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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ABAG	Association of Bay Area Government
ACWD	Alameda County Water District
AF	acre-foot/acre-feet
AMS	Automatic Metering System
AWWARF	American Water Works Association Research Foundation
BAWSCA	Bay Area Water Supply and Conservation Agency
BAWUA	Bay Area Water Users Association
BC	Brown and Caldwell
BERC	Business Enivonrmental Resource Center
BIA	Building Industry Association
BMP	best management practice
C&S Study	Cost & Savings Study
CBDA	California Bay-Delta Authority
CCWD	Contra Costa Water District
CII	commercial, industrial, institutional
CSD	County Sanitation District
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DSS model	Demand Side Management Least Cost Planning Decision Support System
DWR	California Department of Water Resources
EBMUD	East Bay Municipal Utility District
EPA	Environmental Protection Agency
ET	evapotranspiration
ETo	reference evapotranspiration
FTE	full-time equivalent
FY	Fiscal Year
GIS	global information system
GPCD	Gallons Per Capita per Day
GPF	gallon per flush
GPM	gallon per minute
HET	high-efficiency toilet
HEU	high-efficiency urinal
HEW	high-efficiency washer
HOA	Home Owners Association
IRWMP	Integrated Regional Water Management Plan
ITAP	Irrigation Technical Assistance Program (Santa Clara Valley Water District)
IWRMP	Integrated Water Resources Management Planning
LAFCO	Local Agency Formation Commission
LEED	U.S. Green Building Council Leadership and Excellence in Environmental Design
MG	million gallons
MGD	million gallons per day
MMWD	Marin Municipal Water District
MOU	Memorandum of Understanding Regarding Urban Water Conservation
MWM	Maddaus Water Management
ND	new development
NGO	non-profit governmental organization
O&M	operations and maintenance
PEIR	Program Environmental Impact Report
PG&E	Pacific Gas and Electric
PSA	Public Service Announcement
RFQ	request for qualifications
RMF	residential multi-family
RSF	residential single family
RWA	Regional Water Authority
RWCQP	Regional Water Quality Control Plant
RWSO4	Regional Water Supply Option Number 4
SCVWD	Santa Clara Valley Water District
SCWA	Sonoma County Water Agency
SDCWA	San Diego County Water Authority
SFPUC	San Francisco Public Utilities Commission
SWP	Saving Water Partnership
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
Tech Memo	Technical Memorandum
UCCE	University of California Cooperative Extension
ULF	ultra low flow
UNAR	Uniform North American Requirements
USBR	US Bureau of Reclamation
UWMP	Urban Water Management Plan
WCIP	Water Conservation and Recycling Implementation Plan
WSIP	Water System Improvement Program

EXECUTIVE SUMMARY

In September 2008, the Bay Area Water Supply and Conservation Agency (BAWSCA) initiated work on the development of the Water Conservation Implementation Plan (WCIP or Plan). The goal of the WCIP, as defined at that time, was to:

> ***Develop an implementation plan for BAWSCA and its member agencies to attain the water efficiency goals that the agencies committed to achieving in 2004 as part of the Program Environmental Impact Report for the Water System Improvement Program.***

On October 31, 2008 the San Francisco Public Utilities Commission (SFPUC) made the decision to limit the volume of water that the member agencies could purchase from San Francisco Regional Water System to 184 million gallons per day (MGD) until at least 2018. As a result of this decision by the SFPUC, it has been estimated that the BAWSCA member agencies must save up to an additional 10 MGD by 2018 in order to continue to meet customer needs. Therefore, in response to this SFPUC "Interim Supply Limitation" of 184 MGD, the goal of the WCIP was expanded to:

> ***Identify 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 184 MGD Interim Supply Limitation.***

Pursuant to the above goals, the specific objectives of the WCIP are as follows:

1. Assist BAWSCA member agencies in evaluating the potential water savings and cost-effectiveness associated with implementing additional water conservation measures, beyond what they had committed to in 2004;
2. Determine the potential water savings in 2018 and 2030 associated with implementing a selected suite of new conservation measures, in addition to the 2004 water conservation commitments;
3. Determine BAWSCA's role in assisting the member agencies in achieving their individual water conservation goals; and
4. Develop a coordinated, regional plan for implementing water conservation which serves as a guideline for the BAWSCA member agencies to implement specific, new water conservation measures to meet both the water conservation savings they committed to in 2004, as well as up to an additional 10 MGD of savings. Under the assumption that a specific suite of water conservation measures are implemented, the WCIP provides information as to who (i.e., BAWSCA, the member agencies, or Santa Clara Valley Water District (SCVWD), etc.) should implement what conservation measure or program, and when they should implement each measure or program in order to achieve the specified water savings goals.

Background

In preparation for the SFPUC Water System Improvement Program (WSIP) Program Environmental Impact Report (PEIR), the SFPUC, in conjunction with BAWSCA and its member agencies, completed three planning studies to estimate the future water demand and conservation potential for each of the BAWSCA member agencies:

- *Wholesale Customer Water Demand Projections Technical Report* (URS, November 2004);
- *Wholesale Customer Water Conservation Potential Technical Report* (URS, December 2004); and
- *Wholesale Customer Recycled Water Potential Technical Memorandum* (RMC, December 2004).

Based on the 2004 SFPUC Technical Reports, the BAWSCA member agency demand was projected to be 209 MGD from the SFPUC system in 2030, after accounting for the following:

- 25 MGD of conservation savings that would naturally occur within the BAWSCA service area as a result of implementation of existing plumbing codes; and
- 23 MGD of conservation savings and recycled water use that the BAWSCA member agencies committed to including:
  - 10.43 MGD of recycled water, which includes both existing and planned projects.
  - 12.77 MGD of water conservation that is in various stages of planning and implementation.

In October 2007, BAWSCA committed to saving an additional 10 MGD of water purchased from the SFPUC by 2030 as part of its comments on the SFPUC Draft PEIR for its WSIP. As such, the BAWSCA member agencies' demand for SFPUC water is projected to be 199 MGD in 2030. [1]

In October 2008, as part of its adoption of the WSIP PEIR, the SFPUC unilaterally selected a water supply option (i.e., the WSIP Variant) that established an Interim Supply Limitation of 184 MGD for the BAWSCA member agencies until at least 2018. This change in the WSIP accelerates the timeframe by which the BAWSCA member agencies are required to achieve the additional 10 MGD of conservation savings (i.e., those savings now had to be achieved by 2018 rather than 2030 in order to keep BAWSCA member agency purchases from SFPUC below 184 MGD). BAWSCA, in coordination with its member agencies, prepared this *Water Conservation Implementation Plan* in 2009 to identify additional water conservation measures that the member agencies could potentially implement to achieve the water savings necessary to keep their collective purchases from the SFPUC below 184 MGD until 2018.

WCIP Development Process

The WCIP was developed jointly with BAWSCA, its member agencies, and the SCVWD. Additional input was provided by the Pacific Institute. Collectively these parties are referred to herein as the "Working Group". A series of meeting and workshops were held with the Working Group to solicit input on the WCIP development process. In addition, a series of technical memoranda were produced to inform the development of the WCIP. These technical memoranda were reviewed by the Working Group and their comments are incorporated into the WCIP and this report.

As part of the WCIP development, population and employment projections for the BAWSCA member agencies were updated using primarily Association of Bay Area Governments (ABAG) 2007 data. Total water demand projections, before and after plumbing code savings, were also updated utilizing the new ABAG 2007 population and employment projections.

The Demand Side Management Least Cost Planning Decision Support System (DSS model), was used to estimate the future conservation potential for each of the BAWSCA member agencies. The conservation savings associated with the water conservation commitments made by the BAWSCA member agencies in 2004 were updated with actual implementation activity since 2004, to the extent that that information was

[1] BAWSCA Annual Survey FY 2006-2007.

available. As described in more detail below and in Section 3, the result of the modeling effort and the Working Group discussions was the selection of five new water conservation measures that the BAWSCA member agencies agreed to evaluate for implementation and the associated water savings potential, in addition to the water conservation commitments they made in 2004. A subset of the member agencies elected to begin implementation of selected water conservation measures as part of a BAWSCA regional program, at least at some level. The WCIP presents the framework for how BAWSCA will work together with its member agencies to implement a regional water conservation program for the next three years, and provides a detailed implementation plan including budget for Year 1 (fiscal year [FY] 2010).

WCIP Regional Results

Population and Employment Projections. As part of the WCIP, population and employment projections for the BAWSCA agencies were updated using primarily ABAG 2007 data. Total water demand estimates, before and after plumbing code savings, were also updated utilizing the new population and employment projections. Based in the analyses conducted as part of this effort, population and employment are projected to grow by less than one percent per year between 2001 and 2030. Likewise, over the same period, water demands are projected to increase by 0.7 percent per year after accounting for the effects of the existing plumbing code. These results are shown in Tables ES-1 and ES-2.

New Water Conservation Measures Selected for Evaluation. Based on input from the Working Group, the following five new conservation measures were evaluated to assess if, through aggressive implementation of these measures, the BAWSCA member agencies could save up to 10 MGD by 2018, in addition to the water conservation measures and savings that they had committed to in 2004. The five new measures include:

- NM-1: High-efficiency Toilet (HET) Rebate Program
- NM-2: Education/ Training Program for Residential Landscape Water Use Efficiency
- NM-5: High-efficiency Washing Machine (HEW) Rebates
- NM-6: New Building Indoor Water Efficiency Regulations
- NM-7: New Building Landscape Water Efficiency Regulations

Each of these new conservation measures were incorporated into the individual BAWSCA member agency DSS models with the corresponding regional cost and savings results for 2018 and 2030 as shown in Table ES-3 and ES-4.

In order to achieve the water conservation targets identified herein, and the associated water savings, BAWSCA and its member agencies will likely have to increase their water conservation budgets, information campaigns, and other mechanisms to increase program visibility and participation. In addition, to achieve the necessary penetration rates associated with the selected conservation measures, it may be necessary for BAWSCA and its member agencies to consider program changes to increase customer response. For example, with the HET program, BAWSCA and its member agencies may want to consider augmenting the rebate program with a give-away program, or other, more aggressive HET replacement programs.

BAWSCA's Water Conservation Implementation and Financing Plan

Discussions with the Working Group resulted in the development of a plan to guide implement the conservation measures within the BAWSCA agency service areas. The plan was developed in accordance with the following key principles:

- BAWSCA regional conservation programs are paid for by those agencies that benefit from their implementation;

- BAWSCA regional conservation programs reduce the administration costs for the participating agency compared to the agency implementing the program on its own; and
- BAWSCA regional conservation programs are designed to complement, rather than compete with, existing agency programs.

Based on member agency input, a Water Conservation Implementation and Financing Plan was developed that is based on a two tier program that offers *Core Programs* and *Subscription Programs*. In addition to an overall plan, the Working Group also identified the specific actions that BAWSCA would take during FY2009-2010 to support the implementation of the water conservation measures pursuant to both the Core and Subscription Programs (i.e., the Year 1 Plan).

- **The Core Program** is funded through the annual BAWSCA budget and contains those conservation measures that benefit from regional implementation and that provide regional benefit, irrespective of individual agency jurisdictions. The BAWSCA Year 1 Plan Core Program includes:
  - Regional Program Management and Coordination with Wholesale Agencies
  - Developing Regional Partnerships
  - Pursuing Grants or Other Financial Support
  - Providing Technical Support and Training
  - Developing Template New Building Indoor and Outdoor Water Efficiency Regulations (New)
  - Best Management Plan (BMP) and Urban Water Management Plan (UWMP) Reporting Support
  - Legislative Policy Support
  - Design and Implementation of a Regional Public Information Program (New)
  - Education/Training Program for Residential Landscape Water Use Efficiency (Expanded)
- **The Subscription Program** is fully funded by the individual agency that elects to participate in the program based on their participation level and includes conservation measures whose benefits can be realized in individual water agency service areas. The BAWSCA Year 1 Plan Subscription Program includes:
  - School Education Program (Expanded)
  - Bulk Purchase Residential Retrofit Kits (New)
  - HET Rebates (Expanded)
  - High-efficiency Clothes Washer Rebates (Expanded)
  - Residential Weather Based Controller Rebates (New -Design Phase Only)
  - Bulk Purchase of Pre-Rinse Spray Valves (New)
  - Commercial Surveys (New - Design Phase Only)
  - Large Landscape Water Budgets (Existing)

Conclusions and Next Steps

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), as shown in Table ES-3 and ES-4. While the projected water savings are less than the 10 MGD by 2018 goal, based on the revised water demand projections, BAWSCA believes that the identified water conservation savings and other actions will still be sufficient to keep the collective purchases from the SFPUC below 184 MGD by 2018.

At this time, no formal commitment has been made at the individual agency level to implement the new water conservation measures that were evaluated as part of the WCIP, or for achieving additional conservation savings beyond the 2004 savings commitments. However, several member agencies have elected to participate in the BAWSCA regional programs at some level and BAWSCA intends 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 by 2018.

BAWSCA recognizes that actual implementation of water conservation to achieve the identified water savings goal must be managed in an adaptive fashion, making both small and large program changes as needed over time, to ensure that the water savings goals are met. BAWSCA further recognizes that the member agencies may be able to achieve the identified 8.4 MGD (and up to 10 MGD) of water savings by alternate mechanisms than those identified herein. For example, agencies may select to implement various water conservation measures individually, through the BAWSCA regional program, or through other regional efforts (e.g., the SCVWD program) or other sub-groups. Additional clarification regarding individual agencies' commitments to a specific conservation plan and associated conservation savings are anticipated to occur when individual agencies complete their respective UWMPs, which are due to the California Department of Water Resources (DWR) by December 2010.

A critical component of successful implementation of the WCIP and any other conservation programs initiated by the BAWSCA's member agencies will be the monitoring and tracking component such that actual implementation (and the associated water savings) can be measured against the targets. An effective tracking tool better also enables adaptive management both at the local and regional level. BAWSCA will develop such a tracking tool as part of the Year 1 Plan.

THIS PAGE INTENTIONALLY LEFT BLANK

Table ES-1. Comparison of Population and Employment between 2004 and 2008 Studies		
	2030 DSS Population	2030 DSS Employment
2004 Study	1,933,829	1,488,566
2008 Study	2,054,820	1,559,154
Difference between 2004 and 2008 Population and Employment Estimates for 2030	120,991	70,588
Percent Difference between 2004 and 2008 Population and Employment Estimates for 2030	6%	5%

Table ES-2. Total BAWSCA Demand Projections										
Dataset	Base Year (MGD)	Total BAWSCA Demand Projections (MGD)							Demand Increase from 2001 to 2030	
	2001	2005	2010	2015	2020	2025	2030	2035	MGD	Percent
2004 DSS Model Demand Projections Absent Conservation, (without Plumbing Codes)	272	285	300	313	326	337	349	NA	77	28
2004 DSS Model Demand Projections Absent Conservation, (with Plumbing Codes)	272	282	292	299	308	315	324	NA	52	19
2008 DSS Model Demand Projections Absent Conservation, (without Plumbing Codes)	272	271	286	302	322	339	356	373	84	31
2008 DSS Model Demand Projections Absent Conservation, (with Plumbing Codes)	272	268	278	289	302	314	326	341	54	20

Table ES-3. Program-Specific Conservation Evaluation Results for BAWSCA Member Agencies through 2018										
Conservation Program	2018 Water Savings due to Conservation Programs (MGD)[3]	2018 Outdoor Water Savings due to Conservation Programs (MGD)[3]	Present Value of Water Utility Costs ($1,000) through 2018[2]	Water Utility Benefit-Cost Ratio through 2018[2]	Water Utility Cost of Water Saved through 2018 ($/AF)[2]	Present Value of Community Costs ($1,000) through 2018[2]	Community Benefit-Cost Ratio through 2018[2]	Community Cost of Water Saved through 2018 ($/AF)[2]	Total Potential Water Savings in 2018 (MGD)[3]	Incremental Increase in Savings (MGD)[3]
Plumbing Code[1]	NA	NA	NA	NA	NA	NA	NA	NA	16.5	NA
Baseline Conservation (2004 measures)	9.4	4.9	$44,148	2.3	$397	$72,519	1.9	$652	25.9	9.4
Updated Conservation (2004 and 2008 measures)	17.8	6.5	$88,394	1.7	$550	$280,609	0.8	$1,747	34.4	8.4

[1]Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).

[2]Benefits and costs in 2001 dollars

[3] Water savings based on measures were believed to be appropriate for the area in 2009. Water savings estimated were based on best available information at the time of the study. Actual water savings may be higher or lower than stated in this report for a variety of reasons.

Table ES-4. Program-Specific Conservation Evaluation Results for BAWSCA Member Agencies through 2030										
Conservation Program	2030 Water Savings due to Conservation Programs (MGD)[3]	2030 Outdoor Water Savings due to Conservation Programs (MGD)[3]	Present Value of Water Utility Costs ($1,000) through 2030[2]	Water Utility Benefit-Cost Ratio through 2030[2]	Water Utility Cost of Water Saved through 2030 ($/AF)[2]	Present Value of Community Costs ($1,000) through 2030[2]	Community Benefit-Cost Ratio through 2030[2]	Community Cost of Water Saved through 2030 ($/AF)[2]	Total Potential Water Savings in 2030 (MGD)[3]	Incremental Increase in Savings (MGD)[3]
Plumbing Code[1]	NA	NA	NA	NA	NA	NA	NA	NA	29.4	NA
Baseline Conservation (2004 measures)	10.5	6.3	$55,803	3.4	$227	$90,320	2.8	$367	39.9	10.5
Updated Conservation (2004 and 2008 measures)	23.0	9.9	$103,528	3.3	$235	$426,081	1.2	$968	52.4	12.5

[1]Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).

[2]Benefits and costs in 2001 dollars[3] Water savings based on measures were believed to be appropriate for the area in 2009. Water savings estimated were based on best available information at the time of the study. Actual water savings may be higher or lower than stated in this report for a variety of reasons.

THIS PAGE INTENTIONALLY LEFT BLANK

1. INTRODUCTION

This BAWSCA WCIP Final Report summarizes the WCIP development process and the five new water conservation measures that were evaluated for implementation and the associated water savings potential. This report also outlines BAWSCA's plan to implement specific water conservation programs during the upcoming fiscal year of July 1, 2009 through June 30, 2010 (i.e., the Year 1 Plan).

1.1 Collaboration between BAWSCA, Member Agencies and Public Partners

The WCIP was developed as a collaborative process between the Project Team (Maddaus Water Management [MWM] and Brown and Caldwell [BC]), BAWSCA staff, the BAWSCA member agencies, and "public partners". BAWSCA member agencies provided input to the WCIP through two different groups: (1) the "Project Working Group", which was comprised of a representative from each BAWSCA member agency and the SCVWD, and (2) the "Technical Advisory Committee", which is comprised of a designated representative from each BAWSCA member agency and serves as an advisor to the BAWSCA Chief Executive Officer. As a "Public Partner", the Pacific Institute was also involved in the development of the WCIP and reviewed draft technical memorandums and provided comments and suggestions on these documents.

During development of the WCIP, input was solicited from the above groups in multiple forums, including participation in meetings and facilitated workshops, the submission of technical information for use in individual agency DSS model updates and the Regional Conservation Program Shared Vision Model, and review and comment on draft work products. More details on the involvement of all parties that helped design the content and budget for the WCIP and the Year 1 Plan are provided in Section 10.

1.2 Relationship of WCIP to Historical Planning Efforts

In preparation for the SFPUC WSIP PEIR, the SFPUC, in conjunction with BAWSCA and its member agencies, completed three planning studies in November 2004 to estimate the future water demand and conservation potential for each of the BAWSCA member agencies. These studies are collectively referred to herein as the 2004 SFPUC Technical Reports:

- Wholesale Customer Water Demand Projections Technical Report (URS, November 2004);
- Wholesale Customer Water Conservation Potential Technical Report (URS, December 2004); and
- Wholesale Customer Recycled Water Potential Technical Memorandum (RMC, December 2004).

Two of the 2004 SFPUC Technical Reports relied on an end-use model developed by MWM, the Demand Side Management Least Cost Planning DSS model, to estimate the future water demand and conservation potential for each of the BAWSCA member agencies. As part of this effort, each BAWSCA member agency selected a preferred set of conservation measures and made a commitment of conservation savings and recycled water use that aligned with their 2030 water purchase estimates from the SFPUC.

Based on the 2004 SFPUC Technical Reports, the BAWSCA member agencies, as a collective, agreed to the following:

- 25 MGD of conservation savings that were assumed to naturally occur within the BAWSCA service area as a result of implementation of existing plumbing codes;
- 23 MGD of conservation savings and recycled water use that the BAWSCA member agencies committed to including:
  - 10.43 MGD of recycled water, which includes both existing and planned projects.
  - 12.77 MGD of water conservation that is in various stages of planning and implementation.

In 2006, the SFPUC released another planning study called Regional Water Supply Option Number 4 (RWSO4) that utilized the BAWSCA agency DSS Models. The primary goal of RWSO4 was to identify new conservation, recycling, and renewable groundwater projects that, together with existing supplies, would meet SFPUC system-wide normal year demand of 300 MGD in the year 2030.

Projects included in RWSO4 were designed to complement demand management and other water supply projects that are already being planned and funded by SFPUC and its wholesale customers at the local level. The 2006 RWS04 study identified additional water conservation measures that would be cost-effective to implement beyond the 32 measures included in the 2004 SFPUC Technical Reports. The information developed in 2006 as part of the RWSO4 was incorporated as the starting point for the development of the WCIP.

In October 2007, BAWSCA committed to saving an additional 10 MGD of water purchased from the SFPUC by 2030 as part of its comments on the SFPUC Draft PEIR for its WSIP. As such, the BAWSCA member agencies' demand for SFPUC water was projected to be 199 MGD in 2030.[1]

In October 2008, as part of its adoption of the WSIP PEIR, the SFPUC unilaterally selected a water supply option (i.e., the WSIP Variant) that established an Interim Supply Limitation of 184 MGD for the BAWSCA member agencies until at least 2018.

1.3 WCIP Goals and Objectives

The goal of the WCIP, as defined at the initiation of the effort, was to:

> ***Develop an implementation plan for BAWSCA and its member agencies to attain the water efficiency goals that the agencies committed to achieving in 2004 as part of the Program Environmental Impact Report for the Water System Improvement Program.***

As described above, in October 2008 the SFPUC established the Interim Supply Limitation, which meant that the BAWSCA member agencies now needed to save an additional 10 MGD by 2018 in order to continue to meet customer needs. Therefore, in response to this SFPUC Interim Supply Limitation of 184 MGD, the goal of the WCIP was expanded to:

> ***Evaluate 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 184 MGD Interim Supply Limitation.***

[1] BAWSCA Annual Survey FY 2006-2007

Pursuant to the above goals, the specific objectives of the WCIP are as follows:

1. Assist BAWSCA member agencies in evaluating the potential water savings and cost-effectiveness associated with implementing additional water conservation measures, beyond what they had committed to in 2004;
2. Determine the potential water savings in 2018 and 2030 associated with implementing a selected suite of new conservation measures, in addition to the 2004 water conservation commitments;
3. Determine BAWSCA's role in assisting the member agencies in achieving their individual water conservation goals; and
4. Develop a coordinated, regional plan for implementing water conservation which serves as a guideline for the BAWSCA member agencies to implement specific, new water conservation measures to meet both the water conservation savings they committed to in 2004, as well as up to an additional 10 MGD of savings. Under the assumption that a specific suite of water conservation measures are implemented, the WCIP provides information as to who (i.e., BAWSCA, the member agencies, or SCVWD, etc.) should implement what conservation measure or program, and when they should implement each measure or program in order to achieve the specified water savings goals.

The WCIP was prepared with the goal of identifying a plan for achieving up to 10 MGD savings by 2018. However, unlike the commitments made in 2004, the WCIP did not include an activity in which individual agencies committed to the savings potential that was identified in their service area or which water source would be saved in those areas with multiple water sources. Individual agencies maintain control of their local supplies and water supply portfolios. In addition, agencies may select to implement various water conservation measures individually, through the BAWSCA regional program, or through other regional efforts (e.g., the SCVWD program) or other sub-groups. It is further recognized that other options may exist to achieve the target water savings (i.e., other water conservation measures).

BAWSCA intends 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. The effect of the Interim Supply Limitation will be part of this upcoming discussion, as will inclusion of components of the WCIP or other water conservation savings in individual member agencies' UWMPs.

1.4 WCIP Interim Work Products

Three technical memoranda were produced as interim work products to allow for detailed review of results throughout the WCIP planning process and to facilitate dialogue and consensus on elements to be included in the WCIP. Technical Memorandum (Tech Memo) 1, Tech Memo 2, and Tech Memo 3 were developed by the Project Team. The technical memoranda were then reviewed by BAWSCA staff, Working Group members, and the Pacific Institute. Below is a brief description of contents of each of the three Tech Memos:

- Tech Memo 1
  - Updated population, employment, and water demands
- Tech Memo 2
  - Identification and evaluation of new additional water conservation measures
  - Presentation of possible implementation scenarios for meeting conservation goals
  - Presentation of alternative regional implementation strategies
  - Description of different concepts related to financing water conservation

- Tech Memo 3
  - Summary of the coordination efforts between the Project Team and BAWSCA, its member agencies, and the public partners in the development of the Plan
  - Presentation of the new water conservation measures that were selected for inclusion in the WCIP
  - Description of the BAWSCA Year 1 Plan
  - Summary of additional recommendations that were made as part of the WCIP development process.

1.5 Content of WCIP Final Report

The following sections provide a summary of the content of this WCIP Final Report:

- Section 2 – DSS Model Demand Updates for BAWSCA Member Agencies
- Section 3 – Evaluation of Potential Water Conservation Savings Based on Baseline, and Potential New Water Conservation Measures
- Section 4 – Survey of Other Water Conservation Implement6ation and Financing Strategies
- Section 5 – Process and Methodology Used to Develop Regional Water Conservation Implementation and Financing Plan
- Section 6 – Plan Nexus with California Urban Water Conservation Council's (CUWCC's) Memorandum of Understanding
- Section 7 – BAWSCA Year 1 Plan: Core Program Implementation and Financing
- Section 8 – BAWSCA Year 1 Plan: Subscription Program Implementation and Financing
- Section 9 – Selected BAWSCA Program Measures vs. DSS Model Results
- Section 10 – Coordination with Agencies and Public Partners
- Section 11 – Additional Recommendations and Ideas for Future Planning and Implementation Efforts
- Section 12 – Limitations

2. DSS MODEL DEMAND UPDATES FOR BAWSCA MEMBER AGENCIES

2.1 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 further analyzed to approximate the split of indoor and outdoor water usage in each customer-billing category. The indoor/outdoor water usage is further divided into typical end uses for each customer-billing category. 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. Figure 2-1 presents the two steps, differentiated by the dashed line, as a detailed schematic of the key inputs and outputs. Above the dashed line, the figure illustrates the process for establishing the base-year conditions and calibrating the model to a particular water agency service area for the selected base year. Below the dashed line, the figure illustrates the process for forecasting future demands, including the impacts of fixture replacement due to plumbing codes and standards already in place.

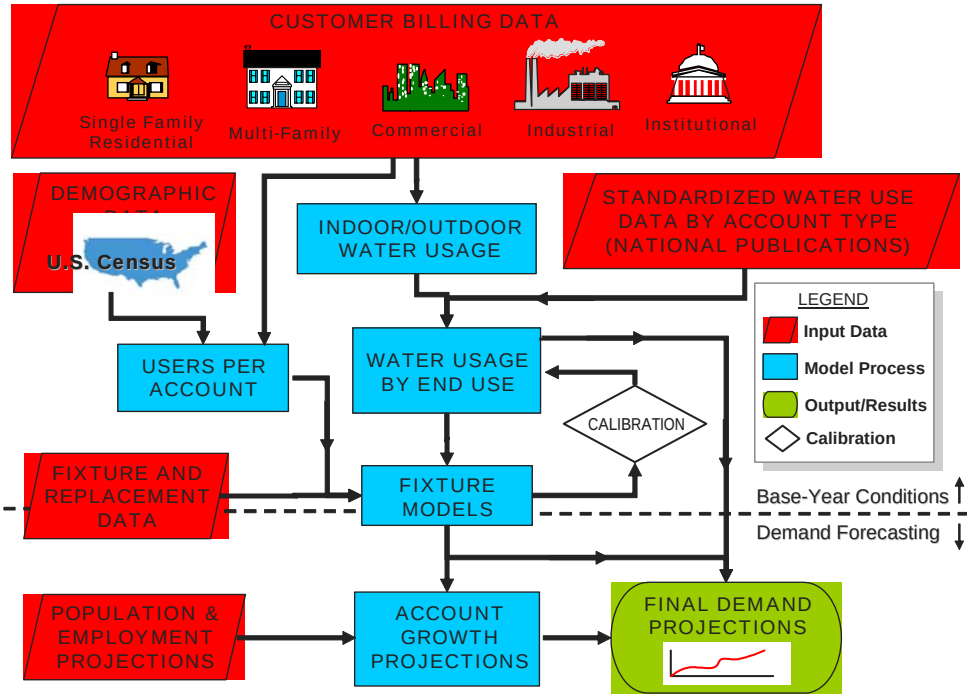

Figure 2-1. Schematic of DSS Model As Applied to an Urban Water Agency or Regional Area for Demand Forecasting

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). Figure 2-2 shows the structure of the model.

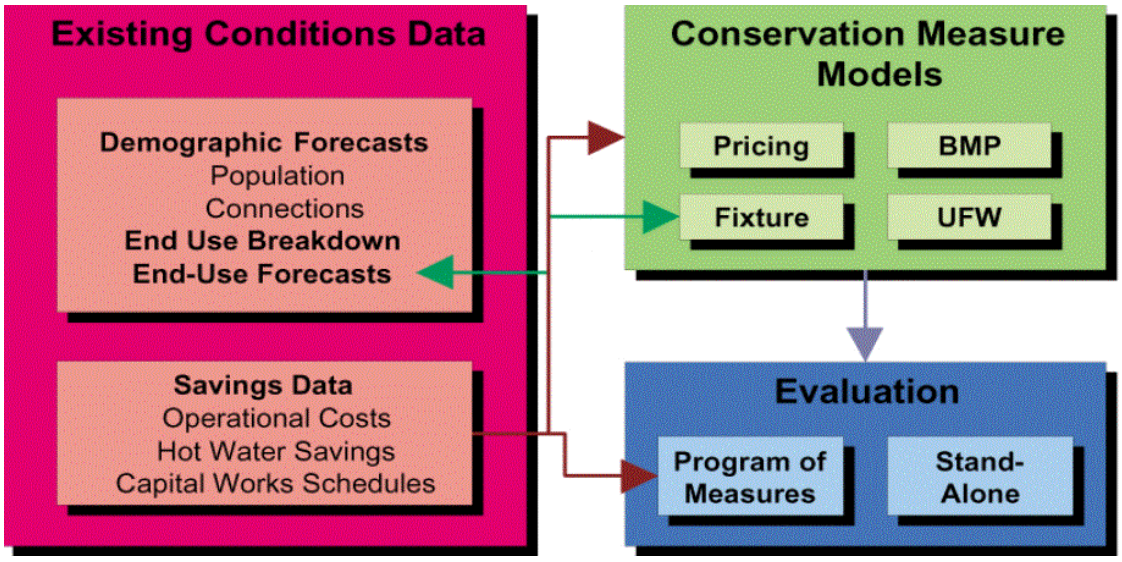

Figure 2-2. Structure of the DSS Model

Benefits are based on savings in water facility operations and maintenance (O&M) and savings from deferring or downsizing future capital facilities, such as water treatment plant expansions or new source development. Facility design criteria, such as peak or average day 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 put together 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.

2.2 Demand Projection Revisions

For this effort, each individual BAWSCA agency DSS model was updated to include:

- Updated population and employment projections to 2035; use of latest Association of Bay Area Governments projections (ABAG 2007) was preferred but use of other methods (e.g. updated and adopted General Plan that supersedes latest ABAG data) was allowable.
- Forecasted new demand projections to 2035 – including before and after plumbing code savings. The Project Team used the following approach:
  - Maintained the base year as 2001.
  - Added the California state requirements regarding use of HETs and high-efficiency urinals (HEUs) into the DSS model's representation of the plumbing code.
  - Compared demand and savings projections in the *Wholesale Customer Water Conservation Potential Technical Report* (URS, 2004) to the demands and savings projected as a result of assumed full, regional implementation of the five new measures selected as part of the WCIP development process.

2.3 Input Data and Updates to DSS Models

The inputs to the DSS Model that were used for *Wholesale Customer Water Conservation Potential Technical Report* (URS, 2004) are discussed within this section, along with updates to the model inputs to used for the WCIP.

2.3.1 Model Input Data Used in the 2004 SFPUC Technical Reports

The two main categories of DSS model input data discussed within this section include: (a) current water use data, and (b) demographic data. For the 2004 SFPUC Technical Reports, the DSS model was calibrated to a base year of 2001. The base year of 2001 was used because 2001 shows less of an effect of the 2001-2002 recession[1] and because 2001 was a relatively "normal" climate year (i.e. not a drought year or an excessively wet year).

In the 2004 SFPUC Technical Reports, several different sources of data provided the basis for populations, household sizes, employment, and future growth rates of population and employment. The primary data sources used during the 2004 study and their respective purposes included:

- 2000 Census data – Provided population and household sizes for each individual city (and/or unincorporated area) serviced by the BAWSCA member agencies.

[1] The year 2002 shows a dip in water demand in many areas due to reduction in economic activity.

- Bay Area Water Users Association (BAWUA) Annual Surveys – Provided population data for both FY 2000-2001 and FY 2001-2002.
- Department of Finance 2001 estimate – Served as official estimates between censuses to establish the growth from 2000 to the base year of 2001; developed by the State of California Department of Finance.
- ABAG 2002 Projections –Subregional population and employment figures for sub-regions (i.e., including unincorporated areas) and jurisdictions.
- City Planning – Provided by input from City Planning staff for Brisbane, Guadalupe Valley Municipal Improvement District and East Palo Alto.
- Change in types of businesses and industry - The billing data provided by agencies readily allow for changes in the types of businesses and industries in a region, or the resulting impacts on water demand associated with those changes. In order to accommodate those types of changes more detailed information on business types and proposed changes would need to be collected and provided by the individual agencies in adopted planning documents and then tied back to the billing systems. A few individual agencies had data on businesses, but the majority did not have the information at the time of the creation of the DSS Models and therefore was not included.

2.3.2 Model Input Data Updated for WCIP

The Project Team updated the member agencies' DSS models to reflect more recent population and employment data. The base year of 2001 remained unchanged to maintain the model calibration achieved to support the conclusions of the 2004 SFPUC Technical Reports.

To incorporate updated growth rates and retain model calibrations, the Project Team applied growth rates from more recent population projections to the base year of 2001. Thus, the DSS model starting population and employment were held constant between the 2004 SFPUC Technical Reports and the WCIP, with only a few exceptions[2]. Growth rates were extracted from recent population projection data and applied to years beyond the base year (2001) through the year 2035.

The Project Team used three main sources of updated population and employment projections for the current study to extract growth rates, including:

- ABAG (2007) – In December 2006, ABAG released updated population and employment projections through the year 2035 that includes population and employment estimates for Bay Area counties and cities. The ABAG (2007) population and employment projections provide an estimated value for each five year increment (i.e., 2010, 2015, and 2020). Sub-regional data were mostly used; however, two additional types of ABAG data were used for two agencies, as follows:
  - ABAG (2007) by Zip Code
  - ABAG (2007) by Census Tract

[2] The Project Team's approach was to not change base year data used in the 2004 study for BAWSCA member agencies. However, several exceptions were required, including base year population revisions for Coastside (base year population), Stanford (base year population), and San Jose (base year employment). A base year discrepancy occurred for Coastside due to a change in the projection source. Because ABAG data are not available for Stanford and the Stanford model is not based on a single growth rate, the base year estimated population was revised to the 2001 actual daily average campus population. Base year employment data for North San Jose changed significantly, based on using tract-specific ABAG data.

- Urban Water Management Plans – By California law, agencies serving more than 3,000 accounts must provide a UWMP to DWR. Among other things, UWMPs contain population data and are subject to the process of approval by agencies' boards or councils. In most cases, the most recent UWMP updates occurred in 2005. Three BAWSCA agencies selected to use population projections from their UWMPs.
- General Plan – Two BAWSCA agencies anticipate relatively large population increases due to development/redevelopment within their service areas. Because ABAG (2007) projections do not consider inclusion of the planned development/redevelopment populations that occurred after the year 2006, the updated general plans were referenced.
- BAWSCA Annual Surveys– BAWSCA conducts an annual survey that includes both historical population data for ten years prior to the current year, and a forecasted population for each decade to the year 2030.

Tables 2-1 and 2-2 include the population and employment projection sources, respectively, from the 2004 SFPUC Technical Reports and the WCIP. Also included in Tables 2-1 and 2-2 are population and employment estimates that are a product of the DSS model, respectively, from the base year of 2001 through 2035 in five-year increments based on updated growth rates. These data are included in each respective agency's DSS model as part of the demand updates. Based on the WCIP analysis, the BAWSCA member agencies' 2030 population projections have increased by 6 percent relative to the projections in the 2004 SFPUC Technical Reports and the 2030 employment projections have increased by 5 percent (Table 2-3).

2.3.3 Changes to Plumbing Code

The Project Team updated the DSS model to include fixtures recently added to the California Plumbing Code. The HETs and HEUs models were incorporated into the DSS model to reflect the update to the California plumbing code that will phase in starting in the year 2010, taking full effect in the year 2014.

2.4 Key Assumptions for the Model

Table 2-4 shows some of the key assumptions used in the DSS model during the development of the 2004 SFPUC Technical Reports and for the WCIP. The assumptions that have the most dramatic impact on the estimates of water savings projected by the DSS model are (1) the assumed rate of natural replacement of water using fixtures, (2) the projections of residential or commercial future use, and (3) the percent of water loss, or "Unaccounted for Water", that is assumed. Many of the assumptions used for the WCIP are unchanged from the assumptions used in the 2004 SFPUC Technical Reports, primarily because new or better data is not available. Any changes that were made to assumptions as part of the WCIP are noted in Table 2-4.

2.5 Updated Water Demand Projections

The updated water demand projections, with and without consideration of the plumbing code, are compared to the water demand projections from the 2004 SFPUC Technical Reports in Table 2-5 and Figure 2-3. Updates in the plumbing code (i.e., new California State legislation for HETs and HEUs that was passed in October 2007) are incorporated into the WCIP "with plumbing code" demand projection. The water demands within Table 2-5 and Figure 2-3 are inclusive of all BAWSCA member agencies' demands.

Based on the WCIP analysis, and comparing to the results of the 2004 SFPUC Technical Reports, the BAWSCA member agencies' projected water demands in 2030 have increased by 7 MGD (3 percent) without considering the plumbing code, and by 2 MGD (1 percent) when considering the plumbing code. The change in the plumbing code results in an overall 1.5 percent demand savings for the BAWSCA member agencies. It

is important to note that the population and employment projections were based on growth rates rather than the exact ABAG, UWMP, or City Planning projection numbers. The resulting population and employment projection numbers used in the DSS model and published in this report in Table 2-1 and Table 2-2 were reviewed and approved by each individual agency as part of the WCIP development process.

Updates in the plumbing code that occurred after the 2004 study were incorporated into the current "with plumbing code" demand projection. Figure 2-3 includes demands with and without the plumbing code. The difference in demand of 7.8 percent in 2030 (with and without plumbing code) from the 2004 study and 9.3 percent in 2035 (with and without plumbing codes) from the WCIP study is attributed to updates in the plumbing code.

For the purposes of the WCIP, the water demand projection used going forward will be the 2008 DSS Model Demand Projections Absent Conservation (with Plumbing Codes), or the last line of Table 2-5.

2.6 Possible Uses of WCIP and DSS Model Data for 2010 UWMPs

The WCIP and the DSS model that was developed for each agency have multiple pieces of information that can be helpful to BAWSCA agencies in preparation of their 2010 UWMPs. The DWR guidelines for the 2010 UWMP have not yet been published, therefore exact table references are not provided. The most commonly used data from the models are the following:

- Population forecasts – Table 2-1 of the WCIP includes summary population data for every 5 years (2010, 2015, 2020, etc.) as typically required by UWMP guidelines. The DSS model developed for each agency has population projections for individual years.
- Employment forecasts –Table 2-2 of the WCIP includes summary employment projections for every 5 years. The DSS model developed for each agency has employment projections for individual years.
- Water demand forecasts – Data for individual agency water demand forecasts are included the DSS models on an annual basis.
- Data for individual conservation measures (i.e., annual savings, costs, and cost-effectiveness) for each agency are included in their DSS model.
- The individual conservation measure annual targets for each customer class (For example, number of Single Family, Multi Family and Commercial accounts that were modeled for measure NM-1 etc.) are included in each agency's DSS model..
- Data for each agency's conservation program (i.e., annual savings, costs, and cost-effectiveness for groups of individual measures) are included in each agency's DSS model.

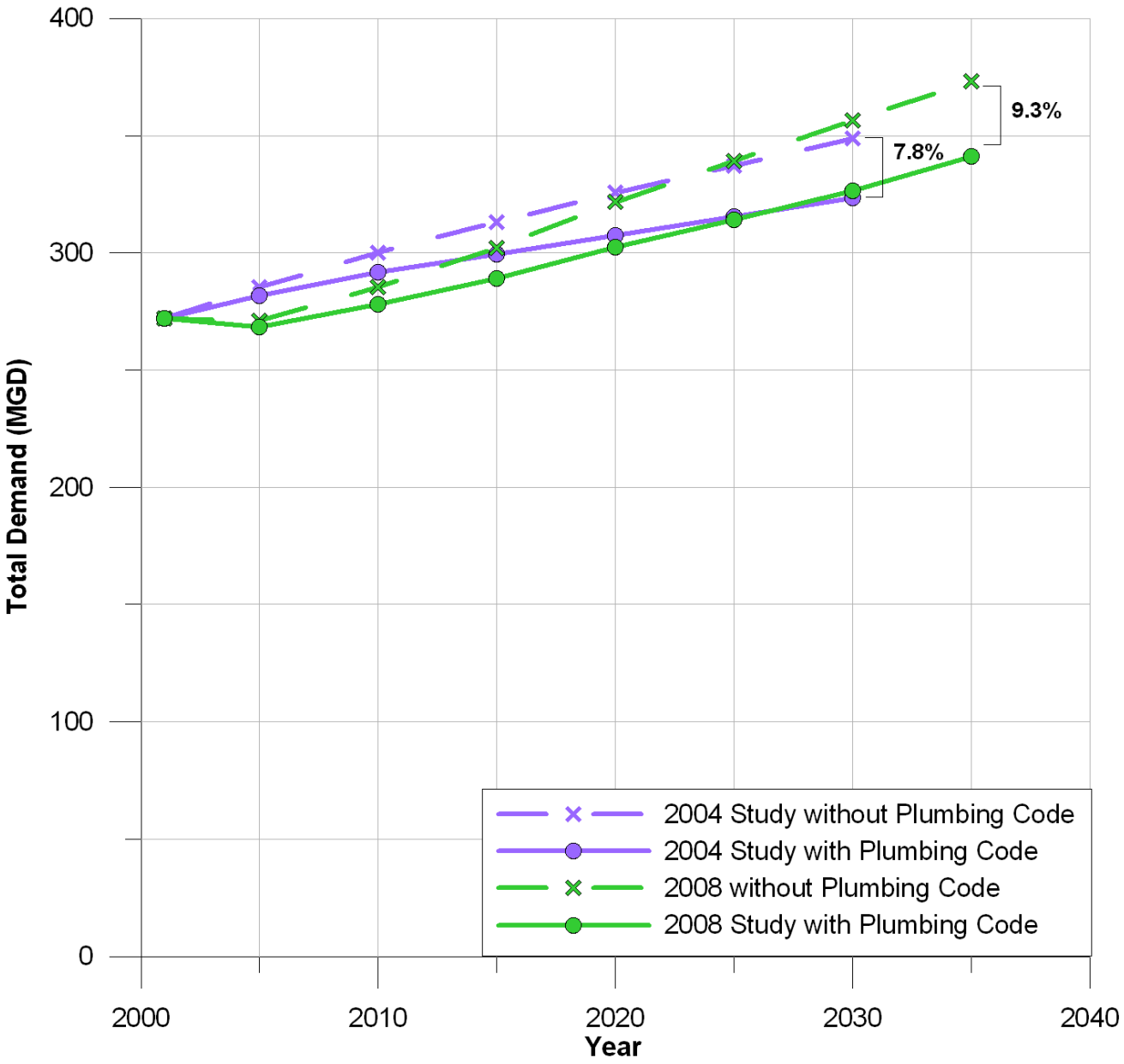

Figure 2-3. Demand Projections for BAWSCA Service Area

Table 2-1. Population Estimates (2001-2035) and Data Sources									
Service Area	2004 Study Projection Source	2008 Study Projection Source	Population Estimates for DSS Model						
			2001	2005	2010	2015	2020	2025	2030	2035
Alameda County Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	316,523	325,742	338,429	350,888	364,856	379,562	395,576	412,640
Brisbane, City of	City Planning	Draft General Plan[a]	3,174	3,247	3,619	3,849	4,080	4,310	4,540	4,770
Burlingame, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	30,154	30,279	30,793	31,508	32,022	32,525	32,933	33,441
CWS - Bear Gulch District	BAWUA Survey	ABAG Sub. Reg. 2007	66,937	68,112	69,416	70,749	72,078	73,408	73,876	75,157
CWS-Mid Peninsula District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	120,856	123,145	126,684	134,143	140,934	146,005	148,307	149,842
CWS - South San Francisco District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	49,207	50,420	52,120	54,891	57,174	59,311	61,480	63,596
Coastside County Water District	ABAG Sub. Reg. 2002	ABAG By Zip Code 2007	18,319	19,099	19,775	20,369	20,933	21,434	21,873	22,236
Daly City, City of	ABAG Sub. Reg. 2002	Amended ABAG[b]	106,117	107,145	110,599	116,741	121,365	124,194	127,003	130,086
East Palo Alto, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	24,395	26,145	27,931	30,042	31,423	33,453	35,726	38,405
Estero MID/Foster City	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	34,568	35,577	36,116	37,088	37,924	38,492	38,869	39,223
Guadalupe Valley MID	City Planning	Draft General Plan[a]	446	456	627	721	815	909	1,004	1,098
Hayward, City of	ABAG Sub. Reg. 2002	Amended ABAG[c]	140,439	145,405	151,079	156,059	161,553	169,809	178,361	184,100
Hillsborough, Town of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	11,618	11,768	11,982	12,196	12,410	12,410	12,517	12,624
Menlo Park, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	12,153	12,138	12,483	13,000	13,380	13,655	13,931	14,242
Mid-Peninsula Water District (formerly Belmont)	2000 UWMP	ABAG Sub. Reg. 2007	26,443	26,817	27,334	28,255	29,175	29,796	30,314	30,815
Millbrae, City of	2002 UWMP	ABAG Sub. Reg. 2007	21,460	21,611	22,231	23,368	24,092	24,609	24,919	25,230
Milpitas, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	62,756	64,416	68,783	73,845	79,204	84,564	89,824	95,085
Mountain View, City of	ABAG Jurisdictional 2002	ABAG Sub. Reg. 2007	71,160	71,979	75,083	78,186	82,291	85,694	88,397	90,700
North Coast County Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	40,457	40,782	41,103	41,939	42,774	43,610	44,240	44,961
Palo Alto, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	59,954	62,322	65,459	68,430	71,485	74,291	76,520	78,914
Purissima Hills Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	6,032	6,345	6,472	6,598	6,666	6,732	6,856	6,979
Redwood City, City of	2003 UWMP	ABAG Sub. Reg. 2007	81,888	83,307	86,608	90,928	95,356	99,735	103,650	107,612
San Bruno, City of	Draft General Plan	ABAG Sub. Reg. 2007	40,727	41,736	43,328	45,513	47,499	49,188	50,779	52,158
San Jose, City of (portion of north San Jose)	ABAG Sub. Reg. 2002	ABAG by Census Tract 2007[d]	11,098	13,152	20,334	19,439	32,620	39,421	46,306	51,981
Santa Clara, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	104,349	110,012	118,459	125,397	131,732	136,660	141,587	146,917

Table 2-1. Population Estimates (2001-2035) and Data Sources									
Service Area	2004 Study Projection Source	2008 Study Projection Source	Population Estimates for DSS Model						
			2001	2005	2010	2015	2020	2025	2030	2035
Skyline County Water District	BAWUA Survey	BAWSCA Survey 2004	1,210	1,413	1,666	2,162	2,658	2,670	2,683	2,692
Stanford University	Water Master Plan	Conservation Study 2008[e]	25,782	27,684	29,185	30,674	32,239	33,883	35,612	37,428
Sunnyvale, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	131,365	132,322	136,854	141,485	146,608	151,732	156,165	160,895
Westborough Water District	BAWUA Survey	UWMP 2005	10,017	10,089	10,741	10,798	10,856	10,914	10,971	11,029
TOTAL			1,629,604	1,672,663	1,745,292	1,819,263	1,906,202	1,982,976	2,054,820	2,124,854

Source: DSS Models

NA - Not Applicable; CWS - California Water Service (Company); MID - Municipal Improvement District

[a] The City of Brisbane and Guadalupe Valley Municipal Improvement District provided projections from the City's Draft General Plan which is currently under public review and comments.

[b] Amended ABAG subregional 2007: amended with draft general plan projections 2010-2035.

[c] Amended ABAG subregional 2007: amended with approved actions by the Hayward City Council and the Local Agency Formation Commission (LAFCO).

[d] Growth rates based on ABAG 2007 data by census tract, using 100 percent of ABAG's census tract # 5046.02 and 100 percent of tract # 5050.05, plus 50 percent of 5050.06 to reflect Hetch Hetchy-served areas.

[e] Residential account growth for Stanford University was projected using increase in dwelling units rather than population projections.

Table 2-2. Employment Estimates (2001-2035) and Data Sources									
Service Area	2004 Study Projection Source	2008 Study Projection Source	Employment Estimates for DSS Model						
			2001	2005	2010	2015	2020	2025	2030	2035
Alameda County Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	151,092	140,986	148,481	159,350	177,034	194,732	212,411	228,775
Brisbane, City of	City Planning	Draft General Plan[a]	3,789	4,089	4,539	8,167	12,821	17,476	22,130	26,784
Burlingame, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	31,205	25,939	27,541	29,042	31,695	34,646	37,717	40,942
CWS - Bear Gulch District	BAWUA Survey	ABAG Sub. Reg. 2007	42,899	39,076	41,260	42,947	44,210	45,455	46,867	48,258
CWS-Mid Peninsula District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	79,493	70,193	75,391	82,174	88,117	94,149	101,053	107,128
CWS - South San Francisco District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	49,288	46,977	49,691	51,972	56,074	59,830	63,455	68,245
Coastside County Water District	ABAG Sub. Reg. 2002	ABAG By Zip Code 2007	3,504	3,476	3,650	3,742	3,827	4,038	4,126	4,217
Daly City, City of	ABAG Sub. Reg. 2002	Amended ABAG[b]	26,941	27,902	30,825	45,092	62,639	66,071	69,762	73,668
East Palo Alto, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2002	3,289	3,540	4,052	5,466	7,535	8,104	8,673	9,258
Estero MID/Foster City	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	24,318	19,843	20,998	23,139	25,293	27,158	29,255	30,826
Guadalupe Valley MID	City Planning	Draft General Plan[a]	4,442	4,794	8,545	8,545	8,923	9,301	9,679	10,057
Hayward, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007[d]	87,473	83,177	86,518	92,777	99,379	106,334	113,597	121,156
Hillsborough, Town of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	1,216	991	1,021	1,069	1,117	1,165	1,212	1,260
Menlo Park, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	10,053	7,695	8,141	8,912	9,748	10,528	11,425	12,231
Mid-Peninsula Water District (formerly Belmont)	2000 UWMP	ABAG Sub. Reg. 2007	14,705	13,566	14,856	16,514	18,272	19,796	22,242	23,766
Millbrae, City of	2002 UWMP	ABAG Sub. Reg. 2007	6,664	6,557	7,015	7,730	8,387	9,178	10,103	10,970
Milpitas, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	53,566	48,420	50,707	53,745	56,864	60,147	63,571	67,138
Mountain View, City of	ABAG Jurisdictional 2002	ABAG Sub. Reg. 2007	75,629	61,967	63,782	69,127	74,663	80,524	86,653	93,063
North Coast County Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	5,797	6,297	6,777	7,067	7,377	7,657	7,897	8,345
Palo Alto, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	105,432	95,646	98,155	101,762	105,480	109,397	113,475	117,722
Purissima Hills Water District	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	420	357	361	365	371	375	378	382
Redwood City, City of	2003 UWMP	ABAG Sub. Reg. 2007	66,389	60,685	65,780	70,422	74,801	79,607	84,454	89,443
San Bruno, City of	Draft General Plan	ABAG Sub. Reg. 2007	16,622	14,115	14,960	16,902	18,988	21,237	23,620	26,136

Table 2-2. Employment Estimates (2001-2035) and Data Sources									
Service Area	2004 Study Projection Source	2008 Study Projection Source	Employment Estimates for DSS Model						
			2001	2005	2010	2015	2020	2025	2030	2035
San Jose, City of (portion of north San Jose)	ABAG Sub. Reg. 2002	ABAG by Census Tract 2007[e]	93,366	77,206	83,485	87,786	93,206	99,407	104,664	113,035
Santa Clara, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	138,163	114,742	117,946	127,844	137,960	148,524	159,668	171,195
Skyline County Water District	BAWUA Survey	NA[f]	224	224	224	224	224	224	224	224
Stanford University	Water Master Plan	Water Master Plan[g]	NA	NA	NA	NA	NA	NA	NA	NA
Sunnyvale, City of	ABAG Sub. Reg. 2002	ABAG Sub. Reg. 2007	125,476	98,044	109,532	118,653	128,585	138,796	149,233	159,910
Westborough Water District	BAWUA Survey	NA[f]	1,610	1,610	1,610	1,610	1,610	1,610	1,610	1,610
TOTAL			1,223,065	1,078,114	1,145,843	1,242,146	1,355,199	1,455,465	1,559,154	1,665,743

Source: DSS Models

NA - Not Applicable; CWS - California Water Service (Company); MID - Municipal Improvement District

[a] The City of Brisbane and Guadalupe Valley Municipal Improvement District provided projections from the City's Draft General Plan which has not been finalized

[b] Amended ABAG subregional 2007: amended with draft general plan projections 2010-2035.

[c] The City of East Palo Alto retain their employment data from the 2004 study, as accuracy of the alternative data sources were questioned.

[d] Amended ABAG subregional 2007: amended with approved actions by the Hayward City Council and the LAFCO.

[e] Growth rates based on ABAG 2007 data by census tract, using 100 percent of ABAG's census tract # 5046.02 and 100 percent of tract # 5050.05, plus 50 percent of 5050.06 to reflect Hetch Hetchy-served areas

[f] Commercial accounts assumed to remain constant.

[g] Employment projections are not applicable for LTCWD and Stanford University. LTCWD only has residential accounts. Stanford University used other parameters such as increase in building square footage increase to forecast growth in Non-Residential accounts. Residential account growth for Stanford University was projected using increase in dwelling units rather than population projections

Table 2-3. Comparison of Population and Employment between 2004 and 2008 Studies		
	2030 DSS Population	2030 DSS Employment
2004 Study	1,933,829	1,488,566
2008 Study	2,054,820	1,559,154
Difference between 2004 and 2008 Population and Employment Estimates for 2030	120,991	70,588
Percent Difference between 2004 and 2008 Population and Employment Estimates for 2030	6%	5%

Table 2-4. List of SFPUC Baseline Demand Projection Assumptions for DSS Model		
Parameter	Value Selected in 2004	Value Selected in 2008
Base Year	2001	2001
Peak Day Factor	1.6 or data from Water Master Plan Survey	1.6 or data from Water Master Plan Survey
Water Loss, percent of Water Production	Calculated from purchase and sales data or 7 percent, whichever is greater; constant over time	Calculated from purchase and sales data or 7 percent, whichever is greater; constant over time
Population Projection, 2002 to 2035	BAWUA 2001-2002 Survey, ABAG Projections 2002, Urban Water Management Plans, Water Master Plans	ABAG 2007, Urban Water Management Plans, General Plans
Employment (Jobs) Projection 2002-2035	BAWUA 2001-2002 Survey, ABAG Projections 2002, Urban Water Management Plans, Water Master Plans	ABAG Projections 2007, General Plans
Number of Water Accounts for Base Year	Data submitted by customers for 2001 (month of June or average of all months in 2001 or other if 2001 data not provided)	Data submitted by customers for 2001 (month of June or average of all months in 2001 or other if 2001 data not provided)
Distribution of Water Use Among Categories	Data submitted by customers for most recent year	Data submitted by customers for most recent year
Indoor/Outdoor Water Use Split by Category, percent of Total	Monthly data submitted by customers for 2001	Monthly data submitted by customers for 2001
Residential End Uses, percent	American Water Works Association Research Foundation (AWWARF) Report “Residential End Uses of Water”	AWWARF Report “Residential End Uses of Water”
Non-Residential End Uses, percent	Professional judgment and AWWARF Report “Commercial and Institutional End Uses of Water”	Professional judgment and AWWARF Report “Commercial and Institutional End Uses of Water”
Residential Fixture Efficiency Current Installation Rates	Census 2000, Housing age by type of dwelling plus natural replacement	Census 2000, Housing age by type of dwelling plus natural replacement
Water Savings for Fixtures, gal/capita/day	AWWARF Report “Residential End Uses of Water”	AWWARF Report “Residential End Uses of Water”
Non-Residential Fixture Efficiency Current Installation Rates	Census 2000, assume commercial establishments built at same rate as housing, plus natural replacement	Census 2000, assume commercial establishments built at same rate as housing, plus natural replacement
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	Falls within ranges in AWWARF Report “Residential End Uses of Water”	Falls within ranges in AWWARF Report “Residential End Uses of Water”

Table 2-4. List of SFPUC Baseline Demand Projection Assumptions for DSS Model		
Parameter	Value Selected in 2004	Value Selected in 2008
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	Estimated based using AWWARF Report "Commercial and Institutional End Uses of Water"	Estimated based using AWWARF Report "Commercial and Institutional End Uses of Water"
Natural Replacement Rate of Fixtures	Toilets – 3 percent per year Showers – 5 percent per year Clothes Washers - 6 percent per year	Toilets – 3 percent per year Showers – 5 percent per year Clothes Washers - 6 percent per year
Project Future Residential Use	Based on Projected Population	Based on Projected Population
Project Future Commercial/Industrial Use	Based on Projected Employment or Population	Based on Projected Employment or Population
Project Future Pubic and Other Use	Based on Projected Population	Based on Projected Population

Table 2-5. Total BAWSCA Demand Projections										
	Base Year (MGD)	Total BAWSCA Demand Projections (MGD)							Demand Increase from 2001 to 2030	
Dataset	2001	2005	2010	2015	2020	2025	2030	2035	MGD	Percent
2004 DSS Model Demand Projections Absent Conservation, (without Plumbing Codes)	272	285	300	313	326	337	349	NA	77	28
2004 DSS Model Demand Projections Absent Conservation, (with Plumbing Codes)	272	282	292	299	308	315	324	NA	52	19
2008 DSS Model Demand Projections Absent Conservation, (without Plumbing Codes)	272	271	286	302	322	339	356	373	84	31
2008 DSS Model Demand Projections Absent Conservation, (with Plumbing Codes)	272	268	278	289	302	314	326	341	54	20

NA = Not Available from the 2004 Study.

THIS PAGE INTENTIONALLY LEFT BLANK.

3. EVALUATION OF POTENTIAL WATER CONSERVATION SAVINGS BASED ON HISTORICAL, BASELINE, AND POTENTIAL NEW WATER CONSERVATION MEASURES

3.1 Background

As stated in Section 1, the goal of the WCIP is to identify mechanisms by which the BAWSCA member agencies could implement water conservation measures to potentially reduce their projected water purchases from the SFPUC system. The WCIP was designed to evaluate whether, through full implementation of (1) the measures that the member agencies had committed to implementing in 2004, and (2) specific, additional water conservation measures, the BAWSCA member agencies could reduce their water demand sufficiently to meet the Interim Supply Limitation that was established by the SFPUC of 184 MGD by 2018.

The amount of water purchased by those BAWSCA member agencies that must (1) report their conservation activities to the CUWCC as part of the Memorandum of Understanding Regarding Urban Water Conservation (MOU), and (2) prepare UWMPs represents the majority of the SFPUC water purchases by BAWSCA member agencies. Based on this fact, the WCIP has been designed to align, where appropriate, with the new CUWCC MOU and/or recommendations from DWR. This will enable BAWSCA and its member agencies to better track conservation results against the new CUWCC MOU and to report their water conservation results and plans in their UWMP's.

The BAWSCA member agencies provided input throughout the WCIP development process to help ensure that the WCIP met the above objectives.

3.2 Historical (2004 to 2008) Conservation Assessment

As part of the WCIP development process, the BAWSCA member agencies were asked to provide data as to what conservation measures they had implemented between 2004 and 2008. These data were used to update the conservation activity estimates in the DSS models for the years 2004 through 2008. The objective of this task was to update the DSS modeling results to reflect historical conservation implementation and to evaluate the relative effect of the current conservation savings on the potential for future conservation savings.

3.2.1 Historical Data Collection

The only measures that were evaluated as part of this historical conservation analysis were those measures that were selected by each BAWSCA agency in 2004 as part of their baseline conservation program, see Table 3-1. Other or new conservation measures, technology and/or water transfer opportunities that the agencies may have been implementing between 2004 and 2008 were not considered as part of this analysis. Therefore, in some cases, this analysis underestimates the conservation savings and efforts by each of the agencies to date.

3.2.2 Historical Conservation Updates in the DSS Models

The historical measure implementation data that the Project Team received from BAWSCA member agencies were incorporated into the DSS models using a consistent set of rules as follows:

- Historical conservation data were entered into the DSS models as a percentage of the total accounts affected by the conservation measure in any particular year.
- If no responses were provided for the years 2004 through 2008, then zero interventions were entered into the model, representing no conservation occurred under the DSS selected measures in those years.
- The cumulative number of accounts affected by a conservation measure could not exceed 100 percent of the accounts in the DSS model for the year 2004 through 2008.
- The cumulative number of accounts affected by a conservation measure could not exceed the assumed market penetration[1] for that measure in the DSS model for conservation occurring in the future (2009 and beyond.). That is, if the number of interventions provided by the agency exceeded the assumed market penetration for that particular conservation measure, interventions for 2009 and beyond were capped at the assumed market penetration percentage.
- No other adjustments were made for future years (2009 and beyond). Notably, adjustments were not made to make up for lost savings due to lack of interventions occurring from 2004 through 2008.
- Conservation programs were not revised as part of this evaluation, which means that the conservation measures selected for each agency's conservation program were not changed based on historical data. Where agencies provided historical conservation data for measures that were not selected in 2004 for their baseline conservation program, those data were entered into the model for future use but were not incorporated into the calculation for associated conservation savings.

3.2.3 Historical Conservation Results

Updating the DSS models to reflect actual implementation of water conservation during the period 2004 to 2008 resulted in changes to the projected future water savings resulting from the conservation commitments made in 2004 by the BAWSCA member agencies. In many cases, these differences occurred in instances where what was actually implemented, tracked and documented did not match what was originally planned in 2004. General observations regarding these changes for specific agencies include:

- Agencies are often behind in the implementation commitments assumed in the 2004 study. As a result, conservation savings that would have been achieved between 2004 and 2008 were not realized.
- Agencies were often implementing different conservation programs than originally specified in 2004. The savings from these alternative conservation measures has not been captured by the DSS model at this time.
- Several of the conservation measures, which were originally set up in the DSS models for the 2004 study, were defined as having short program durations (e.g., 3 years beginning in 2004 and ending in 2006.) In cases where no interventions were completed for those measures between 2004 and 2008, very little, if any conservation savings were realized.

[1] Market penetration percentages were specified for each conservation measure as part of the definitions developed for the 2004 conservations studies. Refer to Table 3-3, Conservation Measure Variables for specific values.

- The lack of consistent methods for tracking historical intervention data suggests a considerable level of uncertainty in the data obtained for this analysis. This uncertainty is further evidenced by intervention data that did not make sense when reconciled with DSS modeling data (e.g., when the number of interventions exceeded the number of accounts.)

The effects of the changes made to incorporate historical conservation results can be seen by examining the average conservation savings[2] over a specified duration. Prior to incorporating historical conservation data, the average conservation savings from 2004 through 2008 summed for all BAWSCA member agencies was 5.8 MGD. After historical conservation data were incorporated into the DSS models the average conservation savings from 2004 through 2008 dropped to 3.6 MGD, which is a 39 percent decrease in savings.

Detailed conservation results are provided in Tables 3-4 through 3-6.

3.3 New Water Conservation Measures Screening Process

As part of the 2004 SFPUC Technical Reports, representatives from each BAWSCA member agency selected a suite of water conservation measures that their agency committed to implementing within their respective service area (Table 3-1).

To meet BAWSCA's increased water savings goal of up to an additional 10 MGD by 2018, a variety of water conservation measures were considered and screened for inclusion in the WCIP, including 18 potential new measures that were not previously considered in the 2004 SFPUC Technical Reports (Table 3-2). Table 3-2 presents the initial list of 14 new measures that were evaluated as part of the WCIP, including four measures that were evaluated in 2006 as part of the 2006 SFPUC Regional study and ten new conservation measures. The list of potential new measures presented in Table 3-2 includes other relevant information, including a brief description of each measure, the targeted customer types, evaluation data from the 2006 SFPUC Regional study for the four new measures (NM-1 to NM-4), an estimate of overall 2030 water savings, and a range in unit costs for the measures. The potential water savings for each measure was estimated assuming that each measure would be fully implemented on a regional basis (i.e., assuming that all of the BAWSCA member agencies fully implemented each measure), as was the relative unit cost of water saved. Four additional water conservation measures were proposed by the Pacific Institute for consideration by Working Group members. The four additional potential new measures included: retrofit on resale, system leak detection, steamer rebates, and commercial, industrial, institutional (CII) pay for performance.

On November 10, 2008, the Project Team provided an overview to the Working Group of key information related to each of the 18 potential new water conservation measures, including the information contained in Table 3-2. The Working Group members then ranked the measures from 1 to 5, with 5 being the measure of highest priority. The Project Team and Working Group then discussed the outcome of the voting process. A total of five new measures were selected by the Working Group and BAWSCA for evaluation as part of the WCIP, including:

- NM-1: Installation of High-efficiency Toilets and Showerheads

  (**Note: Measure NM-1 changed during WCIP development process to HET Rebates**)

[2] Note that the average savings over a specified period is not the same as the annual savings at the end of that period, even though those savings are both reported in units of MGD. For example, the conservation savings realized in 2008 (4.6 MGD in Table 3-4) is greater than the average conservation savings from 2004 through 2008 (3.6 MGD listed above) because the savings are increasing each year between 2004 and 2008.

- NM-2: Education/ Training Program for Residential Landscape Water Use Efficiency
- NM-5: High-efficiency Washing Machine Rebates
- NM-6: New Building Indoor Water Efficiency Regulations
- NM-7: New Building Landscape Water Efficiency Regulations

The final list of water conservation measures that were evaluated as part of the 2004 SFPUC Technical Reports and new measures that were selected for evaluation by the Working Group is included in Table 3-3, along with descriptions of each measure.

As noted above, following the release of Tech Memo 2, measure NM-1 was changed, at the request of BAWSCA and the member agencies, from a Direct Installation Program of HET and Showerheads (modeled after the Redwood City Program), to a HET Rebate program. Therefore, remaining future references for NM-1 in this report, starting with Table 3-3, will be for a HET Rebate program.

3.4 Water Conservation Measure Modeling Assumptions

Appendix A includes the specific assumptions included in the DSS models for each of the following variables:

- Targeted Water User Group; End Use – Water user group (e.g., single-family residential) and end use (e.g., indoor or outdoor water use).
- Market Penetration Goal – Extent of market penetration related to the water conservation product or service.
- Measure Water Savings – Percent water reduction by end use related to the water conservation measure.
- Measure Design Length – Amount of time required for implementation of the measure to achieve the water conservation goal.
- Measure Life – Amount of time that water savings from a conservation measure are expected to last.
- Utility Unit Cost (for contractor) – Cost of rebates, incentives, and contractors hired (by the utility) to implement measures.
- Retail Customer Unit Cost – Cost for implementing measures that is paid by retail customers (i.e., the remainder of a measure's cost that is not covered by a utility rebate or incentive).
- Utility Administration and Marketing Cost – The cost to the utility administering the measure, including consultant contract administration, marketing, and participant tracking.

3.5 BAWSCA New Regional Measure Evaluation

Based on input from the Working Group, five new measures (i.e., NM-1, NM-2, NM-5, NM-6, and NM-7) were analyzed for the entire BAWSCA region using the DSS Model. BAWSCA requested that the Project Team develop the measures individually, and that each be designed to be feasible.

Using the DSS models developed for each BAWSCA member agency, the Project Team evaluated the potential cost-effectiveness and water savings related to the unique suite of water conservation measures selected by each agency, including the baseline measures (selected in 2004), and the five new measures (selected as part of the WCIP development). The goal of adding the impact of the five new measures was to evaluate if these measures could be used to "reasonably attain" up to 10 MGD of water savings by 2018.

The implementation levels assumed in this analysis are based on assumptions that represent an aggressive water conservation program. In general, agencies will need to implement each measure at a more aggressive rate that they have historically to meet the savings goals. Agencies will also have to adaptively manage their programs fashion, making both small and large program changes as needed over time, to ensure savings goals are met.

The assumption made as part of the WCIP analysis was that all five new measures would be fully implemented by each agency. However, it is important to note that this represents just one possible scenario. Some agencies have indicated that they plan to implement alternative measures from those selected in the 2004 SFPUC study and as part of the WCIP. Additionally, it is important to note that the BAWSCA Year 1 Plan activities outlined in Sections 7 and 8 are only designed to support those agencies that selected to participate in the BAWSCA regional programs.

The five new measures analyzed as part of the WCIP include:

- NM-1: HET Rebate Program
- NM-2: Education/ Training Program for Residential Landscape Water Use Efficiency
- NM-5: HEW Rebates
- NM-6: New Building Indoor Water Efficiency Regulations
- NM-7: New Building Landscape Water Efficiency Regulations

The following sections describe each new measure in detail, including planning assumptions.

3.5.1 NM-1 High-Efficiency Toilet Rebate Program

The HET rebates to replace high flow toilets were modeled at a fixed cost of $150.[3] It is assumed that this measure will be implemented for 10 years (i.e., 2010 to 2019) and that approximately 1 percent of all toilets will be replaced during each year. For budgeting purposes this is similar to having one toilet rebate for approximately 3 percent of the year 2010 residential single family (RSF), residential multi-family (RMF) and CII accounts. It is further assumed that the participation levels by all agencies will escalate the activity level up to a ten-year annual average of 12,400 rebates per year (or equivalent program that obtains the same savings goal) including RSF, RMF and CII toilets (the 12,400 toilet rebates is out of an estimated 1.3 million toilets in the region). This total rebate target for the entire BAWSCA region includes all the rebates from BAWSCA, SCVWD, and local member agency programs. BAWSCA is currently planning that for the agencies participating in their regional program will achieve about half of the planned 12,400 rebates for the region as further discussed in Section 8.2.2.

3.5.2 NM-2 Education/Training Program for Residential Landscape Water Use Efficiency

This measure assumes that there will be a combination of three types of training classes: (1) Xeriscape, (2) Homeowner Irrigation, and (3) Promotion of Water Efficient Plants. It is also assumed that all savings are implemented for RSF accounts. It is assumed that this measure will be implemented for 21 years (i.e., 2010 to 2030).

[3] The rebate cost does not include costs associated with rebate administration, marketing, labor or other costs.

The number of accounts affected by this measure is computed on a regional basis and then divided among service areas. This assumes that full regional implementation would achieve the following: 20 class sites, 4 classes per year per site, 50 attendees per class, 1 affected-account per attendee (i.e., 20 x 4 x 50 x 1 = 4,000 additional affected accounts per year). The 4,000 participants per year is less than 0.2 percent of the 1,745,292 population in the year 2010 for the regional area.

3.5.3 NM-5 High-Efficiency Washer Rebates

The high-efficiency clothes washer rebates were modeled at a fixed cost of $200[4]. It is assumed that this measure will be implemented for 9 years (i.e., 2010 to 2018) and that the washing machines at 3.0 percent of all accounts will be replaced each year for the 9-year period (or equivalent program to obtain similar water savings goals).

The total annual rebate target for the entire region is 17,600 rebates (this total would include all the rebates from BAWSCA, SCVWD, and local member agency programs). The 17,600 rebates (or equivalent program to obtain water savings goals) in the region are out of an estimated total of 600,000 to 700,000 residential washers. BAWSCA is currently planning that for the agencies participating in their regional program will achieve about half of the planned 8,300 rebates for the region as further discussed in Section 8.2.3

3.5.4 NM-6 New Building Indoor Water Efficiency Regulation

This measure assumes agencies adopt an ordinance or regulation to require developers to install the following devices where applicable: (1) HET; (2) HEW; (3) Energy Star Dishwasher; (4) High-efficiency Faucets and Showerheads; (5) Efficient Hot Water Delivery System; (6) Multifamily submetering. These requirements are similar, but slightly more stringent (by including more fixtures or devices), than both the United States Environmental Protection Agency's (EPA's) Water Sense for New Homes (as of May 2009) and East Bay Municipal Utility District's (EBMUD)'s new connection regulations that were adopted in July 2009.

It is assumed that this measure will be implemented for 21 years (i.e., 2010 to 2030) and that all the member agencies will adopt an indoor ordinance as described above, and be 75 percent compliant through 2030. The assumed compliance is less than 100 percent due to the lack of long term experience and documentation of successful implementation of similar new development ordinances.

3.5.5 NM-7 New Building Outdoor Water Efficiency Regulations

This measure assumes agencies adopt an ordinance or regulation to require developers to install the following devices/systems where applicable for landscaping around any new building: (1) Efficient landscaping with either a turf limit (such as no more than 40 percent) or a water budget approach, and (2) State of the art irrigation controller (may be a weather adjusting controller in the future). These requirements represent a blend of both EPA's Water Sense for New Homes (as of May 2009) and EBMUD's new connection regulations that were adopted in July 2009.

It is assumed for this study purpose that this measure will be implemented for 21 years (i.e., 2010 to 2030) and that all the member agencies will adopt an outdoor ordinance as described above, and be 65 percent compliant through 2030 (or an equivalent program that obtains the same water savings). The assumed compliance is less than 100 percent due to the lack of long term experience and documentation of successful implementation of similar new development ordinances.

[4] The rebate cost does not include costs associated with rebate administration, marketing, labor or other costs.

3.6 DSS Model – New Water Conservation Measure Results

Based on the parameters shown in Appendix A and summarized above, the Project Team used the DSS model to evaluate the amount of potential water savings for each measure selected under each agency's conservation program (including both baseline, 2004 measures and the five new measures that were selected for evaluation), along with the cost-effectiveness of each respective measure. These results are based on the assumption that each measures is fully implemented by each agency (i.e., the target penetration rates are achieved).

As stated in Section 1, one of the goals of the WCIP is to determine potential mechanisms by which the BAWSCA member agencies can meet the water saving goals (i.e., up to 10 MGD by 2018 and a total of up to 58 MGD of conservation savings and reclamation by 2030).

The DSS model results presented herein compare water savings from the "baseline conservation (2004 measures)" to "updated conservation (2004 and 2008 measures)", wherein:

- **Baseline conservation (2004 measures)** represents the suite of water conservation measures that each agency committed to implementing in 2004 as part of the 2004 SFPUC Technical Reports, and
- **Updated conservation (2004 and 2008 measures)** includes the baseline conservation (2004 measures), plus the five new water conservation measures that were selected for evaluation as part of the WCIP development process, and an estimate of the historical conservation savings achieved by each agency between 2004 an 2008, to the extent that that information was available.

Tables 3-4 through 3-6 present the estimated water savings and cost-effectiveness, in terms of benefit-to-cost ratios, for the baseline conservation (2004 measures) and the updated conservation (2004 and 2008 measures). Collective results included in Tables 3-4 through 3-6 for the member agencies include:

- Estimated water savings related to implementing the current plumbing code,
- Estimated water savings due to conservation programs,
- Estimated outdoor water savings due to conservation programs,
- Estimated present value of water utility costs,
- Water utility benefit-cost ratio,
- Cost of water saved from the utility and community perspectives,
- Benefit-cost ratio from the utility and community perspectives.

Table 3-4 includes the estimated water savings and cost-effectiveness for conservation measures implemented between 2004 and 2008, while Table 3-5 includes results through 2018. Table 3-6 includes the same parameters as Tables 3-4 and 3-5, related to the year 2030. A glossary of terms for Tables 3-4 through 3-6 is available in Table 3-7. Additional information on the historical conservation analysis results and impacts on the savings numbers are presented in Section 3.2.3.

As described in Section 1, one of the objectives of the WCIP was to evaluate whether implementation of the new water conservation measures that were selected for evaluation by the member agencies could achieve up to 10 MGD of water savings by 2018. Based on the DSS model results, the selected new conservation measures have the potential to create 8.4 MGD (as shown in Table 3-5) of water savings by 2018 if ALL of the BAWSCA member agencies fully implement the five new measures according to the parameters set in Appendix A (i.e., the penetration rates), in addition to fully implementing their baseline (2004) conservation programs.

That being said, the member agencies may be able to achieve the target water savings by alternate mechanisms than those identified herein. One possible scenario to obtain the full 10 MGD savings by 2018 would be to increase the market penetration rates of the individual programs. For example, if measure NM-1 was increased to an annual target of 2.5 percent of all toilets (i.e., 32,000 toilet rebates per year), the savings obtained in 2018 could be as high as 10.4 MGD (i.e., an additional 2 MGD of water savings). Alternatively, individual agencies can decide to implement other measures not evaluated as part of the WCIP, or modify targets or activity levels as the program progresses to increase the water savings potential.

The individual agencies have not formally committed to implementing the new water conservation measures that were evaluated as part of the WCIP, nor have they committed to achieving the associated water savings. However, several member agencies have elected to participate in the BAWSCA regional programs at some level and BAWSCA intends 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.

3.6.1 Challenges Associated with Successful Implementation of the New Water Conservation Measures

BAWSCA and the Project Team recognize that the penetration targets that were assumed for the new water conservation measures are more aggressive than the historic implementation rates for both the existing local and regional water conservation programs. As such, implementation of the WCIP may present a challenge to member agencies both in terms of actual implementation (i.e., achieving the target penetration rates) and in being able to acquire the resources and funding that will be necessary to implement the programs at the levels assumed herein.

It is also recognized that actual implementation of water conservation to achieve a future goal must be managed in an adaptive fashion and that individual agencies may need to make choices on a yearly basis about what conservation measures to implement within their local jurisdictions, sub-regionally with other agencies, or regionally through BAWSCA or the SCVWD. The Bay Area has undergone significant change in recent years, and those changes have impacted agencies' water conservation programs. In order to create and sustain successful conservation programs, it is recommended that the BAWSCA program remain flexible to adapt to the changing dynamics of the region including, but not limited to, the following factors:

- Actual water demands are different than projected demands :
  - Population and Employment growth projections and actual growth patterns may increase or decrease over time; and
  - There may be shifts in commercial industry or in population demographics.
- Water conservation program participation rates may vary:
  - Change in public attitude (for example interest in sustainability and resource conservation, successful marketing campaigns);
  - Increasing water and wastewater rates;
  - Availability of supplemental water sources – surface water, reclaimed water, wells, etc.;
  - Level of disposable income of conservation program participants;
  - Ease of implementation for the customer (availability of the technology and public perceived ease implementation - these can change with time and program design);
  - New technology and water efficient best management practices; and
  - Data or reports on actual water savings of programs (e.g. Smart Controller report).

- External Factors that affect both demand and conservation programs:
  - Economic cycles – recessions or booms;
  - Drought or extreme weather event;
  - Change in trends of housing development (e.g., from single family to multifamily units that then impacts the customer base);
  - Other unforeseen events or natural disasters (e.g., earthquakes, fires, floods, climate change) that affect the region.

BAWSCA and the Project Team recognize that measure tracking and evaluation will be key to evaluate the success of the various measures included in the WCIP and to allow for either program or target modifications or to justify expanded budgets and resource allocations. As such, BAWSCA is in the process of developing a database management system this fiscal year is to enable better collection of data regarding the actual water conservation activities that individual agencies are pursuing. The database system will also be designed to assist BAWSCA to more fully quantify conservation savings associated with actual program activity.

Further, the Project Team recommends the following strategies to help achieve the penetration (and water savings) targets:

1. Closely monitor program progress for the entire region (not just the BAWSCA regionally managed programs). Use program data to refine estimates of current market penetration of fixtures. If the savings goals and targets are not being achieved, the agencies may consider program modifications. If a program is not successful or cost-effective with the current design, it may be necessary to employ other distribution techniques such as, for HETs:
   a. Higher incentives
   b. Direct install
   c. Voucher or point of sale coupons
   d. Give-a-ways at special events
   e. Retrofit on resale
   f. Additional marketing and outreach – point of purchase displays, meeting with large stores in the region, etc.
2. Follow the development of new technologies and consider adding new measures when proven to be effective.
3. Each year the program should be evaluated for adjustments using a tracking tool that will allow participation against water savings goals. If major changes are necessary, or the water savings do not materialize as planned it may be advisable to complete a full WCIP update in 5 or 10 years using the DSS models to evaluate the new programs that have appeared, changes in original programs selected, plumbing code changes and actual measure effectiveness. This WCIP update process should be designed to enable BAWSCA to realign goals, implementation dates and test measures, or re-design measures to understand the current ability of the BAWSCA agencies' conservation plans to reach their target.

The WCIP was developed in accordance with BAWSCA's key principle that conservation programs are paid for by those agencies that benefit from their implementation. Each of the measures evaluated as part of the WCIP were determined to be cost-effective at the regional level based on the known cost of water for 2015. As part of the WCIP, BAWSCA member agencies identified a preference for a financing structure based on a core program vs. subscription program arrangement. However, in recognition that implementation of these water conservation measures is not cheap, alternative methods for funding and financing all types of water supply programs, including water conservation, will be part of ongoing discussions between BAWSCA and the member agencies.

THIS PAGE INTENTIONALLY LEFT BLANK.

Table 3-1. Baseline Conservation Program Measures Selected by Each BAWSCA Member Agency in 2004

BAWSCA Member Agency	Residential Water Surveys	Residential Retrofit Kits	Large Landscape Audits	Water Budgets	Clothes Washer Rebate	Public Information Program	Commercial Water Audits	ULF Toilet and Urinal Rebate	SF Res. ULF Toilet Rebate	MF Res. ULF Toilet Rebate	Toilet Retrofit Upon Resale	Home Leak Detection and Repair	Rebates High-efficiency Toilets	ET Controller Rebates	Xeriscape Education	Homeowner Irrigation Classes	New Home Efficient Irrigation	Coin-op Laundry Incentive	MF Building Sub-metering	Require Submetering in New MF	MF Efficient Clothes Washers	Landscape Requirements	Low-flow Spray Rinse Nozzles	Hotel/Motel Water Audits	New Hotel Water Audit (WAVE)	Hotel Retrofit Incentives	Business Award Program	Efficient Equipment	Require 0.5 gal Urinals	Water Use Budgets	Irrigation Upgrade Incentives	Require Dedicated Irrig. Meters	City Bldg Water Reduction Goals
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Alameda County Water District	X	X	X	X	X	X	X	X					X	X				X			X		X	X						X	X		
Brisbane, City of				X		X																X							X				
Burlingame, City of	X	X		X	X	X			X	X					X																		
CWS - Bear Gulch District	X	X			X	X		X	X	X			X	X	X	X							X										
CWS - Mid Peninsula District	X	X			X	X		X	X	X			X		X						X		X	X									
CWS - South San Francisco District	X	X	X		X	X	X		X	X			X		X								X	X								X	X
Coastside County Water District	X		X	X	X	X		X	X	X					X							X	X							X			X
Daly City, City of		X	X	X	X	X	X	X	X	X			X		X						X		X							X			
East Palo Alto, City of	X	X	X		X	X	X		X	X			X		X	X		X	X	X	X	X							X			X	X
Estero MID/Foster City																																	
Guadalupe Valley MID				X		X																X							X				
Hayward, City of		X	X		X	X	X	X						X	X	X	X					X	X	X								X	
Hillsborough, Town of	X				X	X								X	X		X																
Menlo Park, City of		X		X	X	X									X							X	X										X
Mid-Peninsula Water District	X	X			X	X					X												X		X								
Millbrae, City of	X	X	X	X	X	X		X	X	X				X								X	X										
Milpitas, City of	X	X	X	X	X	X	X	X	X	X													X	X									
Mountain View, City of	X	X	X		X	X	X	X	X	X													X										
North Coast County Water District																																	
Palo Alto, City of	X	X	X		X	X	X	X					X	X				X					X	X			X						
Purissima Hills Water District	X	X				X								X																			
Redwood City, City of	X	X	X	X	X	X	X	X	X	X				X				X			X		X							X	X		
San Bruno, City of					X	X		X	X	X			X		X								X						X				

THIS PAGE INTENTIONALLY LEFT BLANK

Table 3-1. Baseline Conservation Program Measures Selected by Each BAWSCA Member Agency in 2004

BAWSCA Member Agency	Residential Water Surveys	Residential Retrofit Kits	Large Landscape Audits	Water Budgets	Clothes Washer Rebate	Public Information Program	Commercial Water Audits	ULF Toilet and Urinal Rebate	SF Res. ULF Toilet Rebate	MF Res. ULF Toilet Rebate	Toilet Retrofit Upon Resale	Home Leak Detection and Repair	Rebates High-efficiency Toilets	ET Controller Rebates	Xeriscape Education	Homeowner Irrigation Classes	New Home Efficient Irrigation	Coin-op Laundry Incentive	MF Building Sub-metering	Require Submetering in New MF	MF Efficient Clothes Washers	Landscape Requirements	Low-flow Spray Rinse Nozzles	Hotel/Motel Water Audits	New Hotel Water Audit (WAVE)	Hotel Retrofit Incentives	Business Award Program	Efficient Equipment	Require 0.5 gal Urinals	Water Use Budgets	Irrigation Upgrade Incentives	Require Dedicated Irrig. Meters	City Bldg Water Reduction Goals
	1	2	3	4	5	6	7	8	9a	9b	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
San Jose, City of (north San Jose)	X	X	X		X	X	X	X					X	X									X	X				X			X		
Santa Clara, City of	X	X	X		X	X	X	X	X	X				X	X							X	X	X									
Skyline County Water District	X	X			X				X		X												X	X									
Stanford University[1]	X	X		X	X	X			X	X			X	X								X	X						X				
Sunnyvale, City of	X	X	X		X	X	X	X	X	X											X		X										
Westborough Water District	X				X	X			X	X																							

NOTE: An "X" in the table for a certain agency and certain measure denotes that the agency chose the respective measure in 2004 and does not reflect programs actually implemented by agencies. Agencies may have implemented other measures that are not reflected in this table. This table represents measures that agencies committed to implementing during the SFPUC 2004 study. Though some agencies chose to not commit to implementing some or any of the measures included in the 2004 SFPUC study), they may have in fact implemented measures that were not previously committed to implementing. The absence of an "X" for a certain agency and certain measure denotes that the agency did not choose the respective measure in 2004, and the respective measure is not included in the agency's DSS model

THIS PAGE INTENTIONALLY LEFT BLANK

Measure Number	Target Customer Category	Measure	Description of Conservation Activity	Potential to Save More Than 1 MGD by 2030?	Relative Unit Cost ($/MG)*	Rank Five Preferred New Measures (1 through 5, with 5 being top priority)
NM-1	RSF, RMF, CII	Install High-efficiency Toilets (HETs) and showerheads	Installation for 25 percent of existing accounts over 10 years (patterned after Redwood City program). Evaluated in 2005 for RWSO4. (this measure was later revised as discussed in Section 3.3)	Yes	Moderate	
NM-2	RSF	Education and Training Programs	Combine existing measures 14, 15, 16 into one program run by BAWSCA focusing on training homeowners in efficient landscaping and irrigation principals. Target approx 0.1 percent of homes per year. Evaluated in 2005 for RWSO4	Yes	Low	
NM-3	RSF	Rain Sensor Rebates	Provide rebates for rain sensor retrofit of existing irrigation controllers (15 percent of existing accounts over 10 years). Evaluated in 2005 for RWSO4	No	Low	
NM-4	CII	Replacement of Urinals	Provide rebates for replacement of 25 percent of existing CII urinals with 0.5 gal/flush models over 10 years. Evaluated in 2005 for RWSO4	Yes	Moderate	
1	RSF	Single Family Water Surveys with AMS	Indoor and outdoor water surveys for existing single-family residential customers. Normally those with high water use are targeted and provided a customized report on how to save water in their home. Survey would be enhanced by the availability of hourly consumption data from Automatic Metering System (AMS) system indicating to the customer where and how their water is used thereby facilitating water use reduction. This would require Agency to install an AMS system. Plan at least one percent of accounts receiving surveys per year starting in 2018.	Yes	High	
2	RMF	Multifamily Surveys with AMS	Indoor and outdoor water surveys for existing multifamily residential customers (5 units or more). Normally those with high water use are targeted and provided customized report to owner Survey would be enhanced by the availability of hourly consumption data from AMS system indicating to the customer where and how their water is used thereby facilitating water use reduction. This would require Agency to install an AMS system. Assume one percent of accounts surveyed annually starting in the year 2018.	No	Moderate	
3	RSF	Washer Rebates for High-efficiency Machines	Homeowners would be eligible to receive a rebate on a new high water efficient clothes washer. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) to only offer the best available technology. Assume rebates given to 2 percent of residential customers each year concluding in the year 2014.	No	Low	

Measure Number	Target Customer Category	Measure	Description of Conservation Activity	Potential to Save More Than 1 MGD by 2030?	Relative Unit Cost ($/MG)*	Rank Five Preferred New Measures (1 through 5, with 5 being top priority)
4	New Development (ND)-1	New Building Indoor Water Efficiency	Require developers to install the following devices where applicable: (1) HET; (2) High-efficiency Clothes Washer; (3) Energy Star Dishwasher; (4) High-efficiency Faucets and Showerheads; (5) Efficient Hot Water Delivery System; (6) Multifamily submetering; (7) 0.5 gal/flush urinals in new commercial buildings. These requirements are similar but slightly more stringent than both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007.	Yes, possibly 5 MGD	Low	
5	ND- 2	New Building Landscape Water Efficiency	Agency adopts ordinance to require developers to install the following devices/systems where applicable for landscaping around any new building: (1) Efficient landscaping with either a turf limit (such as no more than 40 percent) or a water budget approach (such as design to achieve 60 percent of reference evapotranspiration [ETo]); (2) State of the art irrigation controller (may be a weather adjusting controller in the future). These requirements are a blend of both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007.	Yes, close to 2 MGD	Low	
6	ND-3 - CII Plan Review	Require Plan Review for new CII	Require plan reviews for water conservation for all new business customers. Agency will encourage installation of the most water efficient equipment where feasible.	No	Moderate	
7	Irrigation	Artificial Turf Sports Fields	Provide an incentive to install artificial grass on at least one sports field per year.	No, very small	Moderate	
8	RSF	Cisterns	Provide an incentive to assist set number of single family homeowners per year with installation of rain barrels.	No, very small	High	
9	RSF	Garbage Disposal RSF	Encourage set number of single family homeowners per year with garbage disposal removal.	No, very small	Moderate	
10	RSF	Graywater New RSF	Provide an incentive to assist builders of set number of single family homes per year with plumbing for future gray water system installation.	No, very small	High	

**Estimated Relative Costs*

High *>$2,000 per MG*

Moderate *$500 - $2,000 per MG*

Low *<$500 per MG*

MG = Million Gallons

Table 3-3. Description of Conservation Measures Selected for Further Evaluation		
	Conservation Measure	Measure Description
MEASURES INCLUDED IN THE 2004 STUDY		
1.	Residential Water Surveys	Provide indoor and outdoor water surveys to existing Single-Family and Multi-Family residential retail customers with high water use; provide customized report to homeowner.
2.	Residential Retrofit	Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install low flow showerheads, faucet aerators, and toilet tank retrofit devices.
3.	Large Landscape Conservation Audits	Provide free landscape water audits to all public and private irrigators of landscapes larger than one acre with separate Irrigation accounts upon request.
4.	Water Budgets	Provide a monthly irrigation water use budget as information on the water bill for all irrigators of landscapes larger than one acre with separate Irrigation accounts.
5.	Clothes Washer Rebate	Provide a rebate on a new water efficient clothes washer for homeowners.
6.	Public Information Program	Provide public education to raise awareness of conservation measures available to retail customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc.
7.	Commercial Water Audits	Provide a free water audit to high water use Commercial accounts that evaluates ways for the business to save water and money.
8.	Ultra low flow (ULF) Toilet and Urinal Rebates	Provide rebates to pre-1994 businesses with high use fixtures for commercial ULF toilets (1.6 gal/flush) and commercial ULF urinals (1.0 gal/flush).
9.	Residential ULF Toilet Rebate	Provide a rebate to homeowners to replace an existing high volume toilet with a new water efficient toilet.
10.	Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings	Work with the real estate industry to require a certificate of compliance be submitted to the water utility verifying that a plumber has inspected the RSF or RMF property and efficient fixtures were either present or installed at the time of sale, before close of escrow.
11.	Home Leak Detection and Repair	Use leak detection equipment to determine whether and where leaks are occurring on the premises and provide a plumber to the retail customer to repair leaks for free.
12.	Rebates for 6/3 dual flush or 4 liter toilets	Provide a rebate or voucher for the retrofit of a 6/3 dual flush, 4-liter or equivalent very low water use toilet. Rebate amounts would reflect the incremental purchase cost and would be in the range of $50 to $100 per toilet replaced.
13.	Evapotranspiration (ET) Controller Rebates	Provide a rebate for the latest state of the art irrigation controllers with on-site temperature sensors or a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes.
14.	Xeriscape education and staff training at retail garden/irrigation supply houses	Sponsor training for staff of stores where plants and irrigation equipment is sold to educate sales people about the benefits of native (low water use) plants, efficiently irrigated.
15.	Homeowner irrigation classes	Sponsor classes at stores where irrigation equipment is sold or other suitable venues on selection and installation of efficient equipment (drip irrigation, smart controllers, low volume sprinklers, etc.) and proper plant.

Table 3-3. Description of Conservation Measures Selected for Further Evaluation		
	Conservation Measure	Measure Description
16.	Promote water efficient plantings at new homes	Provide information for planting water-efficient landscaping, including avoiding strip turf sections that are difficult to water efficiently and using native plants that do not require supplemental watering. Information would be provided in brochures with the water bill, or mailed. Informational displays at Water Utility offices and nurseries could also be provided.
17.	Incentives for replacement of clothes washers in coin-operated laundries	Provide incentives to apartment and coin-op laundry managers to retrofit or use efficient clothes washers. The rebate would either go to the manager or the washing machine leasing company.
18.	Incentives for retrofitting sub-metering	Rescind any regulations that prohibit sub-metering of multi-family buildings and encourage sub-metering through water audits and direct mail promotions, and/or incentives to building owners.
19.	Require sub-metering multifamily units	Require all new multi-family units to provide sub-meters on individual units. To help reduce financial impacts on tenants, regulations would be adopted that specify acceptable methods of metering and billing.
20.	Rebate efficient clothes washers	Provide a rebate to new apartment complexes over a certain size with a common laundry room equipped with efficient washing machines.
21.	Enforce landscape requirements for new landscaping systems (turf limitations / regulations)	Enforce existing requirements on use of native or low-water-using plants for landscaping purposes. Proof of compliance would be necessary to obtain a water connection on all new Multi-Family Residential and commercial projects. Non-compliers would face a surcharge on their water bill until they complied.
22.	Restaurant low flow spray rinse nozzles	Provide free installation of 1.6 gallon per minute (gpm) spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.
23.	Focused water audits for hotels/motels	Provide free water audits to hotels and motels covering bathrooms, kitchens, ice machines, cooling towers and irrigation system schedules.
24.	WAVE Program (US EPA) for hotels	Provide hotels with information about the US EPA's WAVE program. This program encourages hotels to do their own water audit and then analyze their water use with the software provided. The software identifies water saving projects and computes paybacks. Hotels that agree to participate in the program also agree to install cost-effective water conserving equipment.
25.	Hotel retrofit (w/financial assistance)	Following a free water audit offer participating hotels a rebate for identified water saving. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines for hotels that don't participate in an audit.
26.	Award program for water savings by businesses	Sponsor an annual awards program for businesses that significantly reduce water use. Provide a plaque, presented at a lunch with the mayor.
27.	Replace inefficient water using equipment	Provide a rebate for a standard list of water efficient equipment including icemakers, efficient dishwashers, cooling towers to replace once through cooling, irrigation controllers, and certain process equipment.
28.	Require 0.5 gal/flush urinals in new buildings	Require new buildings be fitted with 0.5 gal/flush urinals.
29.	Financial incentives for complying with water use budget	Link a landscape water budget to a rate schedule that penalizes the account holder for exceeding its water budget and rewards them for using less than the budget.
30.	Financial incentives for irrigation upgrades	Provide rebates for selected types of irrigation equipment upgrade.

Table 3-3. Description of Conservation Measures Selected for Further Evaluation		
	Conservation Measure	Measure Description
31.	Require dedicated irrigation meters for new accounts	Require new accounts with a substantial amount of irrigated landscape have dedicated landscape meters and are charged on a separate rate schedule that recognizes the high peak demand placed on the system by irrigators.
32.	Water Utility / City Department water reduction goals	Provide water use reduction goals for metered City and County accounts and offer audits and employee education.
	ADDITIONAL/NEW MEASURES INCLUDED IN THE 2008 STUDY	
NM-1	High-efficiency Toilet Rebates	HET rebate program for to replace high flow toilets. It is assumes the rebate goal will be approximately 1 percent of all toilets each year. For budgeting purposes this is similar to having one toilet rebate for approximately 3 percent of the year 2010 RSF, RMF and CII accounts.
NM-2	Education/Training External Water Use Efficiency	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.
NM-5	High-efficiency Washer Rebates	HEWs rebate program for 27 percent of residential accounts over 9 years.
NM-6	New Development Indoor Regulations	Require developers to install the following devices where applicable: (1) HET; (2) High-efficiency Clothes Washer; (3) Energy Star Dishwasher; (4) High-efficiency Faucets and Showerheads; (5) Efficient Hot Water Delivery System; (6) Multifamily submetering. These requirements are similar but slightly more stringent than both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007.
NM-7	New Development Outdoor Regulations	Agency adopts ordinance to require developers to install the following devices/systems where applicable for landscaping around any new building: (1) Efficient landscaping with either a turf limit (such as no more than 40 percent) or a water budget approach (such as design to achieve 60 percent of ETo); (2) State of the art irrigation controller (may be a weather adjusting controller in the future). These requirements are a blend of both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007.
	School Education – Resource Action Programs	

Table 3-4. Program-Specific Conservation Evaluation Results for BAWSCA Member Agencies through 2008										
Conservation Program	2008 Water Savings due to Conservation Programs (MGD)[3]	2008 Outdoor Water Savings due to Conservation Programs (MGD)[3]	Present Value of Water Utility Costs ($1,000) through 2008[2]	Water Utility Benefit-Cost Ratio through 2008[2]	Water Utility Cost of Water Saved through 2008 ($/AF)[2]	Present Value of Community Costs ($1,000) through 2008[2]	Community Benefit-Cost Ratio through 2008[2]	Community Cost of Water Saved through 2008 ($/AF)[2]	Total Potential Water Savings in 2008 (MGD)[3]	Incremental Increase in Savings (MGD)[3]
Plumbing Code[1]	NA	NA	NA	NA	NA	NA	NA	NA	5.4	NA
Baseline Conservation (2004 measures)	4.6	2.3	$18,558	1.1	$947	$29,887	1.0	$1,526	10.0	4.6

[1]Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).

[2]Benefits and costs in 2001 dollars

[3] Water savings based on measures were believed to be appropriate for the area in 2009. Water savings estimated were based on best available information at the time of the study. Actual water savings may be higher or lower than stated in this report for a variety of reasons.

Table 3-5. Program-Specific Conservation Evaluation Results for BAWSCA Member Agencies through 2018										
Conservation Program	2018 Water Savings due to Conservation Programs (MGD)[3]	2018 Outdoor Water Savings due to Conservation Programs (MGD)[3]	Present Value of Water Utility Costs ($1,000) through 2018[2]	Water Utility Benefit-Cost Ratio through 2018[2]	Water Utility Cost of Water Saved through 2018 ($/AF)[2]	Present Value of Community Costs ($1,000) through 2018[2]	Community Benefit-Cost Ratio through 2018[2]	Community Cost of Water Saved through 2018 ($/AF)[2]	Total Potential Water Savings in 2018 (MGD)[3]	Incremental Increase in Savings (MGD)[3]
Plumbing Code[1]	NA	NA	NA	NA	NA	NA	NA	NA	16.5	NA
Baseline Conservation (2004 measures)	9.4	4.9	$44,148	2.3	$397	$72,519	1.9	$652	25.9	9.4
Updated Conservation (2004 and 2008 measures)	17.8	6.5	$88,394	1.7	$550	$280,609	0.8	$1,747	34.4	8.4

[1]Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).

[2]Benefits and costs in 2001 dollars

[3] Water savings based on measures were believed to be appropriate for the area in 2009. Water savings estimated were based on best available information at the time of the study. Actual water savings may be higher or lower than stated in this report for a variety of reasons.

Table 3-6. Program-Specific Conservation Evaluation Results for BAWSCA Member Agencies through 2030

Conservation Program	2030 Water Savings due to Conservation Programs (MGD)[3]	2030 Outdoor Water Savings due to Conservation Programs (MGD)[3]	Present Value of Water Utility Costs ($1,000) through 2030[2]	Water Utility Benefit-Cost Ratio through 2030[2]	Water Utility Cost of Water Saved through 2030 ($/AF)[2]	Present Value of Community Costs ($1,000) through 2030[2]	Community Benefit-Cost Ratio through 2030[2]	Community Cost of Water Saved through 2030 ($/AF)[2]	Total Potential Water Savings in 2030 (MGD)[3]	Incremental Increase in Savings (MGD)[3]
Plumbing Code[1]	NA	NA	NA	NA	NA	NA	NA	NA	29.4	NA
Baseline Conservation (2004 measures)	10.5	6.3	$55,803	3.4	$227	$90,320	2.8	$367	39.9	10.5
Updated Conservation (2004 and 2008 measures)	23.0	9.9	$103,528	3.3	$235	$426,081	1.2	$968	52.4	12.5

[1]Plumbing code savings represent water use savings associated with the natural replacement of plumbing fixtures with water-efficient models (i.e., toilets, showerheads, and washing machines).

[2]Benefits and costs in 2001 dollars

[3] Water savings based on measures were believed to be appropriate for the area in 2009. Water savings estimated were based on best available information at the time of the study. Actual water savings may be higher or lower than stated in this report for a variety of reasons.

Table 3-7. Glossary of Terms

Term	Definition
"30-year" annual average water savings	"30-year" annual average water savings represents the water savings for implementing a conservation measure averaged over the 30-year analysis period.
2001 DSS base year water demand	Estimated 2001 DSS base-year water demand developed during the SFPUC Wholesale Customer Water Demand Projections Study.
2030 demand increase (new demand) from 2001	The difference between water demand in 2001 and 2030. Calculated by subtracting the 2001 demand from the 2030 demand.
2030 DSS projected water demand	Projected DSS water demand for the year 2030 developed during the SFPUC Wholesale Customer Water Demand Projections Study.
2030 outdoor water savings due to conservation programs	The amount of outdoor water savings in the year 2030 achieved due to the implementation of a conservation program.
2030 water savings due to conservation programs	The amount of water saved in the year 2030 due to the implementation of a conservation program.
Account	Used by water suppliers to bill for water use measured by a water meter for retail customers; one account per meter.
Average gal/day/acct	The amount of water in gallons that is used per day per account and averaged over a period of time (year, month, etc.).
Base year	The starting year for the water demand analysis; the year used to establish initial conditions. The base year for this study is 2001.
Census 2000	Data provided by the United States Census Bureau. Census 2000 data (U.S. Census Bureau 2002) were used as a resource to obtain population, household sizes, dwelling units by building type, and age of structures for each individual city and unincorporated areas serviced by the water agencies (wholesale customers).
Consumption by customer class	Annual amount of water used and billed by each customer class or category (Single-Family Residential, Multi-Family Residential, Commercial, Industrial, etc.)
Cost of water saved	Cost of water saved is calculated by taking the present value of the water utility costs and dividing by the cumulative amount of water saved over the 30-year analysis period. We express it as $/MG or $/AF.
Cost-effective	For purposes of this study, the definition of cost-effective is being less expensive than the water in 2015. For water purchased from SFPUC, that cost is $1076/AF.
Customer class	Customer-billing category specific to the types of retail customer (Single-Family Residential, Multi-Family Residential, Commercial, Industrial, etc.)
Customer unit cost	Customer costs represent the customer's share of the cost to implement the measure. For example, if the rebate on a clothes washer only covers one-third of the cost difference to purchase an efficient model that is eligible for the rebate, then the customer's cost is the difference required for the purchase and installation.
Customer-billing category	A designation used by water agencies to categorize groups of water users in a billing system. Common customer-billing categories include Single-Family Residential, Multi-Family Residential, Commercial, and Industrial.
DSS model	Demand Side Management Least-Cost Planning DSS model; an end-use model used to develop water demand projections for this study. The end-use model approach uses growth in number of accounts and a complete breakdown of water uses by customer-billing category ("end uses") to forecast water demands.
End use	The ultimate use of the water; can be a fixture, appliance, or other category of water use within an account.
Evapotranspiration (ET)	Loss of water from soil both by evaporation and by transpiration from the plants growing thereon.
First five years utility cost	First five years utility cost is the cost (sum of the actual costs) to the utility of implementing the conservation measure during the first five years of the measure.
Fixture	Any plumbing device in homes or businesses using water such as toilets, showers, or faucets.

Table 3-7. Glossary of Terms	
Term	Definition
Implementable	For purposes of this study, an implementable conservation measure is a measure that an individual wholesale customer believes can be funded and implemented with success in its service area (i.e. meets stated targets or activity goals). An implementable program is a program that consists of a number of measures that can be run concurrently by the individual wholesale customer, can be financed concurrently by an individual wholesale customer, and can be implemented successfully in the customer's service area.
Indoor water use	The amount of water used indoors in an account for uses such as toilets, laundry, showers, faucets, dishwashers, etc.
Market penetration goal	The market penetration goal for a measure is the extent to which the product or service related to the conservation measure occupies the potential market. This is also sometimes referred to as the installation rate goal. The market penetration goal is often expressed in terms of the number of fixtures, rebates, surveys, etc., offered or conducted per year.
Measure life	The measure life is how long the water savings from implementing a measure can be expected to last. Measure life is expressed in terms of years. In general there are two categories of measure life (1) those measures that have a "permanent life" and (2) those measures that have a "finite life." Measures with a permanent life include those measures whose water savings essentially last forever. Measures with a finite life experience water savings that decay or are reduced over time.
Measure water savings	Water savings for each conservation measure are considered in terms of end-use water reductions. To determine how much water is saved from implementing each conservation measure, water reductions are applied to the specific end use targeted by the conservation measure and are expressed as a percent reduction in water use per end use.
Multi-Family Residential	Residential customer class including more than one dwelling unit on a single meter, such as condominiums or apartment buildings.
Net utility benefit	Net utility benefit is the present value of the utility benefits less the present value of the utility costs. Measures with benefit-cost ratios less than 1.0 have a negative net utility benefit.
Outdoor water use	The amount of water used outdoors in an account for uses such as irrigation and car washing.
Per-capita use	Water use per person.
Present value of water-utility costs	The present value of the total utility cost of implementing a measure over the 30-year analysis period
Program length	The measure length is the amount of time the measure must be implemented in order to achieve the market penetration goal. Measure length is expressed in terms of years. Some measures are intended to run indefinitely to reach the market penetration or maintain the water savings associated with the market penetration goal.
Reasonable	For the purposes of this study, a reasonable range of conservation potential represents the range of water savings that seems achievable based on service area water use characteristics, retail customer behavioral patterns, budgetary consideration, and ease of implementation within the individual wholesale customer service area.
Recycled water	Treated water available for nonpotable reuse.
Single-Family Residential	Residential customer class including single-family dwelling units.
Target water user group	Targeted water user groups could include RSF; RMF; CII; and public (PUB). Measures may apply to more than one water user group.
Total potential 2030 water savings	The potential water savings in the year 2030 due to the plumbing code and implementing conservation programs.
Total utility-customer benefit-cost ratio	Total utility-customer benefit-cost ratio is calculated by taking the present value of the water saved plus reduced retail customer energy costs (present value of utility water benefits and customer energy benefits *based on water's projected value in the year 2015*) divided by the present value of the total utility and retail customer costs of implementing a measure over its life

Table 3-7. Glossary of Terms	
Term	Definition
Water loss	The mathematical difference between amount of water produced in a system and water billed to customers (water consumed). This water is often referred to as "lost" water and includes water delivery system leaks and water not billed or tracked in the system (i.e., water used for flushing water system pipelines, fire fighting).
Utility administration and marketing costs	Utility costs also include an administrative cost that covers the cost to the utility of the staff administering the measure. The administrative cost often includes consultant contract administration, marketing and participant tracking. The administrative cost is expressed as a percentage of the cost of the utility unit cost (rebate, incentive, or consultant cost per participant) to implement the measure.
Utility unit cost	Utility unit costs include the costs of rebates and incentives and contractors hired to implement measures. Utility unit costs exclude administrative costs.
Water consumed	Water billed to retail customers in a wholesale customer service area.
Water demand projections	Estimates of water demands for the future based on applying a projection (or growth forecast) to an established base-year value.
Water produced	Water produced is the total of water consumed plus water loss. This includes water purchased from others (such as SFPUC), groundwater, or other sources.
Water purchased	Same as water produced for agencies with a single source of water, such as those who buy all their water from SFPUC.
Water savings as a percentage of total new demand	The water savings due to conservation programs taken as a percentage of the 2030 total new demand (demand increase from 2001 to 2030).
Water savings decay	Water savings decay is the reversal of the water use reductions achieved through implementing a conservation measure. Water savings decay occurs in two ways: (1) as a result of an end user's behavioral change and (2) as a result of a fixture's loss of water conservation.
Water utility benefit-cost ratio	Water utility benefit-cost ratio is calculated by taking the present value of the water saved (present value of the benefits *based on water's projected value in the year 2015*) divided by the present value of the total utility cost of implementing a measure over the 30-year analysis period.
Wholesale customer	Water agency purchasing water from SFPUC for distribution to retail customers in their service area.

4. SURVEY OF OTHER WATER CONSERVATION IMPLEMENTATION AND FINANCING STRATEGIES

4.1 Background

The Project Team worked with the Working Group to develop a WCIP that would facilitate low cost, efficient water conservation program implementation with the goal of maximizing water savings. As part of this effort, the Project Team reviewed information the existing water conservation programs being offered by others (i.e., individual BAWSCA member agencies and other regional water agencies). Preliminary concepts for regional water conservation program implementation and financing opportunities were identified and evaluated as part of the WCIP development.

4.2 Local and Regional Conservation Program Surveys

4.2.1 Local Survey Results

A survey was conducted of the BAWSCA member agencies at the November 10, 2008 Working Group Meeting. Responses were received from 25 of the BAWSCA member agencies. The questions asked as part of the survey were designed to get open-ended responses from each member agency on that agency's perception of the benefits, challenges, and need for a regional water conservation program.

The six questions asked in the survey included:

1. What BMPs or parts of BMPs or conservation activities is your agency currently implementing well and do not want to change course to participate in a regional program?
2. What BMPs or activities are most challenging that your agency you feel may need more help on?
3. How can BAWSCA help implement regional conservation to capture cost savings to your agency?
4. What benefits do you perceive beyond financial cost savings to participating in a regional program?
5. What downsides do you perceive?
6. Other comments?

Table 4-1 includes a summary of the BAWSCA member agency responses to the survey, grouped by the following categories:

- Benefits of regional program participation (beyond financial cost savings)
- Challenges of BMP/activities implementation
- Agencies' needs for BMP/activities implementation
- Unique Comments

4.2.2 Regional Survey Results

The Project Team identified possible implementation strategies for each water conservation measure and conducted a survey of five other regional agencies that have implemented regional water conservation programs to gather information related to how those agencies approached program implementation and financing. The following five regional agencies were selected because (1) their programs had similar characteristics and goals to BAWSCA's program, and (2) their programs had been in place for more than 5 years with multi-million dollar budgets.

- Saving Water Partnership (SWP) – Seattle Public Utilities and 17 retailers
- Sonoma County Water Agency (SCWA) – Regional Saving Water Partnership
- Regional Water Authority (RWA) Water Efficiency Program
- SCVWD
- San Diego County Water Authority (SDCWA)

Table 4-2 outlines the questions that guided the survey that was conducted on the regional agencies. Table 4-3 gives some general information about each agency's program. Highlights and lessons learned from these regional programs are provided in Table 4-4 (and information is provided from the perspective of the responding agency).

From the survey of regional agencies, the Project Team gleaned advice related to development and implementation of BAWSCA's program over the coming years, including the following:

- Maintain flexibility in the program and approaches, given that changes are bound to occur and may include:
  - Changes to BMP implementation requirements of DWR UWMPs, United States Bureau of Reclamation (USBR) Water Management Plans, and CUWCC voluntary MOU, or other third party;
  - New technologies may emerge, while others become outdated;
  - Grants and funding partnerships provide unique opportunities that can influence cost effectiveness; and
  - Over time, some agencies may opt to join programs, and others may choose to stop participating. Consider a minimum threshold (i.e., number of agencies or dollar value) to support the regional core and/or subscription programs.
- Track validity of individual measure water savings performance goals, which can be achieved through implementation of various methods (i.e., direct install versus rebates), and delivery mechanisms (i.e., community based organizations outreach, vouchers, etc.). These measure targets may evolve over time to stay current with customer interest, agency needs and technology advancements. Better performing measures may warrant additional future funding to meet overall regional water savings goals.
- View any plans as "blueprints" that should be broad enough to include a research and development component or "pilot phase" to understand current and appropriate costs and water savings estimates to assist with designing future implementation and financing plans.
- Review regularly (i.e., annually or biannually) the overall feasibility of conducting a program to implement a particular measure or suite of measures, in order to determine the evolving level of effort and associated budget required.

- Consider that subscription programs can be challenging when finalizing agency contracts. Some of the finer details may change as the program takes its shape to be launched (i.e., number of participating agencies or target number of activities), which can change program costs. It is recommended that BAWSCA and member agencies discuss the ranges of program costs upfront. An initial range of costs for the subscription program could be included in the member agencies' draft contracts and, if needed, may be updated in the final contract to reflect revised costs. It is also important to consider contract language to update changes in increase or decrease of future costs (i.e., annual program fee adjustment or upon 60 day notice) for multi-year contracts.
- Frequently monitor and track progress on water savings targets at the individual agency level. Monitoring will allow for tracking regional implementation to meet SFPUC specified water savings commitments. It also allows for communicating the success of individual measure implementation and overall progress to stakeholders and customers.
- Leverage education and marketing programs, which are critical and more economical on a regional scale. Public outreach campaigns broadcast program opportunities and provide social messaging about the need to conserve and help to build traction for implementation of the program. Direct water savings for public outreach campaigns are difficult to quantify; however, customer awareness is essential to successful implementation of other measures. Every successful regional program has a regional outreach messaging campaign.
- Track market transformation of new technologies, which can be pushed more effectively at the regional scale given that change can be leveraged more quickly across service area boundaries. Word-of-mouth about good products and promotions to support new technologies (e.g., rebates), customers' availability and/or choice of retail locations often cross water service boundaries. A regional brand for outreach helps bridge this challenge to clearly communicate to customers who is eligible for what services or promotions.
- Leverage funding in terms of partnerships, grants and developer agreements, which can be useful to supplement and stretch planned financial investments. Regional grants have both unique advantages and challenges, including:
    - Sometimes regional collaboration is the only means for access (e.g., Proposition 84 grants require regional projects and is the next source of large-scale state grant support)
    - Trading can occur between participants (underused funds earmarked for one agency can be used by another)
    - Administrative tasks can be streamlined regionally, depending on the program design
    - Challenges occur when compromise is needed. Not every agency will get all they want in the design of a regional program from level of rebate amount to exact wording they would chose on a brochure. Reaching consensus through a collaborative process may take some time and effort.
    - Other utilities' (energy, wastewater and stormwater) service boundaries often do not align with water service area boundaries. Regional collaboration helps this communication and participation between all parties.
- Consider the sustainability of financial resources needed for the program's duration. For water conservation programs, especially subscription programs, the sustainability of financial resources needed to carry through a program for its duration (minimum annual fiscal budget) needs to be estimated carefully. A contingency budget, as appropriate, could help ensure the sustainable funding that may be refunded at the end of the project, if not used. A fiscal policy of four or six months of estimated operating costs may be a prudent level of funding. A grant funded project should have an associated contingency budget.

Table 4-1. Summary of Local Survey Responses by Category
Benefits of Regional Program Participation
General desire by agencies to participate in regional approach to have "one voice"
Opportunity for regional information campaigns, including rebates and drought, for higher visibility "brand"
Opportunity to obtain grant funding and to seek federal dollars
Potential to conduct regional HET and HEW programs with marketing support (with inspections conducted in-house)
Opportunity for sharing expertise and for increased public relations, networking, and lessons learned
Recognition of cost savings due to capture of economies of scale
Assistance in water savings tracking and measuring
Potential for agencies to take an active role in tracking levels of implementation and meeting requirements (several agencies)
Challenges of BMP/Activities Implementation
Need for "keeping it simple" – less implementation time and more time spent on oversight (turn-key for local agencies)
Layers of bureaucracy (time constraints)
Diversity of needs/loss of local control (priorities, level of effort, admin costs)
Need for compromise (e.g., creativity, eligibility rules, materials, direct control of contractors, timely payments to customers)
Loss of customer identification with local water supplier
Agencies' Needs for BMP/Activities Implementation
Home/CII/Landscape Surveys with targeting larger users, and follow-up (12 agencies)
School Education (2 agencies)
Green Building Support (2 agencies)
Conservation Pricing Policy and Water Budget Rates (2 agencies)
Consistency among agencies (e.g., template ordinances, State Model Landscape Ord) (5 agencies)
Verification of water savings (3 agencies)
Unique Comments
Need for help with all BMP measures
Push more direct install programs (turn-key for customer)
Peer pressure to do non-cost effective measures in service area to participate regionally, hard to get policymaker buy-in
Funding challenges to participate (smaller agencies)
Workshops (GreenPlumber, Landscape Professionals)
Landscape Plan Review
Meter upgrades
Water waste enforcement support
Environmental Sustainability Task Force – "limited resource perspective"

Table 4-2. Regional Water Efficiency Programs - Financing and Implementation Survey Questions
General
1. What is the geographical area served by this entity?
2. What is the approx, population served?
3. How many retailers are served?
4. Is the organization a water wholesaler or what is their form/governance?
5. What are the stated goals of the organization?
6. How many retail utilities participate in water conservation programming?
7. Name of key staff/contact, contact information.
Conservation Program Structure
1. What are the drivers that created and sustain the conservation program?
2. Regulatory mandates for conservation?
3. State or county planning requirements and reporting needs?
4. Local need for more sustainable water supplies (scarcity issues)?
5. Water supply or discharge limitation?
6. Public or political pressure?
7. Pre-requisite of other funding opportunities or planning efforts?
8. Strictly voluntary?
9. How have these drivers helped shape the regional basis program?
10. Are there an existing set of principles which the program adheres to? If yes, how were those developed and how have they been adopted?
11. Why is the program helpful to local utilities?
12. Are there issues with local versus regional control? How were those navigated?
13. Is there overlapping jurisdiction with other water utilities? How is that handled?
14. Is there any staff sharing from local utilities (water, wastewater, stormwater)?

Table 4-2. Regional Water Efficiency Programs - Financing and Implementation Survey Questions

Program Funding and Business Planning

1. How is the regional program funded and on what time scale?
   - Mandated participation and payment? If so, by whom?
   - Contractual requirement (e.g., wholesale, retail agreements?)
   - Voluntary dues?
   - Budgeted yearly? Multiple year? As needed basis?
2. How is the fees/dues structure based?
   - Number of connections
   - Amount of water purveyed (total or by sector)
   - Per capita in service area
   - Other
3. What partnership funding (from within the group of water agency receiving benefits) helps support the program? How was this negotiated?
4. Do you have volunteer or in-kind support of the program? How is coordinated? What lessons learned can you offer?
5. Do you have grant funding support of the program? How do you decide what grants to pursue? How are matching funds gained and collected or documented through members?
6. How is Strategic and Business Planning conducted?
7. May I have a copy of your Strategic Plan, Business and/or Financing Plan?
8. If the plan does not cover financial details may I have the amount:
   - Budgeted for water conservation overall program
   - Budgeted for Public Outreach
   - Budgeted for School Outreach
   - Budgeted for landscape program, or percent of overall program or by individual measure (ET, surveys, workshops, gardens, soil probes, etc) – in real numbers or as a percent
   - Budgeted for CII program, or percent of overall program or by individual measure (water surveys, workshops, fixture and equipment rebates, etc) – in real numbers or as a percent
   - Budgeted for Residential Program Measures

Program Staffing

1. How many staff work for the regional program or agency related to water conservation?
2. How many water conservation staff is there for local purveyors in the region? One for each purveyor or more?

Program Design

1. Do any have a list of measures and any formal write-ups of the program/measures?
   - What is/was the list of measures selected for implementation?
   - How is/was the intended program designed?
   - What do you feel are the strengths of program/measures designed?
   - What do you feel are the weaknesses of program/measures designed?
2. Who administers the program and number of needed labor hours (e.g., internal administers, landscape contractor associations, homeowner or other community-based organizations)?
3. What is/was the timeframe for implementation of the program/measure?
4. What are the advertising methods for each measure? Would you be willing to send us any example handouts or direct us to web sites?

Program Implementation

1. Would you please give some examples of successes with implementation?
2. Would you please give some examples of lessons learned?

Table 4-2. Regional Water Efficiency Programs - Financing and Implementation Survey Questions
Program Measurement and Evaluation
1. What was the expected participation rate/coverage rate? – program goal/measure goals (number of connections, etc)
2. What actual participation rates are/were achieved.
3. What has been effectiveness of meeting targets based on specified evaluation criteria or outcomes (e.g. estimated level of participation, water savings goals, and cost effectiveness)? How is performance data gathered, stored and reported?
4. Has the agency (re)-evaluated their water savings for this program? (Quantified or percentage)?
5. What obstacles have been encountered, how were they overcome (e.g. budget approvals, contractor issues, legislative delays, lack of intended participation levels)?
6. What improvements have been made or will be made?
7. If the program/measure was terminated due to unmet expectations, why?
8. Do you have any background on assumptions or remarks regarding program, savings, budget, etc.?
9. Do you have any other recommendations?

Table 4-3. General Information for Regional Agencies Surveyed						
Agency	Regional Geographic Area Served	No. of Retail Agencies	Population	No. of Conservation Staff	Annual Conservation Budget	Annual Fee Structure
Regional Water Authority	Sacramento Area, California	22[a]	1,700,000[b]	1 full-time, 1 intern	$2.4 million (including grants)	$1.18 per connection with cap for larger agencies at $34,800
San Diego County Water Authority	San Diego Area	24[c]	3,000,000[c]	7 full-time and 1 half-time (4 landscape, 1 residential, 1 CII, 1 new executive contracts administrator, 1 half-time integrated planning, conservation)	$2.5 million	Embedded in wholesaler rates (30 percent) rest is outside funding DWR, USBR, MWD
Santa Clara Valley Water District	South San Francisco Bay Area, California	13[d]	>1,800,000 residents[d] >200,000 commuters[d]	5 full-time, 6-10 interns	$5.5 million (added drought budget allocation of 1.7 million)	Embedded in wholesaler rates plus grant funding and cost-sharing from retailers
Seattle Saving Water Partnership	Seattle Area, Washington	18[e]	1,044,000[e]	1 – Regional Coordinator, 0.5 time landscape, 0.5 commercial irrigation hardware rebate (very active), 0.5 residential irrigation hardware, 1 full-time CII, 1-full time multifamily toilet and clothes washer rebate, 0.5 retailer/contracts coordinator	$500,000 operating (labor), $3.7 million capital programs (hardware)	3 percent of total retail charges
Sonoma County Water Agency	Sonoma County, California	9[f]	>600,000[f]	1 principal, 5 program specialists, for water education 1 public information specialists, 2 program specialists.	$1.8 million	$36.99/AF contracted

[a] *RWA Final 2007 Annual WEP BMP Report*
[b] *RWA website ("About RWA -- Overview") (obtained Dec 2008)*
[c] *SDCWA Fact Sheet: An Overview (Feb 2008)*
[d] *SCVWD WUE Strategic Plan Phase 1, Final Draft (Sept 2008)*
[e] *Saving Water Partnership 2007 Annual Report (May 2008)*
[f] *SCWA website ("About Us") (obtained Dec 2008)*

THIS PAGE INTENTIONALLY LEFT BLANK

Table 4-4. Summary of Regional Survey Responses by User Category

Residential Single Family (RSF)
• Getting and performing residential surveys is challenging. One-on-one interaction is the best but not cost-effective for our agency to pursue. We are considering working with local gardening and nursery associations and relying on our Water Conservation Garden to educate the public to make behavioral changes. We are stressing plumbing fixture, appliance and irrigation equipment changes by residential customers instead of on-site surveys. Voucher programs are popular because cost savings are instantaneous for the customer. (SDCWA)
• The Regional Garden Makeover Contest was successful in getting sign-ups for residential surveys. However, it was administratively burdensome. Also, the value of the makeover counted as a gift tax to the homeowner; so, some declined the grand prize. (RWA)
• Regional programs for high-efficiency toilets and clothes washer rebates make a lot of sense for the economies of scale. Best to outsource and include annual reporting roll-up in the contract. We very rarely get any customer complaints and the administrative burden is kept down to just managing a contractor. (SWP)
• Residential direct install programs can be really challenging due to repeat calls back on install products. We did a toilet direct install program for the CII sector with great success and no calls back. There is a new pilot water-energy program for low-income, disabled and senior direct install toilet program that is restarting up with PGE handling all the administration and customer calls back. (SCVWD)
• One of our retailers, Marin Municipal Water District, started a very successful "Garden Walk" program working with volunteers from local Master Gardeners that have been trained on irrigation system efficiency to do our BMP 1 – Residential Surveys. They pay for one Master Gardener administrator's salary to help with managing sign-ups and scheduling of the volunteers. Had over 150 sign-ups in few months with marketing at local Master Gardener events. (SCWA)
Residential Multi-Family (RMF)
• HETs at $200 per toilet seem to be our local price point, particularly for apartments and hotels where it is cost effective for plumbers to support the efforts. At $165 toilets did not move. Grant supported $265 per toilet moved but now added funds ended. We now added $35 per toilet to MWD's program to get to $200 per HET and program is moving. The same consultant was hired by both San Diego Gas and Electric and us to work with industry representatives to support and educate all our rebate programs to the plumbing industry which helps Residential and CII programs. (SDCWA)
• The Sacramento region is working on a "green" apartment rating system with local news outlet: Sacramento News & Review who would own the publishing rights to the rating system. From the water agency portion, getting multi-family audits and making recommended changes verified would be the key to getting a "green" rating. Criteria being development for water, energy, recycling, etc. with other local and state agency representatives. (RWA)
• Targeting multi-family purchasers by attending one or more large trade shows per year. SWP buys booth space, sponsorship; they buy time at the podium. We then get sign-ups of guest speakers from property managers who are excited and happy; they are our best sales people. It's the same with all commercial vendors; we work to promote those that work/sell more efficient equipment. It is the same with irrigation contractors selling more efficient equipment. Work with vendors, better products, buyer be aware. Most buyers ask for testimonials. Refer to business owners that installed something better. We cannot recommend certain vendors (due to liability) but we can tell customers, which vendors customers happy with their products and services. (SWP)
• Benchmarking in terms of efficient and in-efficient buildings. Target off of billing system for landscape and multi-family. Linked consumption up to tax base global information system (GIS) maps using the county tax system, along with occupancy information for multi-family customer to get consumption for property size. Found that 100 gallons per person per day was high, probably have leaky toilets. We alert the property owners that their consumption is above average and educate on our programs. (SWP)
Commercial, Industrial, Institutional (CII)
• Sonoma County's Business Environmental Alliance is funded from our budget at $85,000, which largely goes to interns' salaries to get the business program out there and educate the chambers of commerce on our program and get them signed up for audits. Has a working group with representation by one water conservation program specialist. (SCWA)
• MWD's Save a Buck program has been successful and could be good model for BAWSCA. We had some challenges with contract language to participate initially but we worked it out. (SDCWA)
• The "Sacramento Sustainable Business" certification program is partially sponsored by the local energy utility, Sacramento Municipal Utility District, Regional Sacramento County Sanitation District and last year, Regional Water Authority joined. Audits are required to get the "water conservation" certification element (one of five elements). The program is administered by interns at the Sacramento County's Business Environmental Resource Center (BERC) which is converting to a multi-county non-profit group. (RWA)
• We pay local Chamber of Commerce's through a contract that outlines expectations and outcomes on the order of $20-30 per toilet to market our programs. Business owners listen to other business owners. Especially in Asian and Hispanic business owners want to hear from community and other business owners not their utility based on the research we have done. (SWP)
• Direct install programs can be run effectively on a regional basis for the CII sector. (SCVWD)

Table 4-4. Summary of Regional Survey Responses by User Category
Landscape
• Recommend working through the supply chain in Working Group concept. Invite industry in to help identify the gaps where utilities have a key role in making change happen for both Industry and Landscape sector. For commercial weather-based controllers, we changed our criteria where, in order to participate in the program, the landscape contractor has to be trained by manufacturers and we maintain a list on who is eligible to participate to get the controllers. It has been a win-win-win where it has served as marketing for the manufacturer, training for contractors and moving to more and better irrigation controllers and our rebate dollars going to best use. Through our Smart Landscape Grant Program, customers can get pressure regulators, weather based irrigation controller, not device-based, more system-based approach. We had no participation in the first year so we had to redesign to this better supply chain concept to get more involvement. Now supply houses, landscape contractor outreach and more involvement means more change. Program runs based on limits of up to $2,500 an acre, up to $5,000 per site and up to $10,000 per site for public facilities. Now getting into more outreach to Home Owners Associations (HOAs) and participation through expanding list of trained landscape contractors. (SDCWA)
• Water budget software using GIS and satellite imagery. Water Budget program – developed member agencies – City of San Diego had good GIS system and another had a billing system based program so we merged the best ideas of the two and went online. Now the software is operational, where member agencies can go online for satellite imagery to get water budget and download water billing system data to create a water budget. Huge interest in this due to the drought. At the regional level, we can run trends, but cannot see directly customer data which was important to retail agencies. We provide the regional programs and tools and strictly deal with retailers and they provide local assistance through staff at retailer level with customer interaction. We have learned that our retailers need to have local control in how they participate in programs. Helix Water District has taken advantage of our offer for paid interns helping them, where historically they had only done 250 budgets over years; they got 400 done in just 4 months. We offer any of our 24 retailers to pay salary for interns, if they give us a plan for how they are going to use them to meet water conservation goals like this water budget program. (SDCWA)
• Irrigation Technical Assistance Program (ITAP), setting water budgets, weather based controller program have all been successful and are models that can be extended. (SCVWD)
Public Outreach
• Every agency had broad regional outreach campaign that was call to action and behavioral oriented based on local messaging.
• We learned from our marketing research that our landscape campaign was off the mark when we targeted young 20-30 year males. The females make a lot of the landscape design and plant selection decisions, where as the males make more of the maintenance decisions (e.g., gas or electric mower). So we shifted our outreach program focus on marketing what is 'beautiful habitat and water efficient.' (SWP)
School Education
• We emphasize student education and capture a lot of adults as a result. We fund a $50,000 Water Education Facility for training and $100,000 materials. We have 2 full-time teachers, and one part time plus student interns – 3, 4, 5 grades for Fall and Spring – more than double the demand Train the Teachers. We also do Saturdays Project WET and WOW Watershed training, the water cycle class is very popular. Assembly programs for Zon, Zon – out of San Jose for 7/8 grades. Number of students 8,225 (cumulative over the years). We also have Lending Library in our office lobby where teachers can come by and check out materials and videos. We also have models and 3 curriculums (mostly water, environmental) and do a poster contest which last year was 556 students. We partner with stormwater. We have new Program for 2009 - Lawrence Hall of Science in Berkeley exhibit called WaterWorks – contact person Andrea Amborse, Development Programs Director Jan 23-April 18th, marketing materials being developed now. (SCWA)

5. PROCESS AND METHODOLOGY USED TO DEVELOP REGIONAL WATER CONSERVATION IMPLEMENTATION AND FINANCING PLAN

The following sections describe the input that was provided by the Working Group during the WCIP development process, including screening the specific measures for regional implementation by BAWSCA, development of an implementation plan that includes both Core and Subscription Programs, and the proposed Year 1 BAWSCA Conservation Program for FY 2010 (i.e., July 1, 2009 to June 30, 2010).

5.1 Screening Process to Determine Which Measures to Include in a BAWSCA Regional Plan

During the January 12, 2009 workshop, the member agencies each completed a survey to identify which conservation measures they would prefer to have implemented as part of a BAWSCA regional water conservation program (Table 5-1). The survey, shown in Table 5-1, included the 32 conservation measures that were previously evaluated as part of the 2004 SFPUC Technical Reports and the five new measures shown below that had been identified during the new measure selection process (see Section 3):

- NM-1: High-efficiency Toilet Rebates
- NM-2: Education and Training Programs
- NM-5: High-efficiency Washing Machine Rebates
- NM-6: New Building Indoor Water Efficiency
- NM-7: New Building Landscape Water Efficiency

The Project Team reviewed the results of the completed surveys and established the following screening process to assist in determining the top ranking measures:

- Three types of screening criteria were used to evaluate the measures:
  - **Ranking** – The Project Team summed the rankings provided for each measure by each member agency (see Table 5-2). Each member agency ranked their top measures using a value of 1 to 10, with 10 being the highest preference. In addition, each member agency indicated their preference for when the measure would be implemented (i.e., Year 1, Years 2-3, Year 4+).
  - **Number of Member Agencies** – The Project Team summed the number of member agencies that voted for regional implementation of each measure during Year 1 (for "High Priority Measures") and during Years 1 through 3 (for "Medium Priority Measures").
  - **Total Service Area Population Served** – The Project Team summed the estimated population to be served by each measure, based on the populations of the member agencies that selected the measure for regional implementation during Year 1 (for "High Priority Measures") and during Years 1 through 3 (for "Medium Priority Measures").

- Two levels of selection criteria were developed to and then applied to screening results. The selection criteria were intended to capture the both the number of interested agencies, as well as the total population that would be impacted by the measure in question:
  - **Primary Selection** – The Project Team selected thresholds for each of the three screening criteria for High Priority (Year 1) relative to Medium Priority (Year 1-3) measures. Measures meeting each of the selection criteria were chosen for implementation.
  - **Secondary Selection** – The Project Team selected slightly less stringent thresholds for each of the three screening criteria. Measures exceeding a mixture of Primary Selection criteria and Secondary Selection criteria were chosen for implementation.

For those measures identified as "High Priority Measures" (i.e., implemented as part of the Year 1 Plan) the Primary and Secondary Selection Thresholds were as follows.

- High Priority Primary Selection thresholds included the following:
  - Total Ranking: Greater than 50
  - Number of Member Agencies: More than 8 member agencies selected the measure for near-term, Year 1 implementation
  - Total Population Served: Greater than 800,000 (based on the member agencies that selected the measure for near-term, Year 1 implementation)
- High Priority Secondary Selection thresholds included the following:
  - Total Ranking: Greater than 29
  - Number of Member Agencies: More than 6 member agencies selected the measure for near-term, Year 1 implementation
  - Total Population Served: Greater than 650,000 (based on the member agencies that selected the measure for near-term, Year 1 implementation)

For those measures identified as "Medium Priority Measures" (i.e., those implemented in Years 1-3), the Primary and Secondary Selection Thresholds were as follows.

- Medium Priority Primary Selection thresholds included the following:
  - Total Ranking: Greater than 20
  - Number of Member Agencies: More than 8 member agencies selected the measure for Years 1 to 3 implementation
  - Total Population Served: Greater than 500,000 (based on the member agencies that selected the measure for Years 1 to 3 implementation)
- Medium Priority Secondary Selection thresholds included the following:
  - Total Ranking: Greater than 15
  - Number of Member Agencies: More than 6 member agencies selected the measure for Years 1 to 3 implementation
  - Total Population Served: Greater than 400,000 (based on the member agencies that selected the measure for Years 1 to 3 implementation)

The Project Team applied the screening protocol outlined above to identify the top-ranked measures. Additional coordination between the Project Team, BAWSCA, and the member agencies allowed packaging of top-ranked measures into several different program elements to be included in the Shared Vision Model, which is described in Section 5.2.

5.2 Regional Planning and Development of the Shared Vision Model

To launch implementation of a regional conservation program, BAWSCA needs to answer a series of key questions to determine measures, budget and schedules for a regional plan. These questions include:

- What measures are feasible and reasonable to implement on regional scale?
- What is the overall level of support needed for each measure?
- Which members are specifically interested in which measures?
- What level of each measure can be planned regionally based on individual member agency plans and budgets?
- What level of administrative support would be required from BAWSCA to run these selected measures?
- What other support is needed (.e.g., outsourced support or grant funding) that is needed or wanted to run these programs?

In order to focus the discussion on the various water conservation measures evaluated as part of the DSS modeling effort made sense for inclusion in the WCIP, it was necessary to incorporate the results of the agency surveys (as described in Section 5.1 and as summarized in Table 5-2), feedback from Workshops 1 and 2, linked to the output from the agency-specific DSS models. The tool used for this process, the Shared Vision Regional Conservation Program Model (Shared Vision Model), is an MS Excel file that post-processes output results from each of the 29 DSS models.

As an analytical tool, the Shared Vision Model allows BAWSCA and the member agencies to evaluate:

- The impact of each member agency's selections for individual conservation measures (in terms of rolling up overall number of activities and associated regional cost and water savings as taken from the DSS model outputs).
- Whether members want to participate in regional implementation of each measure; and if
- BAWSCA has indications of enough support from member agencies to run a regional program (for example, 4 agencies wanting to run a HET rebate program is not enough support launch and maintain a regional program).

The Shared Vision Model includes a tool which allows for each individual agency to place an "X" in a cell to select a measure (in essence "check a box") following which their DSS model results will be included in a summation of a regional program. Deleting the "X" then unselects that member's participation and associated number of activities, costs and water savings are then excluded from the regional program. Thus, the model allows for rapid updating of a summation across the region to reflect number of activities planned and also potential conservation savings associated with each individual member agencies' planned conservation programs. It also sums the planned budget in the summary implementation plan by allowing for changes in cost of each activity (e.g., adjusting the rebate levels) for each respective measure being considered for regional financial plan for implementation through BAWSCA. Thus, the model allows BAWSCA to evaluate the potential cost and effectiveness, in terms of potential water savings, of various regional conservation programs by running "what if" scenarios.

As an example of how the Shared Vision Model functions, each member agency interested in the HEW Rebate Program would be selected and the summation would link the DSS model output for that member agency's target number of interventions (i.e., rebates needed to achieve the assumed penetration rate) for a given year. The second step sums the total estimated number rebates assumed to be issued by participating member agencies. The third step adds in costs for BAWSCA staff support and the development costs or contractor costs that would be needed to run the program on a regional basis (i.e., which offsets local agency administrative costs). The total measure cost, including the administration and development costs (if applicable for new program); can then be estimated for BAWSCA budgeting purposes. In addition to supporting the annual budget process, the Shared Vision Model has the ability to aid in grant program planning or discussion with cost sharing partners for any measure that was included in the DSS models.

The Project Team reviewed the Shared Vision Model with the Working Group and solicited feedback. The following two Working Group meetings and subsequent communication between the BAWSCA program manager and BAWSCA member agency staff were used to achieve consensus on which measures would be included in the BAWSCA Year 1 Plan (i.e., the BAWSCA Regional Program). Implementation of these measures, and the resultant impact on water savings was evaluated using the Shared Vision Model.

5.3 Selection of Core and Subscription Programs and Measures

Based on the results of the surveys and application of the Shared Vision Model, a regional WCIP was developed that evaluated the water conservation measures that BAWSCA would implement at a regional level with those member agencies who elected to participate. Based on BAWSCA's principles for funding and implementing water conservation measures, the regional WCIP was split into two program types: Core Programs and Subscription Programs. Alternative financing mechanisms for the regional WCIP may be evaluated in the future.

  - The specific activities associated with the WCIP implementation in Year 1 for both Core and Subscription programs are provided below.

- **The Core Program** is funded through the annual BAWSCA budget and contains those conservation measures that benefit from regional implementation and that provide regional benefit, irrespective of individual agency jurisdictions. The Core Program for the Year 1 Plan includes:
  - Regional Program Management and Coordination with Wholesale Agencies
  - Developing Regional Partnerships
  - Pursuing Grants or Other Financial Support
  - Providing Technical Support and Training
  - Developing Template Water Efficient Building and Landscape Ordinances (New)
  - BMP and UWMP Reporting Support
  - Legislative Policy Support
  - Design and Implementation of a Regional Public Information Program (New)
  - Residential Landscape Education and Training Program (Expanded)

- **The Subscription Program** is fully funded by the individual agency that elects to participate in the program based on their participation level and includes conservation measures whose benefits can be realized in individual water agency service areas. The Subscription Program for the Year 1 Plan includes:
  - School Education Program (Expanded)
  - Bulk Purchase Residential Retrofit Kits (New)
  - High-efficiency Toilet Rebates (Expanded)
  - High-efficiency Clothes Washer Rebates (Expanded)
  - Residential Weather Based Controller Rebates (New-Design Phase Only)
  - Bulk Purchase of Pre-Rinse Spray Valves (New)
  - Commercial Surveys (New-Design Phase Only)
  - Large Landscape Water Budgets (Existing)

Through the development of a Core Program and Subscription Programs, BAWSCA and its member agencies were able to agree on a financing structure for the regional WCIP Core Program Year 1 that would support BAWSCA in implementing the programs on a regional basis and that would adhere to BAWSCA's key principles.

Table 5-1. Template for Survey of WUE Implementation and Financing Plan Components							
Measure No.	Measure	Reason for Selection / Comments (High Water Savings, Low Water Savings, Not Cost Effective, Plan to Run Individually, Not Interested in this Measure for our Agency)	Yes, 1 year	Yes, 2-3 years	Yes, 4-10 years	Never Regionally	Rank Top 10 10 = Best
MULTIPLE CUSTOMER TYPES							
13	Weather-based Controller Rebates	EXAMPLE: High water savings, high probability for success	X				10
NM-6	New Building Indoor Water Efficiency						
NM-7	New Building Landscape Water Efficiency						
21	Enforce landscape requirements for new landscaping systems (turf limitations / regulations)						
NM-1	Install HETs						
CII							
8	ULF Toilet and Urinal Rebates						
17	Offer incentives for replacement of clothes washers in coin-operated laundries						
22	Restaurant pre-rinse spray nozzles						
24	WAVE Program (US EPA) for hotels						
25	Hotel retrofit (w/financial assistance)						
27	Replace inefficient water using equipment						
28	Require 0.5 gal/flush urinals in new buildings						
7	Commercial Water Audits						
23	Focused water audits for hotels/motels						
26	Award program for water savings by businesses						

Table 5-1. Template for Survey of WUE Implementation and Financing Plan Components							
Measure No.	Measure	Reason for Selection / Comments (High Water Savings, Low Water Savings, Not Cost Effective, Plan to Run Individually, Not Interested in this Measure for our Agency)	Yes, 1 year	Yes, 2-3 years	Yes, 4-10 years	Never Regionally	Rank Top 10 10 = Best
LANDSCAPE							
3	Large Landscape Conservation Audits						
4	Water Budgets						
29	Financial incentives for complying with water use budget						
30	Financial incentives for irrigation upgrades						
14	Xeriscape education and staff training at retail garden/irrigation supply houses						
31	Require dedicated irrigation meters for new accounts						
PUBLIC BUILDINGS							
32	Water Utility / City Department water reduction goals						
RESIDENTIAL - MULTI-FAMILY							
18	Incentives for retrofitting sub-metering						
19	Require sub-metering multifamily units						
20	RMF efficient clothes washer rebates						
RESIDENTIAL - SINGLE-FAMILY							
11	Home Leak Detection and Repair						
15	Homeowner irrigation classes						
16	Promote water efficient plantings at new homes						
NM-2	Education and Training Programs						

Table 5-1. Template for Survey of WUE Implementation and Financing Plan Components							
Measure No.	Measure	Reason for Selection / Comments (High Water Savings, Low Water Savings, Not Cost Effective, Plan to Run Individually, Not Interested in this Measure for our Agency)	Yes, 1 year	Yes, 2-3 years	Yes, 4-10 years	Never Regionally	Rank Top 10 10 = Best
RESIDENTIAL - SINGLE AND MULTI-FAMILY							
2	Residential Retrofit						
5	Clothes Washer Rebate						
9	Residential ULF Toilet Rebate						
10	Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings (ROR)						
12	High-efficient Toilet Rebates						
NM-5	Washer Rebates for High-efficiency Machines						
1	Residential Water Surveys						
EDUCATION							
6	Public Information Program						
Not Listed	School Education - Resource Action Programs						

Table 5-2. Regional Measures Implementation Timeframe and Ranking Survey Responses

Customer Category	Multiple Customer Types					CII										Landscape						Building	Residential - MF			Residential - SF				Residential - SF and MF							Education	
Measure Number	13	NM-6	NM-7	21	NM-1	8	17	22	24	25	27	28	7	23	26	3	4	29	30	14	31	32	18	19	20	11	15	16	NM-2	2	5	9	10	12	NM-5	1	6	Not Listed
Measure Name	Weather-based Controller Rebates	New Building Indoor Water Efficiency	New Building Landscape Water Efficiency	Enforce landscape requirements for new landscaping systems (turf limitations / regulations)	Install High-efficiency Toilets (HETs)	ULF Toilet and Urinal Rebates	Offer incentives for replacement of clothes washers in coin-operated laundries	Restaurant pre-rinse spray rinse nozzles	WAVE Program (US EPA) for hotels	Hotel retrofit (w/financial assistance)	Replace inefficient water using equipment	Require 0.5 gal/flush urinals in new buildings	Commercial Water Audits	Focused water audits for hotels/motels	Award program for water savings by businesses	Large Landscape Conservation Audits	Water Budgets	Financial incentives for complying with water use budget	Financial incentives for irrigation upgrades	Xeriscape education and staff training at retail garden/irrigation supply houses	Require dedicated irrigation meters for new accounts	Water Utility / City Department water reduction goals	Incentives for retrofitting sub-metering	Require sub-metering multifamily units	Rebate RMF efficient clothes washers	Home Leak Detection and Repair	Homeowner irrigation classes	Promote water efficient plantings at new homes	Education and Training Programs	Residential Retrofit	Clothes Washer Rebate	Residential ULF Toilet Rebate	Require 1.6 gpf toilets to be installed at the time of sale of existing buildings (ROR)	High-efficiency Toilet Rebates	Washer Rebates for High-efficiency Machines	Residential Water Surveys	Public Information Program	School Education - Resource Action Programs
Total Ranking	62	53	48	18	34	10	19	56	3	0	0	0	60	3	0	54	26	11	7	30	0	1	0	1	20	2	18	12	51	19	70	13	5	85	59	31	73	30
Total Agencies Voting to Implement Measure during Year 1	7	7	9	4	2	5	3	8	0	0	1	4	8	2	3	10	7	0	5	10	3	2	0	3	6	3	10	7	8	5	13	4	2	12	13	9	14	10
Total Agencies Voting to Implement Measure during Years 2 to 3	5	8	8	4	4	2	4	5	2	6	2	4	3	6	3	2	2	5	2	4	3	0	3	2	1	0	1	3	6	2	1	2	3	1	0	2	2	2
Total Agencies Voting to Implement Measure during Years 4 to 10	3	1	0	2	4	1	4	1	1	1	4	1	2	3	2	2	2	1	1	0	0	2	3	3	5	2	1	0	2	1	0	0	1	0	1	3	0	1
Total Agencies Voting to Never Implement Measure Regionally	2	2	2	8	7	10	5	2	11	8	8	7	3	3	9	2	6	10	6	1	11	13	10	9	3	13	4	6	2	8	2	12	11	2	0	3	2	2

THIS PAGE INTENTIONALLY LEFT BLANK

6. PLAN NEXUS WITH CUWCC'S MEMORANDUM OF UNDERSTANDING

The CUWCC's MOU was most recently revised in December 2008. The revised MOU creates a new compliance and reporting format which will impact the following BAWSCA member agencies who are also CUWCC members:

- Alameda County Water District
- California Water Service
- Coastside County Water District
- City of Hayward
- City of Millbrae
- City of Mountain View
- City of Palo Alto
- City of Redwood City
- City of San Jose
- Mid-Peninsula Water District
- North Coast County Water District
- Purissima Hills Water District
- Stanford University
- Westborough Water District

In addition, the SCVWD is implementing several of the BMPs on behalf of its retailers to meet its long-term water supply reliability goals, as well as the CUWCC MOU goals. Through this action, three additional BAWSCA member agencies (i.e., the City of Milpitas, the City of Santa Clara, and the City of Sunnyvale) are implementing several BMPs to the requirements of the CUWCC's MOU for water conservation (Table 6-1).

The amount of water purchased by those BAWSCA member agencies whose conservation activities must be reported to the CUWCC as part of the MOU represents the majority of the total SFPUC water purchases by BAWSCA member agencies. Based on this fact, the WCIP has been designed to align, where appropriate, with the new CUWCC MOU. This will enable BAWSCA and its member agencies to better track conservation results against the new CUWCC MOU.

There are two fundamental types of BMPs defined in Exhibit 1 of the new CUWCC MOU: Foundational BMPs and Programmatic BMPs. The BMPs are outlined as follows:

Foundational BMPs:

1. Utility operations programs
2. Educational programs

Programmatic BMPs:

1. Residential
2. Commercial, Institutional, and Industrial
3. Landscape

In addition to the measures on the BMP List, the CUWCC Flex Track menu and Gallons Per Capita per Day (GPCD) compliance options may be implemented to meet the BMP savings goal. Agencies choosing the Flex Track option are responsible for achieving water savings greater than or equal to that which they would have achieved using only the BMP list items. The Flex Track Menu will be maintained and regularly updated in the MOU Compliance Policies. For a complete summary of each BMP and the Flex Track options, please see the updated CUWCC MOU on their website (www.cuwcc.org).

Tables 6-2 and 6-3 highlights the measures for Year 1 and Years 2 or 3 (respectively) that have (1) been selected for regional implementation by the BAWSCA member agencies and (2) are related to specific BMPs pursuant to the new CUWCC MOU. Where there is a new or expanded activity resulting from the development of the WCIP, a notation is provided.

Table 6-1. BAWSCA Agencies' Involvement in Regional Programs and Reporting Requirements

Agency	BAWSCA Member Agency	SCVWD Member Agency	CUWCC Signatory
Alameda County Water District	X		X
Brisbane, City of	X		
Burlingame, City of	X		
CWS - Bear Gulch District	X		X
CWS-Mid Peninsula District	X		X
CWS - South San Francisco District	X		X
Coastside County Water District	X		X
Daly City, City of	X		
East Palo Alto, City of	X		
Estero MID/Foster City	X		
Guadalupe Valley MID	X		
Hayward, City of	X		X
Hillsborough, Town of	X		
Menlo Park, City of	X		
Mid-Peninsula Water District (formerly Belmont)	X		X
Millbrae, City of	X		X
Milpitas, City of	X	X	
Mountain View, City of	X	X	X
North Coast County Water District	X		X
Palo Alto, City of	X	X	X
Purissima Hills Water District	X	X	X
Redwood City, City of	X		X
San Bruno, City of	X		
San Jose, City of (portion of north San Jose)	X	X	X
Santa Clara, City of	X	X	
Skyline County Water District	X		
Stanford University	X	X	X
Sunnyvale, City of	X	X	
Westborough Water District	X		X

Table 6-2. Year 1 Planned BAWSCA Activities - Support of CUWCC BMPs			
Name of Measure	BAWSCA Support for Core or Subscription	BAWSCA Level of Support (Existing New or Expanded Measure)	CUWCC MOU BMP Cross-Reference
Utility Operations Support			
Regional Program Management and Coordination with Wholesale Agencies (e.g., SFPUC and SCVWD)	Core	Existing	BMP 1
Development of Regional Partnerships	Core	Expanded	BMP 1
Pursuing Grants or Other Financial Support	Core	Expanded	BMP 1
Technical Support Develop Ordinance Templates New building indoor water efficiency New building landscape water efficiency	Core	New	BMP 1
Water Shortage and Water Waste Support	Core	Expanded	BMP 1
BMP Reporting Support	Core	Expanded	BMP 1
Educational Programs			
Regional Public Information Campaign Targeting Customer Actions(*new*)	Core	New	BMP 2
Support Development of a School Education Program K-8 Program (*expanded*) 9-12 Program (*new*)	Subscription	Expanded and New	BMP 2
Residential			
Residential Education & Training	Core	Existing	BMP 3
Bulk purchase of residential retrofit devices	Subscription	New	BMP 3
High-efficiency clothes washer rebates	Subscription	Expanded	BMP 3
High-efficiency toilet rebates for RSF and RMF	Subscription	Expanded	BMP 3
Commercial			
Bulk purchase of CII retrofit devices (e.g., pre-rinse spray valves) (*new*)	Subscription	New	BMP 4
High-efficiency toilet rebates for CII accounts	Subscription	Expanded	BMP 4
Landscape			
Large landscape surveys	Subscription	Expanded	BMP 5
Water budgets	Subscription	Expanded	BMP 5

Table 6-3. Year 2 or 3. Potential BAWSCA Activities - Support of CUWCC BMPs			
Name of Measure	BAWSCA Support for Core or Subscription	BAWSCA Level of Support (Existing New or Expanded Measure)	CUWCC MOU BMP Cross-Reference
Residential leak and landscape surveys	Subscription	New	BMP 3
Residential weather-based controller rebates	Subscription	New	BMP 3 and BMP 5
Commercial surveys	Subscription	New	BMP 4

THIS PAGE INTENTIONALLY LEFT BLANK

7. BAWSCA YEAR 1 PLAN: CORE PROGRAM IMPLEMENTATION AND FINANCING

As described in earlier sections, the WCIP was developed to lay out a long-term plan for achieving water conservation savings within the BAWSCA service area. The following presents the specific measures included in the WCIP Core Program for implementation in Year 1, as well as measure implementation and financing options. Table 7-1 presents the assumed number of interventions (e.g., rebates) and estimated budgets for each measure included in the Core Program, as well as the estimated water savings. It should be noted that additional BAWSCA staff support for BMP 1 Utility Program Support is assumed to be included in the overall annual labor budget for BAWSCA.

The Core Program will be funded through annual assessments to the agencies. The Subscription Programs will be fully funded by the participating BAWSCA member agencies. In both cases, funding may be supplemented with other outside funding sources, such as grants through Proposition 84 with the Integrated Water Resources Management Planning (IWRMP) funding process, cost-sharing partnerships, and in-kind services that BAWSCA can assist with supporting more conservation funding for the region.

Core program elements include the following:

BMP 1: Utility Programs Support

- Regional Program Management and Coordination with Wholesale Agencies
- Develop Regional Partnerships
- Pursuing Grants or Other Financial Support
- Provide Technical Support and Training
    - Develop Template Water Efficient Building and Landscape Ordinances (*new*)
- BMP and UWMP Reporting Support
- Legislative Policy Support

BMP 2: Educational Programs

- Regional Public Information Program designed to solicit customer participation in conservation programs (*new*)

BMP 3: Residential Programs

- Residential Landscape Education & Training (*expanded*)

7.1 BMP 1. Utility Programs Support

BAWSCA's support for BMP 1- Utility Programs is outlined in the following sections.

7.1.1 Regional Program Management and Coordination with Wholesale Agencies

There are on-going changes in the water conservation industry with new water saving technologies and grant funding opportunities continuously becoming available. In support of the evolving regional program and individual member agency programs, the BAWSCA Program Manager and staff will continue to actively support and pursue the following:

- Maintain communication with state, SFPUC and regional representative(s) from other counties, the SCVWD, and others, as appropriate;
- Coordinate agendas, minutes and comments to meeting representative(s) (e.g. BAWSCA member agency staff, SFPUC, SCVWD, other outside agency staff);
- Work with committee chairs or others in respective working group and special committees; and
- Communicate effectively to BAWSCA Member Agencies and BAWSCA Board Members.

Specific duties may include:

- Provide statewide and regional representation at meetings (e.g., State Water Resources Control Board [SWRCB], DWR) as appropriate;
- Attend water efficiency specialty briefings with DWR and others as needed and report in email;
- Provide meeting presentations to BAWSCA member agencies on the latest updates from state and federal agencies;
- Attend CUWCC Plenary and Committee Meetings, as necessary;
- Communicate with regional representative(s) of BAWSCA and other utilities (energy and wastewater);
- Provide staff support for BAWSCA Water Resources Committee meetings; and
- Facilitate long-range water conservation and water supply reliability planning for BAWSCA member agencies for the two critical planning periods – now to 2018, and 2019 to 2030.

7.1.2 Develop Regional Partnerships

BAWSCA's existing conservation program has been developed in conjunction with its member agencies and through partnerships with other entities. The program's demonstrated success since its inception highlights the value of regional partnerships and it is BAWSCA's intent to continue to build on relationships with the following partner entities and others:

- Other major Bay Area water utilities: SFPUC, Marin Municipal Water District (MMWD), Contra Costa Water District (CCWD), EBMUD, SCWA, and SCVWD, among others
- Pacific Gas and Electric (PG&E)
- Silicon Valley Water Conservation Coalition
- Pacific Institute
- UC Cooperative Extension, Master Gardeners
- Bay-Friendly Coalition (StopWaste.org)
- Wastewater Utilities

Wastewater agencies and associated partner water agencies that are involved in recycled water projects in the BAWSCA region are listed in Table 7-2. At a minimum, BAWSCA will be checking in annually on progress related to recycled water projects and meeting the 2018 target date for implementation.

7.1.3 Financial Investments through Outside Funding

BAWSCA will continue to actively pursue partnerships with other entities to pursue grant funding opportunities. Independent actions to secure grant funding are not contemplated at this time but can be considered as necessary and appropriate. Specific activities may include:

- Regular updates to BAWSCA agencies on grant funding opportunities;
- Support IWRMP partnership seeking funding for high priority regional water efficiency projects (e.g., large scale rebate programs); and
- When consensus is achieved, and as appropriate, BAWSCA may prepare regional grant applications. It is anticipated that at least one grant application related to the Bay Area Integrated Regional Water Management Plan (IRWMP) will be submitted in FY 2010 for those agencies that are ready with implementation requirements met per AB 1420[1].

7.1.4 Provide Technical Support and Training

Beginning Year 1 and on an on-going basis, the BAWSCA Program Manager will also support the development and logistics for in-house training of member agencies' staff. It is assumed that facilities will be provided by the member agencies or conducted at BAWSCA offices. Where possible, BAWSCA will seek coordination with other organizations (e.g., the CUWCC) to reduce the costs associated with training. Only general support expenses (e.g., administrative logistics, material copies, meeting refreshments) are costs attributable to the BAWSCA budget. Some potential training opportunities for FY 2010 include:

- Flex-Track Planning for CUWCC BMP Compliance
- Water Loss Control
- Landscape Certification
- Water Conservation Practitioner
- Field Staff Training
- Conservation Staff Annual Briefing (BAWSCA web resources and program overview)

Technical assistance to agencies includes the following types of support:

- Answer questions of conservation staff related to planning support needs; and
- Provide or research answers to technical questions related to water efficient products or forward to CUWCC or Water Forum for support in answering the questions.

[1] Assembly Bill (AB) 1420 (Stats. 2007, ch. 628) amended the Urban Water Management Planning Act, Water Code Section 10610 et seq., to require, effective January 1, 2009, that the terms of, and eligibility for, any water management grant or loan made to an urban water supplier and awarded or administered by DWR, SWRCB, or California Bay-Delta Authority (CBDA) or its successor agency (collectively referred to as "Funding Agencies") , be conditioned on full compliance with implementation requirements of the water Demand Management Measures (DMMs) described in Water Code Section 10631(f).

7.1.5 Develop Template Water Efficient Building and Landscape Ordinances

One of the most important technical support tasks for Year 1 will include assistance with development of template language for local building and landscape ordinances. The following description outlines assumptions for supporting this task.

DSS Model Measure NM-6 and NM-7. Detailed description of work effort for Technical Support of Model Development Ordinances. Year 1. This measure includes BAWSCA's support to develop and achieve member agency consensus on template language for the Water Efficient Building and Landscape Ordinances. BAWSCA, in coordination with others (e.g., the SCVWD and SFPUC), will modify language from other, already existing ordinances. It is expected that the member agencies may modify the template ordinances to reflect particulars of local conditions and requirements. In order to achieve the estimated water savings associated with the implementation of these ordinances as modeled, the ordinances need to be more restrictive and contain more requirements than many of the current voluntary green building programs. As part of this measure, it is expected that BAWSCA will attend outside agency meetings to get to closure and adoption of ordinances, some of which are expected to take more extensive conversations (e.g., Counties).

Description of staffing or contractor support. BAWSCA will support meeting logistics and facilitate dialogue among the BAWSCA member agencies to develop comprehensive, template ordinances that extend beyond the current state and U.S. Green Building Council Leadership and Excellence in Environmental Design (LEED) requirements to maximize water savings. BAWSCA plans to contract for legal and technical support as deemed necessary.

Total estimated budget and schedule assumptions. Several options for implementing this measure were considered by the Working Group as part of this evaluation. The preferred option provides for 20 percent staff time support from the BAWSCA project manager, one two-hour meeting a month for 12 months, and 40 hours support for staff discussions or presentations at individual BAWSCA agencies in Year 1. This budget does not include inspections to confirm compliance with the ordinances or other support activities which are envisioned to occur in Years 2 and 3.

DSS model assumptions. This measure assumes that the Water Efficient Building Ordinance will require developers to install the following interior water conserving devices, where applicable, in any new building or residence:

- High-efficiency Toilets and High-efficiency Urinals
- High-efficiency Clothes Washers
- Energy Star Dishwashers
- High-efficiency Faucets and Showerheads
- Efficient Hot Water Delivery Systems
- Multi-family submetering

These requirements are similar but slightly more stringent than both EPA's Water Sense for New Homes (latest release: Draft May 7, 2009) and EBMUD's current new connection regulations which were adopted in 2007.

This measure also assumes that the member agencies, or other appropriate entities, will adopt a Water Efficient Landscape Ordinance that will require developers to install outdoor water conserving devices/systems which will result in a 25 percent savings in outdoor landscaping water use. Such savings

could be achieved through implementation of the following, where applicable, for landscaping around any new building or residence:

- Efficient landscaping with either a turf limit (e.g., no more than 40 percent of landscaped area or a water budget approach (e.g., a landscape and irrigation system design to achieve 60 -70 percent of reference evapotranspiration [ETo]), and
- State of the art irrigation controller (e.g., weather adjusting controller).

These requirements represent a combination of both EPA's Water Sense for New Homes (latest release: Draft May 7, 2009) and EBMUD's current new connection regulations which were adopted in 2007.

Regional survey findings and other suggestions for program element design. A review of SCVWD, SCWA, and EBMUD templates is recommended to provide guidance for developing the ordinance templates. A review of the following existing guidelines is also recommended: (1) Modify LEED; (2) Modify EPA Water Sense New Home Specifications; (3) Review 'Build It Green' Building Industry Association (BIA) initiative to see value including elements into a model ordinance for BAWSCA agencies; and (4) the California State Updated Model Water Efficient Landscape Ordinance (AB 1881).

7.1.6 BMP and UWMP Reporting Support

Beginning Year 1 and on an on-going basis, for the conservation programs that it implements on behalf of its member agencies, BAWSCA will provide the information to each member agency that must be used by its member agencies in reporting BMP activity to the CUWCC and State of California as part of a UWMP. This information, collected on a fiscal year basis, will be supplied to BAWSCA agencies in time for their use.

The BAWSCA agencies are interested in implementing cost-effective programs that receive BMP compliance credit and have generated key ideas as follows:

- Obtain credit for programs not specified in the BMPs, such as the Living Wise Program;
- Provide support for “at least as effective as” programs;
- Track and support the methodology and reporting requirements for CUWCC FlexTrack BMP option; and
- Provide BMP reporting assistance to agencies.

BAWSCA is considering establishing a comprehensive water conservation tracking database to report annual progress in implementing water conservation beginning in FY 2010.

7.1.7 Legislative Policy Support

While it is challenging to get all agencies in a regional area to agree on a stance for legislative bills, where consensus is attainable, the region likely benefits from voicing their opinions. On case-by-case basis, and at the request of the BAWSCA agencies, BAWSCA will support addressing legislative issues. Some of the activities that it is envisioned that BAWSCA could support include:

- Tracking legislative changes;
- Developing comment letters on active water conservation related legislation;
- Developing talking points for agencies related to water conservation topics; and
- Providing general media support.

7.2 BMP 2. Educational Programs

In Year 1, BAWSCA will lead the design and implementation of the Regional Public Information Program that is intended to solicit customer participation in conservation programs.

Description of work effort. As appropriate, and as agreed upon with the BAWSCA member agencies, the Regional Public Information Program shall be consistent with supporting the needs outlined in Foundational Best Management Practice for Education, in the CUWCC MOU. This effort will also be designed to complement, not duplicate or be in conflict with, existing campaigns being implemented by the individual member agencies.

The member agencies identified the following high priority needs as part of the public outreach process:

- Regional web site that is user friendly for customers and makes it clear to customers which conservation programs each member agency is offering (similar to the web site developed for the Water Saving Hero Campaign: www.watersavinghero.com and the California State website: www.saveourh2o.org);
- Template materials with consistent messages and graphics for items like bill inserts, table tops, fact sheets, and newsletter articles that will be made available for individual agency printing.
- Public Service Announcement (PSA) campaign development and placement promoting rebate programs and other "calls to action" for customers in addition to the "conservation awareness" social marketing message outlined in BMP 2 for Education.
- Speaker's bureau template presentations that can be tailored and presented by each member agency.
- Coordination and least cost approach to outreach, including BAWSCA seeking media interviews and aid in support through developing talking points related to current local water supply conditions and need for conservation. BAWSCA may be directly interviewed along with member agency staff to convey the regional messages.

Other key priorities may be defined over time as BAWSCA maintains its existing, and continues to develop more, partnerships and seeks in-kind and cost-sharing opportunities to promote water conservation. BAWSCA will continue to seek partners for message outreach and publication of their outreach materials, which may include the following organizations:

1. Other utilities, including electric utilities
2. Master Gardeners
3. California Landscape Contractors Association
4. University of California Cooperative Extension (UCCE)
5. Retail and wholesale outlets (e.g., hardware stores)
6. Local Colleges
7. Green Building Programs
8. Newsletter articles published in other entities' newsletters:
    a. Home Owners Associations (HOAs)
    b. City/county materials
    c. Non-profits
    d. Other
        i. Water conservation gardens at utility or other high traffic areas or new homes
        ii. Water wise landscape contest or awards program

Description of staffing or contractor support. BAWSCA will release a request for qualifications (RFQ) for an outreach consultant to support development of the outreach campaign messaging and graphics in Year 1. BAWSCA staff will support the implementation of the campaign.

Total estimated budget = $145,000. It is estimated that $100,000 of the total measure budget will be used to develop the public outreach campaign, with the balance used to support BAWSCA staff time and expenses. This budget does not include paid placement of advertisements in print, radio or television. It is assumed that these costs will be paid for through individual agency funds that target the zip codes in their service areas.

DSS model measure description and key assumptions for Measure 6. It is recommended that BAWSCA provide public education to raise awareness of conservation measures available to retail customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts.

Regional survey findings and other suggestions for program element design. All regional programs surveyed had a regional public outreach program to capture cost efficiencies for PSA and advertisement placement using consistent messaging and branding. Equity in the funding scheme is achieved through the amount of water purveyed (e.g., wholesaler rates) or through a per connection fee. There is a potential to leverage marketing research from other Bay Area agencies (e.g., contact SCVWD, and potentially leverage their plans to capture economies of scale in same news shed).

7.3 BMP 3. Residential Programs

In discussions with BAWSCA member agencies during meetings and workshops, there was clear consensus to continue with the regional residential landscape education and training programs and to seek expansion of both the curriculum and number of classes offered. Given that this program serves customers across service area boundaries, this was included in the Core Program for budget support through annual assessments.

7.3.1 Residential Landscape Education & Training

Description of work effort. Beginning Year 1, BAWSCA will work with partners like StopWaste.org to leverage support and marketing for the landscape education classes that will be similar to the successful Bay-Friendly Landscape program. For example, class series may include:

1. Principles in California Native Plants (Xeriscape) Design (Bay Friendly Landscape/EBMUD Book)
2. Homeowner Irrigation Design and Maintenance;
3. Water Efficient Plant Selection; and/or
4. Optional additional class could include a "put it all together" workshop with in-depth do-it-yourself landscape design plans review and assistance from landscape professionals.

Description of staffing or contractor support. BAWSCA will be responsible for new curriculum development, promotion and logistical support. It is expected that member agency staff will provide volunteer support. The educational series is anticipated to ramp up over time. Year 1 will include three class series at six sites (18 classes total), Year 2 will include four classes series at 10 locations, and Year 3 will include two sets of four classes at 10 locations. It is assumed that BAWSCA will support logistics for promoting the classes, customer sign-ups, and copying materials and that host agencies will support event logistics related to the selected site and coordination to meet instructor needs.

Total estimated budget = $50,000. It is recommended that BAWSCA seek opportunities to partner with other entities in implementing this measure, including with SCVWD, SFPUC, CCWD, EBMUD, and StopWaste.org. The budget is set at $950 per class to cover the instructor's fee, which is the current contract fee for the existing program. It is assumed that BAWSCA agencies will find host locations at no cost to BAWSCA.

DSS model Measure NM-2 assumptions. It is assumed that there will be a combination of three types of training classes: (1) Xeriscape, (2) Homeowner Irrigation, and (3) Promotion of Water Efficient Plants. It is also assumed that all savings are implemented for RSF accounts. The number of accounts affected is computed on a regional basis and then divided among service areas. This assumes that full regional implementation would achieve the following: 20 class sites, 4 classes/year/site, 50 attendees/class, 1 affected-account/attendee. 20 x 4 x 50 x 1 = 4,000 affected accounts.

Regional survey findings and other suggestions for program element design. BAWSCA will lead the expansion of the education and training program with revisiting specific offers of support and input from Bay Area agencies, such as Alameda County Water District (ACWD), SCVWD, SFPUC, CCWD, EBMUD, StopWaste.org, and City of Hayward. The Project Team also recommends that BAWSCA seek more input from other Bay Area agencies to review and decide on a revised format, curriculum, and outreach strategies, and to connect with potential local non-profit groups for support.

Table 7-1. Regional Water Conservation Implementation and Financing Planning Options - Core Program

Program Element Description	DSS Model Based Measure Descriptions	Regional Program Implementation Plan Description	Implementation Options	Planning Number of Participation Agencies	Development Cost	Cost Basis per Activity	BAWSCA Admin Cost (Hourly Rate) or Percent per Participant or Activity ($90.00)	Contractor Cost	Planning Number of Activities	FY 2010 Total Cost Estimate	Full Cost BAWSCA Regional Program	BAWSCA Cost if over 50 percent Grant Supported (50%)	BAWSCA Cost if Partial Grant Supported (75%)	BAWSCA Cost if Partial Partnership Funding Supported (60%)	Comments
Core Program Elements with Support for Foundational BMP 1. Utility Operations Programs															
BMP 1. (b) Technical Training and Assistance															
Template New Ordinances New Building Indoor Water Efficiency New Building Landscape Water Efficiency	NM-6 and NM-7. Require developers to install the following devices where applicable: (1) HET Toilet; (2) High-efficiency Clothes Washer; (3) Energy Star Dishwasher; (4) High-efficiency Faucets and Showerheads; (5) Efficient Hot Water Delivery System; (6) Multifamily submetering. These requirements are similar but slightly more stringent than both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007. Agency adopts ordinance to require developers to install the following devices/systems where applicable for landscaping around any new building: (1) Efficient landscaping with either a turf limit (such as no more than 40 percent) or a water budget approach (such as design to achieve 60 percent of ETo); (2) State of the art irrigation controller (may be a weather adjusting controller in the future). These requirements are a blend of both EPA's Water Sense for New Homes and EBMUD's current new connection regulations adopted in 2007.	New Program for Year 1. Labor support to get template language to consensus. Recommend modifying existing ordinance language from others. Water savings based on larger scale than voluntary green building programs. Recommend BAWSCA support to attend outside agency meetings to get to closure and adoption of ordinances, some will take more extensive conversations (e.g., Counties). Opportunity to partner with SCVWD.	Option A -Support for template language plus attendance at 27 local outside agency and/or adoption meetings (1 at each agency)	27	$50,760.00		15%	$68,000	1	$126,400	$126,400	$ --	$ --	$ --	Not anticipated for grant funding opportunities. Potential labor cost share with other agencies? Assume $38,000 technical support and $30,000 legal support.
			Option B - Indoor New Development Building Inspections provided through regional contractor as outsource options for agencies (assume development and 3 trainings for building officials for inspection protocols)	27	$60,000.00	$75	15%		1,474	$179,100	$179,100	$ --	$ --	$ --	Not grant funded. Potential labor cost share with other agencies?
			Option C - Outdoor New Development Building Inspections provided through regional contractor as outsource options for agencies (assume development and 3 trainings for building officials for inspection protocols)	27	$60,000.00	$25	15%		2,342	$124,500	$124,500	$ --	$ --	$ --	Not grant funded. Potential labor cost share with other agencies?

THIS PAGE INTENTIONALLY LEFT BLANK

Table 7-1. Regional Water Conservation Implementation and Financing Planning Options - Core Program

Program Element Description	DSS Model Based Measure Descriptions	Regional Program Implementation Plan Description	Implementation Options	Planning Number of Participation Agencies	Development Cost	Cost Basis per Activity	BAWSCA Admin Cost (Hourly Rate) or Percent per Participant or Activity ($90.00)	Contractor Cost	Planning Number of Activities	FY 2010 Total Cost Estimate	Full Cost BAWSCA Regional Program	BAWSCA Cost if over 50 percent Grant Supported (50%)	BAWSCA Cost if Partial Grant Supported (75%)	BAWSCA Cost if Partial Partnership Funding Supported (60%)	Comments
Core Program Elements with Support for Foundational BMP 2. Education Programs															
Regional Public Information Campaign Targeting Customer Actions	Measure 6. Provide public education to raise awareness of conservation measures available to retail customers. Programs could include poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts.	Years 1-3. Basic campaign materials and web site to be created by BAWSCA for use by all agencies. Opportunity to partner with SCVWD.	Design and Implementation Regional Public Information Program targeting key needs requested by agencies as requested to include:(a) regional web site; (b) template materials with consistent messages and graphics for items like bill inserts, table tops, fact sheets, newsletter articles, presentations that can be tailored and printed by each agency; (c) media interviews; (d PSA development and placement. Does not include paid placement in print, radio or TV. Might consider higher budget due to current drought for paid placement.	29	$100,000	$ --	$45,000	$ --	0	$145,000	$145,000	$72,500	$108,750	$87,000	DWR grant support is requiring higher and higher cost matches to get funded currently running over 75% agency funding required to get state funding
Core Program Elements with Support for Foundational BMP 3. Residential Programs															
Residential Education & Training for Landscape Water Use Efficiency	Measure NM-2. 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.	Ramping up through Years 1-3. Work with partners like BayFriendly to leverage support and marketing for the classes. For example, three part class series (three classes total) to include (1) Xeriscape Design (Bay Friendly/EBMUD Book?), (2) Homeowner Irrigation, (3) Promotion of Water Efficient Plants; (4) Put it all together class with in-depth DIY landscape design plans review and assistance lab. Opportunity o partner with SCVWD	Year 1 - 18 classes (6 class sites, 3 classes per year) Year 2 - 40 classes (some classes in English and some in Spanish) Year 3 - 80 classes (some classes in English and some in Spanish)	29	$20,000	$950	50%	$ --	18	$45,650	$45,650	$22,825	$34,238	$27,390	

THIS PAGE INTENTIONALLY LEFT BLANK

Table 7-2. Recycled Water Project(s) Area and Related BAWSCA Agency		
	Recycled Water Project(s) Area	BAWSCA Member Agency Served by the Recycled Water Project
1	ACWD/Union Sanitary District	ACWD
2	City of Burlingame	City of Burlingame
3	Coastside County Water District (Half Moon Bay)	Coastside County Water District
4	City of Hayward	City of Hayward
5	City of Millbrae	City of Millbrae
6	North San Mateo County Sanitation District (CSD)	California Water Service Company City of Daly City Westborough Water District
7	North Coast County Water District (City of Pacifica)	North Coast Water District
8	Palo Alto Regional Water Quality Control Plant (RWCQP) – Mountain View Project	City of Palo Alto City of Mountain View
9	Palo Alto RWQCP – Other	City of Palo Alto City of Mountain View Stanford University
10	Redwood City Recycled Water Project	City of Redwood City
11	South Bay Water Recycling (San Jose/Santa Clara Water Pollution Plant)	City of Milpitas City of San Jose City of Santa Clara
12	South San Francisco/San Bruno	California Water Service Company City of San Bruno
13	Stanford University	Stanford University
14	City of Sunnyvale	City of Sunnyvale
15	San Francisco International Airport	City of Millbrae
16	City of San Mateo	City of San Mateo

THIS PAGE INTENTIONALLY LEFT BLANK

8. BAWSCA YEAR 1 PLAN: SUBSCRIPTION PROGRAM IMPLEMENTATION AND FINANCING

As described above, the WCIP was developed to lay out a long-term plan for achieving water conservation savings within the BAWSCA service area. The following presents the specific measures included in the WCIP Subscription Program for implementation in Year 1, as well as measure implementation and financing options. Table 8-1 presents the number of activities and estimated budget details for the Subscription Program elements that relate to water savings. BAWSCA administrative staff support for these "pay for service" subscription programs are included in the cost estimates. In addition, some key opportunities to fund program activities through grants, partnership cost sharing or in-kind contributions, or other third party funds are highlighted and can be estimated using the Shared Vision Model.

A key principle for the subscription program elements is that participating agencies pay the full cost of the individual programs being implemented, including the associated BAWSCA staff cost. Where possible, other supplemental funding sources will be utilized to reduce the overall cost of these programs to participating member agencies. These other supplemental funding sources can include state grants through Proposition 84 with the IRWMP funding process, cost-sharing partnerships, and in-kind services that BAWSCA can assist with leveraging for support of conservation efforts planned for regional implementation.

Subscription program elements include the following:

BMP 2: Educational Programs

- Support Development of a School Education Program
  - K-8 Program (*expanded*)
  - 9-12 Program (*new*)

BMP 3. Residential Programs

- Bulk purchase of residential retrofit devices (*new*)
- High-efficiency clothes washer rebates (*expanded*)
- High-efficiency toilet rebates for RSF and RMF accounts (*expanded*)
- Residential leak and landscape surveys(*future implementation in FY 2011 or later*)
- Residential weather-based controller rebates (*future implementation in FY 2011 or later*)
- Individual measures associated with CUWCC's Flex track options which are yet to be determined (*future implementation in FY 2011 or later)*

BMP 4. Commercial, Institutional, Industrial Programs

- Bulk purchase of CII retrofit devices (e.g., pre-rinse spray valves) (new)
- High-efficiency toilet rebates for CII accounts(*expanded*)
- Commercial surveys (*future implementation in FY 2011 or later*)

- Individual measures associated with CUWCC's Flex track options which are yet to be determined (fut*ure implementation in FY 2011 or later)*

BMP 5. Landscape Programs

- Large landscape surveys (*expanded*)
- Water budgets (*expanded*)
- Individual measures associated with CUWCC's Flex track options which are yet to be determined *(future implementation in FY 2011 or later)*

8.1 BMP 2: Educational Program

BAWSCA will lead an effort to identify the needs of various BAWSCA member agencies for school education programs.

Description of work effort. Beginning Year 1, BAWSCA will examine the existing school education program, as well as consider new alternatives to cost efficiently meet a greater share of the school age children. As appropriate, and as agreed upon with BAWSCA agencies, BAWSCA will explore the development of a regional school education program which will be consistent with supporting the needs outlined in CUWCC MOU Foundational Best Management Practice for Education. The school education program could include assembly or curriculum-based programs, in addition to fixture distribution program.

Description of staffing or contractor support. BAWSCA will lead a committee effort to determine further interest and funding support for a Regional School Education Program as a broader subscription in Years 2 and 3 that will be built on grant funding availability. State teaching standards require that the water and hydrologic cycle be taught in fifth grade and energy concepts taught in the sixth grade. Currently, there is no regional program for Grades 9 through 12.

Total estimated budget = $10,000. It is assumed that BAWSCA will only support minimal staff time towards the development of this measure during Year 1. It is anticipated that BAWSCA will seek partnership and grant dollars to fund the development and implementation of the program in Years 2 and 3.

DSS model assumptions. This measure was not modeled for quantitative water savings. The program will be configured to meet the requirements of CUWCC's BMP 2.

Regional survey findings and other suggestions for program element design. The SCWA and Regional RWA have strong school education programs spanning K-12 that can serve as examples. The SCWA supports salary for two local teachers and an education facility to teach information about the watershed and conservation. RWA has implemented a school assembly program historically called the Great Water Mystery that was jointly funded by local stormwater utilities and a DWR grant. The recent cost for the Great Water Mystery school assembly program was on the order of $2.50-3.00 per student targeting grades 3 through 4 and grades 5 through 6. RWA also has a local Newspaper in Education program that is coordinated with the Sacramento Bee to provide a K-12 curriculum for teachers.

8.2 BMP 3. Residential Programs

There are seven principal measures targeted at residential customers that are envisioned to increase in implementation over the next three or more years. Three measures are included for implementation in Year 1, including: newly added bulk purchase of residential retrofit devices, rebates for high-efficiency clothes washers, and rebates for WaterSense specification high-efficiency toilet rebates. The other two new programs may be supported for regional implementation in Year 2 or later including: residential leak and landscape surveys and weather-based irrigation controllers.

8.2.1 Bulk Purchase Residential Retrofit Kits

Description of work effort. Beginning Year 1, BAWSCA will survey member agencies' current needs and purchase sources. A compiled list will be shared with the interested member agencies with the goal of achieving consensus on what should be purchased for inclusion in the kits. BAWSCA will research prices and solicit order commitments from interested member agencies, order products at bulk discount costs, facilitate distribution of devices, and coordinate payments.

Description of staffing or contractor support. This effort will be supported by BAWSCA staff.

Total estimated budget and schedule assumptions. The budget will be dependent on items selected and orders collected from interested BAWSCA member agencies.

DSS model assumptions for Measure 2. It is assumed that 75 percent of pre-1992 homes will be provided with retrofit kits that contain easy to-install, low-flow showerheads, faucet aerators, and toilet tank retrofit devices. It is assumed that implementation of this measure will result in savings of 21 percent for showers, 2 percent for toilets, and 2 percent for faucets.

Regional survey findings and other suggestions for program element design. As an example, RWA in Sacramento has a bulk purchase program for retrofit kits, pre-rinse spray valves, and school education materials coordinated through their intern. It is recommended that BAWSCA also consider collaboration with GreenPlumbers to implement this measure.

8.2.2 High-efficiency Toilet Rebates RSF and RMF

Description of work effort. Beginning Year 1, implementation of this measure includes extensive expansion of the existing program, as well as expanding the ability of each member agency to opt-in and opt-out of participation. This measure assumes that the rebate amount is fixed at $150 per HET. It is assumed that only high flush toilets will be replaced through this program. It is further assumed that participation levels by current and added interested agencies will escalate the activity level up to more than 6,200 rebates annually (BAWSCA program target), including RSF, RMF and CII toilets. It is assumed that this measure will be implemented for 10 years (i.e., 2010 to 2019) and that approximately 1 percent of all toilets will be replaced during each year. For budgeting purposes this is similar to having one toilet rebate for approximately 3 percent of the year 2010 RSF, RMF and CII accounts. This target is aggressive both at the individual agency level and regional level. It will be necessary for the implementation of this program and the customer response to be re-evaluated at key intervals both for possible program redesign or re-examination of the target. The total rebate target for the entire region is 12,400 rebates annually (this total would include all the rebates from BAWSCA, SCVWD, and local member agency programs).

Description of staffing or contractor support. Currently, this measure is implemented on a regional basis. BAWSCA is assuming responsibility for preparing the rebate application or other agreed-upon distribution method (direct install, give-away, or other agreed-upon method) and providing a single point of submittal for applications. Once applications are entered into an online database system by BAWSCA, the rebate applications would be sent to the individual BAWSCA member agency for dispersal to the customer. Implementation of the Year 1 Plan assumes that BAWSCA staff will support at less than 0.25 full-time equivalents (FTE) to process applications. Once the level of administrative support required exceeds 0.25 FTE, then implementation of the measure may be contracted out. A switch to a contractor-supported program administration is anticipated as early as FY2011 (i.e., Year 2). Alternative measure-administration mechanisms will be reviewed prior to making any changes from the currently-proposed program, including entering into regional partnerships for administration.

Total estimated budget and schedule assumptions. The budget for NM-1 was originally developed for a higher target level required to reach the 10 MGD savings. The overall administrative support budget is estimated at $90 per hour and assumed to include processing 25 applications per hour. This equates to an estimated $55,000 in administrative support required to process 15,200 rebates for a total of $2.2 million in rebates distributed. The target for NM-1 has been revised since this budget estimate was created. The new annual target as requested by the Work Group been lowered to 6,200 annual rebates. In future planning the budget should be adjusted accordingly.

DSS model assumptions for Measure NM-1. HET rebates were modeled at fixed cost of $150 and assumes only high flush toilets would be qualified for the program.

Regional survey findings and other suggestions for program element design. It is suggested that BAWSCA consider expanding this measure by implementing a voucher program like City of San Diego, California and Orlando, Florida. Additionally, a higher dollar value could be considered to increase participation amongst CII and/or RMF customers.

Coordination with SCVWD and SFPUC regarding their plans for their future CII toilet program would also be beneficial to measure implementation. Furthermore, it would be good to track the success of SCVWD's partnership with PG&E for a direct-install HET program for low-income, RSF homes.

Success in HET rebate programs have been noted with rebates higher than $150 for the San Diego County Water Authority, whose price point is $200 per HET.

In addition to offering rebates, this program will benefit from education and partnership with installers, plumbers, and contractors to help ensure that the HETs are installed and work correctly. The Project Team recommends using the Uniform North American Requirements (UNAR) testing results posted on the CUWCC website to help educate local sales staff and customers on the better performing toilets.

8.2.3 High-efficiency Washer Rebates

Description of work effort. Beginning Year 1, implementation of this measure includes expansion of the existing program, as well as expanding the ability of each member agency to opt-in and opt-out of participation. This measure also assumes a rebate amount of $125 for machines that have been rated as Tier 2 efficiency by the Consortium for Energy Efficiency (www.cee1.org), and $200 for machines that have been rated as Tier 3.

Description of staffing or contractor support. BAWSCA will continue to support the management of regional contract with PG&E and will facilitate discussions with other potential partners (e.g. EBMUD, CCWD, SCVWD, and SFPUC) for regional program implementation.

Total estimated budget and schedule assumptions. This program is ongoing and is currently administered by PG&E for a service and marketing fee of $6.00 per rebate. In addition to this fee, participating member agencies will pay the associated BAWSCA staff costs to administer this program (estimated at $5.30 per rebate). The BAWSCA target of 8,300 rebates is considered aggressive and, similar to the HET, it needs to be monitored closely for effectiveness. The total rebate target for the entire region is 17,500 rebates annually (this total would include all the rebates from BAWSCA, SCVWD, and local member agency programs).

DSS model assumptions for Measure NM-5. HEWs rebates were modeled at fixed cost of $200 and assumed to use an average of 20 gallons of water per load.

Regional survey findings and other suggestions for program element design. It is suggested that BAWSCA consider expanding this measure by seeking more marketing support from PG&E and potentially grant funding.

8.2.4 Residential Leak and Landscape Surveys

Description of work effort. New program for Years 2 and 3. This measure follows the guidelines for the implementation requirements for the prior version of the CUWCC BMP 3-Residential Programs. The DSS model water savings assumptions include both indoor and outdoor surveys. The recent changes to the CUWCC MOU require only support for leak survey and outdoor irrigation review.

Description of staffing or contractor support. The staffing plan, including intern program possibilities, and contractor options will be researched by BAWSCA staff for Year 2.

Total estimated budget and schedule assumptions. This measure will be implemented on the Years 2 and 3 implementation timeframe, and the budget will be included in Year 2 Plan.

DSS model assumptions for Measure 1. It is assumed that indoor and outdoor water surveys will be offered to existing RSF retail customers at an average cost of $80 per account, and RMF retail customers at an average cost of $130 per account. High water use customers will be targeted for these surveys. This measure includes a customized report being provided to homeowners.

Regional survey findings and other suggestions for program element design. It is suggested that BAWSCA consider developing a landscape survey program that is modeled after the MMWD program. The MMWD program includes one paid, half-time coordinator to do scheduling and administrative support of the program and to conduct a training session on irrigation for UCCE Master Gardeners. The total cost of the MMWD program is $34,000, including all University of California overhead and associated costs. In 2008, 50 Master Gardeners completed 175 surveys within the MMWD service area. MMWD is planning to train 30 more Master Gardeners and past volunteers in 2009 to perform 250 surveys, called Garden Walks, within the MMWD service area. Garden Walks would constitute a residential survey completed by volunteer labor.

Another option is for interns to serve as labor source to implement residential landscape surveys. An intern training agenda and materials are available from RWA and SDCWA. The CCWD also has experience with intern programs.

8.2.5 Residential Weather Based Controller Rebates

Description of work effort. New program for Years 2 and 3. Year 1 activities will involve a design phase, including the review of the Proposition 13 evapotranspiration (ET) controller study and review of the ACWD and SCVWD program's success and lessons learned.

The following three options have been discussed during the BAWSCA WCIP Plan workshops:

- Option A – Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. BAWSCA staff would administer the voucher program at an assumed 0.25 FTE level of effort. It is assumed that participating member agencies would perform their own random post inspections of at least 10 percent of the accounts.
- Option B - Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. A contractor would administer the voucher program. It is assumed that participating member agencies would perform their own random post inspections of at least 10 percent of the accounts.
- Option C - Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. A contractor would administer the voucher program, as well as perform random post inspections of at least 10 percent of the accounts.

Description of staffing or contractor support. Year 1 support involves BAWSCA initiating research and design of this measure and potentially seeking grant funds for a regional residential and CII weather-based controller rebate program.

Total estimated budget and schedule assumptions. Less than 80 hours at $90 per hour (i.e., an estimated total cost of $7,200) of BAWSCA staff time is assumed to design the program and discuss with the member agencies. Costs associated with writing grants and researching funding resources is not included.

DSS model assumptions for Measure 13. It is assumed a $150 rebate will be provided for the installation of a pre-specified list of state-of-the-art "smart" irrigation controllers (e.g., those with on-site sensors or a signal from a central weather station that modifies irrigation as the weather changes).

Regional survey findings and other suggestions for program element design. It is recommended that BAWSCA review the experiences of the California water agencies that implemented a residential weather based controller rebate program as part of a Proposition 13 grant program. It is also recommended that BAWSCA pursue a future grant opportunity. Based on SCVWD's experience, a rebate of larger than $150 may be required for sites with more than 12 stations.

8.3 BMP 4. Commercial Programs

There are three principal CII measures that are envisioned to be increasing in implementation over the next three or more years through the Subscription Program. The two measures that are included for implementation in Year 1 are (1) the bulk purchase of pre-rinse spray valves, and (2) the continuation of the EPA WaterSense specification HET rebates. The other new measure that may be supported for regional implementation in Year 2 or later is commercial surveys.

8.3.1 Bulk Purchase of Pre-Rinse Spray Valves

Description of work effort. BAWSCA will review research by the PG&E Food Science Technology Center (http://www.fishnick.com/) on pre-rinse spray valves and obtain price quotes for high performing products. Currently more than 60 percent of the installed pre-rinse spray valves have been manufactured by Fisher, Inc. BAWSCA will survey member agencies' current needs to obtain consensus on which spray valve will be purchased. BAWSCA will solicit order commitments from interested member agencies, order products at bulk discount costs, facilitate distribution of devices, and coordinate payments.

Description of staffing or contractor support. This effort will be supported by BAWSCA staff.

Total estimated budget and schedule assumptions. Bulk Purchase Years 1 through 3. The budget is dependent on items selected and orders collected from interested BAWSCA member agencies.

DSS model assumptions for Measure 22. The DSS model assumes an average cost of $181 per site for the purchase and installation of 1.6 gallon per minute (gpm) spray nozzles. There can be multiple valves per site.

Regional survey findings and other suggestions for program element design. A new state regulation in Title 20 Appliance Efficiency Standards that passed in 2006 states that only higher efficiency valves can be available for sale in California. This issue is likely to impact the free-ridership potential for this program. As an example, RWA in Sacramento has a bulk purchase program for retrofit kits, pre-rinse spray valves, and school education materials coordinated through their intern. BAWSCA could consider collaborating with GreenPlumbers, or other partners, in the advertising and implementation of this measure. The bulk purchase price negotiated by RWA was $30 apiece for a minimum order of 500 through Fisher. EBMUD and RWA members retain an inventory for giveaways during CII surveys. Seattle Public Utilities market through their local Chamber of Commerce to distribute devices and solicit testimonials from satisfied business owners.

8.3.2 High-efficiency Toilet Rebates for CII

Description of work effort. Year 1 through 3. Implementation of this measure includes expansion of the existing program, as well as expanding the ability of each member agency to opt-in and opt-out of participation. The rebate amount is assumed to be fixed at $150 per HET toilet. It is further assumed that participation levels by the BAWSCA program will escalate the activity level up to more than 6,200 rebates annually, including RSF, RMF and CII toilets. The program would be combined implementation and administration, as currently operating regionally through BAWSCA.

Description of staffing or contractor support. This is merged with the RSF and RMF HET program as described above.

Total estimated budget and schedule assumptions. This is merged with the RSF and RMF HET program as described above.

DSS model assumptions for Measure NM-1. HET rebates were modeled at fixed cost of $150 and assumes only high flush toilets would be qualified for the program.

Regional survey findings and other suggestions for program element design. It is suggested that BAWSCA consider expanding the existing program by potentially implementing a voucher program like City of San Diego, California and Orlando, Florida.

Coordination with SCVWD and SFPUC regarding their plans for their future CII toilet program would also be beneficial. Success in HET rebate programs have been noted with rebates higher than $150 for the SDCWA.

8.3.3 Commercial Surveys

Description of work effort. There is no regional program planned for Year 1, per input from the BAWSCA member agencies attending January 30 and February 9, 2009 working group meetings. Implementation in Years 2 or 3 will be considered following further discussions with BAWSCA member agencies.

Description of staffing or contractor support. BAWSCA would facilitate hiring contractor(s) to support implementation of this measure or would possibly consider an intern program for light commercial audits (e.g. audits at restaurants, small businesses, offices, retail locations, etc.).

Total estimated budget and schedule assumptions. There is no estimated budget at this time for Years 1, 2, or 3. Based on the survey results, 2 member agencies were interested in a total of 114 surveys to be implemented in Years 2 and 3. Implementation of this program will be considered as part of the development of the Year 2 Plan or for later implementation.

DSS model assumptions for Measure 7. This measure assumes that a free water audit will be provided to high water use CII accounts. These audits evaluate ways in which the business can potentially save water and money (e.g., by replacing high water use toilet with more efficient models). The DSS model assumes an average cost of $3,000 to conduct an audit at a CII account.

Regional survey findings and other suggestions for program element design. The SCWA and RWA have CII audit programs that are supported by an on-call contractor that does the CII audits. This measure would likely benefit from combination with a direct-install program like the pre-rinse spray valves, and presents a potential to partner with PG&E.

8.4 BMP 5. Landscape Programs

There are three principal measures that are envisioned to be increasing in implementation over the next three or more years. Two measures are included for implementation in Year 1: (1) a continuation of the water budget program, and (2) the landscape surveys contractor support. The third measure, a commercial weather based controller incentive program, may be supported for regional implementation in Year 2 or later.

8.4.1 Water Budgets

Description of work effort. Years 1 through 3. This measure includes expanding the existing program and providing member agencies with the ability to opt-in to the program that will be implemented by the existing contractor. In addition, BAWSCA may consider starting an intern program and hosting landscape water budget training support courses for BAWSCA agency staff. It is the responsibility of individual BAWSCA member agencies to use water budget information to create bills or other messaging to convey information about the amount of irrigation that their customers are using, relative to an appropriate budget amount.

Description of staffing or contractor support. BAWSCA currently has a contractor to assist with water budgets. BAWSCA intends to continue to make this contractor available for BAWSCA member agency use. In addition, BAWSCA may explore alternative means for assisting with accomplishing more landscape water budgets on a faster schedule.

Total estimated budget and schedule assumptions. For FY 08/09, the cost is $53 per site contact for a water budget that includes an online review of the site and the development of a report. (This does not include a one-time setup fee per participating agency.)

DSS model assumptions for Measure 4. A monthly irrigation water use budget will be provided as information on the water bill for all accounts with (1) a landscaped area larger than one acre, and (2) a separate irrigation meter. The DSS model assumes an average cost of $200 to develop a water budget for each irrigation account. This assumption in the model is a higher cost that the current cost paid by BAWSCA to its outside contractor for these services as it includes the cost of agency staff time to implement the program.

Regional survey findings and other suggestions basis for program element design. It is recommended that the program be modeled after the SDCWA and CCWD programs.

8.4.2 Landscape Surveys

Description of work effort. Years 1 through 3. This measure includes expanding the existing program and providing member agencies with the ability to opt-in to the program that will be implemented by the existing contractor. BAWSCA may also consider starting up intern program and offering with Landscape Auditor training support.

Description of staffing or contractor support. BAWSCA currently has a contractor to assist with on-site landscape surveys. BAWSCA intends to continue to make this contractor available for BAWSCA member agency use. BAWSCA may also explore alternative means for assisting with accomplishing more landscape surveys on a faster schedule, including seeking grant funding and intern program. The SDCWA has used this approach to accelerate their landscape survey program efforts.

Total estimated budget and schedule assumptions. Current on-site landscape surveys cost $1,350 per site. These surveys include a detailed review of the site and the preparation of a written report that is provided to the individual customers. It is assumed that this contract will continue to be made available. Landscape Auditor training using the Irrigation Association or other available curriculum (e.g., that provided by the CUWCC) may also be made available for member agency staff, if requested. An intern-based program may also be considered for Year 2 or later.

DSS model assumptions for Measure 3. It is assumed that landscape water audits will be provided free of charge to customers, upon request, to accounts with (1) a landscaped area larger than one acre, and (2) a separate irrigation meter. The DSS model assumes an average utility cost of $800 per acre.

Regional survey findings and other suggestions for program element design. It is recommended that the program be modeled after the SDCWA and CCWD programs.

8.4.3 Commercial Weather Based Controller Rebates

Description of work effort. New program for Years 2 and 3. This program, as envisioned, will be merged with the Residential Weather Based Controller Rebates program described above (e.g., a design phase that will involve the review of the study available on the CUWCC website "An Evaluation of California Smart Controller Study Report" that was finalized on July 1, 2009 and the ACWD program). One of the key finding of the reports is that the design of the program is critical and it is especially important to consider the program participants and qualification criteria. The technology is reliable, but the customer application of the device is not guaranteed to save water. The most beneficial was to get the savings from this landscape technology is still being determined at this time, and therefore it was recommended as a Year 2 and Year 3 program.

The following three options have been discussed during BAWSCA WCIP Working Group workshops:

- Option A – Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. BAWSCA staff would administer the voucher program at an assumed 0.25 FTE level of effort. It is assumed that participating member agencies would perform their own random post inspections of at least 10 percent of the accounts.
- Option B - Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. A contractor would administer the voucher program. It is assumed that participating member agencies would perform their own random post inspections of at least 10 percent of the accounts.
- Option C - Provide customers with a voucher, if an inspection confirms they are eligible to receive such a voucher. A contractor would administer the voucher program, as well as perform random post inspections of at least 10 percent of the accounts.

Description of staffing or contractor support. This is merged with the RSF and RMF weather based controller program as described above.

Total estimated budget and schedule assumptions. This measure is merged with the RSF and RMF weather based controller program as described above. However, at this time, only a $150 rebate per irrigation system has been budgeted. Commercial sites are likely to be more expensive to retrofit with weather based controllers than RSF and RMF accounts.

DSS model assumptions for Measure 13. It is assumed a $150 rebate will be provided for the installation of a pre-specified list of state-of-the-art "smart" irrigation controllers (e.g., those with on-site sensors or a signal from a central weather station that modifies irrigation as the weather changes).

Regional survey findings and other suggestions for program element design. It is recommended that BAWSCA review the experiences of the California water agencies that implemented a residential weather based controller rebate program as part of a Proposition 13 grant program and that BAWSCA pursue a future grant opportunity. Based on SCVWD's experience, a rebate of larger than $150 may be required for sites with more than 12 stations.

Table 8-1. Regional Water Conservation Implementation and Financing Planning Options - Subscription Program

Program Element Description	DSS Model Based Measure Descriptions	Regional Program Implementation Plan Description	Implementation Options	Planning number of participation Agencies	Development Cost	Cost Basis per Activity	BAWSCA Admin Cost (Hourly Rate) or Percent per Participant or Activity ($90.00)	Contractor Cost	Planning Number of Activities	FY 2010 Total Cost Estimate	Full Cost BAWSCA Regional Program	BAWSCA Cost if over 50 Percent Grant Supported (50%)	BAWSCA cost if Partial Grant Supported (75%)	BAWSCA Cost if Partial Partnership Funding Supported (60%)	Comments
Subscription Program with Support for Programmatic BMP 3. Residential Programs															
Residential Assistance Support - Bulk Purchase - Residential Retrofit	Measure 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.	Bulk Purchase Years 1-3	Option A - Bulk purchase with agency distribution (least cost)	0	$ --	$23	$3,600	$ --	10,938	$251,600	$251,600	$125,800	$188,700	$150,960	Subscription program. Seek partnership funding opportunities
			Option B - Saving Water Hero Distribution Program	0					10,938						
High-efficiency Clothes Washer Rebates	Measure NM-5. HEWs. Offer rebate program to up to 3 percent of accounts	Year 1-3. Extensive expansion of existing program and opt in and out by more participating agencies, assume rebate amount fixed at $125 Tier 2, $200 Tier 3	Continued BAWSCA support of management of regional contract with PG&E and facilitation of discussions with other regional program partners (e.g. EBMUD, CCWD) for program implementation	18	$ --	$162.50	$44,203	$50,041	8,340	$1,449,530	$44,203	Not applicable, BAWSCA labor support			Continued BAWSCA support of management of regional contract with PG&E and facilitation of discussions with other regional program partners (e.g. EBMUD, CCWD) for program implementation
High-efficiency Toilet Rebate for RSF, RMF and CII	Measure NM-1. HET rebate program for high flow toilets for approximately 1 percent of all toilets each year.	Year 1-3. Extensive expansion of existing program and opt in and out by more participating agencies, assume rebate amount fixed at $150	Option A - BAWSCA Staff <0.25 FTE required for admin	16	$ --	$150	$54,866 [1]	$ --	15,241[1]	$2,340,964[1]	$2,340,964 [1]	$1,170,482[1]	$1,755,723[1]	$1,404,578[1]	Subscription based program will significantly expand existing program. Need staff time to manage RFP process and contracting with new contractor (assume 200 hours)
			Option B - Contractor >0.25 FTE required by BAWSCA												
Subscription Program with Support for Programmatic BMP 4. CII Programs															
CII Assistance Support - Bulk Purchase - Pre-Rinse Spray Valves	Measure 22. Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens.	Bulk Purchase Year 1-3. Potential to restart more extension program modeled on past Rinse and Save program. Opportunity to partner with SCVWD.	Option A - Bulk purchase with agency distribution (least cost)	15	0	$30	$9,000	$8,585	286	$17,585					
			Option B - Contractor during CII Audits can install the valves at audited sites	15	$5,000	$30	$9,000	$8,585	286	$22,585					
			Option C - Intern Program (medium cost)	15	$5,000	$90	$9,000	$25,756	286	$39,756					
			Option D - Contractor hired for installation of valves and walk-thru audit (most expensive)	15	$5,000	$150	$9,000	$42,926	286	$56,926					

[1] Based on annual target of 15,200 rebates which was since revised to 6,200 rebates for the BAWSCA Year 1 Program. Budgets should be adjusted accordingly.

THIS PAGE INTENTIONALLY LEFT BLANK

Table 8-1. Regional Water Conservation Implementation and Financing Planning Options - Subscription Program

Program Element Description	DSS Model Based Measure Descriptions	Regional Program Implementation Plan Description	Implementation Options	Planning number of participation Agencies	Development Cost	Cost Basis per Activity	BAWSCA Admin Cost (Hourly Rate) or Percent per Participant or Activity ($90.00)	Contractor Cost	Planning Number of Activities	FY 2010 Total Cost Estimate	Full Cost BAWSCA Regional Program	BAWSCA Cost if over 50 Percent Grant Supported (50%)	BAWSCA cost if Partial Grant Supported (75%)	BAWSCA Cost if Partial Partnership Funding Supported (60%)	Comments
Subscription Program with Support for Programmatic BMP 4. CII Programs (continued)															
WaterSense Specification (High-efficiency) Toilets Rebate for CII	Measure NM-1. Offer HET rebate program to up to 25 percent of all existing accounts over 10 years.	Year 1-3. Extensive expansion of existing program and opt in and out by more participating agencies, assume rebate amount fixed at $150	Merged with Residential WSS HET program												Subscription based program will significantly expand existing program. Need staff time to manage RFP process and contracting with new contractor (assume 200 hours)
Subscription Program with Support for Programmatic BMP 5. Landscape Programs															
Water Budgets for Accts with Dedicated Meters	Measure 4. Provide a monthly irrigation water use budget as information on the water bill for all irrigators of landscapes larger than one acre with separate Irrigation accounts.	Year 1-3. Expand existing program and opt in and out by more participating agencies using existing contractor. Consider starting up intern program. Continue with Landscape Water Budgets training support.	Option A - Contractor continues with Landscape Auditor program (most expensive)	10	Existing Program	$150	$750	$15,134	101	$15,884	$9,000	$4,500	$6,750	$5,400	Option B - Same interns but less needed if just doing water budgets online and with field verification and not landscape audits.
			Option B - Intern auditor program for water budgets and field verification (medium cost program)	10	$12,000	$15,000	$60,000	$ --	6	$102,000	$60,000	$51,000	$76,500	$61,200	
			Option C - Training classes for agency staff on how to create budgets	10	$ --	$1,000	$ --	$ --	5	$5,000	$5,000	$2,500	$3,750	$3,000	
Large Landscape Surveys Targeting CII Mixed Use and Unmetered Accts	Measure 3. Provide free landscape water audits to all public and private irrigators of landscapes larger than one acre with separate Irrigation accounts upon request.	Year 1-3. Expand existing program and opt in and out by more participating agencies using existing contractor. Consider starting up intern program. Continue with Landscape Auditor training support.	Option A - Contractor continues with Landscape Auditor program	11	Existing Program	$1,350	$825	$46,940	35	$49,115	$3,658	$39,657	$59,486	$47,589	Option B - Assume $15 per hour for half-time field interns. Sharing interns between participating agencies. Fund based on pro-rated cost per number of connections. Interns would be trained to do Residential and Light Commercial Audits, also distribute plumbing kits, pre-rinse valves and do water waste door hangers upon request of individual agencies. Also assist with office duties and reporting to agencies on activities. Assume 0.25 FTE supervisor role by BAWSCA technical staff (new hire)
			Option B - Intern auditor program for less complex audits (medium cost program)	11	$12,000	$15,000	$45,000	$ --	8	$177,000	$60,000	$96,000	$144,000	$115,200	
			Option C - Landscape Auditor Training program (least cost program)	11	LA Classes	$ --	$9,600	$ --	2	$19,200	$9,600	$9,600	$14,400	$11,520	

THIS PAGE INTENTIONALLY LEFT BLANK

9. SELECTED PROGRAM MEASURES VS. DSS MODEL RESULTS

The WCIP was prepared with the goal of identifying a plan for achieving up to an additional 10 MGD of savings by 2018. Based on the assumption that ALL of the member agencies implement the water conservation measures evaluated as part of the WCIP, it is estimated that 8.4 MGD of savings can be achieved by 2018. However, the WCIP development process did not include an activity in which individual agencies committed to the savings potential identified in their service area or committed to which water source would be saved in those areas with multiple water sources. Individual agencies maintain control of their local supplies and water supply portfolios.

The DSS model was used as a tool to estimate a conservation savings potential from the implementation of different conservation measures and compute benefit-cost ratios and water savings. It is important to note that the conservation results shown in the WCIP are possible, but are also just a potential for savings. Achieving those savings will require that all agencies fully participate in all five new measures and that all the penetration goals are reached for individual measures selected in their DSS model.

BAWSCA and the Project Team recognize that the penetration targets that were assumed for the new water conservation measures are more aggressive than the historic implementation rates for both the existing local and regional water conservation programs. As such, implementation of the WCIP may present a challenge to member agencies both in terms of actual implementation (i.e., achieving the target penetration rates) and in being able to acquire the resources and funding that will be necessary to implement the programs at the levels assumed herein. It is recognized that actual implementation of water conservation to achieve a future goal must be managed in an adaptive fashion and that individual agencies may need to make choices on a yearly basis about what conservation measures to implement within their local jurisdictions, sub-regionally with other agencies, or regionally through BAWSCA or the SCVWD.

BAWSCA and the Project Team recognize that measure tracking and evaluation will be key to evaluate the success of the various measures included in the WCIP and to allow for either program or target modifications or to justify expanded budgets and resource allocations. BAWSCA is in the process of developing a database management system that will assist in this effort.

BAWSCA and the Project team further recognize that, although each of the measures evaluated as part of the WCIP were determined to be cost-effective at the individual agency level based on the known cost of water, implementation of these water conservation measures is not cheap. Therefore, BAWSCA will continue to work with the member agencies to evaluate alternative methods for funding and financing all types of water supply programs, including water conservation, beyond the current core- and subscription- based financing model.

THIS PAGE INTENTIONALLY LEFT BLANK

10. COORDINATION WITH AGENCIES AND PUBLIC PARTNERS

A key component in the development of the WCIP was the involvement of the various stakeholders throughout the WCIP development. As such, several different coordination efforts have helped to shape the overall direction and results:

- The **Project Working Group** provided significant direction thought this project through numerous meetings, including the project workshops, and document review. The Working Group was comprised of representatives from BAWSCA's 27 member agencies as well as a representative from the Santa Clara Valley Water District.
- BAWSCA's **Technical Advisory Committee (TAC)** provided input as part of the regularly schedule monthly TAC meetings as well as participation in two half day workshops where key input on overall project direction was needed. The TAC is comprised of a designated representative from each of the BAWSCA member agencies and serves as an advisor to the BAWSCA Chief Executive Officer. In addition to providing input as part of the regularly scheduled monthly TAC meetings, the TAC representatives also attended the Workshops.
- Involvement of **Pacific Institute** throughout the project development. A key component of stakeholder involvement was outreach to public partners. Pacific Institute stepped forward as an interested participant in this project. Several meetings were held with Pacific Institute during the course of the project where the overall project and current activity was discuss and input received from Pacific Institute. Additionally, Pacific Institute has had the opportunity to review and comment on draft technical memoranda as the project has progressed for their review and comment.

Since the project start in September 2008, there were a total of twelve dedicated meetings for this project, including a kickoff meeting, seven Working Group meetings, two half-day workshops, and two meetings with the Public Partners (Table 10-1). Numerous additional briefings have occurred for this project throughout its development, including presentations to the BAWSCA Board of Directors and the BAWSCA Board Policy Committee.

This section provides details of the seven Working Group meetings and two half-day workshops, and the coordination efforts with public partners.

10.1 Working Group Meetings and Agency Workshops

The Project Team held two Working Group meeting in November to discuss the project goals and review the population and employment projections originally presented in Tech Memo 1, and to vote on the new conservation measures for further analysis in the BAWSCA WCIP Plan. A third meeting was held on December 9, 2009 to begin discussing the Financing and Implementation Survey results.

The Project Team discussed the contents and results of Tech Memo 2 (released on December 19, 2009) with BAWSCA and member agency representatives during a half-day workshop held on January 12, 2009. A second half-day workshop was held on February 9, 2009 to present the results of the first workshop and continue the selection process and financing and implementation options.

The January 12, 2009 workshop objectives were the following:

1. Review the Plan project progress to date.
2. Discuss the results of the conservation measure evaluation presented in Tech Memo 2:
   - BAWSCA Program Shared Vision: member-driven program built from the foundation of needs and regional cost effectiveness of implementation.
   - BAWSCA Plan Goals
     - Prioritize the agency support needs from BAWSCA
     - Water savings
     - Cost effectiveness
     - Roles and responsibilities
   - Review feasibility of regional program elements based on surveys and modeling results
3. Completion of survey by agencies to determine list of measures that will be formulated into regional implementation plan.
4. Continued discussion on finance and implementation options.

The February 9, 2009 workshop objectives were the following:

1. Review of Plan project progress to date.
2. Discussion of the January 12, 2009 survey results from agencies to determine regional program conservation measures.
3. Discussion of recycled water survey results.
4. Discussion of historical water conservation analysis.
5. Continued discussion on finance and implementation options:
   - Shared vision discussion: implementation and financing strategies to reach consensus
   - Review and discuss regional program conservation measure survey results
   - Review survey results table on Year 1, Years 2-3 measures (Tables 5-1 and 5-2)
   - Preliminary draft program elements
   - Planning level budget estimates for regional program Year 1
6. Consensus on short list of implementation strategies and financing options.

The two agency workshops focused on discussions of a variety of detailed implementation and financing options. At the beginning of the process in January 2009, the Project Team presented a large variety of measures and implementation strategies. The implementation strategies and finance options were narrowed during discussions during the January 12 and February 9, 2009 workshops.

Two additional Working Group meetings were held by BAWSCA on January 30, 2009 and February 24, 2009. The purpose of these meetings was to gather additional feedback and to allow additional opportunities for member agency attendance and discussion.

The goal of all four meetings in January and February 2009 was to provide clarification, listen to comments, and gather feedback on implementation strategies and financing options, including the specific recommendations for a Year 1 program to be implemented by BAWSCA in FY 2009/2010. Through this process, the BAWSCA member agencies communicated their preferred conservation measures for implementation, and eliminated conservation measures that the member agencies were not interested in implementing on a regional basis.

The outcome of the twelve project meetings was that the BAWSCA member agencies have selected a program they would like BAWSCA to implement on a one-year time frame (i.e., the "Year 1 Plan") or over a two to three-year timeframe. In the future, the program may be modified in response to program results and individual member agency feedback and needs.

10.2 Coordination with Public Partners

The involvement of the public partners provided a broadened perspective in the development of the Plan. A list of possible public partners was created by BAWSCA in October 2008 which included various non-profit governmental organizations (NGOs) and environmental groups. The individual organizations were contacted by BAWSCA and invited to join the process of creating the Plan. The organizations that were contacted included the Sierra Club, the Tuolumne River Preservation Trust, and the Pacific Institute.

The Pacific Institute accepted the invitation to be involved in the development of the Plan and their input was solicited at each step of the Plan creation. The Pacific Institute was provided copies of each Tech Memo and requested to provide comments and recommendations to BAWSCA and the Project Team. BAWSCA and the Project Team incorporated their comments, as appropriate, into the Plan development process.

Tech Memo 1 was provided to Pacific Institute as a draft for review and comment. In response, Pacific Institute provided a suggested list of seven agencies to be incorporated in the regional survey. Ultimately, two of the agencies that the Pacific Institute recommended were incorporated into the regional survey: the Saving Water Partnership Seattle Public Utilities, which has 17 participating retailers, and the Sonoma County Water Agency.

The Pacific Institute also provided a list of four new water conservation measures for consideration under the task of "New Measures Evaluated with the DSS Model". The four suggested measures were retrofit on resale, system leak detection, food steamer rebates and CII performance-based programs. These four measures were provided to the BAWSCA member agencies during the meeting on November 10, 2008 and included in the voting process when selecting new measures for further evaluation. The selection of the new measures was an important step in the project. The process is detailed further in Section 3.2. The additional measures proposed by Pacific Institute were not selected by the BAWSCA member agencies for further evaluation during the voting process in November 2008. However, the BAWSCA agencies did express interest for future possible actions by BAWSCA based on these suggested measures:

- **Retrofit on Resale** – There was interest expressed by the BAWSCA member agencies for a statewide "Retrofit on Resale" ordinance. It was requested that BAWSCA monitor progress at the state level and report back to the member agencies where a collaborative effort might be feasible.
- **Food Steamer Rebates** – The BAWSCA member agencies expressed interest in this measure but indicated a strong desire that such a measure be implemented in partnership with PG&E on a regional level, possibly with other Bay Area water agencies. It was requested that BAWSCA continue to monitor efforts for a regional rebate program offered through PG&E and report back to the member agencies on any new development for future consideration.

Tech Memo 2 was also provided to Pacific Institute as a draft for review and comment. In its comments, Pacific Institute emphasized the importance of gathering feedback from agencies. As part of the Plan development process, BAWSCA and the Project Team worked to solicit and incorporate member agency feedback, most recently during the January 12, 2009 workshop survey (see Tables 5-1 and 5-2). The Pacific Institute also recommended that the Plan offer programs both for the residential and CII sectors.

Two meetings have been held with Pacific Institute representatives to date, along with numerous phone calls to review progress. The first meeting, held on November 18, 2008, provided an opportunity for BAWSCA to brief the Pacific Institute on the overall project and to receive early input on the project and its overall

approach, goals, and objectives. A second meeting was held on January 23, 2009 between BAWSCA, the Pacific Institute, and the Project Team to discuss the preliminary results and to gather feedback on Tech Memo 2. In addition, the January 23, 2009 meeting included a discussion of possible financing and implementation options. As a result of the meeting, a section has been added to this technical memorandum to address options to consider during a water shortage (see Section 11.3).

Summary information from the January 23, 2009 meeting was provided to the Working Group during the January 30, 2009 meeting. The Pacific Institute was provided a copy of Tech Memo 3 and the Draft Report for review comments.

Table 10-1. Summary List of Project Coordination Meetings		
Meeting Title	Meeting Date	Meeting Discussion Topics
Project Kickoff Meeting	September 30, 2008 9:30-11:30am	1. Introductions; 2. Review the goal and purpose of this project.
BAWSCA WCIP Working Group Meeting	November 5, 2008 9:30-11:30am	1. Review the demand and conservation projections work that was done in 2004; 2. Review the goal and purpose of this project, 3. Review the relationship of this project to the supply limitation decision that SFPUC will be made on October 31, 2008 as part of the WSIP PEIR.
BAWSCA WCIP Working Group Meeting	November 10, 2008 1:00-3:30pm	1. Review and discuss Tech Memo 1 including the population and employment projections and associated demands; 2. Vote on new measures for further analysis in the DSS Model; select top five; 3. Provide feedback via a written survey to BAWSCA agencies on desires, needs, and challenges for the BAWSCA Water Conservation and Implementation Regional Plan. Survey results were published in Tech Memo 2.
Public Partner Meeting	November 18, 2008 10:00-12:00pm	4. Brief Pacific Institute on overall project 5. Receive input on project approach, goals, and objectives
BAWSCA WCIP Working Group Meeting	December 9, 2008 2:00-3:30pm	1. Review and discuss the early results of the Implementation and Financing Survey.
BAWSCA WCIP Workshop #1	January 12, 2009 1:00-5:00pm	1. Review and discuss Tech Memo 2 including the conservation modeling results; 2. Provide feedback via written survey to BAWSCA agencies on which measures each agency would want included in the BAWSCA WCIP for Years 1, 2-3, 4-10 or never regionally.
Public Partners Meeting	January 23, 2009 9:00-10:30am	1. Gather feedback and suggestions for the financing and implementation plan; 2. Review and discuss Tech Memo 2 including the conservation modeling results.
BAWSCA WCIP Working Group Meeting	January 30, 2009 10:00am-12:00pm	1. Review the finance and implementation table information that has been developed to date and answer questions that members might have; 2. Discuss the issue of individual agency plans for uses of other water sources available to them in the future (through 2030); and 3. Review the draft Recycled Water Survey.
BAWSCA WCIP Workshop #2	February 9, 2009 1:00-5:00pm	1. Review/Discuss Regional Program Conservation Measure Survey Results; 2. Brief overview of Recycled Water Survey Results; 3. Discuss Historical Water Conservation Analysis; 4. Continue to discuss Finance and Implementation Options. 5. Arrive at a consensus on short list of financing and implementation strategies
BAWSCA WCIP Working Group Meeting	February 24, 2009 9:00-11:00am	Complete discussions on implementation, financing, and sources of water supply.
BAWSCA WCIP Working Group Meeting	May 5, 2009 1:00-3:00 pm	1. Discuss Draft Tech Memo #3. 2. Discuss Updated Recycled Water Tech Memo 3. Discuss Historical Conservation Analysis 4. Discuss demand/supply analysis for 2018
BAWSCA WCIP Working Group Meeting	May 18, 2009 9:30-11:30 am	1. Discuss Draft Tech Memo #3 2. Discuss Updated Recycled Water Tech Memo 3. Discuss Historical Conservation Results 4. Discuss Demand/Supply Analysis for 2018

THIS PAGE INTENTIONALLY LEFT BLANK.

11. ADDITIONAL RECOMMENDATIONS AND IDEAS FOR FUTURE PLANNING AND IMPLEMENTATION EFFORTS

11.1 Improved Conservation Data Collection and Management System

One outcome of the development of the WCIP and the BAWSCA Year 1Plan was the identified need to improve the conservation data collection process and management system.

11.1.1 Accurate and Efficient Data Collection

Data collection for the WCIP project was both time consuming and labor intensive. Large volumes of information that needed to be collected, analyzed, summarized, and then reviewed for 27 agencies presented a challenging task. While it is expected that each member agency is currently tracking, and will continue to track, implementation of its conservation measures, it is recommended that, as a next step in the regional conservation implementation planning process, BAWSCA continue to work with the member agencies to develop goals for a regional water conservation tracking system. Some items to consider in the development of such a regional tracking system include the following:

- Which data should be collected?
- At what level of detail should the data be collected (i.e., at the regional level only or member agency-specific)?
- Who should collect the data (i.e., BAWSCA, member agencies, or contractors)?
- Should the system use commercially available software, or be developed in house?
- What are efficient methods to track measure implementation and estimate or measure water savings, particularly to avoid reporting redundancy (e.g., for the CUWCC, UWMPS, etc)?
- What is the current status of member agency billing systems? Which systems do they use? When were they purchased? Do they plan to upgrade soon? Are there or will there be soon options for using the billing systems to manage these data?
- There is a large number of different billing categories (RSF, RMF, CII), inherent in the member agency billing systems. Can a central system be created to handle all these different inputs in an efficient and consistent manner? Should the member agencies track their own data?
- Select or develop a system that can give monthly or annual savings estimates such that BAWSCA can track progress against the agreed-upon goals.

Table 11-1 presents the matrix that was used to collect the historical conservation measure implementation for 2004 to 2008. This matrix may serve as a starting point for future measure-specific data collection. Measures implemented by each member agency that are outside the scope of the WCIP and the BAWSCA Year 1Plan will also be tracked, if that information is provided to BAWSCA.

The Project Team suggests focusing on both a short term solution and a long term vision. The short term solution would be to immediately collect information on specific program implementation in a consistent

manner that will be started in Year 1, including the conservation efforts that were completed in 2009. The long-term vision could consider converting the member agencies to similar billing systems, with similar billing categories, with the capability to manage at least some of the conservation data on a semi-automatic basis.

11.1.2 Validating Measure Effectiveness

Many assumptions were used herein to estimate the water savings associated with implementation of each selected water conservation measure. As part of WCIP and BAWSCA Year 1 Plan implementation, BAWSCA and its member agencies may want to consider developing a coordinated auditing program to measure the actual vs. estimated water savings associated with specific measure implementation.

11.2 Review WCIP and Consider Implementation of New Technologies

BAWSCA and its member agencies have stated the need to review the WCIP after 5 years. It is expected that such a 5-year review would include the following:

- DSS Model evaluation and demand forecast using new (current) billing data as a starting point;
- Evaluation of new technology and measures;
- Review of actual measure implementation for each program and actual program successes/challenges; and
- WCIP revision based on the above information and other relevant information obtained over the prior 5 years.

The review of the WCIP and BAWSCA Year 1 Plan progress is essential in order to meet the stated water savings goals by 2018 and 2030. The water savings and measure implementation should also be reviewed at minimum on an annual basis.

11.3 Implications for Responding to Water Shortages

As identified in the scope for the WCIP and BAWSCA Year 1 Plan, these plans are focused on a long-term water efficiency prospective. However, in recognition of the Governor's January 27, 2009 declaration of a state of emergency drought for the entire state of California, and as suggested by the Pacific Institute, the Project Team has identified a few possible roles for BAWSCA to consider during a water shortage, as follows:

- Facilitate the communication and coordination between agencies and wholesalers (e.g., SFPUC and SVCWD) on a regional basis such that consistent messages to the public are forthcoming.
- Implement a coordinated regional public education campaign focused on drought actions customers can implement, including development of a coordinated, consistent, clear message for the region where possible.
- Expand coverage and financial incentives for BAWSCA regional programs to achieve a significant short-term increase in market penetrations and associated reductions in water consumption. The Project Team recommends focusing on increasing the penetration and visibility of programs that are currently in effect. Such actions need to be able to be done quickly (i.e., within a few months). There may not be enough time to start a program that is new to the area and expect it to be effective during the water shortage, however, there may be other programs done by neighboring agencies that can be quickly imported.

There are some actions that BAWSCA may undertake immediately in Year 1 if water supply conditions require a greater reduction in overall water use. Specifically, BAWSCA and its member agencies may consider more immediate action for expanding its current program. These actions may include:

- Implement regional drought awareness campaign; and/or
- Expand bulk purchase and distribution of selected water-efficient fixtures.

Besides ramping up existing measures, one possible program to consider during a water shortage is a CII Performance Program modeled after the program currently running at the SFPUC. This particular program was recommended by the Pacific Institute as a possible way to achieve large savings from the existing CII customers with a reasonable and short-term investment of time and resources.

The key feature of this program for BAWSCA is that it extends the coverage and funding of the CII Audit program currently recommended for Years 2-3 of WCIP implementation. Assuming this program was in place during the water shortage, the existing CII audit staff could be utilized to help coordinate this new effort.

The CII Performance Program goal for BAWSCA during a water shortage situation would be to identify large CII users that have previously been audited and that have a significant project (e.g., replacing food steamers, laundry recycling, replacing a large number of toilets, use of ozone water treatment, or other process technology) that may have already been identified by individual company operations staff or auditors but might not have been implemented for various reasons, including funding. There are multiple large CII customers in the BAWSCA service area that could be approached and asked if there are current projects that could be funded to save a significant amount of water. During droughts, companies may be motivated to implement these projects to save on utility bills, following short-term rate increase.

11.4 Suggestions for Future Model Updates

Water demand projections should be updated periodically as needed. For BAWSCA, the next update of the demand projections should occur in the next five to ten years and include an update of the base year of 2001.

Demand projections are used by agencies for many purposes including:

1. Preparing necessary information for Urban Water Management Plans
2. Updating long-range projections for capital facility planning.
3. Preparing short-term projections for revenue planning.
4. Tracking whether water conservation programs are reducing water demand as planned.
5. Communication with the public about the efficacy of conservation investments.

Agencies and BAWSCA should balance the costs and benefits of updating the base year as a part of updating demand projections. If demand projections are updated every five years, then the base year should be updated at least every ten years.

Table 11-1. Number of Interventions Template for Implementation of Conservation Measures							
		Actual Interventions					
Measure	Billing Category	2004	2005	2006	2007	2008	Units
1 - Residential Water Surveys	Single Family						Accounts
1 - Residential Water Surveys	Multifamily						Accounts
2 - Residential Retrofit	Single Family						Accounts
2 - Residential Retrofit	Multifamily						Accounts
3 - Large Landscape Conservation Audits	Commercial						Accounts
3 - Large Landscape Conservation Audits	Industrial						Accounts
3 - Large Landscape Conservation Audits	Institutional						Accounts
3 - Large Landscape Conservation Audits	Irrigation						Accounts
3 - Large Landscape Conservation Audits	Other						Accounts
4 - Water Budgets	Commercial						Accounts
4 - Water Budgets	Industrial						Accounts
4 - Water Budgets	Institutional						Accounts
4 - Water Budgets	Irrigation						Accounts
4 - Water Budgets	Other						Accounts
5 - Washing Machine Rebate According to New BMP 6	Single Family						Dwelling Units
5 - Washing Machine Rebate According to New BMP 6	Multifamily						Dwelling Units
6 - Public Information	Single Family						Accounts
6 - Public Information	Multifamily						Accounts
7 - Commercial Water Audits	Commercial						Accounts
7 - Commercial Water Audits	Industrial						Accounts
7 - Commercial Water Audits	Institutional						Accounts
7 - Commercial Water Audits	Irrigation						Accounts
7 - Commercial Water Audits	Other						Accounts
8 - ICI ULF Toilet Rebate	Commercial						Fixtures
8 - ICI ULF Toilet Rebate	Industrial						Fixtures
8 - ICI ULF Toilet Rebate	Institutional						Fixtures
8 - ICI ULF Toilet Rebate	Irrigation						Fixtures

Table 11-1. Number of Interventions Template for Implementation of Conservation Measures							
		Actual Interventions					
Measure	Billing Category	2004	2005	2006	2007	2008	Units
8 - ICI ULF Toilet Rebate	Other						Fixtures
9a - RSF Toilet Sponsored Replacement	Single Family						Fixtures
9b - RMF Toilet Sponsored Replacement	Multifamily						Fixtures
10a - RSF Toilet Replacement Ordinance	Single Family						Accounts
10b - RMF Toilet Replacement Ordinance	Multifamily						Accounts
11 - Home Leak Detection and Repair	Single Family						Accounts
12 - Rebates for 6/3-Dual Flush Toilets	Single Family						Fixtures
12 - Rebates for 6/3-Dual Flush Toilets	Multifamily						Fixtures
13 - ET Controller Rebates	Single Family						Accounts
13 - ET Controller Rebates	Multifamily						Accounts
13 - ET Controller Rebates	Commercial						Accounts
13 - ET Controller Rebates	Industrial						Accounts
13 - ET Controller Rebates	Institutional						Accounts
13 - ET Controller Rebates	Irrigation						Accounts
13 - ET Controller Rebates	Other						Accounts
14 - Xeriscape Classes for Staff	Single Family						Accounts
15 - Irrigation Classes for Homeowners	Single Family						Accounts
16 - Promote Water Efficient Plantings	Single Family						Accounts
17 - Offer Incentives for Replacement of Coin Operated Washers	Commercial						Fixtures
17 - Offer Incentives for Replacement of Coin Operated Washers	Industrial						Fixtures
17 - Offer Incentives for Replacement of Coin Operated Washers	Institutional						Fixtures
17 - Offer Incentives for Replacement of Coin Operated Washers	Irrigation						Fixtures
17 - Offer Incentives for Replacement of Coin Operated Washers	Other						Fixtures
18 - Incentives for Retrofit Submetering in Multi-family Buildings	Multifamily						Accounts
19 - Require Submetering in Multi-family Buildings	Multifamily						Accounts
20 - Offer Incentives for Replacement of Multifamily Washers	Multifamily						Fixtures
21 - Landscape Requirements for New Systems	Multifamily						Accounts
21 - Landscape Requirements for New Systems	Commercial						Accounts

Table 11-1. Number of Interventions Template for Implementation of Conservation Measures							
		Actual Interventions					
Measure	Billing Category	2004	2005	2006	2007	2008	Units
21 - Landscape Requirements for New Systems	Industrial						Accounts
21 - Landscape Requirements for New Systems	Institutional						Accounts
21 - Landscape Requirements for New Systems	Irrigation						Accounts
21 - Landscape Requirements for New Systems	Other						Accounts
22 - Low Flow Restaurant Spray Nozzles	Commercial						Fixtures
23 - Water Audits Hotels-Motels	Commercial						Accounts
24 - WAVE Program Hotels	Commercial						Accounts
25 - Hotel Retrofit	Commercial						Accounts
26 - Award Program for COM Water Savings	Commercial						Accounts
27 - Replace Inefficient Equipment	Industrial						Accounts
28 - Require 0.5 gal/flush Urinals in New ICI Buildings	Commercial						Accounts
28 - Require 0.5 gal/flush Urinals in New ICI Buildings	Industrial						Accounts
29 - Financial Incentives for Complying with Water Use Budget	Commercial						Accounts
29 - Financial Incentives for Complying with Water Use Budget	Industrial						Accounts
29 - Financial Incentives for Complying with Water Use Budget	Institutional						Accounts
29 - Financial Incentives for Complying with Water Use Budget	Irrigation						Accounts
29 - Financial Incentives for Complying with Water Use Budget	Other						Accounts
30 - Financial Incentives for Irrigation Upgrades	Irrigation						Accounts
31 - Require Dedicated Irrigation Meters	Multifamily						Accounts
31 - Require Dedicated Irrigation Meters	Commercial						Accounts
31 - Require Dedicated Irrigation Meters	Industrial						Accounts
31 - Require Dedicated Irrigation Meters	Institutional						Accounts
31 - Require Dedicated Irrigation Meters	Irrigation						Accounts
31 - Require Dedicated Irrigation Meters	Other						Accounts
32 - Water Utility/City Department Reduction Goals	Institutional						Accounts
32 - Water Utility/City Department Reduction Goals	Other						Accounts

12. LIMITATIONS

This document was prepared solely for BAWSCA in accordance with professional standards at the time the services were performed and in accordance with the contract between BAWSCA and MWM (and BC) dated September 19, 2008, as amended. This document is governed by the specific scope of work authorized by BAWSCA; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by BAWSCA and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

This document sets forth the results of certain services performed by MWM and Brown and Caldwell. The report includes technical content and tables developed by MWM and Brown and Caldwell. The text of the document reflects edits made by BAWSCA during the Draft report revision process. BAWSCA recognizes and acknowledges that these services were designed and performed within various limitations, including budget and time constraints.

Further, MWM and Brown and Caldwell makes no warranties, express or implied, with respect to this document, except for those, if any, contained in the agreement pursuant to which the document was prepared. All data, drawings, documents, or information contained this report have been prepared exclusively for the person or entity to whom it was addressed and may not be relied upon by any other person or entity without the prior written consent of MWM and Brown and Caldwell unless otherwise provided by the Agreement pursuant to which these services were provided

THIS PAGE INTENTIONALLY LEFT BLANK.

APPENDIX A - CONSERVATION MEASURE VARIABLES

THIS PAGE INTENTIONALLY LEFT BLANK.

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
MEASURES INCLUDED IN THE 2004 STUDY									
1.	Residential Water Surveys	RSF, RMF; Indoor and Outdoor	15 percent[1] of target water user group accounts with applicable end use at end of ten years	5 percent - Internal water savings, 10 percent - Leaks & Exterior[1] water savings - - - - - - - - - - - - - - - - - - - Cost & Savings Study (C&S Study) for untargeted surveys, pg 2-46; savings per dwelling unit surveyed converted to end-use percentage basis for DSS Model using SFPUC mean customer indoor/outdoor per capita use and household size (see SFPUC Wholesale Customer Water Demand Projections Technical Report (URS 2004)))	Indefinitely - - - - - - - - - - - - Measure planned to continue indefinitely so savings stay at the level reached after 7 years (the measure life)	7[2] - - - - - - - - - - - CUWA Report page 20	$80/RSF account, $130/RMF account[1] - - - - - - - - - - - - - - - - - - - RSF survey costs within range provided by C&S Study, pg 2-48, which is $40-200 per RSF survey; costs for RMF based on MWM experience.	$15/RSF account, $50/RMF account - - - - - - - - - - - - - - - - - MWM experience, allows for minor leak repair and retrofits by owner	25% - - - - - - - - - - - - - - - - - MWM experience, requires large marketing effort to hit targets
2.	Residential Retrofit	RSF, RMF; Indoor	75 percent of existing non-low flow devices in target water user group accounts with applicable end use (varies by city)1	21 percent - Internal water savings, end use is Showers[3,9] - - - - - - - - - - - - - - - - - - - Adapted from AWWARF REUS report, by John Olaf Nelson and published in his Kobe, Japan paper.	5	Permanent - - - - - - - - - - - Only low flow showerheads can be purchased to replace original retrofit	$30/RSF, $15/RMF dwelling unit [1] - - - - - - - - - - - - - - - - - - - Costs within range provided by C&S Study, pg 2-49, assuming 2 showers/RSF and 1 per RMF	0 - - - - - - - - - - - - - - - - - Customer installed - no cost assigned	10% - - - - - - - - - - - - - - - - - MWM experience, many prior examples available to follow
3.	Large Landscape Conservation Audits	CII; Outdoor	15 percent of target water user group accounts with mixed use meters[1]	15 percent Exterior water savings, end use is Irrigation[1] - - - - - - - - - - - - - - - - - - - C&S Study in the range reported on pages 2-99,100	10	10[2] - - - - - - - - - - - CUWA Report page 20	$800/acre[4,5] - - - - - - - - - - - - - - - - - - - Adapted from BMP 5 Handbook, pg. 3-11, deleting marketing cost and adding 30 percent allowance for periodic follow-up to maintain savings. Converted to $/acre using avg survey site value of 1.25 acres (From BMP Reporting Database Water Savings Calculator default value)	$200/acre - - - - - - - - - - - - - - - - - MWM experience	30% - - - - - - - - - - - - - - - - - MWM experience, sometimes difficult to promote
4.	Water Budgets	CII; Outdoor	90 percent of CII sites with irrigation meters1	15 percent Exterior water savings, end use is Irrigation[2] - - - - - - - - - - - - - - - - - - - CUWA Report page A-11	5	Permanent[2] - - - - - - - - - - - CUWA Report page 20	$200/Irrigation account[3] - - - - - - - - - - - - - - - - - - - Within the range cited in BMP 5 Handbook, pg. 2-19	0 - - - - - - - - - - - - - - - - - Customer's contractor adjusts irrigation controller, no cost assigned	15% - - - - - - - - - - - - - - - - - MWM experience, straight-forward but tedious
5.	Clothes Washer Rebate	RSF, RMF; Indoor	As per new BMP 6 2005-2007, 4.8 percent of dwelling units in target water user group accounts with applicable end use by 2007	35 percent-Interior water savings, end use is Laundry[1] - - - - - - - - - - - - - - - - - - - Reduced slightly from the range in the C&S Study range on pg. 2-13 due to high household sizes in the Bay Area and the potential for shared laundry loads; specific savings based on fixture modeling	3	Permanent - - - - - - - - - - - MWM judgment that user will not replace an efficient machine with an inefficient one, given pending state standards	$75/fixture - - - - - - - - - - - - - - - - - - - Typical rebates currently offered	$200/fixture - - - - - - - - - - - - - - - - - Estimate of added cost for an efficient machine	30% - - - - - - - - - - - - - - - - - MWM experience in consultation with BAWSCA

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
6.	Public Information Program	RSF; Indoor and Outdoor	100 percent of target water user group accounts with applicable end use	1 percent water savings on all indoor and outdoor end uses - MWM estimate, assuming a robust conservation program accompanies public education, but that most of customer water savings are accounted for in other programs	Indefinitely - - - - - - - - - - - Program planned to continue indefinitely so savings stay at the level reached after 2 years	2 - - - - - - - - - - - MWM judgment that public education has a limited life and must be continued to maintain savings	$2/RSF Account/yr - - - - - - - - - - - - - - - - - MWM experience	0 - - - - - - - - - - - - - - - - Customer actions are voluntary.	0 - - - - - - - - - - - - - - - - - Cost included in utility cost
7.	Commercial Water Audits	CII; Indoor and Outdoor	Top 10 percent (highest water users) of target water user group accounts with applicable end use	12 percent water savings of all site end uses (potential for 30 percent savings but only implement 40 percent of the potential)[1,6] - Default value for BMP 9, see MOU pg 44, also within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential	10	Permanent - - - - - - - - - - - MWM experience that potential is in equipment changes, likely to be permanent, rather than behavioral changes	$3000/account (top 10 percent of water users)[1] - - - - - - - - - - - - - - - - - In range of costs cited in C&S Study, pg 2-66, mean analyst surveys adjusted for inflation since 1995	$2000/account - - - - - - - - - - - - - - - - MWM experience, excludes costs for cost-effective projects paid by facility, covers facility contract administration costs	50% - - - - - - - - - - - - - - - - - MWM experience, marketing is difficult
8.	ULF Toilet and Urinal Rebates	CII; Indoor	3 percent of target water user group accounts with pre-1992 Toilets	Water savings are variable percentage of COM Toilet use, varies with current toilet stock[7]; - Savings calculated by CUWCC with toilet data by zip code. Savings based on CII ULFT Savings Study	3	Permanent	$200/fixture - - - - - - - - - - - - - - - - - Typical rebates currently offered, higher than residential rebates due to higher toilet use and savings	$200/fixture - - - - - - - - - - - - - - - - MWM experience, assumes replacement fixture is usually a flushometer type toilet	25% - - - - - - - - - - - - - - - - - MWM experience, many examples are available to follow, but still labor intensive
9.	Residential ULF Toilet Rebate	RSF, RMF; Indoor	Result of 10 years of replacement at resale rate less natural replacement rate for applicable target water user group accounts	Water savings is approximately 60 percent of RSF and RMF toilet end use water usage, savings varies with current toilet stock[3] - Savings set up in fixture models, see SFPUC Wholesale Customer Water Demand Projections Technical Report (URS 2004)	10	Permanent	$50/fixture - - - - - - - - - - - - - - - - - Typical rebates currently offered	$75 per fixture - - - - - - - - - - - - - - - - Estimate of added cost for an efficient machine	25% - - - - - - - - - - - - - - - - - MWM experience, many examples are available to follow, but still labor intensive
10.	Require 1.6 gal per flush toilets to be installed at the time of sale of existing buildings	RSF, RMF; Indoor	Approximately 100 percent of target water user group accounts with applicable end use (varies by city ~7 percent/yr)	Water savings is approximately 60 percent of RSF and RMF toilet end use water usage, savings, varies with current toilet stock[3] - Savings set up in fixture models, see SFPUC Wholesale Customer Water Demand Projections Technical Report (URS 2004)	Varies with resale rate approximately 10 years	Permanent	$10/account - - - - - - - - - - - - - - - - - MWM experience	$125/fixture - - - - - - - - - - - - - - - - Estimate of total cost for an efficient machine, installed	15% - - - - - - - - - - - - - - - - - MWM experience for regulatory program that is somewhat complicated and not routine
11.	Home Leak Detection and Repair	RSF; Indoor and Outdoor	Offer to top 20 percent of accounts (highest water users) in target water user group, complete approximately half of those offered (10 percent of total accounts in target water user group)	90 percent water savings, end use is Int./Ext. Leakage use[3] - Savings assume 90 percent of leaks removed by plumber, leakage amount based on AWWARF REUS	10	5 - - - - - - - - - - - MWM experience, new leaks will appear	$200/account - - - - - - - - - - - - - - - - - MWM experience, cost of plumber and leak repair materials	0 - - - - - - - - - - - - - - - - Utility subsidizes entire cost of repair	25% - - - - - - - - - - - - - - - - - MWM experience, new program

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
12.	Rebates for 6/3 dual flush or 4 liter toilets	RSF, RMF; Indoor	25 percent of target water user group accounts with applicable end use	Water savings is approximately 67 percent, end use is Toilets, varies with current toilet stock[3] - - - - - - - - - - - - - - - - - - - Savings based on DSS Model toilet fixture models, which were based on AWWARF REUS, adjusted for lower flush volume	10	Permanent - - - - - - - - - - - Assumes dual flush toilet replaced eventually with a like model	$100/fixture - - - - - - - - - - - - - - - - - - MWM experience, assumes future price reduction from current levels	$50/fixture - - - - - - - - - - - - - - - - - MWM experience, covers installation cost	25% - - - - - - - - - - - - - - - - - MWM experience, new program
13.	ET Controller Rebates	RSF, RMF, CII, PUB; Outdoor	50 percent of accounts in target water user group with applicable end use are eligible, Assume approximately 20 percent of those eligible accept	15 percent water savings, end use is Irrigation[1] - - - - - - - - - - - - - - - - - - - Savings based on C&S Study, pg 2-2 that reports on IRWD findings, slightly reduced to account for different climate in Bay Area from Orange County where studies were done.	20	Permanent - - - - - - - - - - - Assumes ET Controller replaced eventually with a like model	$150/rebate per account - - - - - - - - - - - - - - - - - - MWM experience, assumes future price reduction from current levels	$100/account - - - - - - - - - - - - - - - - - MWM experience, covers installation cost	50% - - - - - - - - - - - - - - - - - MWM experience, high due to new technology and more difficult marketing and probable call backs to adjust settings
14.	Xeriscape education and staff training at retail garden/irrigation supply houses	RSF; Outdoor	10 classes per site (training center) per year, each 300 homeowners/year (in target water user group with applicable end use)	15 percent water savings, end use is Irrigation - - - - - - - - - - - - - - - - - - - New measure, no published data available, MWM estimate	Indefinitely - - - - - - - - - - - - Small program done every year to reach significant population	Permanent - - - - - - - - - - - Assumes permanent landscape conversions on part of landscaped area	$300/class; ten per year per training site - - - - - - - - - - - - - - - - MWM experience, covers training cost	$200/account - - - - - - - - - - - - - - - - - MWM experience, covers new plant material purchase cost	10% - - - - - - - - - - - - - - - - - MWM experience, easy to administer once established
15.	Homeowner irrigation classes	RSF; Outdoor	200 homeowners (in target water user group with applicable end use) per training site per year	10 percent water savings, end use is Irrigation - - - - - - - - - - - - - - - - - - - New measure, no published data available, MWM estimate	Indefinitely - - - - - - - - - - - - Small program done every year to reach significant population	Permanent - - - - - - - - - - - Assumes permanent irrigation system upgrade on part of landscaped area	$300/class; ten per year - - - - - - - - - - - - - - - - - MWM experience, covers training cost	$300/account - - - - - - - - - - - - - - - - - MWM experience, covers new irrigation system material purchase cost	10% - - - - - - - - - - - - - - - - - MWM experience, easy to administer once established
16.	Promote water efficient plantings at new homes	RSF; Outdoor	10 percent of new homes in target water user group with applicable end use	10 percent water savings, end use is Irrigation - - - - - - - - - - - - - - - - - - - No published data available yet; measure being implemented in several places, MWM estimate	Indefinitely - - - - - - - - - - - - Small program done for larger subdivisions every year to reach significant population	Permanent - - - - - - - - - - - - Assumes permanent low water use landscape installation	$100/account - - - - - - - - - - - - - - - - - MWM experience, covers possible incentive to new home buyers	$1,000/account - - - - - - - - - - - - - - - - - MWM experience, covers added cost of low water use plants instead of turf	20% - - - - - - - - - - - - - - - - - MWM experience, covers coordinating with developers
17.	Offer incentives for replacement of clothes washers in coin-operated laundries	CII; Indoor	50 percent of target water user group accounts with applicable end use by the year 2007	35 percent water savings, end use is Laundry[1] - - - - - - - - - - - - - - - - - - - Reduced slightly from the range in the C&S Study range on pg. 2-13 due to new measure; specific savings based on service area data collected	3	Permanent - - - - - - - - - - - MWM judgment that owner will not replace an efficient machine with an inefficient one, given pending standards	$300/washer - - - - - - - - - - - - - - - - - MWM experience, covers rebate cost which can be higher than for a residential machine because commercial machine used much more frequently	$100/washer - - - - - - - - - - - - - - - - - MWM experience, covers added cost of efficient commercial machine	25% - - - - - - - - - - - - - - - - - MWM experience, new program, but sites have been identified

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
18.	Incentives for retrofitting sub-metering	RMF; Indoor	25 percent of the number of multifamily buildings (with more than 20 units in the building), new and existing buildings are included	10 percent water savings of all indoor end uses[1] - - - - - - - - - - - - - - - - - - - New measure, savings estimate consistent with C&S Study, pg 2-26 for data available in 2003.	10	Permanent - - - - - - - - - - - MWM judgment that owner will not remove sub-meters	$1,000/account - - - - - - - - - - - - - - - - - MWM experience, covers planned average rebate cost which would be based on building units	$100/unit + $5/month per unit metered - - - - - - - - - - - - - - - - - MWM experience, covers installation (retrofit) cost and meter read and bill cost	25% - - - - - - - - - - - - - - - - - MWM experience, new program, difficult to accomplish equitably
19.	Require sub-metering multifamily units	RMF; Indoor	90 percent of new units in target water user group (RMF), applies to all building sizes.	10 percent water savings of all indoor end uses[1] - - - - - - - - - - - - - - - - - - - New measure, savings estimate consistent with C&S Study, pg 2-26 for data available in 2003	Indefinitely - - - - - - - - - - - Applies to all new units	Permanent - - - - - - - - - - - Removal not allowed	$10/unit - - - - - - - - - - - - - - - - - MWM experience, covers added design review and inspection cost	$50/unit + $5/month/unit metered - - - - - - - - - - - - - - - - - MWM experience, covers installation on new units cost and meter read and bill cost	10% - - - - - - - - - - - - - - - - - MWM experience, administered through normal building code enforcement
20.	Rebate RMF efficient clothes washers	RMF; Indoor	50 percent of target water user group accounts by the year 2007	35 percent water savings, end use is Laundry[1] - - - - - - - - - - - - - - - - - - - Reduced slightly from the range in the C&S Study range on pg. 2-13 due to new measure; specific savings based on service area data collected	3	Permanent - - - - - - - - - - - MWM judgment that owner will not replace an efficient machine with an inefficient one, given pending standards	$200/washer - - - - - - - - - - - - - - - - - MWM experience, covers rebate cost which can be higher than for a Single-Family Residential machine but less than public coin-op machine based on use frequency	$100/washer - - - - - - - - - - - - - - - - - MWM experience, covers added cost of efficient heavy duty machine	25% - - - - - - - - - - - - - - - - - MWM experience, new program, targets not identified
21.	Enforce landscape requirements for new landscaping systems (turf limitations / regulations)	RMF, CII; Outdoor	70 percent of new installations in target water user groups with applicable end uses	15 percent water savings, end use is Irrigation - - - - - - - - - - - - - - - - - - - New measure enforcing existing AB325 regulations, MWM estimate	Indefinitely - - - - - - - - - - - Applies to all new Non-Residential accounts	Permanent - - - - - - - - - - - MWM judgment that owner will not replace an efficient landscape with an inefficient landscape	$50 per new Non-Residential account - - - - - - - - - - - - - - - - - MWM experience, covers added new site design review and inspection cost	$500 per account - - - - - - - - - - - - - - - - - MWM experience, covers added cost of low water landscaping versus turf	15% - - - - - - - - - - - - - - - - - MWM experience, covers landscape industry education and compliance checking
22.	Restaurant low flow spray rinse nozzles	CII; Indoor	75 percent of restaurants, colleges, and hospitals (derived based on billing and census data and wholesale customer feedback specific to their service area)	50 percent water savings of spray nozzle usage (150 gpd/site)[8] - - - - - - - - - - - - - - - - - - - Based on year one CA PUC sponsored retrofit, 2003 reported savings (since revised down 8 percent)	5	Permanent - - - - - - - - - - - MWM judgment that owner will not replace an efficient valve with an inefficient valve	$200/site[8] - - - - - - - - - - - - - - - - - Based on year one CA PUC sponsored retrofit, plus 10 percent to account for wider installation program	0 - - - - - - - - - - - - - - - - - Provided free and installed for customer	15% - - - - - - - - - - - - - - - - - MWM experience, assuming centrally organized and contracted out, expand existing program
23.	Focused water audits for hotels/motels	CII; Indoor and Outdoor	50 percent of hotel and motels (derived based on billing and census data, and wholesale customer feedback specific to their service area)	15 percent water savings on all Hotel/Motel end uses[1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential plus MWM experience with hotel audits	10	Permanent - - - - - - - - - - - MWM judgment that owner will not replace retrofitted efficient equipment with inefficient equipment	$3,000/site[1] - - - - - - - - - - - - - - - - - In range of costs cited in C&S Study, pg 2-66, mean analyst surveys adjusted for inflation since 1995; assumes audits are done in large numbers and done efficiently	$2,000/site - - - - - - - - - - - - - - - - - MWM experience with hotel audits, excludes cost-effective project costs; allows for hotels administration costs	25% - - - - - - - - - - - - - - - - - MWM experience, assuming centrally organized and contracted out

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
24.	WAVE Program (US EPA) for hotels	CII; Indoor	10 percent of hotels and motels (derived based on billing and census data, and wholesale customer feedback specific to their service area)	5 percent water savings on all Hotel/Motel end uses - - - - - - - - - - - - - - - - - - - New measure relies on voluntary compliance; no published savings, MWM estimate	10	Permanent - - - - - - - - - - - MWM judgment that owner will not replace retrofitted efficient equipment with inefficient equipment	$200/site - - - - - - - - - - - - - - - - - Direct utility costs for promoting program	$5,000/site - - - - - - - - - - - - - - - - MWM experience with hotel audits, includes in-house cost of doing water audit and using EPA provided software to identify cost-effective retrofit projects	15% - - - - - - - - - - - - - - - - - Covers other utility costs for promoting program
25.	Hotel retrofit (w/financial assistance)	CII; Indoor	20 percent of hotels and motels (derived based on billing and census data, and wholesale customer feedback specific to their service area)	20 percent water savings on all Hotel/Motel end uses[1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential plus effects of financial assistance	10	Permanent - - - - - - - - - - - MWM judgment that owner will not replace retrofitted efficient equipment with inefficient equipment	$100/room - - - - - - - - - - - - - - - - - Utility rebate for subsidizing retrofit program	$100/room - - - - - - - - - - - - - - - - Balance of cost to retrofit room (new toilet, showerhead, faucet aerator)	25% - - - - - - - - - - - - - - - - - MWM experience, covers other utility costs for promoting program and working with hotels to accomplish retrofits
26.	Award program for water savings by businesses	CII; Indoor and Outdoor	3 accounts every other year for each wholesale customer with significant number CII water using accounts (large customers in target water user group only)	25 percent water savings, end use is commercial [1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential plus effects of reward (for businesses who achieve this level of savings)	Indefinitely	Permanent - - - - - - - - - - - MWM judgment that owner will not replace retrofitted efficient equipment with inefficient equipment	$1000/account (top 5 percent of applicable accounts) for publicity, judging - - - - - - - - - - - - - - - - - MWM experience, (budgeted number for program)	$5,000/account - - - - - - - - - - - - - - - - MWM experience, excludes costs for cost-effective projects, covers water audit cost and facility contract administration costs	15% - - - - - - - - - - - - - - - - - MWM experience
27.	Replace inefficient water using equipment	CII; Indoor	10 percent of accounts in target water user group with applicable end use	15 percent water savings, end use is Process use[1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential plus effects of reward (targeted at process use by large customers)	10	Permanent - - - - - - - - - - - MWM judgment that owner will not replace retrofitted efficient equipment with inefficient equipment	$1,000/account - - - - - - - - - - - - - - - - - Utility rebate for approved retrofit program	$5,000/account - - - - - - - - - - - - - - - - MWM experience, excludes costs for cost-effective projects, covers water audit cost and facility contract administration costs	15% - - - - - - - - - - - - - - - - - MWM experience, sites contact utilities for rebate, lower promotion costs than for CII surveys
28.	Require 0.5 gal/flush urinals in new buildings	CII; Indoor	70 percent of new accounts in target water user group with applicable end use	50 percent water savings, end use is Urinals[1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pg 2-92; assumes average of 0.5 gal/flush urinal used instead of 1 gal/flush urinal, currently required.	Indefinitely - - - - - - - - - - - - Applies to all new Non-Residential accounts	Permanent	$25/new CII Account with urinals - - - - - - - - - - - - - - - - - Utility budget for extra checking during building approval and construction phases	0 - - - - - - - - - - - - - - - - MWM experience, assumes no added cost of low water use flush valve	10% - - - - - - - - - - - - - - - - - MWM experience, administered through normal building code enforcement
29.	Financial incentives for complying with water use budget	CII; Outdoor	75 percent of sites in applicable target water user group with irrigation meters	15 percent water savings (on top of water budget savings), end use is Irrigation[2,4] - - - - - - - - - - - - - - - - - - - Within range of savings reported by CUWA pg A-11 and BMP 5 handbook, pg 2-17	Indefinitely - - - - - - - - - - - - Permanent change for sites with irrigation meters	Permanent - - - - - - - - - - - MWM judgment that owner will not replace efficient irrigation equipment with inefficient equipment	$500/account - - - - - - - - - - - - - - - - - Average utility rebate for those sites that reduce use	$1000/account - - - - - - - - - - - - - - - - MWM experience, covers cost of irrigation retrofit to meet water budget	10% - - - - - - - - - - - - - - - - - MWM experience on regulatory program

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
30.	Financial incentives for irrigation upgrades	CII; Outdoor	10 percent of new sites in applicable target water user group with irrigation or mixed use meters	15 percent water savings, end use is Irrigation[1] - - - - - - - - - - - - - - - - - - - C&S Study in the range reported on pages 2-99,100	10	Permanent - - - - - - - - - - - MWM judgment that owner will not replace efficient irrigation equipment with inefficient equipment	$500/account - - - - - - - - - - - - - - - - Average utility rebate per site	$500/account - - - - - - - - - - - - - - - - MWM experience, covers cost of new site to install more efficient irrigation equipment than is normal practice	25% - - - - - - - - - - - - - - - - MWM experience with City of Pleasanton and others EBMUD and CCWD who have implemented this program
31.	Require dedicated irrigation meters for new accounts	CII; Outdoor	50 percent of new CII accounts where no irrigation meters currently exist	Apply water budget savings from measure 4 to all new targeted Irrigation accounts[2] - - - - - - - - - - - - - - - - - - - CUWA Report page A-11	Indefinitely - - - - - - - - - - - - Applies to all new Non-Residential accounts	Permanent - - - - - - - - - - - MWM judgment that owner will not replace efficient irrigation equipment with inefficient equipment	$10/account/year - - - - - - - - - - - - - - - - Average utility cost per site to read and bill more irrigation meters than would otherwise occur.	$1000/account - - - - - - - - - - - - - - - - MWM experience, covers cost of new site to install more efficient irrigation system, motivated by link to water budget	10% - - - - - - - - - - - - - - - - MWM experience on regulatory program
32.	Water Utility / City Department water reduction goals	PUB; Indoor and Outdoor	50 percent of city departments (derived from billing data and census data, and wholesale customer feedback specific to their service area)	10 percent water savings in indoor end uses, 15 percent water savings in City, County Irrigation usage[1] - - - - - - - - - - - - - - - - - - - Within range of savings reported in C&S Study pgs 2-62-65, allowing for a 40 percent implementation of identified potential plus MWM experience with hotel audits	10	Permanent - - - - - - - - - - - MWM judgment that city will not replace efficient equipment with inefficient equipment	$500/account - - - - - - - - - - - - - - - - Average water utility rebate per site	$2,000/account - - - - - - - - - - - - - - - - MWM experience, covers cost to install more efficient equipment and devices	15% - - - - - - - - - - - - - - - - MWM experience on agency to agency communication program
ADDITIONAL/NEW MEASURES INCLUDED IN THE 2008 STUDY									
NM-1	High-efficiency Toilet Rebate Program	RSF, RMF, CII; Indoor	Approximately 1 percent of accounts affected annually for 10 years. Based on; approximately 60 percent are already ULF toilets. Participation rate is 9.5 percent of RSF, RMF, and CII accounts by the end of the program. When M12 is run with NM1, market penetration reduces to 15 percent and 10 percent, respectively	68 percent savings of toilet end use - - - - - - - - - - - - - - - - - - - Reduction percentage depends on replacement of high volume existing toilets with HETs.	10 - - - - - - - - - - - - Should test program after 10-years and continue if savings and costs are effective.	Permanent - - - - - - - - - - - - Assumes that owner will not replace retrofitted efficient equipment with inefficient equipment (MWM 2005a).	$150/ toilet - - - - - - - - - - - - - - - - Based on cost estimate per request of Nicole Sandkulla at BAWSCA.	$100/toilet - - - - - - - - - - - - - - - - Net cost is approximately $100 to cover installation.	25% - - - - - - - - - - - - - - - - Additional cost to the utility for administration and marketing.
NM-2	Education and Training Programs	RSF; Outdoor		10% irrigation	Indefinite - - - - - - - - - - - - This program will be run every year for the entire length of the analysis.	Permanent - - - - - - - - - - - - Assumes owner will not replace efficient irrigation equipment with inefficient equipment (MWM 2005a).	$950 - - - - - - - - - - - - - - - - Average cost per class is $920, 50 people per class (assumes a ratio of 1 class at $1400 each for professionals to every 3 classes at $800 each for homeowners).	$300 - - - - - - - - - - - - - - - - Average per-account cost; includes cost of new plants/landscaping systems and irrigation equipment.	50% - - - - - - - - - - - - - - - - Includes cost of new plants/landscaping systems and irrigation equipment.

THIS PAGE INTENTIONALLY LEFT BLANK

Table A-1. Conservation Measure Variables

	Measure	Target Water User Group; End Use	Market Penetration Goal[10]	Measure Water Savings (as a percent of total water usage [per end use] on each account to which the measure is applied)	Measure Design Length (years)	Measure Life (years)	Utility Unit Cost (for contractor)	Retail Customer Unit Cost	Utility Administration and Marketing Cost (percentage per participant)
NM-5	Washer Rebates for High-efficiency Machines	RSF, RMF; Indoor --- Only applies to those account categories that have a fixture model applied to them for washers	27 percent of accounts affected by the end of the program in the year 2019.	Varies --- Reduction percentage depends on gallons per load of existing washers. Old machines can use as much as 45 gallons per load. New High-efficiency machines assumed to use an average of 18 gallons per load.	9 --- Assumes rebate no longer needed after 2018 as most washers sold will be HEWs.	Permanent --- Assumes that owner will not replace retrofitted efficient equipment with inefficient equipment (MWM 2005a).	$200 --- Rebate amount, may be matched by PG&E.	$200 --- Added cost per washer for a HEW. This is the cost to pay for the difference between a HEW and a conventional washer.	20% --- Added cost per washer for a HEW. This is the cost to pay for the difference between a HEW and a conventional washer.
NM-6	New Building Indoor Water Efficiency	RSF, RMF, COM, IND, INS, MUN, BUS; Indoor	75 percent of new accounts	Varies --- High-efficiency toilet: 20.0 percent Efficient clothes washer: 50.9 percent Efficient dishwasher: 33.0 percent High-efficiency faucets: 15.0 percent High-efficiency showers: 15.0 percent Efficient hot water system-faucets: 10.65 percent Efficient hot water system-showers: 3.55 percent RMF submeter: 15.0 percent	22	Permanent	$25 for RSF accounts $100 for RMF accounts $100 for non-residential accounts	Varies --- High-efficiency toilet: $150 Efficient clothes washer: $400 Efficient dishwasher: $400 High-efficiency faucets: $50 High-efficiency showers: $50 Efficient hot water system-faucets: $700 Efficient hot water system-showers:-- RMF submeter: $3,000	5%
NM-7	New Building Landscape Water Efficiency	RSF, RMF, COM, IND, INS, MUN, BUS, IRR; Outdoor	65 percent of new accounts	10 percent for low water use landscaping 15 percent for high-efficiency irrigation system with Smart Controller	22	Permanent	$25 for RSF, RMF, and non-residential accounts	$5,000 for low water use landscaping $500 for high-efficiency irrigation system with Smart Controller	5%

Notes:
RSF: Residential Single-Family
RMF: Residential Multi-Family
CII: Industrial/Commercial/Institutional
PUB: Public
COM: Commercial
BUS: Business
MUN: Municipal
INS: Institutional
[1] California Urban Water Conservation Council (CUWCC) BMP Cost and Savings Study, October 2004 version
[2] California Urban Water Agencies (CUWA) Urban Water Conservation Potential, August 2001.
[3] American Water Works Association, Residential End Uses of Water Study (REUS), 1999
[4] CUWCC BMP 5 Handbook, April 1999
[5] BMP Reporting Database water Savings Calculations, Memo from David Mitchell to CUWCC R&E Committee, April 2003
[6] CUWCC MOU, December 2002
[7] CUWCC CII ULFT Savings Study, 1997.
[8] CUWCC Potential Best Management Practices, Year 1 Report, June, 2004.
[9] Nelson, J.O. Residential End Uses of Water and Demand Management Opportunities, Proceedings of the International Symposium on Efficient Water Use in Urban Areas: Innovative Ways of Finding Water for Cities, Kobe, Japan, 1999
[10] Under Market Penetration Goal, the number of target water user group accounts was derived based on billing data and census data and was projected using the DSS model (SFPUC Wholesale Customer Water Demand Projections Technical Report (URS 2004)

THIS PAGE INTENTIONALLY LEFT BLANK.

REFERENCES

Association of Bay Area Governments, Projections, 2007.

Maddaus Water Management. DSS SFPUC Wholesale Customer Model, 2004 and 2006.

Maddaus Water Management. BAWSCA Regional Water Conservation Analysis, 2005.

San Francisco Public Utilities Commission (SFPUC). Water System Improvement Program, 2006.

URS Corporation and San Francisco Public Utilities Commission (SFPUC), Investigation of Regional Water Supply Option Number 4, Technical Memorandum, 2006.

URS Corporation and Maddaus Water Management, SFPUC Wholesale Customer Water Demand Projections, 2004.

URS Corporation and Maddaus Water Management, SFPUC Wholesale Customer Water Conservation Potential, 2004.

Water Sense, DRAFT New Home Guidelines, May 9, 2009.

THIS PAGE INTENTIONALLY LEFT BLANK.