholesale Purchasers Share of Water

Level of System-Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers 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 1 Plan will expire at the end of the term of the Water Supply Agreement, unless extended by San Francisco and the wholesale customers.

Tier 2 Drought Allocations. The wholesale customers have negotiated, and adopted, the "Tier 2 Plan", the second component of the WSAP that allocates the collective wholesale customer share among each of the 26 wholesale customers. The Tier 2 allocation's formula is that takes multiple factors for each wholesale customer into account, including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customer's allocation would be divided among the wholesale customers who have supplies above their needs as determined among the BAWSCA agencies under the Tier 2 plan. That amount is in proportion to each wholesale customer's Allocation Basis, expressed in mgd, which in turn is the weighted average of two components. The first component is the wholesale customer's Individual Supply Guarantee, as stated in the WSA, and is fixed. The second component, the Base/Seasonal Component, is variable and is calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers, for all available water

supplies. The second component is based on twice the weight of the first, fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply provided for all wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers' collectively under the Tier 1 Plan, by the wholesale customer's Allocation Factor.

The Tier 2 Plan requires that BAWSCA calculate the Allocation Factors each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier 2 Plan when adopted.

The Tier 2 Plan will expire in 2018 unless extended by the wholesale customers.

SFPUC and the City prepared a Draft Wholesale Customer Contingency Plan for Daly City in June 2000. This Plan is included in this report as Appendix J. It addresses the contingency procedures if there is a loss of water supply from any of the SFPUC connections. There are eight emergency planning scenarios identified and, in general, the scenarios involve loss of only one to three connections and possibly entire pipelines. The responses are generally to increase flow from other connections or groundwater wells and use system reservoir and pump station interties to continue supplying water to all zones. Assessed were short-term contingencies of less than two days and long-term contingencies of two to three days. In extreme emergencies, introduction of untreated well water into the system accompanied with Boil Water Order and Notice of Contamination, as described in the City of Daly City Water System Water Quality and Supplies Corrective Action Plan included as Appendix K.

5.1.3 Wholesaler Reliability

The SFPUC's WSIP provides goals and objectives to improve the delivery reliability of the Regional Water System (RWS) including water supply reliability. The goals and objectives of the WSIP related to water supply are:

Table 5-5. WSIP Goals and Objectives

Program Goal	System Performance Objective
Water Supply – meet customer water needs in non-drought and drought periods	• Meet average annual water demand of 265 million gallons per day (mgd) from the SFPUC watersheds for retail and wholesale customers during non-drought years for system demands through 2018. • Meet dry-year delivery needs through 2018 while limiting rationing to a maximum 20 percent system-wide reduction in water service during extended droughts. • Diversify water supply options during non-drought and drought periods. • Improve use of new water sources and drought management, including groundwater, recycled water, conservation, and transfers.

The adopted WSIP had several water supply elements to address the WSIP water supply goals and objectives. The following provides the water supply elements for all year types and the dry-year projects of the adopted WSIP to augment all year type water supplies during drought.

Water Supply – All Year Types. SFPUC historically has met demand in its service area in all year types from its watersheds. They are the:

- Tuolumne River watershed
- Alameda Creek watershed
- San Mateo County watersheds

In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

SFPUC will expand its water supply portfolio by increasing the types of water supply resources. Table 5-6 summarizes the existing and planned sources of wholesale water supply assumed to be available by year 2030.

Table 5-6. Wholesale Supplies – Existing and Planned Sources of Water (DWR Table 17)

Wholesaler sources	Contracted Volume (Individual Supply Guarantee, AFY)	Projected System-Wide Volume [a] (AFY)				
		2015[a]	2020[a]	2025[a]	2030	2035
Sierra Nevada - Hetch Hetchy, Alameda Watershed, San Mateo Watershed	4,808	296,839 [a]	296,839 [a]	296,839 [a]	296,839 [a]	296,839 [a]
Crystal Springs Reservoir		68,375 [b]	68,375 [b]	68,375 [b]	68,375 [b]	68,375 [b]
Westside Basin Groundwater		8,100 [b]	8,100 [b]	8,100 [b]	8,100 [b]	8,100 [b]
Calaveras Reservoir Recov		96,670 [b]	96,670 [b]	96,670 [b]	96,670 [b]	96,670 [b]
Districts' Transfer		2,240 [b]	2,240 [b]	2,240 [b]	2,240 [b]	2,240 [b]

[a] Source: Email from Molly Petrick, SFPUC, to Nicole Sandkulla, BAWSCA, dated March 24, 2011. This number represents the total supplies for SFPUC's wholesale and retail customers.

[b] Source: Letter from Paula Kehoe, SFPUC, to Nicole Sandkulla, BAWSCA dated March 31, 2011. Letter from Nicole Sandkulla, BAWSCA to BAWSCA Designated Water Management Representatives on March 21, 2011.

Water Supply – Dry-Year Types. The adopted WSIP includes the following water supply projects to meet dry-year demands with no greater than 20 percent system-wide rationing in any one year:

- Restoration of Calaveras Reservoir capacity
- Restoration of Crystal Springs Reservoir capacity
- Westside Basin Groundwater Conjunctive Use
- Water Transfer with Modesto Irrigation District (MID) / Turlock Irrigation District (TID)

In order to achieve its target of meeting at least 80 percent of its customer demand during droughts, SFPUC must successfully implement the dry-year water supply projects included in the WSIP.

Table 5-7 presents the wholesaler's supply reliability for single and multiple dry years based on current water sources.

Table 5-7. Supply Reliability – Current Water Sources (DWR Table 31)

Wholesaler sources	Average/Normal Water Year Supply (AFY)	Single Dry Year (AFY)	Multiple Dry Years (AFY)		
			Year 2011	Year 2012	Year 2013
SFPUC – Daly City Allocation	4,808 [a]	4,544 [b]	4,544 [b]	3,946 [b]	3,946 [b]
Groundwater	3,842	3,842	3,842	3,842	3,842
Recycled Water	547	547	547	547	547
Percent of Average/Normal Year:	100%	97%	97%	91%	91%

[a] *This number is based on the City's Individual Supply Guarantee of 4.292 mgd.*

[b] *Source: Based on the letter from Paula Kehoe, SFPUC, to Nicole Sandkulla, BAWSCA dated March 31, 2011 (Appendix D) and Daly City's Tier 2 Final Allocation Factor as included in the BAWSCA Drought Implementation Plan (DRIP) Among Wholesale Customers dated November 5, 2010. The dry year reliability of SFPUC supplies was calculated by multiplying the City's Final Allocation Factor of 2.66% from the Tier 2 DRIP by SFPUC's wholesale allocations for dry years. SFPUC indicated in the March 31, 2011 letter that the wholesale allocation for single dry years and the first of multiple dry years is 152.6 mgd and that the wholesale allocation for the second and third of multiple dry years is 132.5 mgd.*

Projected SFPUC System Supply Reliability. SFPUC has provided data related to the projected RWS supply reliability (Appendix D, Table 3). This table assumes that the wholesale customers purchase 184 mgd from the RWS through 2030 and the implementation of the dry-water water supply projects included in the WSIP. The numbers represent the wholesale share of available supply during historical year types per the Tier 1 Water Shortage Allocation Plan. This table does not reflect any potential impact to RWS yield from the additional fishery flows required as part of Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project.

Impact of Recent SFPUC Actions on Dry Year Reliability of SFPUC Supplies. In adopting the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, SFPUC committed to providing fishery flows below Calaveras Dam and Lower Crystal Springs Dam as well as bypass flows below Alameda Creek Diversion Dam. The fishery flow schedules for Alameda Creek and San Mateo Creek represent a potential decrease in available water supply of an average annual 3.9 mgd and 3.5 mgd, respectively with a total of 7.4 mgd average annually. These fishery flows could potentially create a shortfall in meeting the SFPUC demands of 265 mgd and slightly increase the SFPUC's dry-year water supply needs. If a shortfall occurs, it is anticipated that SFPUC must provide the fishery flows at the time of completion of construction of both the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements project in approximately 2015 and 2013, respectively.

The adopted WSIP water supply objectives include (1) meeting a target delivery of 265 mgd through 2018 and (2) rationing at no greater than 20 percent system-wide in any one year of a drought. As a result of the fishery flows, SFPUC may not be able to meet these objectives between 2013 and 2018 without (1) a reduction in demand, (2) an increase in rationing, or (3) a supplemental supply. The following describes these actions.

Reduction in Demand. The current projections for purchase requests through 2018 remain at 265 mgd. However, in the last few years, SFPUC deliveries have been below this level, as illustrated below. If this trend continues, SFPUC may not need 265 mgd from its watersheds to meet purchase requests through 2018. As a result, the need for supplemental supplies of 3.5 mgd starting in 2013 and increasing to 7.4 mgd in 2015 to offset the water supply loss associated with fish releases may be less than anticipated.

Table 5-8. Water Deliveries in SFPUC Service Area[5]					
	FY2006	FY2007	FY2008	FY2009	FY2010
Total Deliveries (mgd)	247.5	257	254.1	243.4	225.2

Increase in Rationing. The adopted WSIP provides for a dry year water supply program where implementation would result in system-wide rationing of no more than 20 percent. The PEIR identified the following drought shortages during the design drought: 3.5 out of 8.5 years at 10 percent rationing and 3 out of 8.5 years at 20 percent. If SFPUC did not develop a supplemental water supply in dry years to offset the effects of the fishery flows on water supply, rationing would increase during dry years. If SFPUC experiences a drought between 2013 and 2018 in which users would need to impose rationing, rationing would increase by approximately 1 percent in shortage years. Rationing during the design drought would increase by approximately 1 percent in rationing years.

Supplemental Supply. SFPUC may be able to manage the water supply loss associated with the fishery flows through the following actions and considerations:

- Development of additional conservation and recycling
- Development of additional groundwater supply
- Water transfer from MID and/or TID
- Increase in Tuolumne River supply
- Revising the Upper Alameda Creek Filter Gallery Project capacity
- Development of a desalination project

Meeting the Level of Service Goal for Delivery Reliability. SFPUC has committed to meeting its contractual obligation to its wholesale customers of 184 mgd and its delivery reliability goal of 265 mgd with no greater than 20 percent rationing in any one year of a drought. In Resolution No. 10-0175 adopted by the SFPUC on October 15, 2010, SFPUC directed staff to provide information to the Commission and the public by March 31, 2011 on how SFPUC has the capability to attain its water supply levels of service and contractual obligations. This directive was in response to concerns expressed by SFPUC and the Wholesale Customers regarding the effect on water supply of the in stream flow releases required because of the Lower Crystal Springs Dam Improvement Project and the Calaveras Dam Replacement Project. In summary, SFPUC has a projected shortfall of available water supply to meet its LOS goals and contractual obligations. SFPUC has stated that current decreased levels of demand keep this from being an immediate problem, but that in the near future, SFPUC must resolve these issues. Various activities are underway by SFPUC to resolve the shortfall problem. SFPUC staff will report to the Commission by August 31, 2011, to provide further information on actions to resolve the shortfall problem.

5.1.4 Distribution System Reliability

Eleven reservoirs and one private reservoir in the system currently have a total capacity of about 24.6 million gallons (MG). In an emergency, they have the capacity to supply both the current average daily demand of 8.6 mgd and the projected future 2035 demand of 9.5 mgd (which includes cumulative water conservation reductions of 0.82 mgd by 2035 as calculated by the DSS model) for approximately 3.37 days. The actual emergency supply available is highly dependent on the individual reservoir size

[5] Reference: SFPUC FY09-10 J-Table Line 9 “Total System Usage” plus 0.7 mgd for Lawrence Livermore National Laboratory use and 0.4 mgd for Groveland. No groundwater use is included in this number. Unaccounted-for-Water is included.

and the area served. Nonetheless, the storage capacity in the smallest reservoir in the system is equal to approximately 1.5 times the average daily demand for its service areas when full. Additionally, all six wells are equipped with standby power. The City also has developed a contingency plan for water pump stations that addresses response actions during power interruptions or if pumps fail. Since 2005, the City has installed new facilities to improve its capacity to transfer water to and from the Bayshore Zone. The City of Daly City's Water System Water Quality and Supplies Corrective Action Plan (included as Appendix L) describes emergency responses to contamination of water quality and interruption of City's water supplies to distribution.

5.2 Water Quality Impacts on Future Water Supply

SFPUC treats the water that it supplies. The City chloraminates and fluoridates its groundwater, and blends groundwater with SFPUC water to meet its customer demands and in some instances for nitrate control. 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, SFPUC is undertaking a Water System Improvement Program (WSIP). The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to its customers in a reliable, affordable and environmentally sustainable manner. Cite the section dealing with the main body of this discussion.

SFPUC promotes an ongoing effort for environmentally sustainable stewardship of natural resources through its current watershed management plans and activities. The level of service chosen for water quality provides for an annual appropriation for watershed management to the year 2035.

Table 5-9. Water Quality – Current and Projected Water Supply Impacts (DWR Table 30)

Water source	Description of Condition	Current and Projected Water Supply Impacts (AFY)					
		2010	2015	2020	2025	2030	2035
Groundwater	Nitrate levels	852	852	852	852	852	852
Recycled water	Recycled water regulations	547	3,103	6,911	6,911 [a]	6,911 [a]	6,911 [a]
Purchased water	N/A	0	0	0	0	0	0

[a] *This is contingent on an additional recycled water facility being constructed and rated at 3.4 mgd for watering cemeteries in Colma and/or for groundwater regeneration*

5.3 Supply and Demand Comparisons

This section compares current and projected water supply and demand. It is noted that the projections made throughout this document are predicated on receiving the requested amount of SFPUC water to meet anticipated system demand in the future (as included in Table 4-1). The requests include future population estimates and the cumulative water conservation reductions of 0.82 mgd by 2035 as calculated by the DSS model. In SFPUC letters dated May 27, 2005 and the revised June 1, 2005 the higher range was used in the Table 3 calculation associated with multi-year droughts (Appendix D). The ranges can also be found in the SFPUC 2030 Purchase Estimates Technical Memorandum. The results of the following tables would be considerably different if status quo were to be reflected. However, for the sake of consistency, the numbers reflected in the letter have been used throughout. In order for these scenarios to work SFPUC would have to commit officially to providing future demand as reflected in their letters.

The comparison basis is on the water demand projections in Section 3, water supply projections in Section 4, and the supply reliability evaluation in Section 4.6. The comparison considers the projected

normal water year demands versus the projected normal water year supplies. Consideration is also given to water demand and supply conditions for a single dry water year and four consecutive (i.e., multiple) dry water years.

In any one dry year, the City will be able to maintain regular water use, but will need to prepare for possible future multiple dry years. In the second consecutive dry year, the City will probably need to enter into a Stage I water shortage response. In the third consecutive dry year, or in the event of a major system failure, the City may continue a Stage I water shortage response or move into a Stage II water shortage response. See the Water Shortage Contingency Plan (Section 8) and Four-Year Minimum Water Supply section of Section 5 for more detailed information.

Normal Water Supply Years. Table 5-10 presents a comparison of the supply and demand during a normal precipitation year in five-year increments from 2015 to 2035.

Table 5-10. Supply and Demand Comparison – Normal Year (DWR Table 32)

	Supply and Demand Comparison – Normal Year (AFY)				
	2015	2020	2025	2030	2035
Supply totals	11,260	15,561	15,894	16,231	16,768
Demand totals	11,828	10,102	13,100	17,526	17,615
Difference	(568)	5,459	2,794	(1,295)	(847)
Difference as percent of supply	-5.0%	35.1%	17.6%	-8.0%	-5.1%
Difference as percent of demand	-4.8%	54.0%	21.3%	-7.4%	-4.8%

Single and Multiple Dry Water Years. The SFPUC letters dated February 22, 2010 serve as the basis for single and multiple drought scenarios. Table 5-11 compares supply and demand projections for single dry years using the supply reductions stated by SFPUC on Daly City's purchased water supply. Daly City intends on using its local groundwater supply to buffer the impacts associated with concurrent reductions in surface water availability. If the length of the drought continues, Daly City would pump at its sustainable yield average during the period to account for further planned reductions in surface water availability. The city also would consider the use of standby emergency wells to provide for reliability/redundancy within the local groundwater basin so not to impact local health and safety.

Table 5-11. Supply and Demand Comparison – Single Dry Year (DWR Table 33)

	Supply and Demand Comparison – Single Dry Year (AFY)				
	2015	2020	2025	2030	2035
Supply totals	10,996 [a]	15,298 [a]	15,298 [a]	15,298 [a]	15,298 [a]
Demand totals	11,828	10,102	13,100	17,526	17,615
Difference	(832)	5,195	2,198	(2,228)	(2,317)
Difference as percent of supply	-7.6%	34.0%	14.4%	-14.6%	-15.1%
Difference as percent of demand	-7.0%	51.4%	16.8%	-12.7%	-13.2%

[a] *Assumes that the current amount of single dry year SFPUC supply as shown in Table 5-7 is available in future years.*

Table 5-12 compares supply and demand totals for first, second, and third consecutive years of a multiple dry year scenarios.

Table 5-12. Supply and Demand Comparison -Multiple Dry Year Events (DWR Table 34)

		Supply and Demand Comparison – Multiple Dry Year Events (AFY)				
		2015	2020	2025	2030	2035
Multiple-dry year First year supply	Supply totals	10,996 [a]	15,298 [a]	15,298 [a]	15,298 [a]	15,298 [a]
	Demand totals	11,828	10,102	13,100	17,526	17,615
	Difference	(832)	5,195	2,198	(2,228)	(2,317)
	Difference as percent of supply	-7.6%	34.0%	14.4%	-14.6%	-15.1%
	Difference as percent of demand	-7.0%	51.4%	16.8%	-12.7%	-13.2%
Multiple-dry year Second year supply	Supply totals	10,398 [a]	14,699 [a]	14,699 [a]	14,699 [a]	14,699 [a]
	Demand totals	11,828	10,102	13,100	17,526	17,615
	Difference	(1,430)	4,597	1,599	(2,827)	(2,916)
	Difference as percent of supply	-13.8%	31.3%	10.9%	-19.2%	-19.8%
	Difference as percent of demand	-12.1%	45.5%	12.2%	-16.1%	-16.6%
Multiple-dry year Third year supply	Supply totals	10,398 [a]	14,699 [a]	14,699 [a]	14,699 [a]	14,699 [a]
	Demand totals	11,828	10,102	13,100	17,526	17,615
	Difference	(1,430)	4,597	1,599	(2,827)	(2,916)
	Difference as percent of supply	-13.8%	31.3%	10.9%	-19.2%	-19.8%
	Difference as percent of demand	-12.1%	45.5%	12.2%	-16.1%	-16.6%

[a] *Assumes that the current amount of multiple dry year SFPUC supply as shown in Table 5-7 is available in future years.*

5.4 Water Shortage Contingency

This section describes the water shortage contingency plan that the City has prepared to address a future drought with water restrictions, penalties, charges, and plan to manage expenditures and revenues during a drought.

5.4.1 Past Drought, Water Demand, and Conservation Information

Daly City experienced a prolonged drought from 1986 through 1992. The City met its customers' needs through careful management of groundwater supply and purchases, and by investing in water conservation. Community involvement made it possible to have voluntary rationing during 1987-89. By 1990, however, because of worsening local conditions, the City adopted Urgency Ordinance No. 1125 on May 14, 1990. This ordinance established rules and regulations for rationing water during a water shortage emergency and penalties for violation. The City designed this water conservation program to achieve a 25 percent reduction in water usage. The City modified the program by amending Ordinance No 1143 on June 10, 1991 to make the program more equitable per person for households with greater than two people, while increasing excess water rate charges to single-family and multi-family residences. When drought conditions subsided and when it was demonstrated that the conservation efforts of the resi-

dences and businesses were effective and would continue voluntarily, Ordinance No. 1156 was adopted on May 11, 1992, that suspended Ordinance Nos. 1125 and 1143. Appendix K of this Plan presents the three ordinances.

Daly City citizens have a high commitment to quality of life and environmental issues and are continuing to hold water conservation as a high priority, evidenced by the below average gallons per capita per day noted earlier. Refer to Section 7 for more information on the City's current and future conservation programs and an economic evaluation of each as conducted through the DSS modeling program.

5.4.2 Preparation for Catastrophic Water Supply Interruption

In 1997, in accordance with the requirements of the California Department of Public Health, Office of Drinking Water, and the City's DWWR prepared a Disaster Response Plan (DRP). This DRP also satisfied the requirements of Senate Bill 1841. The City's Plan is consistent with the City of Daly City Emergency Plan, as amended under consolidated SEMS Operations Plan and was coordinated with the San Mateo County Area Office of Emergency Services.

Additionally, DWWR is a participant in the Water Agency Response Network (II-WARN) Omnibus Mutual Aid Agreement. II-WARN is an organization made up of water agencies from the 16 counties of Northern California that make up the State Office of Emergency Services Region II. The purpose of II-WARN is to support and provide intra- and interagency emergency preparedness planning, disaster response, and mutual aid matters in times of emergency.

The City's DRP establishes Standard Operating Procedures to protect the safety of DWWR employees in the event of a disaster and to ensure rapid repair and restoration of the water and wastewater systems for customers within the areas served. The DWWR establishes response priorities for returning services to customers and the procedures for issuing a Boil Water Order (BWO) or an Unsafe Water Alert (UWA). The priorities for response activities are listed in order of priority for DWWR resources and actions:

- Priority 1 Restore water for fire fighting.
- Priority 2 Restore water to hospitals and emergency care facilities.
- Priority 3 Get sewage overflows out of the streets.
- Priority 4 Restore treatment plant to normal operating conditions.
- Priority 5 Restore water to residences and other customers.
- Priority 6 Restore wastewater to residences and other customers.

DWWR inspects facilities annually for earthquake safety. The City has installed auxiliary generators and improvements to the water storage facilities to minimize loss of these facilities during an earthquake or any disaster causing an electric power outage. Table 5-13 summarizes action items that the City may pursue in preparing for and responding to a catastrophic water supply interruption.

Table 5-13. Preparation Actions for a Catastrophe	
Name of Measures	Check if Discussed
1. Stretch existing water storage.	✓
2. Obtain additional water supplies.	✓
3. Determine where the funding will come from.	✓
4. Contact and coordinate with other agencies.	✓
5. Create an Emergency Response Team/Coordinator.	✓
6. Create a catastrophe preparedness plan.	✓
7. Put employees/contractors on-call.	✓
8. Develop methods to communicate with the public.	✓
9. Develop methods to prepare for water quality interruptions.	✓

SFPUC has addressed emergency preparedness for its water system within its UWMP. The SFPUC UWMP includes information on the wholesaler's emergency planning, training and exercise; emergency drinking water planning; power outage preparedness and response; and capital projects for seismic reliability and overall system reliability. Refer to the SFPUC 2010 UWMP for further detail related to these topics.

5.4.3 Supplemental Water Supplies

During disasters, the City may be able to use its emergency interties with the Westborough County Water District, California Water Service Company, Brisbane/Guadalupe Valley Municipal Improvement District, or North Coast County Water District. However, because SFPUC provides the majority of their supply, these sources would not be directly available during a drought.

5.4.4 Water Shortage Contingency Ordinance/Resolution

As mentioned earlier, the City adopted Ordinance No. 1125 on May 14, 1990 and Ordinance No. 1143 on June 10, 1991. On May 11, 1992, the City suspended these ordinances with Ordinance No. 1156. As needed, the City will prepare and adopt new ordinances and/or resolutions. As described in Section 5.1.2, the Tier 1 and Tier 2 Drought Allocations dictate the reductions in SFPUC purchases during times of water shortage.

Water Supply Shortage Stages and Conditions. This section describes the stages of action that DWWR will undertake in response to water supply shortages. Included is an outline of specific water supply conditions that are applicable to each stage. Four stages of action to be taken during a water supply shortage are defined in Table 5-14. DWWR will implement the stages during water supply shortages according to shortage level, ranging from 5 percent shortage in Stage I to 50 percent shortage in Stage IV. The DWWR management will make the determination and declaration during a water supply shortage. Table 5-10 describes the water supply shortage levels and stages taken during minimum water supply years.

Table 5-14. Water Shortage Contingency – Rationing Stages to Address Water Supply Shortages (DWR Table 35)		
Stage No.	Water Supply Conditions	% Shortage
I	Minimum water supply shortage - voluntary conservation at 10% water use reduction	5-10%
II	Moderate water supply shortage - Mandatory Conservation Phase, Voluntary Allotments and/or Mandatory Conservation Rules, 20% use reduction	10-20%
III	Severe water supply shortage - Rationing Phase, Allotments and Mandatory Conservation Rules, 35% use reduction	20-35%
IV	Critical water supply shortage - Intense Rationing Phase, Allotments and Mandatory Conservation and Rules, 50% use reduction	35-50%

Stage I. During Stage I, water alert conditions are declared and voluntary conservation is encouraged. DWWR explains the drought to public and governmental bodies together with other stages and forecasts future actions. In addition, DWWR requests voluntary water conservation.

Existing, ongoing water conservation measures are continued and emphasized as necessary to alert the public of the nature of the water supply shortage. DWWR maintains an ongoing public information campaign consisting of distribution of literature, speaking engagements, bill inserts, and conservation messages printed in local newspapers and advertized on the local cable channel 27.. Educational programs in area schools are ongoing and utilized as necessary. DWWR uses the toll-free Conservation Hotline with trained Conservation Representatives to answer customer questions about the water shortage, as well as conservation and water use efficiency.

Stage II. During Stage II of a water supply shortage, the shortage is moderate, 10 to 20 percent, and conservation may be voluntary, consisting of allotments and/or mandatory conservation rules. The severity of actions depends upon the percent shortage. DWWR aggressively continues its public information and education programs. DWWR asks consumers for 10 to 20 percent voluntary or mandatory water use reductions. If necessary, DWWR also supports passage of drought ordinances by the City. SFPUC may also determine that its supply shortage requires mandatory actions. SFPUC may establish allocations for the City and set up a banking system. SFPUC may impose excess use charges that the City will need to pass on to the City's customers for effectiveness.

Stage III. In Stage III, the water supply shortage is severe, 20 to 35 percent, and conservation consists of allotments and mandatory conservation rules. This phase becomes effective upon notification by SFPUC and BAWSCA that water usage will be reduced by a mandatory percentage. DWWR implements mandatory reductions and rate changes to penalize excess usage.

DWWR puts water use restriction into effect; i.e., prohibited uses can include restrictions on daytime hours for watering, excessive watering resulting in gutter flooding, using hose without shutoff device, non-recycling fountains, washing down sidewalks or patios, un-repaired leaks, etc. DWWR monitors production weekly for compliance with necessary reductions. In the case of a customer consistently abusing use, DWWR installs a flow restrictor.

Stage IV. During Stage IV of a water supply shortage, the shortage is critical, 35 to 50 percent. Conservation consists of allotments and mandatory conservation rules. DWWR intensifies all steps taken in prior stages and monitors production daily for compliance with necessary reductions.

5.4.5 Prohibitions, Consumption Reduction Methods and Penalties

The following section includes an overview on prohibitions, consumption reduction methods, and penalties.

Prohibitions. During Stage II, DWWR may support passage of drought ordinances by the City that include mandatory conservation, water use reductions, and excess use penalties. The City may impose prohibitions on various wasteful water uses, including, but not limited to, the hose washing of sidewalks and driveways using potable water, cleaning or filling decorative fountains, and allowing plumbing leaks to go uncorrected for more than 72 hours. Table 5-15 identifies prohibitions and the stages during which the prohibition is voluntary and mandatory.

Table 5-15. Water Shortage Contingency – Mandatory Prohibitions (DWR Table 36)

Prohibitions	Stage when prohibition becomes mandatory
Cleaning of streets/sidewalks/ walkways/parking areas/patios/ porches or verandas	II, III, IV
Washing cars	II, III, IV
Watering lawns/landscapes	II, III, IV
Non-permanent agriculture	II, III, IV
Uncorrected plumbing leaks	II, III, IV
Gutter flooding	II, III, IV
Cleaning/filling/operating/maintaining levels in non-recycling decorative fountains	II, III, IV

Consumption Reduction Methods. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, is appropriate for its area, and has the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. California Water Code Section 10632 (e) requires the water supplier to provide consumption reduction methods in the most restrictive stages of a water shortage. DWWR will use the consumption reduction methods defined in Table 5-16 to reduce water use in the most restrictive stages.

Table 5-16. Water Shortage Contingency –Consumption Reduction Methods (DWR Table 37)		
Consumption reduction methods	Stage when method takes effect	Projected Reduction % [a]
Voluntary rationing	I, II	5-15%
Restrict for only priority uses	II, III, IV	5-20%
Use prohibitions	II, III, IV	5-20%
Mandatory rationing	III, IV	5-50%
Excess use penalty	III, IV	10-20%
Percentage reduction by customer type	III, IV	10-20%
Flow restriction	III, IV	10-30%
Per capita allotment by customer type	III, IV	10-50%
Water conservation kits	All Stages	5%
Plumbing fixture replacement	All Stages	5%
Education Program	All Stages	5%
Demand reduction program	All Stages	5-50%
Water shortage pricing	All Stages	10-20%

[a] Because the City has not quantified the percent reductions in the past for its consumption reduction methods, engineering judgment and other UWMP's have been used to make reduction estimates

Reduction Measuring Mechanism. Production meters and customer meters measure reductions in water use. DWWR records water production figures daily. DWWR reports totals monthly and incorporates data into water supply reports. DWWR reads customer meters bimonthly. Metering identifies exceptionally high usage at meter reading time by reviewing water use data. The City investigates these accounts for potential water loss or abuse problems. During all stages of water shortages, monitor daily production figures. DWWR may elect to read customer meters on a more frequent basis. Table 5-17 summarizes these measuring mechanisms.

Table 5-17. Water Use Monitoring Mechanisms	
Mechanism for Determining Actual Reductions	Type Data Expected
Production meters	Water production figures daily. Totals reported monthly
Customer meters	Read bimonthly, high usage reported at time of reading high meter
Investigation of accounts for potential water loss or abuse problems	Identification of any leaks in the system or over use by any customer

Penalties or Charges for Excessive Use. After one written warning, DWWR may install a flow-restricting device on the service line of any customer observed to be using water for any non-essential or unauthorized use as will be defined in a City Ordinance. DWWR charges an excess use penalty per 100 cubic feet of water used in excess of the applicable allocation during each billing period for all service rendered on and after the effective date of the Ordinance. Repeated violations of unauthorized water use will result in discontinuance of water service. Table 5-18 displays types of penalties and charges and the stage during which they take effect.

Table 5-18. Water Shortage Contingency – Types of Penalties and Charges (DWR Table 38)	
Types of Penalties and Charges	Stage when Penalty Takes Effect
Penalties for not reducing consumption	III, IV
Charges for excess use	III, IV
Charge per unit over allotment	III, IV
Flow restriction	III, IV
Termination of Service	III, IV
Flat fine	All Stages

5.4.6 Analysis of Revenue and Expenditure Impacts

During water shortages, the DWWR will establish memorandum accounts to track expenses and revenue shortfalls caused by both mandatory rationing and voluntary conservation efforts. DWWR may impose a surcharge to recover revenue shortfalls recorded in its drought memorandum accounts. Accounting review soon after the water shortage has started will evaluate and define the impacts on DWWR revenues and expenditures resulting from a water shortage. Tables 5-19 and 5-20 display the items addressed as part of the evaluation of impacts to revenue and expenditure.

Table 5-19. Items to Address for Revenue Impact Analysis	
Name of Measures	Check if Discussed
Review of rate adjustment	✓
Development of reserves	✓
Change in quantity of sales	✓
Impact on customer's bill	✓
Distribution of customer impacts between customer types	✓
Impacts to water supplier of higher rates and penalties	✓
Cost recovery reviews	✓

Table 5-20. Items to Address for Expenditure Analysis	
Name of Measures	Check if Discussed
Change in quantity of sales	✓
Cost recovery reviews	✓
Increased staff salaries/overtime	✓
Increased costs of new supplies, transfers or exchanges	✓
Distribution of customer impacts between customer types	✓
Impacts to water supplier of higher rates and penalties	✓

Section 6

Demand Management Measures

Water conservation is one available method to reduce water demands, thereby reducing water supply needs for the City. This section presents an analysis of water demand management measures (DMMs) and a description of the methods of the analysis performed by SFPUC for water conservation.

6.1 California Urban Water Conservation Council (CUWCC)

The California Urban Water Conservation Council (CUWCC) is a voluntary organization of water utilities, environmental, and other interested groups that are responsible for administering the implementation of water conservation measures in California. The Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) (California Urban Water, 2008) defines the water conservation measures or BMPs, also referred to as DMMs. The signatories of the CUWCC submit a semi-annual report regarding their implementation of DMMs.

The City is not a MOU signatory and, therefore, does not submit semi-annual reports. Nevertheless, the City recognizes the importance of DMMs and participated in the SFPUC report on Wholesale Customer Water Conservation Potential Technical Report (December 2004). This report provides a summary and review of the economic analysis of 32 DMMs that SFPUC conducted using the DSS model. This report also presents a recommended water management plan.

The unpredictable water supply and ever-increasing demand on California's complex water resources have resulted in a coordinated effort by DWR, water utilities, environmental organizations, and other interested groups to develop a list of urban DMMs for conserving water. This consensus-building effort resulted in development and signing of the MOU (as amended December 10, 2008) among parties, which formalizes an agreement to implement these DMMs and makes a cooperative effort to reduce the consumption of California's water resources.

CUWCC administers the MOU. Table 6-1 presents the 14 DMMs, otherwise known as BMPs, as defined by the MOU. Since development of the 2005 Plan, the CUWCC has revised its classification of BMPs. Both the revised (current) and former BMP classifications are included in Table 6-1.

The MOU requires that a water utility implement only economically feasible DMMs. If a DMM is not economically feasible, the water utility may request an economic exemption for that DMM. The DMMs as defined in the MOU are standard definitions of water conservation measures. The City is not a signatory of the MOU; however, the City implements the DMMs that are cost beneficial.

Table 6-1. Water Conservation Demand Management Measures Listed in MOU				
Revised (Current) CUWCC BMP Category			DMM Name	
Category	BMP No.	BMP Name	DMM No.	DMM Name
Foundational BMPs	BMP 1	Utility Operations		
	BMP 1.1	Operations Practices		
	BMP 1.1.1	Conservation Coordinator	L	Conservation Coordinator
	BMP 1.1.2	Water Waste Prevention	M	Water Waste Prohibition
	BMP 1.1.3	Wholesale Agency Assistance	J	Wholesale Agency Assistance Programs
	BMP 1.2	Water Loss Control	C	System Water Audits, Leak Detection, and Repair
	BMP 1.3	Metering with Commodity Rates	D	Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections
	BMP 1.4	Retail Conservation Pricing	K	Conservation Pricing
	BMP 2	Educational		
	BMP 2.1	Public Information	G	Public Education Programs
	BMP 2.2	School Education	H	School Education Programs
Programmatic BMPs	BMP 3	Residential		
	BMP 3.1	Residential Assistance	A & B	Water Survey Programs for Single-Family and Multi-Family Residential Customer (Indoor) and Residential Plumbing Retrofit
	BMP 3.2	Landscape Water Survey	A	Water Survey Programs for Single-Family and Multi-Family Residential Customer (Outdoor)
	BMP 3.3	High-Efficiency Clothes Washers	F	High-Efficiency Washing Machine Rebate Programs
	BMP 3.4	Water Sense Standard (WSS) Toilets	N	Residential ULFT Replacement Programs
	BMP 3.5	Water Sense Standard (WSS) for New Residential Development	(new)	
	BMP 4	Commercial Industrial Institutional (CII)	I	Conservation Programs for Commercial, Industrial, and Institutional Accounts
	BMP 5	Landscape	E	Large Landscape Conservation Programs and Incentives

6.2 Regional Coordination on Demand Management

Daly City has participated in regional coordination efforts related to demand management, including the SFPUC Wholesale Customer Water Conservation Study, the BAWSCA Water Conservation Implementation Plan (WCIP), and other regional programs.

6.2.1 SFPUC Wholesale Customer Water Conservation Study

In spring 2004, SFPUC, in conjunction with its 26 wholesale customers including the City of Daly City, conducted a study to assess the potential for water conservation savings in the SFPUC's wholesale customer service area. BAWSCA participated in the study by coordinating efforts of the wholesale customers and SFPUC.

SFPUC used the DSS model in determining water conservation potential in the wholesale customer service area including Daly City. The DSS model developed water demand projections and evaluated the cost-effectiveness of 32 conservation measures over a 30-year planning period (see Appendix M). This analysis included the measurable DMMs that are listed in the MOU (DMM 1, 2, 5, 6, 7, 9, 14), but did not include the DMMs that cannot be measured.

DSS Model Methodology and Economic Analysis. The approach relied on screening an initial list of 75 conservation measures using qualitative criteria related to the following (SFPUC 2004, SFPUC Wholesale Customer Water Conservation Technical Report):

- Does the product work well and is it readily available?
- Would the measure have widespread application in the Bay Area?
- Will the retail customer participate in the measure or use the product, and it is fair in its application throughout the service area among the different customer types?
- Among similar measures that accomplish the same things, is this measure the best way to save water?

Thirty two-measures passed the initial screening. Market potential, costs, and benefits were identified for these 32 conservation measures, and a benefit-cost analysis was performed to evaluate the cost-effectiveness of each measure. Other factors such as service area water use characteristics, retail customer behavioral patterns, budget considerations, and ease of implementation were used to develop three sets of conservation measures Programs A, B, and C which evaluated the 32 measures. Program A included measures currently implemented by the City. Program B included Program A plus the additional measures considered most implementable by the City. An implementable conservation measure is a measure that an individual wholesale customer believes is fundable and implementable with success in its service area. Program C includes all the measures included in Programs A and B plus additional measures that may be implementable in some form in the future. The programs were designed to accomplish an increasing level of water savings. The programs are not intended to be rigid programs but rather to demonstrate the range of savings if the selected measures were run together. This approach allows the DSS model to account for overlaps in water savings and benefits from the packages of measures as programs.

6.2.2 DSS Model Overview

The following is a general description of how the DSS model calculates demands and water savings related to implementation of water conservation measures. For further detail, please see the 2004 SFPUC Technical Reports.

The DSS model prepares 30-year total water demand projections at a very detailed level. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand.

The DSS model is an end-use model that breaks down total water production (water demand in the service area) to specific water end uses such as toilets, faucets, or irrigation. The end-use approach allows for detailed criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts.

To forecast urban water demands using the DSS model, customer-billing data are obtained from the water agency being modeled. The billing data are reconciled with available demographic data to characterize the water usage for each customer-billing category in terms of number of users per account and per capita water use. The billing data are analyzed further to approximate the split of indoor and outdoor water usage in each customer-billing category. The indoor/outdoor water usage is broken into typical end uses for each customer-billing category. The combined published data on average per-capita indoor water use and average per-capita end use are combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer-billing category.

Once this calibration is complete, an account-growth forecast for each customer category based on population and/or job growth, or other growth surrogate, is used to predict the expected increase in water usage for that customer category. At the same time, high-efficiency fixture replacement parameters are used to adjust the end-use water usage and refine the water demand projections. The resulting projections by customer category are summed to develop total water demand projections.

In general, two steps are involved in the DSS modeling process to arrive at water demand projections: (1) establishing base-year conditions, and (2) forecasting future water demand.

For conservation measure evaluation, the DSS model performs benefit cost analysis using net present value and benefit-to-cost ratio as economic indicators. The benefit cost analysis is performed from various perspectives including the utility and community (utility plus customer).

Benefits are based on savings in water facility operations and maintenance (O&M) and savings from deferring or downsizing future capital facilities, such as plant expansions or new source development. Facility design criteria, such as peak or average water demand, are used to calculate future facility timing with and without conservation. Present value analysis is used to compute benefit-cost ratios of each measure.

When measures are assembled in programs, the interactions are accounted for by multiplying the water use reduction factors, at the end use level, together. This avoids double counting when more than one measure acts to reduce the same end use of water.

6.2.3 BAWSCA Water Conservation Implementation Plan

In September 2009, BAWSCA completed the Water Conservation Implementation Plan (WCIP) (BAWSCA 2009a). The goal of the WCIP is to develop an implementation plan for BAWSCA and its member agencies to attain the water efficiency goals that the agencies committed to in 2004 as part of the PEIR for the WSIP, described in Section 4.5. The WCIP's goal was expanded to include identification of how BAWSCA member agencies could use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 mgd Interim Supply Limitation. SFPUC imposed the Interim Supply Limitation on October 31, 2008, to limit the volume of water that the BAWSCA member agencies and San Francisco can collectively purchase from the RWS to 265 mgd until at least 2018.

Based on the WCIP development and analysis process, BAWSCA and its member agencies identified five new water conservation measures, which, if implemented fully throughout the BAWSCA service area,

could potentially save an additional 8.4 mgd by 2018 and 12.5 mgd by 2030. The demand projections for the BAWSCA member agencies, as transmitted to SFPUC on June 30, 2010, indicate that collective purchases from SFPUC will stay below 184 mgd through 2018 as a result of revised water demand projections, the identified water conservation savings, and other actions.

Several member agencies have elected to participate in the BAWSCA regional water conservation programs and BAWSCA continues to work with individual member agencies to incorporate the savings identified in the WCIP into their future water supply portfolios with the goal of maintaining collective SFPUC purchases below 184 mgd through 2018.

The City also participated in development of the BAWSCA Water Conservation Implementation Plan (WCIP) (September 2009).

It is important to note, however, that the studies also concluded that Daly City's gross consumption in 2010 was approximately 62 gpcd Conservation practices instituted during two major droughts in the past two decades have contributed to this below average gpcd use. Figure 6-1 shows that the current water production is currently less than use in the early 1980's, despite an approximate 29 percent increase in population between 1980 and 2010 (Population in 1980=78,519 and in 2010=110,599). The City's use is considerably lower than the BAWSCA average gross consumption of approximately 130 gpcd, per the BAWSCA 2009/2010 Final Draft Annual Survey. It is clear that Daly City is approaching demand hardening, although the studies concluded that the conservation potential, while low, does lend itself to additional conservation opportunities saving an estimated 0.82 mgd annually by 2035.

More information on the WCIP is provided in Appendix N.

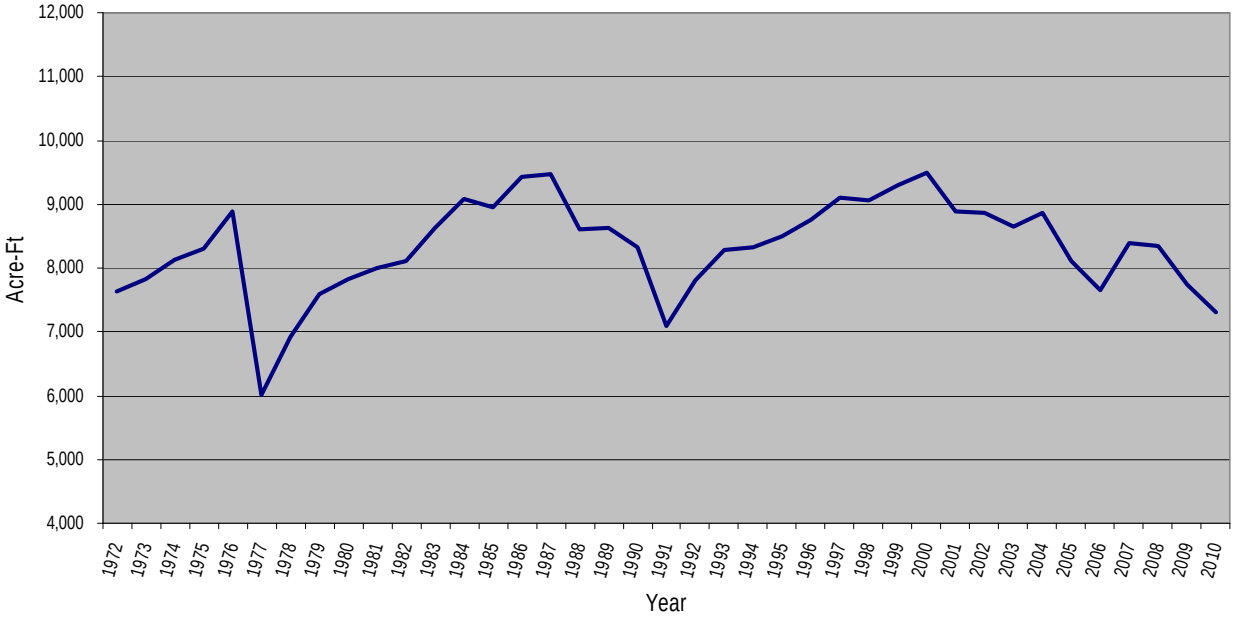

Figure 6-1. Annual Water Production 1972 to Present

6.2.4 Other Regional Coordination on Demand Management

BAWSCA and its member agencies look for opportunities to work with other water agencies, including the SFPUC and the Santa Clara Valley Water District (SCVWD), and leverage available resources to implement water use efficiency projects. For example, in 2005, BAWSCA and SFPUC entered into a Memoran-

dum of Understanding (MOU) regarding the administration of a Spray Valve Installation Program. Through this MOU, BAWSCA and SFPUC worked cooperatively to offer and coordinate the installation of water conserving spray valves to food service providers throughout the BAWSCA service area. In addition, BAWSCA participates in the Bay Area Efficient Clothes Washer Rebate Program, a residential rebate program offered by all of the major Bay Area water utilities. Through participation in this program, BAWSCA and its participating member agencies were the recipients of $187,500 in Proposition 50 grant funds, which became available in Fiscal Year 2006/2007.

More recently, as part of the Bay Area Integrated Regional Water Management Plan, BAWSCA and the other major Bay Area water utilities submitted a Proposition 84 Implementation Grant Proposal in January 2011 to support regional water conservation efforts that offer drought relief and long-term water savings. The proposed project includes a package of water conservation programs to improve water use efficiency throughout the San Francisco Bay Area. The project provides direct funding, financial incentives (rebates), and/or subsidies for the implementation of programs that achieve reduced water demand, by all classes of water users: residential, and commercial, industrial and institutional. There were four specific programs selected for the project because they were determined to provide the most quantifiable and sustainable water savings, including:

1. Water-Efficient Landscape Rebates, Training and Irrigation Calculator,
2. High-Efficiency Toilet/Urinal Direct Install and/or Rebates,
3. High-Efficiency Clothes Washer Rebates, and
4. Efficient Irrigation Equipment Rebates.

BAWSCA and its member agencies will continue to look to partner with each other and the other Bay Area water utilities, as appropriate, to develop regional water conservation efforts that extend beyond local interests to examine costs, benefits and other related issues on a system-wide level. The goal is to maximize the efficient use of water regionally by capitalizing on variations in local conditions and economies of scale.

6.3 Description of Daly City's Existing Conservation Program

The City currently implements the water conservation measures included in Table 6-2. Information on the City's selected measures from the DSS model, including the number of interventions and estimated water savings by year, is included in Appendix O.

Table 6-2. Summary of City's Existing Conservation Program Measures	
DMM	Description
Residential Retrofit (DMM 2)	Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install low flow showerheads, faucet aerators, and toilet tank retrofit devices.
System Water Audits, Leak Detection and Repair (DMM 3)	Annually complete a prescreening system audit to determine the need for a full-scale system audit.
Metering with commodity rates for all new connections and retrofit of existing connections. (DMM 4)	The City water distribution system is fully metered. The City is currently replacing old meters in the system in an effort to provide more accurate readings of water use within its service area.
Large Landscape Conservation Audits (DMM 5)	This DMM is a Bay Area Water Supply and Conservation Association's (BAWSCA) Regional Conservation Program developed in 2003. The City reviewed all dedicated irrigation accounts. The objective was to isolate large irrigation accounts and develop water budgets. Properties with more than 2 meters/accounts were considered to fragment to be of value. The result was seven properties with ten irrigation meters
Clothes Washer Rebate (DMM 6)	This DMM is a Bay Area Water Supply and Conservation Association's (BAWSCA) Regional Conservation Program developed in 2001. Homeowners receive a rebate on a new water efficient clothes washer.
Public Information School Information Program (DMM 7& 8)	Use public education to raise awareness of other conservation measures available to customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc. The City provides the public with conservation news articles, fliers, media coverage, community events, etc.
Commercial Water Audits (DMM 9)	High water use accounts would be offered a free water audit that would evaluate ways for the business to save water and money
Wholesale agency assistance program (DMM10)	SFPUC
Conservation Pricing (DMM11)	Conservation pricing.
Water conservation coordinator (DMM 12)	The City's conservation coordinator is an ongoing component of a City's water conservation program. She is responsible for implementing and monitoring a City's water conservation activities.
Water waste prohibition (DMM13)	Water conservation Ordinances
NEW as a result of Study: Regional Spray Rinse Valve Replacement/Installation Program. (New)	This conservation measure is a Bay Area Water Supply and Conservation Association's (BAWSCA) Regional Conservation Program developed in 2005. This program replaces spray rinse valves in commercial businesses with water conserving spray valves.

6.4 Future Water Conservation

The City has committed to implementing additional conservation programs designed to save 0.82 mgd by 2035. Table 6-3 includes the water conservation measures selected for future implementation with cross-references to CUWCC BMPs and DWR DMMs. Table 6-4 includes the water savings analysis and economic results of all of the water conservation measures analyzed in the DSS model for the City through the year 2031 (i.e., not all measures were selected for future implementation). It is important to note that Table 6-4 presents results as though measures were implemented individually. Thus, water savings across measures may be redundant and would be overestimated if summed from this table. Information on the City's selected measures from the DSS model, including the number of interventions and estimated water savings by year, is included in Appendix O.

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Table 6-3. Conservation Measure Selected for Implementation in the City's DSS Model and CUWCC BMP/DMM Cross References

DSS Model Reference	CUWCC Old BMP Number & Name	CUWCC New BMP Category	DWR Demand Management Measure (DMM) Reference	Comment
02 - Residential Retrofit	2. Residential Plumbing Retrofit	Programmatic: Residential	(B) Residential plumbing retrofit.	
03 - Large Landscape Conservation Audits	5. Large Landscape Conservation Programs and Incentives	Programmatic: Landscape	(E) Large landscape conservation programs and incentives.	
04 - Water Budgets	5. Large Landscape Conservation Programs and Incentives	Programmatic: Landscape	(E) Large landscape conservation programs and incentives.	
05 - Washing Machine Rebate According to New BMP 6	6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential	(F) High-efficiency washing machine rebate programs.	
06 - Public Information	7. Public Information Programs	Foundational: Education – Public Information Programs	(G) Public information programs.	
07 - Commercial Water Audits	9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional	(I) Conservation programs for commercial, industrial, and institutional accounts.	
08 - ICI ULF Toilet Rebate	9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional	(I) Conservation programs for commercial, industrial, and institutional accounts.	
09a - RSF Toilet Sponsored Replacement	14. Residential ULFT Replacement Programs (now WaterSense Specification Toilets)	Programmatic: Residential	(N) Residential ultra-low-flush toilet replacement programs.	
09b - RMF Toilet Sponsored Replacement	14. Residential ULFT Replacement Programs (now WaterSense Specification Toilets)	Programmatic: Residential	(N) Residential ultra-low-flush toilet replacement programs.	
12 - Rebates for 6/3-Dual Flush Toilets	14. Residential ULFT Replacement Programs (now WaterSense Specification Toilets)	Programmatic: Residential	(N) Residential ultra-low-flush toilet replacement programs.	Was the original HET rebate program for 2001 to 2009. In 2010 measure starts to overlaps with NM-1
14 - Xeriscape Classes	7. Public Information Programs	Foundational: Education – Public Information Programs	(G) Public information programs.	
20 - Offer Incentives for Replacement of Multifamily Washers	6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential	(F) High-efficiency washing machine rebate programs.	
22 - Low Flow Restaurant Spray Nozzles	9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional	(I) Conservation programs for commercial, industrial, and institutional accounts.	Spray Valves were tracked in CUWCC Database for BMP 9
29 - Financial Incentives for Complying with Water Use Budget	5. Large Landscape Conservation Programs and Incentives	Programmatic: Landscape	(E) Large landscape conservation programs and incentives.	
NM1 -Rebate High Efficiency Toilets - SF / MF	14. Residential ULFT Replacement Programs (now WaterSense Specification Toilets)	Programmatic: Residential	(N) Residential ultra-low-flush toilet replacement programs.	
NM1 -Rebate High Efficiency Toilets - CII	9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Programmatic: Commercial, Industrial, and Institutional	(I) Conservation programs for commercial, industrial, and institutional accounts.	CII toilet rebated were tracked in CUWCC Database for BMP 9
NM2 - Education/Training External Water Use Efficiency	7. Public Information Programs	Foundational: Education – Public Information Programs	(G) Public information programs.	This is an education class. It is debatable if this is part of public education.
NM5 - High Efficiency Washer Rebates	6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	Programmatic: Residential	(F) High-efficiency washing machine rebate programs.	
NM6 - New Development Indoor Regulations		Programmatic: Residential (WaterSense Specifications for residential development)		
NM7 - New Development Outdoor Regulations		Programmatic: Residential (WaterSense Specifications for residential development)		
Not evaluated in DSS Model	8. School Education Programs	Foundational: Education – School Education Programs	(H) School education programs.	
Not evaluated in DSS Model	10. Wholesale Agency Assistance Programs	Foundational: Utility Operations – Operations	(J) Wholesale agency programs.	
Not evaluated in DSS Model	11. Retail Conservation Pricing	Foundational: Utility Operations – Pricing	(K) Conservation pricing.	
Not evaluated in DSS Model	12. Conservation Coordinator	Foundational: Utility Operations – Operations	(L) Water conservation coordinator.	
Not evaluated in DSS Model	13. Water Waste Prohibition	Foundational: Utility Operations – Operations	(M) Water waste prohibition.	

Table 6-4. Water Conservation Program Water Savings Analysis and Economic Results

Measure Number	Measure Name	Selected for Implementation? (Yes/No)	Cumulative									
			Present Value of Water Utility Benefits	Present Value of Total Community Benefits	Present Value of Water Utility Costs	Present Value of Total Community Costs	Water Utility Benefit Cost Ratio	Total Community Benefit Cost Ratio	Average Water Savings (mgd)	Total Water Savings (ac-ft)	Cost per Volume ($/ac-ft)	Total Number of Accounts Participating
1	Residential Water Surveys	No	$30,997	$46,055	$63,018	$74,473	0.49	0.62	0.002	25	$2,551	701
2	Residential Retrofit	Yes	$5,843	$13,489	$19,221	$19,221	0.30	0.70	0.001	4	$4,841	245
3	Large Landscape Conservation	Yes	$14,424	$14,424	$43,875	$52,312	0.33	0.28	0.001	11	$3,927	109
4	Water Budgets	Yes	$2,663	$2,663	$2,233	$2,233	1.19	1.19	0.000	2	$1,234	10
5	Clothes Washer Rebate	Yes	$6,725	$15,681	$28,490	$86,931	0.24	0.18	0.001	5	$6,234	184
6	Public Information Program	Yes	$268,095	$421,193	$130,029	$130,029	2.06	3.24	0.018	203	$642	19,411
7	Commercial Water Audits	Yes	$476,944	$610,639	$1,029,809	$1,487,502	0.46	0.41	0.032	363	$2,841	534
8	Commercial ULF Toilet and Urinal Rebates	Yes	$0	$0	$0	$0	0.00	0.00	0.000	0	#DIV/0!	0
9	Residential ULF Toilet Sponsored Replacement	Yes	$0	$0	$2,235	$4,916	0.00	0.00	0.000	0	#DIV/0!	3
10	Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings	No	$0	$0	$0	$0	1.30	0.10	0.000	0	$4,474	0
11	Home Leak Detection and Repair	No	$72,413	$72,413	$139,567	$139,567	0.52	0.52	0.005	56	$2,503	544
12	Rebates for 6/3 dual flush or 4 liter toilets	Yes	$73,230	$73,230	$267,663	$374,728	0.27	0.20	0.005	59	$4,548	1,118
13	ET Controller Rebates	No	$3,241	$3,241	$43,528	$62,873	0.07	0.05	0.000	3	$16,707	235
14	Xeriscape education and staff training at retail garden/irrigation supply houses	Yes	$4,790	$4,790	$20,552	$118,775	0.23	0.04	0.000	4	$5,338	595
15	Homeowner irrigation classes	No	$2,133	$2,133	$5,444	$103,917	0.39	0.02	0.000	2	$3,176	398
16	Promote water efficient plantings at new homes	No	$130	$130	$2,408	$22,470	0.05	0.01	0.000	0	$23,017	24
17	Offer incentives for replacement of clothes washers in coin-operated laundries	No	$0	$0	$0	$0	0.00	0.00	0.000	0	#DIV/0!	0
18	Incentives for retrofitting sub-metering	No	$6,450	$11,391	$20,462	$105,461	0.32	0.11	0.000	5	$4,080	19
19	Require sub-metering multifamily units	No	$65,206	$115,078	$71,733	$429,548	0.91	0.27	0.004	50	$1,442	146
20	Rebate efficient clothes washers	Yes	$0	$0	$0	$0	0.00	0.00	0.000	0	#DIV/0!	0
21	Enforce landscape requirements for new landscaping systems (turf limitations / regulations)	No	$27,981	$27,981	$25,682	$249,000	1.09	0.11	0.002	22	$1,172	515
22	Restaurant low flow spray rinse nozzles	Yes	$0	$0	$0	$0	0.00	0.00	0.000	0	#DIV/0!	0
23	Focused water audits for hotels/motels	No	$20,828	$33,641	$62,923	$96,481	0.33	0.35	0.001	16	$3,939	19
24	WAVE Program (US EPA) for hotels	No	$323	$521	$61	$1,380	5.32	0.38	0.000	0	$234	0
25	Hotel retrofit (w/financial assistance)	No	$2,582	$4,171	$2,161	$3,890	1.19	1.07	0.000	2	$1,041	0
26	Award program for water savings by businesses	No	$0	$0	$0	$0	0.00	0.00	0.000	0	$0	0
27	Replace inefficient water using equipment	No	$1,210	$1,210	$18,336	$98,055	0.07	0.01	0.000	1	$18,853	19
28	Require 0.5 gal/flush urinals in new buildings	No	$2	$2	$1	$1	3.36	3.36	0.000	0	$370	0
29	Financial incentives for complying with water use budget	Yes	$6,705	$6,705	$8,901	$25,085	0.75	0.27	0.000	5	$1,652	20
30	Financial incentives for irrigation upgrades	No	$129	$129	$1,008	$1,815	0.13	0.07	0.000	0	$9,694	2
31	Require dedicated irrigation meters	No	$0	$0	$0	$0	0.00	0.00	0.000	0	$0	0
32	Water Utility / City Department water reduction	No	$4,381	$4,381	$5,518	$24,713	0.79	0.18	0.000	4	$1,567	12

Table 6-4. Water Conservation Program Water Savings Analysis and Economic Results

Measure Number	Measure Name	Selected for Implementation? (Yes/No)	Cumulative									
			Present Value of Water Utility Benefits	Present Value of Total Community Benefits	Present Value of Water Utility Costs	Present Value of Total Community Costs	Water Utility Benefit Cost Ratio	Total Community Benefit Cost Ratio	Average Water Savings (mgd)	Total Water Savings (ac-ft)	Cost per Volume ($/ac-ft)	Total Number of Accounts Participating
	goals											
NM1	Install High Efficiency Toilets & Showerheads	Yes	$14,646	$14,646	$117,044	$179,468	0.13	0.08	0.001	12	$9,844	222
NM2	Education/Training External Water Use Efficiency	Yes	$812	$812	$6,363	$73,347	0.13	0.01	0.000	1	$9,651	230
NM3	Rain Sensor Give-aways	No	$1,011	$1,011	$32,514	$32,514	0.03	0.03	0.000	1	$39,632	353
NM4	Commercial Urinal Rebates	No	$6	$6	$16,715	$36,774	0.00	0.00	0.000	0	$3,489,455	0
NM5	High Efficiency Washer Rebates	Yes	$26,693	$61,788	$228,089	$418,164	0.12	0.15	0.002	22	$10,526	673
NM6	New Development Indoor Regulations	Yes	$13,677	$25,879	$6,387	$227,637	12.83	1.64	0.001	11	$2,846	142
NM7	New Development Outdoor Regulations	Yes	$1,722	$1,722	$2,614	$550,282	0.66	0.00	0.000	1	$1,870	103
TOTALS			$1,155,992	$1,591,155	$2,424,581	$5,233,563	0.48	0.30	0.081	887	$2,734	26,586

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Section 7

Climate Change

The issue of climate change has become an important factor in water resources planning in the State, and is frequently being considered in urban water management planning purposes, though the extent and precise effects of climate change remain uncertain. As SFPUC described in its Final Water Supply Availability Study for the City and County of San Francisco, dated October 2009, there is evidence that increasing concentrations of greenhouse gasses have caused and will continue to cause a rise in temperatures around the world, which will result in a wide range of changes in climate patterns. Moreover, there is evidence that a warming trend occurred during the latter part of the 20th century and will likely continue through the 21st century. These changes will have a direct effect on water resources in California, and numerous studies have been conducted to determine the potential impacts to water resources. Based on these studies, climate change could result in the following types of water resource impacts, including impacts on the watersheds in the Bay Area:

- Reductions in the average annual snowpack due to a rise in the snowline and a shallower snowpack in the low and medium elevation zones, such as in the Tuolumne River basin, and a shift in snowmelt runoff to earlier in the year;
- Changes in the timing, intensity and variability of precipitation, and an increased amount of precipitation falling as rain instead of as snow;
- Long-term changes in watershed vegetation and increased incidence of wildfires that could affect water quality;
- Sea level rise and an increase in saltwater intrusion;
- Increased water temperatures with accompanying potential adverse effects on some fisheries and water quality;
- Increases in evaporation and concomitant increased irrigation need; and
- Changes in urban and agricultural water demand.

According to SFPUC (2009), other than the general trends listed above, there is no clear scientific consensus on exactly how climate change will quantitatively affect the state's water supplies, and current models of water systems in California generally do not reflect the potential effects of climate change.

Initial climate change modeling completed by SFPUC indicates that about seven percent of runoff currently draining into Hetch Hetchy Reservoir will shift from the spring and summer seasons to the fall and winter seasons in the Hetch Hetchy basin by 2025. This percentage is within the current interannual variation in runoff and is within the range accounted for during normal runoff forecasting and existing reservoir management practices. The predicted shift in runoff timing is similar to the results found by other researchers modeling water resource impacts in the Sierra Nevada due to warming trends associated with climate change.

SFPUC has stated that based on this preliminary analysis, the potential impacts of climate change are not expected to affect the water supply available from the San Francisco Regional Water System (RWS) or the or the overall operation of the RWS through 2030.

SFPUC views assessment of the effects of climate change as an ongoing project requiring regular updating to reflect improvements in climate science, atmospheric/ocean modeling, and human re-

sponse to the threat of greenhouse gas emissions. To refine its climate change analysis and expand the range of climate parameters being evaluated, as well as expand the timeframes being considered, SFPUC is currently undertaking two additional studies. The first utilizes a newly calibrated hydrologic model of the Hetch Hetchy watershed to explore sensitivities of inflow to different climate change scenarios involving changes in air temperature and precipitation. The second study will seek to utilize state-of-the-art climate modeling techniques in conjunction with water system modeling tools to more fully explore potential effects of climate change on the SFPUC water system as a whole. Both analyses will consider potential effects through the year 2100.

Section 8

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Appendix A: DWR Checklist

Table A-1 Urban Water Management Plan checklist, organized by legislation number

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)	System Demands		Section 3.1
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	System Demands	Retailer and wholesalers have slightly different requirements	Not applicable
3	Report progress in meeting urban water use targets using the standardized form.	10608.40	Not applicable	Standardized form not yet available	Section 3.1 Section 3.2
4	Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)	Plan Preparation		Section 1.3
5	An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.	10620(f)	Water Supply Reliability		Section 5.1
6	Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.	10621(b)	Plan Preparation		Section 1.4
7	The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).	10621(c)	Plan Preparation		City to provide

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
8	Describe the service area of the supplier	10631(a)	System Description		Section 2
9	(Describe the service area) climate	10631(a)	System Description		Section 2.1
10	(Describe the service area) current and projected population . . . The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier . . .	10631(a)	System Description	Provide the most recent population data possible. Use the method described in “Baseline Daily Per Capita Water Use.” See Section M.	Section 2.6
11	. . . (population projections) shall be in five-year increments to 20 years or as far as data is available.	10631(a)	System Description	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.6
12	Describe . . . other demographic factors affecting the supplier's water management planning	10631(a)	System Description		Section 2.6
13	Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).	10631(b)	System Supplies	The ‘existing’ water sources should be for the same year as the “current population” in line 10. 2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 4.1 Section 4.2 Section 4.3 Section 4.4 Section 4.5 Section 4.6 Section 4.7
14	(Is) groundwater . . . identified as an existing or planned source of water available to the supplier . . .?	10631(b)	System Supplies	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
15	(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management. Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)	System Supplies		Section 4.2.1
16	(Provide a) description of any groundwater basin or basins from which the urban water supplier pumps groundwater.	10631(b)(2)	System Supplies		Section 4.2.1
17	For those basins for which a court or the board has adjudicated the rights to pump groundwater, (provide) a copy of the order or decree adopted by the court or the board	10631(b)(2)	System Supplies		Section 4.2.1
18	(Provide) a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.	10631(b)(2)	System Supplies		Not applicable (not adjudicated)
19	For basins that have not been adjudicated, (provide) information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.	10631(b)(2)	System Supplies		Section 4.2.1
20	(Provide a) detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(3)	System Supplies		Section 4.2.3
21	(Provide a) detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.	10631(b)(4)	System Supplies	Provide projections for 2015, 2020, 2025, and 2030.	Section 4.2.3

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following: (A) An average water year, (B) A single dry water year, (C) Multiple dry water years.	10631(c)(1)	Water Supply Reliability		Section 5.1
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)	Water Supply Reliability		Section 5.1
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)	System Supplies		Section 4.3
25	Quantify, to the extent records are available, past and current water use, and projected water use (over the same five-year increments described in subdivision (a)), identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses: (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof;(I) Agricultural.	10631(e)(1)	System Demands	Consider “past” to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.2.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
26	(Describe and provide a schedule of implementation for) each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following: (A) Water survey programs for single-family residential and multifamily residential customers; (B) Residential plumbing retrofit; (C) System water audits, leak detection, and repair; (D) Metering with commodity rates for all new connections and retrofit of existing connections; (E) Large landscape conservation programs and incentives; (F) High-efficiency washing machine rebate programs; (G) Public information programs; (H) School education programs; (I) Conservation programs for commercial, industrial, and institutional accounts; (J) Wholesale agency programs; (K) Conservation pricing; (L) Water conservation coordinator; (M) Water waste prohibition;(N) Residential ultra-low-flush toilet replacement programs.	10631(f)(1)	DMMs	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.2 Section 6.3 Section 6.4 Appendix O
27	A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.	10631(f)(3)	DMMs		Section 6.2.2
28	An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.	10631(f)(4)	DMMs		Section 6.2 Section 6.3 Section 6.4

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
29	An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following: (1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors; (2) Include a cost-benefit analysis, identifying total benefits and total costs; (3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost; (4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.	10631(g)	DMMs	See 10631(g) for additional wording.	Section 6.4
30	(Describe) all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.	10631(h)	System Supplies		Section 4.7
31	Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.	10631(i)	System Supplies		Section 4.4

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
32	Include the annual reports submitted to meet the Section 6.2 requirement (of the MOU), if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	DMMs	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Not applicable
33	Urban water suppliers that rely upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).	10631(k)	System Demands	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Section 3.3
34	The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)	System Demands		Section 3.2.3
35	Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.	10632(a)	Water Supply Reliability		Section 5.4
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)	Water Supply Reliability		Section 5.1
37	(Identify) actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)	Water Supply Reliability		Section 5.4.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
38	(Identify) additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)	Water Supply Reliability		Section 5.4.5
39	(Specify) consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)	Water Supply Reliability		Section 5.4.5
40	(Indicated) penalties or charges for excessive use, where applicable.	10632(f)	Water Supply Reliability		Section 5.4.5
41	An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)	Water Supply Reliability		Section 5.4.6
42	(Provide) a draft water shortage contingency resolution or ordinance.	10632(h)	Water Supply Reliability		Section 5.4.4
43	(Indicate) a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)	Water Supply Reliability		Section 5.4.5
44	Provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area	10633	System Supplies		Section 4.5
45	(Describe) the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)	System Supplies		Section 4.5.2
46	(Describe) the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)	System Supplies		Section 4.5.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
47	(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)	System Supplies		Section 4.5.5
48	(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)	System Supplies		Section 4.5.5
49	(Describe) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.	10633(e)	System Supplies		Section 4.5.4
50	(Describe the) actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)	System Supplies		Section 4.5.5
51	(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)	System Supplies		Section 4.5.1
52	The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.	10634	Water Supply Reliability	For years 2010, 2015, 2020, 2025, and 2030	Section 5.2

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
53	Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)	Water Supply Reliability		Section 5.3
54	The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.	10635(b)	Plan Preparation		Section 1.4 Appendix B
55	Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642	Plan Preparation		Section 1.4 Appendix B
56	Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area.	10642	Plan Preparation		Section 1.4 Appendix B
57	After the hearing, the plan shall be adopted as prepared or as modified after the hearing.	10642	Plan Preparation		Section 1.4 Appendix B
58	An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.	10643	Plan Preparation		Section 1.4 Appendix B

No.	UWMP requirement [a]	Calif. Water Code reference	Subject [b]	Additional clarification	UWMP location
59	An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.	10644(a)	Plan Preparation		City to provide
60	Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.	10645	Plan Preparation		City to provide

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Appendix B: Notice of Preparation and Resolution to Set Time and Place of Public Hearing on Adoption of UWMP, Public Hearing Notice and Resolution to Adopt the Urban Water Management Plan

CITY OF DALY CITY

Department of Water and Wastewater Resources
153 Lake Merced Boulevard
Daly City, CA 94015
(650) 991-8200
Fax (650) 991-8220

Patrick Sweetland, Director

January 12, 2011

BAWSCA
155 Bovet Road, Suite 302
San Mateo, CA 94404

Subject: Notice of Preparation of Urban Management Plan

Dear

The Urban Water Management Plan Act requires the City of Daly City to update its Urban Water Management Plan by June 30, 2011. We are reviewing our current Plan, which was last updated in 2005, and will be considering revisions to it.

We will make proposed revisions to our Plan available for public review and will hold a public hearing later this year. In the meantime, if you have any questions about our Plan, or the process for updating it, please contact:

Cynthia Royer
Manager of Technical Services
Department of Water and Wastewater Resources
153 Lake Merced Boulevard
Daly City, CA 94015
Tel: 650-991-8203
Fax: 650-991-8220
E-mail: croyer@dalycity.org

Sincerely,

Cynthia Royer
Manager of Technical Services

CR:az
L11-007

RESOLUTION NO. 11-56

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DALY CITY SETTING TIME AND PLACE OF PUBLIC HEARING ON ADOPTION OF URBAN WATER MANAGEMENT PLAN, 2010/2011 FOR THE CITY OF DALY CITY

WHEREAS, pursuant to the provisions of the California Urban Water Management Planning Act, the City of Daly City, an agency that provides water to more than 3,000 urban customers per year, is required to adopt an Urban Water Management Plan every five years; and

WHEREAS, in accordance with the provisions of said code, the legislative body is directed to conduct a public hearing on the proposed Urban Water Management Plan and make the proposed Plan available for public inspection prior to its adoption.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Daly City does hereby set the 13th day of June, 2011, at the hour of 7 P.M., in the Daly City Council Chambers located at City Hall, 333-90th Street, Daly City, California, as the time and place for hearing on adoption of said proposed Urban Water Management Plan, 2010/2011, for the City of Daly City.

BE IT FURTHER RESOLVED that the City Clerk's Office shall publish a notice of said hearing and of the filing of said report once a week for two successive weeks, with at least five days intervening between the respective publication dates, prior to the time and date set for hearing, in a newspaper of general circulation printed and published within the County within which the Water Service Area is located.

BE IT FURTHER RESOLVED that a copy of the proposed Urban Water Management Plan shall be available for public inspection in the City Clerk's Office, Westlake Library, Serramonte Library and the Department of Water and Wastewater Resources, during regular working hours.

I hereby certify the foregoing to be a true copy of a Resolution adopted by the City Council of Daly City, California, at a regular meeting thereof held on the 9th day of May, 2011, by the following vote of the members thereof:

AYES, and in favor thereof, Councilmembers: Buenaventura, Canepa, Guingona Torres, Klatt

NOES, Councilmembers: None

Absent, Councilmembers: None

K. Annette Pigoni
CITY CLERK OF THE CITY OF DALY CITY

APPROVED:

CAROL L. KLATT
MAYOR OF THE CITY OF DALY CITY

UWMP Distribution Lists

Draft UWMP Distribution List
San Francisco Public Utilities Commission (SFPUC)
Bay Area Water Supply and Conservation Agency (BAWSCA)
Alameda County Water District
City of Brisbane
City of Burlingame
Cal Water Service Co.
Coastside County Water District
City of Daly City
East Palo Alto
Estero Municipal Improvement District
Guadalupe Valley Municipal Improvement District
City of Hayward
Town of Hillsborough
City of Menlo Park
Mid-Peninsula Water District
City of Millbrae
City of Milpitas
City of Mountain View
North Coast County Water District
City of Palo Alto
Purissima Hills Water District
City of Redwood City
City of San Bruno
City of San Jose
City of Santa Clara
Stanford University
City of Sunnyvale
Westborough Water District
Tuolumne River Trust
General public (via Daly City's website)

Distribution of Final UWMP Hard Copies
San Francisco Public Utilities Commission (SFPUC)
Bay Area Water Supply and Conservation Agency (BAWSCA)
City of Daly City Public Works Department
State Library
California Department of Water Resources (DWR)

RESOLUTION NO. 11-78

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DALY CITY ADOPTING THE URBAN WATER MANAGEMENT PLAN 2010/2011 FOR THE CITY OF DALY CITY AND AUTHORIZING SUBMITTAL THEREOF TO THE CALIFORNIA DEPARTMENT OF WATER RESOURCES

A. The Urban Water Management Planning Act requires water utilities to submit urban water management plans every five years to the California Department of Water Resources.

B. An updated Urban Water Management Plan has been prepared and submitted to the City Council for consideration and adoption.

C. As part of the adoption process, the City Council held a public hearing on the Daly City Urban Water Management Plan 2010/2011 on June 13, 2011. A copy of the Plan has been available for public review at City Hall, at all Daly City libraries, and at the Department of Water and Wastewater Resources.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Daly City that it does hereby adopt the 2010/2011 Update to the Daly City Urban Water Management Plan and authorizes City staff to submit the Plan to the California Department of Water Resources.

I hereby certify the foregoing to be a true copy of a Resolution adopted by the City Council of Daly City, California, at a regular meeting thereof held on the 13th day of June, 2011, by the following vote of the members thereof:

AYES, and in favor thereof, Councilmembers: Buenaventura, Canepa, Guingona, Torres

NOES, Councilmembers: None

Absent, Councilmembers: Klatt

K. Annette Hipona
CITY CLERK OF THE CITY OF DALY CITY

APPROVED:

SAL TORRES
VICE MAYOR OF THE CITY OF DALY CITY

Appendix C: 2009 Water Supply Agreement Between the City and County of San Francisco and Wholesale Customers in Alameda, San Mateo and Santa Clara Counties

Cover Sheet

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Website to access full report:

http://sfwater.org/wholesale/detailPage.cfm?c_id=3092

WATER SUPPLY AGREEMENT

between

THE CITY AND COUNTY OF SAN FRANCISCO

and

WHOLESALE CUSTOMERS
in
ALAMEDA COUNTY, SAN MATEO COUNTY AND SANTA CLARA COUNTY

JULY 2009

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Appendix D: Letter Dated March 31, 2011 from Paula Kehoe, SFPUC, to Nicole Sandkulla, BAWSCA from SFPUC Supply Cutbacks During Single and Multiple Year Droughts

SFPUC
WATER
WASTEWATER
POWER

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

1145 Market St., 4th Floor, San Francisco, CA 94103 • Tel. (415) 554-3271 • Fax (415) 554-3161 • TTY (415) 934-5770

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ART TORRES
COMMISSIONER

VINCE COURTNEY
COMMISSIONER

ED HARRINGTON
GENERAL MANAGER

March 31, 2011

Nicole Sandkulla
Senior Water Resources Engineer
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

Dear Nicole,

Attached please find additional information through 2035 on the Regional Water System's supply reliability for use in the Wholesale Customer's 2010 Urban Water Management Plan updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected Single dry-year supply for 2010
- Projected Multiple dry-year supply beginning 2010; and
- Projected supply reliability for years 2010-2035.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry-year supply for 2010 and projected multiple dry-year supply beginning 2010.

With regards to future demands, the SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by 2035.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan ("Plan") was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2010 though 2035. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrologic period 1920 through 2002. The results of this analysis are summarized in Table 3.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1
Projected Deliveries for Three Multiple Dry Years

	2010	One Critical Dry Year	Deliveries during Multiple Dry Years in mgd		
			Year 1	Year 2	Year 3
System-Wide Shortage in Percent	0%	10%	10%	20%	20%
Wholesale Allocation (mgd)	184.0	152.6	152.6	132.5	132.5

Table 2

UWMP Studies: Water Supply Reliability **Water Supply Options for Years 2010 through 2030**						
	2010	2015	2020	2025	2030	2035
Crystal Springs Reservoir (20.28bg)		x	x	x	x	x
Westside Basin Groundwater afa		8,100	8,100	8,100	8,100	8,100
Calaveras Reservoir Recovery (31.5 bg)		x	x	x	x	x
Districts' Transfer afa		2240	2240	2240	2240	2240

Table 3: Projected System Supply Reliability Based on Historical Hydrologic Period

Allocation by Year	Wholesale Demand in mgd					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation in mgd					
Delivery for Fiscal Year	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
1920	184.0	184.0	184.0	184.0	184.0	184.0
1921	184.0	184.0	184.0	184.0	184.0	184.0
1922	184.0	184.0	184.0	184.0	184.0	184.0
1923	184.0	184.0	184.0	184.0	184.0	184.0
1924	184.0	184.0	184.0	184.0	184.0	184.0
1925	154.6	184.0	184.0	184.0	184.0	184.0
1926	184.0	184.0	184.0	184.0	184.0	184.0
1927	184.0	184.0	184.0	184.0	184.0	184.0
1928	184.0	184.0	184.0	184.0	184.0	184.0
1929	184.0	184.0	184.0	184.0	184.0	184.0
1930	184.0	184.0	184.0	184.0	184.0	184.0
1931	184.0	184.0	184.0	184.0	184.0	184.0
1932	132.5	152.6	152.6	152.6	152.6	152.6
1933	184.0	184.0	184.0	184.0	184.0	184.0
1934	184.0	184.0	184.0	184.0	184.0	184.0
1935	154.6	184.0	184.0	184.0	184.0	184.0
1936	184.0	184.0	184.0	184.0	184.0	184.0
1937	184.0	184.0	184.0	184.0	184.0	184.0
1938	184.0	184.0	184.0	184.0	184.0	184.0
1939	184.0	184.0	184.0	184.0	184.0	184.0
1940	184.0	184.0	184.0	184.0	184.0	184.0
1941	184.0	184.0	184.0	184.0	184.0	184.0
1942	184.0	184.0	184.0	184.0	184.0	184.0
1943	184.0	184.0	184.0	184.0	184.0	184.0
1944	184.0	184.0	184.0	184.0	184.0	184.0
1945	184.0	184.0	184.0	184.0	184.0	184.0
1946	184.0	184.0	184.0	184.0	184.0	184.0
1947	184.0	184.0	184.0	184.0	184.0	184.0
1948	184.0	184.0	184.0	184.0	184.0	184.0
1949	184.0	184.0	184.0	184.0	184.0	184.0
1950	184.0	184.0	184.0	184.0	184.0	184.0
1951	184.0	184.0	184.0	184.0	184.0	184.0
1952	184.0	184.0	184.0	184.0	184.0	184.0
1953	184.0	184.0	184.0	184.0	184.0	184.0
1954	184.0	184.0	184.0	184.0	184.0	184.0
1955	184.0	184.0	184.0	184.0	184.0	184.0
1956	184.0	184.0	184.0	184.0	184.0	184.0
1957	184.0	184.0	184.0	184.0	184.0	184.0
1958	184.0	184.0	184.0	184.0	184.0	184.0
1959	184.0	184.0	184.0	184.0	184.0	184.0

Delivery for Fiscal Year	2010	2015	2020	2025	2030	2035
1960	184.0	184.0	184.0	184.0	184.0	184.0
1961	152.6	184.0	184.0	184.0	184.0	184.0
1962	132.5	152.6	152.6	152.6	152.6	152.6
1963	184.0	184.0	184.0	184.0	184.0	184.0
1964	184.0	184.0	184.0	184.0	184.0	184.0
1965	184.0	184.0	184.0	184.0	184.0	184.0
1966	184.0	184.0	184.0	184.0	184.0	184.0
1967	184.0	184.0	184.0	184.0	184.0	184.0
1968	184.0	184.0	184.0	184.0	184.0	184.0
1969	184.0	184.0	184.0	184.0	184.0	184.0
1970	184.0	184.0	184.0	184.0	184.0	184.0
1971	184.0	184.0	184.0	184.0	184.0	184.0
1972	184.0	184.0	184.0	184.0	184.0	184.0
1973	184.0	184.0	184.0	184.0	184.0	184.0
1974	184.0	184.0	184.0	184.0	184.0	184.0
1975	184.0	184.0	184.0	184.0	184.0	184.0
1976	184.0	184.0	184.0	184.0	184.0	184.0
1977	152.6	184.0	184.0	184.0	184.0	184.0
1978	136.2	152.6	152.6	152.6	152.6	152.6
1979	184.0	184.0	184.0	184.0	184.0	184.0
1980	184.0	184.0	184.0	184.0	184.0	184.0
1981	184.0	184.0	184.0	184.0	184.0	184.0
1982	184.0	184.0	184.0	184.0	184.0	184.0
1983	184.0	184.0	184.0	184.0	184.0	184.0
1984	184.0	184.0	184.0	184.0	184.0	184.0
1985	184.0	184.0	184.0	184.0	184.0	184.0
1986	184.0	184.0	184.0	184.0	184.0	184.0
1987	184.0	184.0	184.0	184.0	184.0	184.0
1988	152.6	184.0	184.0	184.0	184.0	184.0
1989	132.5	152.6	152.6	152.6	152.6	152.6
1990	132.5	152.6	152.6	152.6	152.6	152.6
1991	132.5	132.5	132.5	132.5	132.5	132.5
1992	132.5	152.6	152.6	152.6	152.6	152.6
1993	136.2	132.5	132.5	132.5	132.5	132.5
1994	184.0	184.0	184.0	184.0	184.0	184.0
1995	154.6	184.0	184.0	184.0	184.0	184.0
1996	184.0	184.0	184.0	184.0	184.0	184.0
1997	184.0	184.0	184.0	184.0	184.0	184.0
1998	184.0	184.0	184.0	184.0	184.0	184.0
1999	184.0	184.0	184.0	184.0	184.0	184.0
2000	184.0	184.0	184.0	184.0	184.0	184.0
2001	184.0	184.0	184.0	184.0	184.0	184.0
2002	184.0	184.0	184.0	184.0	184.0	184.0

Appendix E: WSIP Quarterly Report

WSIP Quarterly Report: Q2-FY2010-2011

5. PROJECT PERFORMANCE SUMMARY*

All costs are shown in $1,000s as of 12/25/10

Project Name	Active Phase(s) (**)	2005 Baseline Budget (a)	2009 Approved Budget (b)	Q2/FY10-11 Forecasted Cost (c)	Expenditures To Date (d)	Cost Variance (e= b - c)	Cost Status (+)	2005 Baseline Completion (f)	2009 Approved Completion (g)	Q2/FY10-11 Forecasted Completion (h)	Schedule Variance (i = g - h)	Schedule Status (+)	Project Data Sheet
San Joaquin Region													
CUW36401 - Lawrence Livermore Water Quality Improvement	CN	$ 4,235	$ 3,900	$ 4,400	$ 3,942	($499)	●	11/07/11	12/21/10	12/19/11	12.1 mo. Late	●	See Section 6
CUW37301 - San Joaquin Pipeline System	DS, BA, CN	$ 352,732	$ 278,055	$ 224,478	$ 44,276	$ 53,578	★	03/25/14	03/25/14	03/25/14	-	★	See Appendix D
CUW37302 - Rehabilitation of Existing San Joaquin Pipelines	PL, DS, CN	$ 80,000	$ 31,852	$ 31,852	$ 18,678	-	★	06/30/14	06/30/14	06/30/14	-	★	See Appendix D
CUW38401 - Tesla Treatment Facility	CN	$ 101,643	$ 114,162	$ 111,410	$ 89,619	$ 2,752	★	07/01/11	03/30/12	05/07/12	1.3 mo. Late	⚠	See Section 6
Sunol Valley Region													
CUW35201 - Upper Alameda Creek Filter Gallery	DS	$ 18,809	$ 21,855	$ 44,244	$ 2,800	($22,388)	●	05/25/12	08/22/14	11/30/15	15.5 mo. Late	●	See Section 6
CUW35901 - New Irvington Tunnel	CN	$ 214,650	$ 337,704	$ 319,980	$ 46,407	$ 17,724	★	09/17/13	12/16/13	10/31/14	10.6 mo. Late	●	See Section 6
CUW35902 - Alameda Siphon #4	CN	$ 78,577	$ 60,881	$ 62,497	$ 46,883	($1,616)	⚠	04/14/11	06/12/12	06/12/12	-	★	See Section 6
CUW37401 - Calaveras Dam Replacement	DS	$ 256,511	$ 409,445	$ 434,143	$ 43,602	($24,698)	⚠	05/25/12	12/04/15	12/04/15	-	★	See Section 6
CUW37403 - San Antonio Backup Pipeline	DS	$ 7,677	$ 39,203	$ 52,041	$ 6,802	($12,838)	●	06/29/12	12/31/13	10/30/14	10.1 mo. Late	●	See Section 6
CUW38101 - SVWTP Expansion & Treated Water Reservoir	CN	$ 133,108	$ 144,872	$ 126,828	$ 37,774	$ 18,044	★	07/09/13	07/09/13	12/05/13	5.0 mo. Late	⚠	See Section 6
CUW38601 - San Antonio Pump Station Upgrade	CN	$ 41,854	$ 14,713	$ 13,898	$ 11,212	$ 815	★	12/12/11	12/07/11	02/02/12	1.9 mo. Late	⚠	See Section 6

* Exclude projects with completed construction and projects that are no longer active (i.e., deleted projects, closed projects, and projects combined with other projects)

**** Phase Status Legend**

PL Planning | DS Design | BA Bid & Award
CN Construction | CL Close-Out

+ Cost and Schedule Status

★ Meets Requirements: Forecasted Cost/Schedule is within Approved Budget/Schedule.

⚠ Need Attention: Forecasted Cost is over Approved Budget by greater than $50K and less than 10%. Or Forecasted Schedule is over Approved Schedule by greater than 1 month and less than 6 month and less than 10%.

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All costs are shown in $1,000s as of 12/25/10

Project Name	Active Phase(s) (**)	2005 Baseline Budget (a)	2009 Approved Budget (b)	Q2/FY10-11 Forecasted Cost (c)	Expenditures To Date (d)	Cost Variance (e= b - c)	Cost Status (+)	2005 Baseline Completion (f)	2009 Approved Completion (g)	Q2/FY10-11 Forecasted Completion (h)	Schedule Variance (i = g - h)	Schedule Status (+)	Project Data Sheet
Bay Division Region													
CUW35302 - Seismic Upgrade of BDPL Nos. 3 & 4	DS	$ 66,793	$ 85,193	$ 96,052	$ 10,221	($10,859)	●	10/15/12	12/18/14	02/25/15	2.3 mo. Late	⚠	See Section 6
CUW36301 - SCADA System - Phase II	CN	$ 36,099	$ 18,233	$ 10,694	$ 7,830	$ 7,538	★	02/24/12	02/24/12	02/24/12	-	★	See Appendix D
CUW36302 - System Security Upgrades	DS, BA, CN		$ 9,380	$ 9,180	$ 3,587	$ 200	★		02/24/12	11/03/15	44.9 mo. Late	●	See Section 6
CUW36801 - BDPL Reliability Upgrade - Tunnel	CN	$ 572,023	$ 346,660	$ 313,129	$ 61,076	$ 33,531	★	01/31/14	08/14/15	08/14/15	-	★	See Appendix D
CUW36802 - BDPL Reliability Upgrade - Pipeline	CN		$ 250,629	$ 207,051	$ 113,281	$ 43,579	★		03/05/13	03/05/13	-	★	See Appendix D
CUW38001 - BDPL Nos. 3 & 4 Crossovers	CN	$ 36,617	$ 33,944	$ 34,789	$ 14,851	($844)	⚠	04/24/13	09/16/13	09/16/13	-	★	See Section 6
Peninsula Region													
CUW35401 - Lower Crystal Springs Dam Improvements	BA	$ 27,752	$ 36,253	$ 34,676	$ 10,848	$ 1,577	★	08/16/11	06/13/12	06/13/12	-	★	See Appendix D
CUW35601 - New Crystal Springs Bypass Tunnel	CN	$ 83,223	$ 94,609	$ 85,999	$ 74,811	$ 8,610	★	10/28/10	03/12/12	03/06/12	<1 mo. Early	★	See Appendix D
CUW36103 - Pulgas Balancing - Structural Rehabilitation and Roof Replacement	CN	$ 36,713	$ 21,247	$ 21,003	$ 10,763	$ 244	★	01/29/13	02/09/12	02/09/12	-	★	See Appendix D
CUW36105 - Pulgas Balancing - Modifications of the Existing Dechloramination Facility	CN		$ 6,158	$ 5,699	$ 2,350	$ 459	★		05/30/12	05/30/12	-	★	See Appendix D
CUW36701 - HTWTP Long-Term Improvements	BA	$ 167,570	$ 359,063	$ 310,864	$ 30,607	$ 48,199	★	04/08/14	06/12/14	11/20/15	17.5 mo. Late	●	See Section 6
CUW36702 - Peninsula Pipelines Seismic Upgrade	PL		$ 15,000	$ 17,017	$ 1,268	($2,017)	●		12/18/14	08/31/15	8.5 mo. Late	●	See Section 6
CUW37101 - Crystal Springs/San Andreas Transmission Upgrade	CN	$ 148,583	$ 192,071	$ 167,493	$ 23,014	$ 24,578	★	04/01/14	04/01/14	04/01/14	-	★	See Appendix D

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Project Name	Active Phase(s) (**)	2005 Baseline Budget (a)	2009 Approved Budget (b)	Q2/FY10-11 Forecasted Cost (c)	Expenditures To Date (d)	Cost Variance (e= b - c)	Cost Status (+)	2005 Baseline Completion (f)	2009 Approved Completion (g)	Q2/FY10-11 Forecasted Completion (h)	Schedule Variance (i = g - h)	Schedule Status (+)	Project Data Sheet
Peninsula Region (cont'd)													
CUW37801 - Crystal Springs Pipeline No. 2 Replacement	BA	$ 93,926	$ 71,243	$ 58,702	$ 10,606	$ 12,542	★	04/27/12	07/18/13	07/18/13	-	★	See Appendix D
CUW37901 - San Andreas Pipeline No. 3 Installation	CN	$ 42,030	$ 31,903	$ 30,705	$ 25,565	$ 1,198	★	06/09/11	05/25/12	10/03/11	7.8 mo. Early	★	See Appendix D
CUW39101 - Baden and San Pedro Valve Lots Improvements	CN	$ 47,320	$ 27,090	$ 26,881	$ 21,795	$ 209	★	10/12/11	08/24/11	08/24/11	-	★	See Appendix D
San Francisco Regional Region													
CUW30103 - Regional Groundwater Storage and Recovery	DS	$ 39,233	$ 49,849	$ 63,128	$ 9,203	($13,279)	●	02/27/14	09/08/14	11/30/15	14.9 mo. Late	●	See Section 6
CUW37201 - University Mound Reservoir - North Basin	CN	$ 102,883	$ 46,147	$ 43,842	$ 36,300	$ 2,305	★	03/10/11	12/02/11	12/02/11	-	★	See Appendix D
System-Wide Region													
CUW38802 - Habitat Reserve Program	DS, BA, CN		$ 48,146	$ 78,483	$ 9,845	($30,337)	●		08/24/11	12/04/15	52.1 mo. Late	●	See Section 6
CUW39401 - Watershed Environmental Improvement Program	PL	$ 20,000	$ 20,000	$ 20,000	$ 544	-	★	06/28/13	06/28/13	06/27/14	12.1 mo. Late	●	See Section 6

* Exclude projects with completed construction and projects that are no longer active (i.e., deleted projects, closed projects, and projects combined with other projects)

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PL Planning DS Design BA Bid & Award

CN Construction CL Close-Out

+ Cost and Schedule Status

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● Exceeds Limits: Forecasted Cost is over Approved Budget by 10% or more. Or Forecasted Schedule is over Approved Schedule by greater than 6 month or 10% or more.

6. PROJECTS NOT WITHIN BUDGET AND/OR SCHEDULE

CUW36401 - Lawrence Livermore Water Quality Improvement

Project Description: The project includes new ultraviolet (UV) disinfection facilities, piping and pumps for water served to the Lawrence Livermore National Laboratory from Thomas Shaft of the Coast Range Tunnel.

Region: San Joaquin	**Project Status:** Construction	**Environmental Status:** Completed (EIR)

Project Cost:			**Project Schedule:**		
Approved		$3.90 M	Approved Feb-04		Dec-10
Forecast*		$4.40 M	Forecast* Feb-04		Dec-11
Actual		$4.00 M	Project Percent Complete: 89.7%		

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction+ Final Completion
Current Forecast	12/18/08✓	04/09/09✓	08/26/09✓	01/21/11

+ Construction final completion shown above is for Construction Contract WD-2597. However, overall construction phase includes system security installation and integration with completion anticipated in June 2011.

Progress and Status:

Contract substantial completion was achieved on August 31, 2010. Work towards final completion was performed this quarter, leaving only a minor shaft cover installation, demobilization, and final payment/administrative closeout to complete early next quarter.

Issues and Challenges:

Construction contract final completion is anticipated mid-January 2011 with no remaining issues or challenges to resolve prior to Commission acceptance. Approved, pending and potential change orders to date amount to just over 13% of the original contract amount. The completion of the project's Construction phase is currently driven by security system activities which are forecasted to finish in the coming summer. This pushes out the overall project's final close-out date to December 2011.

Lawrence Livermore - Deep Well Pumps

CUW38401 - Tesla Treatment Facility

Project Description: The project includes a new ultra-violet (UV) disinfection facility; chemical storage and feed facilities; office, laboratory, and control facilities; piping and valves; and emergency engine generators to provide treatment of Hetch Hetchy flow in response to the USEPA's Long-Term 2 Enhanced Surface Water Treatment Rule.

Region: San Joaquin	**Project Status:** Construction	**Environmental Status:** Completed (EIR)

Project Cost:		**Project Schedule:**	
Approved	$114.16 M	Approved Jul-02	Mar-12
Forecast*	$111.41 M	Forecast* Jul-02	Sep-12
Actual	$89.62 M	Project Percent Complete: 85.6%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	12/18/08✓	04/08/08✓	03/31/09✓	06/28/12

Progress and Status:

The construction for Tesla Treatment Facility is at 90% complete as of the reporting date and progressing on schedule and still expecting a final completion date before the contractual date. It is because of this final completion contract date that the project schedule is forecast to complete after the approved schedule. Work continued on the UV, Chemical and Operations Buildings piping and electrical work, finishes and equipment installation. Site work progressed with placement of landscape berms, installation of irrigation piping, subgrade preparation, curbs, gutters and base placement, installation of new microwave tower. Installation of sample pumps and piping, rough electrical, valve actuator installation was performed in the new SJPL valves vault. Rough piping and electrical continued at the Chemical Injection Yard. Design of portal protection upgrades progressed to 95% completion.

1 of 12 UV reactor branches at Tesla

Issues and Challenges:

One of the major challenges with this work has been the redesign of the plant's power service equipment to protect against potential short circuit scenarios. As a result, the construction substantial completion date has slipped due to long lead times for new primary service equipment and coordination of this work with PG&E. Inspite of this delay, the forecast for construction substantial completion remains earlier than that required by the contract.

CUW35201 - Upper Alameda Creek Filter Gallery

Project Description: The project includes an in-stream infiltration gallery, potential treatment of the captured water, pump station, and piping to convey water that is recaptured from upstream releases for fisheries habitat enhancement to existing storage sites in the Sunol Valley.

Region: Sunol Valley	**Project Status:** Design	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$21.86 M	Approved Sep-03	Aug-14
Forecast*	$44.24 M	Forecast* Sep-03	Nov-15
Actual	$2.80 M	Project Percent Complete: 12.0%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	12/19/13	04/07/14	09/17/14	09/16/15

Progress and Status:

The design phase of the project was initiated with the start of the early design activities which include installation of boreholes and monitoring wells, ground surveys and water quality studies. The project team negotiated and finalized a contract in December 2010 with a specialty consultant to start the conceptual design of the restoration component. Drilling for the boreholes was completed in mid October 2010. The drilling and installation of monitoring wells is scheduled around February 2011 when the groundwater levels are stabilized in the area after the winter rains. SFPUC survey crew has completed about 75% percent of the field survey for delineation of the project boundary. Water quality studies including the source water quality assessment, watershed sanitary survey and required ongoing water quality monitoring are being conducted by the Water Quality Division beginning next quarter. The environmental phase continues to make progress with the completion of the biological surveys and preliminary draft Notice of Preparation.

Issues and Challenges:

* Confirmation of the design flows: Project team is working with the Water Enterprise Division to confirm the design flows as well as the operational criteria for the filter gallery. Water Enterprise needs to complete the groundwater and surface water modeling to confirm these flows and establish an operation criteria for the filter gallery.

* Confirmation of the project description: The sizing of the facilities will be required to confirm the project footprint and the eventual project description for the EIR. The sizing of the facilities will be confirmed after the confirmation of design flows.

Sample of Stainless Screen Wire-Wrapped Well Screen for Filter Galleries

* Procurement of design consultant: A specialty consultant is required for the design of some of the project components including the filter galleries and restoration component due to the complexity of the components. The project team is working toward finalizing the scope of the design in order to start the consultant procurement process.

* Project Schedule: The Schedule for the overall completion of this project is impacted due to additional time required to finalize the design flows and operational criteria for the filter galleries. Project team is working closely with Water Enterprise to confirm the design flows and operational criteria for the filter galleries.

CUW35901 - New Irvington Tunnel

Project Description: The project includes a new tunnel that is parallel to and just south of the existing Irvington Tunnel, and provides the ability to take the existing tunnel out of service for maintenance. The new tunnel has a minimum diameter of 8.5 feet and is approximately 3.5 miles long.

Region: Sunol Valley	**Project Status:** Construction	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$337.70 M	Approved Dec-01	Dec-13
Forecast*	$319.98 M	Forecast* Dec-01	Oct-14
Actual	$46.41 M	Project Percent Complete: 16.0%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid+ Advertisement**	**Construction+ NTP**	**Construction+ Final Completion**
Current Forecast	11/05/09✓	01/13/10✓	07/22/10✓ 08/26/10✓ 09/07/10✓	06/15/14

+ Construction contract includes multiple NTPs.

Progress and Status:

Construction is underway and is 5.4% complete. At the Alameda West Portal site, Southland/Tutor Perini JV finished clearing and grubbing, removal and stockpiling of topsoil, base rocked the new access roadway between Calaveras Road and the existing bridge across Alameda Creek, rebuilt the existing bridge for equipment access, started excavations at the new tunnel portal and the adjacent Staging Area B, started installation of the access road and pad for the construction of the new tunnel overflow shaft, and prepared the Spoils Fill Sites to receive excess material from the upcoming excavation for the new tunnel and from the excavation of Vargas Shaft.

At the Vargas Road site, near Highway I-680, the Contractor completed clearing and grubbing, removal and stockpiling of topsoil, grading of the site area around the Vargas Shaft and the Vargas staging area. The Contractor has also started installation of secant pile for the Vargas Shaft and has completed over half of the piles to date. Due to weak ground conditions, the secant piles are being drilled down to 115 feet for the Shaft instead of 45 feet as designed.

Upcoming work include the completion of secant piles for Vargas Shaft, installation of sound barriers at Vargas Road and Irvington Portal prior to loud-noise construction activities, the arrival and assembly of the roadheader tunneling machines, and the start of new tunnel excavation by February 2011.

The baseline (approved) schedule for this project was not changed on the June 2009 Revised WSIP. The delay in schedule was due to unanticipated time to acquire environmental permits, and the acquisition of temporary construction easements through eminent domain.

Issues and Challenges:

The drilling of secant piles for Vargas Shaft have encountered a potential changed site condition due to weaker than anticipated ground at depth. The secant piles are being drilled down to a depth of 115 feet instead of the originally designed 45 feet. Although the longer piles has taken longer to finish, the shaft lining will be in place and the Contractor will not have to place rock bolts, shotcrete and pre-excavation grouting as per the original design.

Construction of the access road and pad for the overflow shaft for the new tunnel has been a challenge. The topographical maps used for the design were not accurate, resulting in field changes to the pad, and extensions of the soil nail walls necessary to create a stable grade for the pad in its steep hillside location.

Groundwater inflows into the tunnel excavation must be dewatered and well managed to keep the work safe, while mitigating the adverse effects on groundwater well supplies for local residents.

Two winter season water system shutdowns are required during which the critical connections between the new tunnel and four large existing pipelines must be completed.

CUW35902 - Alameda Siphon #4

Project Description: The project includes: a seismically reliable, fourth siphon across Alameda Creek consisting of approximately 3,000 feet of new 66-inch diameter pipe; a water quality blending structure; new isolation and throttling valves; new overflow piping and ventilation improvements for the Alameda East Portal; and road improvements at the intersection of Calaveras Road.

Region: Sunol Valley	**Project Status:** Construction	**Environmental Status:** Completed (MND)

Project Cost:		**Project Schedule:**	
Approved	$60.88 M	Approved Dec-01	Jun-12
Forecast*	$62.50 M	Forecast* Dec-01	Jun-12
Actual	$46.88 M	Project Percent Complete: 81.6%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	05/08/08✓	03/23/09✓	08/26/09✓	12/30/11

Progress and Status:

The Alameda Siphon No. 4 project construction is approximately 75% complete. The micro-tunneling boring machine that broke down half way underneath Alameda Creek was retrieved and repaired. Micro-tunneling re-commenced and was completed in early November. As requested, the Department of Fish & Game extended their October 15th permit deadline for all work to be completed in the creek to November 30th to afford more time to backfill the emergency micro-tunnel machine rescue pit and restore the creek channel. The Siphon No. 4 and overflow pipelines were completed and dished heads installed on the ends of the pipes for hydrostatic pressure testing. The shutdown of existing Siphons No. 1 and No. 3 is underway. New pipe for Siphons No. 1 and No. 3 were installed for the mixing manifold and flowmeter vaults. The concrete footing was poured for the Mixing Chamber Valve Control Building. Soil nail wall construction to stabilize the hillside for a new access road to Alameda East Portal from the east side of Calaveras Road has started. Upcoming major activities are the hydrostatic testing of the Siphons No. 4 and overflow pipelines, completion of welded steel joints and earth backfill for new Siphons No. 1 and No. 3 pipelines at the mixing manifold, completion of the siphons shutdown, completion of the Mixing Chamber Valve Control Building, and the insertion of the 66-inch welded steel pipe final liner for Siphon No. 4 into the micro-tunnel.

Issues and Challenges:

Forensic analysis has begun to establish the cause of the micro-tunneling boring machine breakdown. The results of the analysis will help determine whether the breakdown was the result of mechanical failure of the machine and whether there are any grounds for a change site condition claim. Coordination between the Alameda Siphon No. 4 and New Irvington Tunnel project continues. In an effort to accommodate concurrent New Irvington Tunnel construction, the Alameda Siphon contractor's staging area to construct the rest of the mixing chamber has been reduced and the contractor has had to modify their planned procedure for the work. The encountering of alleged larger and more than expected cobbles and boulders in the jacking and receiving pits, and in the soil nail wall area, has caused the contractor some delay. Negotiations are underway to determine merit for changed site condition change orders. The project has used approximately 41% of the construction contingency. Large contributors to this were the work associated with the Coast Range Tunnel Shutdown and the unexpected Siphon No. 3 shutdown due to incorrect or missing as-builts.

CUW37401 - Calaveras Dam Replacement

Project Description: The project provides for the replacement of the existing dam with a new seismically reliable dam and facilities, including: a 210 foot high earth and rock dam, spillway, stilling basin, and intake tower. Stream release facilities at the new dam as well as at the Alameda Creek Diversion Dam will be constructed to support downstream aquatic resources.

Region: Sunol Valley	**Project Status:** Design	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$409.44 M	Approved Sep-02	Dec-15
Forecast*	$434.14 M	Forecast* Sep-02	Dec-15
Actual	$43.60 M	Project Percent Complete: 11.6%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	01/27/11	01/31/11	08/01/11	07/30/15

Progress and Status:

Project to be advertised January 31, 2011, pending CEQA certification and SFPUC Commission approval on January 27, 2011. Working with CEQA lead agency, completed work on CEQA EIR Comments and Responses. Competed environmental permit application documentation; supported resource agency staff in their ongoing preparation of permits. Continued baseline pre-construction air and water quality monitoring.

Issues and Challenges:

Allowances have been added to the project forecast to provide for the design, environmental review, permitting and construction of proposed fish screens and fish ladder at the Alameda Creek Diversion Dam (ACDD) and fish screens at the existing Calaveras Reservoir intake adits. Geology of the project site includes Franciscan Mélange formation with naturally occurring asbestos (NOA), resulting in significant additional project costs to proactively mitigate impacts. Special and unique mitigation measures will be required during construction to address the NOA issue, including extensive air and water quality monitoring, dust mitigation, and other special provisions for the protection of workers and the environment. Other challenges include obtaining final approvals of project design from the California Division of Safety of Dams (DSOD), and/or coordinating various issues with local jurisdictions and agencies, including but not limited to Alameda County, Santa Clara County, and East Bay Regional Parks District.

Existing Calaveras Dam and Reservoir

CUW37403 - San Antonio Backup Pipeline

Project Description: The project includes 6,400 feet of new 66-inch diameter pipe connected to the Alameda Siphon No. 3 to allow discharge of Hetch Hetchy flow to a quarry near San Antonio Creek. The project also includes chemical storage and feed facilities, and water quality monitoring equipment, for treatment of all discharges through the San Antonio Pipeline, San Antonio Backup Pipeline, and Alameda East Portal Overflow Shaft.

Region: Sunol Valley	**Project Status:** Design	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$39.20 M	Approved Dec-03	Dec-13
Forecast*	$52.04 M	Forecast* Dec-03	Oct-14
Actual	$6.80 M	Project Percent Complete: 16.6%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	02/02/12	02/15/12	08/23/12	05/01/14

Progress and Status:

Completed CEQA EIR Project Description revision to reflect the quarry pits water level management operational options. Completed 95% Design Independent Technical Review.

Issues and Challenges:

The project challenges are the environmental and project permitting in support of quarry pit discharges. The overall project schedule slip is due to the new operational option to avoid discharges to Alameda and San Antonio Creeks. One primary concern is to maintain the water level within the quarry pits to provide the necessary capacity for the design discharge event. The additional project scope including proposed discharge facility were presented to and approved by the Change Management Board. The project schedule and budget requires further updates and refinements to incorporate the Environmental Project Description revisions and to add the new project components of cutoff wall and quarry pit dewatering system.

HH Discharges to SMP-24 F3 East Quarry Pit

CUW38101 - SVWTP Expansion & Treated Water Reservoir

Project Description: The project includes treatment plant improvements to increase the sustainable capacity to 160 million gallons per day (mgd), including: new flocculation and sedimentation basin; upgrades to filters; new chemical storage and feed facilities; upgrades to back-up power and controls systems; new 17.5 million gallon treated water reservoir and 3.5-MG chlorine contact tank; 2,700 feet of 78-inch diameter pipe.

Region: Sunol Valley	**Project Status:** Construction	**Environmental Status:** Completed (EIR)

Project Cost:		**Project Schedule:**	
Approved	$144.87 M	Approved Apr-05	Jul-13
Forecast*	$128.02 M	Forecast* Apr-05	Dec-13
Actual	$37.77 M	Project Percent Complete: 32.1%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	12/17/09✓	12/17/09✓	06/23/10✓	06/02/13

Progress and Status:

The construction phase of the project which started on June 23, 2010 is progressing well. Shimmick (SCCI) who is the contractor on this project, has completed approximately 98 percent of the required excavation for the treated water reservoir (TWR), 95 percent of the required excavation for the chlorine contact tank (CCT), and 100 percent of the required excavation for the flocculation/sedimentation basin. The total amount of soil excavated to date for these three major project components amount to approximately 400,000 cubic yards. The excavated soil has been moved to Site 1 for eventual disposal. The soil nail and shot-crete wall construction for the TWR and CCT is approximately 90 percent complete including the drilling of 1400 soil nails and installation of rebar on the face of the soil nail. The installation of shotcrete for the soil nail wall will start in early January. The contractor worked night shifts during the months of August, September and October to expedite the excavation and construction of the soil nail shot-crete wall before the upcoming winter. With most of the civil work nearing completion, the structural and mechanical work has picked up on the TWR, CCT and the floc/Sed basin. Work related to the replacement of the 9 existing chemical tanks has also started. The drilling of up to 1450 drilled piers for the foundation for TWR and CCT started in the last week of December 2010.

Issues and Challenges:

The shutdowns related to the twelve filter upgrades and other minor plant shutdowns; major plant shutdowns related to the twelve filter upgrades need close coordination with the overall system shutdowns. SCCI has also requested several other minor shutdowns within SVWTP to complete the plant related work. The project team has been working closely with the Operations staff and contractor to coordinate and schedule these shutdowns so they can be included in the baseline schedule.

In the Baseline Schedule the project team is working with SCCI to finalize the project baseline schedule. Several meetings have been held with the project team and SCCI to resolve the baseline schedule.

Additional work requested by SFPUC Water Supply and Treatment Division (WSTD); the project team has completed the negotiations of four additional work items with SCCI that were requested by WSTD. However, two items, namely the chemical replacement tanks and replacement of chemical feed lines has required more effort than was originally envisioned. Project team is working with operations, design consultant and SCCI to gather all relevant data prior to starting work on these items. These items will have impacts on costs and schedule which will be determined in a few weeks. WSTD has agreed to fund all additional work items through change orders.

The cost variance from the approved budget reflects the Construction Phase savings due to low bids.

CUW35302 - Seismic Upgrade of BDPL Nos. 3 & 4

Project Description: Located between the two new valve vaults on either side of the Hayward Fault, this project provides a new seismically resistant pipeline and vault system across the fault for BDPL No. 3, and a partial upgrade of BDPL No. 4 to control water that may be released from BDPL No. 4 during a major seismic event.

Region: Bay Division	**Project Status:** Design	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$85.19 M	Approved Oct-04	Dec-14
Forecast*	$96.13 M	Forecast* Oct-04	Feb-15
Actual	$10.22 M	Project Percent Complete: 14.3%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	01/20/11	09/08/11	03/05/12	08/26/14

Progress and Status:

URS completed the surface flow analysis and is working on a draft Tech Memo. URS reviewed the results from the CH2MHILL BDPL 4 rupture analysis and determined that the scour from the rupture of BDPL 4 could undermine the secant pile wall and reach the articulated box. A TAP meeting will be scheduled in January 2011. Fabrication of the two ball joints is underway and factory testing is scheduled for February 2011. The 72-inch slip joint purchase order was advertised and no bids were received. The project team is working with the sole interested vendor to determine why they did not bid on the project. They are also looking at other options for ordering the slip joint. The project team is working on agreements with Alameda County Water District (ACWD), PG&E, AT&T and Union Sanitary District (USD) for the relocation of the utility lines, and with Alameda County Flood Control (ACFC) for connections to their storm drain system. An inspection of the Corrugated Metal Pipes (CMP) segments 2 and 3 was completed and the pipes are in good condition. Work continues on the Draft Environmental Impact Report, Response to Comments and the MMRP's. SFPUC approval is scheduled for 01/27/11.

Issues and Challenges:

* The 95% design submittal has been delayed to March 2011 to address the BDPL 4 rupture and scour issue and the extension of the ACWD water line replacement across Trace C. This work is additional scope for URS.

Ball Joint

* The current cost forecast for this project is $10.9M more than the approved budget including a cost increase of $4.7M in the reporting quarter and the completion schedule is extended 3 months. The cost and schedule impact is due to additional design and construction costs to upgrade the seismic reliability of BDPL No. 4 at Trace A of the Hayward Fault, to relocate ACWD water lines around the construction area, and relocation of the AT&T and PG&E utility lines.

CUW36302 - System Security Upgrades

Project Description: The project includes the identification, planning and design of all necessary security components associated with WSIP facilities. The individual projects will fund the construction of the components.

Region: Bay Division	**Project Status:** Multiple Phases	**Environmental Status:** Active (CatEx)

Project Cost:		**Project Schedule:**	
Approved	$9.38 M	Approved Jun-06	Feb-12
Forecast*	$9.18 M	Forecast* Jan-06	Nov-15
Actual	$3.59 M	Project Percent Complete: 74.9%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid+ Advertisement**	**Construction+ NTP**	**Construction+ Final Completion**
Current Forecast	05/31/11	N/A	11/13/06✓ - 05/02/11	07/13/07✓ - 01/13/12

+ Final completion for this project is for stand-alone construction contracts only. Other construction work is being tracked under individual WSIP projects.

Progress and Status:

The Security Consultant is responsible for Phase A and Phase B Design Documents. Phase A design consists of security appurtenances incorporated into the overall design such as conduit routing. Phase A work provides for the security infrastructure and is bid as part of the WSIP construction project. Phase B design consists of completion of project security system components which will be purchased, installed and tested by Security Integrator specialist. Phase B work is provided via Task Order under an As-needed Construction Contract. The first of four As-needed Construction contracts for Phase B installation was advertised in December 2010 with anticipated bid opening date in early February 2011. Purchase Order for Master Server (1155 Market/525 Golden Gate) and two Regional Servers (Moccasin and San Francisco) were awarded in December 2010. ITS to perform set-up operations and configuration of the servers is anticipated to be fully operational by first quarter 2011.

Issues and Challenges:

The current project completion forecast is forty-five (45) months later than approved completion. This delay is primarily related to security integration work to be completed on the WSIP's last project (37401: Calaveras Dam Replacement). The installation of security systems typically begin shortly after the construction of a project is substantially complete.

Advertisement of the As-Needed Security Integrator Specialist Services contract that includes purchasing, installing and testing of each project security system is delayed due to the reformulation of the contracting strategy from a professional services contract to a construction contract, as well as delay in the security integration system designs. The delay in the security system upgrades will not have an impact on the substantial completion of construction activities on any WSIP regional projects.

CUW38001 - BDPL Nos. 3 & 4 Crossovers

Project Description: The project provides three crossover facilities (connecting valves and vaults) between parallel reaches of BDPL Nos. 3 and 4 along the South Bay to add seismic reliability and facilitate taking shorter segments of either pipeline out of service for inspection or repair.

Region: Bay Division	**Project Status:** Construction	**Environmental Status:** Completed (MND)

Project Cost:		**Project Schedule:**	
Approved	$33.94 M	Approved Feb-04	Sep-13
Forecast*	$34.79 M	Forecast* Feb-04	Mar-13
Actual	$14.85 M	Project Percent Complete: 45.6%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	10/23/08✓	02/13/09✓	07/13/09✓	09/14/12

Progress and Status:

Construction percent complete at the Guadalupe site is approximately 97%. Overall, the contractual project construction is approximately 32% complete. The contractor worked on electrical changes, punch list items, installed corrosion protection systems, completed startup and testing on the backup generator, and installed landscaping. The license agreement for Silicon Valley Power at Guadalupe River site was executed and power was turned on. Barron Creek and Bear Gulch sites are on schedule and will begin work in April 2011.

Issues and Challenges:

Variance in project total cost is to cover the anticipated increase in Operations requirements for the 4 remaining shutdowns based on experience and actual costs of the 2 shutdowns completed at the Guadalupe site. The increased cost for the 2 shutdowns include: Reduced discharge rate as required by SCVWD permit; construction of discharge piping system over the Guadalupe levee and safe access along system; modifications for down stream facilities to control leakage; and extended shutdown due to non-compliant gasket issue.

Guadalupe River site vegetation starting to grow outside the fenced area

CUW36701 - HTWTP Long-Term Improvements

Project Description: The project increases the treatment plant sustainable capacity to 140 mgd, and provides seismic reliability following a major seismic event. The project includes: extensive seismic, hydraulic and electrical upgrades throughout the plant; five new filters; improvements to the washwater and sludge handling systems; a new 11 million gallon treated water reservoir; and associated piping and equipment replacement.

Region: Peninsula	**Project Status:** Multiple Phases	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$359.06 M	Approved Jul-03	Jun-14
Forecast*	$294.03 M	Forecast* Jul-03	Nov-15
Actual	$30.68 M	Project Percent Complete: 8.4%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	10/14/10✓	10/18/10✓	04/04/11	05/29/15

Progress and Status:

CEQA certification of the Draft EIR was completed on 10/15/10. The project team worked with the current Horse Stables Lessee to facilitate their move in preparation for the proposed construction work and reached agreement in December 2010. The JOC tree removal contractor commenced work starting in November 2010 during the tree cutting season. The Contractor developed and implemented the Storm Water Pollution Prevention Plan (SWPPP) for the tree removal work. The request for bids for construction was posted 10/17/10. Five bids were received on 12/16/10. The project team is evaluating the bids. Construction management services were revised to provide staff augmentation and are expected to be on-board by Notice to Proceed.

Issues and Challenges:

The variance between the Current Forecast and the Approved Schedule reflect the extended duration for design development in electrical work and changes resulting from further discovered site conditions within the project site. The resulting constructability schedule was evaluated to determine the duration necessary for the Contractor to complete the staged work during partial operation of the facility during the construction period. Efforts to prevent any future delays have included key coordination with Operations to minimize potential shutdown impacts during construction. Independent technical and constructability reviews have been preformed to prevent further delays or design changes during construction. The Current Project Forecast is less than the Approved Project Cost, largely attributed to the favorable variance in construction cost based on the apparent low bidder.

Harry Tracy Water Treatment Plant

CUW36702 - Peninsula Pipelines Seismic Upgrade

Project Description: The project includes a focused geotechnical investigation, followed by seismic improvements at up to three pipeline crossings of the Serra Fault at two locations. The pipelines include the San Andreas Pipeline Nos. 2 & 3 and the Sunset Branch Pipeline.

Region: Peninsula	Project Status: Planning	Environmental Status: Active (EIR)

Project Cost:		Project Schedule:	
Approved	$15.00 M	Approved Jul-09	Dec-14
Forecast*	$17.02 M	Forecast* Jul-09	Aug-15
Actual	$1.27 M	Project Percent Complete: 11.7%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	12/31/12	03/01/13	09/03/13	02/27/15

Progress and Status:

The draft AAR was completed in Nov 2010 for internal review. Design consultant has initiated the CER on Dec 1, 2010. Environmental Consultant has completed the work plan and conducted the first site visit on Dec 2, 2010.

Issues and Challenges:

Due to the refinement in the geotechnical investigation scope of work to conclude the fault crossing location; the planning phase forecasted schedule has been extended for twelve months and with a project overall schedule extended for eight and a half month, and forecasted budget increased for $1 Million. The environmental phase forecasted budget has also been increased for $1 Million for the environmental consultant to prepare a Focus Environmental Impact Report (EIR). Upon completion of the AAR, the project scope of work will be better defined. The current environmental schedule assumes that the project would require a Focused EIR. It is anticipated that this schedule will be revised in the next monthly update once the type of the environmental document (Focused or Full EIR) required for the project is confirmed.

Peninsula Pipeline Seismic Upgrades, Field Investigations and Monitoring

CUW30103 - Regional Groundwater Storage and Recovery

Project Description: The project includes construction of 16 groundwater wells with a total capacity of 7.2 mgd. The wells will be connected to three regional customer water systems on the Upper Peninsula (the Cities of Daly City and San Bruno, and California Water Service Company) and to the SFPUC transmission system. Potentially some wells may require treatment systems.

Region: San Francisco Regional	**Project Status:** Design	**Environmental Status:** Active (EIR)

Project Cost:		**Project Schedule:**	
Approved	$49.85 M	Approved Jun-03	Sep-14
Forecast*	$63.13 M	Forecast* Jun-03	Nov-15
Actual	$9.20 M	Project Percent Complete: 17.3%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	Environmental Approval	Bid Advertisement	Construction NTP	Construction Final Completion
Current Forecast	09/20/12	11/28/12	05/06/13	02/28/15

Progress and Status:

The Design Team completed site investigations at 14 out of the 16 preferred sites and the associated 35% design package; it is also performing an analysis of groundwater-related physical effects required to inform Project Operations and support EIR preparation. Preparation of the first Administrative Draft EIR is underway. The installation of groundwater monitoring wells has been completed for all but two of the preferred well station sites.

Issues and Challenges:

Variances in project schedule result from the need (1) to conduct detailed technical studies that evaluate groundwater-related physical effects and (2) to evaluate the test wells as part of the EIR, thereby postponing test well bid and award until after EIR certification in 2012. Both of these requirements have dictated that the EIR schedule be extended. The project cost is impacted by the need to add two new well stations and add manganese treatment at nine well stations, as well as construction escalation associated with the schedule extension. The potential risks for this project are: (1) the analysis of groundwater-related physical effects for the EIR has the potential of delaying publication of the EIR; and (2) reaching Right-of-Way (ROW) agreements with Lake Merced Golf Club, Golden Gate National Cemetery, San Mateo County, and Jefferson Unified School District (in total, 8 Access Easements, 5 Pipeline Easements and 5 Fee Acquisitions are required). Efforts to prevent any future delays include: (1) mutual agreement among SFPUC, consultants and MEA on the schedule for preparation and review of EIR-related deliverables, and (2) initiating pre-CEQA ROW outreach with the above parties and development of draft memorandums of agreement.

Drilling Operation for 750 feet Deep Monitoring Well

The variance in cost increased since last quarter due to (1) additional studies required for the EIR, (2) the EIR consultant's additional work to cover out of scope items during the extended environmental phase, and (3) additional Project Management support to assist with Golden Gate National Cemetery and Westlake Pump station coordination.

CUW38802 - Habitat Reserve Program

Project Description: The program provides a coordinated and consolidated approach to compensate for impacts caused by the WSIP construction. The program includes projects to preserve, enhance, restore or create approximately 1,435 acres of various types of habitats.

Region: System-Wide	**Project Status:** Multiple Phases	**Environmental Status:** Active (Permitting Only)

Project Cost:			**Project Schedule:**		
Approved		$48.15 M	Approved Sep-06		Aug-11
Forecast*		$78.48 M	Forecast* Sep-06		Dec-15
Actual		$9.85 M	Project Percent Complete: 21.4%		

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	Environmental Approval	Bid+ Advertisement	Construction+ NTP	Construction+ Final Completion
Current Forecast	05/31/11	(A) 08/20/10✓ (B) 02/18/11 (C) 03/01/11	(A) 01/31/11 (B) 06/08/11 (C) 07/21/11	05/31/11 07/07/15++ 01/29/15++

+ Project Includes multiple construction contracts.
(A) Goat Rock – Water Well; (B) Homestead Pond/San Andreas Reservoir; (C) Goldfish Pond
++ Includes plant establishment, maintenance, and monitoring period

Progress and Status:

There are 9 compensation sites in the Alameda watershed and 11 in the Peninsula watershed. Design is now completed for four sites. Design teams are responding to Agency comments on twelve sites. Two sites do not require design and two sites are at 10% design status. Permit applications were submitted for seven sites (19 of the 20 sites have applications). United States Fish and Wildlife issued permits for six sites (subtotal is now 7). Two sites at 100% design are in constructability review and will be bid next quarter. Goat Rock well and fence contracts were awarded and will commence when weather permits. Final planting at Arroyo de la Laguna site commenced in December. Three firms submitted qualifications to pre-qualify as wetland habitat contractors.

Issues and Challenges:

Five agencies have been reviewing the design of compensation sites: the US Army Corps of Engineers, Environmental Protection Agency, US Fish and Wildlife Service, Department of Fish and Game, and Regional Water Quality Control Board. These agency reviews, which are still ongoing, trigger additional requirements and have extended the Habitat Reserve Program's (HRP) schedule and added project costs. Additional costs are from increases in required compensation and related construction and monitoring. Major cost increases this quarter result from final Mitigation and Monitoring Plans detailing construction methods, monitoring during construction and monitoring during the permit compliance period. Construction cost estimates based on refined designs result in an increase of $13.3M from the approved phase budget. Construction management and monitoring has been estimated and led to a $6.7M increase. Performance monitoring, a cost previously attributed to the endowment account, is now estimated and increased the project budget $4.6M in the Construction Management Phase. A previous major cost contributor was the need to compensate 20 acres of oak woodland ($3.0M) for impacts identified for the Lower Crystal Springs Dam Improvement Project.

In addition, the project experienced delays due to extended agency deliberations and arrival at consensus on compensation. The agencies added four years of performance monitoring and maintenance, which extends the overall project schedule from 2011 to 2015. Due to delays in finalizing designs to the satisfaction of all the agencies and the need to construct a number of sites in 2010 and 2011 to meet compensation obligations timely for projects starting construction, additional project management and engineering support was recruited for the HRP project to accelerate activities leading to construction and resulted in additional project costs ($2.7M).

CUW39401 - Watershed Environmental Improvement Program

Project Description: The project consists of various improvements aimed at protecting and restoring lands within the hydrologic boundaries that contribute to the SFPUC Source waters in the Alameda Creek, Peninsula and the Tuolumne River watersheds. The overall scope for this project has yet to be fully developed.

Region: System-Wide	**Project Status:** Planning	**Environmental Status:** Not Initiated (TBD)

Project Cost:		**Project Schedule:**	
Approved	$20.00 M	Approved Jan-07	Jun-13
Forecast*	$20.00 M	Forecast* Jan-07	Jun-14
Actual	$0.54 M	Project Percent Complete: 5.4%	

Approved; Actual Cost; * Forecast Status: Meets Requirements Needs Attention Exceeds Limits

Key Milestones:	**Environmental Approval**	**Bid Advertisement**	**Construction NTP**	**Construction Final Completion**
Current Forecast	12/30/11	01/03/12	06/22/12	12/30/13

Progress and Status:

The project team continued to outreach to property owners in the upper Alameda Watershed about potential watershed protection opportunities. Staff met with two property owners, interested in placing conservation easements on their properties, and discussed moving forward with preliminary title reports and conducting field visits of the properties.

Staff continued to work with several organizations to coordinate watershed protection efforts in the upper Alameda Creek Watershed. An MOU should be completed in March 2010, which will describe how these organizations will work together to coordinate efforts.

On December 14, 2010 the SFPUC approved the purchase of 160 acres above San Antonio Reservoir utilizing Watershed and Environmental Improvement Program Measure A Bond Funds. The purchase of this property will protect the parcel from future development and protect water quality.

The Upper Alameda Watershed

Issues and Challenges:

The project experienced a 1-year delay due to the challenge of contacting and educating landowners who live in such a remote location about the watershed protection program.

7. On-Going Construction

Construction Contract	Schedule			Budget		Variance (Original - Forecast)		Planned % Complete	Actual % Complete
	NTP Date	Original Construction Final Completion	Q2/FY10-11 Forecasted Construction Final Completion	Original Contract Cost	Q2/FY10-11 Forecasted Cost*	Schedule (Cal. Days)	Cost		
San Joaquin Region									
CUW36401 - Lawrence Livermore Laboratory and PH II Thomas Shaft Improvement Project	08/26/09	06/11/10	01/21/11	$ 1,267,900	$ 1,593,888	(224)	($325,988)	100%	99%
CUW37301 - San Joaquin Pipeline System – Crossovers	06/02/10	11/07/11	11/07/11	$ 11,723,817	$ 12,340,870	-	($617,053)	52%	38%
CUW37302 - Roselle Crossover Improvements	08/26/09	09/19/10	01/26/11	$ 2,837,000	$ 3,162,292	(129)	($325,292)	100%	88%
CUW38401 - Tesla Treatment Facility***	03/31/09	06/28/12	06/28/12	$ 81,420,562	$ 85,602,701	-	($4,182,139)	99%	90%
Sunol Valley Region									
CUW35901 - New Irvington Tunnel	08/26/10	06/15/14	06/15/14	$ 226,657,700	$ 227,389,386	-	($731,686)	14%	5%
CUW35902 - Alameda Siphon No. 4	08/26/09	12/30/11	12/30/11	$ 31,933,695	$ 34,106,201	-	($2,172,506)	93%	77%
CUW38101 - SVWTP Expansion & Treated Water Reservoir**	06/23/10	06/02/13	06/02/13	$ 83,102,160	$ 87,328,644	-	($4,226,484)	23%	23%
CUW38601 - San Antonio Pump Station Upgrade	11/02/09	09/01/11	09/01/11	$ 6,991,000	$ 7,302,431	-	($311,431)	97%	92%

Note: * The Forecasted Cost includes all approved, pending, and potential change orders.
** The CUW38101 - SVWTP construction contract includes $4,570,000 Non-WSIP Work which will be funded by Non-WSIP fund.

*** Planned % Complete is reported based on the Contractor's proposed schedule, which is an aggressive schedule. Contractor is behind the aggressive schedule, but the construction is on time based on the project's approved schedule. The contractor is expected to achieve final completion within the contractual requirements.

Construction Contract	Schedule			Budget		Variance (Original - Forecast)		Planned % Complete	Actual % Complete
	NTP Date	Original Construction Final Completion	Q2/FY10-11 Forecasted Construction Final Completion	Original Contract Cost	Q2/FY10-11 Forecasted Cost*	Schedule (Cal. Days)	Cost		
Bay Division Region									
CUW36301 - SCADA System Phase II	12/15/09	11/30/10	01/28/11	$ 3,847,250	$ 3,974,496	(59)	($127,246)	100%	50%
CUW36801 - BDPL Reliability Upgrade - Bay Tunnel	04/01/10	05/01/15	05/01/15	$ 215,294,530	$ 215,539,834	-	($245,304)	17%	13%
CUW36802 - BDPL 5 Reliability Upgrade East Bay***	01/07/10	02/07/12	02/07/12	$ 61,588,008	$ 64,597,988	-	($3,009,980)	95%	79%
CUW36802 - BDPL 5 - Peninsula Reaches***	03/10/10	04/11/12	04/11/12	$ 52,183,400	$ 55,590,714	-	($3,407,314)	59%	40%
CUW38001 - Bay Division Pipelines 3&4 Crossover	07/13/09	09/14/12	09/14/12	$ 12,695,000	$ 13,180,685	-	($485,685)	46%	32%
Peninsula Region									
CUW35601 - New Crystal Springs Bypass (Polhemus) Tunnel	12/01/08	08/13/11	08/13/11	$ 55,674,000	$ 57,445,479	-	($1,771,479)	95%	93%
CUW36103 - Pulgas Balancing Reservoir Structural Rehabilitation And Roof Replacement	11/30/09	07/09/11	07/09/11	$ 12,857,000	$ 13,131,264	-	($274,264)	76%	45%
CUW36105 - Pulgas Balancing - Modifications of the Existing Dechloramination Facility	09/22/10	10/31/11	10/31/11	$ 1,864,560	$ 1,864,560	-	-	17%	17%
CUW37101 - Crystal Springs/San Andreas Transmission Upgrade	12/01/10	08/06/13	08/06/13	$ 99,763,000	$ 99,763,000	-	-	0%	0%
CUW37901 - San Andreas Pipeline No. 3 Installation***	08/27/09	04/28/11	04/28/11	$ 16,336,350	$ 17,027,410	-	($691,060)	100%	94%

Note: * The Forecasted Cost includes all approved, pending, and potential change orders.
** The CUW38101 - SVWTP construction contract includes $4,570,000 Non-WSIP Work which will be funded by Non-WSIP fund.

*** Planned % Complete is reported based on the Contractor's proposed schedule, which is an aggressive schedule. Contractor is behind the aggressive schedule, but the construction is on time based on the project's approved schedule. The contractor is expected to achieve final completion within the contractual requirements.

Construction Contract	Schedule			Budget		Variance (Original - Forecast)		Planned % Complete	Actual % Complete
	NTP Date	Original Construction Final Completion	Q2/FY10-11 Forecasted Construction Final Completion	Original Contract Cost	Q2/FY10-11 Forecasted Cost*	Schedule (Cal. Days)	Cost		
Peninsula Region (Cont'd)									
CUW39101 - Baden and San Pedro Valve Lot Improvements	04/08/09	04/02/11	04/02/11	$ 11,536,500	$ 12,071,145	-	($534,645)	89%	88%
San Francisco Regional Region									
CUW37201 - University Mound Reservoir North Basin Seismic Upgrades	08/03/09	06/23/11	06/23/11	$ 29,597,000	$ 30,418,974	-	($821,974)	95%	90%

Program Total for On-Going Construction	Original Contract Cost	Q2/FY10-11 Forecasted Cost*	Variance	
			Cost	Percent
	$ 1,019,170,432	**$ 1,043,431,963**	**($24,261,531)**	**(2.4%)**

Note: * The Forecasted Cost includes all approved, pending, and potential change orders.
** The CUW38101 - SVWTP construction contract includes $4,570,000 Non-WSIP Work which will be funded by Non-WSIP fund.

*** Planned % Complete is reported based on the Contractor's proposed schedule, which is an aggressive schedule. Contractor is behind the aggressive schedule, but the construction is on time based on the project's approved schedule. The contractor is expected to achieve final completion within the contractual requirements.

8. PROJECTS IN CLOSE-OUT

Project Title	2005 Baseline Construction Phase Completion	2009 Approved Construction Phase Completion	Actual Construction Phase Completion	2005 Baseline Construction Phase Budget	2009 Approved Construction Phase Budget	Construction Phase Expenditures To Date
Bay Division Region						
CUW38901 - SFPUC/EBMUD Intertie	09/29/06	01/31/08	01/31/08	$ 7,700,000	$ 7,700,000	$ 7,878,357
TOTAL				$ 7,700,000	$ 7,700,000	$ 7,878,357

9. COMPLETED PROJECTS

Project Title	2005 Baseline Project Completion	2009 Approved Project Completion	Actual Project Completion	2005 Baseline Project Budget	2009 Approved Project Budget	Project Expenditures To Date
Sunol Valley Region						
CUW35501 - Standby Power Facilities - Various Locations	12/06/10	12/06/10	12/22/10	$ 9,949,735	$ 13,110,233	$ 12,950,481
CUW37001 - Pipeline Repair & Readiness Improvements	03/30/07	12/31/08	04/16/09	$ 5,591,770	$ 5,407,881	$ 5,205,493
CUW37402 - Calaveras Reservoir Upgrades	02/17/06	07/28/06	07/28/06	$ 1,740,055	$ 1,690,552	$ 1,690,552
Bay Division Region						
CUW35301 - BDPL Nos. 3 & 4 Crossover/Isolation Valves	09/30/08	09/30/08	07/31/09	$ 27,600,158	$ 27,731,316	$ 27,011,558
CUW36803 - BDPL Reliability Upgrade - Relocation of BDPL Nos. 1 & 2	-	07/12/11	05/28/10	-	$ 2,885,191	$ 3,046,681
CUW39301 - BDPL No. 4 Condition Assessment PCCP Sections	05/01/08	02/06/09	02/06/09	$ 2,000,000	$ 2,028,309	$ 1,937,679
Peninsula Region						
CUW35701 - Adit Leak Repair - Crystal Springs/Calaveras	07/03/08	07/31/08	07/31/08	$ 3,748,452	$ 2,792,885	$ 2,787,322
CUW36101 - Pulgas Balancing - Inlet/Outlet Work	05/11/06	05/11/06	05/11/06	$ 1,667,532	$ 1,765,939	$ 1,765,938
CUW36102 - Pulgas Balancing - Discharge Channel Modifications	08/05/13	08/20/10	07/30/10	$ 8,111,422	$ 4,432,368	$ 2,898,957
CUW36501 - Cross Connection Controls	05/15/09	02/27/09	04/30/09	$ 6,111,779	$ 3,802,675	$ 3,923,618
CUW36601 - HTWTP Short-Term Improvements (Demo Filters)	07/03/06	11/14/06	11/14/06	$ 4,381,375	$ 3,062,332	$ 3,067,903
CUW36603 - HTWTP Short-Term Improvements - Coagulation & Flocculation/ Remaining Filters	09/08/10	09/08/10	07/28/10	$ 9,741,617	$ 19,578,722	$ 18,583,972
CUW36901 - Capuchino Valve Lot Improvements	07/24/09	08/19/08	08/19/08	$ 3,573,782	$ 2,818,379	$ 2,803,153
San Francisco Regional Region						
CUW35801 - Sunset Reservoir - North Basin	05/06/09	05/06/09	09/10/10	$ 61,975,999	$ 64,334,929	$ 64,271,570
System-Wide Region						
CUW38801 - Programmatic EIR	06/20/07	06/30/09	06/30/09	$ 9,271,001	$ 11,086,441	$ 10,730,684
TOTAL				$ 155,464,677	$ 166,528,152	$ 162,675,561

Appendix F: Westside Basin Groundwater Report

TECHNICAL MEMORANDUM

DATE: May 6, 2011

TO: Mr. Patrick Sweetland
Director of Water and Wastewater Resources
City of Daly City

FROM: John Fio and Gus Yates, HydroFocus, Inc.

SUBJECT: WESTSIDE BASIN GROUNDWATER-FLOW MODEL: UPDATED MODEL AND 2008 NO PROJECT SIMULATION RESULTS.

This technical memorandum documents the update to the Westside Basin Groundwater-Flow Model ("*Westside Basin Groundwater-Flow Model [version 2.0], Historical Calibration Run [1959-05] Results and Sensitivity Analysis",* HydroFocus, 2007; and, *"Westside Basin Groundwater-Flow Model: Historical Simulation and No Project Simulation Results",* HydroFocus, 2009). Herein the model reported previously in 2009 is referred to as "version 2.1" and this update referred to as "version 3.1" or the "updated model". For archiving and documentation purposes, **Appendix A** reports the chronology and evolution of model changes to version 2.1 that have been completed and are now represented in version 3.1.

In version 2.1, the Historical Simulation represented hydrologic conditions during the period October 1958 through December 2005. Since 2005, the available information for model construction and calibration has increased substantially:

- Semi-annual water quality sampling, various water level measurements, and water use information collected and made available in annual basin monitoring reports for calendar years 2005 through 2009. The monitoring and reporting is done by San Francisco Public Utilities Commission (SFPUC) staff in cooperation with the City of Daly City, California Water Services Company, and the City of San Bruno.

- New monitoring wells constructed throughout the basin as part of the planning effort for the Regional Groundwater Storage and Recovery Project, San Francisco Groundwater Supply Project, and Lake Merced lake level management plan. Most of the sites include multiple wells constructed with relatively short screen intervals installed at different depths. The data provide detailed information on vertical hydraulic gradients in areas where information did not previously exist.

- New borehole data and an updated conceptual geohydrologic framework presented in *"Final Task 8B Technical Memorandum No. 1, Hydrologic*

Setting of the Westside Basin", LSCE, May 5, 2010. This report included refined basin cross-sections inferring the spatial distribution of depth to bedrock and thickness and extent of aquifers and confining beds.

This memorandum documents incorporation of the new information into the model including an extension of the Historical Simulation to include the period January 2006 through September 2009. As part of the update, we adjusted simulated recharge and aquifer parameters to improve comparisons between observed and simulated water levels. We then employed the model to simulate 2008 No Project conditions and compare the updated results to those reported previously using model version 2.1.

1.0 UPDATED INFORMATION

Model updates completed in version 3.1 include: (1) improved model geometry, discretization, and additional calibration locations; (2) modified boundary conditions (drains were added in the Bay Plain area to simulate groundwater discharge from the shallow water table); (3) refined and extended the recharge input data set; (4) extended the pumpage data set; and, (5) updated aquifer parameterization (calibration). This memorandum provides an overview of the nature and scope of the model update, as well as a general assessment of model performance and implications for 2008 No Project condition simulation results and water supply planning. Model practitioners requiring additional documentation on the update are referred to **Appendix A**.

1.1 Grid and Calibration Points

Figure 1 shows model layering projected onto a conceptual geologic framework represented by a section aligned from approximately Golden Gate Park in the north to the Bay Plain east of Millbrae in the south. The section also shows the lateral boundaries of model parameter zones which represent groups of model cells having equal assigned aquifer parameter values (horizontal and vertical hydraulic conductivity, specific yield, and specific storage).

Minor adjustments to the model layering were completed to represent new depth to bedrock information, changes in the bottom elevations of significant confining beds (for example, the bottom of layer 4 was adjusted to represent updates to the bottom elevation of the "W-clay" characterized in various refined sections), and ensure that relatively short-screened monitoring wells are located in single model layers. Model cell dimensions were also modified to maintain smooth transitions between cells of different dimensions and ensure constant dimensions when required in the appropriate model areas. As a result of these grid refinements, minor adjustments occurred to the extent of active cells to maintain the previously defined minimum layer thickness of 20 feet at model edges.

Each active model cell is assigned aquifer parameter values, and the model cells within each layer are grouped into parameter zones; the aquifer characteristics are assumed uniform within each layer of each parameter zone. The areal extent of parameter zones in layer 1 are shown in **Figure 2** (aquifer parameter values are summarized for all zones and layers in **Table 1** found later in **Section 2.3** of this report). The parameter zones are modified slightly relative to model version 2.1 to account for updated geologic information and the spatial distribution of new monitoring well locations. The modifications are described as follows.

- The former "Sunset District" parameter zone is now sub-divided into two zones corresponding to the general mapped extent of the "W-clay". The "Sunset District – South" parameter zone represents the approximate northern extent of the "W-clay" and the clay is assumed absent beneath the "Sunset District – North" parameter zone.

- In the southern part of the basin, the former "Cal Water/Cemeteries" zone is now sub-divided into two zones and renamed the "Colma" and "South San Francisco" zones. The Colma zone includes the approximate southerly extent of the "W-clay", and the South San Francisco zone represents the area where the "W-clay" is not identified in existing borehole data and there is a transition into fine-grained sediments identified in San Bruno area borehole data.

During 2005-2009, monitoring well construction activities substantially increased the number of calibration points in the basin (a total of 38 new wells). **Figure 3** shows water level data locations and the new sites included as part of the model update summarized below.

- CPS (Central Pump Station, San Francisco): two wells having screen depths corresponding to model layers 1 and 2.

- LMPS (Lake Merced Pump Station, San Francisco): four wells having screen depths corresponding to model layers 2, 3, 4 and 5.

- CUP-10A (Conjunctive Use Project, Daly City): four wells having screen depths corresponding to model layers 1 (two wells in layer 1), 4 and 5.

- CUP-18 (Conjunctive Use Project, Daly City): four wells having screen depths corresponding to model layers 1, 3, 4 and 5.

- CUP-19 (Conjunctive Use Project, Colma): four wells having screen depths corresponding to model layers 1, 4 and 5 (two wells in layer 5).

- CUP-22A (Conjunctive Use Project, Colma): four wells having screen depths corresponding to model layers 1, 2, 4 and 5.

- CUP-23 (Conjunctive Use Project, Colma): four wells having screen depths corresponding to model layers 1, 4, and 5 (two of the wells are at depths corresponding to layer 5).

- CUP-36-1 (Conjunctive Use Project, South San Francisco): four wells having screen depths corresponding to model layers 1, 2, 4 and 5.

- SSFLP (South San Francisco Linear Park, South San Francisco): four wells having screen depths corresponding to model layers 1, 2, 4, and 5.

- CUP-44-1 (Conjunctive Use Project, San Bruno): four wells having screen depths corresponding to model layers 1, 2, 4 and 5.

1.2 Boundary Conditions

In the Bay Plain area (land areas of the Bay Mud North and Bay Mud South parameter zones shown in **Figure 2**), groundwater likely discharges by evaporation from the shallow water table and seepage to various natural drainage channels, unlined ditches, and passive de-watering operations. Evidence for shallow groundwater and seepage includes groundwater encountered in shallow monitoring wells (for example, leaky underground storage tank sites), sustained baseflow in the Colma Creek gauging record (1-2 cfs)[1], and the visible presence of creek channels and ditches inland throughout the Bay Plain as far west as Highway 101.

Drain boundaries were added to layer 1 of the Bay Plain area to simulate evaporation from the shallow water table and seepage to San Francisco Bay (see **Figure 4** for drain cell locations). When modeled water levels are greater than the drain elevation, simulated discharge is assumed proportional to the difference between the water level in the model cell and the specified drain elevation; the proportionality constant (conductance) represents the effective conductivity of the water bearing sediments. Average cell elevations were previously derived from a 30-meter digital elevation model, and we assumed drain elevations equal to 1 foot below the modeled land surface elevation. The effective hydraulic conductivity of the water bearing sediments was assumed equal to 1 foot per year.

Implementation of drains reduced the occurrence of simulated water levels above land surface in the Bay Plain area (flooding), but had minimal effect on simulated water levels further inland. The simulated drainage averaged less than 120 acre-feet per year (AF/yr), which is less than 1 percent of the volumetric budget. The simulated drainage was not uniform across the Bay Plain area, but occurred in only about 22-percent of the 760 total drain cells. The simulated discharge is

[1] "*Westside Basin Groundwater-Flow Model [version 2.0], Historical Calibration Run [1959-05] Results and Sensitivity Analysis – Appendix A",* HydroFocus, 2007.

concentrated near the northern and southern ends of the Bay Plain area, where groundwater is not likely to contribute significantly to potential well yields in San Bruno and South San Francisco.

1.3 Recharge

Groundwater recharge is estimated from deep percolation of rainfall, applied irrigation water, and leakage from water supply and sewer pipes. Climate and water delivery data are processed by a Soil Moisture Budget (SMB) model to calculate the temporal and spatial distribution of deep percolation, and a Shallow Groundwater Zone model further processes the deep percolation by including attenuation and leakage effects. The output from the Shallow Groundwater Zone model is a monthly recharge time-series for input to the groundwater-flow model. As a result of updates to rainfall, temperature, and water delivery data the simulated average annual model-wide groundwater recharge increased 4 percent from 14,744 AF/yr (version 2.1; 1959-2005 simulation period) to 15,313 AF/yr (version 3.1; 1959-2009 simulation period).

Rainfall and Temperature

The SMB input was modified to use monthly rainfall from measurements at the San Francisco International Airport (SFIA) and Lake Merced Pump Station (LMPS). The SMB zones in the Colma Creek Basin are weighted to the monthly SFIA rainfall data and the SMB zones in the Lake Merced Basin[2] are weighted to use the monthly Lake Merced Pump Station (LMPS) rainfall data.[3] The spatial distribution of rainfall between SMB zones is based on a modified contour map of 1976-83 average annual rainfall (**Figure 5**). The mapped point data and

[2] Surface drainage basins names from Kirker, Chapman and Associates, 1972, "Daly City Groundwater Investigation."

[3] The Lake Merced Pump Station (LMPS) gauge is a daily rain gauge operated for years by the San Francisco Public Utilities Commission's (SFPUC) City Distribution Division. The LMPS is located on the eastern side of South Lake Merced. The original rainfall values were recorded in the SFPUC's Water Supply and Treatment Division's (WSTD) hard copy log books and later scanned and transferred to the Water Information System KISTERS (WISKI) database maintained by the SFPUC. The data are available almost continuously for the period January 1926 to September 2005, with the exception of one missing period from January 1968 to December 1969. For the purposes of simulating rainfall for the groundwater model, the missing period was estimated using the correlation between LMPS and Richmond-Sunset station rainfall and linear regression techniques. The data set was extended from October 2005 through September 2009 using data from the tipping bucket rain gauge located on the western side of South Lake Merced and operated by the SFPUC's Wastewater Enterprise. Monthly data missing from that data set (October and November 2005 and August 2006 through May 2007) were estimated using linear regression between the tipping bucket and the rain gauge located at the Oceanside station.

interpretative contours were originally published by the USGS[4]; however, we slightly re-interpreted the western-most contours around Lake Merced to better conform to observed rainfall reported at the gauges. Specifically, the contour values near Lake Merced and extending westward into the Pacific Ocean were about one-inch lower than indicated by the station observations and adjusted accordingly. Additionally, the contour map did not extend far enough south to include all of the Westside Basin. We therefore utilized contours published by Rantz[5] to spatially distribute monthly rainfall in the south part of the basin; the contours published by Rantz were slightly modified to agree with the 1976-83 average at the SFIA gauge station. Additional details on rainfall simulation and rainfall contour maps are provided in **Appendix A**.

Consistent with version 2.1, simulated monthly evapotranspiration demand is based on temperature measurements at the SFIA and Richmond-Sunset stations. The spatial distribution of temperature weighting factors utilize the SFIA station to represent southern San Mateo County and the Richmond-Sunset station to represent the San Francisco area; temperature in areas generally in between the two stations are weighted equally between the two stations. Additional information on simulating the distribution of temperature is also provided in **Appendix A**.

The updated rainfall data, addition of the data from the LMPS gauge, and modified 1976-86 average annual rainfall contours combined to decrease total simulated rainfall about 7-percent relative to version 2.1. Specifically, average annual simulated rainfall decreased from 55,975 AF/yr in model version 2.1 (1959-2005) to 52,022 AF/yr in version 3.1 (1959-2009). The changes to rainfall and updated temperature data decreased annual average evapotranspiration by almost 3 percent. Overall, the net effect was a decrease in SMB-estimated rainfall and irrigation pumping.

Water Deliveries

Refined municipal surface-water delivery data for Daly City, South San Francisco, San Bruno, Burlingame, Hillsborough, and Millbrae are provided in Bay Area Water Supply and Conservation Agency (BAWSCA) annual reports. Similarly, SFPUC staff provided water delivery data for the City of San Francisco. The refined delivery data generally increased annual water deliveries to some areas in some years but decreased deliveries to other areas and in other years.

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[4] Modified from Phillips, S.P., Hamlin, S.N., and Yates, E.B.,1993, “Geohydrology, water quality, and estimation of ground-water recharge in San Francisco, California, 1987-92”, U.S. Geological Survey Water-Resources Investigations Report 92-4019, 69 p. and Rantz, S.E., 1971, “Mean annual precipitation and precipitation depth-duration-frequency data for the San Francisco Bay region, California”, U.S. Geological Survey Open-File Report, 23 p.

[5] Rantz, S.E., 1971, Mean annual precipitation and precipitation depth-duration-frequency data for the San Francisco Bay region, California, U.S. Geological Survey Open-File Report, 23 p.

On the average, the improved water delivery data collectively increased water deliveries by 5 percent.

1.4 Pumpage

The model simulates monthly groundwater extractions at individual municipal and private wells. The actual monthly municipal extraction rates from individual wells for the 2006 through 2009 update were provided by the well owners (City of Daly City, California Water Services Company, and City of San Bruno). Metered irrigation pumping was also available from monitoring reports for several wells located in the San Francisco area (Elk Glen, North Lake, South Windmill Replacement, and Zoo 5). Additionally, annual pumpage by Lake Merced Golf and Country Club (wells 1, 2, & 3), Olympic Club (wells 8 and 9), and San Francisco Golf Club (west well) was provided as part of recycled water use reporting. All remaining private pumping was estimated using the updated climate data and irrigation demands calculated by the recharge preprocessor (SMB model). Additional information on wells and pumpage is provided in **Appendix A**.

1.5 Predicted 2009 Water Levels

After implementing the revisions and model updates described above, a test simulation was completed that utilized the version 2.1 aquifer parameter values. The results were then reviewed to assess how well the model forecasted groundwater conditions in 2009, which is almost 3 years after the version 2.1 calibration period. This test is similar to a model post-audit, whereby projected post-calibration water levels are compared to actual observed water levels to answer the question of how well the model predicted future conditions represented by data collected after the version 2.1 calibration ending date (December 2005).

Figure 6 shows average 2009 measured and simulated water table altitudes and deep aquifer piezometric heads. The measured water table altitude, represented by the shallowest well with standing water at each monitoring site, is compared in **Figure 6** to the simulated water level in the model cell corresponding to the monitoring well screen. Most of the vertical change in water levels occurs across the W-clay, and deep aquifer conditions were therefore represented by measured water levels in the deepest monitoring wells. Accordingly, the deep aquifer piezometric head was represented by the simulated head in layer 5.

In the northerly portion of the basin, there was reasonably good agreement between the measured and simulated water table from south of Golden Gate Park to central Daly City (Park Plaza monitoring site). South of the Park Plaza site, the simulated water table is generally lower than observed. In the deep aquifer, simulated heads were in reasonably good agreement with observed

water levels in the northern basin but greater than observed water levels in wells from the LMPS monitoring site south to the CUP-19 site located in Colma. Further south, the simulated deep aquifer heads were generally lower than observed water levels. In the southern portion of the basin, water table altitude and deep aquifer heads were therefore both under-predicted by the model.

The discrepancies between the post-audit results and observed water levels conceivably are caused by errors in simulated recharge and pumping rates, and/or incorrectly specified aquifer parameter values. Municipal pumping represents most of the groundwater extracted from the basin, and substantial errors in the specified pumping rates are not likely. Although the municipal pumping data were provided by multiple sources, the data represent metered values and a significant systematic error in the measured pumpage would have been necessary to impact the entire southern portion of the model. Similarly, aquifer parameter values were estimated for multiple subareas and were somewhat constrained by aquifer test analysis results. Although uncertainty can exist in modeled aquifer parameter values, these too are not likely the cause of under-predicted water levels over such a large area. We therefore concluded the lower simulated water table altitude is most likely explained by actual groundwater recharge being greater than simulated in the southern part of the basin.

The Shallow Groundwater Zone model simulates the attenuation and leakage of monthly deep percolation and ultimately the water that reaches the water table as groundwater recharge. It assumes the maximum leakage rate everywhere is greater than the maximum deep percolation rate (0.0262 feet per day), with the exception of the Colma Creek drainage area (defined by the historical area that naturally drained to Colma Creek) and Bay Plain area, which employ maximum leakage rates of 0.0008 and 0.0002 feet per day, respectively ("*Westside Basin Groundwater-Flow Model [version 2.0], Historical Calibration Run [1959-05] Results and Sensitivity Analysis",* HydroFocus, 2007). As a result, monthly deep percolation in version 2.1 was reduced in the Colma Creek drainage area and Bay Plain area relative to the northerly model areas. Relaxing the restriction on the maximum leakage rate increased simulated recharge and improved the comparisons between simulated and observed shallow water levels south of Daly City.

2.0 MODEL CALIBRATION

The refined model geometry, updated conceptual geologic framework, and version 2.1 post audit results all warranted an update to model calibration. The calibration adjustments were performed manually and utilized a trial-and-error approach, whereby modest adjustments were made to select model input to improve the comparisons between observed and modeled water levels.

Initial recalibration testing revealed that the comparison between observed and simulated water levels is improved by (1) increasing recharge in the Colma Creek drainage area; (2) reducing the conductivity across the Serra Fault; and, (3) adjusting the vertical conductivity in various model layers and locations. Additional details beyond what is provided below, including statistics and hydrographs of the re-calibration results are provided in **Appendix A**.

2.1 Recharge in Colma Creek Drainage Area

The Colma Creek drainage area generally coincides with the part of the basin where the simulated 2009 water levels are lower than observed (**Figure 6**). We therefore increased the maximum leakage rate specified in the Shallow Groundwater Zone model to improve comparisons between observed and simulated water levels. Increasing the maximum leakage rate from 0.0008 feet per day (3.5 inches per year) to 0.0014 feet per day (about 6 inches per year) improved comparisons between simulated and observed water levels in most shallow well locations in the Colma Creek drainage area.

Simulated water levels were still lower than observed in the Daly City-Colma area even after the maximum leakage rate was increased to about 6 inches per year. We further improved the comparisons between observed and simulated water levels by increasing the maximum leakage rate to about 11 inches per year within the geographic area corresponding to the main cemetery SMB zone (96) and several smaller adjacent zones (66, 73, 74, and 80). The location of these zones represents a transitional area between unrestricted deep percolation in the north and the maximum restricted deep percolation in the Colma Creek drainage area.

The simulated water table configuration using the version 2.1 aquifer parameters and the revised distribution of maximum leakage rates described above is illustrated in **Figure 7**. Comparisons between **Figure 6** and **Figure 7** show the improved agreement between simulated and observed water levels in the shallow (water table) aquifer as a result of increasing the maximum leakage rates in the Colma Creek drainage area. However, simulated deep aquifer heads exceed observed water levels at most locations in the central portion of the basin, indicating additional adjustments to the model are needed.

2.2 Fault Conductivity

In the southwestern portion of the basin, the Serra Fault is simulated as a no-flow boundary, whereas in the northwest it is simulated as a horizontal flow barrier (HFB) boundary. The HFB's were shown previously with the other boundary conditions in **Figure 4**. In MODFLOW, a HFB simulates groundwater movement between two areas separated by a relatively thin, vertical, low-permeability geologic feature such as a fault. Simulated water levels at the Park Plaza

monitoring well site (model layers 4 and 5), and in the deep aquifer at other locations (model layer 5) are sensitive to fault conductivity.

The comparisons between simulated and observed water levels were improved substantially by decreasing the overall HFB conductivity. The hydraulic conductivity was decreased along both the northern HFB segment (north of the Daly City area) and southern HFB segment (south of the Daly City area to San Bruno). Along the northern segment, the hydraulic conductivity in model layers 1 through 4 was decreased from 0.002 feet per day (version 2.1) to 0.00001 feet per day; in layer 5, the hydraulic conductivity was decreased from 0.002 (version 2.1) to 0.00002 feet per day. Along the southern segment, the hydraulic conductivity in model layers 1 through 4 was decreased from 0.0008 feet per day (version 2.1) to 0.00005 feet per day; in layer 5, the hydraulic conductivity was decreased from 0.0008 feet per day (version 2.1) to 0.00002 feet per day.

2.3 Hydraulic Conductivity

Monitoring sites constructed with clusters of multiple wells having relatively short screen intervals located at various depths reveal the spatial distribution of vertical hydraulic gradients and hydraulic effects of low-permeability beds that restrict the vertical movement of water between water-bearing zones. Model parameters were adjusted as needed to represent fine-grained beds and reduce the differences between observed and simulated water levels.

Table 1 summarizes the final distribution of simulated hydraulic conductivity. Relative to version 2.1, the most significant conductivity changes were to the magnitude and distribution of vertical conductivity that represent the resistance to flow from fine-grained sediment beds. With the exception of model layer 5, the vertical conductivity between layers generally decreased by factors ranging from 0.5 to 0.05 (one-half to one-twentieth) of the values employed in version 2.1. In model layer 5, the vertical conductivity generally increased by a factor of 10 relative to version 2.1. The relative changes to horizontal hydraulic conductivity were less extensive than the vertical conductivity changes. Horizontal conductivity values were adjusted in only five of the 20 parameter zones, and although the adjustments included both increases and decreases all but two were in layers 1 or 2 only and no clear spatial trend is observed.

Table 1: Horizontal and vertical hydraulic conductivity specified in the model, in feet per day.

Parameter Zone	*Horizontal (Kh) and Vertical (Kv) Conductivity*										
	Layer	1		2		3		4		5	
	ZONE	*Kh*	*Kv*	*Kh*	*Kv*	*Kh*	*Kv*	*Kh*	*Kv*	*Kh*	*Kv*
		Western Boundary/Ocean									
Ocean	14	6	0.6	6	0.6	6	0.0005	6	0.1	3	0.0001
Thornton Beach	3	0.01	0.0025	4	0.008	4	0.04	4	0.04	4	0.04
		Central Basin									
Golden Gate Park	4	16	0.4	16	0.4	16	0.4	16	0.4	16	0.4
Sunset District - N.	23	10	0.25	10	0.25	10	0.25	10	0.25	10	0.25
Sunset District - S.	30	10	0.1	10	0.1	10	0.0005	10	0.1	10	0.0001
Lake Merced Area (west)	1	12	0.1	12	0.05	12	0.005	6	0.05	3	0.0001
Berm	11	250	1								
Berm	20	250	1								
Lake Merced Area (east)	29	4	0.1	4	0.1	12	0.005	12	0.05	6	0.0001
Daly City Area (west)	24	6	0.1	6	0.1	6	0.1	6	0.05	3	0.0001
Daly City Area (central)	22	8	0.1	8	0.1	8	0.1	8	0.05	4	0.0001
Colma	9	6	0.01	8	0.1	8	0.0005	8	0.05	4	0.0001
South San Francisco	31	4	0.005	8	0.1	8	0.00075	8	0.05	4	0.1
San Bruno	21	2	0.005	2	0.01	7	0.0002	7	0.01	4	0.01
Millbrae/Burlingame	5	2	0.1	2	0.1	2	0.01	2	0.1		
		Eastern Boundary/Uplands									
Pan Handle	12	10	-N/A-								
Eastern Fringe - N.	7	12	-N/A-								
Eastern Fringe - S.	6	8	-N/A-								
		Eastern Boundary/Bay									
Bay Muds - N.	8	0.5	0.01	0.05	0.001	0.2	0.00025	0.2	0.1		
Bay Muds - S.	28	0.5	0.01	2.5	0.1	5	0.00025	0.2	0.1		

The general distribution of modeled horizontal and vertical conductivity is illustrated in **Figure 8**. Excluding the Bay Mud subareas, horizontal conductivities range from 2 to 16 feet per year and hydraulic conductivity decreases with depth (layer 5 represents water-bearing sediments beneath the W-clay, and modeled horizontal conductivity of these deep water-bearing sediments is one-half to one-fourth the horizontal conductivity of the overlying water-bearing sediments). The vertical conductivity of the clay beds is two to four orders of magnitude lower than the horizontal conductivity, and vertical conductivity also generally decreases with depth.

2.4 Results

Water Levels

The spatial distribution of simulated and observed 2009 water table altitude and deep aquifer piezometric head is illustrated in **Figure 9**. The agreement between observed and simulated 2009 water levels improved relative to the aquifer parameter values utilized by version 2.1 and shown in **Figure 6**; the discrepancies between observed and simulated water levels are generally greater in layer 1 (the water table) than layer 5 (the deep aquifer). Compared to the version 2.1 post audit, the simulated water table altitudes generally increased as a result of greater simulated recharge in the Colma Creek drainage area and lower vertical conductivity specified for layer 3. The lower vertical conductivity presumably improved representation of the significant clay beds identified in that depth interval (**Figure 1**).

A comparison between simulated and observed water levels over the entire model domain and simulation period is plotted in **Figure 10**. From a basin wide perspective, the root-mean-square-error (RMSE) calculated from the water level residuals is 18.9 feet.[6] The RMSE is a common statistical measure that expresses the average of the squared differences between modeled and observed water levels, and therefore on average, modeled water levels are within about 19 feet of observed water levels. Furthermore, the RMSE represents only about 4-percent of the total range in observed water levels across the model. The errors between modeled and observed water levels are therefore only a small part of the overall basin-wide model response. Lastly, the average difference between modeled and observed water levels is fairly small and positive (1.6 feet), indicating simulated water levels are on average slightly higher than the observed water levels. These findings together with comparisons between observed and modeled gradients and trends reported in **Appendix A** indicate the updated model is a reasonable tool for basin-scale analyses and comparisons of water resources management alternatives.

The RMSE values for the overall model and individual model parameter zones (model version 2.1 aquifer parameters and version 3.1) are summarized and

[6] The water levels in the CUP-10A -160, -250 and -500 are not considered when calculating the RMSE. The water levels in these three wells are inconsistent with the spatial pattern characterized by nearby wells of similar depth. For example, wells screened at the depth of model layer 4 at the Park Plaza, CUP-18, CUP-19, CUP-22A and A-Street sites all have water levels between -77 and -135 feet mean sea level, while the corresponding wells at the CUP-10A site had an average water level of +61 feet mean sea level. Similarly, wells screened at the depths of model layers 1 through 3 (DC-1, DC-8, Arco, CUP-18 and CUP-22) all had water levels in the range of -47 to -107 feet mean sea level, while the corresponding two wells at CUP-10 were substantially higher (+77 to +88 feet mean sea level). The cause of the anomalous water levels in CUP-10A-160, -250 and -500 is unknown, but the data from these wells are not considered representative of regional groundwater conditions.

compared in **Table 2**. After the model was re-calibrated, the overall RMSE decreased from 25.8 to 18.9 feet (a net decrease of 6.9 feet, or 26 percent). The re-calibrated aquifer parameters therefore improved the match between observed and modeled water levels.

Table 2. Statistical comparison between simulated and observed water levels in aquifer parameter zones, 1959-2009.

Parameter Zone		RMSE (feet)		
Number	Name	v. 2.1[a]	v. 3.1	Change
All		25.8	18.9	-6.9
12	Pan Handle	11.8	13.6	1.8
4	Golden Gate Park	7.7	7.6	-0.1
23	Sunset District-N	2.7	3.4	0.7
30	Sunset District-S	3.4	4.4	1.0
1	Lake Merced Area	13.8	8.6	-5.2
3	Thornton Beach	6.1	4.2	-1.9
24	Daly City (west)	45.7	19.3	-26.4
22	Daly City (central)	35.5	23.4	-12.1
9	Colma	38.5	26.1	-12.4
31	South San Francisco	34.9	27.0	-7.9
21	San Bruno	43.7	37.4	-6.3
5	Millbrae	32.5	22.3	-10.2
8	Bay Mud - N	19.0	26.2	7.2
28	Bay Mud - S	10.1	5.9	-4.2

a) Simulation uses version 2.1 aquifer parameters and updated recharge and pumping data sets (1959-2009) from version 3.1 (i.e., simulated water levels before aquifer parameter re-calibration).

At the scale of individual parameter zones, the match between observed and simulated water levels improved following re-calibration of the model version 2.1 aquifer parameters. In ten of the fourteen zones, the RMSE decreased from only 0.1 foot in Golden Gate Park (4) to almost 26 feet in Daly City-west (24). The aquifer parameter adjustments for version 3.1 therefore improved model performance in these ten zones relative to results using version 2.1 aquifer parameters. In contrast, the RMSE increased in four zones (Pan Handle, Sunset District North, Sunset District South, and Bay Mud North), indicating the match between observed and simulated water levels was made worse after the aquifer parameters were adjusted. The increases in the Pan Handle and two Sunset District zones were small relative to the overall model performance (0.7 foot to 1.8 feet relative to 18.9 feet for the entire model). However, the RMSE in the Bay Mud North zone increased 7.2 feet. The hydraulic interactions between San Francisco Bay and inland aquifers are not well understood, and further adjustments are not likely necessary because simulated inland water levels and volumetric water budgets are fairly insensitive to simulated conditions in the Bay Mud zone.

Model performance can also be assessed with linear regression by comparing simulated and observed water level trends at select wells over several years (2002 though 2005). **Table 3** reports the comparison between observed trends, simulated trends using version 2.1 aquifer parameters, and simulated trends using the re-calibrated aquifer parameters (version 3.1). In Daly City (Westlake DC-1, Westlake DC-2, and DC-8), the trends simulated by version 3.1 generally increased relative to observed trends and those simulated with the version 2.1 aquifer parameters. In South San Francisco (California Water Service wells SSF-02, -18, and -20), the trends simulated by version 3.1 generally decreased relative to the trends simulated with the version 2.1 aquifer parameters; the version 3.1 simulated trends were within 25- to 52-percent of observed trends. In San Bruno (SB-12), both version 3.1 and version 2.1 aquifer parameters simulated the same trend (7.9 feet per year), which is more than double the observed trend of 3.0 feet per year.

Table 3. Comparisons between observed and simulated water level trends in select wells, 2002-2005.

	Well	Trends				
		Observed Trend	*Version 2.1*		*Version 3.1*	
			Trend	*Difference* [a]	*Trend*	*Difference* [a]
Daly City	Westlake 1	10.8	8.2	-24%	9.0	-17
	Westlake 2	13.4	15.9	19%	16.8	25%
	DC-8	8.4	8.6	2%	9.2	10%
South San Francisco	SSF-02	6.6	3.2	-52%	1.9	-71%
	SSF-18	7.7	9.6	25%	7.7	0%
	SSF-20	8.8	11.9	35%	9.8	11%
San Bruno	SB-12	3.0	7.9	163%	7.9	163%

a) Difference is calculated between observed and simulated trends expressed as a percentage (100 x [simulated - observed]/observed).

Model application to local areas within the basin should consider the calibration comparisons between simulated water levels and trends and their implications for the reliability and interpretation of simulated subarea-scale groundwater conditions.

Volumetric Water Budget

We extracted the simulated volumetric water budget and summed the results for inland areas where municipal water supply wells and most private water wells are located (herein referred to as the “Developed Area”). Five water budget subareas are located within the Developed Area: San Francisco, Daly City, Colma, South San Francisco, and San Bruno. Groundwater flow from adjacent model areas

(i.e., beneath the Pacific Ocean, San Francisco Bay Plain, Millbrae, and across the Serra Fault) are included as net flow to or from the Developed Area.

Figure 11 summarizes the simulated historical average annual water budget components for each subarea (1982-2002). **Figure 11(a)** shows the budget results from model version 3.1, and **Figure 11(b)** shows the version 2.1 results reported as Figure 1 of the 2009 report. The 1982-2002 averaging period was selected because (1) average annual rainfall was approximately the same as the average of the long term record; (2) it generally represents existing land- and water-use conditions; (3) it minimizes uncertainty introduced by assumed initial groundwater conditions; and, (4) it does not include water level and storage changes that occurred as a result of the Conjunctive Use Pilot Project (CUPP) initiated in October of 2002 and the Lake Merced area recycled water project which began in 2005.

Comparing the combined recharge and pumpage for the Developed Area indicates that on average recharge exceeded pumpage by about 1,520 AF/yr. However, more than 3,000 AF/yr of recharge discharges to the Pacific Ocean, and when other inflows and outflows are considered (for example, inflow from beneath the Bay Plain, inflow across the Serra Fault, and outflow to Lake Merced), total simulated inflow (13,723 AF/yr) exceeded total outflow (13,549 AF/yr) by only 175 AF/yr. Hence, prior to the CUPP and recycled water projects, simulated groundwater storage in the Developed Area increased on average by 175 AF/yr. This increase in storage is a reversal from the almost 490 AF/yr decline reported in 2009 for the same averaging period using model version 2.1 and shown in **Figure 11(b)**. The primary changes to the simulated budget were an increase in recharge (717 AF/yr) and reduction in outflow to the Pacific Ocean (539 AF/yr).

3.0 2008 NO PROJECT SIMULATION

The updated model was utilized to analyze the 2008 No Project Scenario reported previously in 2009. The 2008 No Project Scenario simulates a 47-year continuation of anticipated land and water use conditions as of May 2008. It assumes no new projects are implemented, but includes new supply wells, planned operational changes to the magnitude and spatial distribution of pumpage, and existing recycled water projects in place as of May 2008.

Some 2008 No Project Scenario assumptions conceivably could be modified using current information on planned water management activities. For example, the model update extends the Historical Simulation period to 2009 and the No Project Scenario conceivably could also be extended to represent 2009 conditions, thereby increasing the simulation period from 47 to 51 years. Our approach, however, was to maintain the scenario length and assumptions identical to the analysis using model version 2.1 and reported in 2009.

The relevant modeling assumptions for the 2008 No Project Scenario are summarized below. They are essentially identical to what was reported in 2009 using version 2.1, but they are repeated here for completeness.

3.1 Initial Groundwater Levels

Model versions 2.1 and 3.1 both utilize simulated September 2002 water levels from their respective Historical Simulations as initial water levels for the first monthly stress period (October 2002) of the 2008 No Project Scenario.

3.2 Hydrology

Observed monthly rainfall and temperature for the period October 1958 through December 2005 are assumed to repeat and are overlain onto the 47-year simulation period.

3.3 Lake Merced

Lake geometry and initial lake level elevation is assumed equal to the updated September 2002 simulated elevation. Other lake assumptions during the simulation period include:

- No Vista Grande stormwater diversions into Lake Merced.
- No SFPUC or other water additions.
- No direct withdrawals from the lake.

3.4 Irrigation Water Use

Active Wells

Model versions 2.1 and 3.1 use the same irrigation wells to simulate the 2008 No Project Scenario. The list of irrigation wells and their 2008 activity status is provided in **Table 4**.

Pumping and Recharge

The 47-year monthly turf and landscape irrigation for the 2008 No Project Scenario is similar to the October 1958 through December 2005 values because (1) October 1958 through December 2005 monthly rainfall and temperature are repeated; and, (2) irrigated land use patterns, system losses, water application and use efficiencies, and runoff characteristics essentially remain the same. The exception is cemetery water use. In the Historical Simulation, the irrigated cemetery area increases from 584 acres to 749 acres during the period 1959 through 2005; whereas, in the 2008 No Project Scenario the irrigated cemetery area is constant at 749 acres.

Table 4. Irrigation wells and activity status in 2008 No Project Scenario.

Well Name	Date Installed	Activity Status
Golf Courses		
Burlingame Country Club	unknown	active
Calif. Golf No. 02	1924	active
Green Hills No. 05	1947	active
Harding Park	1931	abandoned
Lake Merced Golf No. 01	1964	active (a)
Lake Merced Golf No. 02	1964	active (a)
Lake Merced Golf No. 03	1986	active (a)
Olympic Club No. 04	1930's	inactive
Olympic Club No. 09	2001	active (a)
SF Golf West	1985	active (a)
Cemeteries		
Cypress Lawn No. 02	1964	active
Cypress Lawn No. 03	1962	active
Eternal Home	1978	active
Hills of Eternity No. 02	1965	active
Holy Cross No. 03	1948	active
Home of Peace No. 02	1966	active
Italian Cemetery	1955	active
Olivet	1969	active
Serbian Cemetery	1946	abandoned
Woodlawn No. 02	1962	active
Golden Gate Park		
Alvord Lake	1984	inactive
Arboretum No. 04	1926	inactive
Arboretum No. 05	1926	inactive
Elk Glen	1982	active
Windmill NE	1929	inactive
Windmill NW	1947	inactive
Windmill S	1926	active (b)
North Lake	2000	active
Other		
Hillsborough resid. 01	1989	active
Hillsborough resid. 02	1989	active
Hillsborough resid. 03	1989	active
Hillsborough resid. 04	1989	active
Hillsborough resid. 05	1989	active
Hillsborough resid. 06	1989	active
Hillsborough resid. 07	1989	active
Hillsborough resid. 08	1989	active
Hillsborough resid. 09	1989	active
Hillsborough resid. 10	1989	active
Hillsborough resid. 11	1989	active
Hillsborough resid. 12	1989	active
Edgewood School	1930	active
Stern Grove	1930	active (c)
Zoo No. 03	1930	abandoned
Zoo No. 04	1930?	inactive
Zoo No. 05	2000	active

Source: Modified from Table 2 "Water supply wells and simulated groundwater production", in "Westside Basin Groundwater-Flow Model, Historical Calibration run (1959-2000) results and sensitivity analysis", December 2007.

(a) Current primary irrigation water supply is recycled water; typically low use to completely inactive.

(b) Replacement well; similar location but different construction and simulated as new well in the model.

(c) Well recently re-habilitated with new pump, housing, meter, etc.

Recycled Water

The introduction of recycled water as an irrigation source to some turf areas has altered the quantity of irrigation water extracted from the aquifer. Beginning in 2005, tertiary-treated recycled water, with a maximum receivable capacity of 850 AF/yr, was delivered to the Olympic Golf Club, Lake Merced Golf and Country Club, and San Francisco Golf Club to meet irrigation demand.

Table 5 reports the annual proportional contribution of recycled water to annual irrigation water use by each of the three golf courses. During the period 2005-2007, 84- to 91-percent of the total metered water use was provided by recycled water. The resulting simulated annual total turf and landscape irrigation demand ranges from about 500 to 880 acre-feet per year (47-year average of about 700 AF/yr). For the 2008 No Project Scenario, recycled water use is therefore assumed to continue at the average proportions listed in **Table 5**

Table 5. Contribution of recycled water to irrigation water use, 2005-2007.

Recycled Water User	***Percent Contribution to Annual Irrigation Water Use*** [a]			
	2005	2006	2007	Average
Lake Merced Golf and Country Club	95%	nr	76%	86%
Olympic Golf Club [b]	99%	nr	99%	99%
San Francisco Golf Club	74%	nr	75%	75%
Combined Total	91%	84%	88%	88%

nr is "not reported".

a) Percentages calculated from annual recycled water and groundwater use reported in "2007 Annual Groundwater Monitoring Report, Westside Basin, San Francisco and San Mateo Counties, California", Prepared by San Francisco Public Utilities Commission, April 2008.

b) The Olympic Club has two active irrigation wells (no. 8 and no. 9). Olympic Well no. 9 is a relatively new production well, and was added to the 2008 No Project Scenario model input data set. Pumpage was assumed to have switched from well no. 4 to wells no. 8 and no. 9. However, the current primary supply is recycled water, and actual well use is therefore assumed low (1-percent of the total water use).

3.5 Municipal Water Use

Total municipal water supply is assumed constant and equal to the anticipated groundwater production rates projected by the different purveyors as of May 2008, with the exception of drought periods where surface- and groundwater use decrease by 4- and 2-percent per year, respectively. Municipal pumping rates and patterns for the 2008 No Project Scenario assume there is no in-lieu recharge project, and annual pumping rates are based on historical well activity, current system capacities, or planned pumping levels.

Table 6 summarizes assumed municipal pumping rates simulated in the 2008 No Project Scenario. Model versions 2.1 and 3.1 both used these same rates. The pumping rates remained constant throughout the simulation period, with the exception of drought periods (the 47-year average annual groundwater use is slightly less than the assumed 2008 municipal pumping rates reported in **Table 6** due to simulated decreases in water use during drought periods). The municipal pumping rates are based on assumed conditions as of May 2008, and may be different from actual pumping rates in 2008 and beyond. Furthermore, the continuation of assumed 2008 pumping rates into the future can change as a result of ongoing water management planning activities and their influence on current and projected basin water supplies.

Table 6. Assumed annual 2008 No Project Scenario municipal groundwater pumping, in acre-feet per year.

Municipality	***Groundwater***
City of San Francisco [a]	0
City of Daly City	3,840 [b]
South San Francisco (Cal Water)	1,534 [c]
City of San Bruno	2,350 [d]

a: Estimated groundwater extractions in San Francisco subarea of the Westside Basin. Groundwater component does not include groundwater use by Golden Gate Park, San Francisco Zoo, other parks, and schools (which are included under irrigation water use).
b: Current annual use level (City of Daly City, written communication, May 21, 2008).
c: Planned annual use level (California Water Services Company, written communication, March 3, 2008).
d: 2007 Calendar Year pumpage, which represents typical annual use (WRIME, written communication, May 5, 2008).

Table 7 summarizes the simulated allocation of total annual pumpage between individual active municipal wells, which is assumed to remain constant throughout the entire 2008 No Project Scenario.

Table 7. 2008 No Project Scenario municipal pumpage distribution among production wells.		
Model data base well number	**Common Name**	**Proportion of Annual Municipal Pumpage**
City of Daly City [a]		
1	A-Street	0.00
16	Jefferson	0.19
17	Vale	0.26
21	No. 4	0.10
62	Westlake	0.20
--- [b]	Junipero Serra	0.25
	Sum	1.00
South San Francisco (Cal Water) [c]		
7	CWS-14	0.11
8	CWS-15	0.07
9	CWS-17	0.00
10	CWS-18	0.20
11	CWS-19	0.20
12	CWS-20	0.19
13	CWS-21	0.23
	Sum	1.00
City of San Bruno [d]		
49	No. 15 (Commodore)	0.12
50	No. 16 (Forest Lane)	0.26
51	No. 17 (Corporation Yard)	0.13
52	No. 18 (Cypress)	0.14
89	No. 20 (Lions Park)	0.35
	Sum	1.00

a: Proportions based on current use levels (Daly City, written communication, May 21, 2008).
b: The Junipero Serra well is located about 330 feet from DC-10, but its well screens are deeper than DC-10. We therefore added the Junipero Serra well to the 2008 No Project well input data set (new model data base well number 90).
c: Proportions based on reported 1998-2002 average annual production. The Cal Water wells are located in close proximity to each other and within a small area relative to the basin and regional model grid. Specifically, Cal Water's wells are distributed between 6 model cells located within a contiguous 3x4 block of 12 cells. The proportional distribution of annual pumping between individual Cal Water wells therefore will not significantly influence simulated results summarized for the subarea or basin.
d: Proportions based on 2007 well production during April through October, which was a recent period when all 5 wells were on-line (WRIME, written communication, February 15, 2008).

3.6 Recharge

Simulated monthly recharge in water budget subareas is determined from both municipal water use and the historical temperature and rainfall records.

3.7 Simulation Results

Figure 12 summarizes annual simulated recharge, pumpage, and cumulative storage[7] changes for the Historical Simulation and the 2008 No Project Scenario (version 3.1). The budget components are plotted for Developed Area subareas (the San Francisco, Daly City, Colma, South San Francisco, and San Bruno water budget subareas). The temporal and spatial variability in recharge for the 2008 No Project Scenario is similar to the Historical Simulation, except for a slight decrease in temporal variability in the Colma subarea. This exception is due to increases in the developed cemetery area during the Historical Simulation (the irrigated area increases from 584 to 749 acres) but assumed constant cemetery development level in the 2008 No Project Scenario (assumed constant irrigated area of 749 acres). The differences in recharge between subareas are attributed to land use, hydrogeologic conditions, and subarea size. The differences in pumpage between subareas are determined by municipal water demand, the water supply mix, private well activity, and delivery of recycled water to Lake Merced area golf courses for irrigation.

Figure 13 shows the average annual simulated 2008 No Project Scenario groundwater budgets for the San Francisco, Daly City, Colma, South San Francisco, and San Bruno water budget subareas. **Figure 13(a)** shows the version 3.1 results, and **Figure 13(b)** shows the version 2.1 results reported as Figure 8 of the 2009 report. The average storage changes are consistent with the cumulative storage changes within each subarea shown in **Figure 12**; groundwater storage increases in the San Francisco subarea (average increase of 182 AF/yr), increases in the Daly City subarea (average increase of 28 AF/yr),

[7] In **Figure 12,** simulated storage beneath San Bruno increases about 6,400 acre-feet during 1977-1991 (average increase of about 430 AF/yr). Close inspection of the results indicate the accretion occurs primarily in the water table aquifer represented by model layer 1. The accretion may be explained by low starting water levels specified for layer 1, thereby providing evacuated storage space to accumulate water table recharge, changes in annual pumping rates, and changes in the depth distribution of pumping. Observed water level data are limited in the San Bruno area to confirm or refute the initial water table conditions specified in the model, but testing and refining of initial shallow water levels could be investigated as part of a future model update. The simulated average annual pumping rate during 1959-1976 (2,220 AF/yr) is 650 AF/yr greater than during 1977-1991 (1,585 AF/yr), and the difference of sufficient magnitude to influence the storage accretion rate noted in **Figure 12**. Lastly, prior to 1993 some San Bruno wells were partially screened in layer 1 and therefore had direct influence on the simulated water table. Since 1993, those wells have been abandoned and groundwater is now extracted from the deeper water bearing zones only.

and decreases in the Colma, South San Francisco, and San Bruno subareas. The depletion rates range from 20 AF/yr in the San Bruno subarea to 163 AF/yr in the South San Francisco subarea.

Figure 14 shows the simulated cumulative change in groundwater storage for the Historical Simulation and 2008 No Project Scenario (the cumulative storage change for a stress-and-response pumping sensitivity test is also shown but not discussed until later in **Section 4.0** of this report). In the Developed Area, the 2008 No Project pumping rates and Lake Merced area recycled water project result in approximately no net change in groundwater storage (a combined annual storage increase of 2 AF/yr for the entire Developed Area). However, the simulated storage change within the individual subareas can be significantly different from the basin wide average. In the north (San Francisco subarea), groundwater storage increases 182 AF/yr, whereas in the south (Daly City, Colma, South San Francisco, and San Bruno subareas) the net change is a decrease in storage of 180 AF/yr. The accretion rate in the north is only slightly greater than simulated previously using model version 2.1, but in the south the depletion rate has decreased substantially (a reduction of more than 550 AF/yr). The simulated long-term imbalance between recharge and extraction has therefore decreased considerably as a result of new insights provided by recent data collection efforts.

There are several large changes in the subarea water balances resulting from the model update. Estimated pumpage in the San Francisco subarea increased by 351 AF/yr; an apparent discrepancy in metered pumping at the time of the 2009 report has been resolved and the new data support using the higher SMB-estimated irrigation pumping. Additionally, recharge in the San Francisco subarea decreased by 641 AF/yr because of the changes to the simulated rainfall distribution. These two changes were balanced primarily by a decrease in ocean outflow (a decrease of 1,031 AF/yr) and southward flow to Daly City (a decrease of 66 AF/yr). The reduced hydraulic conductivity of the Serra Fault decreased inflow into Daly City from the Merced Uplands by 446 AF/yr. The decreased inflow to the Daly City subarea from the north and across the Serra Fault (a total decrease of 512 AF/yr) caused more groundwater to come from the Colma subarea and a reversal in net flow direction (a net increase of inflow to Daly City of 614 AF/yr). Recharge to the Daly City subarea decreased by 54 AF/yr, but recharge increased in the Colma, South San Francisco, and San Bruno subareas by 554, 552, and 261 AF/yr respectively. The remaining changes between version 3.1 and 2.1 water balances were generally small (less than 200 AF/yr).

4.0 PUMPING SENSITIVITY ANALYSIS

In the southern part of the Developed Area, model results indicate that continuous pumping at 2008 No Project rates could cause a modest decline in future groundwater storage and water levels. Although model results indicate a small net annual increase in simulated storage within the Daly City subarea, the

combined change in all four southerly subareas indicates a storage decline of 180 AF/yr. Depletion of groundwater storage and declining water levels in pumped aquifer zones could increase potential for exposed screens in some wells (which would reduce well efficiency and pumping rates), potentially damage the well, and possibly require lowering of pump intakes and eventual deepening or replacement of wells. Additionally, simulated water levels near San Francisco Bay may decline and increase the risk of potential water quality degradation by saltwater.

We tested the sensitivity of the storage depletion to municipal pumping rates by simulating an alternative, hypothetical municipal pumping distribution. The alternative pumping distribution is intended to result in a net groundwater storage change of zero in the Daly City, South San Francisco, and San Bruno subareas. The target of zero net storage change over the 47-year simulation period could be considered as a starting point for sustainable yield studies; however, it should not be assumed that existing water levels are indefinitely sustainable and without adverse impacts. For example, inland water levels in the southern part of the Developed Area northwest of San Francisco Bay are presently below sea level and indicate a potential risk of water quality degradation by saltwater, though no water quality data to date have indicated this has definitively occurred. Furthermore, a perennial extraction rate for municipal wells assumes private well owners do not change groundwater use patterns relative to 2008 No Project conditions and that no other adverse effects of pumping were to occur.

One simulated attempt to achieve the zero storage change could be to adjust annual subarea municipal pumping rates by amounts equal to the corresponding projected change in groundwater storage [see **Figure 13(a)**]. Accordingly, the specified annual pumping rate in the Daly City subarea would increase from 3,815 AF/yr to 3,843 AF/yr (a net increase in specified pumping rate of almost 30 AF/yr), whereas the specified pumping rates in the South San Francisco and San Bruno subareas would decrease to 1,588 and 2,300 AF/yr, respectively (net decreases in specified pumping rates of about 160 and 20 AF/yr). This approach is herein referred to as a “storage-based” pumping sensitivity test.

Figure 15 shows the simulated subarea water balances for the storage-based pumping sensitivity test. In the Daly City subarea, the 29 AF/yr increase in pumpage is supplied primarily by proportionally more groundwater inflow from the Colma subarea, essentially resulting in an increase in the upward groundwater storage trend beneath the Daly City subarea from 28 to 36 AF/yr. In the South San Francisco subarea, the 163 AF/yr decrease in pumpage reduces the annual storage depletion from 163 to 103 AF/yr (a net improvement of 60 AF/yr), and in the San Bruno subarea the 21 AF/yr decrease in pumpage results in an annual storage increase of 6 AF/yr (a net improvement of 26 AF/yr). In summary, groundwater accretion in the Daly City and San Bruno subareas indicates additional pumping may not deplete the storage in those subareas;

groundwater continues to be depleted in the Colma and South San Francisco subareas even after pumping rates are decreased but at a reduced rate.

The water balance results in **Figure 15** and discussion above indicate that the relationships between subarea pumping rates and projected subarea storage changes are not one-to-one because changes in pumping affect all head-dependent items in the water balance (for example, flows between subareas, across faults and across the ocean and bay boundaries). Consequently the change in storage is always smaller than the change in pumping, and the pumping rate adjustments designed to reach a zero storage change objective are not intuitive. A “stress-and-response” approach was therefore employed to estimate the municipal extraction rates to achieve zero storage change. The stress-and-response approach is described as follows.

First, the sensitivity of the simulated storage change to incremental pumping rate adjustments was quantified for the Daly City, South San Francisco, and San Bruno subareas using the groundwater-flow model. Pumping adjustments were not included for the Colma subarea because (1) pumping in the Colma subarea is entirely from private wells; and, (2) the 2008 No Project Scenario assumes irrigated land use patterns, system losses, water application and use efficiencies, and runoff characteristics are constant for the 749 acres of irrigated cemetery in the Colma subarea. After systematically calculating the stress responses for each subarea, they were combined into a set of linear equations and simultaneously solved for the pumping rates that resulted in no (zero) net change in storage. In effect, the procedure increases pumping rates within model subareas where projected groundwater storage is increasing, and decreases pumping rates within subareas where projected groundwater storage is decreasing. Additionally, the municipal extraction rates induce changes in the exchange of groundwater between the basin, Pacific Ocean, San Francisco Bay, and across internal subarea boundaries. These relationships are represented by the model and are therefore also accounted for in the stress-and-response approach results.

The stress-and-response pumping rate adjustments meet the objective of no net change in storage in the Daly City, South San Francisco, and San Bruno subareas. **Table 8** summarizes the 2008 No Project and stress-and-response pumping sensitivity test, and results indicate that 2008 No Project pumping rates in the Daly City and San Bruno subareas can increase by 348 AF/yr and 359 AF/yr (about 0.3 MGD each), whereas the pumping rate needs to decrease in the South San Francisco subarea by 849 AF/yr (0.76 MGD). Where municipal pumpage is simulated (the Daly City, South San Francisco, and San Bruno subareas), the net change in storage is zero. However, where municipal wells do not exist (the Colma and San Francisco subareas) storage increases by 10 AF/yr and 166 AF/yr, respectively. The storage increase in the San Francisco subarea is 16 AF/yr less than before the stress-and-response pumping rate adjustments. From a basin wide perspective, the stress-response pumping distribution results

in a 176 AF/yr average accretion in groundwater storage (see cumulative storage change for the stress-and-response test results plotted in **Figure 14**). Accordingly, extractions can likely increase in the Colma and San Francisco subareas and still maintain a long-term storage balance in the Developed Area.

Table 8. Simulated Annual Pumpage from Municipal and Private wells for the 2008 No Project Scenario and the Stress-and-Response Pumping Sensitivity Test (negative storage change indicates a decrease in storage).

Subarea	2008 No Project Pumpage (AF/yr)			Pumping Sensitivity Test (AF/yr)		
	Municipal	Private	Average Storage Change	Municipal	Private	Average Storage Change
San Francisco	0	-1,806	182	0	-1,806	166
Daly City	-3,788	-27	28	-4,136	-27	0
Colma	0	-858	-25	0	-858	10
South San Francisco	-1,514	-237	-163	-665	-237	0
San Bruno	-2,320	0	-20	-2,679	0	0
TOTAL	**-7,622**	**-2,928**	**2**	**-7,480**	**-2,928**	**176**

Figure 16 shows the average annual simulated subarea water budgets from the stress-and-response pumping sensitivity test. The water budget components can be compared with their corresponding flows from the 2008 No Project scenario shown in **Figure 13(a)**. The 348 AF/yr pumping increase in the Daly City subarea is compensated by a reduction in outflow to the Pacific Ocean (about 52 AF/yr), an increase in subsurface inflow from the Colma subarea (about 236 AF/yr), and an increase in subsurface inflow from the San Francisco subarea (80 AF/yr). The 849 AF/yr pumping decrease in the South San Francisco subarea eliminated the 163 AF/yr storage depletion simulated under 2008 No Project conditions and reduced subsurface inflow from beneath the Bay Plain by 16 AF/yr. The 359 AF/yr pumping increase in the San Bruno subarea was offset by an increase of 354 AF/yr of subsurface inflow from South San Francisco; the subsurface inflow to the San Bruno subarea from beneath the Bay Plain decreased by 8 AF/yr.

The stress-and-response sensitivity test reveal other effects of increasing the pumping rates in Daly City and San Bruno, which would need to be considered from a groundwater basin management perspective. For example, the increased pumping in Daly City produces additional potential drawdown beneath Daly City and in the Lake Merced area located north of Daly City. Similarly, the increased pumping in San Bruno produces additional potential drawdown in the San Bruno area (see **Attachment A-2 in Appendix A** for comparisons between simulated 2008 No Project and stress-and-response water level hydrographs).

5.0 UNCERTAINTY IN SIMULATED WATER BUDGET

Simulated groundwater storage changes are determined in part by the measured or estimated pumping and recharge rates provided as model input. More than 70-percent of the groundwater extracted from the Westside Basin is municipal pumpage. The municipal pumping rates are determined from metered pumpage, whereas private irrigation well pumping rates are estimated by the recharge preprocessor. The recharge preprocessor calculates recharge values for input to the groundwater-flow model and also estimates irrigation pumping, all using a transient soil-moisture accounting approach (SMB model). The SMB model utilizes physical conditions, land use characteristics, monthly water use, climatic data, and other factors to estimate pumpage for irrigation. Recharge from rainfall and applied water is also estimated by the SMB model. The uncertainty in groundwater storage changes simulated by the model due to potential uncertainty in SMB pumpage and recharge estimates is therefore assessed below.

Municipal pumpage is metered and inherently includes uncertainty in the metering devices; however, greater uncertainty is likely associated with SMB-estimated pumping rates for private wells. For example, during the period 2005-2008 the SMB model estimated a combined average annual irrigation rate for three Lake Merced area golf courses of 652 AF/yr (1.11 feet per year). The actual water use by these golf courses based on reported recycled water deliveries and groundwater use indicated a lower irrigation requirement of only 632 AF/yr (1.07 feet per year). The SMB model calculations therefore over-estimated private pumping for turf irrigation by 3-percent. In the Colma subarea, the SMB model estimates almost 860 AF/yr of groundwater extracted by private wells to irrigate cemeteries. Monitoring groundwater extraction by private wells in the Colma subarea will improve the reliability of simulated pumping rates in that portion of the model. If the metered values also turn out less than the SMB model estimates, it could reduce groundwater depletions simulated in the southern portion of the Developed Area.

Simulated groundwater storage changes are sensitive to the uncertainty in recharge. In 2007, HydroFocus assessed the sensitivity of recharge estimates to the uncertainty in SMB model input. They tested the sensitivity of estimated recharge to various model input variables and concluded it was highly sensitive to four variables (mean annual rainfall, runoff from soil, irrigation efficiency, and sewer and water pipe leak rates). Input-specific uncertainty resulted in changes to estimated recharge that range from a 17-percent decrease to 9.5-percent increase. For example, the rainfall sensitivity test described in **Appendix A** indicated a change in the rainfall averaging period, and resulting adjustments to the rainfall contour map resulted in a 3-percent increase in recharge and 57-percent decrease in simulated storage depletion for the Developed Area.

Uncertainty in pumpage and recharge can influence simulated groundwater storage changes. In the 2008 No Project Scenario, the simulated decline in storage in the southern portion of the Developed Area (180 AF/yr) is 16-percent of the un-metered pumpage in the basin (1,122 AF/yr). Hence, efforts to manage municipal pumping rates and groundwater storage require continued metering to track future water levels and verify projected groundwater storage conditions. Expanding the current monitoring efforts to include metered pumpage from private wells will substantially reduce water budget uncertainty. Furthermore, future model updates including verification of SMB model recharge estimates can substantially reduce water budget uncertainty.

6.0 SUMMARY AND CONCLUSIONS

This memorandum documents new information incorporated into the Westside Basin Groundwater-Flow Model including an almost 3-year extension of the Historical Simulation period to include January 2006 through September 2009. The previous model is referred to as version 2.1, and the updated model is herein referred to as version 3.1. As part of this update, we adjusted simulated recharge and aquifer parameters to improve comparisons between observed and modeled water levels at new well locations constructed since 2006. We employed the model to simulate assumed 2008 No Project conditions and assessed the sensitivity of basin storage to the magnitude and distribution of municipal pumping rates and rainfall.

Since 2005, the available information for model construction and calibration increased substantially:

- Semi-annual water quality sampling, various water level measurements, and water use information collected and made available in annual basin monitoring reports for calendar years 2005 through 2009. The monitoring and reporting is done by San Francisco Public Utilities Commission (SFPUC) staff in cooperation with the City of Daly City, California Water Services Company, and the City of San Bruno.

- New monitoring wells constructed at ten sites throughout the basin as part of planning efforts for the Regional Groundwater Storage and Recovery Project, San Francisco Groundwater Supply Project, and Lake Merced lake level management plan. Most of the sites include multiple wells constructed with relatively short screen intervals installed at different depths. The data provide detailed information on vertical hydraulic gradients in areas where information did not previously exist.

- New borehole data and an updated conceptual geohydrologic framework presented in *"Final Task 8B Technical Memorandum No. 1, Hydrologic Setting of the Westside Basin*", LSCE, May 5, 2010. This report included

refined basin cross-sections inferring the spatial distribution of depth to bedrock and thickness and extent of aquifers and confining beds.

The updated model (version 3.1) includes the following changes and improvements.

- Improved model geometry, discretization, and additional calibration locations were incorporated.

- The number of parameter zones was increased and boundaries refined to account for updated geologic information and the spatial distribution of new monitoring well locations.

- Drain boundaries were added to simulate evaporation from a shallow water table and groundwater seepage to San Francisco Bay.

- The rainfall contour map was reinterpreted in the western portion of the model area, and the procedures for specifying the spatial distribution of simulated recharge were improved and refined. Rainfall data from a gauge at the Lake Merced Pump Station was included and the recharge input data set extended to include the period January 2006 through September 2009.

- Simulated pumpage was extended to include the period January 2006 through September 2009.

- Maximum leakage rates were increased in the Colma Creek drainage area to increase recharge and improve the comparison between the observed water levels in shallow wells located in that part of the basin.

- Hydraulic conductivity across the Serra Fault, horizontal conductivity east of Lake Merced, and vertical conductivity between model layers representing significant clay beds were adjusted to improve the comparisons between observed and simulated water levels.

The root-mean-square error (RMSE) is a common statistical measure that expresses the average of the squared differences between modeled and observed water levels. The RMSE is one measure to gauge model performance and was used to assess the updated results. From a basin wide perspective, the RMSE decreased from 25.8 feet using version 2.1 aquifer parameter values to 18.9 feet following our parameter adjustments. On average, modeled water levels are therefore within about 19 feet of observed water levels on a basin-wide basis. The 6.9 feet decrease in the RMSE indicates the aquifer parameter adjustments substantially improved the match between modeled and observed water levels. Comparisons between observed and modeled gradients and trends further confirmed that the model is a reasonable tool for basin-scale analyses and comparison of water resources management alternatives.

The RMSE decreased in ten of fourteen model parameter zones. The decrease in RMSE ranged from 0.1 foot in the Golden Gate Park zone to about 26 feet in the Daly City (west) zone. Aquifer parameter adjustments therefore improved the match between observed and simulated water levels in these ten zones. In contrast, the RMSE increased in four zones. The increase in three of the zones was small relative to overall model performance (0.7 foot in the Sunset District North zone, 1.0 foot in the Sunset District South zone, and 1.8 feet in the Panhandle zone). The RMSE in the Bay Mud North zone increased 7.2 feet, but hydraulic interactions between San Francisco Bay and inland aquifers are not well understood. Furthermore, the simulated inflow to San Bruno from beneath the adjacent Bay Mud zone is fairly insensitive to parameter value changes (within the range of aquifer parameter values tested). Application of the model to local areas within the basin should consider these calibration errors and the implications of those errors for the reliability and interpretation of subarea-scale results.

We extracted the simulated volumetric budgets and summed the results for inland areas where most of the groundwater is used (referred to in this report as the “Developed Area”). The Developed Area includes the San Francisco, Daly City, Colma, South San Francisco, and San Bruno water budget subareas. During 1982-2002 average annual recharge exceeded annual pumpage by over 1,500 acre-feet per year (AF/yr). However, more than 3,000 AF/yr discharged to the Pacific Ocean, and when all modeled inflows and outflows are considered groundwater storage increased by 175 AF/yr. The increase in storage is a reversal from the almost 490 AF/yr decline reported in 2009 for the same averaging period using model version 2.1.

Simulated groundwater storage changes are determined in part by the specified magnitude and distribution of pumping and recharge rates in the model. More than 70-percent of modeled pumpage is from metered municipal wells, whereas the remaining pumpage (28-percent) is estimated. A Soil Moisture Budget (SMB) model is employed to estimate un-metered pumping and groundwater recharge based on physical conditions, land use characteristics, monthly water use, climatic data, and other factors. A considerable portion of the uncertainty in the simulated groundwater budget is a result of uncertainty in un-metered pumping and recharge produced by the SMB model calculations. Metering well pumpage and verification of SMB-estimated recharge rates reduce uncertainty in the simulated water budget.

The 2008 No Project Scenario simulates a 47-year continuation of existing or anticipated land and water use conditions as of May 2008. It assumes no new projects are implemented, but includes new supply wells, planned operational changes to the magnitude and spatial distribution of pumpage, and continuation of existing recycled water projects in place as of May 2008. Within the Developed Area, the 2008 No Project Scenario depletion rate simulated by model version

2.1 was almost 590 AF/yr. In contrast, model version 3.1 indicates a reversal in the storage trend and a small accretion rate of about 2 AF/yr. The storage trend reversal is primarily the result of greater simulated recharge in the southern portion of the basin and less groundwater outflow from the San Francisco subarea to the Pacific Ocean.

Model version 3.1 indicates projected annual 2008 No Project groundwater storage trends are positive in the San Francisco subarea (average increase of 182 AF/yr) and the Daly City subarea (average increase of 28 AF/yr). South of the Daly City subarea, the projected annual groundwater storage trends are negative: 25 AF/yr in the Colma subarea, 163 AF/yr in the South San Francisco subarea, and 20 AF/yr in the San Bruno subarea. The net change in the southern portion of the Developed Area (Daly City, Colma, South San Francisco, and San Bruno subareas combined) is a depletion rate of 180 AF/yr, which is substantially lower than the depletion rate simulated previously by model version 2.1 (almost 740 AF/yr).

The spatial distribution in storage depletion is explained by the spatial changes in 2008 No Project pumping rates. In the north, annual pumpage in the San Francisco and Daly City subareas decreases as a result of recycled water use by Lake Merced area golf courses (a net pumping decrease of 733 AF/yr relative to 1982-2002 average conditions). In contrast, annual pumpage in the South San Francisco and San Bruno subareas increases relative to 1982-2002 average conditions (a net increase of 828 AF/yr).

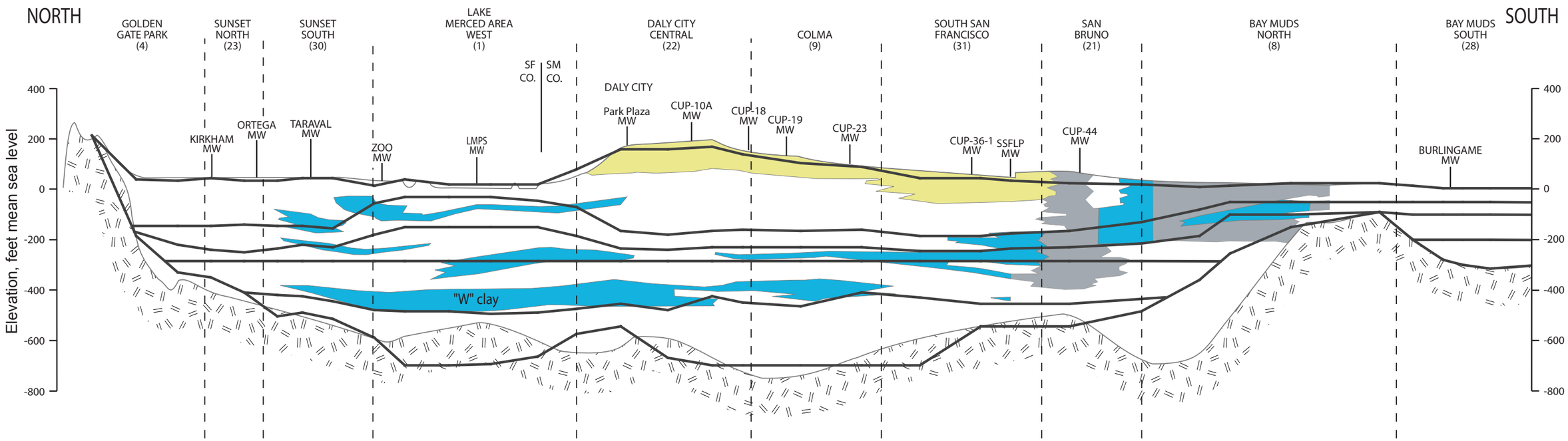
The relationships between municipal pumping rates and projected storage changes are not one-to-one because changes in pumping also affect flow between subareas, across faults, and to and from the Pacific Ocean. We therefore employed a stress-and-response approach to test the sensitivity of simulated groundwater storage changes in the southern part of the Developed Area to the distribution and intensity of 2008 No Project Scenario municipal pumping rates. The procedure increased pumping rates within model subareas where projected groundwater storage increased, and decreased pumping rates within subareas where projected groundwater storage decreased. Additionally, it considers the complex relationships between municipal pumping rate changes and their effects on the subsurface water movement between subareas and at the boundaries of the Developed Area (i.e., the hydraulic interactions between basin groundwater, the Pacific Ocean, and San Francisco Bay).

The stress-and-response approach achieved zero net change in groundwater storage within the Daly City, South San Francisco, and San Bruno subareas. The approach indicates the balance can be achieved by increasing the 2008 No Project municipal pumping rates in the Daly City and San Bruno subareas by 348 AF/yr and 359 AF/yr, respectively, and decreasing the municipal pumping rate in the South San Francisco subarea by 849 AF/yr. In this sensitivity analysis, the modified annual average municipal pumping rates for the Daly City, South San

Francisco, and San Bruno subareas were 4,136 AF/yr, 665 AF/yr, and 2,679 AF/yr (3.7, 0.6, and 2.4 million gallons per day, respectively). These pumping rates represent a net decrease of only 142 AF/yr, but reverse the simulated storage decline from an annual depletion rate of 180 AF/yr to an annual accretion rate of 10 AF/yr. Hence, the stress-and-response results maximized the combined municipal pumping rate, achieved the objective of no net change in groundwater storage (in subareas where municipal pumping exists), and resulted in greater overall groundwater storage accretion in the Developed Area (an increase from 2 AF/yr to 176 AF/yr). There was an accretion of groundwater storage within the San Francisco Subarea (166 AF/yr), which was 16 AF/yr less than the 2008 No Project scenario, and Colma Subarea (10 AF/yr) which was 35 AF/yr greater than the 2008 No Project scenario.

The stress-and-response approach revealed other effects of increasing the pumping rates in Daly City and San Bruno, which would need to be considered from a groundwater basin management perspective. For example, the increased pumping in Daly City produced additional potential drawdown beneath Daly City and in the Lake Merced area located north of Daly City. This increased drawdown increased the simulated inflows from the San Francisco subarea (80 AF/yr) and the Colma subarea (236 AF/yr). Similarly, the increased simulated pumping in San Bruno produced additional potential drawdown beneath parts of San Bruno and increased the simulated inflows from South San Francisco (354 AF/yr), the Bay Plain (8 AF/yr), and inland areas south of San Bruno (17 AF/yr).

The target of zero net storage change over the 47-year simulation period could be considered as a starting point for sustainable yield studies; however, it should not be assumed that existing water levels would be indefinitely sustainable and without risk of future adverse impacts. Efforts to manage groundwater storage by controlling municipal pumping rates would require continued monitoring to track future water levels and verify projected groundwater storage conditions and the potential for adverse effects. Expanding the current monitoring efforts to include metered pumpage from private wells would reduce uncertainty associated with that component of the simulated water budget. Furthermore, future model updates including verification of SMB model recharge estimates could reduce water budget uncertainty.



EXPLANATION

COLMA (9) — Aquifer Parameter zone name and number

Aquifer Parameter zone boundary

Model layer

"Blue" Clay

Blue & Gray Clays with Sand & Clay and Sand Beds

Clay & Sand, Red & Brown Soil Zone

Sand, Sand & Gravel or Sandy Gravel

Bedrock

Note: Modified from North South Geologic Cross Section, Final Task 8B Technical Memorandum No. 1, Hydrologic Setting of the Westside Basin, Luhdorff & Scalmanini Consulting Engineers, May 5, 2010.

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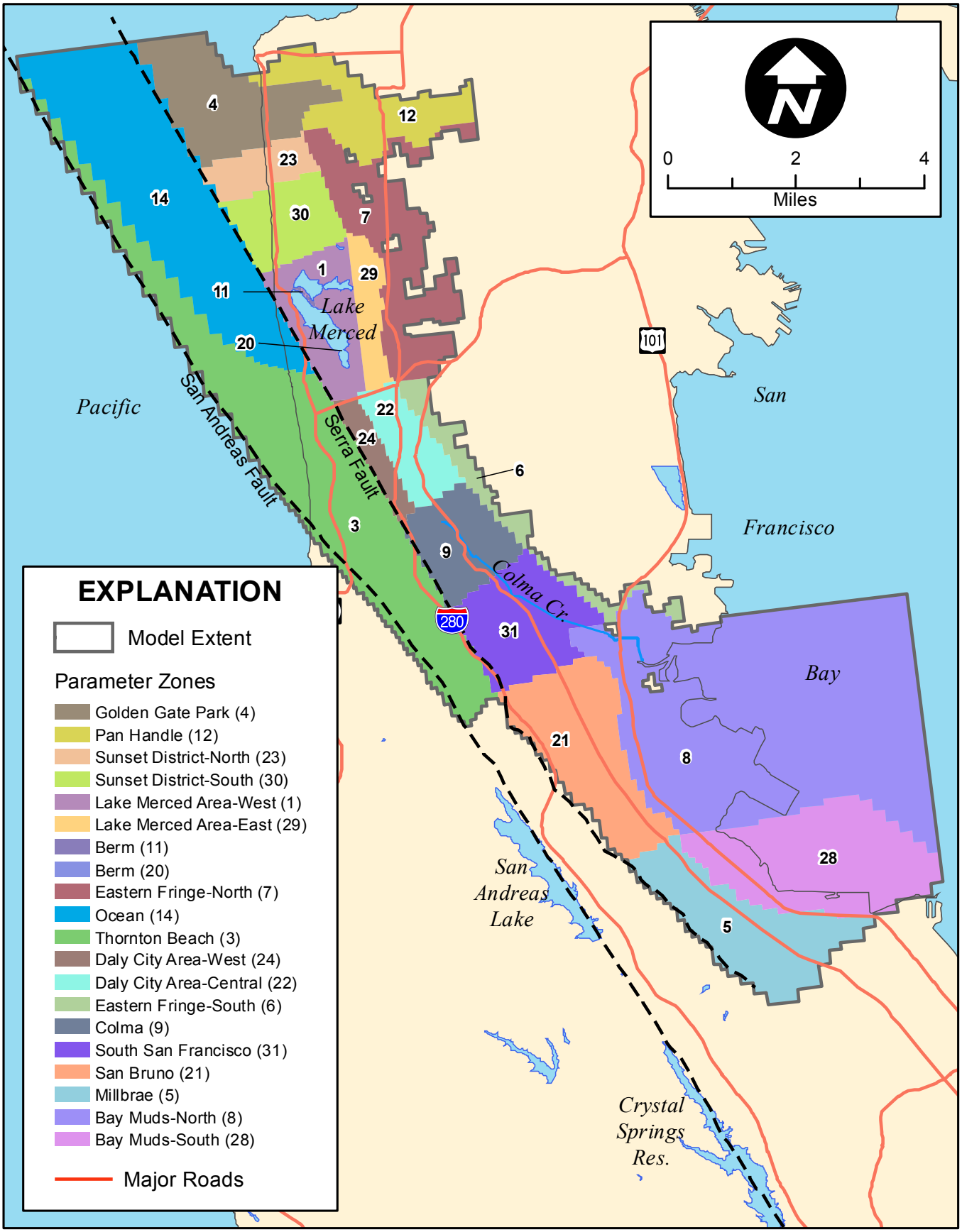
Conceptual geologic framework, model layers, and parameter zone boundaries (version 3.1).

Figure 1

PROJECT: 5048

DATE: 5/3/2011



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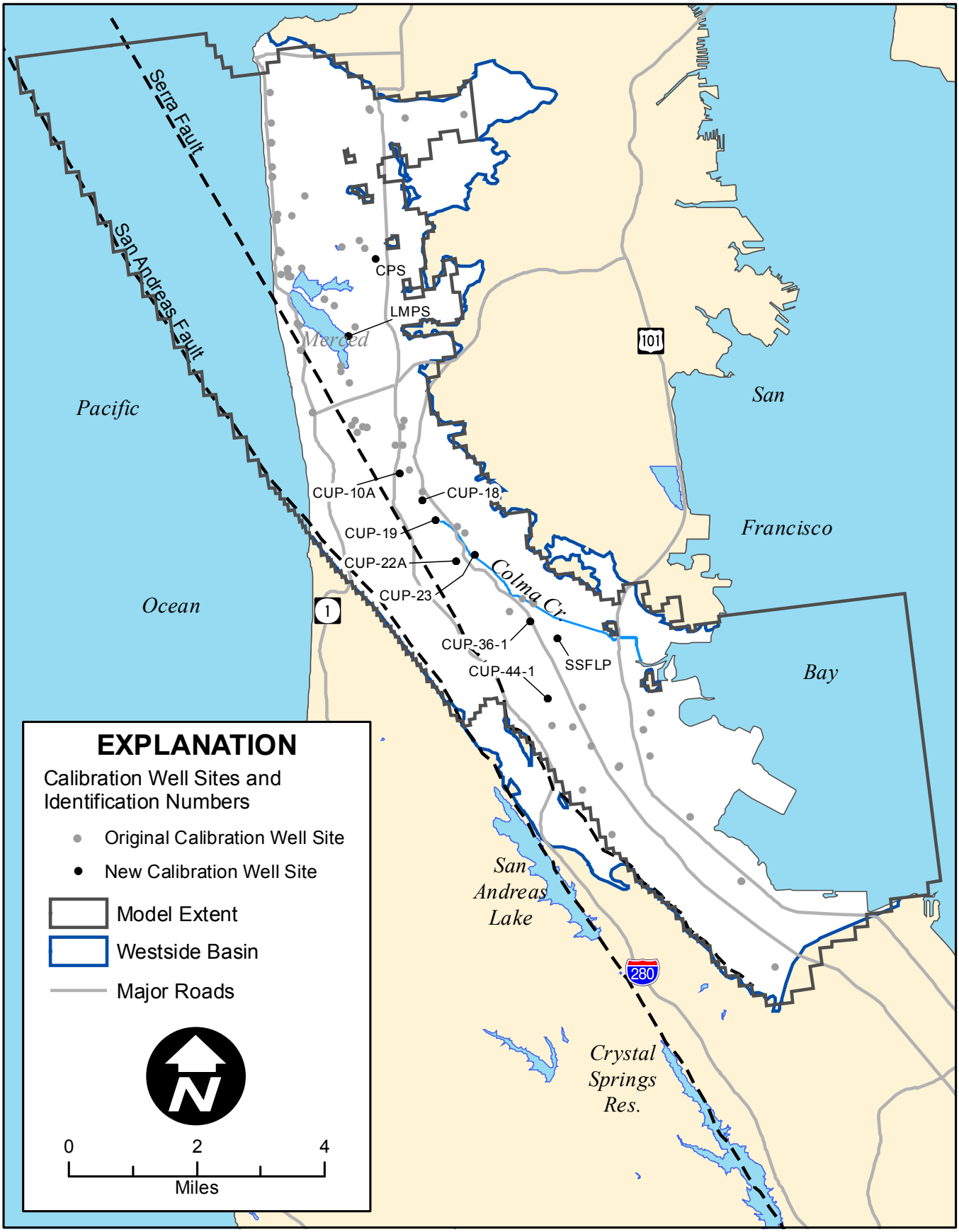
Layer 1 Parameter zones (version 3.1)

Figure 2

PROJECT: 5048

DATE: 5/3/2011



HYDROFOCUS INC.
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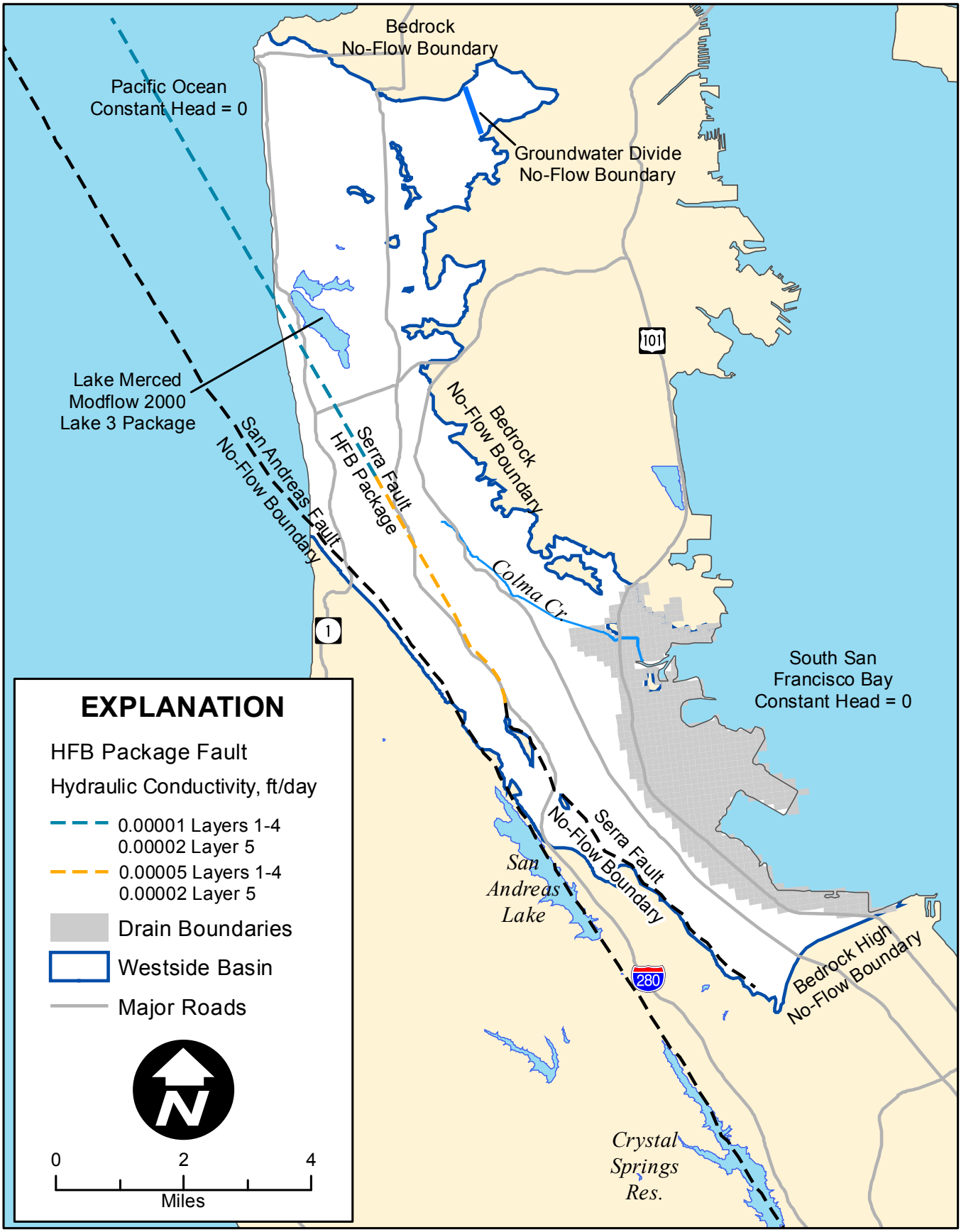
Water level data locations.

Figure 3

PROJECT: 5048

DATE: 5/3/2011



HYDROFOCUS INC.
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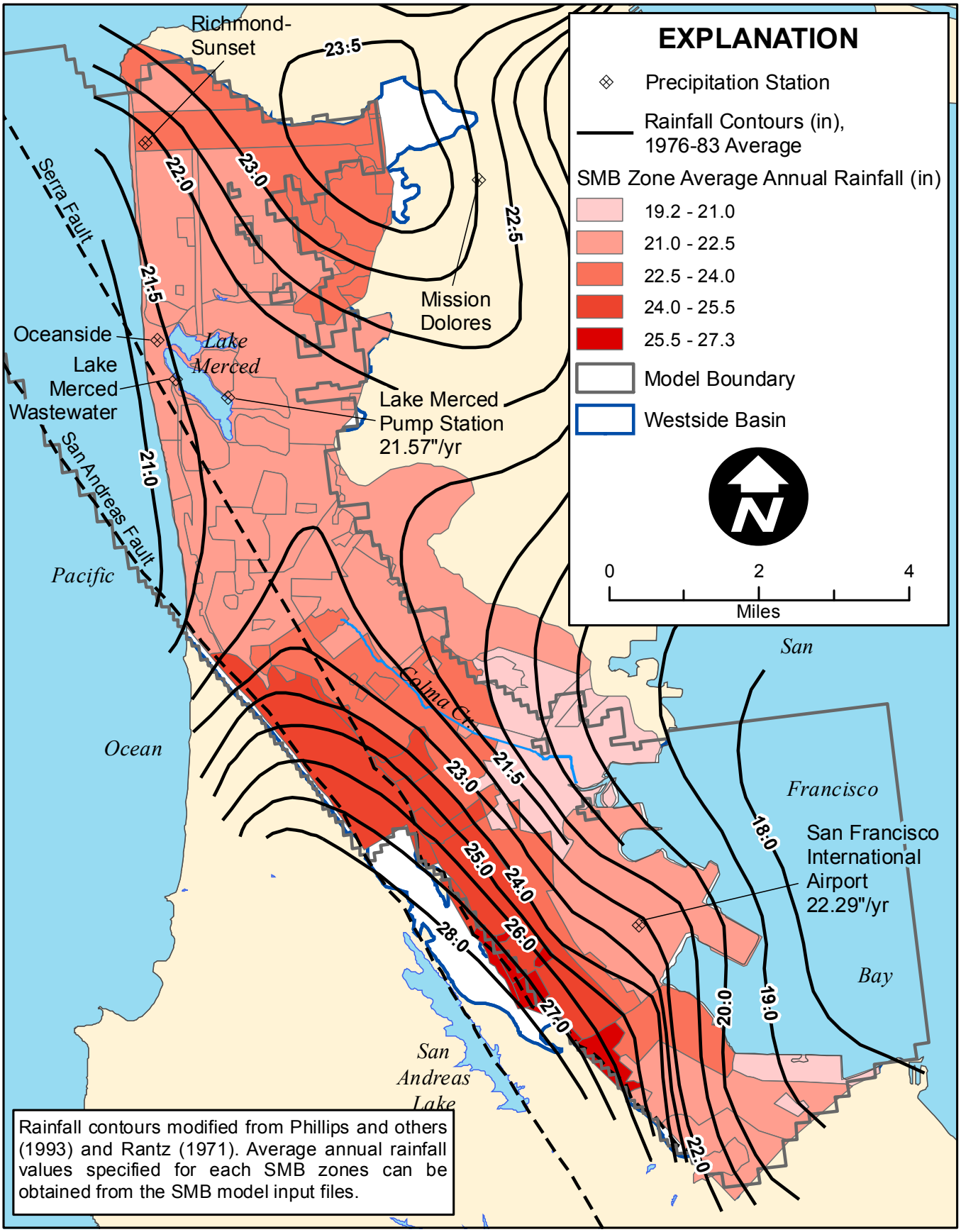
Boundary conditions represented in the model.

Figure 4

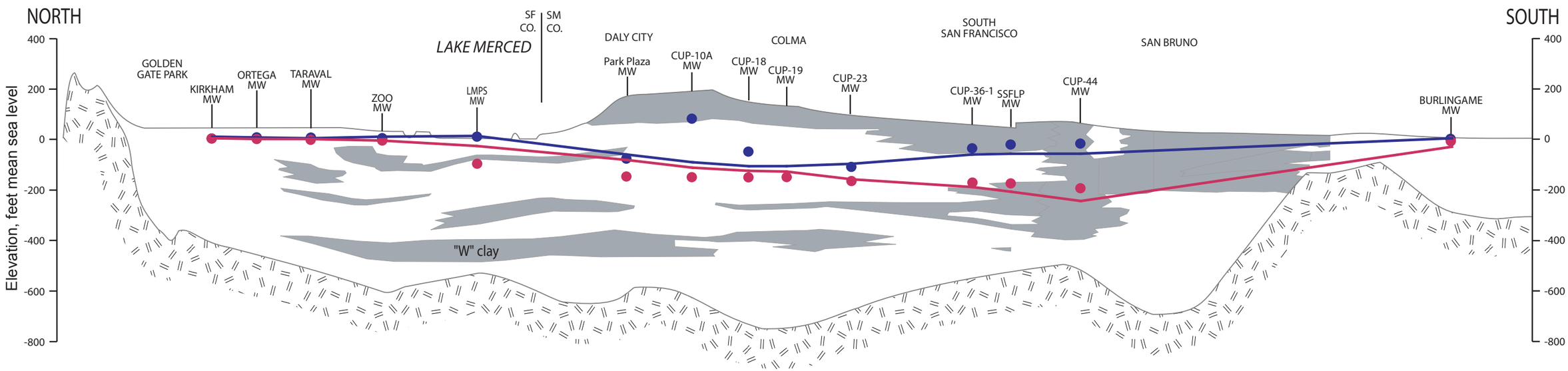
PROJECT: 5048

DATE: 5/3/2011



Rainfall contours modified from Phillips and others (1993) and Rantz (1971). Average annual rainfall values specified for each SMB zones can be obtained from the SMB model input files.

HYDROFOCUS INC. Solutions for Land and Water Resources	Precipitation stations, contours of 1976-83 average annual rainfall, and SMB zone average rainfall values.	Figure 5
PROJECT: 5048	DATE: 5/3/2011	



EXPLANATION

- Observed Water Table Altitude
- Observed Deep Aquifer Water Level
- Simulated Water Table Altitude
- Simulated Deep Aquifer Water Level
- Predominately fine-grained sediment
- Predominately coarse-grained sediment
- Bedrock

Note: Modified from North South Geologic Cross Section, Final Task 8B Technical Memorandum No. 1, Hydrologic Setting of the Westside Basin, Luhdorff & Scalmanini Consulting Engineers, May 5, 2010.

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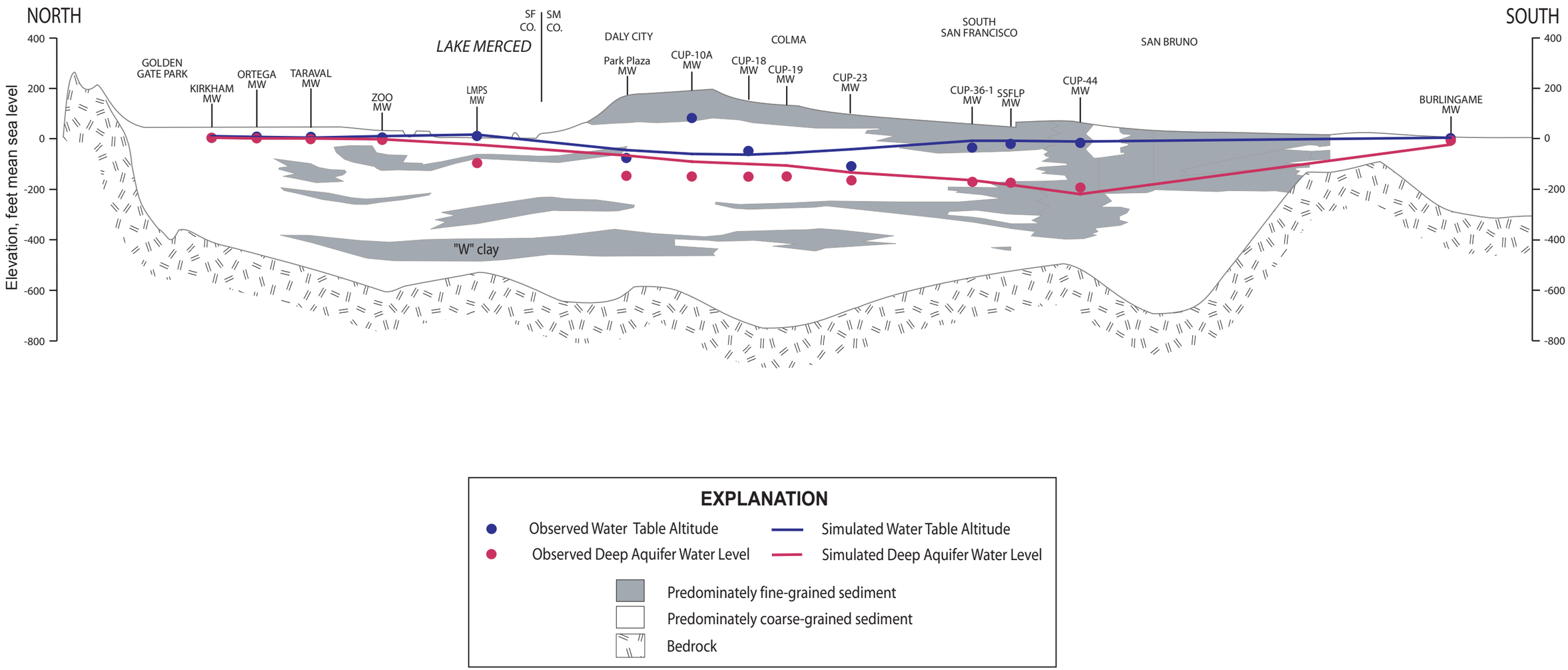
Average 2009 observed and simulated water table and deep aquifer (layer 5) water levels, version 2.1 aquifer parameters.

Figure 6

PROJECT: 5048

DATE: 5/3/2011



Note: Modified from North South Geologic Cross Section, Final Task 8B Technical Memorandum No. 1, Hydrologic Setting of the Westside Basin, Luhdorff & Scalmanini Consulting Engineers, May 5, 2010.

HYDROFOCUS INC
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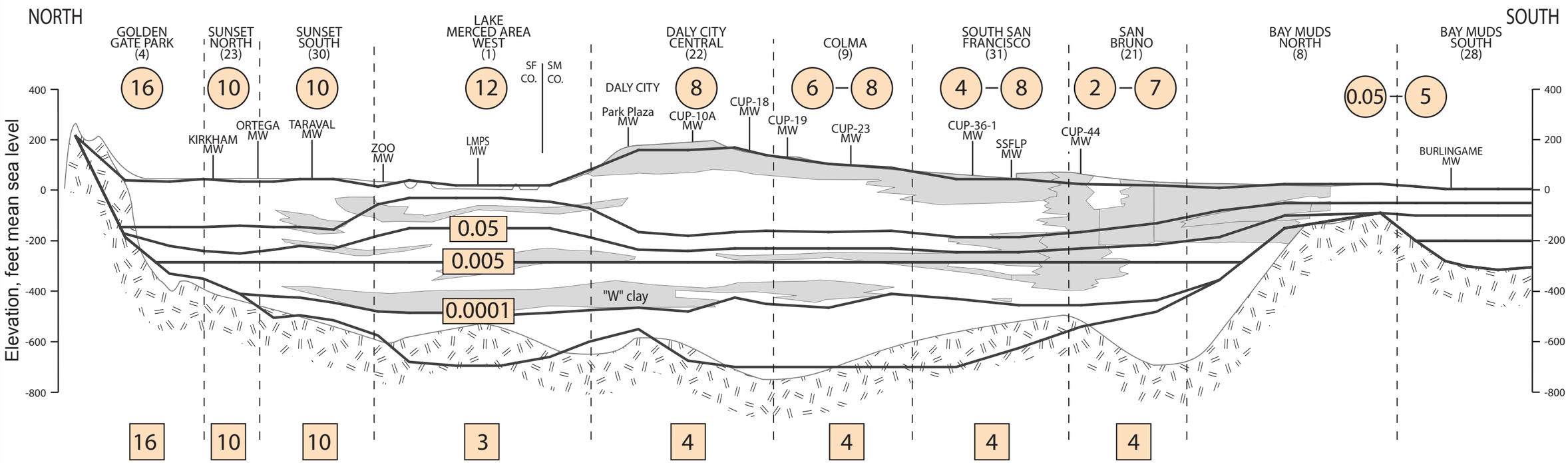
Average 2009 observed and simulated water table and deep aquifer (layer 5) water levels, version 2.1 aquifer parameters and increased recharge in the Colma Creek drainage area.

Figure 7

PROJECT: 5048

DATE: 5/3/2011



EXPLANATION

COLMA (9) — Aquifer Parameter zone name and number

Aquifer Parameter zone boundary

Model layer

16 — Horizontal Hydraulic Conductivity, layers 1 through 4 (ft/day)

16 — Horizontal Hydraulic Conductivity, layer 5 (ft/day)

0.005 — Vertical Hydraulic Conductivity

Predominately fine-grained sediment

Predominately coarse-grained sediment

Bedrock

HYDROFOCUS INC
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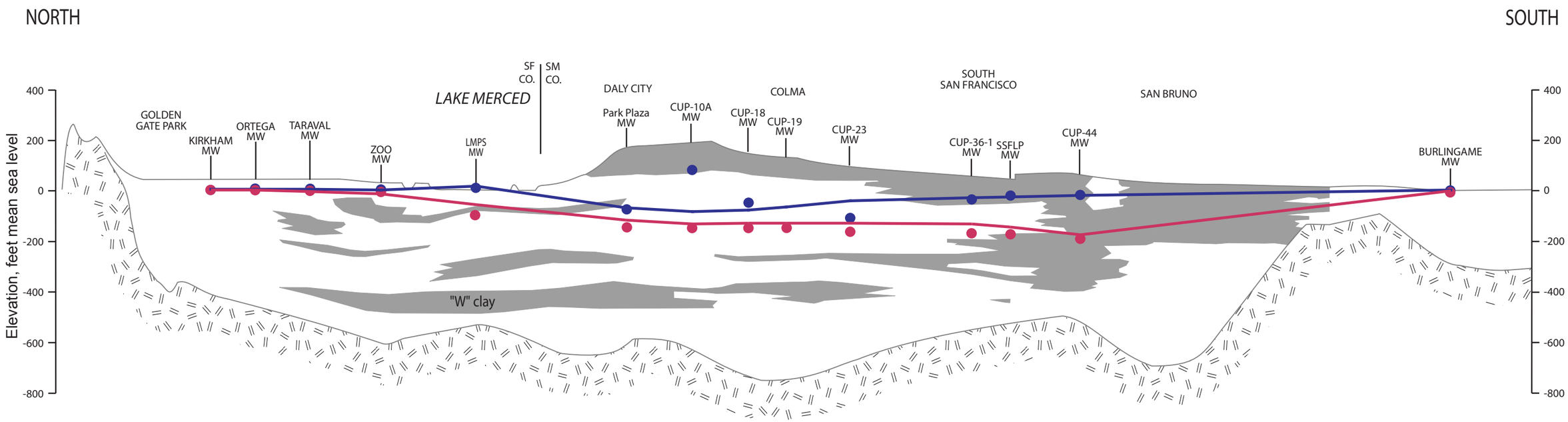
General calibrated horizontal and vertical conductivity distribution in model version 3.1.

Figure 8

PROJECT: 5048

DATE: 5/3/2011



EXPLANATION

- Observed Water Table Altitude
- Observed Deep Aquifer Water Level
- Simulated Water Table Altitude
- Simulated Deep Aquifer Water Level
- Predominately fine-grained sediment
- Predominately coarse-grained sediment
- Bedrock

Note: Modified from North South Geologic Cross Section, Final Task 8B Technical Memorandum No. 1, Hydrologic Setting of the Westside Basin, Luhdorff & Scalmanini Consulting Engineers, May 5, 2010.

HYDROFOCUS INC
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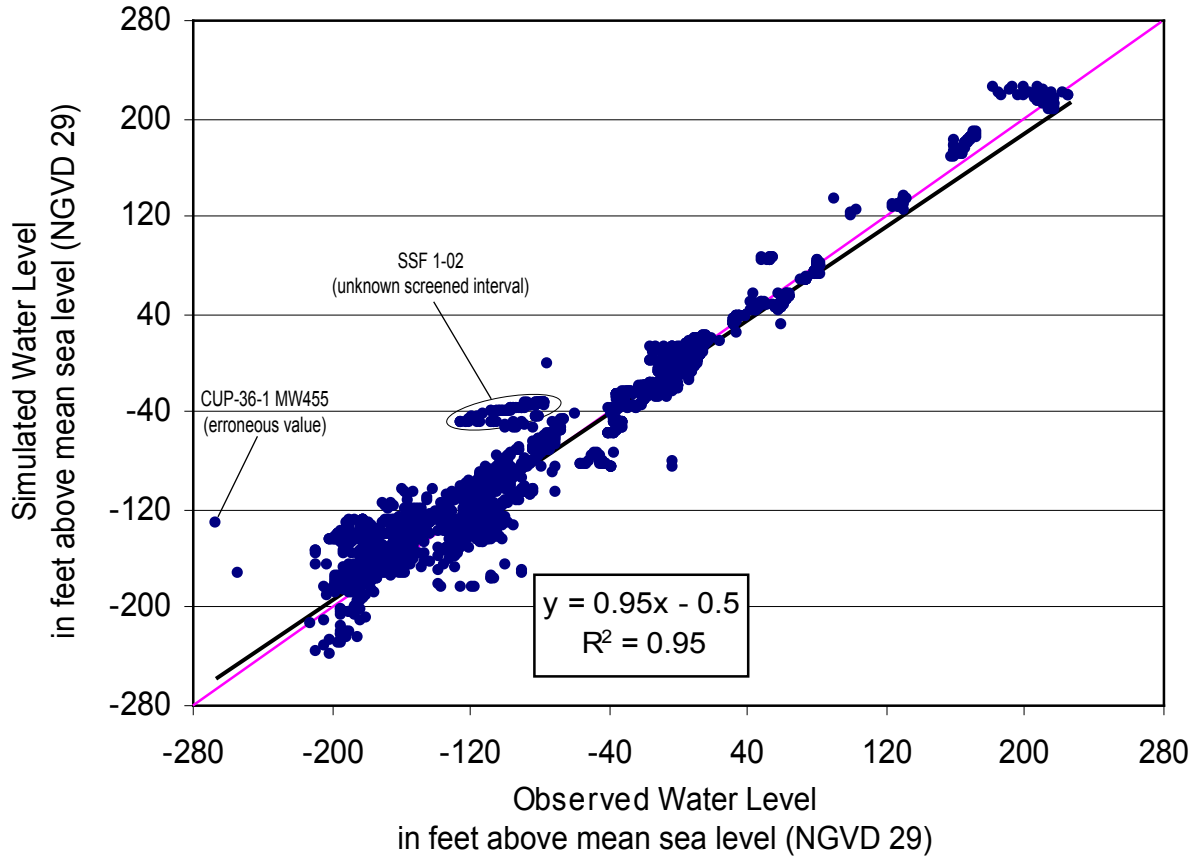
Average 2009 observed and simulated water table and deep aquifer water levels, model version 3.1.

Figure 9

PROJECT: 5048

DATE: 5/3/2011



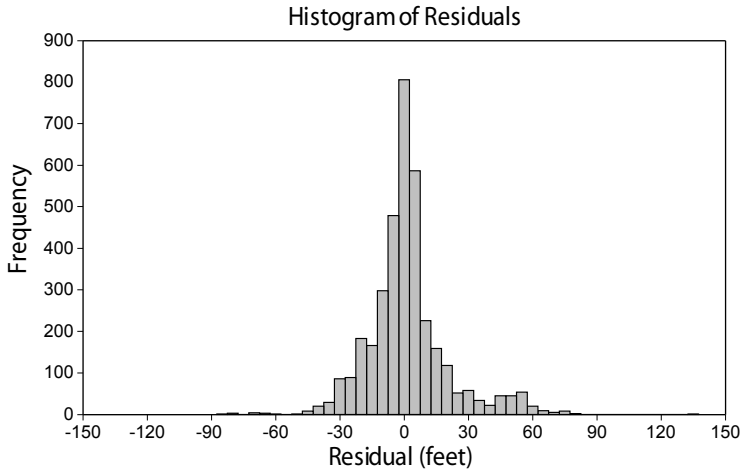
EXPLANATION

Observation Well

Linear (Wells)

1 to 1

Error Statistics (in feet)	
RMSE:	18.9
Min error:	-83.1
Max error:	135.8
Mean error:	1.6
Median error:	0.3



HYDROFOCUS INC.
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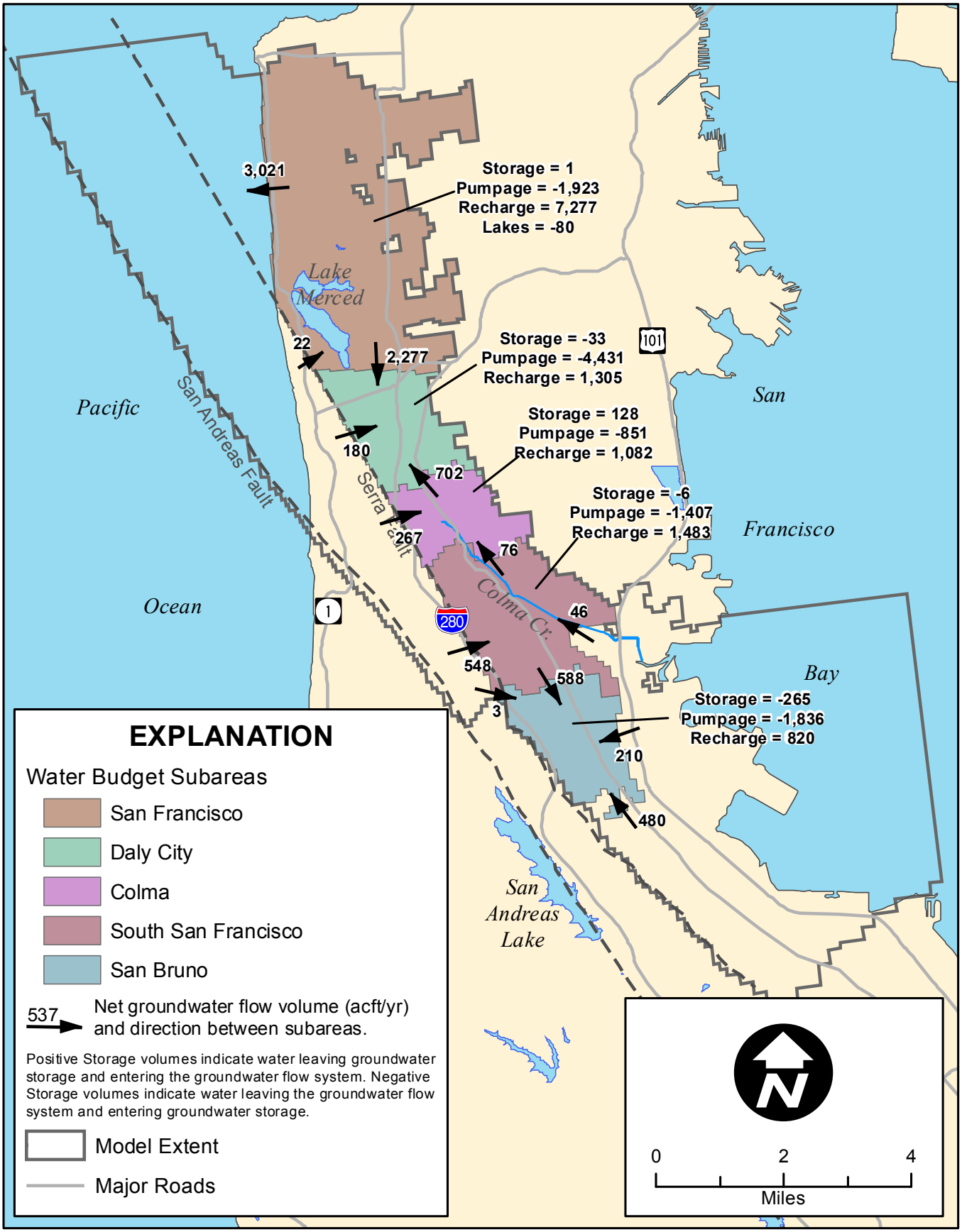
Scatter plot of observed and simulated water levels, 1959-2009.

Figure 10

PROJECT: 5048

DATE: 5/3/2011



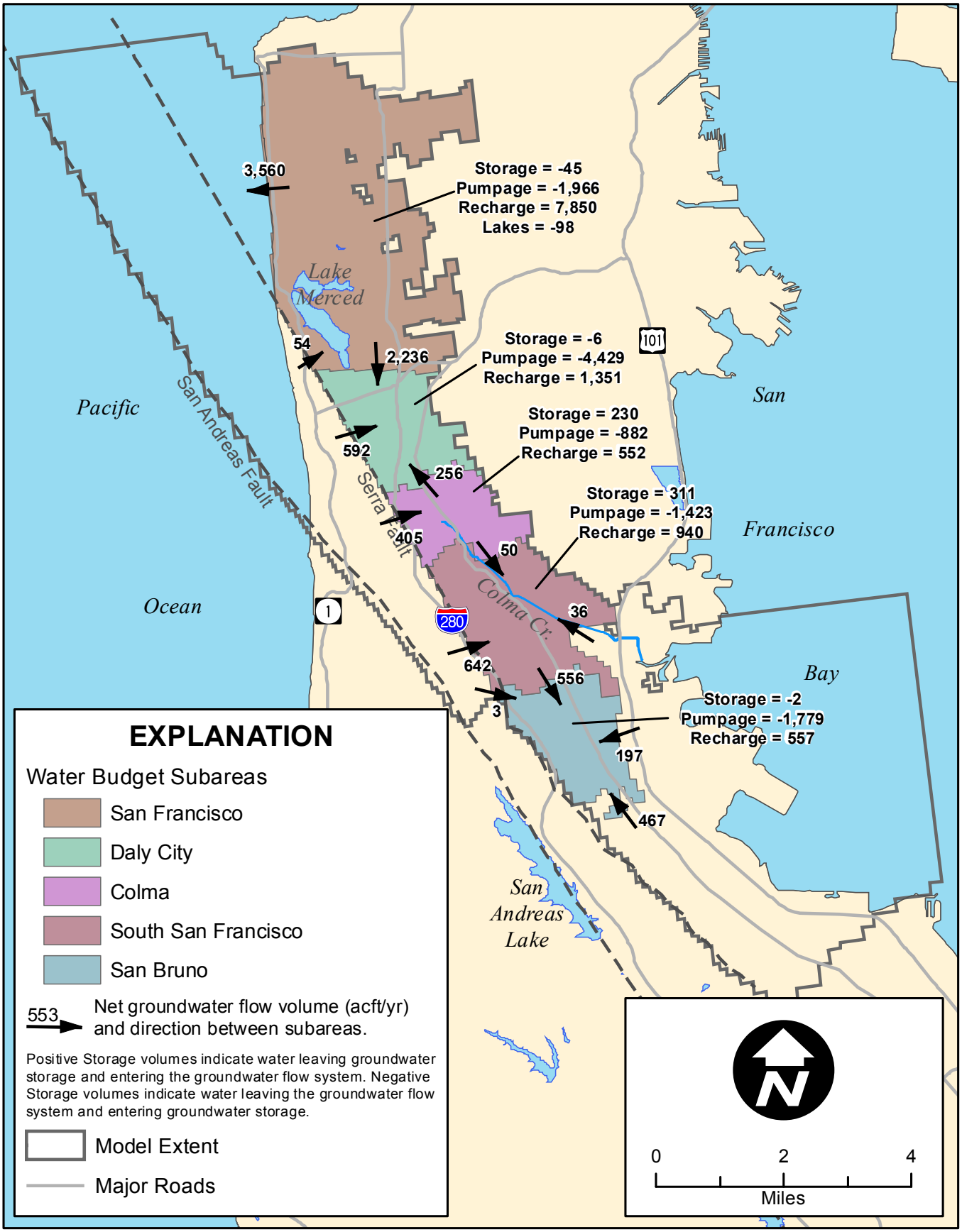
HYDROFOCUS INC.
Solutions for Land and Water Resources

Average annual simulated volumetric budgets for Developed Area subareas, 1982-2002, version 3.1.

Figure 11(a)

PROJECT: 5048

DATE: 5/3/2011



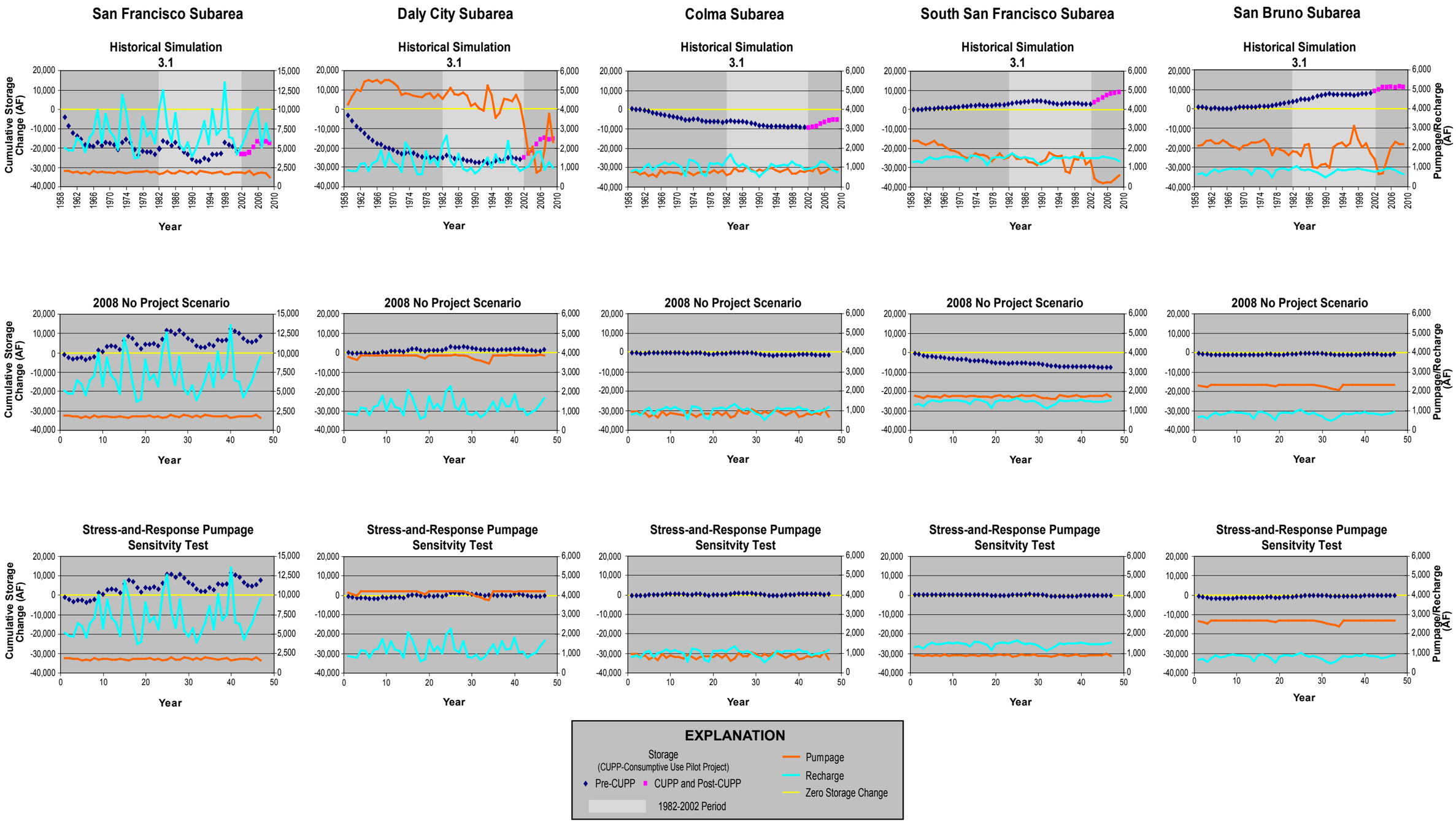
HYDROFOCUS INC
Solutions for Land and Water Resources

Average annual simulated volumetric budgets for Developed Area subareas, 1982-2002, version 2.1 (from 2009 report).

Figure 11(b)

PROJECT: 5048

DATE: 5/3/2011



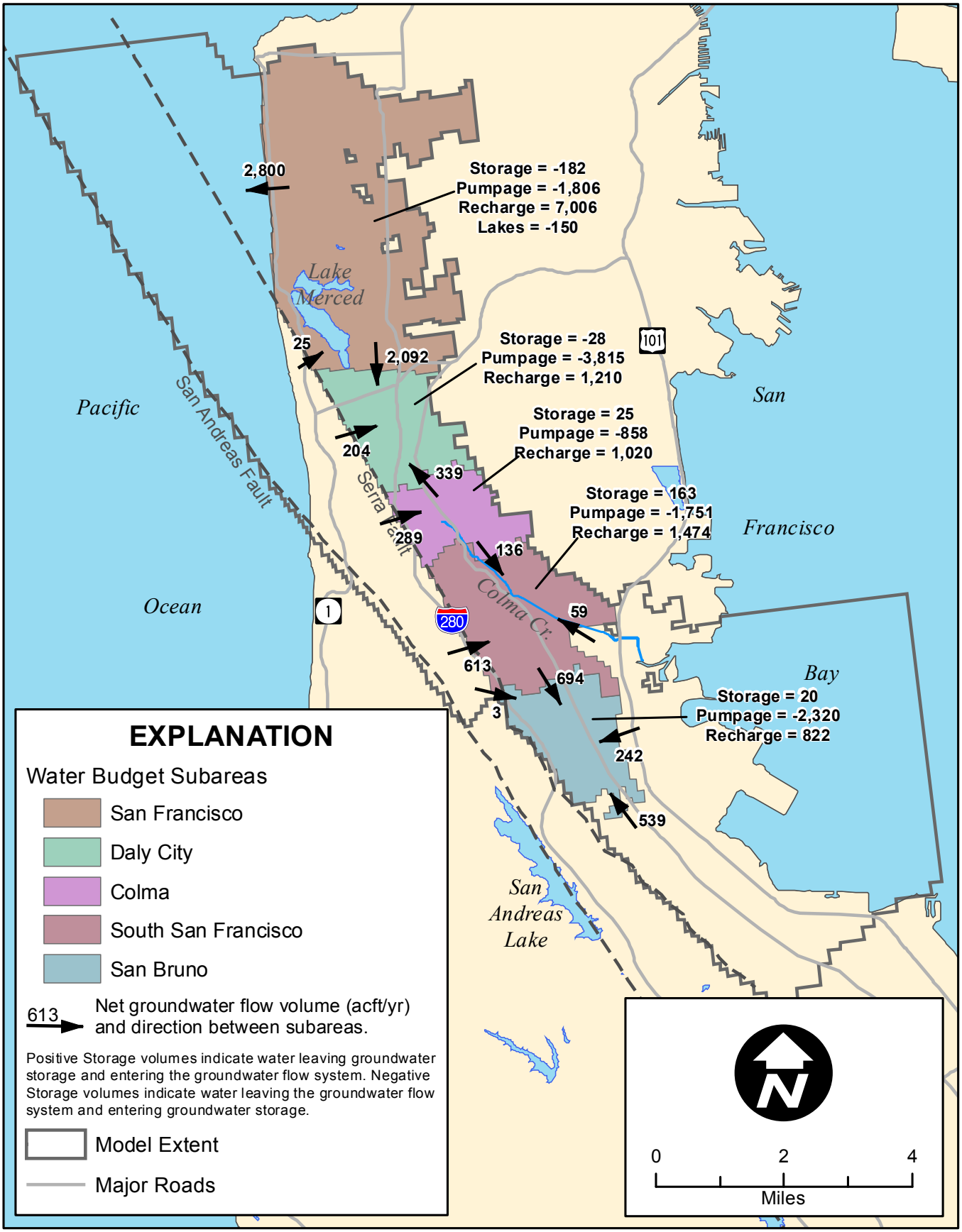
HYDROFOCUS INC.
Solutions for Land and Water Resources

Simulated annual recharge, pumpage, and groundwater storage change for five water budget subareas.

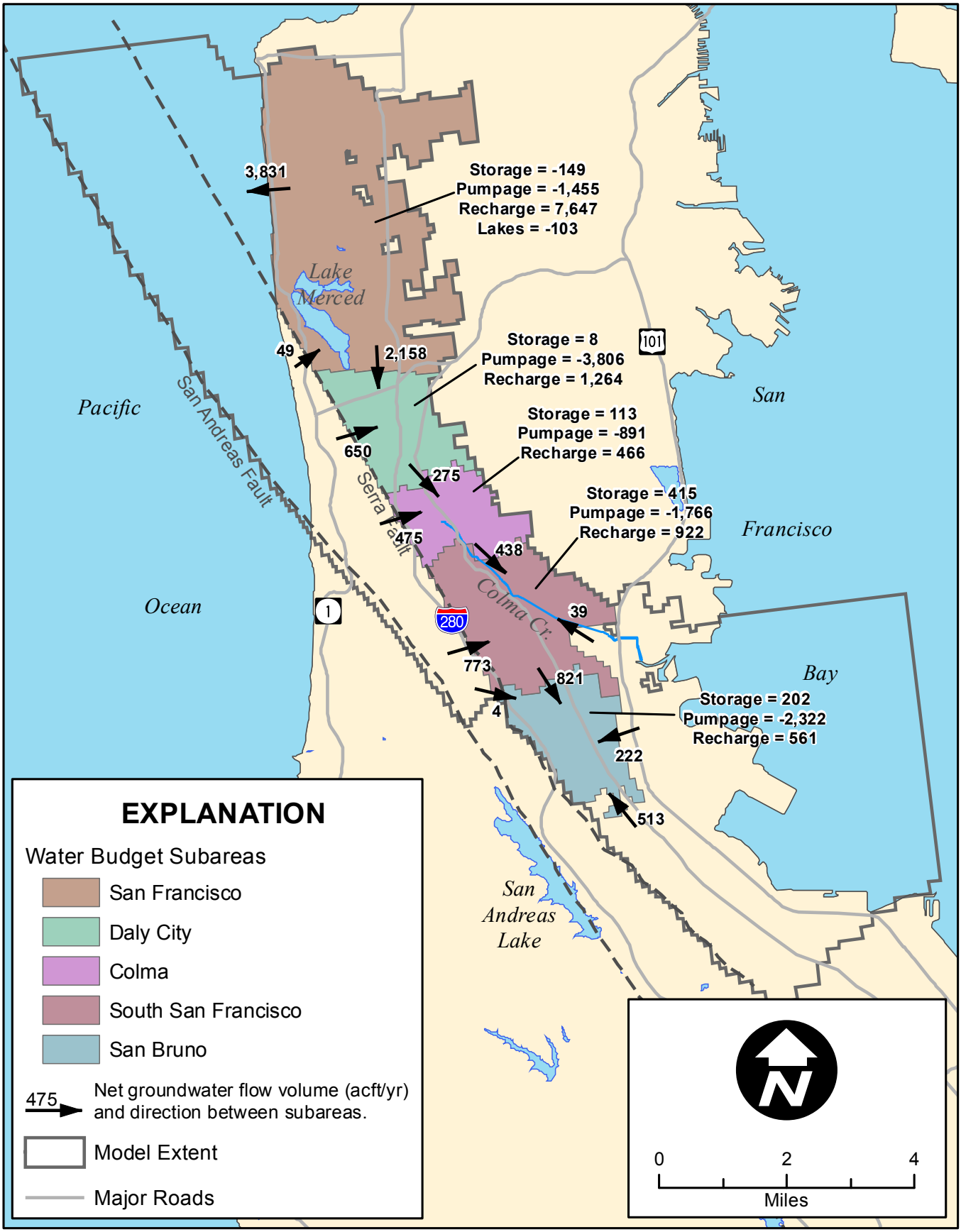
Figure 12

PROJECT: 5048

DATE: 5/3/2011



HYDROFOCUS INC. Solutions for Land and Water Resources	Average annual simulated 2008 No Project scenario volumetric budgets for Developed Area subareas, version 3.1.	Figure 13(a)
PROJECT: 5048	DATE: 5/3/2011	



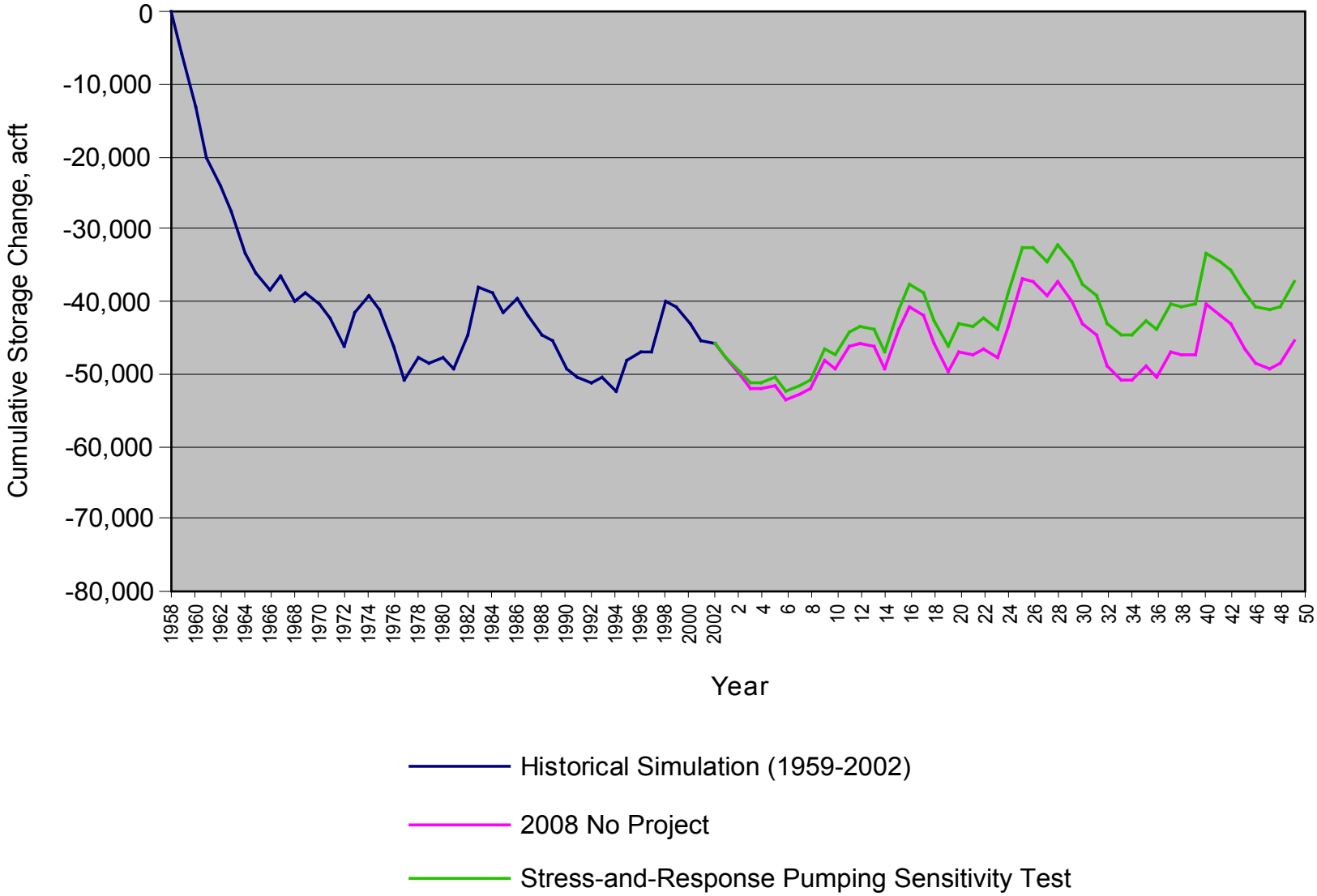
HYDROFOCUS INC.
Solutions for Land and Water Resources

Average annual simulated 2008 No Project scenario volumetric budgets Developed Area subareas, version 2.1 (from 2009 report).

Figure 13(b)

PROJECT: 5048

DATE: 5/3/2011



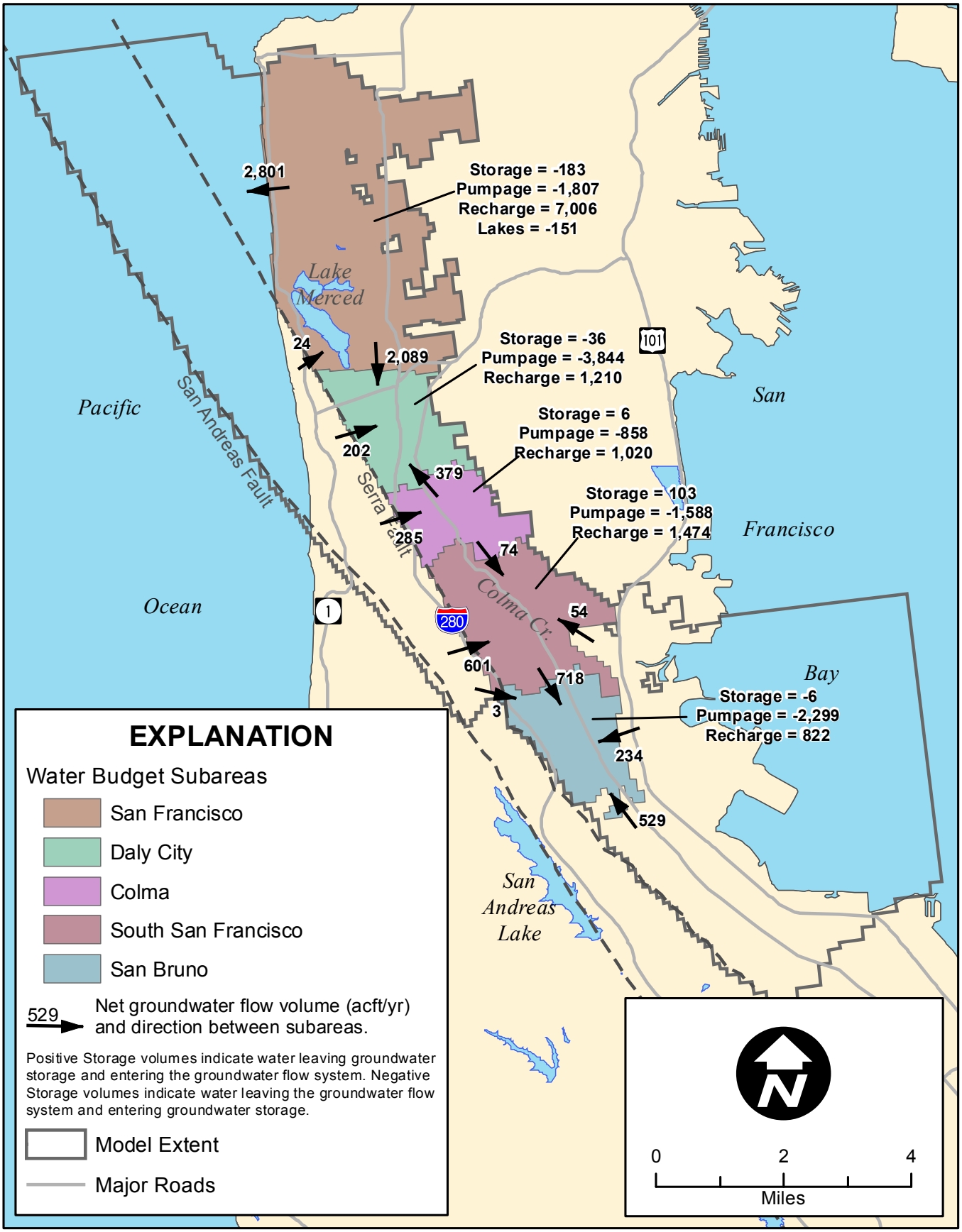
HYDROFOCUS INC.
Solutions for Land and Water Resources

Simulated cumulative decrease in groundwater storage in the Historical Simulation (1959-2002), and 47-year period of the 2008 No Project and Pumpage Sensitivity test scenarios.

Figure 14

PROJECT: 5048

DATE: 5/3/2011



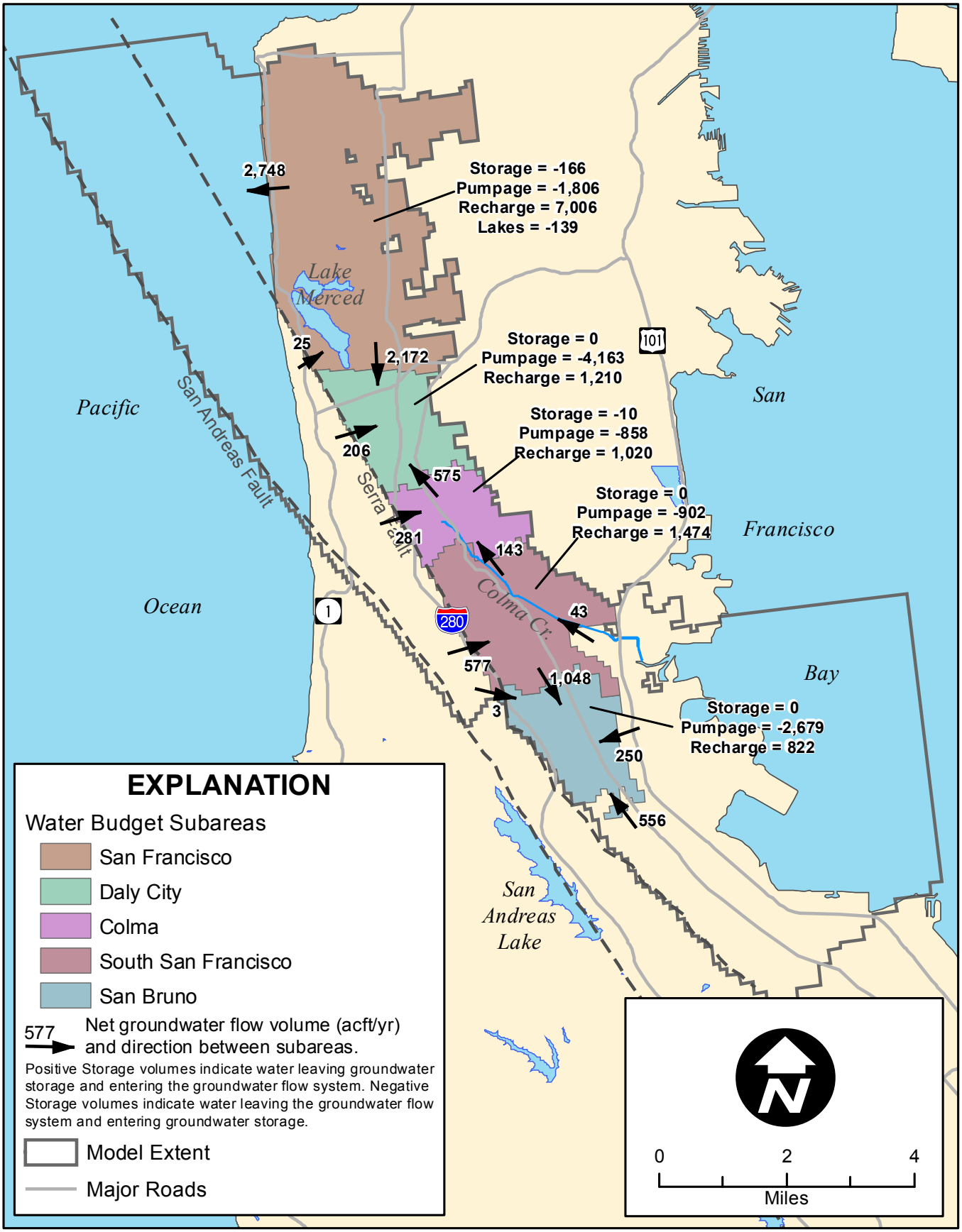
HYDROFOCUS INC
Solutions for Land and Water Resources

Average annual simulated volumetric budget for Developed Area subareas, storage-based pumpage sensitivity test.

Figure 15

PROJECT: 5048

DATE: 5/3/2011



HYDROFOCUS INC.
Solutions for Land and Water Resources

Average annual simulated volumetric budget for Developed Area subareas,stress-and-response pumping sensitivity test.

Figure 16

PROJECT: 5048

DATE: 5/3/2011

Appendix G: SFPUC Tier 1 Water Shortage Allocation Plan: Attachment H in the Water Supply Agreement

ATTACHMENT H

WATER SHORTAGE ALLOCATION PLAN

This Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement").

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming year.

1.3. Shortage Conditions. The SFPUC will compare the available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year (defined as the period from July 1 through June 30). When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual shortage allocations and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers 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 water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers.

2.2 Annual Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately

preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 water allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 shortage allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and

transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC.

If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to the transferring parties within ten (10) business days after receipt of notice of the transfer. Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement.. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

In All Years	Target Dates
1. SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2. SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3. SFPUC issues initial estimate of available water supply	February 1
4. SFPUC announces potential first year of drought (if applicable)	February 1
5. SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6. SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7. SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8. SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

In Drought Years	Target Dates
9. SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-31
10. SFPUC declares the need for a voluntary or mandatory response	April 15-31
11. BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 31
12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

Appendix H: BAWSCA Tier 2 Drought Implementation Plan (DRIP)

EXHIBIT A

TIER 2 DROUGHT IMPLEMENTATION PLAN AMONG WHOLESALE CUSTOMERS

This Tier 2 Drought Implementation (Plan) describes the method for allocating the water made available by the San Francisco Public Utilities Commission (SFPUC) among the Wholesale Customers during shortages caused by drought. This Plan is adopted pursuant to Section 3.11.C of the July 2009 Water Supply Agreement between the City and County of San Francisco and the Wholesale Customers (Agreement).

SECTION 1. APPLICABILITY AND INTEGRATION

Section 1.1 **Applicability**. This Plan applies when, and only when, the SFPUC determines that a system-wide water shortage of 20 percent or less exists, as set forth in a declaration of water shortage emergency adopted by the SFPUC pursuant to California Water Code Sections 350 *et seq.* This Plan applies only to water acquired and distributed by the SFPUC to the Wholesale Customers and has no effect on water obtained by a Wholesale Customer from any source other than the SFPUC.

Section 1.2 **Integration with Tier 1 Water Shortage Allocation Plan**. The Agreement contains, in Attachment H, a Water Shortage Allocation Plan which, among other things, (a) provides for the allocation by the SFPUC of water between Direct City Water Users (e.g., retail water customers within the City and County of San Francisco) and the Wholesale Customers collectively during system-wide water shortages of 20 percent or less, (b) contemplates the adoption by the Wholesale Customers of this Plan for allocation of the water made available to Wholesale Customers collectively among the 26 individual Wholesale Customers, (c) commits the SFPUC to implement this Plan, and (d) provides for the transfer of both banked water and shortage allocations between and among the Wholesale Customers and commits the SFPUC to implement such transfers. That plan is referred to as the Tier 1 Plan.

The Tier 1 Plan also provides the methodology for determining the Overall Average Wholesale Customer Reduction, expressed as a percentage cutback from prior year's normal SFPUC purchases, and Overall Wholesale Customer Allocation, in million gallons per day, both of which are used in determining the Final Allocation Factor for each Wholesale Customer. The Overall Average Wholesale Customer Reduction is determined by dividing the volume of water available to the Wholesale Customers (the Overall Wholesale Customer Allocation), shown as a share of available water in Section 2 of the Tier 1 Plan, by the prior year's normal total Wholesale Customers SFPUC purchases and subtracting that value from one.

This Plan is referred to in the Agreement as the Tier 2 Plan. It is intended to be integrated with the Tier 1 Plan described in the preceding paragraph. Terms used in this Plan are intended to have the same meaning as such terms have in the Tier 1 Plan.

SECTION 2. ALLOCATION OF WATER AMONG WHOLESALE CUSTOMERS

Section 2.1 **Annual Allocations Among the Wholesale Customers**. The annual water supply allocated by the SFPUC to the Wholesale Customers collectively during system-wide shortages of 20 percent or less shall be apportioned among them based on the methodology described in this Section.

Section 2.2 **Methodology for Allocating Water Among Wholesale Customers**. The water made available to the Wholesale Customers collectively will be allocated among them in proportion to each Wholesale Customer's Allocation Factor, adjusted as described in the following subsections below. The Wholesale Customer Allocation Factors will only be calculated at the onset of a drought and will remain the same until such time as the SFPUC declares the shortage condition over. The Wholesale Customer Allocation Factors will be recalculated during subsequent shortage periods for use during those specific periods.

Section 2.2.1 **Step One: Determination of Base/Seasonal Purchase Cutback For Each Wholesale Customer**. The first step requires calculating the Wholesale Customer's Base/Seasonal Purchase Cutback. This calculation has seven parts. An example of Steps 1b-1f is presented in Table 2. Step 1g is shown in columns 3-6 in Table 3. For steps 1b-1g, the calculation uses average monthly production values for the three years preceding the drought for all potable supply sources, expressed as a monthly value in hundred cubic feet:

- Step 1a: Each agency's total annual purchases from the SFPUC will be compared to its Individual Supply Guarantee (ISG), with any annual purchases above its ISG subtracted from that agency's total annual SFPUC purchases by subtracting the amount on a monthly basis in proportion to the agency's monthly SFPUC purchase pattern,

- Step 1b: Calculate Average Monthly and Total Production for the three fiscal years immediately preceding the drought, excluding years during which shortage allocations were in effect, based on monthly production data from the SFPUC and Wholesale Customers,

- Step 1c: Calculate Base Component which is equal to the Average Monthly Production during the base months of December, January, February and March, multiplied by 12,

- Step 1d: Calculate Seasonal Component as the difference between Total Production and Base Component,

- Step 1e: Calculate an agency's Base/Seasonal Allocation , expressed in hundred cubic feet, by multiplying the Base Component by one minus the Base Reduction Percentage, or 90%, and the Seasonal Component by the percentage needed (Seasonal Reduction Percentage) to achieve the required Overall Average Wholesale Customer Reduction, which is expressed as a percentage,

- Step 1f: Calculate the Base/Seasonal Allocation Cutback Percentage for each agency by dividing its Base/Seasonal Allocation by the agency's Total Production, and

- Step 1g: Calculate the Base/Seasonal Purchase Cutback Percentage by multiplying the Base/Seasonal Allocation Cutback percentage times the lesser of: (a) the immediately preceding SFPUC purchases or (b) ISG, adjusting the Seasonal percentage above until the total reduction equals the Overall Average Wholesale Customer Reduction.

Additionally, adjustments to the Base Component for Stanford University will be made to remove that two week time period that the University is completely closed during the winter break per policy set by the University President as long as that policy remains in place. This adjustment will be removed at such time as the seasonal closure policy is terminated by Stanford University.

Section 2.2.2 <u>Step Two: First Adjustment for San Jose and Santa Clara</u>. The resulting Base/Seasonal Purchase Cutback Percentage in Section 2.2.1 for San Jose and Santa Clara will be compared to the highest Base/Seasonal Purchase Cutback percentage of the other Wholesale Customers. If both San Jose's and Santa Clara's percentage reductions are larger than the highest percentage reduction among any other Wholesale Customers, the Base/Seasonal Purchase Cutback percentage established under Section 2.2.1 will remain unchanged. If either San Jose's percentage cutback or Santa Clara's percentage cutback, or both, is smaller than the highest Base/Seasonal Purchase Cutback percentage of other Wholesale Customers, the Base/Seasonal Allocation (in mgd) of San Jose or Santa Clara, or both, will be reduced so that the percentage cutback of each is no smaller than that of the Wholesale Customers' otherwise highest percentage cutback. The amount of shortage allocation (in mgd) removed from San Jose and/or Santa Clara will be reallocated among the remaining Wholesale Customers in proportion to the Base/Seasonal Allocation of each.

Section 2.2.3 <u>Step Three: Determination of Weighted Purchase Cutback For Each Wholesale Customer</u>. Each agency's weighted allocation is calculated by multiplying its Adjusted Base/Seasonal Allocation in Section 2.2.2 by 66.66% and its Fixed Component by 33.33%. The Fixed Component is (i) the Wholesale Customer's ISG provided for in the Agreement, or (ii) in the case of Hayward, 25.11 mgd, or (iii) in the case of San Jose and Santa Clara, consistent with the limit on purchases from SFPUC set forth in Section 4.05 of the Agreement, e. g., 4.5 mgd each. The amount of the Fixed Component for each Wholesale Customer is shown on Table 1.

Section 2.2.4 <u>Step Four: Second Adjustment for San Jose and Santa Clara</u>. The resulting Weighted Allocations for San Jose and Santa Clara will be compared to the highest Weighted Purchase Cutback, shown as a percentage, of the other Wholesale Customers. If both San Jose's and Santa Clara's percentage cutback is larger than the highest percentage cutback among other Wholesale Customers, the Weighted Purchase Cutbacks established under Section 2.2.3 will remain unchanged. If either San Jose's

percentage cutback or Santa Clara's percentage cutback, or both, is smaller than the highest percentage cutback of any other Wholesale Customers, the Weighted Shortage Allocation (in mgd) of San Jose or Santa Clara, or both, will be reduced so that the percentage reduction of each is no smaller than that of the Wholesale Customers' otherwise highest Weighted Percentage Cutback. The amount of allocation (in mgd) removed from San Jose and/or Santa Clara will be reallocated among the remaining Wholesale Customers in proportion to the Weighted Shortage Allocation of each.

Section 2.2.5 **Step Five: Adjustment for Minimum and Maximum Cutbacks**. Using the Adjusted Weighted Purchase Cutbacks, either a 10% minimum cutback or maximum cutback, as defined below, is applied to any agency whose Adjusted Weighted Purchase Cutback falls outside this range:

- A minimum 10% cutback is applied to the individual agency Adjusted Weighted Allocation, with the reapportioned water being placed in the hardship bank for allocation to East Palo Alto.

- A maximum cutback of the average cutback plus 20% (e.g. 15% average cutback results in a maximum cutback of 15% + 20% = 35%) is applied to the individual agency Adjusted Weighted Allocation, with the water necessary to meet that level being subtracted in proportion to each Wholesale Customer's Adjusted Weighted Allocation from all remaining agencies, except those at agencies subject to the minimum cutback above.

The result is the Adjusted Minimum/Maximum Purchase Cutback, expressed as a percentage.

Section 2.2.6 **Step Six: Adjustment to Provide Sufficient Supply for East Palo Alto**. In order to provide for sufficient water supply for water customers served by the City of East Palo Alto (EPA), the maximum Final Purchase Cutback applied at any given time to EPA will be equal to 50% of the Overall Average Wholesale Customer Reduction. The water needed to accommodate the guaranteed maximum cutback to EPA will be provided in two ways:

- First, water from the hardship bank provided by the 10% minimum cutback will be first added to the EPA Adjusted Weighted Purchase Allocation, and

- Second, the balance of water needed for EPA will be deducted on a prorated basis from those agencies with a pre-drought residential per capita water use greater than 55 gallons per capita per day (as documented in the most recent BAWSCA Annual Survey) in proportion to each agency's Min./Max. Adjusted Allocation and who are not subject to the minimum and maximum reductions already applied per Section 2.2.5

The result is the Allocation with EPA Adjustment, expressed as an mgd.

Section 2.2.7 **Step Seven: Determination of Final Allocation Factor.** Each Wholesale Customer's Final Allocation Factor is the fraction expressed as a percentage, the numerator of which is the particular Wholesale Customer's "Final Allocation with EPA Adjustment" (in mgd) as calculated in Steps One through Six and the denominator of which is the Overall Wholesale Customer Allocation (in mgd), a number provided by the SFPUC during the drought period as determined by the SFPUC in the Tier 1 Plan.

Section 2.2.8 **Example Calculation**. Table 2 presents a sample of the calculations involved in Steps 1b-1f. Table 3 presents a sample of the calculations involved in Step 1g and Steps Two through Seven, using the values from Tables 1 and 2 and recent water use data for the other values. Tables 2 and 3 are presented for illustrative purposes only and do not supersede the foregoing provisions of this Section 2.2. In the event of any inconsistency between this Section 2.2 and Tables 2 and 3, the text of this section will govern.

Section 2.3 **Calculation of Individual Wholesale Customer Allocation Factors; Directions to SFPUC**. The Tier 1 Plan contemplates that in any year in which the methodology described above must be applied, the Bay Area Water Supply and Conversation Agency (BAWSCA) will calculate each Wholesale Customer's individual percentage share of the amount of water made available to the Wholesale Customers collectively, following the methodology described above and defined above as Wholesale Customer Allocation Factors. The Tier 1 Plan requires SFPUC to allocate water to each Wholesale Customer in accordance with calculations delivered to it by BAWSCA.

Each Wholesale Customer authorizes BAWSCA to perform the calculations required, using water sales data furnished to it by the SFPUC, and to deliver to SFPUC a list of individual Wholesale Customer Allocation Factors so calculated as contemplated by the Tier 1 Plan. Neither BAWSCA nor any officer or employee of BAWSCA shall be liable to any Wholesale Customer for any such calculations made in good faith, even if incorrect.

SECTION 3. GENERAL PROVISIONS

Section 3.1 **No Third-Party Beneficiaries**. This Plan is for the sole benefit of the Wholesale Customers and shall not be construed as granting rights to any person other than another Wholesale Customer.

Section 3.2 **Governing Law**. This Plan is made under and shall be governed by the laws of the State of California.

Section 3.3 **Effect on Water Supply Agreement.** This Plan describes the method for allocating water from the SFPUC among the Wholesale Customers during system-wide water shortages of 20 percent or less declared by the SFPUC. The provisions of this Plan, and the Tier 1 Plan contained in Attachment H to the Agreement with which it is integrated, are intended to implement Section 3.11 of the Agreement. The Plans do not

affect, change or modify any other section, term or condition of the Agreement or of the individual Water Sales Contracts between each Wholesale Customer and San Francisco.

Section 3.4 **Amendment**. This Plan may be amended only by the written agreement of all Wholesale Customers.

Section 3.5 **Termination**. This Plan shall expire on December 31, 2018. It may be terminated prior to that date only by the written agreement of all Wholesale Customers.

Appendix I: Draft Wholesale Customer Contingency Plan for Daly City

APPENDIX E

DRAFT WHOLESALE CUSTOMER CONTINGENCY PLAN FOR DALY CITY

San Francisco Public Utilities Commission
&
City of Daly City of Daly City

Wholesale Customer Contingency Plan
Daly City

Draft
June 2000

Olivia
Chen
Consultants

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1.0 Introduction

Purpose

The purpose of this document is to provide information for San Francisco Public Utilities Commission (SFPUC) Water Supply and Treatment Division (WS&TD) planning in the event that SFPUC water supply pipelines serving the Daly City water system are not available.

Under emergency operations, the SFPUC may opt to issue a water use reduction alert, boil water notice, or unsafe water alert to maintain system pressures and fire protection capabilities. The goal of this effort is to document contingency operations to ensure that Daly City's water supply can be maintained under emergency scenarios that may reduce SFPUC service levels. The contingency operations documented in this plan were identified in several working sessions held with City of Daly City Operations Staff.

Scope

The scope of this evaluation is to:

- Provide an overview of the City of Daly City's water distribution system.
- Identify SFPUC supply lines that supply the Daly City water system.
- Identify scenarios that could result in a reduction in water supply from SFPUC to Daly City.
- Document contingency operations plans for each potential failure.

Relationship to Other Plans

The SFPUC has established response notification procedures under the "SFPUC – Suburban Customer Water Supply Emergency Operations and Notification Plan" for all its suburban customers. The Incident Commander (IC) responding to an emergency resulting from loss of SFPUC supply must be familiar with this notification plan.

Supplement to the notification plan is the ‘SFPUC/Suburban Customer Emergency Operations Plan - Phase 2, Emergency Demand Survey.’ This document provides important background information with regard to the SFPUC suburban customers, including an assessment of suburban customer alternate water supply sources and dependency on SFPUC supply to these customers. The information provided in this demand survey along with information provided in this document may be used to evaluate the impact of a loss of supply emergency on the Daly City water supply.

This document may be used as a supplement to the above documents and the Daly City Department of Water & Wastewater Resources’ (DWWR) Disaster Response Plan (DRP). The DRP establishes standard operation and management procedures for rapid

repair and restoration of water system by the DWWR in the event of a disaster. The contingencies included herein address emergencies arising from a loss of SFPUC supply lines only.

Like all emergency response documents, this contingency planning effort should be reviewed annually to ensure that the information contained herein is complete, accurate, and up-to-date. Contingency procedures should be reviewed regularly, particularly following actual emergency events or exercises and drills (see below). All shortcomings of the plan should be clearly identified and improved as needed.

Training, Exercises, and Drills

An initial orientation training session should be held to familiarize SFPUC WS&TD and DWWR staff with the contingency plans established by this document. In preparation for an emergency and to test the feasibility of the contingency plans identified in this document, an initial exercise should be conducted by SFPUC WS&TD Operations Staff jointly with DWWR staff to ensure that the water system will function as anticipated during an emergency.

The DWWR conducts annual disaster preparedness training sessions during the month of April. Additionally, the DWWR also participates in county-wide exercises during the month of October. If feasible, drills on the contingency procedures identified in this document may be incorporated as pad of these events.

2.0 Daly City Water Supply

Overview of SFPUC System

The SFPUC is responsible for providing water to the City and County of San Francisco and over thirty suburban customer agencies on the San Francisco Peninsula, in the South Bay and parts of the East Bay, totaling over 2.5 million people. The SFPUC system originates in the Sierra Nevadas and consists of several watersheds and reservoirs connected by a series of aqueducts and tunnels, known as the Hetch Hetchy Water Supply System. This system supplies approximately 80 to 85 percent of the SFPUC water supply and is augmented by local surface water resources from the Alameda and Peninsula watersheds. These local supplies are treated at the Sunol Valley Water Treatment Plant in Alameda County and the Harry Tracy Water Treatment Plant (HTWTP) in San Mateo County. Harry Tracy Water Treatment Plant and Sunol Valley Water Treatment Plant (SVWTP) contribute an average of 60 to 65 mgd and 40 to 45 mgd, respectively, to the 200 mgd from the Hetch Hetchy (HH) system.

Of this total supply of 300 mgd, about 32 percent is served to customers in the City and County of San Francisco; the remaining 68 percent is served to thirty suburban customers, including cities, water districts and other private water companies, located in

Alameda, Santa Clara and San Mateo Counties. From an operations point of view, SFPUC's suburban customers are divided into two geographical categories: Peninsula and South Bay. A list of SFPUC's suburban customers is presented in Table 1. A map showing the locations of each of the suburban customer agencies is provided in Figure 1.

Table 1. SFPUC's Suburban Customers

Peninsula

- California Water Service Company) (Palomar, San Carlos, San Mateo and South San Francisco)
- City of Brisbane/Guadalupe Valley Municipal Improvement District
- City of Burlingame
- City of Daly City
- City of Millbrae
- City of San Bruno
- Coastside County Water District
- Estero Municipal Improvement District
- North Coast County Water District
- San Francisco County Jail (retail)
- San Francisco International Airport (retail)
- Town of Hillsborough
- Westborough County Water District

South Bay

- Alameda County Water District
- Belmont County Water District
- California Water Service Company (Bear Gulch)
- City of Hayward
- City of Menlo Park
- City of Milpitas
- City of Mountain View
- City of Palo Alto
- City of Redwood City
- City of San Jose (North San Jose Service Area)
- City of Sunnyvale
- City of Santa Clara
- Cordilleras Mutual Water Association
- East Palo Alto Water District
- Lawrence Livermore National Laboratory (retail)
- Los Trancos Water District
- NASA (retail)
- Purissima Hills Water District
- Skyline County Water District
- Stanford University
- Town of Sunol (retail)

Although many of the suburban customers rely solely on the SFPUC for their water supply, some of the suburban customers have other local supplies including surface water and groundwater and other supply sources such as the South Bay Aqueduct (State Water Project) and the Santa Clara Valley Water District (SCVWD).

Appendix J: BAWCSA Long-Term Reliable Water Supply Strategy

Cover Sheet

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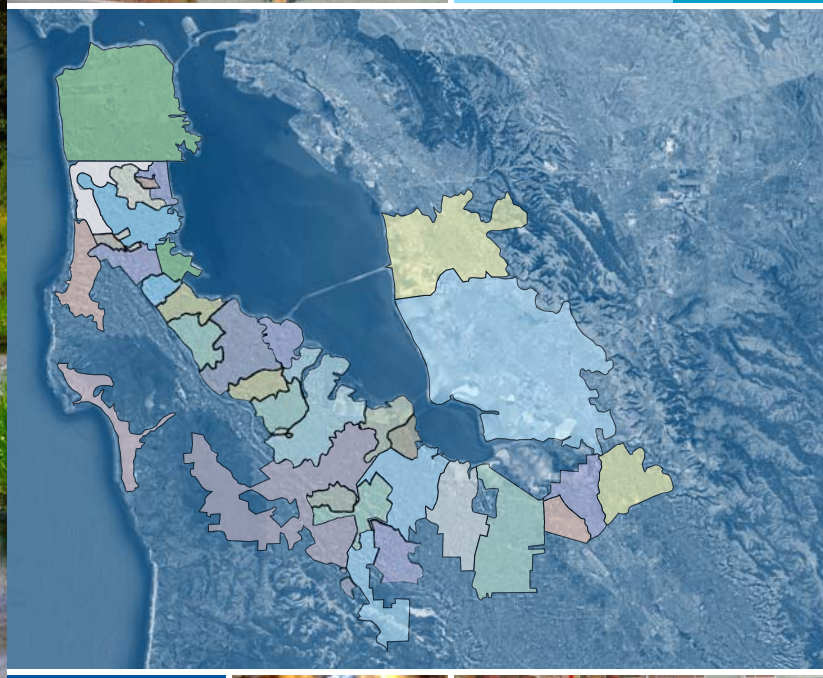
Website to access full report:

http://bawsca.org/water-supply/long-term-reliable-water-supply-strategy/

BAWSCA
Bay Area Water Supply & Conservation Agency

Long-Term Reliable Water Supply Strategy Phase I Scoping Report



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consulting • engineering • construction • operations

May 27, 2010

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Appendix K: Water Conservation Ordinances

CITY COUNCIL, CITY OF DALY CITY, STATE OF CALIFORNIA
ORDINANCE SUMMARY

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF DALY CITY REPEALING AND REPLACING CHAPTER 17.41 OF THE MUNICIPAL CODE RE: ESTABLISHING WATER CONSERVATION IN LANDSCAPING REGULATIONS

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1. SUMMARY

State law requires cities to adopt a Water Conservation in Landscaping Ordinance to meet the requirements of the California Water Conservation in Landscaping Act. This Ordinance is at least as effective as the Model Ordinance in conserving water.

This Ordinance is necessary to manage the City of Daly City's potable water supply in the short and long term and to avoid or minimize the effects of drought and shortage within the City of Daly City.

Chapter 17.41 is repealed and replaced to the Daly City Municipal Code to establish water conservation in landscaping regulations.

2. CERTIFICATION AND POSTING AFTER ADOPTION

This Ordinance was adopted on MARCH 22, 2010. Within fifteen days after adoption (1) the Summary of this Ordinance was published in a newspaper of general circulation and circulated in the City, and (2) a certified copy of this Ordinance, with the names of those City Council members voting for or against, or otherwise voting, was posted in my office, all in accordance with Government Code Section 36933.

The vote was recorded as follows:

FOR: CANEPA, GOMEZ, KLATT, TORRES, GUINGONA

AGAINST: NONE
ABSTAIN: NONE
ABSENT: NONE

Dated: MARCH 22, 2010

K. Annette Hipona
CITY CLERK OF THE CITY OF DALY CITY

ORDINANCE NO. 1349

AN ORDINANCE OF THE CITY OF DALY CITY REPEALING AND REPLACING CHAPTER 17.41 OF THE DALY CITY MUNICIPAL CODE RE ESTABLISHING WATER CONSERVATION IN LANDSCAPING REGULATIONS

THIS ORDINANCE is adopted in light of the following facts and circumstances, which are hereby found and declared by the City of Daly City City Council:

WHEREAS, a reliable minimum supply of potable water is essential to the public health, safety and welfare of the people and economy of the City of Daly City;

WHEREAS, the California Water Conservation in Landscaping Act, also known as the State Landscape Model Ordinance ("Model Ordinance"), has been implemented by a Statewide Landscape Task Force which was overseen by the California Urban Water Conservation Council. The California Water Conservation in Landscaping Act was amended pursuant to AB 2717 (Chapter 682, Stats. 2004) and AB 1881 (Chapter 559, Stats. 2006);

WHEREAS, AB 1881 requires cities and counties, no later than January 1, 2010, to adopt the updated Model Ordinance or an equivalent document which is "at least as effective as" the Model Ordinance in conserving water. In the event cities and counties do not take such action, the State's Model Ordinance will be deemed to be automatically adopted by statute;

WHEREAS, the City of Daly City has developed this local Water Conservation In Landscaping Ordinance to meet the requirements and guidelines of the Model Ordinance and to address the unique physical characteristics, including average landscaped areas, within the City of Daly City's jurisdiction in order to ensure that this Ordinance will be "at least as effective as" the Model Ordinance in conserving water;

WHEREAS, although this Water Conservation in Landscaping Ordinance is more streamlined and simplified than the Model Ordinance, the City Council finds that it is "at least as effective as" the Model Ordinance for the following reasons: (1) this Ordinance applies to more accounts than the Model Ordinance does because it lowers the size threshold for applicable landscapes from 2,500 square feet (or, in the case of single-family residences, from 5,000 square feet) to 1,000 square feet, to better reflect the typical landscaped areas located within this City's boundaries; (2) this Ordinance includes a default turf restriction of 25% of the irrigated area and requires that at least 80% of the plants in non-turf landscape areas be native plants, low-water using plants, or no-water using plants (unless the applicant elects to perform a water budget); and (3) this Ordinance expands the requirement for dedicated irrigation meters to all accounts with landscaping greater than 5,000 square feet. The Model Ordinance does not contain any such default turf restrictions or specified plant requirements and only requires dedicated irrigation meters on non-residential accounts with landscaping greater than 5,000 square feet.

WHEREAS, although this Water Conservation in Landscaping Ordinance is more streamlined and simplified than the Model Ordinance, the City Council further finds that it is "at least as effective as" the Model Ordinance because this Ordinance includes water budget parameters and values and landscape parameters that are consistent with the Model Ordinance. By using the same water budget parameters as the Model Ordinance (e.g., plant factors, irrigation efficiency), this Ordinance will be as effective as the Model Ordinance in developing landscape

water budgets. By using the same landscape parameters as the Model Ordinance for, among other things, slope restrictions and width restrictions for turf, irrigation times, and minimum mulch requirements, this Ordinance will be at least as effective as the Model Ordinance in achieving water savings.

WHEREAS, Article X, Section 2 of the California Constitution and Section 100 of the California Water Code declare that the general welfare requires water resources be put to beneficial use, waste or unreasonable use or unreasonable method of use of water be prevented, and conservation of water be fully exercised with a view to the reasonable and beneficial use thereof.

WHEREAS, the San Francisco Public Utilities Commission has imposed an interim water supply limitation on its wholesale customers, including local water suppliers, until at least 2018.

WHEREAS, current supply and demand projections for the Bay Area Water Supply and Conservation Agency ("BAWSCA") member agencies indicate that, in the absence of increased water conservation, water demands will exceed available water supplies in 2015 and implementation of water conserving ordinances is one mechanism by which agencies can reduce future water demands and remain within existing supplies.

WHEREAS, The City Council finds and determines that this Ordinance is consistent with the provisions requiring reductions in outdoor water use for landscaping in the California Green Building Standards Code, as such provisions will be implemented in the coming years. Such requirements include the development of a water budget for landscape irrigation in accordance with methodology outlined in either the Model Ordinance or pursuant to a locally adopted ordinance.

WHEREAS, the State Legislature has identified the provision of a more reliable water supply and the protection, restoration and enhancement of the Delta ecosystem as a high priority for the state. Pursuant to this, in November 2009, the State Legislature passed Senate Bill 7 (7th Extraordinary Session) requiring certain urban water suppliers to reduce per capita urban water use by 20% by the year 2020. Accordingly, the City Council finds that implementation of this Ordinance is consistent with the policies and goals established by the State Legislature in enacting SB 7 (7th Extraordinary Session).

WHEREAS, Article XI, Section 7 of the California Constitution declares that a city or county may make and enforce within its limits all local, policy, sanitary, and other ordinances and regulations not in conflict with general laws.

WHEREAS, the City Council finds and determines that this Ordinance is not subject to the California Environmental Quality Act (Public Resources Code Section 2100 et seq.) ("CEQA") pursuant to Section 15307 (the activity assures the maintenance, restoration, enhancement, or protection of a natural resource) and Section 15378(b)(2) (the activity is not a project as it involves general policy and procedure making) of the State CEQA Guidelines, California Code of Regulations, Title 14, Chapter 3, since it makes and implements policies and procedures to ensure that water resources are conserved by reducing water consumption through

the establishment of a structure for planning, designing, installing, maintaining and managing water-efficient landscapes.

WHEREAS, the adoption and enforcement of this Ordinance is necessary to manage the City of Daly City's potable water supply in the short and long-term and to avoid or minimize the effects of drought and shortage within the City of Daly City. This Ordinance is essential to ensure a reliable and sustainable minimum supply of water for the public health, safety and welfare.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DALY CITY DOES ORDAIN AS FOLLOWS:

Section 1. Chapter 17.41 of the Municipal Code is hereby repealed.

Section 2. Chapter 17.41 of the Municipal Code is hereafter added to read as follows:

CHAPTER 17.41

WATER CONSERVATION IN LANDSCAPING

Sections:

17.41.010 Applicability
17.41.020 Definitions
17.41.030 Water Conservation in Landscaping Requirements
17.41.040 Compliance with Chapter.
17.41.050 Landscape Project Application
17.41.060 Outdoor Water Use Efficiency Checklist
17.41.070 Water Budget Calculations
17.41.080 Landscape and Irrigation Design Plans
17.41.090 Landscape Audit Report
17.41.100 Landscape and Irrigation Maintenance Schedule
17.41.110 Stormwater Management
17.41.120 Provisions for Existing Landscapes Over One Acre in Size
17.41.130 Penalties
17.41.140 Public Education

17.41.010. Applicability.

A. The provisions of this Ordinance shall apply to all of the following landscape projects:

i. *Tier 1 Landscapes*: All new construction and rehabilitated landscapes with irrigated landscape areas between 1,000 square feet and 2,500 square feet requiring a building or landscape permit, plan check or design review, or requiring new or expanded water service.

ii. *Tier 2 Landscapes*: All new construction and rehabilitated landscapes with irrigated landscape areas equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review or requiring new or expanded water service.

iii. Existing landscapes, including existing cemeteries, shall only be subject to the provisions for existing landscapes provided for in Section 17.41.130, "Provisions for Existing Landscapes Over One Acre in Size;" and

iv. New and rehabilitated cemeteries shall only be subject to the provisions of Section 17.41.070 "Water Budget Calculations", Section 17.41.090 "Landscape Audit Report", and Section 17.41.100 "Landscape and Irrigation Maintenance Schedule."

B. The provisions of this Ordinance shall not apply to:

i. New construction and rehabilitated landscapes with irrigated landscape areas less than 1,000 square feet or that do not require a building or landscape permit, plan check or design review, or new or expanded water service;

ii. Landscapes, or portions of landscapes, that are only irrigated for an establishment period;

iii. Registered local, state or federal historical sites where landscaping establishes a historical landscape style, as determined by a public board or commission responsible for architectural review or historic preservation;

iv. Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system; or

v. Community gardens or plant collections, as part of botanical gardens and arboretums open to the public, agricultural uses, commercial nurseries and sod farms.

17.41.020. Definitions

A. "applied water" means the portion of water supplied by the irrigation system to the landscape.

B. "automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

C. "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

D. "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and Irrigation Association's Certified Irrigation Designer program.

E. "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and Irrigation Association's Certified Landscape Irrigation Auditor program.

F. "certified professional" or "authorized professional" means a certified irrigation designer, a certified landscape irrigation auditor, a licensed landscape architect, a licensed landscape contractor, a licensed professional engineer, or any other person authorized by the state to design a landscape, an irrigation system, or authorized to complete a water budget.

G. "conversion factor (0.62)" means the number that converts inches per square foot to gallons. This conversion factor represents the amount of water that will fill one square-foot, to 1 inch of depth.

H. "drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

I. "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

J. "effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.

K. "establishment period" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth.

L. "Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 17.41.070 "Water Budget Calculations."

M. "ET adjustment factor" (ETAF) means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing non-rehabilitated landscapes shall not exceed 0.8.

N. "evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

O. "flow rate" means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

P. "hardscapes" means any durable material (pervious and non-pervious).

Q. "hydrozone" means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

R. "invasive plant species" means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources. "Noxious weeds" means any weed designated by the Weed

Control Regulations in the Weed Control Act and identified on a Regional District noxious weed control list. Lists of invasive plants are maintained at the California Invasive Plant Inventory and USDA invasive and noxious weeds database.

S. "irrigation audit" means an in-depth evaluation of the performance of an irrigation system. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

T. "irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this Ordinance is 70%. Greater irrigation efficiency can be expected from well-designed and maintained systems.

U. "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

V. "irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

W. "landscape architect" means a person who holds a license to practice landscape architecture in California as further defined by the California Business and Professions Code, Section 5615.

X. "landscape area" means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation), agricultural uses, commercial nurseries and sod farms.

Y. "landscape contractor" means a person licensed by the State of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

Z. "landscape project" means the total area comprising the landscape area, as defined in this Ordinance.

AA. "lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve.

BB. "local agency" means a city or county, including a charter city or charter county, or water district that is responsible for adopting and implementing this Ordinance.

The local agency is also responsible for the enforcement of this Ordinance, including but not limited to, in the case of a city or county, approval of a permit and plan check or design review of a project; and in the case of a district, approval of a new or expanded water service application.

CC. "local water purveyor" means any entity, including a public agency, city, county, district or private water company that provides retail water service.

DD. "low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers.

EE. "low water use plant" means a plant species whose water needs are compatible with local climate and soil conditions. Species classified as "very low water use" and "low water use" by *WUCOLS*, having a regionally adjusted *plant factor* of 0.0 through 0.3, shall be considered low water use plants.

FF. "Maximum Applied Water Allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 17.41.070, "Water Budget Calculations."

GG. "mined-land reclamation projects" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

HH. "mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

II. "native plant" means a plant indigenous to a specific area of consideration. For the purposes of these guidelines, the term shall refer to plants indigenous to the coastal ranges of Central and Northern California, and more specifically to such plants that are suited to the ecology of the present or historic natural community(ies) of the project's vicinity.

JJ. "new construction" means the construction of a new building or structure containing a landscape or other new land improvement, such as a park, playground, or greenbelt without an associated building.

KK. "no-water using plant" means a plant species with water needs that are compatible with local climate and soil conditions such that regular supplemental irrigation is not required to sustain the plant after it has become established.

LL. "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

MM. "overhead sprinkler irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

NN. "overspray" means the irrigation water which is delivered beyond the target area.

OO. "permit" means an authorizing document issued by local agencies for new construction or rehabilitated landscapes.

PP. "pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

QQ. "plant factor" or "plant water use factor" is a factor, when multiplied by ETo, estimates the amount of water needed by plants.

RR. "precipitation rate" means the rate of application of water measured in inches per hour.

SS. "project applicant" means the individual or entity submitting a Project Landscape Application, to request a permit, plan check, or design review from the local agency or requesting new or expanded water service from the water district. A project applicant may be the property owner or his or her designee.

TT. "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

UU. "recreational area" means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.

VV. "reference evapotranspiration" or "ETo" means a standard measurement of environmental parameters which affect the water use of plants.

WW. "rehabilitated landscape" means any re-landscaping project that requires a permit, plan check, design review, or requires a new or expanded water service application.

XX. "runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area.

YY. "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

ZZ. "Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

AAA. "sprinkler head" means a device which delivers water through a nozzle.

BBB. "station" means an area served by one valve or by a set of valves that operate simultaneously.

CCC. "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermuda grass, Kikuyu grass, Seashore Paspalum, St. Augustine grass, Zoysia grass, and Buffalo grass are warm-season grasses.

DDD. "valve" means a device used to control the flow of water in the irrigation system.

EEE. "water factor" means the number of gallons per cycle per cubic foot that a clothes washer uses.

FFF. "water feature" means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied).

GGG. "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000.

17.41.030. Water Conservation in Landscaping Requirements.

A. All owners of new construction and rehabilitated landscapes of applicable sizes shall: (1) complete the Landscape Project Application and (2) comply with the Landscape and Irrigation Maintenance Schedule requirements of this Ordinance.

B. All owners of existing landscapes over one acre in size, even if installed before enactment of this Ordinance, shall: (1) comply with local agency programs that may be instituted relating to irrigation audits, surveys and water use analysis, and (2) shall maintain landscape irrigation facilities to prevent water waste and runoff.

17.41.040 Compliance with this Chapter.

A. The local agency shall:

i. Provide the project applicant with the Ordinance and Landscape Project Application requirements and the procedures for permits, plan checks, design reviews, or new or expanded water service;

ii. Review the Landscape Project Application submitted by the project applicant;

iii. Approve or deny the project applicant's Landscape Project Application submittal;

iv. Issue or approve a permit, plan check or design review that complies with the approved Landscape Project Application or approve a new or expanded water service application that complies with the approved Landscape Project Application;

v. Submit a copy of the complete Landscape Project Application to the local water purveyor or land use authority, as the case may be.

B. The project applicant shall:

i. Prior to construction, submit all portions of the Landscape Project Application, except the Landscape Audit Report, to the local agency; and

ii. After construction, submit the Landscape Audit Report portion of the Landscape Project Application to the local agency.

17.41.050. Landscape Project Application.

A. The elements of a landscape must be designed to achieve water efficiency and will comply with the criteria described in this Ordinance. In completing the Landscape Project Application, project applicants may choose one of two options to demonstrate that the landscape meets the Ordinance's water efficiency goals. Regardless of which option is selected, the applicant must complete and comply with all other elements of the Ordinance. The options include:

i. Planting restrictions:

a. The turf area may not be more than 25% of the landscape area; and

b. At least 80% of the plants in non-turf landscape areas shall be native plants, low-water using plants, or no-water using plants;

or the:

ii. Water Budget Calculation

B. The Landscape Project Application shall include the following elements:

i. Project Information;

ii. Outdoor Water Use Efficiency Checklist;

iii. Water Budget Calculations, if applicant selects to use a water budget approach rather than comply with the turf area limitations or specified plant type restrictions;

vi. Landscape and Irrigation System Design Plans; and

vii. Landscape Audit Report.

17.51.060. Outdoor Water Use Efficiency Checklist.

The City of Daly City has developed an Outdoor Water Use Efficiency Checklist (Checklist), based on the criteria described below. For Tier 1 projects, either the project applicant or a certified or authorized professional shall complete the Checklist and submit it to the Planning Division along with the Landscape and Irrigation Design Plan. For Tier 2 projects, the Checklist shall be completed by a certified or authorized professional and submitted to the Planning Division along with the Landscape and Irrigation Design Plan.

A. Plant Material

i. Each hydrozone shall have plant materials with similar water use that are selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site.

ii. The turf area shall not be more than 25% of the landscape area, unless the project applicant develops a site-specific water budget and the ETWU of the landscape area does not exceed the MAWA.

iii. Turf shall not be planted on slopes greater than 25% or in areas that are less than eight feet wide, unless irrigated with subsurface irrigation or a low volume irrigation system.

iv. At least 80% of the plants in non-turf landscape areas shall be native plants, low-water using plants, or no-water using plants, unless the project applicant develops a site-specific water budget and the ETWU of the landscaped area does not exceed the MAWA.

v. Fire-prone plant materials and highly flammable mulches should be avoided.

vi. The use of invasive and/or noxious plant species is strongly discouraged.

vii. The architectural guidelines of a common interest development shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

B. Mulch

A minimum two-inch layer of mulch shall be applied on all exposed soil surfaces of planting areas, although a three-inch layer is recommended.

C. Irrigation System

An irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance.

i. Dedicated landscape water meters shall be required for landscape areas greater than 5,000 square feet and are highly recommended for landscape areas greater than 2,500 square feet.

ii. *Tier 2 Landscapes* are required to have automatic irrigation controllers that utilize either evapotranspiration or soil moisture sensor data for irrigation scheduling.

iii. Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems.

iv. The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions.

v. Low volume irrigation required in mulched areas, in areas with slope greater than 25%, and within 24-inches of a non-permeable surface, or in narrow or irregularly shaped areas that are less than eight feet in width in any direction.

vi. Average irrigation efficiency is assumed to be 70%. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average landscape irrigation efficiency of 70%.

vii. Irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m., unless unfavorable weather prevents it or otherwise renders irrigation unnecessary.

D. Hydrozone

i. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

ii. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

iii. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.

iv. Individual hydrozones that mix plants with different water uses may be allowed if a water budget is performed, and the plant factor calculation is based on the proportion of the respective plant water uses or the plant factor of the higher water using plant is used.

E. Water Features

i. Recirculating water systems will be used for water features.

ii. The surface area of a water feature will not exceed 10% of the landscape area and will be counted as a high-water using plant for purposes of a water budget calculation.

iii. Pool and spa covers are highly recommended.

F. Soil Amendments

Soil amendments, such as compost, shall be incorporated according to the soil conditions at the project site and based on what is appropriate for the selected plants.

17.41.070 Water Budget Calculations.

Project applicant may elect to complete a water budget calculation for the landscape project. A Tier 1 water budget may be developed and completed by the project applicant. A Tier 2 water budget calculation must be completed by a certified or authorized professional. Water budget calculations, if prepared, shall adhere to the following requirements:

A. The plant factor used shall be from WUCOLS. The plant factor ranges from 0.0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

B. All water features shall be included in the high water use hydrozone.

C. All Special Landscape Areas (SLA) shall be identified and their water use included in the water budget calculations.

D. The reference evapotranspiration adjustment factor (ETAF) for SLA shall not exceed 1.0. The ETAF for all other landscaped areas shall not exceed 0.7.

E. Irrigation system efficiency shall be greater than or equal to 70%.

F. Maximum Applied Water Allowance (MAWA) may be calculated using one of the following equations:

i. $MAWA = (ETo)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$

Where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
0.62 = Conversion Factor (to gallons)
0.7 = Reference Evapotranspiration Adjustment Factor (ETAF)
LA = Landscape Area including SLA (square feet)
0.3 = Additional Water Allowance for SLA
SLA = Special Landscape Area (square feet)

ii. A local agency or project applicant may consider Effective Precipitation (25% of annual precipitation) in tracking water use and may use the following equation to calculate the MAWA:

$$MAWA = (ETo - Eppt)\ (0.62)\ [(0.7 \times LA) + (0.3 \times SLA)]$$

G. Estimated Total Water Use (ETWU) will be calculated using the equation below. The sum of the ETWU calculated for all hydrozones will not exceed the MAWA.

$$ETWU = (ETo)(0.62)\left(\frac{PF \times HA}{IE} + SLA\right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)
ETo = Reference Evapotranspiration (inches)
PF = Plant Factor from WUCOLS
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor
IE = Irrigation Efficiency (minimum 0.70)

17.41.080. Landscape and Irrigation Design Plans.

A. *Tier 1 Landscapes*: The Landscape and Irrigation Design Plan may be prepared by, and bear the signature of, the project applicant, or that of a certified or authorized professional.

B. *Tier 2 Landscapes*: The components of the Landscape and Irrigation Design Plan shall be prepared as follows:

i. The landscape design portion shall be prepared by, and bear the signature of, a licensed landscape architect, licensed landscape contractor, or that of a certified or authorized professional; and

ii. The irrigation design portion shall be prepared by, and bear the signature of, a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or that of a certified or authorized professional.

C. The landscape design portion of the Landscape and Irrigation Design Plan, at a minimum, shall:

i. Delineate and label each hydrozone;

ii. Identify each hydrozone as low, moderate, high water, or mixed water use;

iii. Identify Special Landscape Areas (i.e., recreational areas; areas permanently and solely dedicated to edible plants; areas irrigated with recycled water);

iv. Identify type of mulch and application depth;

v. Identify type and surface area of water features;

vi. Identify hardscapes (pervious and non-pervious); and

vii. Contain the following statement: "I have complied with the criteria of the Water Conservation in Landscaping Ordinance and applied them for the efficient use of water in the Landscape and Irrigation Design Plan."

D. The irrigation design portion of the Landscape and Irrigation Design Plan, at a minimum, shall contain:

i. Location and size of separate water meters for landscape;

ii. Location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;

iii. Static water pressure at the point of connection to the public water supply;

iv. Flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;

v. Irrigation schedule;

vi. The following statement: "I have complied with the criteria of the Water Conservation in Landscaping Ordinance and applied them accordingly for the efficient use of water in the Landscape and Irrigation Design Plan."

E. Grading

If the Landscape Project will be graded, then the grading shall be designed to minimize soil erosion, runoff, and water waste. All grading should be conducted to:

i. Maintain all irrigation and normal rainfall within property lines and avoid drainage on to non-permeable hardscapes;

ii. Avoid disruption of natural drainage patterns and undisturbed soil;

iii. Avoid soil compaction in landscape areas; and

iv. Be consistent with city and county grading requirements.

17.41.090. Landscape Audit Report.

A. *Tier 1 Landscapes*: Landscape irrigation audits for new or rehabilitated landscapes installed after April 21, 2010 shall be conducted after the landscaping and irrigation systems have been installed. The audit may be conducted by the project applicant or by a certified landscape irrigation auditor.

B. *Tier 2 Landscapes*: Landscape irrigation audits for new or rehabilitated landscapes installed after April 21, 2010 shall be conducted by a certified landscape irrigation auditor after the landscaping and irrigation system have been installed.

C. The Landscape Audit Report shall include, but is not limited to: inspection to confirm that the landscaping and irrigation system were installed as specified in the Landscape and Irrigation Design Plan, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule.

D. The Landscape Audit Report shall include the following statement: "The landscape and irrigation system has been installed as specified in the Landscape and Irrigation Design Plan and complies with the criteria of the Ordinance and the permit".

E. Local agency shall administer on-going programs that may include, but not be limited to, post-installation landscape inspection, irrigation water use analysis, irrigation audits, irrigation surveys and water budget calculations to evaluate compliance with the MAWA.

17.41.100. Landscape and Irrigation Maintenance Schedule.

Landscapes shall be maintained to ensure water use efficiency.

A. A regular maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas; and removing obstructions to emission devices.

B. Repair of all irrigation equipment shall be done with the originally installed components or their equivalents.

C. A Project applicant is encouraged to implement sustainable or environmentally-friendly practices for overall landscape maintenance.

17.41.110. Stormwater Management.

Stormwater best management practices should be implemented into the landscape and grading design plans to minimize runoff and to increase on-site retention and infiltration and should be consistent with city and county stormwater management requirements.

17.41.1200. Provisions for Existing Landscapes Over One Acre in Size.

This section shall apply to all existing landscapes that were installed before April 21, 2010, and are over one acre in size.

A. Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

i. For landscapes that have a water meter, the local agency shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the MAWA for existing landscapes. The MAWA for existing landscapes shall be calculated as:

$$MAWA = (0.8)\ (ETo)(LA)(0.62).$$

ii. For landscapes that do not have a meter, the local agency shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

iii. All landscape irrigation audits for existing landscapes that are greater than one acre in size shall be conducted by a certified landscape irrigation auditor.

B. Water Waste Prevention.

Local agencies shall prevent water waste resulting from inefficient landscape irrigation by prohibiting runoff from leaving the target landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures.

17.41.130. Penalties

A. Violation and Notice of Correction.

It is unlawful for any person, firm, partnership, association, or corporation subject to the requirements of this Ordinance to fail to comply with the outdoor water use efficiency requirements of this Ordinance. The City of Daly City has the authority to conduct such inquiries, audits or surveys to ensure compliance with the requirements of this Ordinance. Whenever the City of Daly City determines that a violation of this Ordinance has occurred, the City of Daly City may serve a notice of correction on the owner(s) of the property on which the violation is situated. The owner(s) of record shall have ninety (90) days to take corrective action.

B. Administrative Enforcement.

In addition to any other remedy provided by the Daly City's Municipal Code, any provision of this Chapter may be enforced by an administrative order issued pursuant to the administrative processes set forth in Section 8.16.100 et. seq. of the Daly City Municipal Code. The Administrative Appeal Board shall serve as the administrative enforcement hearing board for the purposes of considering any appeals. All notices shall be served in accordance with Article II of Section 8.16 of the Daly City Municipal Code.

17.41.140 Public Education

A. The local agency shall provide information to all applicants regarding the design, installation, management, and maintenance of water-efficient landscapes and irrigation systems.

B. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water-efficient landscapes that are described in this Ordinance.

Section 2. .Severability. If any section, subsection, provision or part of this Ordinance, or its application to any person or circumstance, is held to be unconstitutional or otherwise invalid, the remainder of this Ordinance, and the application of such provision to other person or circumstances, shall not be affected thereby and shall remain in full force and effect and, to that end, the provisions of this Ordinance are severable.

Section 3. Environmental Determination. The City Council finds and determines that this Ordinance is not subject to the California Environmental Quality Act (Public Resources Code Section 2100 et seq.) ("CEQA") pursuant to Section 15307 (the activity assures the maintenance, restoration, enhancement, or protection of a natural resource) and Section 15378(b)(2) (the activity is not a project as it involves general policy and procedure making) of the State CEQA Guidelines, California Code of Regulations, Title 14, Chapter 3, since it makes and implements policies and procedures to ensure that water resources are conserved by reducing water consumption through the establishment of a structure for planning, designing, installing, maintaining and managing water-efficient landscapes.

Section 4. Publication and Effective Date.

Pursuant to the provisions of Government Code Section 36933, a summary of this ordinance shall be prepared by the City Attorney. At least five (5) days prior to the Council meeting at which this ordinance is scheduled to be adopted, the City Clerk shall (1) publish the summary, and (2) post it in the City Clerk's Office a certified copy of this ordinance. Within fifteen (15) days after the adoption of this ordinance, the City Clerk shall (1) publish the summary and (2) post in the City Clerk's Office a certified copy of the full text of this ordinance along with the names of those City Council members voting for and against this ordinance or otherwise voting. This ordinance shall be in full force and effect thirty (30) days after adoption by the City Council of the City of Daly City.

AN ORDINANCE OF THE CITY OF DALY CITY REPEALING AND REPLACING CHAPTER 17.41 OF THE DALY CITY MUNICIPAL CODE RE ESTABLISHING WATER CONSERVATION IN LANDSCAPING REGULATIONS

Introduced this 8th day of March, 2010.

Passed and adopted as an Ordinance of the City of Daly City at a regular meeting of the City Council of the City of Daly City held on the 22 day of MARCH, 2010, by the following vote:

AYES, Councilmembers: CANEPA, GOMEZ, KLATT, TORRES GUINGONA

NOES, Councilmembers: NONE

Absent, Councilmembers: NONE

K. Annette Hypona
CITY CLERK OF THE CITY OF DALY CITY

APPROVED:

MICHAEL P. GUINGONA
MAYOR OF THE CITY OF DALY CITY

ORDINANCE NO. 1125

AN URGENCY ORDINANCE OF THE CITY COUNCIL OF THE CITY OF DALY CITY RE: ESTABLISHING RULES AND REGULATIONS FOR RATIONING WATER DURING A WATER SHORTAGE EMERGENCY AND ESTABLISHING PENALTIES FOR VIOLATIONS THEREOF

BE IT ORDAINED by the City Council of the City of Daly City, as follows:

Section 1. Findings and Determinations.

A. A water shortage emergency condition prevails within the area served by the City of Daly City.

B. The City of Daly City, at the direction of the San Francisco Public Utilities Commission, has requested that all resale customers, including the City of Daly City, immediately institute a water conservation program designed to effect a 25% reduction in water usage.

C. The rules, regulations and restrictions set forth in this Ordinance are intended to conserve the water supply of the City of Daly City for the greatest public benefit with particular regard to domestic use, sanitation and fire protection.

D. The specific uses prohibited or restricted by this Ordinance are nonessential, if allowed would constitute wastage of the City of Daly City water, and should be prohibited pursuant to the City of Daly City's power under Water Code Section 350 et. seq., Water Code Section 71640 et. seq., and the common law.

E. The actions taken hereinafter are exempt from the provisions of Section 21000 et. seq., of the Public Resources Code as a project undertaken as immediate action necessary to prevent or mitigate an emergency pursuant to Title 14, California Administrative Code Section 15269.

F. The City Council of the City of Daly City further finds and determines that because of the drought conditions prevailing, it would be in the best interests of the citizens of Daly City and for the immediate preservation of the peace, health or safety that this Ordinance take effect immediately.

Section 2. Definitions.

A. 'City' shall mean the City of Daly City.

B. 'City Manager' shall mean the City Manager of the City of Daly City, or his designated representative.

C. 'Person' means any person, firm, partnership, association, corporation, company, organization or governmental entity.

D. 'Customer' means any person, whether within or without the geographic boundaries of City who uses water supplied by City.

E. 'Base year' shall mean calendar year 1987.

Section 3. Prohibition of Nonessential Water use.

It shall be unlawful for any person, firm, partnership, association, corporation or political entity to use water obtained from the water system of City for nonessential uses as hereinafter defined.

Section 4. Nonessential uses defined.

The following uses of water are hereby determined to be nonessential, except as further provided herein:

A. Use of water in excess of the following allotment:

1. Single Family Residential, Commercial, Industrial and Governmental Customers.

Each single family unit shall be allocated a total number of 1000 cubic feet, bi-monthly, based upon a maximum of four (4) persons residing full time at said premises. An additional allotment will be granted:

a) For each person over four (4) persons, 250 cubic feet bi-monthly; or

b) 85% of the average winter usage above 1000 cubic feet, bi-monthly, for the months of December, January, February and March; and

c) 70% of the average summer usage above 1000 cubic feet bi-monthly for the months of April, May, June, July,

August, September, October and November.

2. Multi-Residential Units:

The amount allotted for each number of units or buildings shall be the total number of units hooked up to a meter times 1000 to arrive at the total number of cubic feet bi-monthly for the building or number of units hooked up to one meter, plus the additional allotments as described in Section 4 A.1.

3. Irrigation and Outside Water Usage Customers:

Fifty percent 50% of the water used for irrigating parks, common greens, median strips, recreational areas, cemeteries, golf courses and other similar uses during base year.

B. Use of water through any meter when the customer has been given five (5) days' notice to repair broken or defective plumbing, sprinkler, watering or irrigation systems and has failed to effect such repairs or that a single residential unit uses in excess of 3600 cubic feet bi-monthly.

1. In emergency situations, the City may immediately install a flow restricting device or terminate all water service at the premises of customer. Notice shall be given to the customer of such action by immediately posting notice upon the property or by personal service within twenty-four 24 hours of such action. Posting shall be made upon the front entrance of the property and upon the garage door.

2. In the event of a non-emergency, City shall have the right to install a flow restricting device or terminate all water service at the premises of customer upon the second notice concerning such broken or defective plumbing, sprinkler, watering or irrigation systems, when customer fails to effectuate repairs within twenty-four (24) hours of such second notice. Said notice shall be posted upon the front entrance of the property and upon the garage door.

3. In the event that the customer uses excess water hereinabove set forth, City shall have the right to install a flow

restricting device or terminate all water service at the premises of customer upon the second notice concerning such excessive water use. Said notice shall be posted upon the front entrance of the property and upon the garage door or personally served on the customer.

C. Use of water which results in flooding or runoff in the gutters or streets.

D. Use of water to clean or fill decorative fountains, unless existing in an interior location using recycled water.

E. Use of water for construction purposes such as consolidation of backfill unless no other source of water or other method can be used.

F. Service of water by restaurants except upon the request of a customer.

G. Use of water to clean sidewalks, driveways, patios, parking lots or other hard-surfaced areas.

H. Use of water for cleaning cars, boats, trailers or other vehicles unless a positive shutoff value is used.

I. Failure to use cooling water which is recycled where possible.

J. Use of water for irrigation between 11:00 A.M. and 6:00 P.M.

K. Unapproved use of water for irrigation of new landscaping.

The City Manager may modify, delay or otherwise restrict the installation of new landscaping.

Section 5. Exceptions.

Written application for an exception, adjustment or appeal of any action by City under this Ordinance may be made to the City Manager or his designated representative.

The City Manager, or his representative, may:

A. Grant permits for the uses of water otherwise prohibited; or

B. Adjust the allotments in Section 4 A if he finds that:

1. to fail to do so would cause an emergency condition adversely affecting the health, sanitation, fire protection or safety of customer or public; and

2. the customer has adopted all practicable water conservation measures;

C. Rescind any termination notice upon adequate cause being shown for the failure to do the acts as prohibited in Section B, including the excessive use of water.

D. Service connections for new construction may be granted so long as owner thereof agrees to abide by all conditions of this Ordinance and no landscaping shall be allowed until termination of the emergency.

E. Any customer may appeal the determination of the City Manager or his designated representative to the City Council by filing written notice of the appeal within seven (7) days after receipt of the notice of determination. The City Council may reverse, modify or uphold the determination of the City Manager, or his designated representative if it finds that to fail to do so would cause an unnecessary and undue hardship to the customer or the public.

Section 6. Excess Water Rate Charges.

An excess use water charge rate shall be levied on all water used in excess of the Customer allotment as defined in Section 4 above. The excess use rate is as follows:

A. For excess amounts up to and including ten percent (10%) over allotment:

...Two hundred percent (200%) of the highest current rate per unit or portion thereof.

B. For excess amounts over ten percent (10%) and up to and including twenty percent (20%) over allotment:

...Six hundred percent (600%) of the highest current rate per unit or portion thereof.

C. For excess amounts over twenty (20%) of allotment:

...One thousand percent (1000%) of the highest current rate per unit or portion thereof.

Section 7. Enforcement.

A. Installation of Flow-Restricting Devices.

In lieu of or in addition to the penalties provided for in Section 356 and Section 71640 of the Water Code, the City may install a flow-restricting device on the service line of any customer violating any of the provisions of this Ordinance, including use of water in excess of the allotments set out in Section 4 A.

No flow-restricting device shall be installed until after one written notice to the offender. Said person shall have the right to request a hearing for determination by the City Manager, or his designated representative, by giving written notice of such request to the City Manager within ten (10) days after receipt of notice of written warning. Determination of the City Manager shall be subject to appeal to the City Council which appeal must be in writing and filed with the City Clerk within five (5) days after receipt of notice of determination by the offender. First installation shall remain in place a minimum of three (3) days; succeeding installation, ten (10) days minimum.

Section 8. Charges.

Charges for installation of Flow-Restricting Devices and Restoration of Service:

Meter Size	Installation Charge	Removal Charge
5/8" to 1"	$ 50	$ 50
1-1/2" to 2"	$100	$100
3" and larger	Actual Cost*	Actual Cost*

*Actual Cost shall include all material, labor, equipment and overhead charges.

Section 9. Penalties.

A. It shall be a misdemeanor and punishable by a fine not exceeding the sum of Five Hundred ($500) Dollars or by imprisonment for a period not exceeding six (6) months, or both, in the event any person applying for additional allocation of water makes any false or misleading statements in any application for additional water.

B. Violation of any other provision of this Ordinance shall be an infraction punishable by a fine not to exceed $50.00 for a first violation, a fine not exceeding $100.00 for a second violation of this Ordinance within one (1) year and a fine not exceeding $250.00 for each additional violation of this Ordinance within one (1) year.

Section 10. This Ordinance is hereby declared to be an urgency Ordinance and is adopted under the provisions of the Government Code of the State of California, Section 36937, subsection (b) thereof, and is to take effect immediately.

Section 11. Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council of the City of Daly City declares that it would have adopted each section, subsection, sentence, clause, phrase or portion thereof, irrespective of the fact that any one or more sections, subsections, clauses, phrases or portions be declared invalid or unconstitutional.

Section 12. The City Council finds that this ordinance is statutorily exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article 18, Section 15269 "Emergency Projects" of the CEQA Guidelines which states:

> "The following emergency projects are exempt from the requirements of CEQA:
>
> (c) Specific actions necessary to prevent or mitigate an emergency."

Section 13. Publication.

This Ordinance shall be published once in the Daly City Record, a newspaper of general circulation published in the City of Daly City, and shall take effect immediately.

Introduced this 14th day of May, 1990.

Passed and adopted as an Ordinance of the City of Daly City at a regular meeting of the City Council of the City of Daly City held on the 14th day of May, 1990, by the following vote:

AYES, Councilmen: Nevin, Powell, Teglia, Tucker

NOES, Councilmen: None

Absent, Councilmen: Giammona

City Clerk of the City of Daly City

APPROVED:

JAMES J. TUCKER
Mayor of the City of Daly City

ORDINANCE NO. 1143

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF DALY CITY AMENDING URGENCY ORDINANCE NO. 1125 (ESTABLISHING RULES AND REGULATIONS FOR RATIONING WATER DURING WATER SHORTAGE EMERGENCY AND ESTABLISHING PENALTIES FOR VIOLATIONS THEREOF), AS TO SECTION 4 (NONESSENTIAL USES DEFINED) AND AS TO SECTION 6 (EXCESS WATER RATE CHARGES)

BE IT ORDAINED by the City Council of the City of Daly City, as follows:

Section 1: Urgency Ordinance No. 1125 adopted May 14, 1990 Establishing Rules and Regulations for Rationing Water During a Water Shortage Emergency and Establishing Penalties for Violations Thereof is hereby amended as to Section 4 thereof, to read as follows:

"Section 4. Non essential uses defined.

The following uses of water are hereby determined to be nonessential, except as further provided herein:

A. Use of water in excess of the following allotment:

1. Single Family Residential, Commercial, Industrial and Governmental Customers.

Each single family unit shall be allocated a total number of 1000 cubic feet, bi-monthly, based upon a maximum of two (2) persons residing full time at said premises. An additional allotment will be granted:

a. For the third person residing full time at said premises, an additional 200 cubic feet bimonthly, and for the fourth person an additional 400 cubic feet bimonthly; and for each person above four (4) persons, an additional 300 cubic feet bimonthly for each additional person. The total allocation shall not exceed 3600 cubic feet bimonthly, regardless of the number of residents; or

b. 85% of the average winter usage above 1000 cubic feet, bi-monthly, for the months of December, January, February and March; and

c. 70% of the average summer usage above 1000 cubic feet bi-monthly for the months of April, May, June, July, August, September, October and November of the Base Year."

Section 2: Urgency Ordinance No. 1125 adopted May 14, 1990 Establishing Rules and Regulations for Rationing Water During a Water Shortage Emergency and Establishing Penalties for Violations Thereof is hereby further amended as to Section 6 thereof, to read as follows:

"Section 6. Excess Water Rate Charges.

An excess use water charge rate shall be levied on all water used in excess of the Customer allotment as defined in Section 4 above. The excess use rate is an follows:

A. Single-Family and Multi-Family Residential:

1. For excess amounts up to and including two (2) units bimonthly over allotment:

...Five dollars ($5.00) per unit in addition to the current rate for water.

2. For excess amounts over two (2) units bimonthly and up to and including five (5) units bimonthly over allotment:

...Eight dollars ($8.00) per unit in addition to the current rate for water.

3. For excess amounts of over five (5) units bimonthly over allotment:

...Fifteen dollars ($15.00) per unit in addition to the current rate for water."

B. All Other:

1. For excess amounts up to and including ten percent (10%) over allotment:

...Two hundred percent (200%) of the highest current rate per unit or portion thereof.

2. For excess amounts over ten percent (10%) and up to and including twenty percent (20%) over allotment:

...Six hundred percent (600%) of the highest current rate per unit or portion thereof.

3. For excess amounts over twenty (20%) of allotment:

...One thousand percent (1000%) of the highest current rate per unit or portion thereof."

Section 3. Severability.

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance. The City Council of the City of Daly City declares that it would have adopted each section, subsection, sentence, clause, phrase or portion thereof, irrespective of the fact that any one or more sections, subsections, clauses, phrases or portions be declared invalid or unconstitutional.

Section 4. The City Council finds that this ordinance is statutorily exempt from the requirements of the California Environmental Quality Act (CEQA) pursuant to Article 21080, Section 15273, "Rates, Tolls, Fares and Charges" of the CEQA Guidelines which provides that CEQA does not apply to the establishment, modification, structuring, restructuring or approval of rates, tolls, fares or other charges of public agencies which are for the purpose of meeting operating expenses, financial reserve needs or funding for capital projects.

Section 5. Publication.

This Ordinance shall take effect and be enforced thirty (30) days from and after its adoption. The City Clerk shall publish this ordinance or ordinance summary according to law.

Introduced this 10th day of June, 1991.

Passed and adopted as an Ordinance of the City of Daly City at a regular meeting of the City Council of the City of Daly City held on the 24th day of June, 1991, by the following vote:

AYES, Councilmen: Agrimonti, Nevin, Powell, Teglia, Giammona

NOES, Councilmen: None

Absent, Councilmen: None

Lorraine M. Cleri

City Clerk of the City of Daly City

APPROVED:

ANTHONY A. GIAMMONA

Mayor of the City of Daly City

ORDINANCE NO. 1156

AN ORDINANCE OF THE CITY OF DALY CITY SUSPENDING ORDINANCES NOS. 1125 AND 1143 RE: RULES AND REGULATIONS FOR RATIONING WATER DURING A WATER SHORTAGE EMERGENCY AND PENALTIES FOR VIOLATION

BE IT ORDAINED by the City Council of the City of Daly City, as follows:

Section 1: Findings

A. The City of Daly City, by means of Urgency Ordinance 1125, and amending Ordinance 1143, instituted a water conservation program that sought and secured significant reductions in water use by the residents and businesses of the City of Daly City; and

B. The conservation practices heretofore adopted by the City and implemented by the residents and businesses of the City of Daly City have ameliorated those emergency conditions supporting the penalties and fines instituted by Urgency Ordinance 1125 and thereafter amended by Ordinance 1143; and

C. Pursuant to California Water Code §355, the City Council finds and determines that the current conservation efforts of the residents and businesses of Daly City will not deplete water resources beyond those necessary for human consumption, sanitation and fire protection.

Section 2: Suspension of Ordinances

The City Council of the City of Daly City hereby suspends Urgency Ordinance 1125, and amending Ordinance 1143, in their entirety.

Section 3: Severability

If any section, subsection, sentence, clause, phrase or portion of this Ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall be affect the validity of the remaining portions of this Ordinance. The City Council of the City of Daly City declares that it would have adopted each section, subsection, sentence, clause, phrase or portion thereof, irrespective of the fact that any one or more sections, subsections, clauses, phrases or portions be declare invalid or unconstitutional.

Section 4: Publication

This Ordinance shall be published once in The Record, a newspaper of general circulation published in the City of Daly City.

Introduced this 11th day of May, 1992.

Passed and adopted as an Ordinance of the City of Daly City at a regular meeting of the City Council of the City of Daly City held on the 26th day of May, 1992, by the following vote:

AYES, Councilmen: Agrimonti, Giammona, Nevin, Teglia, Powell

NOES, Councilmen: None

Absent, Councilmen: None

Lorraine V. Elia

City Clerk of the City of Daly City

APPROVED:

JANE POWELL

Mayor of the City of Daly City

ORDINANCE NO. 1348

AN ORDINANCE OF THE CITY OF DALY CITY ADDING CHAPTER 15.66
RE: INDOOR WATER USE EFFICIENCY AND CONSERVATION STANDARDS
PROGRAM FOR NEW AND REMODELED BUILDINGS

THIS ORDINANCE is adopted in light of the following facts and circumstances, which are hereby found and declared by the Daly City City Council:

WHEREAS, a reliable minimum supply of potable water is essential to the public health, safety and welfare of the people and economy of the City of Daly City, California.

WHEREAS, Northern California is a Semi-Arid region and is largely dependent upon local surface water, groundwater, and imported water supplies. Factors, such as drought, a growing population, climate change, and environmental and regulatory concerns affect our region's water reliability and make the region highly susceptible to water supply challenges.

WHEREAS, careful water management requires active water conservation measures, not only in times of drought but at all times, in order to ensure a reliable minimum supply of water to meet current and future water supply needs.

WHEREAS, Article X, Section 2 of the California Constitution and Section 100 of the California Water Code declare that the general welfare requires water resources be put to beneficial use, waste or unreasonable use or unreasonable method of use of water be prevented, and conservation of water be fully exercised with a view to the reasonable and beneficial use thereof.

WHEREAS, the San Francisco Public Utilities Commission has imposed an interim water supply limitation on its wholesale customers, including local water suppliers, until at least 2018.

WHEREAS, current supply and demand projections for the Bay Area Water Supply and Conservation Agency member agencies indicate that, in the absence of increased water conservation, water demands will exceed available water supplies in 2015 and implementation of water conserving ordinances is one mechanism by which agencies can reduce future water demands and remain within existing supplies.

WHEREAS, the City Council finds and determines that this Ordinance is consistent with the provisions requiring high efficiency water conserving fixtures and reductions in indoor water use in the 2007 California Plumbing Code and the California Green Building Standards Code, respectively, as such provisions will be implemented in the coming years. Implementation of this Ordinance is necessary to expedite the use of high efficiency water conserving fixtures and assist BAWSCA member agencies in achieving water savings.

WHEREAS, the State Legislature has identified the provision of a more reliable water supply and the protection, restoration and enhancement of the Delta ecosystem as a high priority for the State. Pursuant to this, in November 2009, the State Legislature passed Senate Bill 7 (7th Extraordinary Session) requiring certain urban water suppliers to reduce per capita urban water use by 20% by the year 2020. Accordingly, the City Council finds that the implementation of

this Ordinance is consistent with the policies and goals established by the State Legislature in enacting Senate Bill 7 (7th Extraordinary Session).

WHEREAS, the State Legislature has identified urban water conservation as a cost-effective approach to addressing water supply needs and determined that there are many water conservation practices that produce significant energy and water resource savings that should be encouraged as a matter of state policy. Pursuant to this finding, the State Legislature passed Senate Bill 407 (Chapter 587, Stats. 2009), requiring all residential and commercial property owners to replace existing plumbing fixtures with water-conserving fixtures by 2017 and 2019, respectively, and to upgrade existing plumbing fixtures upon any remodel initiated after January, 1 2014. Senate Bill 407 further authorizes a city, county, or retail water supplier to enact local ordinances that promote compliant use of water efficient plumbing fixtures or which will result in a greater amount of water savings than those provided for in Senate Bill 407. Accordingly, the City Council finds and determines that this Ordinance is consistent with the mandates of Senate Bill 407 and will result in water savings as provided for in Senate Bill 407.

WHEREAS, Article XI, Section 7 of the California Constitution declares that a city or county may make and enforce within its limits all local, policy, sanitary, and other ordinances and regulations not in conflict with general laws.

WHEREAS, the City Council pursuant to Health & Safety Code Section 17958.5, finds and determines that the more restrictive building standards for water conserving fixtures provided for in this Ordinance are reasonably necessary because of local climatic, geological or topographical conditions.

WHEREAS, the City Council finds and determines that this Ordinance is not subject to the California Environmental Quality Act (Public Resources Code Section 2100 et seq.) ("CEQA") pursuant to Section 15307 (the activity assures the maintenance, restoration, enhancement, or protection of a natural resource) and Section 15378(b)(2) (the activity is not a project as it involves general policy and procedure making) of the State CEQA Guidelines, California Code of Regulations, Title 14, Chapter 3, since it makes and implements policies and procedures for ensuring that water resources are conserved by reducing water consumption through the use of water efficient indoor plumbing fixtures.

WHEREAS, the adoption and enforcement of this Ordinance is necessary to manage the City of Daly City's potable water supply in the short and long-term and to avoid or minimize the effects of drought and shortage within the City of Daly City. This Ordinance is essential to ensure a reliable and sustainable minimum supply of water for the public health, safety and welfare.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DALY CITY DOES ORDAIN AS FOLLOWS:

Section 1. Chapter 15.66, consisting of Sections 15.66.010 through 15.66.080, is hereby added to Title 15 of the Daly City Municipal Code, and shall read as follows:

CHAPTER 15.66

INDOOR WATER USE EFFICIENCY AND CONSERVATION ORDINANCE

Sections:

15.66.010 Coordination with the Plumbing Code
15.66.020 Applicability
15.66.030 Definitions
15.66.040 Minimum Indoor Fixture Requirements
15.66.050 Compliance with Chapter
15.66.060 Components of the Indoor Water Efficiency Checklist
15.66.070 Penalties and Enforcement
15.66.080. Public Education

15.66.010. COORDINATION WITH THE PLUMBING CODE

The code of rules and regulations printed in one volume and published by the International Association of Plumbing and Mechanical Officials, under the title "California Plumbing Code, 2007 Edition," and the appendices printed therein, and all supplements subsequently issued thereto, hereinafter collectively called the "Plumbing Code," prescribing regulations for the installation of all plumbing fixtures, printed in book form and filed in the office of the City Clerk as of December 10, 2007, and by reference incorporated herein as if set forth, as the Plumbing Code of the City of Daly City establishing the rules, regulations, and standards within the City of Daly City as to all matters therein contained; subject however, to the amendments, additions, and deletions set forth in this chapter. The mandatory requirements of the adopted appendix to the California Plumbing Code, 2007 Edition, shall be enforceable to the same extent as if contained in the body of the Plumbing Code. One copy of the Plumbing Code shall at all times be kept on file in the office of the City Clerk.

To the extent the provisions of this Ordinance conflict with any provisions in the existing Plumbing Code, the California Building Standards Code, or any other applicable code or regulation known to be in conflict then the provisions of this Ordinance shall supersede and control with regard to the indoor fixture requirements described herein.

15.66.020. APPLICABILITY.

A. The provisions of this Chapter shall apply to the following projects:

1. All new construction, regardless of building classification, requiring a building permit, plan check or design review, or requiring new or expanded water service.

2. All kitchen and bathroom remodels initiated before January 1, 2014 requiring a building permit, plan check, design review, new or expanded

water service, except that the provisions of this Ordinance will only apply to the fixtures normally included in the kitchen or bathroom, as the case may be, to be remodeled; and

3. Any remodel initiated on or after January 1, 2014 shall retrofit all plumbing fixtures with water efficient plumbing fixtures.

B. The provisions of the Chapter shall also require:

1. The retrofit of all single-family residential plumbing fixtures with water efficient plumbing fixtures on or before January 1, 2017; and

2. On or after January 1, 2017, a seller or transferor of a single-family residential real property shall disclose in writing to a prospective purchaser or transferee of the requirements to retrofit plumbing fixtures with water efficient plumbing fixtures and whether the real property includes any noncompliant plumbing fixtures.

3. The retrofit of all multi-family real property and commercial real property with water efficient plumbing fixtures on or before January 1, 2019.

C. The provisions of this Chapter shall not apply to:

1. Existing buildings not seeking a building permit, plan check or design review;

2. Registered local, state or federal historical sites;

3. Remodels where, in the discretion of the Chief Building Official the unique configuration of the building, its drainage system or portions of the public sewer, or both, are incompatible with efficiency standards listed in the Indoor Water Use Efficiency Table and require a greater quantity of water to flush the system in a manner that is consistent with public health.

15.66.030. DEFINITIONS.

A. "certified professional" means a licensed contractor, licensed architect or licensed professional engineer.

B. "Energy Star Qualified" means that a given fixture meets the United States Environmental Protection Agency standard for an energy efficient product.

C. "gal/cycle" means gallons per cycle.

D. "gal/100 lbs ice" means gallons per hundred pounds of ice.

E. "gpf" means gallons per flush.

F. "gpm" means gallons per minute.

G. "local agency" means a city or county, including a charter city or charter county, or water district that is responsible for adopting and implementing the Ordinance. The local agency is also responsible for the enforcement of this Ordinance, including but not limited to, in the case of a city or county, approval of a permit and plan check or design review of a project; and in the case of a district, approval of a new or expanded water service application.

H. "LSI" means Langelier Saturation Index providing an indication of the degree of saturation of water with respect to calcium carbonate related to cooling tower efficiency.

I. "local water purveyor" means any entity, including a public agency, city, county or private water company that provides retail water service.

J. "permit" means the document issued by local agencies in connection with new construction, remodels or renovations and which authorizes the lawful initiation of construction, improvements or repairs to a building or structure.

K. "Project applicant" means the individual or entity submitting a Indoor Water Use Efficiency Checklist as required under Section VII, and requesting a permit, plan check, design review, or new or expanded water service application from the local agency. A Project applicant may be the property owner or his or her designee.

L. "RMF" means residential multi-family.

M. "sq. ft." means square feet.

N. "Water Factor" means the number of gallons per cycle per cubic foot that the clothes washer uses.

O. "Single-Family" means any real property that is improved with, or consisting of, a building containing not more than one unit that is intended for human habitation.

P. "Multi-family" means any real property that is improved with, or consisting of, a building containing more than one unit that is intended for human habitation, or any mixed residential-commercial buildings or portions thereof that are intended for human habitation .

Q. "Commercial Property" means any real property that is improved with, or consisting of, a building that is intended for commercial use, including hotels and motels, that is not single-family residential real property or multi-family residential real property.

15.66.040. MINIMUM INDOOR FIXTURE REQUIREMENTS.

All new construction and applicable remodels will have, at a minimum, fixtures that comply with the efficiency standards listed below (the "Indoor Water Use Efficiency Table"):

INDOOR WATER USE EFFICIENCY TABLE

Fixture	Residential	Non-Residential
Toilets	≤ 1.28 gpf, and ≥ 350 grams	≤ 1.28 gpf, and ≥ 350 grams
Urinals	≤ 0.5 gpf	≤ 0.5 gpf
Showers	≤ 2.0 gpm	≤ 2.0 gpm
Bathroom faucets	≤ 1.5 gpm	≤ 0.5 gpm
Kitchen faucets	≤ 2.2 gpm	≤ 2.2 gpm
Clothes washers	≤ 6.0 Water Factor	≤ 6.0 Water Factor
Dishwashers	≤ 6.5 gal/cycle, or Energy Star Qualified	Energy Star Qualified
Cooling towers	≥ 5 - 10 cycles, or ≥ 2.5 LSI	≥ 5 - 10 cycles, or ≥ 2.5 LSI
Food steamers	--	Boiler less, or Self-contained
Ice machines	--	≤ 25 gal/100 lbs ice, or Air-cooled
Pre-rinse spray valves	--	≤ 1.15 gpm
Automatic vehicle wash facilities	--	≥ 50% of water that is recycled on site
Commercial refrigeration	--	Closed loop, or Air-cooled
Meters	Submeters for RMF, and Separate meter for outdoor if landscape >5000 sq. ft.	Submeters, and Separate meter for outdoor if landscape >5000 sq. ft.

15.66.050. COMPLIANCE WITH CHAPTER.

A. The local agency shall:

1. Provide the Project applicant with this Chapter and the Indoor Water Use Efficiency Checklist requirements when it provides applicant with the procedures for permits, plan checks, design reviews or new or expanded water service applications;

2. Review the Indoor Water Use Efficiency Checklist submitted by the Project applicant;

3. Approve or deny the Project applicant's Indoor Water Use Efficiency Checklist submittal;

4. Only upon approval of the Indoor Water Use Efficiency Checklist, issue a permit or approve the plan check, design review or new or expanded water service application for the Project applicant;

5. In its discretion, inspect the installation of the water efficient fixtures and appliances to verify that they have been installed and are performing at the required use levels; and

6. Submit a copy of the complete Indoor Water Use Efficiency Checklist to the local water purveyor or land use authority, as the case may be.

B. The Project applicant shall:

1. Meet the minimum water use efficiency standards for indoor fixtures and appliances provided for in the Indoor Water Use Efficiency Table and Checklist.

2. Prior to construction, submit all portions of the Indoor Water Use Efficiency Checklist to the local agency for verification.

15.66.060. COMPONENTS OF THE INDOOR WATER USE EFFICIENCY CHECKLIST.

The Indoor Water Use Efficiency Checklist shall require, at a minimum:

A. Project Information;

B. Quantity and unit water use factors of all indoor fixtures and appliances relative to the standards listed in the Indoor Water Use Efficiency Table and Checklist;

C. Contain the following statement to be completed by the Project applicant: "I certify that the subject project meets the specified requirements of the Indoor Water Use Efficiency and Conservation Ordinance"; and

D. Bear the signature of the Project applicant, or that of a certified professional.

15.66.070. PENALTIES AND ENFORCEMENT

A. Violation and Notice of Correction.

It is unlawful for any person, firm, partnership, association, or corporation subject to the requirements of this Chapter to fail to comply with the water use efficiency requirements or to alter or replace the fixtures and appliances required by this Ordinance with other noncompliant fixtures or appliances after the completion of construction or remodel. Whenever the Chief Building Official determines that a

violation of this Ordinance has occurred, the Chief Building Official may serve a notice of correction on the owner(s) of the property on which the violation is situated. The owner(s) of record shall have ninety (90) days to take corrective action.

B. Administrative Enforcement.

In addition to any other remedy provided by the Daly City's Municipal Code, any provision of this Chapter may be enforced by an administrative order issued pursuant to the administrative processes set forth in Section 8.16.100 et. seq. of the Daly City Municipal Code. The Administrative Appeal Board shall serve as the administrative enforcement hearing board for the purposes of considering any appeals. All notices shall be served in accordance with Article II of Section 8.16 of the Daly City Municipal Code.

15.66.080. PUBLIC EDUCATION.

The City of Daly City shall provide information to all applicants regarding the installation of water efficient fixtures and appliances.

Section 2. Severability. If any section, subsection, provision or part of this Ordinance, or its application to any person or circumstance, is held to be unconstitutional or otherwise invalid, the remainder of this Ordinance, and the application of such provision to other person or circumstances, shall not be affected thereby and shall remain in full force and effect and, to that end, the provisions of this Ordinance are severable.

Section 3. Environmental Determination. The City Council finds, pursuant to Title 14 of the California Code of Regulations, Section 15378, that this Ordinance is exempt from the requirements of the California Environmental Quality Act (CEQA) in that it is not a project as provided by the Act, in that it does not have a potential for resulting in a detrimental physical change in the environment, directly or ultimately, as provided in Title 14, Section 15378(a), and that it is also exempt under the definition of "project" in Section 15378(b)(3) in that it concern general policy and procedure making.

Section 4. Publication and Effective Date. Pursuant to the provisions of Government Code Section 36933, a summary of this ordinance shall be prepared by the City Attorney. At least five (5) days prior to the Council meeting at which this ordinance is scheduled to be adopted, the City Clerk shall (1) publish the summary, and (2) post it in the City Clerk's Office a certified copy of this ordinance. Within fifteen (15) days after the adoption of this ordinance, the City Clerk shall (1) publish the summary and (2) post in the City Clerk's Office a certified copy of the full text of this ordinance along with the names of those City Council members voting for and against this ordinance or otherwise voting. This ordinance shall be in full force and effect thirty (30) days after adoption by the City Council of the City of Daly City.

Introduced this 25th day of January, 2010.

Passed and adopted as an Ordinance of the City of Daly City at a regular meeting of the City Council of the City of Daly City held on the 8th day of February, 2010, by the following vote:

AYES, Councilmembers: Canepa, Gomez, Klatt

Torres, Guingona

NOES, Councilmembers: None

Absent, Councilmembers: None

K. Annette Higgins

CITY CLERK OF THE CITY OF DALY CITY

APPROVED:

MICHAEL P. GUINGONA

MAYOR OF THE CITY OF DALY CITY

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Appendix L: City of Daly City Water System Quality and Supplies Corrective Action Plan

CITY OF DALY CITY WATER SYSTEM

Water Quality and Supplies

Corrective Action Plan

Purpose

This Corrective Action Plan identifies the actions necessary in the event of the interruption or contamination of the City water supplies. It fulfills a mandate directed in a letter from the Department of Public Health (DOPH), regarding the San Francisco Water Department (SFWD) water supply operation.

A. SFWD's Rapid Notification Communications Plan

As required by DOPH, SFWD submitted a Rapid Notification Communications Plan, dated June 1, 1995. SFWD has initiated a test message system along with emailing to notify and provide water quality, water supply and system operation information to retail customers on a real time basis. SFWD staff may send three types of text messages as follows:

- Action customers will be requested to reduce demand or to go to alternate supply, etc.
- Alerts to alert customers of water quality or supply problems
- Advisory to provide general system operation information

Key personnel within the City who will have pagers are listed below.

Name	Title	Pager Number
Patrick Sweetland	Water and Wastewater Resources Director	(650) 740-2579
Kevin Brown	Chief of Operations	(650) 888-4223
Senior Operator	Senior Operator on Duty	(650) 740-2543
Water Operations	Duty Operator	(650) 740-2542

SFWD also follows all pages with a fax transmittal. Retail customers can, in return send numeric or text messages (depending on their individual capability) to SFWD staff as follows

Name	Title	Pager Number
Water Supply		
David Briggs	Water Supply Coordinator	(650) 872-5901
Water Quality		
Eddy So	Water Quality	(650) 652-3115
Andrew DeGraca	Water Quality Manager	(650) 652-3102

Emergency Contacts - the following City personnel shall be notified in the following order is an imminent danger to the health of water users exists.

Name and Title	Day Phone	After Hours
Kevin Brown, Chief of Operations	(650) 991-8204	(650) 888-4223
Duty Water Operator	(650) 991-8200	(650) 991-8200
Jim Anders, W/WW Operator II	(650) 991-8200	(650) 349-3127
Ed Burns, W/WW Operator II	(650) 991-8200	(707) 864-8340
Dave Donatelli, W/WW Operator I	(650) 991-8200	(650) 755-4119
Tony Gerace, W/WW Operator II	(650) 991-8200	(707) 481-9128
Greg Krauss, W/WW Operator II	(650) 991-8200	(650) 992-4945
Paul Perez, W/WW Operator II	(650) 991-8200	(650) 692-3038
Bahman Rahimian, W/WW Operator II	(650) 991-8200	(415) 883-3824
Dean Vittori, W/WW Operator II	(650) 991-8200	(650) 341-2697
John Wong, W/WW Operator II	(650) 991-8200	(650) 994-3392
Patrick Sweetland, Director, DWWR	(650) 991-8201	(415) 924-0201
George DeBono, P&E Supervisor	(650) 991-8206	(415) 333-7199
Tom Piccolotti, C&D Supervisor	(650) 991-8207	(650) 359-8228
Kerry Burns, Assistant City Manager	(650) 991-8127	(650) 991-8092
Patricia Martel, City Manager	(650) 991-8127	(650) 991-8092

B. Available Potable Water Supplies

- **Normal Water Supplies** - (See Attachment A for the water facilities map and Attachment B for the water system schematic.)

  Daly City has two separate potable water sources:

  - San Francisco Water Department (SFWD) - treated surface water. There are nine turnouts with a total capacity of 11 mgd or 7,638 gpm. SFWD supplies 50 to 60% of the requirements of the system.

- Daly City Groundwater Wells - treated groundwater. As of January 30, 2011, there are five wells actively supplying the system. These wells supply 35 to 45% of the total requirement for the system.

The two sources are mixed in most of the distribution system. Mixing takes place in three of the pump stations. The two sources are treated with additional chloramination and fluoride at these locations before being distributed to the customers. Due to elevated nitrates in some of the wells and low nitrate concentrations in SFWD and two of the larger wells, these locations are also used for blending to maintain nitrates below the MCL of 45 mg/L.

- **Alternate Water Supplies** (See Attachment A for the water facilities map and Attachment B for the water system schematic.)

  - **Storage Tanks** - The City has eleven storage tanks having a combined maximum capacity of 23 MG. Normal capacity is between 70 and 80% of capacity. There are 16 associated pump and booster stations throughout the City which deliver water to the distribution system. All of the storage tanks contain a mixture of SFWD and groundwater with the exception of Reservoir #8 in the Bayshore zone in northeastern Daly City. Reservoir #8 is filled from the Allan/Geneva and Midway Village and MacDonald connections to the SFWD via the Bayshore Booster Station (BHB).

  - **Interties** - There are three emergency interties with the North Coast County Water District, Brisbane, and three with the California Water Service Company, South San Francisco Division. All of these connections rely solely on the availability of SFWD water to the responding agency. These connections are only utilized after consultation with the respective owners.

  - **Bottled Water Supply** - In some instances it is necessary to supply bottled water to customers during long periods of shutdown or special needs. During a period of severe need, it is possible for the City to request assistance from bottled water companies in the area to maintain an increased supply for our customers.

In addition to the above, City staff can request operational support through the Mutual Aid Agreements with other participants of the Region II Water Agency Response Network (II-WARN). (See Attachment C.)

C. Contamination Event

Corrective Action Plan	Original December 12, 1995
	Updated March 27, 2001
	Updated October 6, 2005
	Updated January 31, 2011

- Contamination of Water Supplies or Distribution System

When the City receives notification of an upcoming supply contamination and the contaminated water has not yet reached the City's turnouts (and monitoring shows no contamination within the City's distribution system), the City staff may implement the steps outlined in Section C. Under normal, average flow conditions, a plug flow from the SFWD Harry Tracy Treatment Plant or the Crystal Springs system require four (4) hours and twelve to eighteen (12 to 18) hours respectively to reach Daly City.

When monitoring shows contamination at the City's turnouts and/or contamination within the City's distribution system, a Boil Water Order may be issued after approval by the City Manager or her designated alternate.

- Boil Water Order

If appropriate personnel conclude that the water supply is or may be biologically unsafe, a Boil Water Order and/or Do Not Drink Order may be issued. (See Attachment D for the Boil Water Order and Attachment E for the Do Not Drink Order as posted.) Examples of these situations include:

- Prolonged water outages in areas with ruptured sewer and/or water mains;
- Ruptured storage and/or distribution facilities in areas of known sewage spills and other biological contaminations;
- Cross connection contamination;
- Illness attributed to the water supply;
- Elevated turbidity in the system;
- Failure of the bacteriological testing system (i.e., known bacteriological contamination or positive fecal coliform results);
- Unusual system characteristics, including:
  - Prolonged loss of pressure
  - Sudden loss of chlorine residual
  - Severe discoloration and/or odor
  - Inability to implement emergency chlorination

Any one or a combination of the following agencies and personnel can direct issuance a Boil Water Order. The City Manager must be notified before the Order is enacted.

- Department of Public Health, Office of Drinking Water (510) 620-3474
- San Mateo County Environmental Health (650) 363-4305
- City of Daly City, City Manager or alternate (650) 991-8127

- Implementation of Procedures

- Notification to personnel listed in Section A will result in the notification of appropriate management and supervisory staff to enable the proper, directed response to any abnormal situation.

- The Water and Wastewater Resources Director and staff can decide on the method of response to water quality, water supply and system operations information received. (i.e., interrupt normal City supplies, issue Boil Water Order or initiate public notification and participation). Their decision will be reviewed as necessary by the office of the City Manager for approval and initiation of procedures other than technical response.

- Interruption of City's Water Supplies or Water Distribution System

When there is an interruption of the City's water supplies from SFWD, staff may implement the following actions:

- Close turnouts on appropriate pipeline(s). The City has nine turnouts connected to the SFWD on three different pipelines.

Location of Turnout	Connected To
Allan at Geneva	Crystal Springs #2
Midway Village	Crystal Springs #2
Guttenberg Avenue	Crocker/Amazon Hydropneumatic Zone
Sullivan Avenue/87th Street	San Andreas #2
Hickey Boulevard	San Andreas #2
Hill Street	Sunset Reservoir
Park Plaza Avenue	Sunset Reservoir
MacDonald Avenue	Crystal Springs #2
B Street	San Andreas #2

- Open such zone connections as necessary to direct water to areas of outage.

When the length of the interruption extends beyond the period deemed acceptable for the specific area of the interruption, more intensive control of distributed water may be deemed necessary. Some of the actions are:

Initiation of water conservation measures in the area up to and including direct notification to customers to reduce use to a specific maximum level;

- Movement of water across multiple zones in order to increase affected area supplies.
- Introduction of untreated well water to the system with an accompanying Boil Water Order and Notice of Contamination. This would include increased monitoring activity for bacteriological contamination to a short interval as determined by DOPH and the City.

- Special Considerations

There are several customers requiring special consideration in the event of a loss of service. They are the Seton Medical Complex, which includes the Seton Medical Center (hospital) and adjacent medical facilities, including doctors' offices, clinics, medical laboratories and other water dependent facilities. There are also two dialysis clinics which must have water to provide their treatment. Loss of water supply in a dialysis center is life-threatening to patients relying on this procedure on a regular basis. These users are notified directly, immediately upon the decision to curtail or modify service in their area.

- Public Notification

Any determination to implement public notification shall pass through and be approved by the City Manager for the City of Daly City or the designated alternate. In no circumstances shall any manager below the level of Department Head make the final decision to implement notification of the public of a health and safety issue concerning drinking water. This includes directives from the DOPH.

Actions that may be taken after approval and direction by the City Manager include:

- Notification of the San Mateo County Communications System at (650) 363-4921. County Communications shall then activate the Emergency Broadcast System

(EBS). The EBS will notify several radio stations and the local emergency services office.

- City staff may notify the following television stations:

KTVU	Channel 2	(510) 834-1212
KRON	Channel 4	(415) 561-8000
KPIX	Channel 5	(415) 765-8610
KGO	Channel 7	(415) 954-7926
KQED	Channel 9	(415) 553-2215
KBHK	Channel 44	(415) 249-4444
City	Channel 8	(650) 991-8166

- Bay City News Wire Services (415) 522-8900
  (For San Francisco, Oakland and San Jose)

- Staff may notify the following radio stations:

AM Stations	KCBS	(415) 765-4112
	KGO	(415) 954-8142
	KNBR	(415) 974-6800
FM Stations	K101	(415) 956-5101
	KBRG	(408) 274-1170 (Spanish)
	KQED	(415) 553-2361 (PBS)
	KCSM	(415) 564-6586 (PBS)

- Staff may coordinate with the water wholesaler to avoid duplicate and possible conflicting notices and to advise the wholesaler of notification actions.

- Staff may be directed to give a press release to the San Francisco Examiner, the San Francisco Chronicle and/or the San Mateo Times.

- In addition to general notification methods above, staff may be directed to use sound trucks and direct notification by door-hanger tags in effected areas.

In the event of sustained bacteriological failure from SFWD, the following shall be notified:

SFWD

- Andrew DeGraca, Water Quality Division Manager (650) 997-8279 (24-hours)
- David Briggs, Division Manager (650) 872-5901 (Pager)

D. Water Quality Monitoring

It is essential for the City to promptly investigate and take immediate steps to correct any problems concerning water quality or distribution system operation. Monitoring will determine the degree and extent of contamination (if any) and provide assurance that any uncontaminated water remains potable.

- **Routine Sampling** - the City routinely takes samples for bacteriological and general physical analysis at various locations. For routine sampling procedures, refer to the City of Daly Water System Operations Manual. All routine sampling is in compliance with Federal, State and County Health regulations.

- **Index Point Sampling** - if contamination of City water supplies is suspected, the City can take special bacteriological, chlorine residual, and other (as required) samples. These samples should be taken at appropriate locations. Selected index points listed on the weekly bacteriological sampling list and may be selected by Zone to determine the extent and intensity of contamination (if any) in the system.

  Once results are analyzed, the Director of Water and Wastewater Resources or designated alternate can determine if additional sampling is required, including compliance with applicable regulations, and if immediate actions need to be taken.

E. Notification of Regulatory Personnel

In all instances of contamination or loss of service to customers where there is danger of a health threat, the DOPH shall be notified as soon as possible. For retail customers within the Santa Clara District (San Mateo and Alameda Counties), designated DOPH contacts are:

Contact Person	Work Phone
Eric Lacy	(510) 620-3453
Van Tsang	(510) 620-3602

The fax number for the Santa Clara District is (510) 620-3455

Appendix M: Economic Analysis of Water Conservation Demand Management Measures from WCIP DSS Model

FINAL Results of Conservation Measures Evaluation
City of Daly City
August 4, 2004

Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	"30-year" Average Water Savings (MGD)	Cost of Savings per Unit Volume ($/MG)	Net Utility Benefit	First Five Years Utility Cost
1	Residential Water Surveys	1.1	1.6	0.035	$1,754	$93,751	$178,914
2	Residential Retrofit	3.5	9.6	0.003	$591	$48,828	$19,727
3	Large Landscape Conservation	1.1	0.9	0.007	$1,712	$15,415	$37,376
4	Water Budgets	14.5	14.5	0.016	$138	$337,265	$26,070
5	Clothes Washer Rebate	2.7	2.4	0.016	$774	$240,099	$149,271
6	Public Information Program	1.3	2.4	0.038	$1,567	$220,095	$191,781
7	Commercial Water Audits	1.4	1.3	0.018	$1,390	$113,546	$172,050
8	Commercial ULF Toilet and Urinal Rebates	18.6	10.3	0.004	$112	$79,931	$5,110
9	Residential ULF Toilet Rebate	1.5	0.7	0.131	$1,362	$979,069	$1,359,245
10	Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings	11.6	0.9	0.146	$176	$3,077,912	$219,907
11	Home Leak Detection and Repair	0.6	0.6	0.009	$4,041	($157,220)	$239,123
12	Rebates for 6/3 dual flush or 4 liter toilets	2.0	1.4	0.124	$980	$1,399,713	$799,582
13	ET Controller Rebates	0.5	0.3	0.010	$3,639	($196,219)	$129,690
14	Xeriscape education and staff training at retail garden/irrigation supply houses	4.4	0.3	0.013	$413	$211,812	$16,500
15	Homeowner irrigation classes	2.0	0.1	0.006	$890	$64,685	$16,500
16	Promote water efficient plantings at new homes	0.4	0.0	0.000	$5,156	($8,804)	$5,640
17	Offer incentives for replacement of clothes washers in coin-operated laundries	3.8	8.2	0.006	$535	$104,956	$39,375
18	Incentives for retrofitting sub-metering	1.1	0.4	0.001	$1,835	$1,933	$16,357
19	Require sub-metering multifamily units	2.1	0.6	0.009	$899	$96,077	$35,366
20	Rebate efficient clothes washers	10.0	19.4	0.019	$210	$413,839	$48,988
21	Enforce landscape requirements for new landscaping systems (turf	8.7	1.2	0.007	$221	$135,393	$5,770

FINAL Results of Conservation Measures Evaluation
City of Daly City
August 4, 2004

Conservation Measure		Water Utility Benefit-Cost Ratio	Total Community Benefit-Cost Ratio	"30-year" Average Water Savings (MGD)	Cost of Savings per Unit Volume ($/MG)	Net Utility Benefit	First Five Years Utility Cost
	limitations / regulations)						
22	Restaurant low flow spray rinse nozzles	15.1	41.1	0.022	$134	$467,064	$36,218
23	Focused water audits for hotels/motels	3.8	4.5	0.004	$515	$71,177	$15,000
24	WAVE Program (US EPA) for hotels	20.6	1.6	0.000	$95	$6,137	$184
25	Hotel retrofit (w/financial assistance)	4.6	4.7	0.002	$421	$40,434	$6,550
26	Award program for water savings by businesses						
27	Replace inefficient water using equipment	0.5	0.1	0.002	$4,229	($48,292)	$51,307
28	Require 0.5 gal/flush urinals in new buildings	19.4	19.4	0.000	$99	$66	$1
29	Financial incentives for complying with water use budget	5.8	2.1	0.009	$339	$170,204	$23,472
30	Financial incentives for irrigation upgrades	3.9	2.2	0.001	$499	$16,634	$2,002
31	Require dedicated irrigation meters for new accounts						
32	Water Utility / City Department water reduction goals	6.1	1.4	0.008	$317	$146,075	$16,485

Notes:
Numbers in parentheses indicate a negative value
MG – Million Gallons
MGD – Million Gallons per Day

FINAL Summary of Current Conservation Programs
City of Daly City
July 13, 2004

Description of Conservation Activity	Corresponding Measure Number
Residential Retrofit (CA BMP 2)	2
Large Landscape Conservation Audits (CA BMP 5)	3
Clothes Washer Rebate (CA BMP 6)	5
Public Information Program (CA BMP 7)	6
Commercial Water Audits (CA BMP 9)	7
System Water Audits, Leak Detection and Repair (CA BMP 3)	Other

FINAL Summary of SFPUC Measures Selected in Conservation Programs
City of Daly City
July 13, 2004

Description of Conservation Activity	Corresponding Measure Number	Program A	Program B	Program C	Not Attractive
Residential Water Surveys	1			X	
Residential Retrofit	2	X	X	X	
Large Landscape Conservation Audits	3	X	X	X	
Water Budgets	4		X	X	
Clothes Washer Rebate	5	X	X	X	
Public Information Program	6	X	X	X	
Commercial Water Audits	7	X	X	X	
ULF Toilet and Urinal Rebates	8		X	X	
Residential ULF Toilet Rebate	9		X	X	
Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings	10				X
Home Leak Detection and Repair	11				X
Rebates for 6/3 dual flush or 4 liter toilets	12		X	X	
ET Controller Rebates	13				X
Xeriscape education and staff training at retail garden/irrigation supply houses	14		X	X	

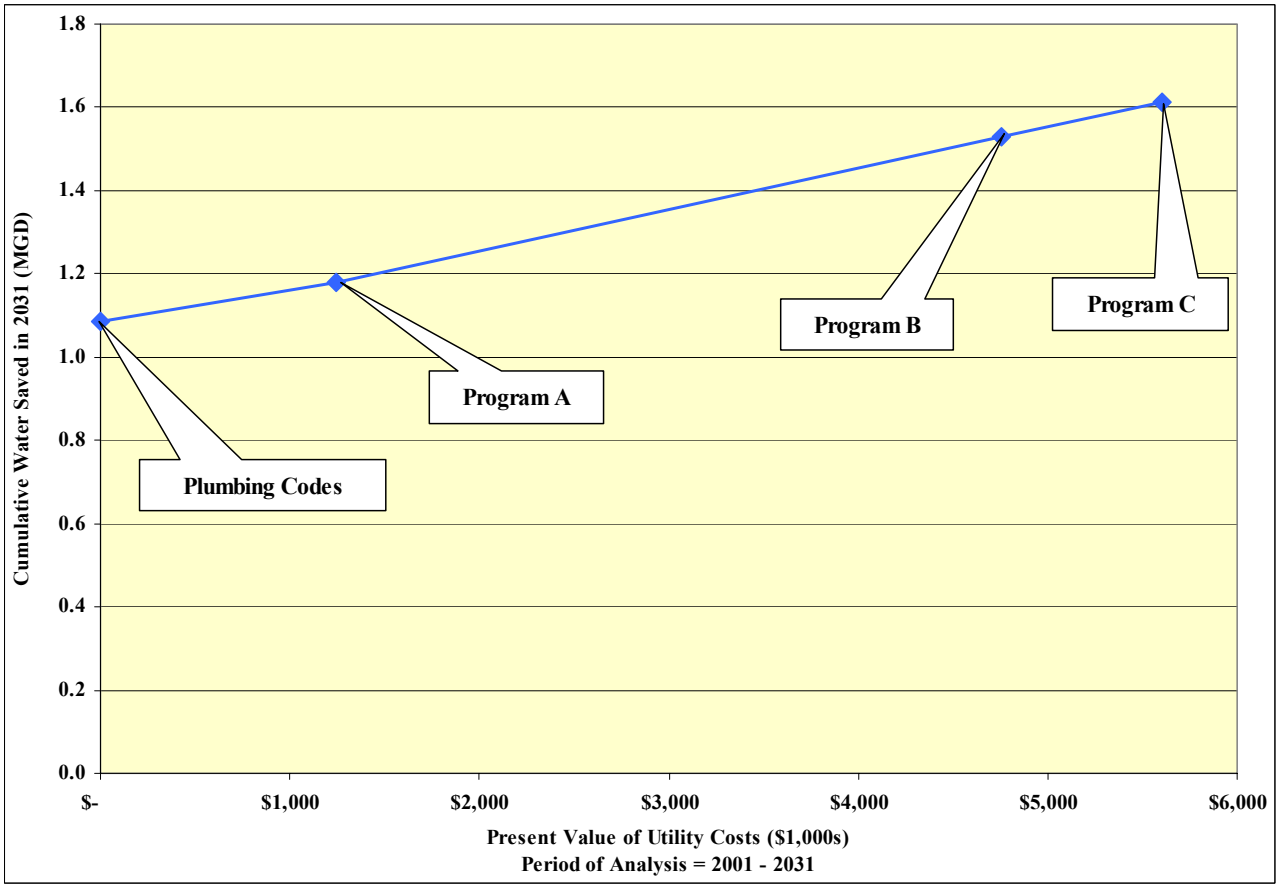
FINAL Summary of SFPUC Measures Selected in Conservation Programs
City of Daly City
July 13, 2004

Description of Conservation Activity	Corresponding Measure Number	Program A	Program B	Program C	Not Attractive
Homeowner irrigation classes	15			X	
Promote water efficient plantings at new homes	16				X
Offer incentives for replacement of clothes washers in coin-operated laundries	17				X
Incentives for retrofitting sub-metering	18				X
Require sub-metering multifamily units	19			X	
Rebate efficient clothes washers	20		X	X	
Enforce landscape requirements for new landscaping systems (turf limitations / regulations)	21			X	
Restaurant low flow spray rinse nozzles	22		X	X	
Focused water audits for hotels/motels	23			X	
WAVE Program (US EPA) for hotels	24				X
Hotel retrofit (w/financial assistance)	25			X	
Award program for water savings by businesses	26				X
Replace inefficient water using equipment	27				X

FINAL Summary of SFPUC Measures Selected in Conservation Programs
City of Daly City
July 13, 2004

Description of Conservation Activity	Corresponding Measure Number	Program A	Program B	Program C	Not Attractive
Require 0.5 gal/flush urinals in new buildings	28				X
Financial incentives for complying with water use budget	29		X	X	
Financial incentives for irrigation upgrades	30				X
Require dedicated irrigation meters for new accounts	31				X
Water Utility / City Department water reduction goals	32				X
TOTAL NUMBER OF MEASURES		**5**	**13**	**19**	**13**

FINAL Present Value of Utility Costs Versus Water Saved
City of Daly City
August 4, 2004



	Plumbing Code	Program A	Program B	Program C
Present Value of Costs ($1,000s)	$0	$1,242	$4,759	$5,604
Cumulative Water Saved (MGD)	1.1	1.2	1.5	1.6

Appendix N: BAWCSA Water Conservation Implementation Plan

Cover Sheet

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Website to access full report:

http://bawsca.org/water-supply/water-conservation-implementation-plan/

Prepared for

BAWSCA
Bay Area Water Supply & Conservation Agency

Water Conservation Implementation Plan

September 2009

FINAL REPORT

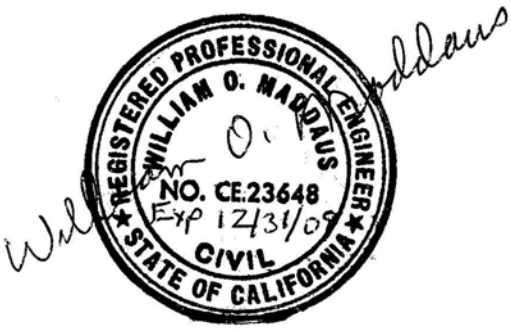
MADDAUS WATER MANAGEMENT

BROWN AND CALDWELL

WATER CONSERVATION IMPLEMENTATION PLAN
FINAL REPORT

Prepared for

Bay Area Water Supply and Conservation Agency
San Mateo, CA
September 2009



MADDAUS WATER MANAGEMENT

BROWN AND CALDWELL

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Appendix O: Daly City's Selected DSS Model Measures – Past and Planned Implementation by Year

This appendix includes DSS model measure sheets for each measure selected by the City for implementation. Note that water savings are presented in terms of million gallons per day (mgd), not acre-feet per year (AFY).

Demand Management Least Cost Planning Decision Support System
General Measure Model

2 - Residential Retrofit

Results Summary

Present Value of Water Utility Benefits:	$902,339
Present Value of Total Community Benefits:	$2,086,556
Present Value of Water Utility Costs:	$172,510
Present Value of Total Community Costs:	$172,510
Water Utility Benefit Cost Ratio:	5.23
Total Community Benefit Cost Ratio:	12.10
Average Water Savings (mgd):	0.03
Cost of Savings per Unit Volume ($/mg):	$573.58

Measure Data

Measure Number:	2		**Reference Row:**	9	*Data Compiled in Row 9 of MeasureData Worksheet.*
Market Penetration	75%		existing non-low flow (varies by city)		*Participation rate is 75 % of the new existing non-low flow (varies by city).*
Water Use Reductions	21%		Shower		*Measure results in 21 % reduction in Shower.*
Program Length	5		(years)		*Assume program length of 5 years.*
Measure Life	permanent		(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 30	$15	per RSF dwelling unit	per RMF dwelling unit	*Assume utility pays $30 per RSF dwelling unit.* *Assume utility pays $15 per RMF dwelling unit.*
Customer Unit Cost	$ -		per		*Assume customer pays $0 per .*
Admin/Marketing Cost	10%		Percent of initial utility unit cost		*Assume utility administration cost of 10%.*

Measure Implementation Costs

Cost assume kits mailed to the units with 50% installation rate (Double the cost per participant)

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$172,510				$19,800	$19,800	$36,432	$52,759	$63,140																							
Customer Implementation Costs by Year:	$0																															

Measure Life (years): 5 Use Measure Life? No

Assume permanent change

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$191,931
Five Year Customer Cost =	$0
Five Year Community Cost =	$191,931

10% per year to get to 75% overall coverage as per MOU.

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Showers	Single Family	0	0	0	200	200	452	695	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	RSF Faucets	Single Family	0	0	0	200	200	452	695	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	RSF Toilets	Single Family	0	0	0	200	200	452	695	700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RMF Showers	Multifamily	0	0	0	45	45	45	82	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	RMF Toilets	Multifamily	0	0	0	45	45	45	82	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	RMF Faucets	Multifamily	0	0	0	45	45	45	82	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Showers	Single Family	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
2	RSF Faucets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	RSF Toilets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	RMF Showers	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5	RMF Toilets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	RMF Faucets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%

Demand Management Least Cost Planning Decision Support System
General Measure Model

3 - Large Landscape Conservation Audits

Results Summary

Present Value of Water Utility Benefits:	$208,515
Present Value of Total Community Benefits:	$208,515
Present Value of Water Utility Costs:	$132,032
Present Value of Total Community Costs:	$157,422
Water Utility Benefit Cost Ratio:	1.58
Total Community Benefit Cost Ratio:	1.32
Average Water Savings (mgd):	0.01
Cost of Savings per Unit Volume ($/mg):	$1,707.99

Estimate Turf Area by Category

	Category	No. Accts in 2001	Irrigation (gpd/acct)	Irrigation (gpd)	Appl. Rate* (ft/yr)	Area (acres)
2.71	Commercial	664	77	50,928	4.0	14
600.00	Industrial	3	420	1,259	4.0	0
22.50	Institutional	80	433	34,676	4.0	10
16.07	Governmental	112	451	50,556	4.0	14
14.63	Irrigation	123	969	119,234	4.0	33
	Total	982		256,652		72

** Should be between 4 to 8 feet*

Estimate Turf Area by Sites

	Elementary School	Middle School	High School	College	Golf Courses	Cemeteries	Parks	Total
Typical Turf Area (acres/site)	3.0	7.0	10.0	50.0	80.0	15.0	10.0	175.0
Number of Sites	23.0	2.0	3.0	1.0	1.0	1.0	0.0	31.0
Total Turf Acres	69.0	14.0	30.0	50.0	80.0	15.0	0.0	258.0
					100% Irrigatec	*100% Irrigatec*	*<<100% Irrigated*	
					Private Wells?	*Private Wells?*	*Private Wells?*	

Acres Audited Per Year = 7.2 *10 year program*

Measure Implementation Costs

Costs based on $800 per acre for Utility and $200 per acre for Customer per year

	NPV	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$132,032	$0	$0	$0	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475	$7,475
Customer Implementation Costs by Year:	$25,391	$0	$0	$0	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438	$1,438

Measure Life (years): 10 Use Measure Life? yes

Calculate Hot Water Savings? no

Five Year Utility Cost =	$37,376
Five Year Customer Cost =	$7,188
Five Year Community Cost =	$44,564

Participants are 1.46677264062913%/year for 10 years as per MOU

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Irrigation	Commercial	0	0	0	10	10	10	10	40	11	11	12	14	15	16	17	18	19	21	22	23	23	24	24	24	24	25	25	25	26	26	26
2	IND Irrigation	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	INS Irrigation	Institutional	0	0	0	0	0	0	0	0	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3
4	GOV Irrigation	Governmental	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
5																																	
6	New COM Irrigation	New Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Irrigation	Commercial	0.0000	0.0000	0.0000	0.0002	0.0005	0.0007	0.0009	0.0018	0.0021	0.0024	0.0026	0.0030	0.0033	0.0034	0.0036	0.0038	0.0040	0.0035	0.0038	0.0040	0.0043	0.0045	0.0047	0.0049	0.0051	0.0053	0.0054	0.0055	0.0056	0.0057	0.0057
2	IND Irrigation	Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
3	INS Irrigation	Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0004	0.0005	0.0008	0.0010	0.0012	0.0015	0.0018	0.0021	0.0024	0.0026	0.0028	0.0029	0.0031	0.0032	0.0034	0.0035	0.0036	0.0037	0.0038	0.0038	0.0039	0.0039
4	GOV Irrigation	Governmental	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0005	0.0007	0.0010	0.0012	0.0014	0.0017	0.0020	0.0022	0.0025	0.0025	0.0025	0.0025	0.0025	0.0026	0.0026	0.0026	0.0026	0.0026	0.0026	0.0027	0.0027	0.0027
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6	New COM Irrigation	New Commercial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
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Total Water Savings (mgd):			0.0000	0.0000	0.0000	0.0002	0.0005	0.0007	0.0009	0.0018	0.0026	0.0033	0.0040	0.0049	0.0057	0.0064	0.0071	0.0078	0.0087	0.0088	0.0093	0.0098	0.0102	0.0106	0.0110	0.0113	0.0117	0.0119	0.0122	0.0124	0.0125	0.0126	0.0128
% Savings of Total Baseline Production:			0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0002	0.0003	0.0004	0.0005	0.0005	0.0006	0.0007	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012	0.0012	0.0012	0.0012	0.0013	0.0013

Demand Management Least Cost Planning Decision Support System
General Measure Model

4 - Water Budgets

Results Summary

Present Value of Water Utility Benefits:	$399,096
Present Value of Total Community Benefits:	$399,096
Present Value of Water Utility Costs:	$19,638
Present Value of Total Community Costs:	$19,638
Water Utility Benefit Cost Ratio:	20.32
Total Community Benefit Cost Ratio:	20.32
Average Water Savings (mgd):	0.01
Cost of Savings per Unit Volume ($/mg):	$144.09

Estimate Turf Area by Category

Category	No. Accts in 2001	Irrigation (gpd/acct)	Irrigation (gpd)	Appl. Rate* (ft/yr)	Area (acres)
Commercial	664	77	50,928	4.0	14
Industrial	3	420	1,259	4.0	0
Institutional	80	433	34,676	4.0	10
Governmental	112	451	50,556	4.0	14
Irrigation	123	969	119,234	4.0	33
Total	982		256,652		72

** Should be between 4 to 8 feet*

Estimate Turf Area by Sites

	Elementary School	Middle School	High School	College	Golf Courses	Cemeteries	Parks	Total
Typical Turf Area (acres/site)	3.0	7.0	10.0	50.0	80.0	15.0	10.0	175.0
Number of Sites	23.0	2.0	3.0	1.0	1.0	1.0	0.0	31.0
Total Turf Acres	69.0	14.0	30.0	50.0	80.0	15.0	0.0	258.0
					100% Irrigatec	*100% Irrigatec*	*<<100% Irrigated*	
					Private Wells?	*Private Wells?*	*Private Wells?*	

Acres Audited Per Year = 7.2 *5 year program*

Measure Implementation Costs

Utility Costs based on $200 per Irrigation Account per year

	NPV	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$19,638				$2,300	$2,300	$2,300	$2,300	$9,200	$184	$184	$327	$327	$327	$327	$327	$247	$247	$247	$247	$247	$151	$151	$151	$151	$151	$150	$150	$150	$150	$150	$164
Customer Implementation Costs by Year:	$0																															

Measure Life (years): 5 Use Measure Life? No

Assume permanent change

Calculate Hot Water Savings? no

Five Year Utility Cost =	$18,400
Five Year Customer Cost =	$0
Five Year Community Cost =	$18,400

Participants are 8.0714089945749 1%/year for 5 years, and then all new accounts

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IRR Outdoor	Irrigation	0	0	0	10	10	10	10	40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	IRR Outdoor Leaks	Irrigation	0	0	0	10	10	10	10	40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IRR Outdoor	Irrigation	0.0000	0.0000	0.0000	0.0015	0.0029	0.0044	0.0058	0.0116	0.0117	0.0119	0.0121	0.0123	0.0125	0.0127	0.0129	0.0131	0.0132	0.0134	0.0135	0.0137	0.0138	0.0139	0.0140	0.0141	0.0142	0.0143	0.0143	0.0144	0.0145	0.0146	0.0147
2	IRR Outdoor Leaks	Irrigation	0.0000	0.0000	0.0000	0.0002	0.0003	0.0005	0.0006	0.0013	0.0013	0.0013	0.0013	0.0014	0.0014	0.0014	0.0014	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
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Total Water Savings (mgd):			0.0000	0.0000	0.0000	0.0016	0.0032	0.0048	0.0065	0.0129	0.0131	0.0132	0.0134	0.0136	0.0139	0.0141	0.0143	0.0145	0.0147	0.0149	0.0150	0.0152	0.0153	0.0154	0.0155	0.0156	0.0157	0.0158	0.0159	0.0160	0.0162	0.0163	0.0164
% Savings of Total Baseline Production:			0.0000	0.0000	0.0000	0.0002	0.0004	0.0006	0.0007	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016

Demand Management Least Cost Planning Decision Support System
General Measure Model

5 - Washing Machine Rebate According to New BMP 6

Results Summary

Present Value of Water Utility Benefits:	$576,684
Present Value of Total Community Benefits:	$1,344,609
Present Value of Water Utility Costs:	$143,345
Present Value of Total Community Costs:	$437,385
Water Utility Benefit Cost Ratio:	4.02
Total Community Benefit Cost Ratio:	3.07
Average Water Savings (mgd):	0.02
Cost of Savings per Unit Volume ($/mg):	$763.27

Measure Data

Measure Number:	5	**Reference Row:**	13	*Data Compiled in Row 13 of MeasureData Worksheet.*
Market Penetration	5%	Dwelling Units over 3 years		*Participation rate is 4.8 % of the new Dwelling Units over 3 years.*
Water Use Reductions	34%	Laundry Use		*Measure results in 34.2 % reduction in Laundry Use.*
Program Length	3	(years)		*Assume program length of 3 years.*
Measure Life	permanent	(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 75	per		*Assume utility pays $75 per .*
Customer Unit Cost	$ 200	per		*Assume customer pays $200 per .*
Admin/Marketing Cost	30%	Percent of initial utility unit cost		*Assume utility administration cost of 30%.*

Measure Implementation Costs

Costs assume a rebate of $75 and an added customer cost of $200 for an efficient washer.

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$143,345				$29,348	$34,905	$34,905	$32,663	$24,375																							
Customer Implementation Costs by Year:	$294,040				$60,200	$71,600	$71,600	$67,000	$50,000																							

Measure Life (years): 3 Use Measure Life? No

Assume permanent change

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$156,195
Five Year Customer Cost =	$320,400
Five Year Community Cost =	$476,595

1.6% per year of total dwelling units to get to 4.8% overall coverage of total dwelling units by 2007 as per MOU.

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Laundry	Single Family	0	0	0	151	179	179	168	125	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	RMF Laundry	Multifamily	0	0	0	34	40	40	38	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Laundry	Single Family	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	RMF Laundry	Multifamily	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%

Demand Management Least Cost Planning Decision Support System
General Measure Model

6 - Public Information

Results Summary

Present Value of Water Utility Benefits:	$1,227,243
Present Value of Total Community Benefits:	$1,929,745
Present Value of Water Utility Costs:	$627,360
Present Value of Total Community Costs:	$627,360
Water Utility Benefit Cost Ratio:	1.96
Total Community Benefit Cost Ratio:	3.08
Average Water Savings (mgd):	0.04
Cost of Savings per Unit Volume ($/mg):	$1,519.94

Measure Data

Measure Number:	6		**Reference Row:** 14	*Data Compiled in Row 14 of MeasureData Worksheet.*
Market Penetration	100%		-	*Participation rate is 100 %-.*
Water Use Reductions	1%		all end uses	*Measure results in 1 % reduction in all end uses.*
Program Length	indefinitely		(years)	*Assume program continues indefinitely.*
Measure Life	2		(years)	*Assume measure life is 2 years.*
Utility Unit Cost	$ 2		per RSF account/yr	*Assume utility pays $2 per RSF account/yr.*
Customer Unit Cost	$ -		per	*Assume customer pays $0 per .*
Admin/Marketing Cost	0%		Percent of initial utility unit cost	*Assume utility administration cost of 0%.*

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$627,360	$0	$0	$0	$10,000	$20,000	$20,000	$20,000	$20,000	$29,351	$38,823	$39,161	$39,593	$40,026	$40,458	$40,891	$41,270	$41,596	$41,921	$42,247	$42,572	$42,835	$43,034	$43,233	$43,433	$43,632	$43,830	$44,028	$44,226	$44,424	$44,622	$44,829
Customer Implementation Costs by Year:	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Measure Life (years): 2 Use Measure Life? yes

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$109,351
Five Year Customer Cost =	$0
Five Year Community Cost =	$109,351

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
2	RSF Showers	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
3	RSF Faucets	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
4	RSF Dishwashers	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
5	RSF Laundry	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
6	RSF Other	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
7	RSF Int. Leakage	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
8	RSF Irrigation	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
9	RSF Car Washing	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
10	RSF Ext. Leakage	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
11	RSF Baths	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
12	RSF Pools	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
13	RSF Wash-Down	Single Family	0	0	0	5,000	5,000	5,000	5,000	5,000	9,675	9,736	9,844	9,952	10,060	10,169	10,277	10,358	10,440	10,521	10,602	10,684	10,734	10,783	10,833	10,883	10,933	10,982	11,032	11,081	11,131	11,180	11,234
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	RSF Showers	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
3	RSF Faucets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4	RSF Dishwashers	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	RSF Laundry	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6	RSF Other	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	RSF Int. Leakage	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
8	RSF Irrigation	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
9	RSF Car Washing	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	RSF Ext. Leakage	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	RSF Baths	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	RSF Pools	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	RSF Wash-Down	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14																																	
15																																	
16																																	
17																																	
18																																	
19																																	
20																																	
Total Water Savings (mgd):			0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.1%	0.3%	0.3%	0.3%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Demand Management Least Cost Planning Decision Support System
General Measure Model

7 - Commercial Water Audits

Average Water Savings (mgd):

Results Summary

Present Value of Water Utility Benefits:	$1,950,104
Present Value of Total Community Benefits:	$2,536,682
Present Value of Water Utility Costs:	$1,127,976
Present Value of Total Community Costs:	$1,629,298
Water Utility Benefit Cost Ratio:	1.73
Total Community Benefit Cost Ratio:	1.56
Average Water Savings (mgd):	0.06
Cost of Savings per Unit Volume ($/mg):	$1,741.77

Measure Data

Measure Number:	7	**Reference Row:**	15	*Data Compiled in Row 15 of MeasureData Worksheet.*
Market Penetration	10%	Top 10%		*Participation rate is 10 % of the new Top 10%.*
Water Use Reductions	12%	of site use (30% potential, 40% compliance)		*Measure results in 12 % reduction. Estimated in tables to right.0/0=0.12*
Program Length	10	(years)		*Assume program length of 10 years.*
Measure Life	permanent	(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 3,000	per account (top 10%)		*Assume utility pays $3000 per account (top 10%).*
Customer Unit Cost	$ 2,000	per account		*Assume customer pays $2000 per account.*
Admin/Marketing Cost	50%	Percent of initial utility unit cost		*Assume utility administration cost of 50%.*

Measure Implementation Costs

Cost are $3000 per survey plus 50% per year admin, and $2000 per survey for customers

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Water Utility Implementation Costs by Year:	$1,127,976	$0	$0	$0	$225,000	$225,000	$225,000	$225,000	$225,000	$37,580	$38,307	$41,853	$45,399	$48,945
Customer Implementation Costs by Year:	$501,322	$0	$0	$0	$100,000	$100,000	$100,000	$100,000	$100,000	$16,702	$17,025	$18,601	$20,177	$21,753

Measure Life (years):	10	Use Measure Life?	no

Assume permanent change

Five Year Utility Cost =	$1,125,000
Five Year Customer Cost =	$500,000
Five Year Community Cost =	$1,625,000

Participant 1% per year for 10 years

Calculate Hot Water Savings? Yes

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	COM Toilets	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
2	COM Showers	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
3	COM Faucets	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
4	COM Dishwashers	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
5	COM Laundry	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
6	COM Process	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
7	COM Irrigation	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
8	COM Pools/Fountains	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
9	COM Wash-Down	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
10	COM Ext. Leakage	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
11	INS Toilets	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
12	INS Showers	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
13	INS Faucets	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
14	COM Cooling	Commercial	0	0	0	50	50	50	50	50	7	8	8	9	10
15	INS Laundry	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
16	INS Process	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
17	INS Int. Leakage	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
18	INS Irrigation	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
19	INS Pools/Fountains	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1
20	INS Ext. Leakage	Institutional	0	0	0	0	0	0	0	0	1	1	1	1	1

Number	End Use Identifier	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	COM Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	COM Faucets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	COM Dishwashers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	COM Laundry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	COM Process	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	COM Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	COM Pools/Fountains	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	COM Wash-Down	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	COM Ext. Leakage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	INS Toilets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	INS Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	INS Faucets	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	COM Cooling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	INS Laundry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	INS Process	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	INS Int. Leakage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	INS Irrigation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	INS Pools/Fountains	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	INS Ext. Leakage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1	COM Toilets	Commercial	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02
2	COM Showers	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	COM Faucets	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
4	COM Dishwashers	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	COM Laundry	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	COM Process	Commercial	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
7	COM Irrigation	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01
8	COM Pools/Fountains	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	COM Wash-Down	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	COM Ext. Leakage	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	INS Toilets	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	INS Showers	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	INS Faucets	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	COM Cooling	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	INS Laundry	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	INS Process	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	INS Int. Leakage	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	INS Irrigation	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	INS Pools/Fountains	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	INS Ext. Leakage	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Water Savings (mgd):			0.00	0.00	0.00	0.01	0.03	0.04	0.05	0.06	0.07	0.07	0.07	0.07	0.07
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.2%	0.3%	0.4%	0.6%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%

Number	End Use Identifier	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
2	COM Showers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	COM Faucets	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4	COM Dishwashers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	COM Laundry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	COM Process	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
7	COM Irrigation	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
8	COM Pools/Fountains	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	COM Wash-Down	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	COM Ext. Leakage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	INS Toilets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	INS Showers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	INS Faucets	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	COM Cooling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	INS Laundry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	INS Process	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	INS Int. Leakage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	INS Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19	INS Pools/Fountains	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	INS Ext. Leakage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Water Savings (mgd):		0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
% Savings of Total Baseline Production:		0.8%	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%

Demand Management Least Cost Planning Decision Support System
General Measure Model

8 - ICI ULF Toilet Rebate

Results Summary

Present Value of Water Utility Benefits:	$3,585
Present Value of Total Community Benefits:	$3,585
Present Value of Water Utility Costs:	$184
Present Value of Total Community Costs:	$332
Water Utility Benefit Cost Ratio:	19.44
Total Community Benefit Cost Ratio:	10.80
Average Water Savings (mgd):	0.0001
Cost of Savings per Unit Volume ($/mg):	$154.71

CII Toilet Savings Calculation

	Category	Number of Accounts-1992	Number of Toilets	Toilets per Account	Water Savings	End Use (gpd/acct)	Use (gpd)	Water Savings (%)
Commercial	BUS	598	6583	11.0	195509	312	186667	
Industrial	IND	3	60	22.2	1386	584	1576	
Institutional and Governmental	PA	173	1367	7.9	26823	659	113944	
	Total	773	8010		223718		302187	**74%**

Should be 60-75% equivalent to changing 4-5 gal toilet t 1.6 gal toilet

Assign all savings to Commercial Category
Replacement Amount over 3 years = *3%*

Measure Implementation Costs

Assume utility pays $200 per toilet and customer pays $200 per toilet.
Assume utility administration cost of 25%

	NPV	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$184	$0	$0	$0	$0	$0	$0	$0	$227	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Customer Implementation Costs by Year:	$148	$0	$0	$0	$0	$0	$0	$0	$182	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Measure Life (years): 3 Use Measure Life? No

Assume permanent change

Five Year Utility Cost = $227
Five Year Customer Cost = $182
Five Year Community Cost = $409

Participation rate is 3% of accounts over 3 years as per MOU

Calculate Hot Water Savings? No

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	Commercial	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Demand Management Least Cost Planning Decision Support System
Fixture Model - Retrofit and Code Measures

9a - RSF Toilet Sponsored Replacement

Results Summary

Present Value of Water Utility Benefits:	$421,818
Present Value of Total Community Benefits:	$421,818
Present Value of Water Utility Costs:	$210,316
Present Value of Total Community Costs:	$462,696
Water Utility Benefit Cost Ratio:	2.01
Total Community Benefit Cost Ratio:	0.91
Average Water Savings (mgd):	0.01
Cost of Savings per Unit Volume ($/mg):	$1,477.93

Measure Data

Measure Number:	9	**Reference Row:**	17	*Data Compiled in Row 17 of MeasureData Worksheet.*
Market Penetration	Result of 10 years of replacement a	per year (varies by city ~7%/yr)		*Result of 10 years of replacement at resale rate*
Water Use Reductions	60%	of RSF, RMF Toilet use, varies with current toilet stock		*60%*
Program Length	10	(years)		*Assume program length of 10 years.*
Measure Life	permanent	(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 50	per fixture		*Assume utility pays $50 per fixture.*
Customer Unit Cost	$ 75	per fixture		*Assume customer pays $75 per fixture.*
Admin/Marketing Cost	25%	Percent of initial utility unit cost		*Assume utility administration cost of 25%.*

Fixture Replacement

Assume Average Number of Fixtures per SF Account	2.0

Model Setup Data

End Use Identifier:	RSF Toilets
Consumer Category:	Single Family
Account User Forecast:	RSF Household Size
Starting Year for Forecasts:	2001
Internal or External End Use?:	Internal
Temperature of Use (oF) (Blank if not heated):	
Cost Per Degree Change Per Gallon:	

Model Calculations

Parameter / Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Account Details																															
Users per Account:	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59	3.59
Number of Accounts:	18,683	18,728	18,774	18,819	18,864	18,986	19,107	19,229	19,351	19,472	19,688	19,905	20,121	20,337	20,554	20,716	20,879	21,042	21,205	21,368	21,467	21,567	21,666	21,766	21,866	21,965	22,064	22,162	22,261	22,360	22,469
Data for Next Years Calcs																															
No. Of New Accounts	45	45	45	45	122	122	122	122	122	216	216	216	216	216	163	163	163	163	163	100	100	100	100	100	99	99	99	99	99	109	
Replacement Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
New Unit Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
No Retrofit (Base Case)																															
Account Totals																															
Total 1.28 gal/flush	1.9	1.8	23.5	66.2	129.2	221.1	334.4	468.4	622.5	796.2	1,204.8	1,711.8	2,315.2	3,013.3	3,804.2	4,522.2	5,221.5	5,902.7	6,566.3	7,213.1	7,780.4	8,331.9	8,868.2	9,389.8	9,897.2	10,390.2	10,870.0	11,337.1	11,791.8	12,234.5	12,675.5
Total 1.6 gal/flush	9,341.5	9,760.5	10,142.6	10,489.5	10,802.3	11,149.3	11,462.2	11,742.3	11,990.6	12,208.0	12,274.3	12,232.0	12,083.3	11,830.4	11,475.5	11,131.2	10,797.3	10,473.4	10,159.2	9,854.4	9,558.8	9,272.0	8,993.8	8,724.0	8,462.3	8,208.4	7,962.2	7,723.3	7,491.6	7,266.9	7,048.9
Total High flush & 3.5 gal/flush	9,339.6	8,966.0	8,607.4	8,263.1	7,932.6	7,615.3	7,310.7	7,018.2	6,737.5	6,468.0	6,209.3	5,960.9	5,722.5	5,493.6	5,273.8	5,062.9	4,860.4	4,666.0	4,479.3	4,300.1	4,128.1	3,963.0	3,804.5	3,652.3	3,506.2	3,366.0	3,231.3	3,102.1	2,978.0	2,858.9	2,744.5
% 1.28 gal/flush	0.0%	0.0%	0.1%	0.4%	0.7%	1.2%	1.8%	2.4%	3.2%	4.1%	6.1%	8.6%	11.5%	14.8%	18.5%	21.8%	25.0%	28.1%	31.0%	33.8%	36.2%	38.6%	40.9%	43.1%	45.3%	47.3%	49.3%	51.2%	53.0%	54.7%	56.4%
% 1.6 gal/flush	50.0%	52.1%	54.0%	55.7%	57.3%	58.7%	60.0%	61.1%	62.0%	62.7%	62.3%	61.5%	60.1%	58.2%	55.8%	53.7%	51.7%	49.8%	47.9%	46.1%	44.5%	43.0%	41.5%	40.1%	38.7%	37.4%	36.1%	34.8%	33.7%	32.5%	31.4%
% High flush & 3.5 gal/flush	50.0%	47.9%	45.8%	43.9%	42.1%	40.1%	38.3%	36.5%	34.8%	33.2%	31.5%	29.9%	28.4%	27.0%	25.7%	24.4%	23.3%	22.2%	21.1%	20.1%	19.2%	18.4%	17.6%	16.8%	16.0%	15.3%	14.6%	14.0%	13.4%	12.8%	12.2%
% Total Check	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Daily End Use Volume per Account (gal/d):	48.8	48.0	47.2	46.5	45.8	45.0	44.3	43.6	42.9	42.2	41.4	40.6	39.8	39.0	38.2	37.5	36.8	36.1	35.5	34.9	34.3	33.8	33.3	32.8	32.4	32.0	31.5	31.1	30.8	30.4	30.0
Managed Demand Case																															
Code Influenced Replacement Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Code Influenced New Unit Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Account Totals																															
Total 1.28 gal/flush	1.9	1.8	23.5	66.2	129.2	221.1	334.4	468.4	622.4	796.1	1,201.1	1,703.9	2,302.6	2,995.4	3,780.7	4,493.6	5,188.1	5,864.8	6,524.4	7,167.4	7,731.2	8,279.6	8,813.0	9,332.0	9,837.1	10,328.0	10,806.0	11,271.3	11,724.5	12,166.0	12,605.8
Total 1.6 gal/flush	9,341.5	9,760.5	10,142.6	10,489.5	10,802.3	11,151.4	11,468.5	11,754.7	12,011.0	12,930.3	12,971.4	12,905.5	12,734.9	12,461.7	12,087.9	11,725.2	11,373.5	11,032.3	10,701.3	10,380.3	10,068.9	9,766.8	9,473.8	9,189.6	8,913.9	8,646.5	8,387.1	8,135.5	7,891.4	7,654.7	7,425.0
Total High flush & 3.5 gal/flush	9,339.6	8,966.0	8,607.4	8,263.1	7,932.6	7,613.2	7,304.4	7,005.8	6,717.1	5,745.8	5,515.9	5,295.3	5,083.5	4,880.1	4,684.9	4,497.5	4,317.6	4,144.9	3,979.1	3,820.0	3,667.2	3,520.5	3,379.7	3,244.5	3,114.7	2,990.1	2,870.5	2,755.7	2,645.5	2,539.6	2,438.1
% 1.28 gal/flush	0.0%	0.0%	0.1%	0.4%	0.7%	1.2%	1.8%	2.4%	3.2%	4.1%	6.1%	8.6%	11.4%	14.7%	18.4%	21.7%	24.8%	27.9%	30.8%	33.5%	36.0%	38.4%	40.7%	42.9%	45.0%	47.0%	49.0%	50.9%	52.7%	54.4%	56.1%
% 1.6 gal/flush	50.0%	52.1%	54.0%	55.7%	57.3%	58.7%	60.0%	61.1%	62.1%	66.4%	65.9%	64.8%	63.3%	61.3%	58.8%	56.6%	54.5%	52.4%	50.5%	48.6%	46.9%	45.3%	43.7%	42.2%	40.8%	39.4%	38.0%	36.7%	35.4%	34.2%	33.0%
% High flush & 3.5 gal/flush	50.0%	47.9%	45.8%	43.9%	42.1%	40.1%	38.2%	36.4%	34.7%	29.5%	28.0%	26.6%	25.3%	24.0%	22.8%	21.7%	20.7%	19.7%	18.8%	17.9%	17.1%	16.3%	15.6%	14.9%	14.2%	13.6%	13.0%	12.4%	11.9%	11.4%	10.9%
% Total Check	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Daily End Use Volume per Account (gal/d):	48.8	48.0	47.2	46.5	45.8	45.0	44.3	43.5	42.8	40.8	40.1	39.4	38.7	37.9	37.2	36.5	35.8	35.2	34.6	34.1	33.6	33.1	32.6	32.2	31.8	31.3	31.0	30.6	30.2	29.9	29.6
Retrofit Data for Next Year's Calculations																															
Accounts Retrofitting High flush & 3.5 gal/flush to 1.28 gal/flush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Accounts Retrofitting 1.6 gal/flush to 1.28 gal/flush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Accounts Retrofitting High flush & 3.5 gal/flush to 1.6 gal/flush	0.0	0.0	0.0	0.0	2.1	4.3	6.4	8.5	702.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Water Savings

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Measure Impact Factor:	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.967	0.969	0.970	0.971	0.972	0.973	0.973	0.974	0.975	0.976	0.977	0.977	0.978	0.979	0.980	0.980	0.981	0.982	0.982	0.983	0.983	0.984
Water Savings Per Account (gal/d):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.3	1.2	1.2	1.1	1.1	1.0	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5
Total Water Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total External Water Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Internal Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Savings of Total Baseline Production:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Modified Forecasts

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Water Production (mgd):	8.7	8.7	8.6	8.6	8.6	8.7	8.7	8.7	8.8	8.8	8.9	9.0	9.1	9.2	9.3	9.5	9.6	9.7	9.8	9.9	9.9	9.9	9.9	9.9	10.0	10.0	10.0	10.0	10.0	10.1	10.1
External Consumption (mgd):	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Peak Day Water Production (mgd):	13.0	13.0	13.0	13.0	13.0	13.1	13.1	13.2	13.3	13.3	13.5	13.7	13.9	14.1	14.3	14.5	14.7	14.9	15.1	15.3	15.3	15.4	15.4	15.5	15.5	15.6	15.6	15.7	15.7	15.8	15.9
Dry Weather Wastewater (mgd):	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.9	6.9	6.9	7.0	7.1	7.2	7.3	7.4	7.4	7.5	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8
Design Wet Weather Wastewater: (mgd):	20.5	20.5	20.5	20.6	20.6	20.7	20.8	20.9	21.1	21.1	21.4	21.7	22.0	22.3	22.6	22.8	23.1	23.3	23.6	23.8	23.9	24.0	24.1	24.2	24.3	24.3	24.4	24.5	24.6	24.7	24.8

Demand Management Least Cost Planning Decision Support System
Fixture Model - Retrofit and Code Measures

9b - RMF Toilet Sponsored Replacement

Results Summary

Present Value of Water Utility Benefits:	$52,539
Present Value of Total Community Benefits:	$52,539
Present Value of Water Utility Costs:	$27,682
Present Value of Total Community Costs:	$60,900
Water Utility Benefit Cost Ratio:	1.90
Total Community Benefit Cost Ratio:	0.86
Average Water Savings (mgd):	0.00
Cost of Savings per Unit Volume ($/mg):	$1,595.32

Measure Data

Measure Number:	9	**Reference Row:**	17	*Data Compiled in Row 17 of MeasureData Worksheet.*
Market Penetration	Result of 10 years of replacement a	per year (varies by city ~7%/yr)		*Result of 10 years of replacement at resale rate*
Water Use Reductions	60%	of RSF, RMF Toilet use, varies with current toilet stock		*60%*
Program Length	10	(years)		*Assume program length of 10 years.*
Measure Life	permanent	(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 50	per fixture		*Assume utility pays $50 per fixture.*
Customer Unit Cost	$ 75	per fixture		*Assume customer pays $75 per fixture.*
Admin/Marketing Cost	25%	Percent of initial utility unit cost		*Assume utility administration cost of 25%.*

Fixture Replacement

Assume Average Number of Fixtures per MF Account	1.0
Average Number of Dwelling Units per MF Account	4.4

Model Setup Data

End Use Identifier:	RMF Toilets
Consumer Category:	Multifamily
Account User Forecast:	RMF Household Size
Starting Year for Forecasts:	2001
Internal or External End Use?:	Internal
Temperature of Use (oF) (Blank if not heated):	
Cost Per Degree Change Per Gallon:	

Model Calculations

Parameter	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Account Details																															
Users per Account:	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73	13.73
Number of Accounts:	2,840	2,847	2,854	2,861	2,868	2,886	2,904	2,923	2,941	2,960	2,993	3,026	3,059	3,091	3,124	3,149	3,174	3,199	3,223	3,248	3,263	3,278	3,294	3,309	3,324	3,339	3,354	3,369	3,384	3,399	3,415
Data for Next Years Calcs																															
No. Of New Accounts	7	7	7	7	18	18	18	18	18	33	33	33	33	33	25	25	25	25	25	15	15	15	15	15	15	15	15	15	15	17	
Replacement Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
New Unit Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
No Retrofit (Base Case)																															
Account Totals																															
Total 1.28 gal/flush	0.3	0.3	3.6	10.1	19.6	33.6	50.8	71.2	94.6	121.0	183.1	260.2	351.9	458.0	578.3	687.4	793.7	897.3	998.1	1,096.5	1,182.7	1,266.5	1,348.0	1,427.3	1,504.5	1,579.4	1,652.4	1,723.3	1,792.5	1,859.8	1,926.8
Total 1.6 gal/flush	1,420.0	1,483.7	1,541.8	1,594.5	1,642.1	1,694.8	1,742.4	1,784.9	1,822.7	1,855.7	1,865.8	1,859.4	1,836.8	1,798.3	1,744.4	1,692.1	1,641.3	1,592.1	1,544.3	1,498.0	1,453.0	1,409.4	1,367.2	1,326.1	1,286.4	1,247.8	1,210.3	1,174.0	1,138.8	1,104.6	1,071.5
Total High flush & 3.5 gal/flush	1,419.7	1,362.9	1,308.4	1,256.1	1,205.8	1,157.6	1,111.3	1,066.8	1,024.2	983.2	943.9	906.1	869.9	835.1	801.7	769.6	738.8	709.3	680.9	653.7	627.5	602.4	578.3	555.2	533.0	511.7	491.2	471.5	452.7	434.6	417.2
% 1.28 gal/flush	0.0%	0.0%	0.1%	0.4%	0.7%	1.2%	1.8%	2.4%	3.2%	4.1%	6.1%	8.6%	11.5%	14.8%	18.5%	21.8%	25.0%	28.1%	31.0%	33.8%	36.2%	38.6%	40.9%	43.1%	45.3%	47.3%	49.3%	51.2%	53.0%	54.7%	56.4%
% 1.6 gal/flush	50.0%	52.1%	54.0%	55.7%	57.3%	58.7%	60.0%	61.1%	62.0%	62.7%	62.3%	61.5%	60.1%	58.2%	55.8%	53.7%	51.7%	49.8%	47.9%	46.1%	44.5%	43.0%	41.5%	40.1%	38.7%	37.4%	36.1%	34.8%	33.7%	32.5%	31.4%
% High flush & 3.5 gal/flush	50.0%	47.9%	45.8%	43.9%	42.1%	40.1%	38.3%	36.5%	34.8%	33.2%	31.5%	29.9%	28.4%	27.0%	25.7%	24.4%	23.3%	22.2%	21.1%	20.1%	19.2%	18.4%	17.6%	16.8%	16.0%	15.3%	14.6%	14.0%	13.4%	12.8%	12.2%
% Total Check	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Daily End Use Volume per Account (gal/d):	187.5	184.5	181.6	178.8	176.0	173.1	170.3	167.6	164.9	162.4	159.3	156.3	153.2	150.1	146.9	144.1	141.5	138.9	136.5	134.1	132.1	130.1	128.2	126.3	124.6	122.9	121.3	119.8	118.3	116.9	115.6
Managed Demand Case																															
Code Influenced Replacement Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Code Influenced New Unit Market Shares																															
1.28 gal/flush Market Share	0.0%	3.1%	6.3%	9.4%	12.5%	15.6%	18.8%	21.9%	25.0%	50.0%	62.5%	75.0%	87.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	
1.6 gal/flush Market Share	100.0%	96.9%	93.8%	90.6%	87.5%	84.4%	81.3%	78.1%	75.0%	50.0%	37.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
High flush & 3.5 gal/flush Market Share	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Account Totals																															
Total 1.28 gal/flush	0.3	0.3	3.6	10.1	19.6	33.6	50.8	71.2	94.6	121.0	183.0	259.9	351.5	457.5	577.5	686.5	792.7	896.1	996.9	1,095.1	1,181.2	1,264.9	1,346.4	1,425.6	1,502.7	1,577.5	1,650.4	1,721.4	1,790.4	1,857.7	1,924.7
Total 1.6 gal/flush	1,420.0	1,483.7	1,541.8	1,594.5	1,642.1	1,695.9	1,745.7	1,791.6	1,833.7	1,877.3	1,886.6	1,879.4	1,856.2	1,817.2	1,762.6	1,709.8	1,658.5	1,608.7	1,560.4	1,513.6	1,468.2	1,424.2	1,381.5	1,340.0	1,299.8	1,260.8	1,223.0	1,186.3	1,150.7	1,116.2	1,082.7
Total High flush & 3.5 gal/flush	1,419.7	1,362.9	1,308.4	1,256.1	1,205.8	1,156.5	1,107.9	1,060.2	1,013.2	961.7	923.3	886.3	850.9	816.8	784.2	752.8	722.7	693.8	666.0	639.4	613.8	589.3	565.7	543.1	521.3	500.5	480.5	461.2	442.8	425.1	408.1
% 1.28 gal/flush	0.0%	0.0%	0.1%	0.4%	0.7%	1.2%	1.8%	2.4%	3.2%	4.1%	6.1%	8.6%	11.5%	14.8%	18.5%	21.8%	25.0%	28.0%	30.9%	33.7%	36.2%	38.6%	40.9%	43.1%	45.2%	47.2%	49.2%	51.1%	52.9%	54.7%	56.4%
% 1.6 gal/flush	50.0%	52.1%	54.0%	55.7%	57.3%	58.8%	60.1%	61.3%	62.3%	63.4%	63.0%	62.1%	60.7%	58.8%	56.4%	54.3%	52.3%	50.3%	48.4%	46.6%	45.0%	43.4%	41.9%	40.5%	39.1%	37.8%	36.5%	35.2%	34.0%	32.8%	31.7%
% High flush & 3.5 gal/flush	50.0%	47.9%	45.8%	43.9%	42.1%	40.1%	38.1%	36.3%	34.4%	32.5%	30.8%	29.3%	27.8%	26.4%	25.1%	23.9%	22.8%	21.7%	20.7%	19.7%	18.8%	18.0%	17.2%	16.4%	15.7%	15.0%	14.3%	13.7%	13.1%	12.5%	11.9%
% Total Check	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Daily End Use Volume per Account (gal/d):	187.5	184.5	181.6	178.8	176.0	173.1	170.1	167.2	164.4	161.3	158.3	155.3	152.3	149.2	146.2	143.4	140.7	138.2	135.8	133.5	131.5	129.5	127.6	125.8	124.1	122.5	120.9	119.4	117.9	116.5	115.2
Retrofit Data for Next Year's Calculations																															
Accounts Retrofitting High flush & 3.5 gal/flush to 1.28 gal/flush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Accounts Retrofitting 1.6 gal/flush to 1.28 gal/flush	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Accounts Retrofitting High flush & 3.5 gal/flush to 1.6 gal/flush	0.0	0.0	0.0	0.0	1.140	2.280	3.420	4.560	10.960	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

Water Savings

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Measure Impact Factor:	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.998	0.997	0.994	0.994	0.994	0.994	0.994	0.995	0.995	0.995	0.995	0.995	0.995	0.996	0.996	0.996	0.996	0.996	0.996	0.996	0.997	0.997	0.997	0.997
Water Savings Per Account (gal/d):	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.5	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4
Total Water Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total External Water Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Internal Savings (mgd):	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% Savings of Total Baseline Production:	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Modified Forecasts

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Water Production (mgd):	8.7	8.7	8.6	8.6	8.6	8.7	8.7	8.7	8.8	8.8	8.9	9.0	9.1	9.3	9.4	9.5	9.6	9.7	9.8	9.9	9.9	9.9	9.9	10.0	10.0	10.0	10.0	10.0	10.1	10.1	10.1
External Consumption (mgd):	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Peak Day Water Production (mgd):	13.0	13.0	13.0	13.0	13.0	13.1	13.1	13.2	13.3	13.3	13.5	13.7	14.0	14.2	14.3	14.5	14.7	14.9	15.1	15.3	15.4	15.4	15.4	15.5	15.5	15.6	15.6	15.7	15.7	15.8	15.9
Dry Weather Wastewater (mgd):	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.9	6.9	7.0	7.1	7.1	7.2	7.3	7.4	7.5	7.5	7.6	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.8	7.8
Design Wet Weather Wastewater: (mgd):	20.5	20.5	20.5	20.6	20.6	20.7	20.8	20.9	21.1	21.2	21.5	21.7	22.0	22.3	22.6	22.8	23.1	23.3	23.6	23.8	23.9	24.0	24.1	24.2	24.3	24.4	24.4	24.5	24.6	24.7	24.8

Demand Management Least Cost Planning Decision Support System
General Measure Model

12 - Rebates for 6/3-Dual Flush Toilets

Results Summary

Present Value of Water Utility Benefits:	$1,585,030
Present Value of Total Community Benefits	$1,585,030
Present Value of Water Utility Costs:	$649,950
Present Value of Total Community Costs:	$909,930
Water Utility Benefit Cost Ratio:	2.44
Total Community Benefit Cost Ratio:	1.74
Average Water Savings (mgd):	0.050
Cost of Savings per Unit Volume ($/mg):	$1,158.59

Measure Data

Measure Number:	12	Reference Row:	20
Market Penetration	25%	RSF and RMF accounts	
Water Use Reductions	54%	~67% of Toilet use, varies with current toilet stock	
Program Length	10	(years)	
Measure Life	permanent	(years)	
Utility Unit Cost	$ 100	per fixture	
Customer Unit Cost	$ 50	per fixture	
Admin/Marketing Cost	25%	Percent of initial utility unit cost	

Data Compiled in Row 20 of MeasureData Worksheet.
Participation rate is 25% of the new RSF and RMF accounts. When M12 is run with NM1, market penetration reduces to 15% and 10% respectively.
Measure results in 53.7 % reduction. Estimated in tables to right.1.19/2.57=0.54
Assume program length of 10 years.
Assume measure life is permanent years.
Assume utility pays $100 per fixture.
Assume customer pays $50 per fixture.
Assume utility administration cost of 25%.

Data from Toilet Fixture Model

Weighted Average of Water Volume by Type of Toilet (gal/use):

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-yr Avg.
2.76	2.72	2.68	2.63	2.59	2.55	2.51	2.46	2.42	2.37	2.57

6/3-Dual Flush Toilet Data	
6L Flush Volume (gal/use)	1.6
3L Flush Volume (gal/use)	0.8
Percent of 6L uses	50%
Percent of 3L uses	50%
Average Flush Volume (gal/use)	1.19

Water use reduction per affected account: (1-1.19/2.57) = 54%

Fixture Replacement	
Assume Average Number of Fixtures per SF Account	2.0
Assume Average Number of Fixtures per MF Account	1.0
Average Number of Dwelling Units per MF Account	4.4

Dwelling Units (DU) per account determined from reconciling billing data with Census data (see Water Use Data Input

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$649,950				$0	$0	$0	$0	$0	$161,762	$162,778	$164,586	$166,394	$168,202																		
Customer Implementation Costs by Year:	$259,980				$0	$0	$0	$0	$0	$64,705	$65,111	$65,835	$66,558	$67,281																		

Measure Life (years): 10 Use Measure Life? No
Assume permanent change

Calculate Hot Water Savings? No

Five Year Utility Cost =	$0
Five Year Customer Cost =	$0
Five Year Community Cost =	$0

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0	0	0	0	0	0	0	0	484	487	492	498	503	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	RMF Toilets	Multifamily	0	0	0	0	0	0	0	0	74	74	75	76	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
2	RMF Toilets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.05	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.6%	0.8%	0.9%	0.9%	0.9%	0.8%	0.8%	0.8%	0.8%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%

Demand Management Least Cost Planning Decision Support System
General Measure Model

14 - Xeriscape Classes

Results Summary

Present Value of Water Utility Benefits:	$269,667
Present Value of Total Community Benefits	$269,667
Present Value of Water Utility Costs:	$61,848
Present Value of Total Community Costs:	$806,835
Water Utility Benefit Cost Ratio:	4.36
Total Community Benefit Cost Ratio:	0.33
Average Water Savings (mgd):	0.009
Cost of Savings per Unit Volume ($/mg):	$589.47

Measure Data

Measure Number:	14		**Reference Row:**	22
Market Penetration	300		acct/yr (20 staff/site/yr)x(25 acct/staff/site/yr)	
Water Use Reductions	15%		Irrigation	
Program Length	indefinitely		(years)	
Measure Life	permanent		(years)	
Utility Unit Cost	$ 300	10	per class (one per site per year)	
Customer Unit Cost	$ 200		per account	
Admin/Marketing Cost	10%		Percent of initial utility unit cost	

Data Compiled in Row 22 of MeasureData Worksheet.
500 accounts affected (20 staff trained x 25 accounts/staff)
Measure results in 15 % reduction in Irrigation.
Assume program continues indefinitely.
Assume measure life is permanent years.
Assume utility pays $300 per class (one per site per year).
Assume customer pays $200 per account.
Assume utility administration cost of 10%.

Specific Account Data

Measure Number:	14	**Reference Row:**	89
Home & Garden Locations (e.g. - retailers) where classes would be helc			1

If site is shared with another service area, use a fraction (e.g. - 0.5).

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$61,848				$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300	$3,300
Customer Implementation Costs by Year:	$744,987				$0	$0	$0	$0	$0	$60,000	$59,076	$58,186	$57,328	$56,502	$55,706	$54,938	$54,182	$53,449	$52,738	$52,047	$51,377	$50,699	$50,037	$49,390	$48,758	$48,140	$47,536	$46,946	$46,368	$45,804	$45,252	$44,719

Measure Life (years): 30 Use Measure Life? No

Assume permanent change

Five Year Utility Cost =	$16,500
Five Year Customer Cost =	$0
Five Year Community Cost =	$16,500

Calculate Hot Water Savings? No

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0	0	0	0	0	0	0	0	300	295	291	287	283	279	275	271	267	264	260	257	253	250	247	244	241	238	235	232	229	226	224
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%

Demand Management Least Cost Planning Decision Support System
General Measure Model

20 - Offer Incentives for Replacement of Multifamily Washers

Results Summary

Present Value of Water Utility Benefits:	$50,484
Present Value of Total Community Benefits:	$122,560
Present Value of Water Utility Costs:	$28,582
Present Value of Total Community Costs:	$40,015
Water Utility Benefit Cost Ratio:	1.77
Total Community Benefit Cost Ratio:	3.06
Average Water Savings (mgd):	0.001
Cost of Savings per Unit Volume ($/mg):	$1,686.20

Measure Data					
Measure Number:	20		Reference Row:	28	*Data Compiled in Row 28 of MeasureData Worksheet.*
Market Penetration	50%		RMF Washers		*Participation rate is 50 % of the existing RMF Washers.*
Water Use Reductions	35%		Laundry		*Measure results in 35 % reduction in Laundry.*
Program Length	3		(years)		*Assume program length of 3 years.*
Measure Life	permanent		(years)		*Assume measure life is permanent years.*
Utility Unit Cost	$ 200		per washer		*Assume utility pays $200 per washer.*
Customer Unit Cost	$ 100		per washer		*Assume customer pays $100 per washer.*
Admin/Marketing Cost	25%		per washer		*Assume utility administration cost of 25%.*

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$28,582				$0	$0	$0	$16,329	$16,329																							
Customer Implementation Costs by Year:	$11,433				$0	$0	$0	$6,532	$6,532																							

Measure Life (years): 14 Use Measure Life? No

Assume permanent change

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$32,658
Five Year Customer Cost =	$13,063
Five Year Community Cost =	$45,722

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RMF Laundry	Multifamily	0	0	0	0.00	0.00	0.00	15	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RMF Laundry	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Demand Management Least Cost Planning Decision Support System
General Measure Model

22 - Low Flow Restaurant Spray Nozzles

Results Summary

Present Value of Water Utility Benefits:	$370,388
Present Value of Total Community Benefits	$851,425
Present Value of Water Utility Costs:	$131,247
Present Value of Total Community Costs:	$131,247
Water Utility Benefit Cost Ratio:	2.82
Total Community Benefit Cost Ratio:	6.49
Average Water Savings (mgd):	0.011
Cost of Savings per Unit Volume ($/mg):	$1,064.17

Measure Data					
Measure Number:	22		Reference Row:	30	Data Compiled in Row 30 of MeasureData Worksheet.
Market Penetration	75%		restaurants + colleges + hospitals		Participation rate is 75 % of the new restaurants + colleges + hospitals.
Water Use Reductions	50%		Kitchen Spray Rinse		Measure results in 50 % reduction in Kitchen Spray Rinse.
Program Length	5		(years)		Assume program length of 5 years.
Measure Life	permanent		(years)		Assume measure life is permanent years.
Utility Unit Cost	$ 181		per site		Assume utility pays $181 per site.
Customer Unit Cost	$ -		per		Assume customer pays $0 per .
Admin/Marketing Cost	15%		Percent of initial utility unit cost		Assume utility administration cost of 15%.

Specific Account Data				
Measure Number:	22	Reference Row:	126	Data Compiled beginning in Row 126 of MeasureData Worksheet.
Number of Restaurants			116	
Number of Universities/Colleges with Kitchen			0	
Number of Hospitals w Kitchen			0	
Assumed Number of Spray Nozzles per Site			1.0	

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$131,247				$0	$0	$125,984	$18,000	$0																							
Customer Implementation Costs by Year:	$0				$0	$0	$0	$0	$0																							

Measure Life (years): 5 Use Measure Life? No

Assume permanent change

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$143,984
Five Year Customer Cost =	$0
Five Year Community Cost =	$143,984

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Kitch Spray Rinse	Commercial	0	0	0	0.0	0	605	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	New COM Kitch Spray Rinse	New Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Kitch Spray Rinse	Commercial	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	New COM Kitch Spray Rinse	New Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Demand Management Least Cost Planning Decision Support System
General Measure Model

29 - Financial Incentives for Complying with Water Use Budget

Measure works with existing irrigation meters (if a billing category) and water budgets from measure 4

Results Summary

Present Value of Water Utility Benefits:	$177,037
Present Value of Total Community Benefits:	$177,037
Present Value of Water Utility Costs:	$23,747
Present Value of Total Community Costs:	$66,923
Water Utility Benefit Cost Ratio:	7.46
Total Community Benefit Cost Ratio:	2.65
Average Water Savings (mgd):	0.006
Cost of Savings per Unit Volume ($/mg):	$367.96

Measure Data

Measure Number:	29		**Reference Row:**	37
Market Penetration	75%		sites with irrigation meters	
Water Use Reductions	15%		Irrigation on top of water budget savings	
Program Length	indefinitely		(years)	
Measure Life	permanent		(years)	
Utility Unit Cost	$ 500		per account	
Customer Unit Cost	$ 1,000		per account	
Admin/Marketing Cost	10%		Percent of initial utility unit cost	

Data Compiled in Row 37 of MeasureData Worksheet.
Participation rate is 75 % of the new sites with irrigation meters.
Measure results in 15 % reduction in Irrigation on top of water budget savings.
Assume program continues indefinitely.
Assume measure life is permanent years.
Assume utility pays $500 per account.
Assume customer pays $1000 per account.
Assume utility administration cost of 10%.

Measure Implementation Costs

Assume utility pays $500 per participating account for rebate and customer pays $1000 per participating account
Assume utility administration cost of 10%

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$23,747				$0	$0	$0	$0	$0	$5,587	$5,199	$5,123	$4,793	$4,488	$594	$594	$446	$446	$446	$446	$446	$272	$272	$272	$272	$272	$270	$270	$270	$270	$270	$296
Customer Implementation Costs by Year:	$43,176				$0	$0	$0	$0	$0	$10,159	$9,452	$9,314	$8,715	$8,161	$1,079	$1,079	$810	$810	$810	$810	$810	$494	$494	$494	$494	$494	$491	$491	$491	$491	$491	$539

Measure Life (years): 10 Use Measure Life? no

Assume permanent change

Calculate Hot Water Savings? No

Five Year Utility Cost =	$0
Five Year Customer Cost =	$0
Five Year Community Cost =	$0

Partcipation rate is 75 % of the new ICI Accounts with separate irrigation meters, spread over 10 years + new irrigation accounts added each year

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IRR Outdoor	Irrigation	0	0	0	0	0	0	0	0	10	9	9	9	8	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
2	IRR Outdoor Leaks	Irrigation	0	0	0	0	0	0	0	0	10	9	9	9	8	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IRR Outdoor	Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	IRR Outdoor Leaks	Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Demand Management Least Cost Planning Decision Support System
General Measure Model
NM1 - Rebate High Efficiency Toilets

Results Summary

Present Value of Water Utility Benefits:	$1,468,551
Present Value of Total Community Benefits:	$1,468,551
Present Value of Water Utility Costs:	$1,027,952
Present Value of Total Community Costs:	$1,576,193
Water Utility Benefit Cost Ratio:	1.43
Total Community Benefit Cost Ratio:	0.93
Average Water Savings (mgd):	0.05
Cost of Savings per Unit Volume ($/mg):	$1,872.40

MEASURE DATA AND PARAMETERS		
Description	--	Offer HET rebate or giveaway program to up to 9.5% percent of existing accounts over 10 years
Applicable Customer Classes	--	RSF, RMF, and CII including if applicable COM, MUN, BUS, IND, INS, PUB
Applicable End Uses	--	Toilets (fixture model required)
Market Penetration by End Of Program	9.5%	Percent of accounts affected annually. Approximately 60% are already ULF toilets or tankless. Participation rate is 9.5% of the existing RSF, RMF, and CII accounts in the year 2010.
Water Use Reductions For Targeted End Uses	68%	Reduction percentage depends on flush volume of existing high flush toilets (assumed to be an average of 4 gallons), which is shown up to the right on this sheet.
Average Volume Per Use of HETs	1.28	Average use in gal/use. Assume HETs use 1.28 gallons per flush.
Program Length, years	10	Should test program after 10-years and continue if savings and costs are effective.
Measure Life, years	*permanent*	Assume that owner will not replace retrofitted efficient equipment with inefficient equipment (MWM 2005a).
Utility Unit Cost, $/unit	$150	Cost per toilet. $150 rebate per Nicole Sandkulla at BAWSCA on 2/3/09.
Customer Unit Cost, $/unit	$100	Net cost is approximately $100 to cover installation.
Annual Utility Admin & Marketing Cost	25%	Additional cost to the utility for administration and marketing.

Average Water Use of Toilets Being Replaced (gal/use) over Duration of Program (data from fixture models)

Fixture Model	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	10-yr Avg.
RSF Toilets	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
RMF Toilets	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
COM Toilets	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Fixture Replacement	
Assume Average Number of Fixtures per RSF dwelling un	2.2
Assume Average Number of Fixtures per RMF dwelling un	1.2
Average Number of Dwelling Units per RMF Account	4.4
Assume Average Number of Fixtures per CII Account	9.3

Annual Rebate Target

Daly City	Annual Accounts NM-1	Annual Rebates NM-1	Total accounts 2010
RSF	185	407	19,472
RMF	28	150	2,960
COM + IND + INS + GOV	9	86	971
TOTAL	222	643	23,403

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$1,027,952										$120,567	$120,567	$120,567	$120,567	$120,567	$120,567	$120,567	$120,567	$120,567	$120,567	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Customer Implementation Costs by Year:	$548,241										$64,302	$64,302	$64,302	$64,302	$64,302	$64,302	$64,302	$64,302	$64,302	$64,302	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? No

Five Year Utility Cost =	$602,835
Five Year Customer Cost =	$321,512
Five Year Community Cost =	$924,347

Max Saturation, RSF =	9%
Max Saturation, RMF =	9%
Max Saturation, COM =	5%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0	0	0	0	0	0	0	0	0	185	185	185	185	185	185	185	185	185	185	0	0	0	0	0	0	0	0	0	0	0	0
2	RMF Toilets	Multifamily	0	0	0	0	0	0	0	0	0	28	28	28	28	28	28	28	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0
3	COM Toilets	Commercial	0	0	0	0	0	0	0	0	0	7	7	7	7	7	7	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0
4	IND Toilets	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	INS Toilets	Institutional	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
6	GOV Toilets	Governmental	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
2	RMF Toilets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
3	COM Toilets	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4	IND Toilets	Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	INS Toilets	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6	GOV Toilets	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.3%	0.4%	0.5%	0.6%	0.7%	0.8%	0.8%	0.9%	0.9%	0.9%	0.9%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%	0.8%

Demand Management Least Cost Planning Decision Support System
General Measure Model

NM2 - Education/Training External Water Use Efficiency

Results Summary

Present Value of Water Utility Benefits:	$137,394
Present Value of Total Community Benefits:	$137,394
Present Value of Water Utility Costs:	$104,365
Present Value of Total Community Costs:	$1,202,943
Water Utility Benefit Cost Ratio:	1.32
Total Community Benefit Cost Ratio:	0.11
Average Water Savings (mgd):	0.00
Cost of Savings per Unit Volume ($/mg):	$1,918.72

MEASURE DATA AND PARAMETERS

Description	--	Combination of three types of training classes: (1) Xeriscape, (2) Homeowner Irrigation, and (3) Promotion of Water Efficient Plants. Assume all savings are implemented for RSF accounts. Number of accounts affected is computed on a regional basis and then divided among service areas. REGIONALLY: 20 class sites, 4 class/year/site, 50 attendees/class, 1 affected-account/attendee. 20 x 4 x 50 x 1 = 4000 affected accounts. This is multiplied by the fraction contributing to the service area.
Applicable Customer Classes	--	RSF
Applicable End Uses	--	Irrigation, Landscaping
Number of Accounts Affected per Class	50	Input the number of persons attending each class (assume one person affects one account).
Number of Classes to be Conducted Regionally	80	Input the number of sites times the number of classes held per year.
Fraction of Classes affecting Service Area	0.0575	Input the fraction of all of the regional classes that will affect this service area (see BC memorandum 2005a).
Water Use Reductions For Targeted End Uses	10%	10% irrigation
Program Length, years	*indefinite*	This program will be run every year for the entire length of the analysis.
Measure Life, years	*permanent*	Assume owner will not replace efficient irrigation equipment with inefficient equipment (MWM 2005a).
Utility Annual Cost, $/year	$950	Average cost per class is $920, 50 people per class (assume a ratio of 1 class at $1400 each for professionals to every 3 classes at $800 each for homeowners).
Customer Unit Cost, $/unit	$300	Average per-account cost; includes cost of new plants/landscaping systems and irrigation equipment.
Annual Utility Admin & Marketing Cost	50%	Multiply by the total annual cost for the fraction contributing in this service area. Includes staff time and marketing

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$104,365										$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555	$6,555
Customer Implementation Costs by Year:	$1,098,578										$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000	$69,000

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? No

Five Year Utility Cost =	$32,775
Five Year Customer Cost =	$345,000
Five Year Community Cost =	$377,775

Max Saturation, RSF =	23%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0	0	0	0	0	0	0	0	0	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%

Demand Management Least Cost Planning Decision Support System
General Measure Model

NM5 - High Efficiency Washer Rebates

Results Summary

Present Value of Water Utility Benefits:	$2,799,926
Present Value of Total Community Benefits:	$6,481,267
Present Value of Water Utility Costs:	$1,902,756
Present Value of Total Community Costs:	$3,488,385
Water Utility Benefit Cost Ratio:	1.47
Total Community Benefit Cost Ratio:	1.86
Average Water Savings (mgd):	0.09
Cost of Savings per Unit Volume ($/mg):	$1,824.07

MEASURE DATA AND PARAMETERS

Description	--	High efficiency washers (HEWs) assumed to use an average of 18 gallons per load.
Applicable Customer Classes	--	RSF, RMF(only apply to those account categories that have a fixture model applied to them for washers)
Applicable End Uses	--	Washers (fixture model required)
Market Penetration by End Of Program	27%	Percent of accounts affected.
Water Use Reductions For Targeted End Uses	varies	Reduction percentage depends average flush volume of existing washers, which is tracked in the fixture model. Therefore, this value will vary by service area see side calculation table to right.
Average Volume Per Use of HEWs	18.00	Average use in gal/use. Machine uses 18 gallons per load. Old machines average 45 gallons, new machines average 18 gallons or less.
Program Length, years	9	Assume rebate no longer needed after 2018 as most washers sold will be HEWs.
Measure Life, years	permanent	Assumes that owner will not replace retrofitted efficient equipment with inefficient equipment (MWM 2005a).
Utility Unit Cost, $/unit	$200	Rebate amount, may be matched by PG&E.
Customer Unit Cost, $/unit	$200	Added cost per washer for a HEW. This is the cost to pay for the difference between a HEW and a conventional washer.
Annual Utility Admin & Marketing Cost	20%	Additional cost to the utility for administration and marketing.

Average Water Use of Washers Being Replaced (gal/use) over Duration of Program (data from fixture models)

Fixture Model	2010	2011	2012	2013	2014	2015	2016	2017	2018	9-yr Avg.
RSF Washers	36.72	36.54	36.30	36.02	35.70	35.34	34.96	34.54	34.09	35.58
RMF Washers	36.72	36.54	36.30	36.02	35.70	35.34	34.96	34.54	34.09	35.58

Fixture Replacement	
Assume Average Number of Washers per RSF Accour	1.0
Assume Average Number of Washers per RMF Accour	4.4
Average Number of Dwelling Units per RMF Account	4.4

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$1,902,756										$234,954	$237,564	$240,173	$242,783	$245,393	$248,002	$249,967	$251,931	$253,896	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Customer Implementation Costs by Year:	$1,585,630										$195,795	$197,970	$200,145	$202,319	$204,494	$206,669	$208,306	$209,943	$211,580	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$1,200,867
Five Year Customer Cost =	$1,000,723
Five Year Community Cost =	$2,201,590

Max Saturation, RSF =	26%
Max Saturation, RMF =	26%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Laundry	Single Family	0	0	0	0	0	0	0	0	0	584	591	597	604	610	617	621	626	631	0	0	0	0	0	0	0	0	0	0	0	0	0
2	RMF Laundry	Multifamily	0	0	0	0	0	0	0	0	0	89	90	91	92	93	94	94	95	96	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Laundry	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.05	0.06	0.07	0.08	0.10	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09
2	RMF Laundry	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.04	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.04	0.06	0.08	0.10	0.11	0.13	0.15	0.17	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.14
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.6%	0.8%	1.0%	1.2%	1.4%	1.6%	1.7%	1.7%	1.7%	1.6%	1.6%	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.4%	1.4%

Demand Management Least Cost Planning Decision Support System
General Measure Model
NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$1,444,981
Present Value of Total Community Benefits:	$2,752,015
Present Value of Water Utility Costs:	$46,674
Present Value of Total Community Costs:	$3,158,295
Water Utility Benefit Cost Ratio:	30.96
Total Community Benefit Cost Ratio:	0.87
Average Water Savings (mgd):	0.05
Cost of Savings per Unit Volume ($/mg):	$83.48

MEASURE DATA AND PARAMETERS — *Table Notes ===>*

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	RSF	RSF	RSF	RSF	RSF	RSF	RSF	NA
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[4]	Showers[5]	Faucets[6]	Showers[5]	Indoor[7]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	permanent	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	..[9]	..[9]	..[9]	..[9]	..[9]	..[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	..[9]	..[9]	..[9]	..[9]	..[9]	..[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	..[9]	..[9]	..[9]	..[9]	..[9]	..[9]	$100
Customer Unit Cost, $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

1	HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.
2	Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.
3	Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.
4	RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.
5a	Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.
5b	Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.
5c	No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.
6	Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.
7	Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).
8	Unit cost to the utility for each affected Single Family Residential account (RSF).
9	No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.
10	Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.
11	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.
12a	Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.
12b	$50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$46,674										$2,394	$4,258	$4,258	$4,258	$4,258	$4,258	$3,206	$3,206	$3,206	$3,206	$3,206	$1,961	$1,961	$1,961	$1,961	$1,961	$1,947	$1,947	$1,947	$1,947	$1,947	$2,137
Customer Implementation Costs by Year:	$3,111,620										$159,630	$283,859	$283,859	$283,859	$283,859	$283,859	$213,703	$213,703	$213,703	$213,703	$213,703	$130,745	$130,745	$130,745	$130,745	$130,745	$129,821	$129,821	$129,821	$129,821	$129,821	$142,484

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$19,426
Five Year Customer Cost =	$1,295,065
Five Year Community Cost =	$1,314,491

Max Saturation, RSF =	10%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
2	RSF Laundry	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
3	RSF Dishwashers	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
4	RSF Faucets	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
5	RSF Showers	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
6	RSF Faucets	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
7	RSF Showers	Single Family	0	0	0	0	0	0	0	0	0	91	162	162	162	162	162	122	122	122	122	122	75	75	75	75	75	74	74	74	74	74	81
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Toilets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	RSF Laundry	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04
3	RSF Dishwashers	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	RSF Faucets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
5	RSF Showers	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6	RSF Faucets	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
7	RSF Showers	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.05	0.05	0.06	0.07	0.07	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.11	0.11
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.3%	0.4%	0.5%	0.6%	0.6%	0.7%	0.7%	0.8%	0.8%	0.8%	0.9%	0.9%	0.9%	1.0%	1.0%	1.0%	1.0%	1.1%	1.1%

Demand Management Least Cost Planning Decision Support System
General Measure Model

NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$1,028,131
Present Value of Total Community Benefits:	$2,035,425
Present Value of Water Utility Costs:	$56,760
Present Value of Total Community Costs:	$1,151,410
Water Utility Benefit Cost Ratio:	18.11
Total Community Benefit Cost Ratio:	1.77
Average Water Savings (mgd):	0.04
Cost of Savings per Unit Volume ($/mg):	$142.83

MEASURE DATA AND PARAMETERS

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	RMF	RMF	RMF	RMF	RMF	NA	NA	RMF
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[5]	Showers[5]	Faucets[6]	Showers[6]	Indoor[4]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	--[9]	--[9]	--[9]	--[9]	--[9]	--[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	--[9]	--[9]	--[9]	--[9]	--[9]	--[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	--[9]	--[9]	--[9]	--[9]	--[9]	--[9]	$100
Customer Unit Cost, $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

Table Notes ===>

1 HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.

2 Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.

3 Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.

4 RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.

5a Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.

5b Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.

5c No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.

6 Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.

7 Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).

8 Unit cost to the utility for each affected Single Family Residential account (RSF).

9 No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.

10 Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.

11 Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.

12a Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.

12b $50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$56,760										$2,912	$5,178	$5,178	$5,178	$5,178	$5,178	$3,896	$3,896	$3,896	$3,896	$3,896	$2,385	$2,385	$2,385	$2,385	$2,385	$2,368	$2,368	$2,368	$2,368	$2,368	$2,599
Customer Implementation Costs by Year:	$1,094,650										$56,157	$99,860	$99,860	$99,860	$99,860	$99,860	$75,179	$75,179	$75,179	$75,179	$75,179	$45,995	$45,995	$45,995	$45,995	$45,995	$45,670	$45,670	$45,670	$45,670	$45,670	$50,125

Year

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$23,624
Five Year Customer Cost =	$459,596
Five Year Community Cost =	$479,220

Max Saturation, RMF = 10%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RMF Toilets	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
2	RMF Laundry	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
3	RMF Dishwashers	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
4	RMF Faucets	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
5	RMF Showers	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
6																																	
7																																	
8	RMF Toilets	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
9	RMF Baths	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
10	RMF Showers	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
11	RMF Faucets	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
12	RMF Dishwashers	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
13	RMF Laundry	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
14	RMF Other	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
15	RMF Int. Leakage	Multifamily	0	0	0	0	0	0	0	0	0	14	25	25	25	25	25	19	19	19	19	19	11	11	11	11	11	11	11	11	11	11	12
16																																	
17																																	
18																																	
19																																	
20																																	

Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RMF Toilets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	RMF Laundry	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
3	RMF Dishwashers	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	RMF Faucets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	RMF Showers	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6																																	
7																																	
8	RMF Toilets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
9	RMF Baths	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	RMF Showers	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
11	RMF Faucets	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12	RMF Dishwashers	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	RMF Laundry	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
14	RMF Other	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	RMF Int. Leakage	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
16																																	
17																																	
18																																	
19																																	
20																																	
Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.08	0.08
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.2%	0.3%	0.4%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.8%

Demand Management Least Cost Planning Decision Support System
General Measure Model
NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$741,957
Present Value of Total Community Benefits:	$1,358,287
Present Value of Water Utility Costs:	$61,093
Present Value of Total Community Costs:	$642,935
Water Utility Benefit Cost Ratio:	12.14
Total Community Benefit Cost Ratio:	2.11
Average Water Savings (mgd):	0.03
Cost of Savings per Unit Volume ($/mg):	$212.75

MEASURE DATA AND PARAMETERS — *Table Notes ===>*

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	COM	COM	COM	NA	COM	NA	NA	NA
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[5]	Showers[5]	Faucets[6]	Showers[6]	Indoor[4]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	permanent	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Customer Unit Cost. $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

1	HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.
2	Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.
3	Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.
4	RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.
5a	Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.
5b	Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.
5c	No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.
6	Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.
7	Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).
8	Unit cost to the utility for each affected Single Family Residential account (RSF).
9	No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.
10	Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.
11	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.
12a	Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.
12b	$50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$61,093										$1,135	$5,538	$5,538	$5,538	$5,538	$5,538	$6,811	$6,811	$6,811	$6,811	$6,811	$1,332	$1,332	$1,332	$1,332	$1,332	$1,433	$1,433	$1,433	$1,433	$1,433	$1,516
Customer Implementation Costs by Year:	$581,842										$10,806	$52,745	$52,745	$52,745	$52,745	$52,745	$64,871	$64,871	$64,871	$64,871	$64,871	$12,688	$12,688	$12,688	$12,688	$12,688	$13,646	$13,646	$13,646	$13,646	$13,646	$14,440

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$23,288
Five Year Customer Cost =	$221,786
Five Year Community Cost =	$245,074

Max Saturation, BUS = 43%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	Commercial	0	0	0	0	0	0	0	0	0	11	53	53	53	53	53	65	65	65	65	65	13	13	13	13	13	14	14	14	14	14	14
2	COM Laundry	Commercial	0	0	0	0	0	0	0	0	0	11	53	53	53	53	53	65	65	65	65	65	13	13	13	13	13	14	14	14	14	14	14
3	COM Dishwashers	Commercial	0	0	0	0	0	0	0	0	0	11	53	53	53	53	53	65	65	65	65	65	13	13	13	13	13	14	14	14	14	14	14
4																																	
5	COM Showers	Commercial	0	0	0	0	0	0	0	0	0	11	53	53	53	53	53	65	65	65	65	65	13	13	13	13	13	14	14	14	14	14	14
6																																	
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	COM Toilets	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
2	COM Laundry	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
3	COM Dishwashers	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4																																	
5	COM Showers	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.2%	0.2%	0.3%	0.3%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%

Demand Management Least Cost Planning Decision Support System
General Measure Model

NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$1,112
Present Value of Total Community Benefits:	$2,158
Present Value of Water Utility Costs:	$30
Present Value of Total Community Costs:	$301
Water Utility Benefit Cost Ratio:	37.10
Total Community Benefit Cost Ratio:	7.16
Average Water Savings (mgd):	0.00
Cost of Savings per Unit Volume ($/mg):	$69.21

MEASURE DATA AND PARAMETERS

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	IND	IND	IND	NA	NA	NA	NA	NA
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[5]	Showers[5]	Faucets[6]	Showers[6]	Indoor[4]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	permanent	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Customer Unit Cost. $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

Table Notes ===>

1	HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.
2	Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.
3	Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.
4	RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.
5a	Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.
5b	Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.
5c	No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.
6	Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.
7	Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).
8	Unit cost to the utility for each affected Single Family Residential account (RSF).
9	No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.
10	Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.
11	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.
12a	Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.
12b	$50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$30										$2	$3	$3	$3	$3	$3	$2	$2	$2	$2	$2	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1	$1
Customer Implementation Costs by Year:	$271										$14	$25	$25	$25	$25	$25	$19	$19	$19	$19	$19	$11	$11	$11	$11	$11	$11	$11	$11	$11	$11	$12

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$12
Five Year Customer Cost =	$113
Five Year Community Cost =	$125

Max Saturation, IND = 10%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IND Toilets	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	IND Laundry	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	IND Dishwashers	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	IND Toilets	Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	IND Laundry	Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	IND Dishwashers	Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Demand Management Least Cost Planning Decision Support System
General Measure Model
NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$325,338
Present Value of Total Community Benefits:	$530,747
Present Value of Water Utility Costs:	$7,361
Present Value of Total Community Costs:	$77,462
Water Utility Benefit Cost Ratio:	44.20
Total Community Benefit Cost Ratio:	6.85
Average Water Savings (mgd):	0.01
Cost of Savings per Unit Volume ($/mg):	$58.06

MEASURE DATA AND PARAMETERS

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	INS	INS	INS	NA	INS	NA	NA	NA
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[5]	Showers[5]	Faucets[6]	Showers[6]	Indoor[4]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	permanent	permanent	permanent	permanent	permanent	permanent	permanent	permanent
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Customer Unit Cost. $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

Table Notes ===>

1	HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.
2	Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.
3	Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.
4	RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.
5a	Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.
5b	Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.
5c	No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.
6	Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.
7	Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).
8	Unit cost to the utility for each affected Single Family Residential account (RSF).
9	No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.
10	Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.
11	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.
12a	Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.
12b	$50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$7,361										$137	$667	$667	$667	$667	$667	$821	$821	$821	$821	$821	$161	$161	$161	$161	$161	$173	$173	$173	$173	$173	$183
Customer Implementation Costs by Year:	$70,101										$1,302	$6,355	$6,355	$6,355	$6,355	$6,355	$7,816	$7,816	$7,816	$7,816	$7,816	$1,529	$1,529	$1,529	$1,529	$1,529	$1,644	$1,644	$1,644	$1,644	$1,644	$1,740

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$2,806
Five Year Customer Cost =	$26,721
Five Year Community Cost =	$29,527

Max Saturation, INS = 43%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	INS Toilets	Institutional	0	0	0	0	0	0	0	0	0	1	6	6	6	6	6	8	8	8	8	8	2	2	2	2	2	2	2	2	2	2	2
2	INS Laundry	Institutional	0	0	0	0	0	0	0	0	0	1	6	6	6	6	6	8	8	8	8	8	2	2	2	2	2	2	2	2	2	2	2
3	INS Dishwashers	Institutional	0	0	0	0	0	0	0	0	0	1	6	6	6	6	6	8	8	8	8	8	2	2	2	2	2	2	2	2	2	2	2
4	INS Showers	Institutional	0	0	0	0	0	0	0	0	0	1	6	6	6	6	6	8	8	8	8	8	2	2	2	2	2	2	2	2	2	2	2
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	INS Toilets	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
2	INS Laundry	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	INS Dishwashers	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	INS Showers	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%

Demand Management Least Cost Planning Decision Support System
General Measure Model

NM6 - New Development Indoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$27,268
Present Value of Total Community Benefits:	$44,484
Present Value of Water Utility Costs:	$1,119
Present Value of Total Community Costs:	$11,778
Water Utility Benefit Cost Ratio:	24.36
Total Community Benefit Cost Ratio:	3.78
Average Water Savings (mgd):	0.00
Cost of Savings per Unit Volume ($/mg):	$105.40

MEASURE DATA AND PARAMETERS — *Table Notes ===>*

Description	High Efficiency Toilet	Efficient Clothes Washer	Efficient Dishwasher	High Efficiency Faucets	High Efficiency Showers	Efficient Hot Water System-Faucets	Efficient Hot Water System-Showers	RMF Submeter
Applicable Customer Classes	GOV	GOV	GOV	NA	NA	NA	NA	NA
Applicable End Uses	Toilets[1]	Washers[2]	Dishwashers[3]	Faucets[5]	Showers[5]	Faucets[6]	Showers[6]	Indoor[4]
Market Penetration by End Of Program	75%	75%	75%	75%	75%	75%	75%	75%
Water Use Reductions For Targeted End Uses	20.0%	50.9%	33.0%	15.0%	15.0%	10.65	3.55	15.0%
Program Length, years (2010-2031)	22	22	22	22	22	22	22	22
Measure Life, years[7]	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*	*permanent*
Utility Unit Cost for RSFaccounts, $/unit[8]	$25	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$25
Utility Unit Cost for RMF accounts, $/unit[10]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Utility Unit Cost for non-Res accounts, $/unit[11]	$100	_[9]	_[9]	_[9]	_[9]	_[9]	_[9]	$100
Customer Unit Cost. $/unit[12]	$150	$400	$400	$50	$50	$700		$3,000
Annual Utility Admin & Marketing Cost	5%	5%	5%	5%		5%		5%

1	HET Toilets: CUWCC Product Specifications for HETs Feb 2007 1.6 to 1.28 gallons or 20% savings.
2	Efficient Clothes Washers: 50.9% savings from 2008 Energy Star Calculator for washers is from 32.57 gallons per load to 14.77 gallons per load.
3	Efficient Dishwashers: 33% savings for Dishwashers from 2008 Energy Star Calculator 6 gallons per load to 4 gallons per load.
4	RMF Submetering 15% savings is EBMUD studies and papers. Submetering and Billing Allocation Programs in the Multi-Family Sector: A Survey of Issues and Perceptions REPORT OF RESULTS September 1, 2006.
5a	Showerheads savings based on 2.5 gpm for showers reduced to 2.0 gpm on or 20% maximum savings at 80psi. Showers flow at lower than maximum psi, so savings reduced to 15%.
5b	Non residential faucets are not included because plumbing code already requires 0.5 gpm maximum so not necessary to include in this measure.
5c	No costs listed for High efficiency showers or hot water showers as there is only one charge per account. You would visit the same RSF account, so only one $25 charge.
6	Faucets and Showers: 14.2 gpd savings split between faucet and shower, used 2010 value for end use from baseline sheet for RSF category cells Q114 and Q115, 75% savings to faucets, 25% savings to showers.
7	Assumes owner will not replace efficient equipment/fixtures with inefficient equipment/fixtures (MWM 2005a).
8	Unit cost to the utility for each affected Single Family Residential account (RSF).
9	No additional costs for each fixture replaced; utility unit cost is a one-time cost per visit.
10	Unit cost to the utility for each affected Multi-Family Residential account (RMF). Only one charge per RMF account, see note above.
11	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS). Only one charge per RMF account.
12a	Consumer Reports cost difference in washers is $400 for least expensive regular top loader $300 to a efficient front loader $700. Costs provided by EBMUD Conservation Study August 2008.
12b	$50 faucets and shower costs provided by EBMUD Conservation Study August 2008. Hot Water System is $700 for 2 recirculating systems at $350 each from Metland Hotwater Systems.

Measure Implementation Costs

	NPV	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$1,119	$57	$102	$102	$102	$102	$102	$77	$77	$77	$77	$77	$47	$47	$47	$47	$47	$47	$47	$47	$47	$47	$51
Customer Implementation Costs by Year:	$10,659	$547	$972	$972	$972	$972	$972	$732	$732	$732	$732	$732	$448	$448	$448	$448	$448	$445	$445	$445	$445	$445	$488

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? Yes

Five Year Utility Cost =	$466
Five Year Customer Cost =	$4,436
Five Year Community Cost =	$4,902

Max Saturation, GOV = 10%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	GOV Toilets	Governmental	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
2	GOV Laundry	Governmental	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
3	GOV Dishwashers	Governmental	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
4	GOV Showers	Governmental	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	GOV Toilets	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	GOV Laundry	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	GOV Dishwashers	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	GOV Showers	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Demand Management Least Cost Planning Decision Support System

General Measure Model

NM7 - New Development Outdoor Regulations

Results Summary

Present Value of Water Utility Benefits:	$579,323
Present Value of Total Community Benefits:	$579,323
Present Value of Water Utility Costs:	$61,947
Present Value of Total Community Costs:	$13,041,326
Water Utility Benefit Cost Ratio:	9.35
Total Community Benefit Cost Ratio:	0.04
Average Water Savings (mgd):	0.02
Cost of Savings per Unit Volume ($/mg):	$274.51

MEASURE DATA AND PARAMETERS

Description	Low Water Use Landscaping	High Efficiency Irrigation System w/Smart Controller	
Applicable Customer Classes	--	--	RSF, RMF, COM, IND, INS, MUN, BUS, IRR
Applicable End Uses	Irrigation	Irrigation	
Market Penetration by End Of Program	65%	65%	65% of new accounts comply
Water Use Reductions For Targeted End Uses	10.0%	15.0%	Various Xeriscape publications.
Program Length, years	22	22	Extend until 2031
Measure Life, years	permanent	permanent	Assume owner will not replace efficient irrigation equipment with inefficient equipment (MWM 2005a).
Utility Unit Cost for RSFaccounts, $/unit	$25	$25	Unit cost to the utility for each affected Single Family Residential account (RSF).
Utility Unit Cost for RMF accounts, $/unit	$25	$25	Unit cost to the utility for each affected Multi-Family Residential account (RMF).
Utility Unit Cost for non-Res accounts, $/unit	$25	$25	Unit cost to the utility for each affected Non-Residential account (COM, IND, INS, MUN, BUS).
Customer Unit Cost, $/unit	$5,000	$500	2.50 $/sq.ft times 2000 sq.ft of landscaping. $500 increase cost for smart controller over standard time clock controller; based on 2008 EBMUD Smart Controller Rebate Website www.ebmud.com, assumes BAWSCA pays full cost, no rebate provided.
Annual Utility Admin & Marketing Cost	5%	5%	Additional cost to the utility for adminstration and marketing.

Measure Implementation Costs

	NPV	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Water Utility Implementation Costs by Year:	$61,947										$2,693	$5,643	$5,643	$5,643	$5,643	$5,643	$4,889	$4,889	$4,889	$4,889	$4,889	$2,303	$2,303	$2,303	$2,303	$2,303	$2,314	$2,314	$2,314	$2,314	$2,314	$2,526
Customer Implementation Costs by Year:	$12,979,379										$564,151	$1,182,266	$1,182,266	$1,182,266	$1,182,266	$1,182,266	$1,024,458	$1,024,458	$1,024,458	$1,024,458	$1,024,458	$482,562	$482,562	$482,562	$482,562	$482,562	$484,744	$484,744	$484,744	$484,744	$484,744	$529,164

Measure Life (years): 30 Use Measure Life? No

Calculate Hot Water Savings? No

Five Year Utility Cost =	$25,263
Five Year Customer Cost =	$5,293,217
Five Year Community Cost =	$5,318,480

Max Saturation, RSF =	9%
Max Saturation, RMF =	9%
Max Saturation, BUS =	37%
Max Saturation, IND =	9%

Start Year: 2010

Number of New Participants

Number of New Participating Accounts

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0	0	0	0	0	0	0	0	0	79	141	141	141	141	141	106	106	106	106	106	65	65	65	65	65	64	64	64	64	64	71
2	RMF Irrigation	Multifamily	0	0	0	0	0	0	0	0	0	12	21	21	21	21	21	16	16	16	16	16	10	10	10	10	10	10	10	10	10	10	11
3	COM Irrigation	Commercial	0	0	0	0	0	0	0	0	0	9	46	46	46	46	46	56	56	56	56	56	11	11	11	11	11	12	12	12	12	12	13
4	IND Irrigation	Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	INS Irrigation	Institutional	0	0	0	0	0	0	0	0	0	1	6	6	6	6	6	7	7	7	7	7	1	1	1	1	1	1	1	1	1	1	2
6	GOV Irrigation	Governmental	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
7	IRR Outdoor	Irrigation	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
8	New COM Irrigation	New Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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Total Water Production Savings

Water Savings by Year (mgd)

Number	End Use Identifier	Consumer Category	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1	RSF Irrigation	Single Family	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
2	RMF Irrigation	Multifamily	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
3	COM Irrigation	Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
4	IND Irrigation	Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	INS Irrigation	Institutional	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
6	GOV Irrigation	Governmental	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	IRR Outdoor	Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	New COM Irrigation	New Commercial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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Total Water Savings (mgd):			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
% Savings of Total Baseline Production:			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%