

WaterSMART Small-scale Water Efficiency  
Projects  
Funding for  
**Washington County**  
**Water Conservation Programs:**  
**Irrigation Measures**  
**2019-2021**



533 E Waterworks Drive  
St. George UT 84770  
435.673.3617

Julie Gillins, Water Conservation Manager  
[julie@wcwcd.org](mailto:julie@wcwcd.org)

**April 24, 2019**

# Table of Contents

TECHNICAL PROPOSAL AND EVALUATION CRITERIA.....	3
Executive Summary .....	3
Background on WCWCD.....	3
Project Description .....	5
Evaluation Criteria .....	5
PROJECT BUDGET .....	13
Budget Proposal .....	104
Budget Narrative .....	12
REQUIRED PERMITS OR APPROVALS.....	13
Exhibit A: Funding Plan.....	17
Exhibit B: Letter of Commitment.....	18
Exhibit C: Final MWM Memo .....	19
Exhibit D: Measure Forms .....	20
Exhibit E: Official Resolution.....	21
Exhibit F: Letters of Support.....	22

# TECHNICAL PROPOSAL AND EVALUATION CRITERIA

## Executive Summary

April 24, 2019

Washington County Water Conservancy District (WCWCD)

St. George, Washington, Utah (Southwest Utah)

### **Implementation of Water Conservation Projects—Irrigation Measures**

This proposal will address the task area of water conservation projects on irrigation efficiency measures. This proposal is seeking for funding to continue offering rebates for an existing measure. The measure is: Water Smart Irrigation Upgrades (residential, multifamily, and CII users). This proposal provides Washington County with funding assistance in offering an incentive program to residents, multifamily developments, and CII water users in Washington County. This program, water efficient irrigation systems upgrades, is identified in our recently updated water conservation plan (2015). The measure will offer rebates for installing smart irrigation controllers, high-efficiency nozzles along with other changes to irrigation system to save outside water use. This measure and other measures offered by WCWCD has helped reduce our water use by 9 percent while our population increased 13 percent. The purpose of these program is to help meet the target of a reduction of per capita daily use of 20 percent by 2060. Such financial assistance brings WCWCD closer to reaching its water conservation target.

### **Length of time, estimated project completion and location**

- Project Timeline: October 1, 2019 to September 30, 2021
- This proposed project is not located on a federal facility.

## Background Data

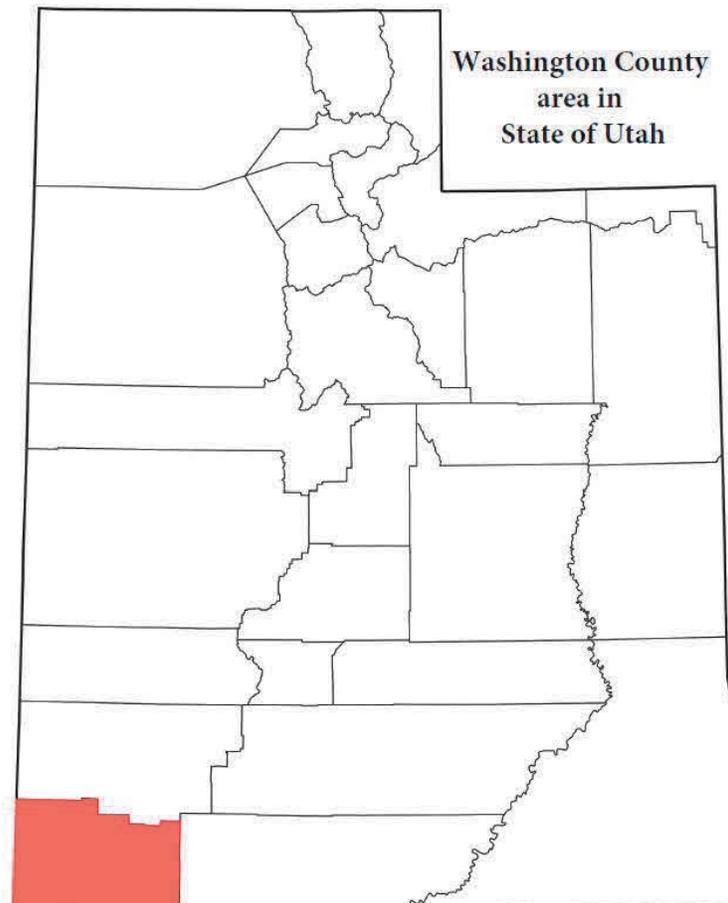
WCWCD's jurisdiction covers all of Washington County though most of its projects are located in the heaviest populated areas of the county. According to the Governor's Office of Planning and Budget and 2015 US Census, this is the fastest going community in the west. The county's population increased 13 percent from 2010 to 2015. The 2010 population of the county is 138,530. WCWCD reliable annual water supply is 32,047 AF and its sole water source is from the Virgin River Basin. WCWCD manages and operates 6 reservoirs (2 for culinary use), 100 miles of culinary pipelines, 80 miles of secondary pipelines, two hydroelectric plants, 4 pump stations, 23 wells, 6 tanks and a 60 mgd culinary water treatment plant. Broken down into percentage of potable water use by class, 77 percent is residential customer sector and the remaining 23 percent is used by the commercial, industrial and institutional customer base. WCWCD is a local government entity with a property tax base and revenues from hydroelectric power and wholesale water sales. Based on a 2010 Water Needs Assessment report, the county will need additional water sources by the year 2025. The conserved water from these programs will help to meet the water needs of our growing population, drought cycles and climate change issues.

### **Prior projects with Bureau of Reclamation**

In the past, WCWCD has had many opportunities of working with Bureau of Reclamation through their various grant programs. In 2003, a grant was used to build southern Utah’s first demonstration garden. WCWCD implemented an Audit and Loss Control program in 2011 with the help of BOR funding. This has allowed WCWCD to minimize losses in its system. Also, during this same time, with funding assistance from Bureau of Reclamation, WCWCD installed a telemetry system along the local river diversions in Washington County. Since 2014, BOR grants have assisted WCWCD in funding our rebate measures offered. WCWCD is working on metering its secondary water system for over 400 residential and agriculture users. WCWCD conducted a study to understand arsenic occurrence and mobilization in the Navajo Sandstone Aquifer. All this has been with assistance of Bureau of Reclamation funds. These grant opportunities help to extend limited funding to offer water saving programs and implement changes to facilities and structures to further save water resources and reduce the environmental impacts of water needs and delivery.

### **Project Location**

Washington County is in the southwest corner of Utah. It is approximately 300 miles south of Salt Lake City and approximately 122 miles north of Las Vegas. The elevation varies from 2,178 to 10,365 feet. Washington County is made up of three major geographic areas; the Colorado Plateau in the east-northeast, the Great Basin in the northwest and the Mojave Desert in the south-southwest.



## Technical Project Description

**Implementation of Irrigation Measures.** This proposal will address the FOA of eligible projects identified in applicant's water conservation projects for Irrigation measures. This proposal is seeking for funding to continue existing program: Water Smart Irrigation Upgrades Rebates (WSIUR) offered to both single family, multi-family and CII.

**Purpose of proposed projects.** This funding will allow WCWCD to continue to provide rebates for applying water efficiencies to residential, multifamily and CII user's irrigation systems. These programs have allowed the district to surpass its previous goals. The target is to reduce gpcd water use by 20 percent. The purpose of these programs is to meet this target. This achievement will bring gpcd from the county's 2015 potable water use gpcd of 229 to 183 in 2060. Below the measure is detailed.

**Water Smart Irrigation Upgrades Rebates (WSIUR).** This program provides rebates to upgrade irrigation systems with water saving devices. This activity could see a water savings of 24.17 AF annually. The savings is estimated with 100 single family participants. This program will rebate half the cost up to \$500 for residential. This program allows for half the cost of the project up to \$2,000 for commercial/Multifamily and half the cost up to \$5,000 for institutional per application. Qualifying devices are SWAT controllers, high-efficiency nozzles, pressure reducer valves, conversion of a spray station to drip and capping a station.

The final step to apply for the rebate is to participate in a "water check" (an audit of the system to determine distribution uniformity and calculate precipitation rate). This water check educates the home owner on appropriate irrigation practices as well as provide information to set up the smart controller and/or adjust the time on zones to accommodate for new water efficient heads.

## Evaluation Criteria

Evaluation Criteria A—*Project Benefits for Smart Irrigation Controller and High-efficiency nozzles. (Describe the expected benefits and outcomes of implementing the proposed project.)*

WCWCD's Water Management and Conservation Plan lists all measures with a recommended implementation date in this proposal. The measures with their implementation dates are listed in this current water conservation plan. The Water Conservation Plan can be found at: <http://www.wcwcd.org/conservation/plan-tips-resources/>. The specific measure for this proposal will increase efficient use of outside water use. This measure will reduce water demand and delay the need of new water development projects. Its estimated 50 percent of the water applied outside is lost.

WCWCD's target plan is to reduce water use by 20% by the year 2060 based on 2015 water use numbers. Our water conservation goal for all programs will maximize our water resources by reducing water consumption by 45.8 gallons per person per day.

Any WaterSense approved devices for irrigation efficiency are considered for the rebate. This activity could see a water savings of 24.17 AF annually. The savings is estimated with 100 single family participants. This program will rebate half the cost up to \$500 for residential. This

program allows half the cost for up to \$2,000 for commercial/Multifamily and up to \$5,000 for institutional per application (approximately 50 applications). Historical ET is approximately 60 inches a year. Qualifying WaterSense certified devices are SWAT controllers, high-efficiency nozzles, any pressure reducer valve, conversion of a spray station to drip and capping a station.

The conserved water from these programs will help to deal with increased water demand with the county's high population growth, the extended periods and harsher drought cycles, climate change issues and preservation of native fish and its habitat. In addition, this measure will reduce water demand and delay the need of new water development projects.

The major river in the county is the Virgin River. This river is home to 6 native fish. Two species are endangered, and the others are sensitive. The county's major river, Virgin River, is home to some of the rarest fish species on earth. The community has entered into the Virgin Spinedace Agreement (Found here: <https://www.wcwcd.org/wp-content/themes/wcwcd/pdf/enviormental/Virgin-Spinedace-Agreement.pdf>) and partners with the Virgin River Program to protect the native fish and its habitat while providing water to its residents in an environmentally and economically sound manner. Entering into this agreement allows the different agencies to work together to protect the native fish and its habitat while providing for the needs of the growing population.

Reducing our water demand through this measure will improve water reliability for the fish species as well as our county residents. Within our county, the reservation of the Shivwits Band of the Paiute tribe resides. Water saved through this measure will benefit all residence of the county.

Last year, Governor Herbert issued a state emergency due to drought with Washington County seeing its worse year. St. George City is located in Washington. This city is ranked to be in the nation's top five fastest growing cities. These programs help the county meet the water needs for the growing population. The 61 percent of the county's water is applied outside. Targeting outside water use with these irrigation measures brings the greatest water savings.

#### Evaluation Criteria B—Planning Efforts Supporting the Project

Washington County's current water supply comes from a combination of surface (direct diversions and reservoirs) and ground (springs and wells) water from the Virgin River watershed, a tributary of the Colorado River. This water source has been developed and used by the county since the area was founded and is reaching its full development capacity. The district's reliable annual water supply is 32,047 AF. With 48 percent of this water is used in the residential customer sector and the remaining 52 percent is used by the commercial, industrial and institutional customer base.

We have had these measures independently evaluated by Maddaus Water Management (MWM) and are identified in our current water conservation plan, updated in 2015. The programs are a part of a portfolio that MWM ran through their proprietary Decision Support System (DSS) model to verify the effectiveness of these measures and to assure they will help to meet the goal. Using the DSS model of an independent consultant, verifies the outcomes of these measures and confirms the ability of WCWCD to reach its target. The memo documenting these results are in **Exhibit C**.

Included in this proposal are letters of support (See Exhibit F) for offering these programs. It is through this collaboration of all the municipal partners that make it possible to offer this measure which benefit all communities in this county.

Since the district is primarily a wholesaler of water, it has a cooperative agreement with seven of the major municipal utility companies through the Regional Water Supply Agreement to provide this information. This agreement also promotes collaboration on the conservation programs administered by the District. Although the agreement doesn't have provisions for financial contribution, it does provide promotion of programs among the utility customer base and access to customer database on to evaluate success of programs. This agreement provides for cooperative and coordinated action with respect to all aspects of water management, including conservation of water. With this cooperation, the district is able to pull water use records from the rebate participants water account of the various municipal partners. This cooperation of the utilities will provide data for analysis and documentation of water savings through participants of this measure.

The purpose of these programs is to help meet the target of a reduction of per capita daily water use by 45.8 gallons by 2060.

### Evaluation Criterion C—Project Implementation

**Project Planning.** WCWCD's Water Management and Conservation Plan lists all measures with a recommended implementation date in this proposal. The measures with their implementation dates are listed in this current water conservation plan. The Water Conservation Plan can be found at: <http://www.wcwcd.org/conservation/plan-tips-resources/>.

The savings of this measure have been verified by an industry recognized independent consultant, Maddaus Water Management, using their decision support system. We have had these measures independently evaluated by Maddaus Water Management (MWM) and are identified in our current water conservation plan, updated in 2015. The programs are a part of a portfolio that MWM ran through their proprietary Decision Support System (DSS) model to verify the effectiveness of these measures and to assure they will help to meet the goal. Using the DSS model of an independent consultant, verifies the outcomes of these measures and confirms the ability of WCWCD to reach its target. The memo documenting these results are in Exhibit C.

This measure will have the same protocol for monitoring performance of our other measures by using the cooperation from regional water supply partners to pull water use records from the rebate participants water account of the various municipal partners. This cooperation of the utilities will provide data for analysis and documentation of water savings through participants of this measure.

**Performance Measures.** The District has a cooperative working relationship with seven of the major municipal utility companies through the Regional Water Supply Agreement to provide this information. This agreement also promotes collaboration on the conservation programs administered by the District. Although the agreement doesn't have provisions for financial contribution, it does provide promotion of programs among the utility customer base and access to customer database on to evaluate success of programs. This agreement provides for cooperative and coordinated action with respect to all aspects of water management, including conservation of water. With this cooperation, the district is able to pull water use records from the rebate participants water account of the various municipal partners. This cooperation of the utilities will provide data for analysis and documentation of water savings through participants of these rebates.

### **Readiness to Proceed.**

<b>Milestone/Task/Activity</b>	
<b>Milestone</b>	<b>Planned Dates</b>
When award notice is given, finalize forms for program and get them approved through legal department.	10/1/2019 — 10/31/2019
Upload page with .pdf forms for the program. (Draft of these forms can be found in <b>Exhibit D</b> )	10/1/2019 — 10/15/2019
When a contract of grant has been signed, put out press release of rebate program at the local paper, radio and television. Send out notices to utilities to put in billings or city newsletters. Put information of program on website. Have public information ads give information on program.	10/1/2019
Process rebates applications as needed. Set up calendar tasks to process required progress reports as defined in the agreement and submit prior to deadline.	10/1/2019 — 9/30/2020
<b>Second Stage</b>	
Process rebates as needed. Prepare semi-annual report and submit prior to deadline.	10/1/2019
Assess remaining funds and if needed, have another push on advertising.	1/1/2020
<b>Third Stage</b>	
Process rebates as needed.	3/1/2020
Evaluate funding availability.	7/1/2020
<b>Fourth Stage</b>	
Process rebates as needed.	3/1/2021
Two (2) months prior to program closing, evaluate funding availability. If necessary, make another final push in the media for programs.	7/1/2021
<b>Final Stage</b>	
Close program and prepare closing report and documents.	9/30/2021
Start collecting data of program participants where a post-year water use is collectable. The District has a cooperative working relationship with seven of the major municipal utility companies through the Regional Water Supply Agreement to provide this information.	12/1/2021

Evaluation Criterion D—Nexus to Reclamation

The Reclamation Reform Act of 1982 key component was to encourage and implement water conservation measures. Part of this act was to provide technical and financial assistance in the administration of water conservation plan. With about half of the county’s water resource comes from the Virgin River, a tributary to the Colorado River. This has direct association with several BOR reclamation projects. Implementation of these conservation measures helps to “to address the competing needs of our limited water resources”. Implementation of efficiency measures also fall within the tasks outlined as eligible in this FOA.

The key component of Bureau of Reclamation’s (BOR) management strategy is more efficient use of water. Its mission is to develop partnerships with local agencies “to address the competing needs of our limited water resources”. About half of the county’s water resource

comes from the Virgin River, a tributary to the Colorado River. In the recent study published by the BOR: Colorado River Basin Water Supply and Demand Study, it identifies this area as one to experience a nine percent decrease in the Colorado River basin flows in the next 50 years due to climate change. This report considers four options to resolve the imbalance of water supply and demand. One of those options is to reduce demand in water and energy. WCWCD has been innovative in water conservation and is featured as part of the Case Study 4 located in Appendix 3B of the Innovative M&I Water Conservation and Reuse Programs Case Studies found in the final report of the Colorado River Basin Study. (Case study is found on page 135 of the 452-page report.)

#### Case Study 4

### Water Conservation Easement

Washington County Water Conservancy District, Utah

#### Program Overview

Washington County Water Conservancy District (WCWCD) assesses impact fees for new development based on meter and lot size. If the lot is more than 10,000 square feet, the applicant can qualify for a minimum impact fee by signing a water conservation easement. This easement generally restricts the lot to 5,000 square feet of irrigated landscape. By assessing impact fees and requiring users to pay based on irrigated landscape area, incentives are provided for water conservation. Impact fees and water conservation easements apply to all culinary (potable) water users in the District's wholesale and retail systems, including residential and commercial users, so the incentives to reduce outdoor water use by limiting irrigated landscape are widespread.

The water conservation easement program is part of WCWCD's Regional Water Supply Agreement with its seven major municipal customers. This Agreement also encourages conservation by eliminating the "take-or-pay" contract incentive for municipal customers to sell water because they must pay for it whether or not it is used. Municipal customers pay only for water as it is delivered from the WCWCD system, allowing them to actively promote conservation without creating budget issues. Additional provisions call for water conservation rate structures, time of day water use and landscape ordinances, and maximum use of secondary irrigation and water reuse systems.

#### Main Program Elements

##### Costs

The Agreement provides that impact fees will be paid at the time of platting or building permit issuance. Impact fees are paid by developers or lot owners and must be segregated to pay for system costs as set forth in WCWCD's Regional Water Capital Facilities Plan and Impact Fee Analysis. Accordingly, WCWCD does not budget separately for this program, but rather absorbs the costs of its operation into general staffing allocations.

#### Agency

Washington County Water Conservancy District

#### Project Status

2006 – Ongoing

#### Targeted Use Sector

Residential/Commercial, Industrial irrigated landscape

#### Estimated Annual Savings

2,000 acre-feet per year

#### Estimated Annual Cost

Budget included in general staffing allocations

#### Key Program Elements

- Increased awareness of developers and lot owners of the costs of irrigated landscape
- Limits outdoor watering with every new connection
- Financial incentives to reduce irrigated landscape and consequently outdoor water use.
- WCWCD and municipal customers partner under terms of the Regional Water Supply Agreement with its seven municipal customers to eliminate the "take or pay" contract



Impact Fees in New Developments

Source: Washington County Water Conservancy District

#### Implementation Resources

The water conservation easement, which limits landscape area, is a benefit offered to avoid additional impact fee charges. This option is part of the processing of impact fees and is explained in published materials and on WCWCD's website ([wcd.org](http://wcd.org)). Because many unique circumstances are presented at the time impact fees are processed, WCWCD staff works with developers and lot owners to find ways to make the water conservation easement work in varying

May 2015

3B-13

<https://www.usbr.gov/lc/region/programs/crbstudy/MovingForward/Phase1Report/fullreport.pdf>  
This proposal would work toward utilizing that option. This grant will allow our agency to meet future water needs from growth, extended periods of drought, and climate change through implementation of these water conservation programs outlined in its plan.

#### Evaluation Criterion E—Department of the Interior Priorities

As identified in DOI priorities, this proposal supports these in the following:

1. *Creating a conservation stewardship legacy second only to Teddy Roosevelt.* This proposal promotes a conservation stewardship by decreasing water use demand and allowing for better management of our natural resources.

2. *Utilizing our natural resources.* Water is the lifeblood of a community. Implementing best management practices such as demand management ensures a healthy economic security for this area.
3. *Restoring trust with local communities.* The district has partnered with the local municipalities to pool our water resources together to manage our needs collectively.
4. *Striking a regulatory balance.* The area is home to 6 native fish. Two species are endangered, and the others are sensitive. The county’s major river, Virgin River, is home to some of the rarest fish species on earth. The community has entered into the Virgin Spinedace Agreement (Found here: <https://www.wcwcd.org/wp-content/themes/wcwcd/pdf/enviornmental/Virgin-Spinedace-Agreement.pdf>) and partners with the Virgin River Program to protect the native fish and its habitat while providing water to its residents in an environmentally and economically sound manner. Entering into this agreement allows the different agencies to work together to protect the native fish and its habitat while providing for the needs of the growing population.
5. *Modernizing our infrastructure.* While this proposal does not affect the modernizing the district’s infrastructure, the district has made many advances in keeping up with technology in managing their facilities and distribution systems. This irrigation measure keeps up with the new technology that has advanced in irrigation application.

## Technical Project Budget

Funding Plan and Letters of Commitment. Exhibit A includes a letter explaining the financial sovereignty of WCWCD. Exhibit B provides the General Fund Budget to show the revenues anticipated for 2020. The funds the district will use towards its contribution of this grant will not come from any federal partners.

### Budget Proposal. *Summary of non-Federal and Federal funding sources*

<b>Funding sources</b>	<b>Percent of Total Project Cost</b>	<b>Funding amount</b>
<b>Non-federal entities: WCWCD</b>	50%	\$75,000
<b>Other federal entities:</b>		\$0.00
<b>Requested Reclamation funding</b>	50%	\$75,000
<b>Total project funding</b>	100%	\$150,000

2019-2021 Budget Worksheet					
Water Conservation Program Irrigation Measures	Computation		Recipient Funding	Reclamation Funding	Total Cost
	<i>\$/Unit and Unit</i>	<i>Quantity</i>			
<b>SALARIES AND WAGES</b>	Not applicable				
			0.00	0.00	0.00
<b>TRAVEL</b>	Not Applicable				
			\$0.00	\$0.00	\$0.00
<b>EQUIPMENT</b>	Not Applicable				
			\$0.00	\$0.00	\$0.00
<b>SUPPLIES/MATERIALS</b>	Not Applicable				
					\$0.00
<b>OTHER COSTS – Rebate Programs</b>	\$150,000	1	75,000	75,000	
					\$150,000.00
<b>CONTRACTUAL/CONSTRUCTION</b>	Not Applicable				
					\$0.00
				<b>Total Direct Costs</b>	\$150,000.00
				<b>Indirect Costs</b>	\$0.00
				<b>Total Estimated Project Cost</b>	\$150,000.00

## Budget Narrative

**A. SALARIES AND WAGES/PERSONNEL —**

The program manager is Julie Gillins, Water Conservation Manager. Grant funds will not go towards her salary.

**B. FRINGE BENEFITS.**

No fringe benefits will be paid by this grant.

**C. Travel.** No travel will be paid for by this grant.

**D. Equipment.** No Equipment will be paid by this grant.

**E. Supplies/Materials.** No Supplies/Materials will be funded by this grant.

**F. Consultants/Contracts** There will be no consultants/contracts funded with this grant.

**G. Environmental and Regulatory Compliance Costs.** Based on the nature of the water conservation programs, there is no need to include Environmental and Regulatory Compliance Costs. These costs will not be incurred implementing these two programs. Therefore, no costs are listed in the budget worksheet.

**H. Other Costs.** The Water Smart Irrigation Upgrade Rebate has an average of \$500 per rebate and can accommodate approximately 200 applications.

<b>Calculations for Estimations</b>		
<b>Water Smart Irrigation Upgrade Rebate (WSIUR)</b>		
<b># of Rebates</b>	<b>Average Rebate</b>	<b>Total</b>
100	\$500	\$50,000
50	\$2,000	100,000
	<b>Total</b>	\$150,000

**I. Indirect Costs.** No indirect costs will be funded by this grant.

## REQUIRED PERMITS OR APPROVALS

Not applicable.

Exhibit A: Funding Plan

Exhibit B: LETTER OF COMMITMENT

Exhibit C: FINAL MWM MEMO SUPPORT OF WATER SAVINGS

Exhibit D: REBATE APPLICATION FORMS

Exhibit E: RESOLUTION

Exhibit F: LETTERS OF SUPPORT

Appendix A

# 2019 Approved Budget



12/5/2018

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
GENERAL FUND**

	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Revenues</b>			
Property Taxes	9,328,803	10,250,578	11,515,613
Property Taxes for SG Redevelopment		273,985	290,424
In Lieu of Fees	602,050	1,012,614	1,073,371
Prior Year Taxes	419,633	859,872	911,464
Interest Income	968,672	1,663,053	182,292
Other Income	449,007	424,000	200,000
Septic Administration Fees	10,000	12,250	10,000
Grants	-	190,000	100,000
<b>Total Revenues and Other Sources</b>	<b>\$ 11,778,165</b>	<b>\$ 14,686,352</b>	<b>\$ 14,283,164</b>
<b>Expenditures</b>			
Bond Issue Costs	167,398	-	-
Payroll Taxes	13,488	15,989	18,974
Wages	861,203	874,104	1,328,541
State Retirement	216,976	211,484	325,000
Insurance and Bonds	5,194	7,799	21,274
Health Insurance	198,831	203,634	425,000
Board Quarterly Expense	7,000	7,000	18,911
Board Expenses	10,280	29,219	59,094
Legal	292,135	320,020	441,334
Accounting	31,442	48,013	53,185
Internet Technology and computers	117,744	103,013	175,000
Office	18,356	32,973	40,000
Building Maintenance	31,022	45,788	59,094
Printing	34,548	-	34,000
Redevelopment fees to St. George City	164,013	177,622	274,218
New Project Development	117,209	-	1,400,000
Public Education	25,637	43,186	260,016
Telephone	34,315	25,838	40,000
Cloud Seeding	26,381	31,658	34,424
Travel	27,892	27,148	45,899
Miscellaneous	-	-	11,033
Seminars and Training	43,660	47,391	50,000
Water Rights	275	780	650,041
Utilities	22,692	22,761	39,002
Fees and Permits	-	-	5,909
Service Charge	459	1,764	5,909
Auto Expense	7,581	12,860	16,065
Capital Expenditures	-	76,294	68,848
Water Conservation	257,201	460,319	450,000
<b>Total Expenditures</b>	<b>\$ 2,565,535</b>	<b>\$ 2,826,657</b>	<b>\$ 6,350,772</b>
<b>Other Uses</b>			
Contribution to Water Fund	3,400,000	3,400,000	3,400,000
Contribution to Hydro Fund	-	-	-
Contribution to Capital Projects	3,521,704	3,521,704	4,532,392
Contribution to Debt Service Fund	-	-	-
<b>Total Other Uses</b>	<b>\$ 6,921,704</b>	<b>\$ 6,921,704</b>	<b>\$ 7,932,392</b>
<b>Total Expenditures and Other Uses</b>	<b>\$ 9,487,239</b>	<b>\$ 9,748,361</b>	<b>\$ 14,283,164</b>
<b>Fund Balance</b>			
CY Contribution / (Use of) Fund Balance			\$ -

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
WATER TREATMENT PLANT**

	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Payroll Taxes</b>	9,032	10,844	40,000
<b>Wages</b>	541,123	674,796	500,000
<b>State Retirement</b>	148,833	168,955	198,487
<b>Insurance &amp; Bonds</b>	22,783	1,322	8,013
<b>Health Insurance</b>	233,829	261,806	205,000
<b>Office</b>	5,396	4,354	22,659
<b>Building Maintenance</b>	27,539	61,159	29,690
<b>Public Relations</b>	424	705	648
<b>Telephone</b>	5,467	6,206	10,070
<b>Travel</b>	4,103	8,004	14,262
<b>Seminars and Training</b>	5,965	24,171	34,203
<b>Equipment Purchases</b>	-	18,358	36,411
<b>Miscellaneous</b>	-	-	5,517
<b>Tools and Accessories</b>	16,272	9,375	19,308
<b>Lab. Expense</b>	81,545	72,836	85,000
<b>Reservoir Treatment/Monitoring</b>	3,703	50,817	159,984
<b>Treatment Plant Chemicals</b>	487,481	471,483	717,168
<b>Utilities</b>	168,221	169,784	242,734
<b>Regional Pipeline Utilities</b>	301,366	359,519	400,000
<b>Regional Pipeline Operation &amp; Maint</b>	374,023	265,804	450,000
<b>Treatment Plant Maintenance</b>	165,745	339,589	360,000
<b>Auto Expense</b>	18,422	18,322	25,932
<b>Capital Expenditures</b>	-	47,361	100,000
<b>Amortization</b>	-	-	-
<b>Depreciation</b>	-	-	-
<b>Repair and Replacement</b>	3,375	99,334	595,801
<b>Total Expenditures</b>	\$ 2,624,649	\$ 3,144,904	\$ 4,260,888

WASHINGTON COUNTY WATER CONSERVANCY DISTRICT			
WATER FUND			
	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Revenues</b>			
Interest Income	320,895	871,060	370,000
Other Income	495,676	16,561	41,566
Water Sales-Other	64,927	29,680	23,752
St George City	5,921,238	8,781,889	7,163,110
HVWS	112,403	208,285	192,336
City of Virgin	132,320	145,549	145,200
Hurricane City (D.Springs & Golf Course)	815,730	716,199	544,500
Kayenta	75,216	94,185	101,586
City of LaVerkin	80,924	89,916	105,650
Kolob	51,409	9,957	53,161
City of Washington	1,242,815	1,848,284	1,452,000
Toquerville Town	2,121	2,259	8,127
Casa de Oro	11,753	12,080	10,836
City of Ivins	61,384	369,403	406,343
Fair Grounds	5,046	7,696	7,126
Power Surcharge-Kayenta	13,036	17,269	12,113
<b>Sewer Sales</b>			
Sand Hollow State Park	528	637	713
<b>Connection Fees &amp; Hookup Fees: Other</b>			
Meter Hookup Fee-HVWS	2,400	533	1,426
Connection Fees-HVWS	400	533	4,156
Kolob	650	-	475
Virgin City	66,584	50,133	11,876
Subtotal	\$ 9,477,453	\$ 13,272,108	\$ 10,656,050
<b>Other Sources:</b>			
Contribution from General Fund	3,400,000	3,400,000	3,400,000
<b>Total Revenues and Other Sources</b>	<b>\$ 12,877,453</b>	<b>\$ 18,098,925</b>	<b>14,056,050</b>
<b>Expenditures</b>			
Payroll Taxes	12,697	16,446	45,000
Wages	658,462	901,207	916,313
State Retirement	(766,984)	231,981	325,000
Insurance and Bonds	137,588	140,617	237,217
Health Insurance	218,183	256,735	375,000
Telephone	14,692	17,651	27,315
Travel	15,716	16,248	25,366
Seminars and Training	16,998	27,654	44,133
Water Rights	78,985	112,476	120,000
Environmental Studies	-	-	78,507
Equipment Supplies	(62,544)	57,947	201,888
Miscellaneous	-	51	11,033
Engineering	3,920	1,263	38,617
Utilities	114,471	110,605	297,901
Operations and Maintenance	458,753	578,682	650,968
Fees and Permits	400	1,233	5,036
Service Charge	8,619	10,800	16,550
Auto Expense	52,273	77,492	82,750
Capital Expenditures	923	74,030	159,984
Repair & Replacement Expenses	4,934	213,815	161,419
Amortization (non-cash expense)	-	50,000	50,000
Depreciation (non-cash expense)	4,762,181	4,968,139	5,117,183
Water treatment plant expense		3,494,338	4,260,888
Total Expenditures	\$ 5,730,266	\$ 11,359,412	\$ 13,248,068
<b>Other Uses</b>			
Contribution to Capital Projects Fund	3,129,855	3,156,564	3,156,564
Contribution to Debt Service Fund	1,366,716	1,366,716	-
Total Other Uses	\$ 4,496,571	\$ 4,523,280	3,156,564
<b>Total Expenditures &amp; Other Uses</b>	<b>\$ 10,226,837</b>	<b>\$ 15,882,692</b>	<b>\$ 16,404,632</b>
<b>Fund Balance</b>			
CY Contribution (Use of) Fund Balance			\$ (2,348,582)

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
TOQUERVILLE SECONDARY WATER SYSTEM**

	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Revenues</b>			
<b>Water Sales-TSWS</b>	75,866	101,764	104,817
<b>Water Connection Fees-TSWS</b>	-	-	16,752
<b>Grant BOR</b>	-	3,670	-
<b>Other Income</b>	3,565	-	-
<b>Total Revenues and Other Sources</b>	\$ 79,431	\$ 105,434	\$121,569
<b>Expenditures</b>			
<b>Printing</b>	-	90	110
<b>Telephone</b>	-	-	552
<b>Water Rights</b>	-	-	1,213
<b>Travel</b>	-	-	220
<b>Engineering</b>	-	-	1,103
<b>Utilities</b>	38,947	32,519	46,340
<b>Operations and Maintenance</b>	24,346	30,077	49,650
<b>Overhaul pump engine</b>	-	-	22,067
<b>Total Expenditures</b>	\$ 63,293	\$ 62,686	\$121,256
<b>Fund Balance</b>			
<b>CY Contribution (Use of) Fund Balance</b>			\$ 313

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
VIRGIN RIVER RECOVERY PROGRAM FUND**

	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Revenues</b>			
Other Income	114,617	200,000	-
UT Dept of Natural Resources	381,376	661,660	585,270
Interest Income	7,964	7,483	3,120
US Fish and Wildlife	373,057	438,779	423,150
<b>Total Revenues and Other Sources</b>	<b>\$ 877,015</b>	<b>\$ 1,307,922</b>	<b>\$ 1,011,540</b>
<b>Expenditures</b>			
Payroll	50,830	52,883	64,840
Payroll Taxes	780	772	1,040
State Retirement	14,517	14,802	15,500
Health Insurance	22,478	22,792	25,000
Office Expense	449	987	4,160
Printing	-	-	1,144
Public Relations	31,393	3,895	48,200
Telephone	722	642	4,160
Travel	1,555	4,481	2,080
Seminars and Training	1,428	1,302	1,200
Environmental Studies	654,626	190,467	552,669
Hatcheries	-	-	74,616
Utilities	32,427	31,679	63,500
Operations and Maintenance	60,234	54,748	47,320
Service Charges	-	-	31
<b>Capital Projects</b>			
Red Hills Desert Garden	-	635	-
District Office Bldg-Aquarium	-	-	2,080
Virgin River Gorge Barrier	5,578	485,901	104,000
<b>Total Expenditures</b>	<b>\$ 877,015</b>	<b>\$ 865,986</b>	<b>\$ 1,011,540</b>
<b>Fund Balance</b>			
CY Contribution to (Use of) Fund Balance			\$ -

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
HYDRO**

	Actual 12/31/2017	Estimated 12/31/2018	Adopted 2019 Budget
<b>Revenues</b>			
Pah Tempe	221,451	192,103	196,973
Quail Creek	772,672	508,225	539,341
<b>Total Revenues and Other Sources</b>	<b>\$ 994,123</b>	<b>\$ 700,329</b>	<b>\$ 736,313</b>
<b>Expenditures</b>			
Depreciation		171,392	160,000
Telephone	505	526	1,101
Equipment	78,981	-	85,221
Miscellaneous	-	-	1,000
Utilities	2,063	1,820	2,758
Operations and Maintenance	27,874	103,748	33,100
Fees and Permits	-	-	4,412
Service Charge	-	-	30,342
<b>Total Expenditures</b>	<b>\$ 109,424</b>	<b>\$ 277,486</b>	<b>\$ 317,933</b>
Contribution to Capital Projects Fund	-	-	418,380
Contribution to Debt Service Fund	725,400	500,000	
<b>Total Other Uses</b>	<b>\$ 725,400</b>	<b>\$ 500,000</b>	<b>\$ 418,380</b>
<b>Total Expenditures &amp; Other Uses</b>	<b>\$ 834,824</b>	<b>\$ 777,486</b>	<b>\$ 736,313</b>
<b>Fund Balance</b>			
CY Contribution (Use of) Fund Balance			\$ -

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
WASTE WATER SERVICES**

	<b>Actual 12/31/2017</b>	<b>Estimated 12/31/2018</b>	<b>Approved 2019 Budget</b>
<b>Revenues</b>			
<b>Other Income</b>	-	962	-
<b>Septic service fees-Dammeron Valley</b>	26,610	25,350	26,000
<b>Total Revenues and Other Sources</b>	\$ 26,610	\$ 26,312	\$ 26,000
<b>Expenditures</b>			
<b>Engineering</b>	-	-	2,206
<b>Utilities</b>	2,304	1,756	2,228
<b>Operations and Maintenance</b>	9,402	8,550	20,964
<b>Repair &amp; Replacement</b>	-	-	602
<b>Total Expenditures</b>	\$ 11,707	\$ 10,306	\$ 26,000
<b>Fund Balance</b>			
<b>CY Contribution to (Use of) Fund Balance</b>			\$ -

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
DEBT SERVICE**

	Actual 12/31/2017	Estimated 12/31/2018	Approved 2019 Budget
<b>Revenues</b>			
Property Taxes	623,064	594,500	-
In Lieu of Fees	125,840	125,840	-
Prior Year Taxes	34,320	34,320	-
Interest Income	2,554	347,119	52,000
Regional Pipeline Payments From Cities	1,152,746	1,072,054	1,310,400
<b>Water Development Surcharge</b>			
Casa de Oro	401	401	460
Hurricane City	170,801	179,076	124,800
HVWS	5,688	10,668	11,199
Ivins City	76,383	78,759	72,280
LaVerkin City	32,671	33,612	42,120
Santa Clara	53,731	57,439	156,000
St. George City	800,594	823,847	759,200
Toquerville City	11,912	12,680	10,400
Washington City	246,434	260,448	223,108
<b>Other Sources</b>			
Contribution from Capital Projects-impact fees	2,310,851	2,310,851	4,719,158
Contribution from Hydro Fund	725,400	500,000	-
Contribution from Water Fund	1,366,716	1,366,716	-
<b>Total Revenues and Other Sources</b>	<b>\$ 7,740,107</b>	<b>\$ 7,808,330</b>	<b>\$ 7,481,124</b>
<b>Debt Service</b>			
Bond Issue Costs	98,500	-	-
2004 Series Bonds - Principal	83,000	85,000	87,000
2004 Series Bonds - Interest (Santa Clara Proj)	24,380	22,720	21,020
2007 Regional Pipeline Refunding-Principal	12,750,000	-	-
2007 Regional Pipeline Refunding-Interest	563,975	-	-
2009B 10MG Tank Drinking Water Bonds-Principal	305,000	309,000	313,000
2009B 10MG Tank Drinking Water Bonds-Interest	14,916	11,256	7,548
2009 A-2Refunding Bonds-Principal	830,000	875,000	915,000
2009 A-2Refunding Bonds-Interest	197,563	156,062	112,312
2009 GO Refunding Bonds-Interest	41,200	14,500	-
2009 GO Refunding Bonds-Principal	560,000	580,000	-
2011A Revenue Bonds RDA 10 mgd tank interest	73,267	72,040	70,772
2011A Revenue Bonds RDA 10 mgd tank principal	37,193	38,420	39,688
2012A Water Treatment Plant Bonds-Principal	1,310,000	1,365,000	1,425,000
2012A Water Treatment Plant Bonds - Interest	618,575	566,175	504,750
2015 Bond - Principal	755,000	785,000	810,000
2015 Bond - Interest	564,450	541,800	510,400
2017 Bond Refunded - 2007 Portion Principal	-	740,000	760,000
2017 Bond Refunded - 2007 Portion Interest	-	466,592	445,400
2017 Bond New Portion Principal	-	-	-
2017 Bond New Portion Interest	-	1,052,416	1,038,000
<b>Total Debt Service</b>	<b>\$ 18,827,019</b>	<b>\$ 7,680,981</b>	<b>\$ 7,059,890</b>
<b>Fund Balance</b>			
CY Contribution (Use of) Fund Balance			<b>\$ 421,234</b>

**WASHINGTON COUNTY WATER CONSERVANCY DISTRICT  
CAPITAL PROJECTS FUND**

	Actual 12/31/2017	Estimated 12/31/2018	Approved 2019 Budget
<b>Revenues</b>			
Impact Fees	25,983,891	19,642,529	16,000,000
Grants	142,419	-	-
Interest Income	229,000	1,264,579	110,000
Other Income - Misc	17,337	-	15,000
<b>SUB TOTAL</b>	<b>\$ 26,372,647</b>	<b>\$ 20,907,108</b>	<b>\$ 16,125,000</b>
<b>Other Sources:</b>			
Contribution from Hydro Fund	-	-	418,380
Contribution from Water Fund	3,129,855	3,156,564	3,156,564
Contribution from General Fund	3,521,704	3,521,704	4,532,392
<b>Total Revenues &amp; Other Sources</b>	<b>\$ 33,024,206</b>	<b>\$ 27,585,376</b>	<b>\$ 24,232,336</b>
<b>Capital Projects</b>			
Ash Creek Project	75,216	52,086	34,000,000
Dammeron Valley Waste Water Treatment Plant	62,584	772	-
Drill Wells at Pintura and Diamond Valley	-	-	1,560,000
Kayenta Wells	-	-	200,000
Kolob Reservoir/Crystal Creek	-	-	100,000
Kolob Water Project	146,355	4,988	224,973
Lake Powel Pipeline	1,411,058	1,418,687	20,000,000
LPP - Payroll Taxes		-	3,000
LPP - Wages		-	270,000
LPP - State Retirement		-	75,000
LPP - Health Insurance		-	50,000
LPP - Life Insurance		-	1,000
Level Fair Ground Parcel	-	-	416,000
Pah Tempe / Water Quality	-	1,794	1,000,000
Water Rights	162,800	172,800	1,664,000
Rights of Way and Land Purchase	38,107	2,706	5,000,000
Sand Hollow Land Purchase	1,704,613	-	-
Sand Hollow Dixie Springs 2740 W Valve Vault	3,997	-	-
Sand Hollow Regional Pipeline	56,115	192,637	19,153,909
Sand Hollow Wells Recharge & West Dam Drain	1,135,587	1,480,214	3,000,000
Sullivan Wells	-	-	1,040,000
Treatment Plant Expansion to 60 mgd and add ozone	-	-	10,000,000
Treatment Plant Taste and Odor Project	11,658	-	-
TSWS additional filter/Springs Drive Bank Stabalization	-	-	156,000
TSWS Irrigation Metering Project	256,711	198,951	600,000
Warner Valley Reservoir	1,335	-	500,000
Santa Clara River Conservation and Augmentation Project	-	-	4,499,456
2 MGD storage tank for Hurricane Valley/Sandhollow	102,689	2,010,942	1,100,000
Add arsenic and manganese treatment at Sand Hollow	-	-	10,000,000
<b>Total Capital Projects</b>	<b>\$ 5,168,826</b>	<b>\$ 5,536,577</b>	<b>\$ 114,613,338</b>
<b>Other Uses</b>			
Contribution to Debt Service Fund	2,310,851	2,310,851	4,719,158
<b>Total Expenditures &amp; Other Uses</b>	<b>\$ 7,479,677</b>	<b>\$ 7,847,428</b>	<b>\$ 119,332,496</b>
<b>Fund Balance</b>			
CY Contribution (Use of) Fund Balance			<b>\$ (95,100,160)</b>



## Exhibit B

March 18, 2019

Bureau of Reclamation  
Financial Assistance Operations  
Attn: Mr. Darren Olson  
Mail Code: 84-27814  
PO Box 25007  
Denver, CO 80225

This letter explains the financial ability of Washington County Water Conservancy District (WCWCD). WCWCD was established to conserve, develop, manage and stabilize water supplies within the county. WCWCD is a political subdivision of the State of Utah organized and existing under the Water Conservancy District Act.

WCWCD is a local government entity with a property tax base and revenues from hydroelectric power and water sales. This provides adequate monies for the cost share of the grant proposal. Therefore, WCWCD is able to fulfill the obligation of the costs identified in this funding request in this proposal.

WCWCD is committed to conserving the limited and unpredictable water resources of this county. Grant opportunities like these allow projects, such as these, to be implemented in this area. The partnership with Bureau of Reclamation has proved beneficial to this local community in the past and WCWCD looks forward to future opportunities.

Respectfully,

A handwritten signature in blue ink that reads "Ronald W. Thompson".

Ronald W. Thompson  
General Manager



MADDAUS  
WATER  
MANAGEMENT INC.



**MWH**

**BUILDING A BETTER WORLD**

---

## FINAL Technical Memorandum

---

Prepared for: The Utah Division of Water Resources  
Washington County Water Conservancy District  
Project Title: Water Conservation Technical Analysis

Technical Memorandum No 2.

Subject: Conservation Technical Analysis  
Date: August 28, 2015  
To: Eric Millis, Utah Division of Water Resources  
Ron Thompson, Washington County Water Conservancy District  
Julie Gillins, Washington County Water Conservancy District  
From: Bill Maddaus, Maddaus Water Management  
Michelle Maddaus, Maddaus Water Management  
Brian Liming, MWH

# TABLE OF CONTENTS

LIST OF FIGURES .....	3
LIST OF TABLES .....	4
LIST OF ABBREVIATIONS .....	5
1. EXECUTIVE SUMMARY .....	6
1.1 Introduction .....	6
1.2 Long-Term Conservation Program Analysis and Results .....	6
2. INTRODUCTION .....	9
2.1 Project Background .....	9
2.2 Overview of the Washington County Water Conservancy District’s Water System .....	9
2.3 DSS Model .....	10
2.4 Purpose and Scope of Conservation Analysis .....	10
2.5 Contents .....	11
3. ANALYSIS OF HISTORICAL AND BASELINE WATER DEMANDS .....	12
3.1 Key Assumptions to the DSS Model .....	12
3.2 Consumption .....	15
3.3 Codes and Standards (Passive) Savings .....	16
4. WATER CONSERVATION MODELING PROCESS .....	18
4.1 Overview of Evaluation Process .....	18
4.2 Screening of Measures .....	19
4.3 Conservation Measures Evaluated .....	20
4.4 Water Reduction Methodology .....	21
4.5 Perspectives on Benefits and Costs .....	21
4.6 Present Value Parameters .....	21
4.7 Measure Assumptions Including Unit Costs and Water Savings .....	22
4.8 Assumptions about Avoided Costs .....	23
5. MODELING RESULTS .....	25
5.1 Comparison of Individual Measures .....	25
5.2 Program Scenarios .....	29
5.3 Modeling Results .....	30
6. CONCLUSIONS .....	35
ATTACHMENT A DSS MODEL BACKGROUND .....	36
A.1 Plumbing Codes and Legislation .....	37
A.2 Present Value Parameters .....	44
A.3 Assumptions about Measure Costs .....	44
A.4 Assumptions about Measure Savings .....	45
ATTACHMENT B MEASURE SCREENING PROCESS AND RESULTS .....	46
ATTACHMENT C CONSERVATION MEASURE INPUTS .....	60
REFERENCES .....	88

## LIST OF FIGURES

Figure 1-1 Conservation Program Costs versus Savings .....	8
Figure 3-1: Consumption by User Group .....	15
Figure 3-2: Overall Use: Indoor vs. Outdoor .....	16
Figure 3-3 Projected Demand With and Without Plumbing Code Savings .....	17
Figure 4-1 Evaluation Process .....	18
Figure 4-2 Structure of the DSS Model .....	19
Figure 5-1 Program Scenario Measures .....	29
Figure 5-2 Conservation Program Costs versus Savings .....	31
Figure 5-3 Conservation Program Projected GPCD to Year 2060 .....	32
Figure 5-4 Water Demand Projections .....	34
Figure A-1 DSS Model Screen Shot .....	36
Figure A-2 DSS Model Overview Used to Make Potable Water Demand Projections.....	38
Figure A-3. Example Toilet Replacement Percentages by Type of Toilet .....	39
Figure A-4. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model.....	40
Figure A-5. Example Residential Toilet Fixture Screenshot from DSS Model .....	41
Figure A-6. Example Future Replacement Rates of Fixtures from DSS Model .....	42
Figure A-7. End Use Breakdown Example Screenshot.....	43
Figure A-8. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot.....	43
Figure B-1 CALFED Public School Retrofit Program for Riverside County, WUE Grant Program.....	56
Figure B-2 CALFED Public School Retrofit Program for Riverside County, Public Campaign.....	56
Figure B-3 CALFED Public School Retrofit Program for Riverside County, EMWD District Vicinity & Cities.....	57
Figure B-4 Screenshot of Santa Clara Valley Water District Submeter Rebate Program Website .....	59

## LIST OF TABLES

Table 1-1 Conservation Measures Analyzed.....	7
Table 1-2 Conservation Program Comparison.....	7
Table 1-3 Conservation Program Long Term Water Savings .....	8
Table 3-1 Water Use Data Analysis and DSS Model Key Assumptions .....	13
Table 3-2 Historical and Projected Demographics and Baseline Demand.....	17
Table 5-1 Summary of Conservation Program Measures Benefit Cost Analysis* .....	27
Table 5-2 Conservation Program Comparison.....	30
Table 5-3 Conservation Program Long Term Water Savings .....	31
Table 5-4 Conservation Program Projected GPCD to Year 2060 .....	32
Table 5-5 Conservation Program Projected GPCD Reduction Percentage to Year 2060.....	33
Table 5-6 Projected Demand .....	33
Table B-1 Existing and Potential Measures Assessed in the Measure Screening Process.....	48

## LIST OF ABBREVIATIONS

AWWA	American Water Works Association	IRR	irrigation
AWWARF	American Water Works Association Research Foundation	ITAP	Irrigation Technical Assistance Program
BMP	best management practice	MF	multifamily
CA DWR	California Department of Water Resources	MG	million gallons
CCF	hundred cubic feet	mgd	million gallons per day
CII	commercial, industrial, & institutional	MGY	million gallons per year
COM	commercial	MWM	Maddaus Water Management
DSS	Decision Support System	NRW	non-revenue water
EMWD	Eastern Municipal Water District	O&M	operations and maintenance
FY	fiscal year	OM&R	operations, maintenance and repair
gal	gallon	psi	pounds per square inch
GOMB	Governor's Office of Management and Budget	PV	present value
GPCD	gallons per capita per day	SF	single family
gpd/a	gallons per day per account	SWAT	smart water application technologies
gpf	gallons per flush	UBWR	Utah Board of Water Resources
gpm	gallons per minute	UDWR	Utah Department of Water Resources
GRAMA	Government Records Access Management Act	ULFT	ultra-low flow toilet
HET	high efficiency toilet	USBR	United State Bureau of Reclamation
HEU	high efficiency urinal	WCWCD	Washington County Water Conservancy District
IND	industrial	WF	water factor
INST	institutional	WNA	water needs assessment
		WUE	water use efficiency

# 1. EXECUTIVE SUMMARY

---

## 1.1 Introduction

In response to the State of Utah's recent decision to achieve their water conservation goals by moving up their 2060 per capita consumption targets to year 2025, the purpose of this project was to evaluate water conservation demand management alternatives, general and site-specific conservation programs, and other water efficiency measures suggested by Washington County Water Conservancy District (WCWCD), MWH, and Maddaus Water Management, Inc. (MWM). These goals were evaluated in terms of water savings, cost, and cost-effectiveness from various perspectives, including acceptability and ease of implementation. This project evaluated the impact of water conservation programs on water demand covering the period 2016 through 2060 with respect to the targets and long-term planning. Specific actions needed to achieve various levels of water savings were identified.

WCWCD is committed to water conservation, and according to state estimates has already achieved 26% reduction in total per capita usage in 2010 from 2000 baseline levels. Total per capita usage is comprised of residential, commercial, institutional, and industrial, including both indoor and outdoor usages. WCWCD is committed to achieving an additional 9% reduction in total per capita usage by 2060, for a total of 35% reduction. This analysis shows how this goal is attainable as well as which reductions can be achieved with plumbing codes, the current conservation program, and implementation of more aggressive conservation measures.

## 1.2 Long-Term Conservation Program Analysis and Results

MWM has prepared this Water Conservation Technical Analysis Memorandum (Memo) to identify programs and projects to most effectively meet water use requirements. This Water Conservation Technical Analysis builds on the 2010 Water Conservation Technical Analysis prepared by MWM and MWH as an update to the Lake Powell Pipeline Water Needs Assessment. The Assessment provides a planning framework and a commitment to continue to implement Best Management Practices (BMPs) for conservation.

A list of 80 conservation measures considered potentially appropriate for the WCWCD service area was developed from known technology and services that would save water. Twenty-eight conservation measures selected by Washington County community representatives were further analyzed and combined into alternative component programs of increasingly higher water savings and implementation costs. All the measures analyzed and included in Programs A, B, and C are included in Table 1-1.

Table 1-2 presents each modeled conservation program's present value of water savings, present value of utility and community costs, cost of savings per unit volume, and both the water utility and community benefit to cost ratios. Additional resources and customer contacts are required to reach higher levels of potential water savings. The plumbing code is included as passive baseline savings in addition to the long-term conservation program in Programs A-C. Most of the future program water savings consist of outdoor landscape improvements. From 2016 to 2060, up to 10% of the new water (both culinary and secondary) needed by WCWCD to accommodate planned growth could be met through aggressive conservation (Program B) implementation. Projected demand with conservation Program B savings in year 2060 represents a 35% reduction from year 2000 water use.

**Table 1-1 Conservation Measures Analyzed**

General Measures	Residential Measures (Indoor)	Commercial Measures (Indoor)	Irrigation Measures (Outdoor)
Real Water Loss Reduction*	Distribute Retrofit Kits*	CII Surveys*	Irrigation Water Surveys (Water Checks)*
Conservation Pricing*	Single Family (SF) Water Surveys*	CII Rebates to Replace Inefficient Equipment*	Xeriscape Demonstration Gardens*
Public Information Program*	Toilet Leak Detection*	Replace Spray Nozzles*	Train Landscape Maintenance Workers*
Water Budgeting/Monitoring*	Multifamily Washer Rebate*	High Efficiency Urinal Rebate (<.5 gallon)*	Financial Incentives for Irrigation Upgrades*
Billing Report Educational Tool*	Require Efficient Toilets and Urinals	School Building Retrofit*	Smart Irrigation Controller Rebates*
Mobile Home Park Submetering	Washer Rebates for High Efficiency Machines (SF)	Install High Efficiency Fixtures in Government Buildings*	Rotating Sprinkler Nozzle Rebates*
Efficient Outdoor Use Education and Training Program*	High Efficiency Toilet (HET) Rebates*	High Efficiency Toilet (HET) Rebates*	Turf Removal
		Install or Rebate High Efficiency Faucets	
		Require Efficient Toilets and Urinals	

\*Represents measures in Program B.

**Table 1-2 Conservation Program Comparison**

Conservation Program	Present Value of Water Savings	Present Value of Utility Costs	Present Value of Community Costs	Utility Cost of Water Saved (\$/MG)*	Community Cost of Water Saved (\$/MG)*	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Program A with Plumbing Code	\$133,889,976	\$26,500,720	\$38,589,697	\$270/MG	\$393/MG	5.1	3.7
Program B with Plumbing Code	\$155,723,518	\$31,960,615	\$44,881,264	\$283/MG	\$397/MG	4.9	4.0
Program C with Plumbing Code	\$182,476,548	\$39,887,538	\$83,589,546	\$301/MG	\$630/MG	4.6	2.6

\* Cost of water saved per unit volume = present value of costs (utility or community) divided by program water savings. Costs and savings are for the analysis period (years 2016-2060).

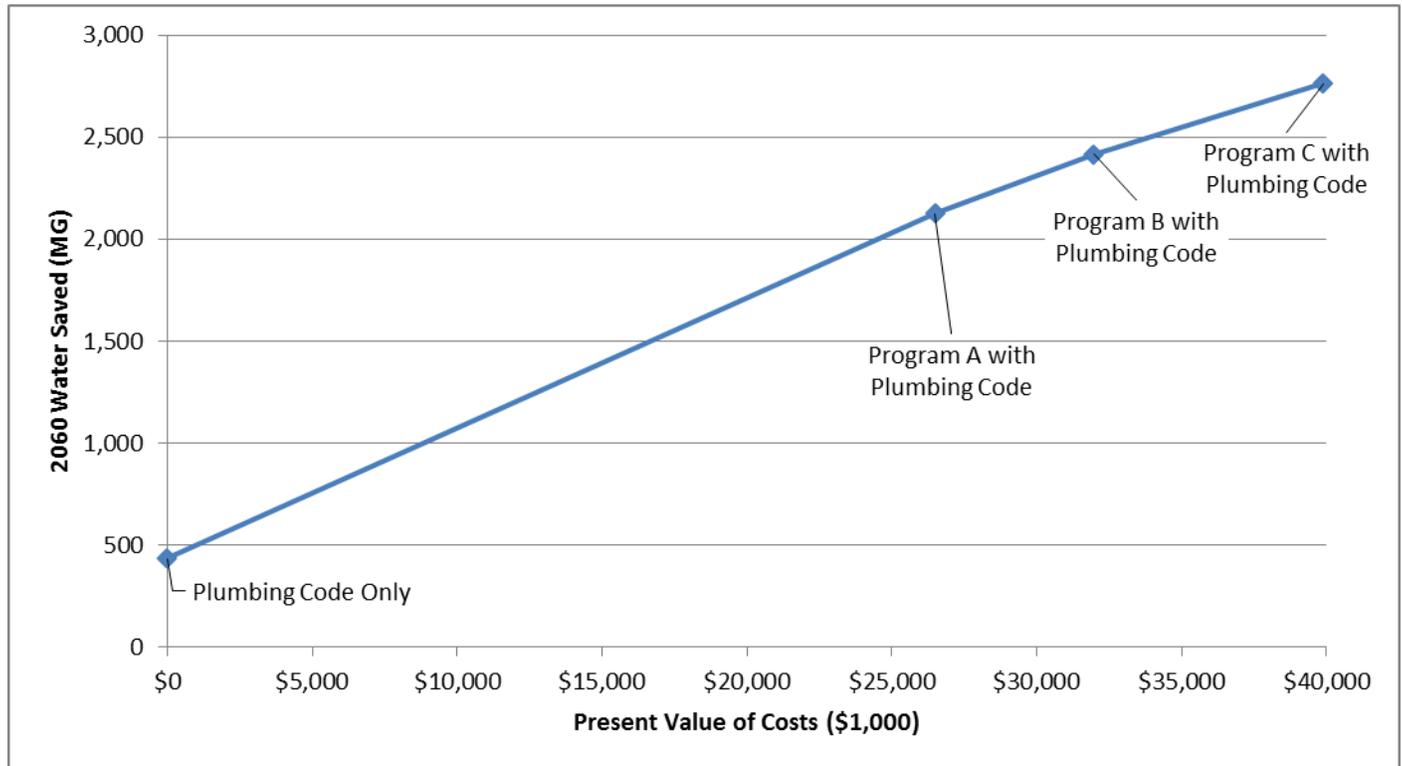
Table 1-3 shows the projected savings from Plumbing Code Only and each conservation program with Plumbing Code: Program A (continue current program, 18 measures), Program B (add 5 new measures to current Program A), and Program C (implement all 28 measures).

**Table 1-3 Conservation Program Long Term Water Savings**

Water Savings (MGY)	2020	2025	2030	2040	2050	2060	Year 2060 Indoor Water Savings	Year 2060 Outdoor Water Savings
Plumbing Code Only	54	218	433	909	1,473	2,158	2,158	0
Program A with Plumbing Code	643	1,477	2,124	3,245	4,590	6,199	166	6,033
Program B with Plumbing Code	816	1,711	2,414	3,598	5,013	6,697	399	6,298
Program C with Plumbing Code	923	1,939	2,763	4,084	5,643	7,476	1,093	6,383

Figure 1-1 illustrates there are apparent diminishing returns when measures are added beyond Program B. Program A reflects estimated water savings derived from continuing the current program and the plumbing code. The additional measures that create programs B and C produce increasing incremental water savings and costs.

**Figure 1-1 Conservation Program Costs versus Savings**



Due to prior conservation efforts, Program B will meet the State of Utah’s goal of a 35% reduction in total use by 2060.

## 2. INTRODUCTION

---

This section provides an overview of the Washington County Water Conservancy District's water system, describes the purpose and scope of the Conservation Technical Analysis, and provides a project history of the steps used to complete the conservation analysis.

### 2.1 Project Background

In response to the State of Utah's recent decision to achieve their water conservation goals by moving up their 2060 per capita consumption targets to 2025, the purpose of this project is to evaluate water conservation demand management alternatives, general and site-specific conservation programs, and other water efficiency measures suggested by WCWCD, MWH, and Maddaus Water Management (MWM). These were evaluated in terms of their water savings, costs, and cost-effectiveness from various perspectives, their acceptability, and their ability to be implemented. This project will evaluate the impact of water conservation programs on water demand covering the period 2014 through 2025 with respect to the targets and to 2060 for long-term planning. Specific actions needed to achieve various levels of water savings were identified.

WCWCD is committed to water conservation and, according to state estimates already achieved 26% reduction in total per capita usage in 2010 from 2000 baseline levels. Total per capita usage is comprised of residential, commercial, institutional and industrial, including both indoor and outdoor usages. WCWCD is committed to achieving an additional 10% reduction in total per capita usage, or a total 35% reduction, by 2060. This analysis shows how this goal is attainable and the reductions which can be achieved with plumbing codes, the current conservation program, and implementation of more aggressive conservation measures. MWM and MWH have prepared this Conservation Technical Analysis Memorandum (Memo) to identify programs and projects to most effectively meet water use requirements. This Conservation Technical Analysis builds on the 2010 Water Conservation Technical Analysis prepared by MWM and MWH as an update to the Lake Powell Pipeline Water Needs Assessment. The Lake Powell Pipeline Water Needs Assessment provides a planning framework and a commitment to continue to implement Best Management Practices (BMPs) for conservation.

### 2.2 Overview of the Washington County Water Conservancy District's Water System

In 2012, baseline population projections were provided from the State of Utah's Governor's Office of Management and Budget (GOMB), which predicted Washington County growing from 139,000 people in 2010 to over 196,000 by year 2020 and 577,000 by 2060. The GOMB plans to release new population estimates in year 2017. WCWCD primarily wholesales water to municipalities that currently have approximately 60,000 service connections.

The WCWCD is a political subdivision of the State of Utah (State) organized and existing under the Water Conservancy District Act. As such, the WCWCD follows the Utah Open & Public Meetings Act and the Government Records Access Management Act (GRAMA). The WCWCD was established in 1962 in response to a petition signed by the property owners of Washington County (County). The WCWCD is charged with conserving, developing, managing and stabilizing water supplies within the County. The WCWCD provides water to over 85% of the people of the County and operates facilities from Kolob to Gunlock. The service area is the entire County. WCWCD has water service agreements with the cities of St. George, Washington, Hurricane, Ivins, La Verkin, Virgin, Toquerville, Santa Clara, and Leeds.

The climate in WCWCD's service area is generally warmer than the rest of Utah with a subtropical desert climate of hot summers and brief, cool winters. The average temperature ranges from 41° F in December to 88° F in July. Average rainfall is about 8 inches per year. Precipitation mostly comes from the Pacific Ocean from late fall through early spring.

## 2.3 DSS Model

Maddaus Water Management's Demand Side Management Least Cost Planning Decision Support System (DSS Model) prepares long-range, water demand and conservation water savings projections. The DSS Model is an end-use model that breaks down total water production (i.e., water demand in the service area) into specific water end uses, such as toilets, faucets, or irrigation. This "bottom-up" 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. The purpose of using end use data is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

The DSS Model prepares short and long-range detailed water demand and conservation savings projections to enable a more accurate assessment of the impact of water efficiency programs on demand. The DSS Model can use either a statistical approach to forecast demands (e.g., an econometric model) or forecasted increases in population and employment to evaluate future demands. Furthermore, the DSS Model evaluates conservation measures using benefit-cost analysis with the present value of the cost of water saved and benefit to cost ratio as economic indicators. The analysis is performed from various perspectives, including those of the utility and community.

The DSS Model's demand estimates take into account savings from passive conservation. Passive conservation refers to water savings resulting from customer actions and activities that do not depend on direct assistance from water agency conservation programs. This includes water savings resulting from: 1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards, and 2) the installation of water-efficient fixtures in new buildings and retrofits as required under federal and state law.

More information about the DSS Model can be found in Attachment A.

## 2.4 Purpose and Scope of Conservation Analysis

The purpose of this task is to prepare an updated Water Conservation Technical Analysis to evaluate how water efficiency goals can be met in a cost-effective manner with measures that are feasible to implement by WCWCD. Key components of the plan include:

- Assessing the effect of recent population growth, employment, and climatological trends on regional water use characteristics;
- Updating and further examining market penetration, water savings, and benefits and costs of WCWCD current program to identify if they are currently on track to meet their 2025 goal; and
- Identifying the best methods of achieving the required 10% per capita savings by 2025, relative to 2010.

### Project Timeline

April 2014

- MWM was requested to update the 2010 Water Conservation Technical Analysis.
- Data request was submitted to WCWCD.

- Data collection and analysis obtained from WCWCD.
- MWM conducted literature review.

#### May 2014

- Prepared measure list was reviewed and finalized by Water Conservation Plan Update Workgroup (Workgroup) for conservation measures analysis.
- Meetings were held with WCWCD staff and Workgroup to review demand analysis preliminary findings.

#### June - September 2014

- MWM worked directly with WCWCD staff to design individual conservation measures (e.g., program start and end date, assumed participation rates, incentive and utility cost values, etc.).
- MWM set up and calibrated a DSS Model to evaluate water savings, costs and benefits from potential conservation measures.
- Meetings were held with WCWCD staff and Workgroup to review conservation modeling results and preliminary findings.
- Draft Water Conservation Technical Analysis completed for WCWCD.

#### October 2014

- Water Conservation Technical Analysis completed and Technical Memorandum provided to WCWCD.

#### June - August 2015

- Revised DSS Model demand and water conservation measure analysis and memorandum per the request of WCWCD.

## 2.5 Contents

The following information is included in this report and is discussed in individual sections below:

- Section 3 - Analysis of Historical and Baseline Water Demands
- Section 4 - Water Conservation Modeling Process
- Section 5 - Modeling Results
- Section 6 - Conclusions
- Attachment A - DSS Model Background
- Attachment B - Measure Screening Process and Results
- Attachment C - Conservation Measure Inputs

### 3. ANALYSIS OF HISTORICAL AND BASELINE WATER DEMANDS

---

The historical water use patterns were analyzed based on water production and consumption data provided by WCWCD. Based on the water billing system data and the total dwelling units reported for 2008-2012 in the U.S. Census American Community Survey 5-Year Estimates for Washington County, residential water use was broken down into single family and multifamily categories. Historical data was segregated into indoor and outdoor water use by customer type using the billing data. Other non-residential categories of use were analyzed separately, such as commercial, institutional, and secondary customer use. It is important to note here a unique characteristic of homeowners in the county: Based on Washington County assessor data, over a quarter of the homes in Washington County are second homes, most of which are occupied during the winter months but vacant during the summer. These non-permanent residents can influence per capita water use by increasing indoor water use when they are in town. They also increase outdoor water use by maintaining lawns year round, even when they are not present (WNA, 2010).

Future community-wide conservation savings will be achieved by implementing both passive and active measures. Passive measures are codes and standards that force consumers to update appliances and fixtures to increase conservation savings. Active measures are those in which WCWCD will invest to promote conservation, such as incentives and educational programs.

#### 3.1 Key Assumptions to the DSS Model

The demand analysis process includes using baseline average water use per customer to forecast water demands by customer category based upon forecasted increases in population and employment to predict customer category account growth. Average water use per customer category account was based on a water use data analysis investigating historical and current water use data and demographic data. This analysis includes the following elements:

- *Model Start Year* – This is the starting year for the analysis. For this project, the start year for the model is 2016. The DSS Model includes 45 years of data projecting information until the year 2060.
- *Base Year for Future Water Factors* – Water use in 2010 was used as a baseline for developing future water use projections. A reduction factor was used to account for plumbing code & county-wide conservation program savings from 2010 to the DSS Model's 2016 start year. A plumbing code savings reduction factor of 0.5% per year and a conservation program savings reduction factor of 0.25% per year were estimated.
- *Average gal/day/acct* – This is the amount of water in gallons that is used per day, per account.
- *Indoor/Outdoor Water Use* – This is the amount of water per account split into the percent that is used indoors and outdoors.
- *Non-Revenue Water (NRW)* – This is the sum of all water input to the system that is not billed (metered and unmetered) water consumption, including apparent (metering accuracy) and real losses. This value is calculated by taking the difference between the amount of water produced and the amount of water that was sold. This value is estimated to be 10% county-wide.

The following Table 3-1 shows the key inputs and assumptions used in the model. The assumptions having the most dramatic effect on future demands are: 1) the natural replacement rate of fixtures; 2) how residential or commercial future use is projected; and 3) the percent of estimated non-revenue water. More details on these assumptions, including screenshots of where they are incorporated into the DSS Model, can be found in Attachment A.

**Table 3-1 Water Use Data Analysis and DSS Model Key Assumptions**

Parameter	Model Input Value, Assumptions, and Key References
<b>Model Start Year</b>	2016
<b>Water Demand Factor Year (Base Year)</b>	2010 A reduction factor was used to account for plumbing code and county-wide conservation program savings from 2010 to the 2016 start year. A plumbing code savings reduction factor of 0.5% per year and a conservation program savings reduction factor of 0.25% per year were estimated.
<b>Non-Revenue Water in Start Year</b>	10% This value can be found in the green NRW section of WCWCD's DSS Model.
<b>Population Projection Source</b>	Utah Department of Water Resources Kanab/Virgin River Basin projections provided on July 9, 2015
<b>Employment Projection Source</b>	Governor's Office of Planning and Budget 2012 Baseline Projections
<b>Avoided Cost of Water</b>	\$2,987/MG (\$973/AF) This value can be found in the "Avoided Costs" red section of WCWCD's DSS Model.
<b>Residential End Uses</b>	Model Input Values are found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet. Key References: CA DWR Report "California Single Family Water Use Efficiency Study," (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end-uses) and AWWARF Report "Residential End Uses of Water" (DeOreo, 1999 – Page 108, Table 5.9: Percentage of average indoor gallons per capita per day usage).
<b>Non-Residential End Uses, %</b>	Model Input Values are found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet. Key Reference: AWWARF Report "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use).
<b>Efficiency Residential Fixture Current Installation Rates</b>	Model Input Values are found in the "Codes and Standards" green section of the DSS Model by customer category fixtures. U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Key Reference: California Urban Water Conservation Council Potential Best Management Practice Report "High Efficiency Plumbing Fixtures – Toilets and Urinals" (Koeller, 2005 – Page 42, Table 8 and Table 9: Residential toilet installation rates in California). Key Reference: Consortium for Efficient Energy ( <a href="http://www.cee1.org">www.cee1.org</a> ).
<b>Water Savings for Fixtures, gal/capita/day</b>	Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model. Key References: AWWARF Report "Residential End Uses of Water" (DeOreo, 1999 – Page 99, Table 5.5: Toilet flush volume, per capita use, and utilization, 12 study sites; Page 102, Table 5.6: Shower per capita use, volume, duration, and flow rate, 12 study sites) and CA DWR Report "California Single Family Water Use Efficiency Study" (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end-uses). WCWCD supplied data on costs and savings; professional judgment was made where no published data was available.

Parameter	Model Input Value, Assumptions, and Key References
<b>Non-Residential Fixture Efficiency Current Installation Rates</b>	Model Input Values are found in the “Codes and Standards” green section of the DSS Model by customer category fixtures. Key Reference: 2010 U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement.
<b>Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day</b>	Model Input Values are found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model and confirmed in each “Service Area Calibration End Use” worksheet by customer category. Key Reference: Falls within ranges in AWWARF Report “Residential End Uses of Water” (DeOreo, 1999 – Page 99, Table 5.5: Toilet flush volume, per capita use, and utilization, 12 study sites, Page 102, Table 5.6: Shower per capita use, volume, duration, and flow rate, 12 study sites).
<b>Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day</b>	Model Input Values are found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model, and confirmed in each “Service Area Calibration End Use” worksheet by customer category. Key References: Estimated based on AWWARF Report “Commercial and Institutional End Uses of Water” (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Based on three studies of office buildings in which the numbers varied from 2.0 to 3.45 toilet flushes per employee per day: Darell Rogers cited in Schultz Communications (1999); Konen Plumbing Engineer July/August 1986); and Eva Opitz cited in PMCL (1996). Fixture uses over a 5-day work week are prorated to 7 days.
<b>Natural Replacement Rate of Fixtures</b>	Model Input Value: Residential Toilets 2% per year (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Model Input Value: Commercial Toilets 2% (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Model Input Value: Residential Showers 4%
	Model Input Value: Residential Clothes Washers 10%
	Model Input Value: 4% replacement rate corresponds to 25-year life of a new fixture.
	Model Input Value: 10% replacement rate based on 10-year washer life. Key References: “Residential End Uses of Water” (DeOreo, 1999) and “Bern Clothes Washer Study, Final Report” (Oak Ridge National Laboratory, 1998).
	Model Input Value is found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model.
<b>Future Residential Water Use</b>	Increases Based on Population Growth and Demographic Forecast
<b>Future Non-Residential Water Use</b>	Increases Based on Population Growth and Demographic Forecast

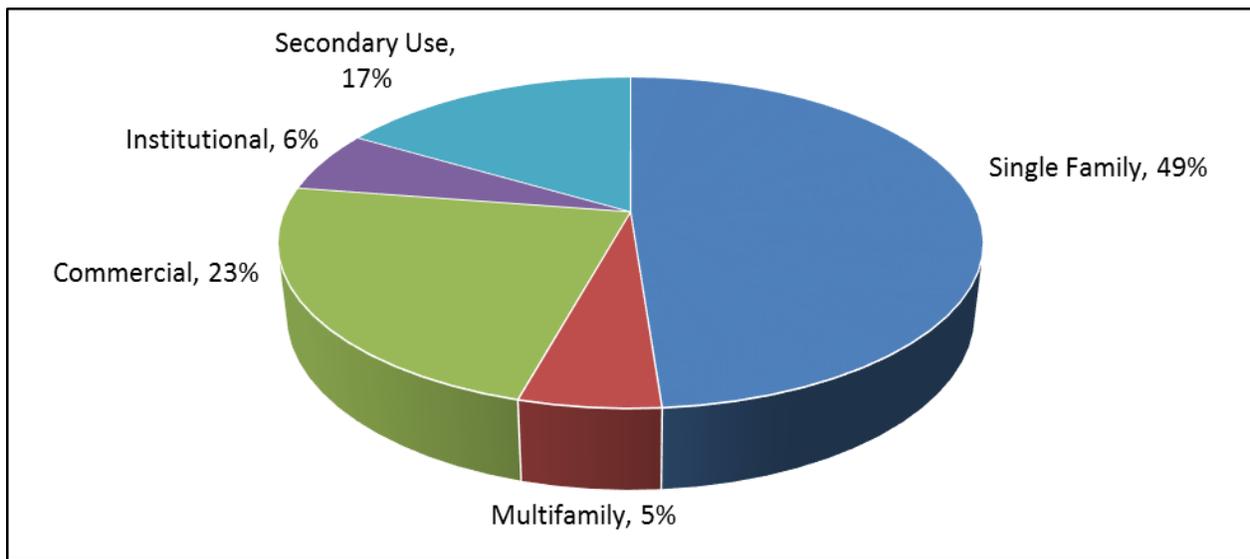
Maddaus Water Management employed its DSS Model for this water conservation technical analysis. Population projections to 2060 for the Kanab/Virgin River Basin were provided by the State and applied to an estimated 2016 GPCD by customer category developed from 2010 customer category use and used in the DSS Model as a baseline demand. Then, plumbing code and conservation savings were estimated annually and applied to this baseline GPCD and demand in order to reduce projected GPCD levels. Population projections from the State and employment projections from the

Governor's Office of Planning and Budget 2012 Baseline Projections Report were used to determine projected water demands to 2060 for WCWCD.

### 3.2 Consumption

Historical water consumption (billed water) data for the year 2010 was referenced in this analysis. Historical water consumption data was measured at the customer meters. WCWCD has a variety of customer categories utilized in their billing system. This Memo has organized users into single family residential, multifamily residential, commercial, institutional, and secondary use categories. Residential water use accounts for over half of all water consumed. Residential includes single family, multifamily and second-home water use. Figure 3-2 presents the water usage breakdowns within WCWCD based on 2010 water use data.

**Figure 3-1: Consumption by User Group**

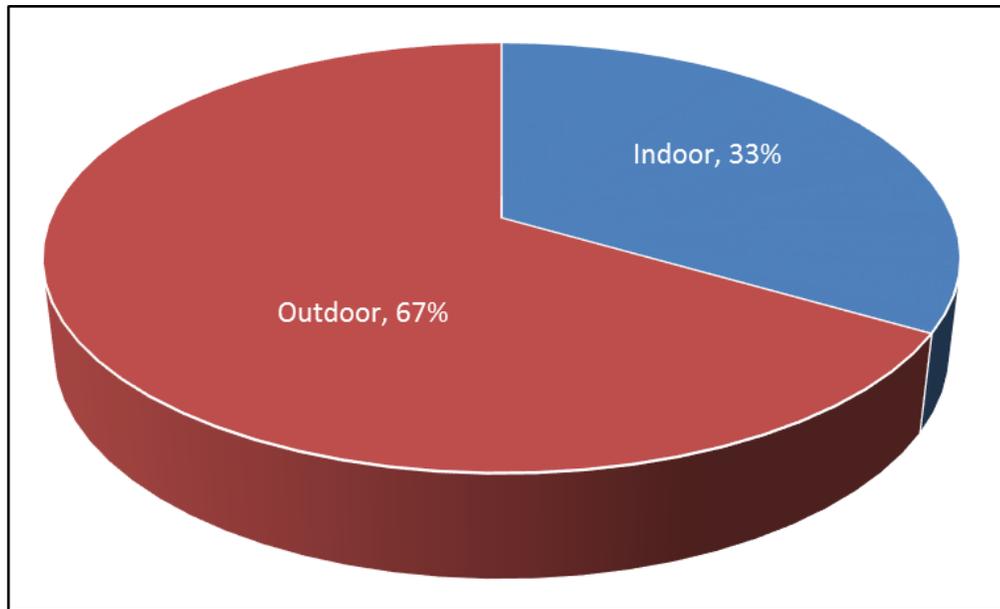


**Notes:**

1. Figure is based on 2010 water use data.
2. Secondary Use includes untreated water for outdoor irrigation use for residential single family, multifamily, second-home, commercial, industrial, and institutional customer categories.
3. Non-revenue water is NOT included in this figure.

Figure 3-2 shows the breakdown of water use into indoor and outdoor components. This breakdown is based on the assumption that water use during the months of December and January represent indoor water use since outdoor water use is at a minimum. While there may be minimal landscape watering in the winter, or leakage from irrigation systems, it is assumed that this is less than 5-10% of the average winter water use. This approach helped understand historical use patterns and allow water conservation planning to focus on the area with the highest overall category of use. Indoor use is approximately 33% of water consumption.

**Figure 3-2: Overall Use: Indoor vs. Outdoor**



Note: Figure is based on 2010 water use data.

### 3.3 Codes and Standards (Passive) Savings

Since it is beneficial to model the impact of the natural changes in the different types of appliances, the DSS Model forecasts service area water fixture use. In the codes and standards part of the DSS Model, specific fixture end use type (point of use fixture or appliance), average water use, and lifetime are compiled. Additionally, state and national plumbing codes and appliance standards for toilets, urinals, showers, and clothes washers are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This yields two demand forecasts: 1) with plumbing codes, and 2) without plumbing codes.

Table 3-2 presents WCWCD's projected population, employment, and consumption. Figure 3-3 presents projected demand with and without plumbing code savings.

Information and assumptions about plumbing code and appliance standards can be found in Attachment A.

The demand projections reflect average water use under average weather conditions and **do NOT** reflect drier and hotter drought conditions. Likewise, climate change (which might alter weather patterns), increased or decreased rainfall, and possible increased irrigation demand in the spring and fall (due to a warmer climate) have **NOT** been addressed in this analysis.

Plumbing code measures account for 32% of the future conservation potential achieved and are independent of any program; they are based on customers following applicable current local, state and federal laws, building codes, and ordinances.

The DSS Model shows total cumulative plumbing code savings of 218 million gallons per year by 2025. The plumbing codes and appliance standards will reduce 2060 demands by 2,158 MG or 3.2% of demands without the plumbing code. Further reductions in demand due to voluntary and regulatory conservation measures are calculated from an end-use version of the demands with the plumbing code.

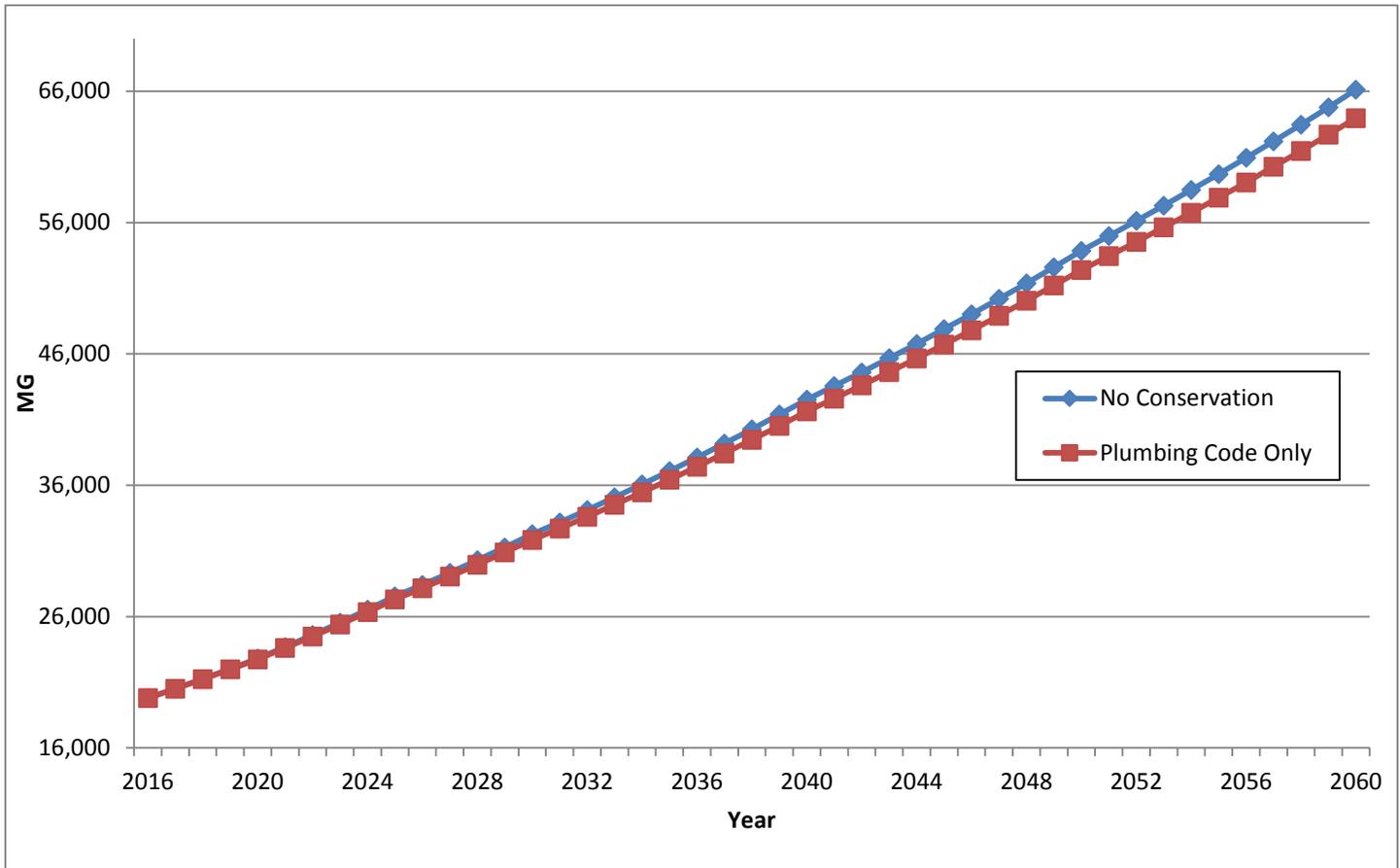
**Table 3-2 Historical and Projected Demographics and Baseline Demand**

Year	Population	Employment	Projected Demand (MG)	Projected Demand with Plumbing Code (MG)	Projected GPCD	Projected GPCD with Plumbing Code
2020	196,478	109,376	22,801	22,747	317	316
2025	237,874	129,316	27,536	27,318	317	315
2030	279,270	149,256	32,267	31,834	317	313
2040	369,366	190,954	42,527	41,618	317	310
2050	468,987	236,376	53,855	52,382	317	309
2060	576,846	285,000	66,106	63,948	317	307

Notes:

1. The DSS Model’s start year is 2016. This analysis assumes year 2016 GPCD represents baseline water use with a reduction due to projected plumbing code savings. Baseline GPCD is based on UDWR’s GPCD population as well as use projections to 2060 for the Kanab/Virgin River Basin.
2. Secondary Use is included in demand estimates.
3. This projection assumes that the mix of potable (culinary) and secondary water demand is the same in the future as in the base years. This does not assume that new secondary systems would allow for the replacement of potable (culinary-grade) water used outdoors with secondary-grade water. Baseline demand projections assume no conservation of any type is implemented. Plumbing code only assumes that the national plumbing code is implemented over time.

**Figure 3-3 Projected Demand With and Without Plumbing Code Savings**



## 4. WATER CONSERVATION MODELING PROCESS

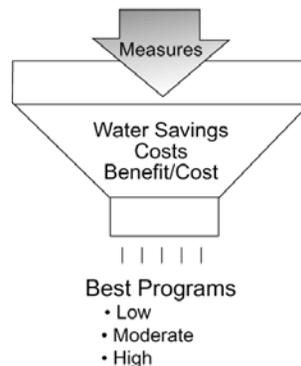
---

Maddaus Water Management employed its DSS Model for this technical analysis. The following sections describe key elements used in the analysis that were reviewed during one public workshop and meeting along with several webinars.

### 4.1 Overview of Evaluation Process

During the evaluation process, water savings were estimated and cost assumptions for the measures were developed by MWM and WCWCD staff. Benefits and costs were compared in a formal present value analysis and conclusions were drawn regarding which measures produce cost-effective water savings. This process can be thought of as an economic screening process, shown in Figure 4-1. Packaging the best measures into alternative programs allows WCWCD to consider what level of conservation is appropriate.

**Figure 4-1 Evaluation Process**



Benefit-cost analysis has been used by many water agencies to evaluate and help select a water conservation measure best suited to local conditions. This analysis requires a locale-specific set of data, such as historical water consumption patterns by customer class, population projections, age of housing stock, and prior conservation efforts.

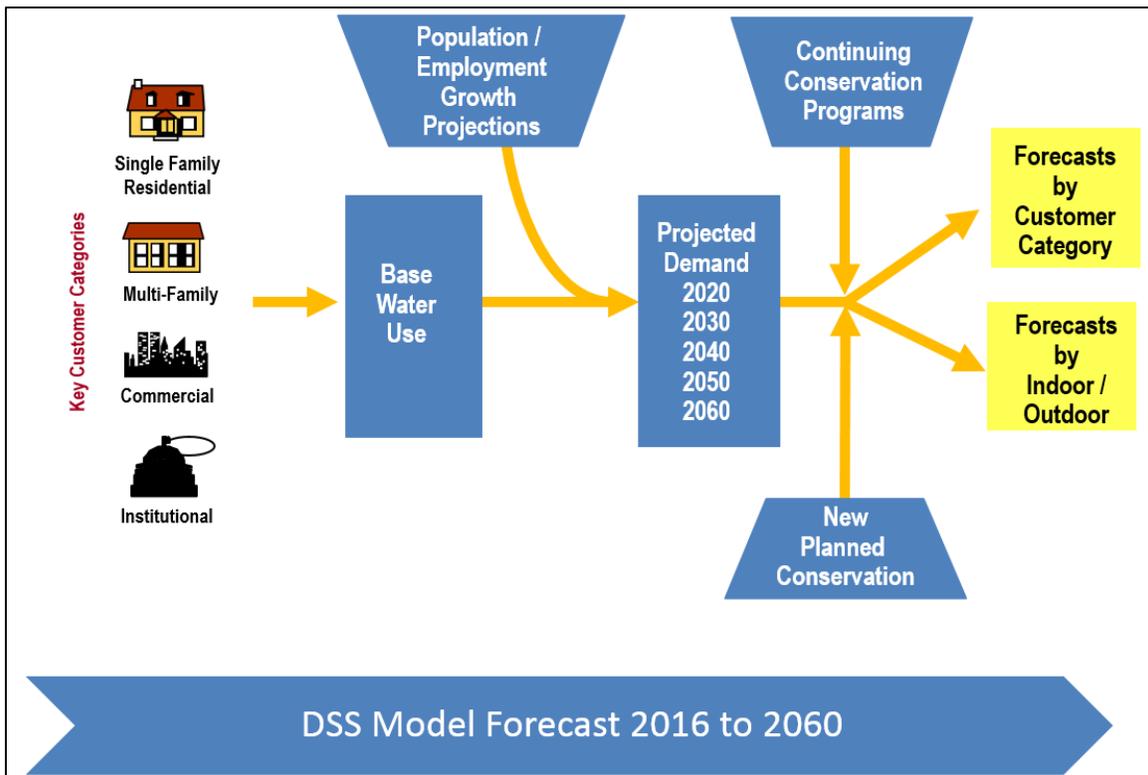
The following eight steps were used to implement the methodology by expanding upon the same DSS Model used to prepare the demand projections.

1. **Determine water use projections without the national plumbing code savings using 2010 GPCD by customer category and UDWR population projections.** Projections cover each key customer category and are broken down into indoor and outdoor end uses. Evaluate the impact of the plumbing code changes.
2. **Identify possible water conservation measures and screen the measures qualitatively** to identify those that are applicable to the service area. Develop appropriate unit water savings and cost factors for each measure.
3. **Estimate the affected customers (or number of accounts) for each conservation measure** by dividing the measure's projected customers (or accounts) who will implement the measure by the total service area customers. This factor is called the market penetration or installation rate.
4. **Estimate total annual average day water savings.** The water savings are computed by multiplying unit water savings per measure by the market saturation or installation rate (i.e., 10% to 90% of accounts) then multiplying by the number of units in the service area (i.e., dwelling units) targeted by a particular measure. The indoor and outdoor water savings are also calculated.

5. **Determine initial and annual costs to implement the measures** based upon pilot projects, local experience, and the costs of goods, services, and labor in the community. This is multiplied by the number of units participating each year then added to overall administration and promotion costs to arrive at a total measure cost, which may be spread over a number of years.
6. **Compare costs of measures** by computing the present value of costs and cost of water saved over the planning period.
7. **Compile three programmatic packages** or programs containing various new and existing measures.
8. **Evaluate the three programs for water savings and cost-effectiveness** and identify the point of diminishing returns from further investments in conservation.

For conservation measure evaluation, the DSS Model performs economic analysis by 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 (community perspective = utility plus customer). Figure 4-2 shows the structure of the model. Results are presented in subsequent sections.

**Figure 4-2 Structure of the DSS Model**



## 4.2 Screening of Measures

The review and screening of water conservation measures is an important step in updating the water conservation program. In this case, some of the measures reviewed have already been implemented by WCWCD and some would be new. The new measures were designed with an implementation schedule reflecting future dates in which WCWCD might begin such programs.

This task included a review of WCWCD's current water conservation measures, identification of current and new measures that may be appropriate for the local entities, and the screening of these measures to a short-list for detailed evaluation (benefit-cost analysis). To complete this process, a list of potential demand management measures for qualitative evaluation (screening) was compiled. This list includes devices or programs (e.g., new high efficiency toilets that would save water if installed) that can be used to achieve water conservation; methods through which the device or program will be implemented; and what distribution method or mechanism can be used to activate the device or program. The list of potential measures was drawn from the general experience of MWM and WCWCD as well as review of cutting edge conservation programs currently being implemented by other water agencies. A list of all the measures considered, including their preliminary measure descriptions and the screening process, can be found in Attachment B.

### 4.3 Conservation Measures Evaluated

Upon inspection of the overall measure screening evaluation list, 28 conservation measures were selected for evaluation in the DSS Model. These 28 measures are shown below, categorized as utility operations, education, incentives, or mandates.

#### Utility Operations

The following conservation measures affect utility operations:

- Real Water Loss Reduction
- Conservation Pricing

#### Education

The following conservation measures are considered educational:

- Single Family Water Surveys
- Public Information Program
- Irrigation Water Surveys (Water Checks)
- Xeriscape Demonstration Gardens
- Train Landscape Maintenance Workers
- CII Surveys
- Billing Report Educational Tool
- Water Budgeting/Monitoring
- Efficient Outdoor Use Education and Training Program

#### Incentives

The following conservation measures are considered incentives (involve providing devices, rebates, etc.):

- Financial Incentives for Irrigation Upgrades
- Smart Irrigation Controller Rebates
- Distribute Retrofit Kits
- Toilet Leak Detection
- High Efficiency Toilet Rebates
- Multifamily Washer Rebate
- Rotating Sprinkler Nozzle Rebates
- CII Rebates to Replace Inefficient Equipment
- Replace Spray Nozzles
- High Efficiency Urinal Rebate (<.5 gallon)
- Turf Removal
- Washer Rebates for High Efficiency Machines (SF)
- School Building Retrofit
- Mobile Home Park Submetering
- Install High Efficiency Fixtures in Government Buildings
- Install or Rebate High Efficiency Faucets

#### Mandates

The following conservation measure is mandated, involving a local ordinance to implement:

- Require Efficient Toilets and Urinals

## 4.4 Water Reduction Methodology

Each conservation measure targets a particular water use such as indoor single family water use. Targeted water uses are categorized by water user group and by end use. Targeted water user groups include single family residential, multifamily residential, commercial, industrial, and institutional (CII). Measures may apply to more than one water user group. Targeted end uses include indoor and outdoor use. The targeted water use is important to identify because the water savings are generated from reductions in water use for the targeted end use. For example, a residential retrofit conservation measure targets single family and multifamily residential indoor use and, in some cases, specifically shower use. When considering the water savings potential generated by a residential retrofit one considers the water saved by installing low-flow showerheads in single family and multifamily homes.

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. In essence, the market penetration goal identifies how many programs (e.g., fixtures, rebates, surveys, etc.) the wholesale customer would have to offer or conduct over a period of time to reach its water savings goal for that conservation measure. This is often expressed in terms of the number of programs offered or conducted per year.

The potential for error in market penetration goal estimates for each measure can be significant because estimates are based on previous experience, chosen implementation methods, projected utility effort, and funds allocated to implement the measure. However, if the market penetration required to achieve specific water savings turns out to be more or less than predicted, adjustments to the implementation efforts can be made. Larger rebates or additional promotions are often used to increase the market penetration. The process is iterative to reflect actual conditions and helps to ensure that market penetration and needed savings are achieved regardless of future variances between estimates and actual conditions.

In contrast, market penetration for mandatory ordinances can be more predictable with the greatest potential for error occurring in implementing the ordinance change. For example, requiring dedicated irrigation meters for new accounts through an ordinance can assure an almost 100% market penetration for affected properties.

Water agencies are constantly analyzing and trying to determine how long it takes a measure to reach saturation. Baseline surveys are the best approach to having the most accurate information on market saturation. This was taken into account when analyzing individual conservation measures where best estimates were made. MWM was not provided with any baseline surveys for this analysis, but discussions were held with WCWCD regarding their best estimates of saturation for their service area.

## 4.5 Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs involves comparing the costs of the programs to the benefits provided. This analysis was performed using the DSS Model developed by MWM. The DSS Model calculates cost-effectiveness of conservation measure savings at the end-use level. For example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. Additional detail on the DSS Model and assumptions can be found in Attachment A.

## 4.6 Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2016 (the model start year) at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are subsequently referred to as “Present Value” sums.

## 4.7 Measure Assumptions Including Unit Costs and Water Savings

Attachment C presents the assumptions and inputs used in WCWCD's DSS Model to evaluate each water conservation measure. Assumptions regarding the following variables were made for each measure:

- Targeted Water User Group End Use – Water user group (e.g., single family residential) and end use (e.g., indoor or outdoor water use).
- Utility Unit Cost – Cost of rebates, incentives, and contractors hired to implement measures. The assumed dollar values for the measure unit costs were closely reviewed by staff and found to be adequate for each individual measure. The values in the majority of cases are in the range of what is currently offered by other water utilities in the region.
- 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 for administering the measure, including consultant contract administration, marketing, and participant tracking. The mark-up is sufficient (in total) to cover conservation staff time, general expenses, and overhead.

Costs are determined for each of the measures based on industry knowledge, past experience, and data provided by WCWCD. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost includes measure design by staff or consultants, any required pilot testing, and preparation of materials that are used in marketing the measure. Measure costs are estimated each year from 2016 to 2060. Costs are spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments as necessary to meet fixed cost obligations.

Data necessary to forecast water savings of measures includes specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

The unit costs vary according to the type of customer account and implementation method being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multifamily account, and for a rebate versus an ordinance requirement or a direct installation implementation method. Typically, water utilities have found there are increased costs associated with achieving higher market saturation, such as more surveys per year. The DSS Model calculates the annual costs based on the number of participants each year. The general formula for calculating annual utility costs is:

- Annual Utility Cost = Annual market penetration rate x total accounts in category x unit cost per account x (1+administration and marketing markup percentage)
- Annual Customer Cost = Annual number of participants x unit customer cost
- Annual Community Cost = Annual utility cost + annual customer cost

## 4.8 Assumptions about Avoided Costs

Future benefits from program water savings can be considered to be future costs that are avoided because the water conservation program makes these expenditures unnecessary or delayed in time (creating a savings in the present value of future costs). WCWCD is currently assuming an avoided cost of water of \$2,987/MG or \$973/AF. This value represents the estimated cost (per unit water) of M&I water delivered by the Lake Powell Pipeline, corrected for elimination of the Cedar Valley Pipeline and the large forebay reservoir at the top of the Hurricane Cliffs. This avoided cost of water value is indexed to the second quarter of year 2015. Changing the avoided costs would alter estimated benefits (from the avoided costs). However, changing avoided costs would not change the relative differences between measure results. Therefore, doing so would not necessarily lead to different planning decisions.

The Modified Draft Socioeconomics and Water Resource Economics Study Report (UBWR, February 2012) documented the present value of the Lake Powell Pipeline Project (Project) capital construction cost opinion as \$1,124,717,000. This present value capital construction cost opinion was computed based on the following assumptions:

- Project present value (PV) at 2010 dollars start of engineering-construction period incorporates a 4.14 percent discount/interest rate.
- The Project PV period starts in 2010; all values used between 2008 and 2010 are escalated annually at 3 percent (includes inflation). Annual inflation after 2010 is 2.5 percent (in real value terms).
- The Project PV period covers 2010 through 2060, with Project operations commencing in 2020 (project life-cycle/operations approach); project power operations are considered at maximum operation in 2042.
- The Project PV period benefits and costs are expressed in real (constant) 2010\$.
- The Project construction period is 2016-2019, with Project operations commencing in 2020. No interest during construction is included, to be consistent with the State of Utah's perspective on economic and financial analyses. The State of Utah does not consider deferred revenues during the construction period as affecting their interest payments on general obligation bond requirements.
- Field Costs During Construction include a 15 percent contingency.
- Non-Construction Contract Costs are 18 percent of Field Costs During Construction.

The present value at 2010\$ of the capital construction cost opinion included several elements of the project that have been changed since 2010. The Cedar Valley Pipeline System was eliminated from the Project in mid-2012 when Central Iron County Water Conservancy District withdrew from the Lake Powell Pipeline. Washington County Water Conservancy District (WCWCD) requested that the Project include a large forebay reservoir east of the Hurricane Cliffs because of needed water storage. A portion of the Water Conveyance System and the Hydro System near the topographical high point in elevation was re-aligned parallel with U.S. 89 and within the Congressionally-designated utility corridor through the Grand Staircase-Escalante National Monument. The Kaibab Band of Paiute Indians purchased a section of land south of the Kaibab-Paiute Indian Reservation that included the Proposed Action (South Alignment Alternative), which was subsequently re-aligned around the subject section.

The December 2009 capital construction cost opinion is more than five years old and has progressively less accuracy with increasing time. The present value of the 2015 capital construction cost has been calculated using an index value through the second quarter of 2015. Although indexing the December 2009 capital construction cost opinion, corrected for the Project changes since 2009, is accompanied by decreasing accuracy, the intended purpose of this present value capital cost opinion is appropriate for the intended avoided cost comparison with water conservation measures in the

Water Conservation Update. The second quarter 2015 present value capital construction cost opinion, in 2010\$ indexed to 2015\$, is \$1,151,000,000. The estimated cost of delivered municipal and industrial water in dollar per acre-foot indexed to the second quarter 2015 is \$973 per acre-foot. This value is recommended as the updated 2015 avoided cost for comparison with the cost of water conservation measures in the Updated Water Conservation Analysis. An updated capital construction cost opinion for the Project will be completed during fall 2015 and available for incorporation into the Updated Water Conservation Analysis as applicable.

## 5. MODELING RESULTS

---

### 5.1 Comparison of Individual Measures

A total of 28 individual measures were evaluated using the DSS Model. For each measure selected to be modeled, a description as well as details on each measure's utility and customer costs, time period, and targets are presented. Screen shots from the DSS Model can be found in Attachment C. Some of the key assumptions used in evaluating the water savings, benefits, and costs include the following:

- Applicable customer class
- Applicable end use
- Annual account participation rates
- Evaluation start and end year
- Program length, years
- Measure life, years
- Utility unit cost, \$
- Customer unit cost, \$
- Annual administration and marketing overhead

Table 5-1 presents a list of all 28 measures and the following benefit-cost analysis parameters:

- Present Value of Water Utility Benefits
- Present Value of Community Benefits
- Present Value of Water Utility Costs
- Present Value of Community Costs
- Water Utility Benefit to Cost Ratio
- Community Benefit to Cost Ratio
- First Five Years of Water Utility Costs 2016-2020
- Water Savings in 2025 and 2060 (mgd)
- Cost of Savings per Unit Volume (\$/MG)

Table 5-1 presents how much water the measures will save in 2025 and 2060, how much they will cost, and what the cost of saved water will be per unit volume if the measures are implemented on a stand-alone basis (i.e., without interaction or overlap from other measures that might address the same end use or uses). Thus, savings from measures which address the same end use(s) are not additive. The model uses impact factors to avoid double counting in estimating the water savings from programs of measures. For example, if two measures are planned to address the same end use and both save 10% of the prior water use then the net effect is not the simple sum of 20%. Rather, it is the cumulative impact of the first measure reducing the use to 90% of what it was without the first measure in place, then reducing the use another 10% to result in the net use being 81% of what it was originally. In this example, the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows,  $0.9 \times 0.9 = 0.81$  or 19% water savings.

Since interaction between measures has **not** been accounted for in Table 5-1, it is **not** appropriate to include totals at the bottom of the table. However, the table is useful to give a close approximation of the cost-effectiveness of each individual measure.

Cost categories are defined below:

- Utility Costs – Those costs that WCWCD as a water utility will incur to operate the measure, including administrative costs.
- Utility Benefits – The avoided cost of producing water.
- Customer Costs – Those costs customers will incur to implement a measure in WCWCD's service area and maintain its effectiveness over the life of the measure.
- Customer Benefits – The savings other than from reduced water/sewer utility bills, such as energy savings resulting from reduced use of hot water. Conservation program participants will see lower water and sewer bills, but overall there will be no net customer benefit.

- Community Costs and Benefits – Community Costs include Utility Costs plus Customer Costs, Community Benefits include Utility Benefits plus Customer Benefits.

The column headings in Table 5-1 are defined as follows:

- Water Savings in years 2025 and 2060 (MGY) = water saved in million gallons per year. The year 2060 is provided as helpful in relation to the goal of achieving a 35% reduction in 2000 total usage by year 2060.
- Present Value (PV) of Utility and Community Costs and Benefits (\$) = present value (PV) of the 45-year time stream of annual costs or benefits, discounted to the base year.
- Utility Benefit-Cost ratio = PV of Utility Costs divided by PV of Utility Benefits over 45 years.
- Community Benefit-Cost ratio = (PV of Utility Benefits plus PV of customer energy savings) divided by (sum of PV of Utility Costs plus PV of Customer Costs), over 45 years.
- Five Years Total Cost to Utility (\$) = sum of the annual Utility Costs for years 2016 through year 2020 (up to year 2021). The measures start in the years specified for each measure shown in Attachment C.
- Utility Cost of Water Saved per Unit Volume (\$/MG) = PV of Utility Costs over 45 years divided by the 45-Year Water Savings. This value is compared to the utility's avoided cost of water as one indicator of the cost-effectiveness of conservation efforts. It should be noted that the value somewhat undervalues the cost of savings because program costs are discounted to present value and the water benefit is not.

From Table 5-1, the following observations can be made:

- There is a considerable range in savings for the various measures - from very small savings of 1 MG to well over 500 MG in year 2025, and from 0 MG to over 1,860 MG in 2060. The zero savings indicates there are measures no longer being implemented and/or no longer exacting any residual water savings.
- 26 of all the measures are cost-effective (BC ratio > 1.0) from the utility perspective.
- 23 of all 28 measures are cost-effective (BC ratio > 1.0) from the community perspective.
- Many of the measures with the highest water savings target landscape water use.
- Measures that target or apply to new homes save more water than measures that target existing customers because of the relatively high planned growth for the service area.
- Three of the top five water saving measures in year 2025 (first column of Table 5-1) are existing measures or a modification of an existing measure (all save more than 100 MG in 2025):
  1. Real Water Loss Reduction (existing measure)
  2. Conservation Pricing (existing measure)
  3. Billing Report Educational Tool (proposed measure)
  4. Require Efficient Toilets and Urinals (new proposed ordinance)
  5. Smart Irrigation Controller Rebates (existing measure)
- The three most expensive measures for the utility (last column in Table 5-1) over the first five years of the study period are:
  1. Financial Incentives for Irrigation Upgrades
  2. Turf Removal
  3. Real Water Loss Reduction

**Table 5-1 Summary of Conservation Program Measures Benefit Cost Analysis\***

Measure	2025 Water Savings (MG)	2060 Water Savings (MG)	Present Value of Water Utility Benefits	Present Value of Water Utility Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs (2016-2021)	Cost of Savings per Unit Volume (\$/MG)
Financial Incentives for Irrigation Upgrades	104	171	\$ 9,460,106	\$ 9,460,106	2.0	1.3	\$ 1,584,458	\$ 723
Smart Irrigation Controller Rebates	109	180	\$ 9,919,020	\$ 9,919,020	5.3	3.0	\$ 639,834	\$ 278
Distribute Retrofit Kits	7.8	0	\$ 176,546	\$ 499,116	2.2	3.4	\$ 42,709	\$ 1,138
Toilet Leak Detection	3.96	0.0	\$ 90,723	\$ 90,723	3.0	0.6	\$ 15,717	\$ 817
High Efficiency Toilets (HET) Rebates	54	44	\$ 3,142,175	\$ 3,142,175	3.1	2.1	\$ 520,275	\$ 502
Single Family Water Surveys	42	108	\$ 4,040,063	\$ 4,040,063	1.8	1.7	\$ 256,253	\$ 770
Multifamily Washer Rebate	2.2	2.0	\$ 141,047	\$ 515,014	1.2	2.1	\$ 49,150	\$ 1,279
Public Information Program	65	154	\$ 6,339,244	\$ 11,280,182	2.0	3.5	\$ 375,838	\$ 746
Conservation Pricing	239	1,869	\$ 3,152,072	\$ 3,152,073	6.7	6.7	\$ 50,000	\$ 13
Rotating Sprinkler Nozzle Rebates	69	114	\$ 6,306,738	\$ 6,306,738	5.2	4.4	\$ 413,418	\$ 283
CII Rebates to Replace Inefficient Equipment	12	19	\$ 1,056,436	\$ 2,829,675	1.3	2.6	\$ 271,925	\$ 1,113
Replace Spray Nozzles	1.2	1.2	\$ 85,151	\$ 548,565	6.3	40.7	\$ 14,335	\$ 256
High Efficiency Urinal Rebate (<.5 gallon)	1.9	1.4	\$ 106,156	\$ 106,156	0.3	0.1	\$ 209,173	\$ 6,016
Irrigation Water Surveys (Water Checks)	7	18	\$ 731,610	\$ 731,610	1.5	1.0	\$ 56,277	\$ 957
Xeriscape Demonstration Gardens	22	56	\$ 2,019,370	\$ 2,019,370	0.9	0.3	\$ 270,603	\$ 1,599
Train Landscape Maintenance Workers	6	15	\$ 596,596	\$ 596,596	3.6	0.8	\$ 19,069	\$ 393
Real Water Loss Reduction	547	1,326	\$ 48,857,485	\$ 48,857,485	6.9	6.9	\$ 1,460,834	\$ 202

Measure	2025 Water Savings (MG)	2060 Water Savings (MG)	Present Value of Water Utility Benefits	Present Value of Water Utility Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs (2016-2021)	Cost of Savings per Unit Volume (\$/MG)
Turf Removal	92	152	\$ 8,408,983	\$ 8,408,983	1.8	1.0	\$ 1,570,874	\$ 806
Washer Rebates for High Efficiency Machines	15	14	\$ 950,978	\$ 3,472,380	1.2	1.4	\$ 355,337	\$ 1,371
CII Surveys	34	55	\$ 3,082,987	\$ 5,447,304	5.1	5.0	\$ 209,173	\$ 293
School Building Retrofit	11	11	\$ 655,303	\$ 1,104,664	12.1	8.1	\$ 28,139	\$ 127
Billing Report Educational Tool	196	462	\$ 19,017,732	\$ 33,840,545	4.1	7.3	\$ 541,206	\$ 358
Mobile Home Park Submetering	5	5	\$ 351,864	\$ 709,010	7.9	6.1	\$ 39,383	\$ 204
Install High Efficiency Fixtures in Government Buildings	8	8	\$ 498,467	\$ 894,272	6.3	4.1	\$ 41,486	\$ 246
Install or Rebate High Efficiency Faucets	7	11	\$ 613,522	\$ 1,170,018	2.0	2.1	\$ 104,587	\$ 735
Water Budgeting/Monitoring	18	30	\$ 1,653,582	\$ 1,653,582	27.1	9.0	\$ 20,917	\$ 55
Require Efficient Toilets and Urinals	146	724	\$ 20,822,231	\$ 27,718,495	9.6	1.0	\$ 316,271	\$ 136
Efficient Outdoor Use Education and Training Program	25	65	\$ 2,318,596	\$ 2,318,596	5.7	3.2	\$ 47,293	\$ 243

Note: Savings estimates of 0 indicate the measure is not implemented in the respective year and/or no longer executes residual savings from previous year implementation (the measure savings life is complete and savings are no longer coming from the measure).

## 5.2 Program Scenarios

Assessing all 28 analyzed measures, WCWCD staff and consultants assembled three potential conservation programs for consideration. Figure 5-1 provides a summary of which measures are included in each of the three programs. The three programs are designed to illustrate an increasing level of water savings for WCWCD, with the third level (Program C) representing the maximum theoretical level of water savings. The decision regarding which measures belong in each program was reviewed and finalized by WCWCD. These programs are not intended to be rigid programs, but rather to demonstrate the range in savings that could be generated if selected measures are run together. In this step, a percent overlap in water savings (and benefits) is accounted for and a combined savings and benefits from programs or packages of measures is estimated. Figure 5-1 displays the conservation program scenarios considered in the DSS Model along with their corresponding measures.

**Program A** – Similar to existing conservation program; includes 18 conservation measures.

**Program B** – Optimized to increase water savings and be cost-effective. Consists of all of Program A’s measures plus added new measures. Includes 23 conservation measures.

**Program C** – All 28 conservation program measures analyzed are included in Program C.

**Figure 5-1 Program Scenario Measures**

 <b>Program Scenarios</b>	Measures	Program A	Program B	Program C
	Financial Incentives for Irrigation Upgrades	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Smart Irrigation Controller Rebates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Distribute Retrofit Kits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Toilet Leak Detection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
High Efficiency Toilets (HET) Rebates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Single Family Water Surveys	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Multifamily Washer Rebate	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Public Information Program	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Conservation Pricing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Rotating Sprinkler Nozzle Rebates	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
CII Rebates to Replace Inefficient Equipment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Replace Spray Nozzles	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
High Efficiency Urinal Rebate (<.5 gallon)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Irrigation Water Surveys (Water Checks)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Xeriscape Demonstration Gardens	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Train Landscape Maintenance Workers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Real Water Loss Reduction	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Turf Removal	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Washer Rebates for High Efficiency Machines	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
CII Surveys	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
School Building Retrofit	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Billing Report Educational Tool	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Mobile Home Park Submetering	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Install High Efficiency Fixtures in Government Buildings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Install or Rebate High Efficiency Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Water Budgeting/ Monitoring	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Require Efficient Toilets and Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Efficient Outdoor Use Education and Training Program	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

### 5.3 Modeling Results

The following Table 5-2 presents each modeled conservation program’s present value of water savings, present value of utility and community costs, cost of savings per unit volume, and both the water utility and community benefit to cost ratios.

**Table 5-2 Conservation Program Comparison**

Conservation Program	Present Value of Water Savings	Present Value of Utility Costs	Present Value of Community Costs	Utility Cost of Water Saved (\$/MG)*	Community Cost of Water Saved (\$/MG)*	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Program A with Plumbing Code	\$133,889,976	\$26,500,720	\$38,589,697	\$270/MG	\$393/MG	5.1	3.7
Program B with Plumbing Code	\$155,723,518	\$31,960,615	\$44,881,264	\$283/MG	\$397/MG	4.9	4.0
Program C with Plumbing Code	\$182,476,548	\$39,887,538	\$83,589,546	\$301/MG	\$630/MG	4.6	2.6

\* Cost of water saved per unit volume = present value of costs (utility or community) divided by program water savings. Costs and savings are for the analysis period (years 2016-2060).

The following Table 5-3 presents each modeled conservation program’s long term water savings as well as year 2060 indoor and outdoor water savings.

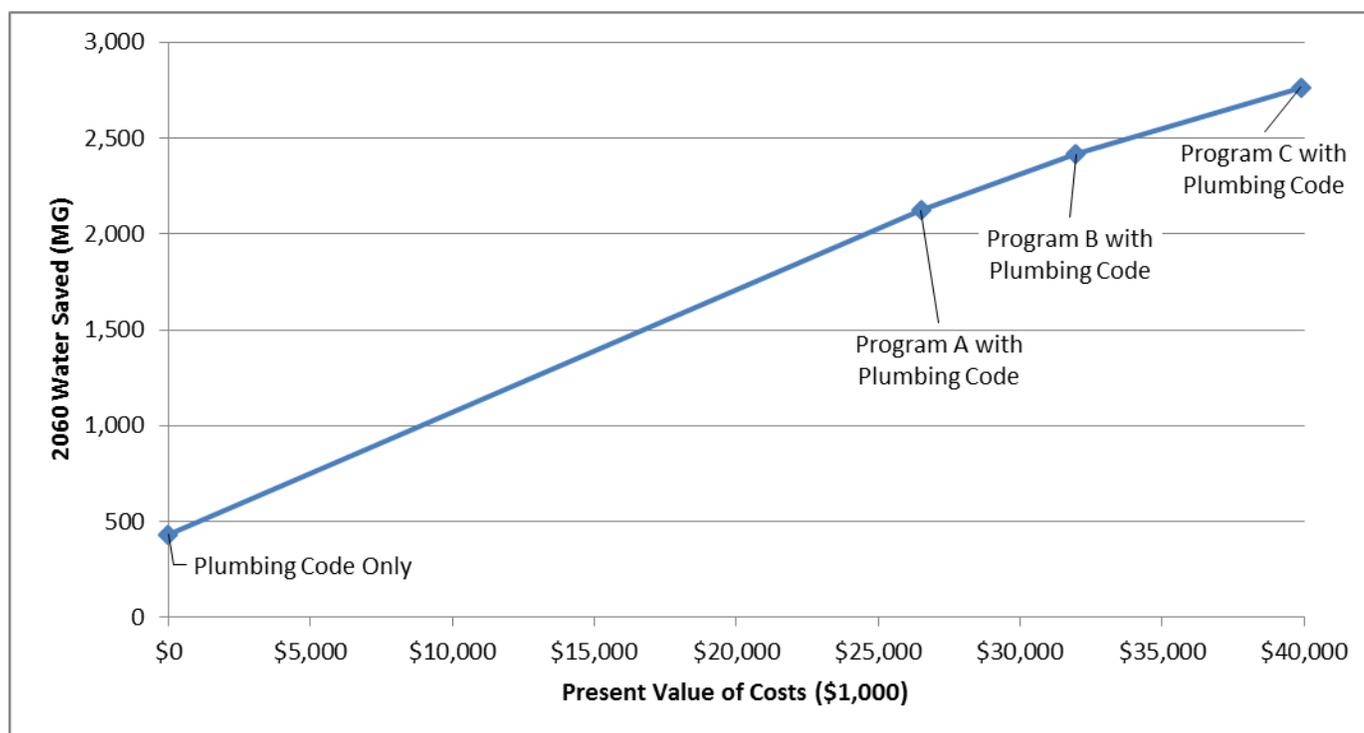
- The plumbing code reduces water production 0.8% in 2025.
- Program A savings are 4.6% or, including the plumbing code, 5.4% in year 2025. (4.6% Program A + Plumbing Code 0.8% = year 2025 Total Savings of 5.4%)
- Program B savings are 5.4% or, including the plumbing code, 6.2% in year 2025 (5.4% Program A + Plumbing Code 0.8% = Total Savings 6.2%)
- Program C savings are 6.2% or, including the plumbing code, 7.0% in year 2025. (6.2% Program A + Plumbing Code 0.8% = Total Savings 7.0% in year 2025)
- The plumbing code reduces water production 3.3% in 2060.
- Program A savings are 6.1% or, including the plumbing code, 9.4% in year 2060. (6.1% Program A + Plumbing Code 3.3% = year 2060 Total Savings of 9.4%)
- Program B savings are 6.9% or, including the plumbing code, 10.1% in year 2060 (6.9% Program A + Plumbing Code 3.3% = Total Savings of 10.1% in year 2060)
- Program C savings are 8.0% or, including the plumbing code, 11.3% in year 2060. (8.0% Program A + Plumbing Code 3.3% = Total Savings 11.3% in year 2060)

**Table 5-3 Conservation Program Long Term Water Savings**

Water Savings (MGY)	2020	2025	2030	2040	2050	2060	Year 2060 Indoor Water Savings	Year 2060 Outdoor Water Savings
Plumbing Code	54	218	433	909	1,473	2,158	2,158	0
Program A with Plumbing Code	643	1,477	2,124	3,245	4,590	6,199	166	6,033
Program B with Plumbing Code	816	1,711	2,414	3,598	5,013	6,697	399	6,298
Program C with Plumbing Code	923	1,939	2,763	4,084	5,643	7,476	1,093	6,383

The following Figure 5-2 displays each conservation program’s utility cost versus savings.

**Figure 5-2 Conservation Program Costs versus Savings**



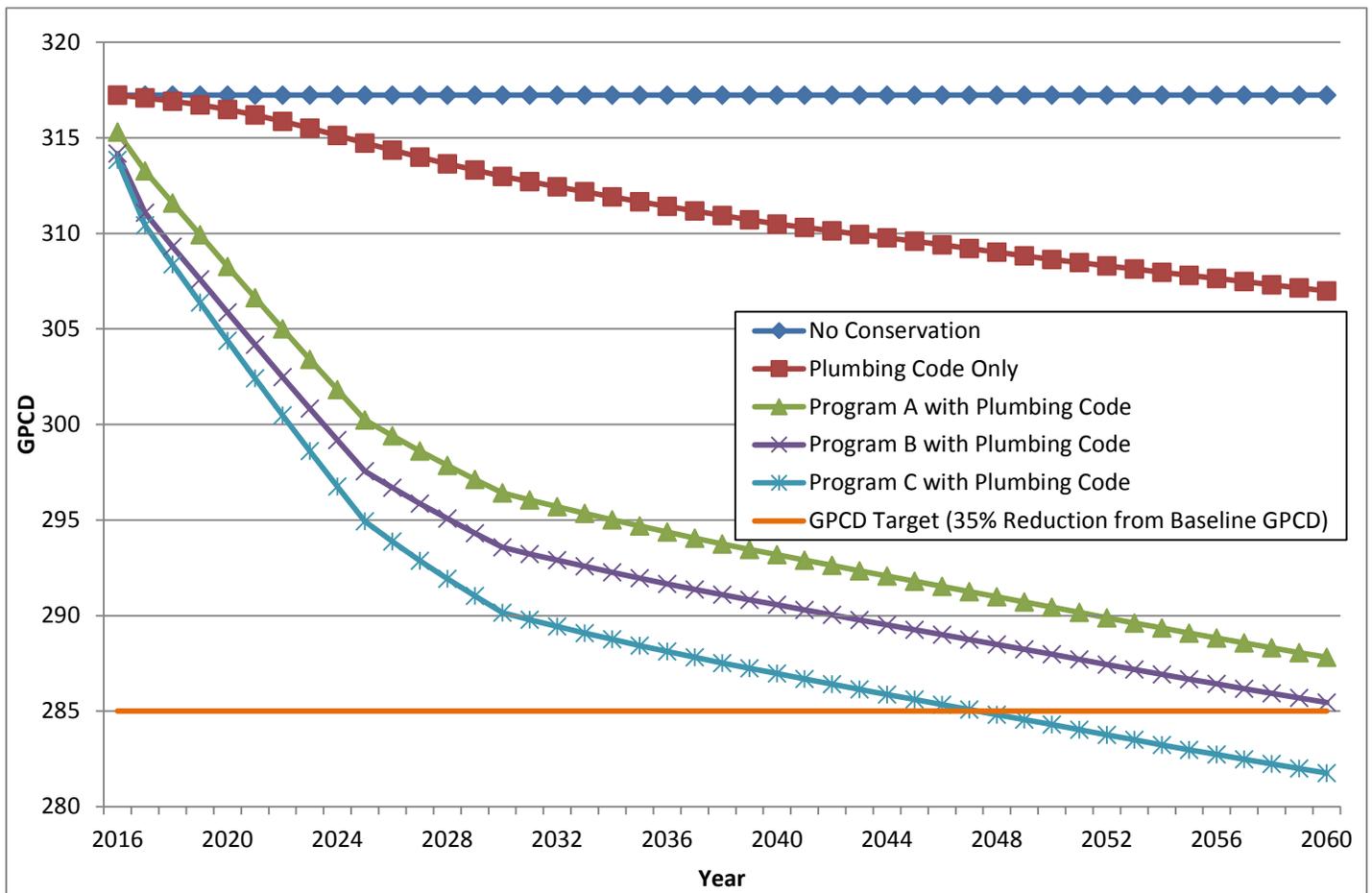
Program A reflects continuing the current program plus the plumbing code. The additional measures that create programs B and C produce increasing incremental costs for the amount of water savings gained. In other words, there are apparent diminishing returns when measures are added to each program beyond Program B. That is not to say that extending the water savings to Program C, the theoretical maximum determined in the study, is a poor investment. Whether it is economical to spend the extra money depends on the cost of the other options to obtain additional water for the WCWCD area, if needed.

The projected GPCD to 2060 is displayed in Table 5-4 and Figure 5-3. GPCD percent (%) reductions from year 2000 water use are presented Table 5-5.

**Table 5-4 Conservation Program Projected GPCD to Year 2060**

Year	No Conservation	Plumbing Code Only	Program A with Plumbing Code	Program B with Plumbing Code	Program C with Plumbing Code
2000	439	439	439	439	439
2010	325	325	325	325	325
2020	317	316	308	306	304
2025	317	315	300	298	295
2030	317	313	296	294	290
2040	317	310	293	291	287
2050	317	309	290	288	284
2060	317	307	288	285	282

**Figure 5-3 Conservation Program Projected GPCD to Year 2060**



**Table 5-5 Conservation Program Projected GPCD Reduction Percentage to Year 2060**

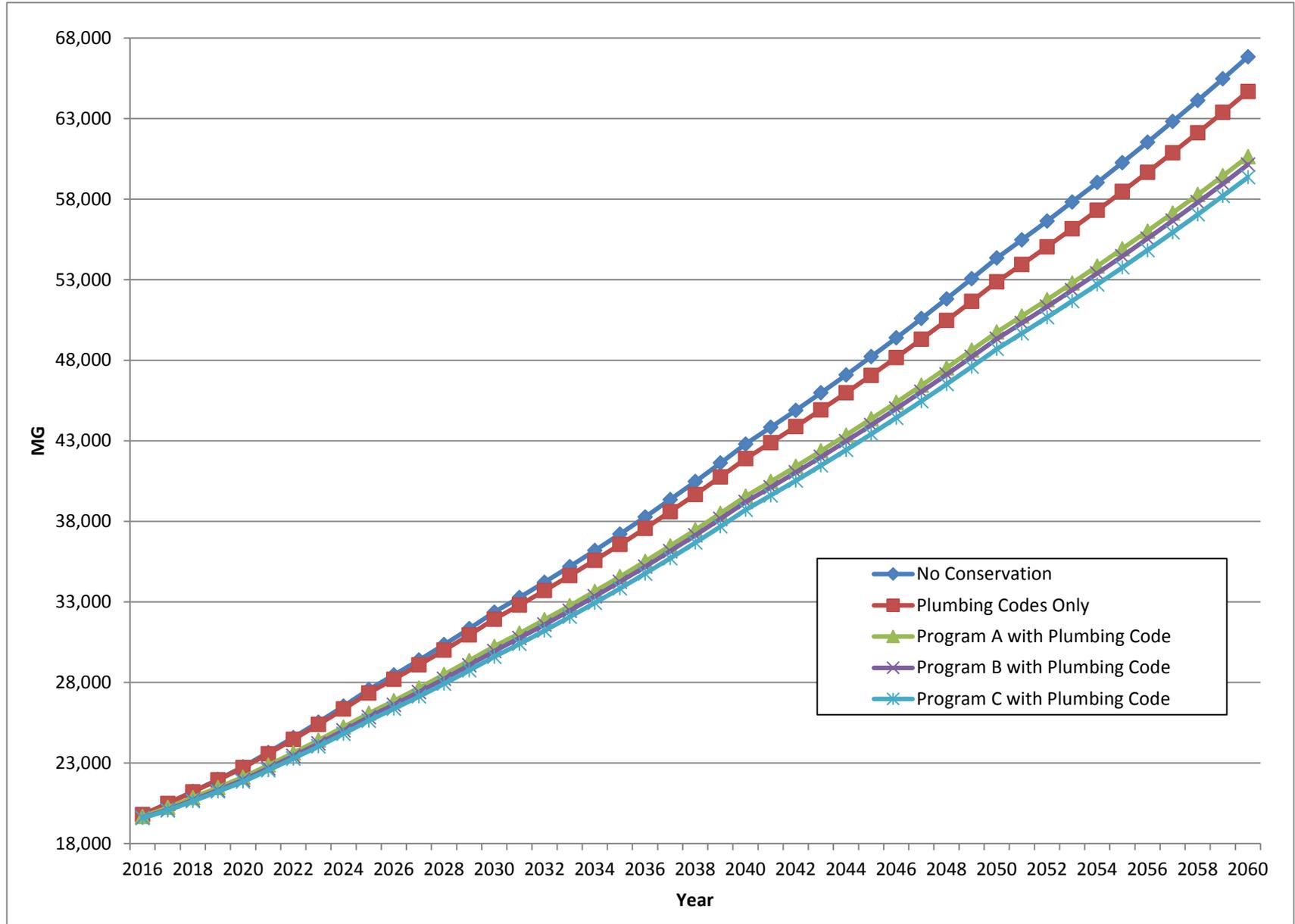
Year	No Conservation	Plumbing Code Only	Program A with Plumbing Code	Program B with Plumbing Code	Program C with Plumbing Code
2000	baseline	baseline	baseline	baseline	baseline
2010	26.0%	26.0%	26.0%	26.0%	26.0%
2020	27.7%	27.9%	29.8%	30.3%	30.7%
2025	27.7%	28.3%	31.6%	32.2%	32.8%
2030	27.7%	28.7%	32.5%	33.1%	33.9%
2040	27.7%	29.3%	33.2%	33.8%	34.6%
2050	27.7%	29.7%	33.8%	34.4%	<b>35.2%</b>
2060	27.7%	30.1%	34.4%	<b>35.0%</b>	35.8%

WCWCD projected demand to 2060 with and without plumbing codes and active conservation programs is displayed in Table 5-6 and Figure 5-4.

**Table 5-6 Projected Demand**

Demand (MGY)	2020	2025	2030	2040	2050	2060
No Conservation	22,766	27,563	32,359	42,799	54,342	66,840
Plumbing Code Only	22,712	27,345	31,926	41,890	52,870	64,682
Program A with Plumbing Codes	22,123	26,086	30,236	39,554	49,753	60,641
Program B with Plumbing Codes	21,950	25,852	29,945	39,201	49,329	60,143
Program C with Plumbing Codes	21,843	25,624	29,596	38,715	48,700	59,364

Figure 5-4 Water Demand Projections



## 6. CONCLUSIONS

---

The WCWCD service area has a relatively high portion of residential water use and a significant amount of outdoor water use. Consequently, residential conservation programs produce the most savings. WCWCD's service area is not a heavy manufacturing sector, so the conservation potential in the commercial sector is relatively low. The amount of new growth forecasted for WCWCD's area is high, so measures directed at new development produce large savings. Because of the high avoided cost of new water, water conservation programs are very cost-effective.

Overall conclusions are as follows:

- Total savings from Program A + Plumbing Code (continuing the current program) would save approximately 9% of demand in 2060 (6,199 MG), as shown in Table 5-3.
- The maximum savings would be that of Program C + Plumbing Code or 7,476 MG in 2060. This equates to an 11% reduction in 2060 water demand, as shown in Table 5-3.
- The average cost of water saved to the utility (present value basis) for all programs ranges from a very attractive \$270/MG to \$301/MG (less than the \$2,987/MG projected price of Lake Powell water to Washington County), as shown in Table 5-2.
- WCWCD achieves the State of Utah's goal of a 35% reduction of year 2000 water use by 2060 with Program B and by 2049 with Program C. Program A does not support WCWCD achieving the 35% goal by year 2060. All of these programs are cost effective from the utility standpoint, as shown in Table 5-2
- Program B appears to optimize the investment in water conservation whose costs and savings are at the point of increasing diminishing returns, as seen in Figure 5-2. Program B is also sufficient to meet the State's goal of a 35% reduction in per capita water use, given the historical savings that have already been achieved.
- Program B is a cost effective way to meet a small part of the growth in demand. Growth in demand without any conservation is projected to be approximately 47,000 MGY. Program B water savings could provide 14% of that projected amount. Therefore, other sources of new water will be needed to meet projected demand in 2060.
- Because of the projected relatively high growth rate in new accounts, implementation of all of the programs described in this report will save approximately 35% of the amount of new water needed in 2060. Water conservation can be an important approach to meeting future demands in the service area.

In summary, this analysis shows that WCWCD's goal to achieve an additional approximate 10% reduction in total per capita usage from 2000 baseline levels (for a total of 35% reduction) by 2060 is attainable. These reductions can be achieved with plumbing codes, the current conservation program, and implementation of more aggressive conservation measures identified in Program B and Program C scenarios.

## ATTACHMENT A DSS MODEL BACKGROUND

The Demand Side Management Least Cost Planning Decision Support System (DSS Model) prepares long-range water demand projections at a very detailed level. The purpose of the model is to enable a more accurate assessment of the impact of water efficiency programs on demand. A rigorous modeling approach is especially important if the project will be subject to regulatory or environmental review.

The DSS Model is an end-use model which shows water demand in the service area as it relates to specific end water uses, such as toilets, faucets, or irrigation. The product is a “bottom-up” approach that 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 water use data, as provided in the form of billing data from the various retail water providers, was obtained from WCWCD regional partners to be modeled. The demand data is reconciled with available demographic data to characterize the water usage for each customer category in terms of number of users per account and per capita water use. The data is further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer 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 category. In other words, the DSS Model checks that social norms from studies on end water use behavior (e.g., flushes per person per day) are not exceeded.



**Figure A-1 DSS Model Screen Shot**

The DSS Model evaluates conservation measures using benefit-cost analysis with the present value of the cost of water saved (\$/MG) and benefit to cost ratio as economic indicators. The analysis is performed from both the utility and community (utility plus customer) perspectives. Benefits are based on savings in water and wastewater facility operations and maintenance (O&M) and savings from deferring or downsizing future capital facilities, such as water treatment plant expansions, new source development, or water purchases from wholesalers. Figure A-1 above presents the steps that illustrate the process for forecasting conservation water savings, including the impacts of fixture replacement due to plumbing codes and standards already in place.

The DSS Model has been used for practical applications of conservation planning in over 230 service areas representing 20 million people, including extensive efforts nationally in California, Colorado, Hawaii, Utah, Georgia, Florida, North Carolina, Oregon and Ohio, and internationally in Australia, New Zealand, and Canada.

The following section presents the key assumptions used in the DSS Model. The assumptions having the most dramatic effect on future demands are: 1) the natural replacement rate of fixtures; 2) how residential or commercial future use is

projected; and 3) the percent of estimated real water losses. This section presents DSS Model assumptions regarding plumbing code water savings, present value parameters, and active conservation measure costs and savings.

## A.1 Plumbing Codes and Legislation

The DSS Model incorporates the following three items as a “code” meaning that the savings are assumed to occur and are therefore “passive” savings.

### National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005, mandates that only fixtures meeting the following standards can be installed in new buildings:

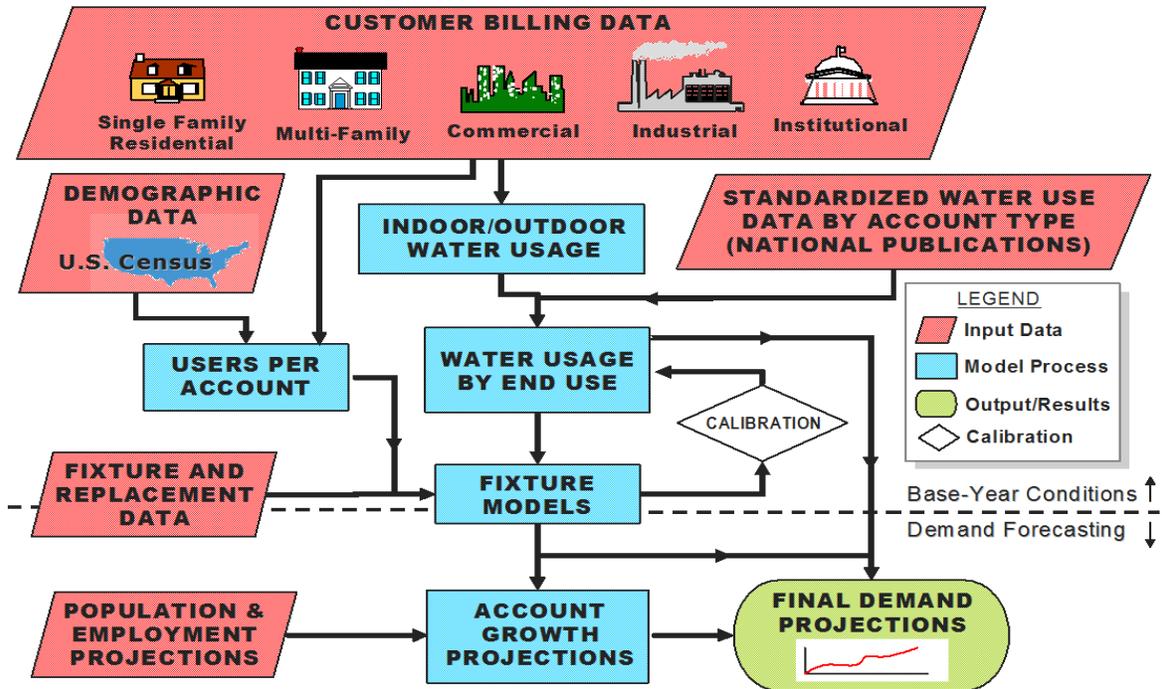
- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead – 2.5 gal/min at 80 psi
- Residential faucets – 2.2 gal/min at 60 psi
- Public restroom faucets – 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act, which mandates that only devices with the specified level of efficiency (as shown above) can be sold as of 2006. The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new, more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code, the U.S. Department of Energy regulates appliances, such as residential clothes washers. Regulations to make these appliances more energy efficient have driven manufactures to dramatically reduce the amount of water these machines use. Generally, front loading washing machines use 30-50% less water than conventional models (which are still available). In a typical analysis, the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 that will be the only type of machines available for purchase. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 10 years, eventually all machines on the market will be the more water efficient models. In 2012, the United States Environmental Protection Agency estimated that the Energy Star clothes washer market share in the U.S. in 2011 was more than 60%. Energy Star washing machines have a water factor (WF) of 6.0 or less. A WF of 6.0 is the equivalent of using 3.1 cubic feet (or 23.2 gallons) of water per load.

The following figure conceptually describes how plumbing codes are incorporated into the flow of information in the DSS Model.

**Figure A-2 DSS Model Overview Used to Make Potable Water Demand Projections**



### DSS Model Fixture Replacement

The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example, currently toilets can be purchased that flush at a rate of 0.8 gallons per flush (gpf), 1.0 gallon per flush or 1.28 gallons per flush. The 1.6 gpf and higher gallons per flush toilets still exist but can no longer be purchased in California. Therefore, they cannot be used for replacement or new installation of a toilet. So, the DSS Model utilizes a fixture replacement table to decide what type of fixture should be installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage, as shown in the following figure. A value of 100% would indicate that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model contains a pair of replacement tables for each fixture type and customer category combination (i.e., Residential Single Family toilets, Residential Multifamily toilets, Commercial toilets, Residential clothes washing machines, Commercial washing machines, etc.).

In this example, the DSS Model includes the effects of the Federal Policy Act on each toilet fixture type. This DSS Model feature determines the “saturation” of 1.6 gpf toilets as the Federal Policy Act was in effect from 1992-2014 for 1.6 gpf toilet replacements.

**Figure A-3. Example Toilet Replacement Percentages by Type of Toilet**

Replacement Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	75%	25%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%
New Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	100%	0%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%

### DSS Model Initial Fixture Proportions

The DSS Model also needs a place to start when it comes to fixture replacement. It needs to know what the initial proportions (or percentages) of each type of fixture that is currently installed (i.e., fixture saturation rate) in the modeled service area for each customer class.

Figure A-3 presents an example of the initial proportions determined for residential toilets in the year 2010. In the following example in Figure A-3, the model started in 2010. Therefore, it is assumed the initial proportions of the 1.28 gallon per flush type toilet is 0%, as that type was not readily available at that time. Then, using the 2010 DP-04 census data, which shows the age of houses in the service area, it is calculated that 39.3% of the total current homes were built since 1992 when 1.6 gallon per flush toilets were required to be installed in new homes. Then an average natural replacement rate (rate of broken or remodeled toilet) of 2.5% per year for higher flush volume toilets is assumed. Then, in this example, a 3.96% replacement rate is calculated due to a rebate program that was raising the replacement rate of toilets. This gives the initial proportion of 1.6 gallon per flush (gpf) toilets to be 90.0%, and 1.28 gpf toilets 3.3%. In this case the initial proportion of high flush toilets is assumed to be the remainder of 6.7%. This figure shows an example of a toilet fixture model and how it incorporates the changes from each of these legislative items. There are similar fixture models for showers, clothes washers, and urinals. There is one fixture model for each of the following categories:

- Single family toilets
- Multifamily toilets
- Commercial toilets
- Commercial urinals
- Single family showers
- Multifamily showers
- Single family clothes washers
- Multifamily clothes washers

**Figure A-4. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model**

Fixture Model:	Residential Toilets					Replacement Data		
Appliance Data						Comments		
Fixture Type	Volume per Use (Gallons) <sup>1</sup>	Proportion of Homes by Age <sup>2</sup>	Net Change due to Natural Replacement	Net Change due to Rebate Program <sup>3</sup>	Initial Proportions <sup>4</sup>		Fixture Type	Percent Annual Replacement <sup>5</sup>
1.28 gal/flush High Efficiency Toilets (HET)	1.3	0.0%	0.0%	3.30%	3.3%	3.4% as these toilets were not very prevalent in the start year.	1.28 gal/flush High Efficiency Toilets (HET)	2.0%
1.6 gal/flush Ultra Low Flow Toilets (ULFT)	1.8	39.3%	50.0%	0.66%	90.0%	39.3% new homes since 1990 + 50% natural replacement +15% retrofit program	1.6 gal/flush Ultra Low Flow Toilets (ULFT)	2.0%
High Flush and 3.5 gal/flush	4.0	60.7%	-50.00%	-3.96%	6.7%	Remainder	High Flush and 3.5 gal/flush	2.5%
NOTES:								
1a. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.								
1b. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.								
2. Assume homes constructed after 1992 installed ULFTs.								
3. Net change due to rebate program is based on historical active conservation activity.								
4. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.								
5a. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.								
5b. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.								

These initial proportions, determined in the fixture model and found in WCWCD’s background water use data analysis workbook, are then entered into the DSS Model for each fixture’s “Codes and Standards” worksheet. A screenshot of the single family toilet codes and standards worksheet is shown in the following figure. Most DSS Models include fixture models for SF and MF toilets, showers, clothes washers, and commercial toilets and urinals.

Figure A-5. Example Residential Toilet Fixture Screenshot from DSS Model

Single Family Toilets																																																													
 <p><b>Single Family Toilets</b></p> <p>Categories</p>	<table border="1"> <tr> <td>Measure Category</td> <td>Default Plumbing Code</td> <td>1</td> <td></td> </tr> <tr> <td>Start Year</td> <td colspan="3">2010</td> </tr> <tr> <td>Description</td> <td colspan="3"> <p>The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at 1.28 gallons per flush or 1.6 gallons per flush. The higher flush toilets (3.5gpf) still exist but no longer can be purchased in this state and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type.</p> <p>The DSS Model combines the effects of the following for the toilet fixture type:</p> <ul style="list-style-type: none"> <li>• Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements.</li> </ul> <p>An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, a natural replacement rate of 2.5% is used for older toilets. This value can be modified by the user as shown on the previous worksheet. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value.</p> </td> </tr> <tr> <td>Comments</td> <td colspan="3"> <ol style="list-style-type: none"> <li>1. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.</li> <li>2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.</li> <li>3. Assume homes constructed after 1992 installed ULFTs.</li> <li>4. Net change due to rebate program is based on historical active conservation activity.</li> <li>5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.</li> <li>6. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.</li> <li>7. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.</li> </ol> </td> </tr> <tr> <td>Customer Category</td> <td>Single Family</td> <td>1</td> <td></td> </tr> <tr> <td>End Use</td> <td>Toilets</td> <td>1</td> <td></td> </tr> <tr> <td colspan="4" style="text-align: center;"><b>Effected Fixtures</b></td> </tr> <tr> <td>1.6 gpf ULFT</td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>High Use Toilet</td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td>1.28 gpf HET</td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> </tr> <tr> <td colspan="4" style="text-align: center;"><b>Initial Fixture Proportions</b></td> </tr> <tr> <td>1.6 gpf ULFT</td> <td>90.0%</td> <td></td> <td></td> </tr> <tr> <td>High Use Toilet</td> <td>10.0%</td> <td></td> <td></td> </tr> <tr> <td>1.28 gpf HET</td> <td>0.0%</td> <td></td> <td></td> </tr> <tr> <td>Total</td> <td>100.0%</td> <td></td> <td></td> </tr> </table>	Measure Category	Default Plumbing Code	1		Start Year	2010			Description	<p>The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at 1.28 gallons per flush or 1.6 gallons per flush. The higher flush toilets (3.5gpf) still exist but no longer can be purchased in this state and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type.</p> <p>The DSS Model combines the effects of the following for the toilet fixture type:</p> <ul style="list-style-type: none"> <li>• Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements.</li> </ul> <p>An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, a natural replacement rate of 2.5% is used for older toilets. This value can be modified by the user as shown on the previous worksheet. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value.</p>			Comments	<ol style="list-style-type: none"> <li>1. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.</li> <li>2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.</li> <li>3. Assume homes constructed after 1992 installed ULFTs.</li> <li>4. Net change due to rebate program is based on historical active conservation activity.</li> <li>5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.</li> <li>6. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.</li> <li>7. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.</li> </ol>			Customer Category	Single Family	1		End Use	Toilets	1		<b>Effected Fixtures</b>				1.6 gpf ULFT	<input checked="" type="checkbox"/>			High Use Toilet	<input checked="" type="checkbox"/>			1.28 gpf HET	<input checked="" type="checkbox"/>			<b>Initial Fixture Proportions</b>				1.6 gpf ULFT	90.0%			High Use Toilet	10.0%			1.28 gpf HET	0.0%			Total	100.0%		
	Measure Category	Default Plumbing Code	1																																																										
	Start Year	2010																																																											
	Description	<p>The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at 1.28 gallons per flush or 1.6 gallons per flush. The higher flush toilets (3.5gpf) still exist but no longer can be purchased in this state and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type.</p> <p>The DSS Model combines the effects of the following for the toilet fixture type:</p> <ul style="list-style-type: none"> <li>• Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements.</li> </ul> <p>An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, a natural replacement rate of 2.5% is used for older toilets. This value can be modified by the user as shown on the previous worksheet. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value.</p>																																																											
	Comments	<ol style="list-style-type: none"> <li>1. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.</li> <li>2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.</li> <li>3. Assume homes constructed after 1992 installed ULFTs.</li> <li>4. Net change due to rebate program is based on historical active conservation activity.</li> <li>5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.</li> <li>6. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they where required.</li> <li>7. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.</li> </ol>																																																											
	Customer Category	Single Family	1																																																										
	End Use	Toilets	1																																																										
	<b>Effected Fixtures</b>																																																												
	1.6 gpf ULFT	<input checked="" type="checkbox"/>																																																											
	High Use Toilet	<input checked="" type="checkbox"/>																																																											
1.28 gpf HET	<input checked="" type="checkbox"/>																																																												
<b>Initial Fixture Proportions</b>																																																													
1.6 gpf ULFT	90.0%																																																												
High Use Toilet	10.0%																																																												
1.28 gpf HET	0.0%																																																												
Total	100.0%																																																												

## DSS Model Fixture Replacement Rates

An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling, or other reason. To do this, the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, high flush toilets have a replacement rate value of 2.5%. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value. This value can be modified by the user for any fixture as shown in Figure A-6 below.

Also included in the following figure are example fixture efficiencies, which can be adjusted to any desired level based on service area characteristics. MWM can update data on efficiency levels found in the field and the California Single Family Water Use Efficiency Study (DeOreo, 2011) or other recent information related to fixture saturation rates.

**Figure A-6. Example Future Replacement Rates of Fixtures from DSS Model**

Fixture Name	End Use	Fixtures			
		Average Water Use	Units	Fixture Life (yrs)	Replacement Rate
1.28 gpf HET	Toilets 1	1.30	gpf	50	2.0%
1.6 gpf ULFT	Toilets 1	1.80	gpf	50	2.0%
High Use Toilet	Toilets 1	3.50	gpf	40	2.5%
1 gpf Urinal	Urinals 2	1.00	gpf	50	2.0%
0.5 gpf Urinal	Urinals 2	0.50	gpf	50	2.0%
Waterless Urinal	Urinals 2	0.00	gpf	50	2.0%
High Use Urinals	Urinals 2	3.00	gpf	40	2.5%
Quart Urinals	Urinals 2	0.25	gpf	50	2.0%
High Efficiency 2 gpm	Showers 4	13.92	gal per use	25	4.0%
Low Flow 2.5 gpm	Showers 4	18.27	gal per use	25	4.0%
High Flow > 3 gpm	Showers 4	23.49	gal per use	25	4.0%
Efficient	Clothes Washers	12.00	gal per use	10	10.0%
Medium Efficiency	Clothes Washers	19.20	gal per use	10	10.0%
Top Loader	Clothes Washers	34.20	gal per use	10	10.0%

## DSS Model End Uses

Indoor and outdoor residential and non-residential end use breakdowns can be found in the "End Uses" section of WCWCD's DSS Model on the "Breakdown" worksheet. A screenshot example of this worksheet is shown in Figure A-6. The sources of these values are: 1) "California Single Family Water Use Efficiency Study" (DeOreo, 2011); 2) "Residential End Uses of Water" (DeOreo, 1999, 2015 update pending); 3) "Commercial and Institutional End Uses of Water" (Dziegielewski, 2000); and 4) WCWCD supplied data on costs and savings.

**Figure A-7. End Use Breakdown Example Screenshot**

Breakdown								
 <p><b>Breakdown</b></p>	Indoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Toilets	16.0%	18.0%	16.5%	12.0%	18.0%		
	Urinals			4.0%	3.0%	5.0%		
	Faucets	21.0%	12.0%	13.0%	14.0%	14.0%		
	Showers	24.0%	28.0%	8.0%	8.0%	8.0%		
	Dishwashers	2.0%	5.0%	6.0%	6.0%	6.0%		
	Clothes Washers	13.0%	16.5%	15.0%	15.0%	15.0%		
	Process			23.0%	27.0%			
	Kitchen Spray Rinse			5.0%	5.0%	5.0%		
	Internal Leakage	7.0%	5.0%	9.5%	10.0%	10.0%		
	Baths	2.5%	1.5%					
	Other	14.5%	14.0%	0.0%	0.0%	19.0%		
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%
	Outdoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Irrigation	80.0%	83.0%	95.0%	95.0%	95.0%	95.0%	
	Pools	1.0%	2.0%					
	Wash Down	7.0%	4.0%					
	Car Washing	7.0%	4.0%					
External Leakage	5.0%	7.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
Outdoor							95.0%	
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

End use breakdown values will vary between different water agencies due to differing demographics of their service area population. Residential frequency of use information for toilets, showers, and washers as well as non-residential frequency of use of toilets and urinals is included in the “Codes and Standards” green section on the “Fixtures” worksheet of WCWCD’s DSS Model. It is then confirmed in each “Service Area Calibration End Use” worksheet. Calculated frequencies of use in uses/user/day for customer end uses are presented in each customer category’s “Service Area Calibration End Use” worksheet and compared to an industry-accepted use range based on AWWARF’s residential, commercial and institutional end use reports mentioned previously. An example of this calibration sheet is shown in the screenshot in Figure A-8 below.

**Figure A-8. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot**

Single Family							
 <p><b>Single Family</b></p>	End Use	Use Percentage	Uses/User/Day	Lower	Upper	State	Fixture Model
	Toilets	16.0%	4.76	4.5	5.6	Calibrated	<a href="#">Edit</a>
	Faucets	21.0%					
	Showers	24.0%	0.73	0.6	0.9	Calibrated	<a href="#">Edit</a>
	Dishwashers	2.0%					
	Clothes Washers	13.0%	0.32	0.3	0.42	Calibrated	<a href="#">Edit</a>
	Internal Leakage	7.0%					
	Baths	2.5%					
	Other	14.5%					
	Total	100.0%					

## A.2 Present Value Parameters

Present value analysis using constant FY 2016 dollars and a real discount rate of 3% is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between the multiple measures.

Economic analysis can be performed from several different perspectives based on which party is affected. For planning water use efficiency programs for utilities, the perspectives most commonly used for benefit-cost analyses are the “utility” perspective and the “community” perspective. The utility benefit-cost analysis is based on the benefits and costs to the water provider. The community benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure beyond what the utility pays.

The utility perspective offers two advantages. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving versus supplying increased quantities of water. Second, revenue shifts are treated as transfer payments, which means program participants will have lower water bills and non-participants will have slightly higher water bills so that the utility’s revenue needs continue to be met. Therefore, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. It should be noted that there is a significant difference between the utility’s savings from the avoided cost of procurement and delivery of water and the reduction in retail revenue that results from reduced water sales due to water use efficiency. This budget impact occurs slowly and can be accounted for in water rate planning. Because it is the water provider’s role in developing a water use efficiency plan that is vital in this study, the utility perspective was primarily used to evaluate elements of this report.

The community perspective includes the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in water use efficiency programs are considered as well as the benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Water bill savings are not a customer benefit in the aggregate for reasons described above. Other factors external to the utility, such as environmental effects, are often difficult to quantify or are not necessarily under the control of the utility. They are therefore frequently excluded from economic analyses, including this one.

The time value of money is explicitly considered. Typically the costs to save water occur early in the planning period, whereas the benefits usually extend to the end of the planning period. A long planning period of 30-40 years is typically used because costs and benefits that occur beyond 20-50 years have very little influence on the total present value of the costs and benefits. The value of all future costs and benefits is discounted to the analysis start year in the DSS Model at the real interest rate of 3.0%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). Cash flows discounted in this manner are herein referred to as Present Value (PV) sums.

## A.3 Assumptions about Measure Costs

Costs were determined for each of the measures based on industry knowledge, past experience, and data provided by WCWCD. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of

materials that will be used in marketing the measure. The model was run for 45 years (each year from 2016 through 2060). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the water use efficiency measures evaluated herein generally take effect over a long span of time that is sufficient to enable timely rate adjustments as necessary to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

#### A.4 Assumptions about Measure Savings

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to seven years after the start of implementation, depending upon the implementation schedule.

For every water use efficiency activity or replacement with more efficient devices, there is a useful life. The useful life is called the “Measure Life” and is defined as how long water use efficiency measures stay in place and continue to save water. It is assumed that measures implemented because of codes, standards, or ordinances (e.g., toilets) would be permanent and not revert to an old inefficient level of water use if the device needed to be replaced. However, some measures that are primarily behavioral based, such as residential surveys, are assumed to need to be repeated on an ongoing basis to retain the water savings (e.g., homeowners move away and new homeowners have less efficient water usage practices around the home). Surveys typically have a measure life on the order of five years.

## ATTACHMENT B MEASURE SCREENING PROCESS AND RESULTS

---

The review and screening of water conservation measures is an important step in updating the water conservation program. In this case, some of the measures reviewed have already been implemented by WCWCD and some of the measures would be new programs. This task included a review of WCWCD's current water conservation measures, identification of current and new measures that may be appropriate for the local entities, and the screening of these measures to a short-list for detailed evaluation (benefit-cost analysis). To complete this process, a list of potential demand management measures for qualitative evaluation (screening) was compiled. The list includes devices or programs (e.g., new high efficiency toilets that would save water) that can be used to achieve water conservation; methods through which the device or program will be implemented; and what distribution method or mechanism can be used to activate the device or program. The list of potential measures was drawn from the general experience of MWM and WCWCD as well as review of cutting edge conservation programs currently being implemented by other water agencies. A list of all the measures considered, as well as the generic measure descriptions used to assess the measure, can be found in Table B-1 below.

WCWCD invited community members and municipal representatives to assist in evaluating the available measures. This Water Conservation Plan Update Workgroup (Workgroup) consisted of 13 individuals that met monthly throughout 2014. With a facilitator managing the discussion, the Workgroup was given a series of presentations about water resources and issues, with a primary focus on WCWCD's water conservation programs and goals. With this information and the different perspectives brought by members of the Workgroup, they assisted MWM in the screening process of conservation measures. This process was undertaken to reduce the new measures to be considered to a more manageable number and to eliminate those measures that are not as well suited to WCWCD's customer base. The result of this process was a short list of measures for further evaluation. This evaluation was specific to the water use characteristics, economies of scale, demographics, and other factors that are unique to WCWCD.

MWM selected the voting criteria and scale. Each potential measure was screened by the Workgroup based on the qualitative criteria below, scored on a scale of 1 to 5 (where 1 represented strongly disapprove of implementing measure; 5 being strongly approve implementing measure). Each screening workshop attendee from the service area was allowed one vote. The votes were then totaled with the measures with the highest scores considered most likely to succeed in the WCWCD service area. The screening was completed in a one-day web-based conferencing call in April 2014, facilitated by MWM.

The measures were screened by WCWCD and the Workgroup using the following criteria:

- Service Area Match – Is the technology appropriate for the area's climate, building stock, or lifestyle? For example, promoting Xeriscape gardens for multifamily or commercial sites may not be appropriate where little or no landscapes exist among the customer base.
- Long Term/Permanent Water Savings – What are the measure's long term or permanent water savings? For example, some measures, such as public information, only show an impact for a couple of years unless repeated indefinitely, while others show a longer term savings (e.g., high efficiency toilets save water for the life of the toilet).

- Savings Quantifiable – Are the water savings quantifiable? For example, it is difficult to determine the amount of water saved in educational programs where customer water use cannot be tracked after participation in the program versus a water efficient irrigation upgrade rebate where water savings are measured after implementation.
- Customer Acceptance/Equity – Are customers willing to implement measures? If not, the market penetration rates (and thus the water savings) might be too low to be significant. Measures should also be equitable (i.e., one category of customers should not benefit while another pays the costs without receiving benefits). Customer acceptance may be based on:
  - Convenience
  - Economics
  - Perceived fairness
  - Aesthetics

The initial list and description of the measures preliminarily considered can be found in the following Table B-1.

**Table B-1 Existing and Potential Measures Assessed in the Measure Screening Process**

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
<b>Existing Measures</b>				
Financial Incentives for Irrigation Upgrades	SF, MF, COM, INST Outdoor	For existing SF, MF, and COM customers with landscape. Provide rebates towards the purchase and installation of selected types of irrigation equipment upgrade, including low-volume sprinkler heads, check valves, and rain sensors. Rebate is up to one-half of cost of equipment. Assume average rebate to be \$2,500 for non-residential customers.	YES	
Smart Irrigation Controller Rebates	SF, MF, COM, INST Outdoor	Provide a 50% cost-share for the purchase of a SMART irrigation controller. Require customer to have a "Water Check" and education.	YES	
Distribute Retrofit Kits	SF Indoor	Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install low-flow showerheads, faucet aerators, and toilet tank retrofit devices. Distribute at community event booths.	YES	
Toilet Leak Detection	SF Indoor	Distribute leak detection tablets for homeowners to test toilets for leaks. Offer advice on toilet leak repair. Continue "Fix the Leak Week" campaign.	YES	
Washer Rebates for High Efficiency Machines	SF Indoor	Homeowners would be eligible to receive a rebate on a new water efficient clothes washer. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology. Can rebate on sliding scale and vary with water efficiency of new machine. Water rebate averages \$200; total rebate higher if local Energy Company participates.	YES	Measure offered previously by St. George City but not currently offered.

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
High Efficiency Toilets (HET) Rebates	SF, MF, COM, INST Indoor	Provide a \$75 rebate or voucher for the installation of a high efficiency toilet (HET). HETs are defined as any toilet that flushes 20% less than an ultra-low flow toilet (ULFT) and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. This program will be eliminated as 1.28 gpf toilets are mandated by state or federal law. This program must be WaterSense labeled.	YES	
Single Family Water Surveys	SF Outdoor	Continue outdoor water surveys (Water Checks) for existing single family residential customers. The participant is provided with a customized report to the homeowner regarding how to save water in their home.	YES	
Multifamily Washer Rebate (Intensive)	MF Indoor	Provide a rebate to apartment complexes (10 or more units) for efficient washing machines in buildings over a certain size that have a common laundry room. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.	YES	
Public Information Program	SF	Public education would be used to raise awareness of other conservation measures available to customers. Programs could include school programs, poster contests, speakers to community groups, radio and television time, and printed educational material, such as bill inserts, etc. Program would continue indefinitely.	YES	
Conservation Pricing	SF	Existing single family water rates would be changed to create an added price incentive to use less water. Modifications could include adjusting the tiers or rates in the upper tiers to increase the incentives to reduce landscape watering. WCWCD would suggest and support a water rate study to develop specific pricing levels. Rates would be decided by the individual cities.	YES	
Rotating Sprinkler Nozzle Rebates	SF, MF, COM, INST Outdoor	Offer a rebate for upgrading to a rotating nozzle for single family properties. Work with irrigation supply companies to promote.	YES	

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
CII Rebates to Replace Inefficient Equipment	COM, INST	Provide a rebate for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replace once through cooling, add conductivity meters on cooling towers, and other equipment. Pattern after San Diego County Water Authority or Seattle Water Department programs. Best if paired with a CII Survey program. Offer to audited sites.	YES	
Replace Spray Nozzles	COM, INST	Provide free installation of 1.14 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens. Program length 2-5 years.	YES	
High Efficiency Urinal Rebate (<.5 gallon)	COM, INST Indoor	Provide a rebate for High Efficiency Urinals (HEUs) to existing high use CII customers (such as restaurants). Eligible replacements would include urinals flushing with no more than 0.5 gpf and best available technology (1 pint).	YES	
Irrigation Water Surveys (Water Checks)	INST Outdoor	All public and private irrigators of landscapes would be eligible for free landscape water surveys upon request. Normally those with high water use would be targeted and provided a customized report. Assume 5% of large turf areas are surveyed per year. Three-year program, then repeat (3-year measure life).	YES	
Xeriscape Demonstration Gardens	SF Outdoor	Create a demonstration garden displaying living examples of low-water-usage gardens and landscaping. The utility would provide signs and brochures to educate people visiting the garden. Costs to be determined. Possibly combine with Public Information Program.	YES	
Train Landscape Maintenance Workers	MF, COM, INST Outdoor	WCWCD would sponsor training for managers and workers in landscape maintenance methods that will save irrigation water. Work with Dixie State and Utah State University Extension.	YES	

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
Real Water Loss Reduction	System	Implement an Audit and loss control on WCWCD systems. This involves auditing the system to find water loss and apply measures to find and repair leaks in the distribution system and reduce real water loss. A ten year program to reduce unaccounted for water to 10% of production or less is proposed for this measure. Program would follow AWWA established standards.	YES	
New Measures				
New Development Require New Landscape and Irrigation requirements	NEW SF, MF, COM Outdoor	Create a model ordinance that specifies that new single family and non-residential buildings be landscaped according to Xeriscape principals with appropriate plant selection and irrigation systems. Would be up to the cities to adopt and then enforce the ordinance.	NO	Most Workgroup members felt this would be hard to get through city councils and costly to enforce. Also new development is already implementing smaller yards. It was addressed that people need choices.
Turf Removal	SF, MF, COM, INST Outdoor	A \$1.50 per square foot incentive is available for removing existing turf and replacing with desert landscaping or synthetic turf. Maximum rebate of \$5,000. Average rebate of \$1,500 for SF accounts and \$2,500 for non-SF accounts. The replacement of irrigated vegetation with desert landscaping or synthetic turf may significantly reduce outdoor watering needs.	YES	Program gets proposed frequently by new residents. Workgroup felt justified to have the numbers run on this measure even though this program presents many issues, such as being very expensive, health concerns, and urban heat islands effect.

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
New Development Require Multifamily Submetering on New Accounts	New MF	Require the metering of individual units in new multifamily, condos, townhouses, mobile-home parks, and business centers (less than four stories and with water heater in the units). Utility administers meter read and bill program.	NO	Most communities are already doing this. Consider if individual impact fees apply or are waived.
Efficient Outdoor Use Education and Training Programs	SF	WCWCD would offer, organize, and sponsor a series of educational workshops for homeowners in efficient landscaping and irrigation principals. Utilize guest speakers, Xeriscape demonstration gardens, and incentives, such as a nursery plant coupon.	YES	This is already being done.
CII Surveys	CII	High water use accounts would be offered a free water survey that would evaluate ways for the business to save water and money. Assume reach top 5% of high water using accounts by end of program.	YES	
School Building Retrofit	INST	Run a program patterned after Eastern Municipal Water District (EMWD) Public School Retrofit Program wherein the school receives a grant to replace fixtures and upgrade irrigation systems. A description of EMWD's program can be found after this table.	YES	Secondary water is used on most schools.
Billing Report Educational Tool	ALL	Example: Water Smart Software with online access to customer billed consumption and customized suggestions to save water.	YES	This may be done by neighborhood.
Mobile Home Park Submetering	MF Indoor	Require or provide a partial cost rebate to meter all remaining mobile home parks that are currently master metered and not separately metered. Pattern after Santa Clara Valley Water District's (California) program. A description on Santa Clara's program can be found after this table.	YES	
High Efficiency Urinal Rebates	CII Indoor	Provide a rebate or voucher for the installation of a HEU. WaterSense standard is 0.5 gpf or less, though models flushing as low as 0.125 gpf (1 pint) are available and	YES	

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
		function well and so could be specified. Rebate amounts would reflect the incremental purchase cost.		
Install High Efficiency Fixtures in Government Buildings	CII Indoor	Provide rebates or grants to install high efficiency faucets, toilets, urinals, and showerheads in local and state government facilities.	YES	
Install or rebate high efficiency faucets	CII Indoor	Consider direct install program, rebates, or grants for installation of high efficiency sensor faucet fixtures in all or selected high-use commercial and institutional buildings.	YES	
Water Budgeting/ Monitoring	Large Landscape	Website that provides feedback on irrigation water use (budget vs. actual) modeled after Municipal Water District of Orange County's Landscape Certification Program.	YES	
Rebate or Free Rain Sensors	Outdoor ALL or Selected	Provide a rebate or free rain sensor shut-off device for existing irrigation controllers. These cancel scheduled sprinkling when sufficient rain has been received. This measure is most effective in areas with intermittent rain in peak watering seasons and in spring and fall when early or late rains occur.	NO	Not enough rain during the months that it is needed to warrant rebate. Stay with SWAT controllers.
Require Rain Sensors	Outdoor ALL or Selected	Require installation of rain sensor shut-off devices when installing new in-ground irrigation systems.	NO	Not enough rain during the months that it is needed to warrant rebate. Stay with SWAT controllers.
Gray water Retrofit SF	SF Outdoor	Provide a rebate to assist a certain percentage of single family homeowners per year to install gray water systems. Coordinate with county health department.	NO	Workgroup felt there were too many issues with this. The State

Existing or Potential New Measures			Pass?	Comments
Specific Program	Focus of Program	Measure Description		
				legalized it, but gave implementation responsibility to each public health department. No programs are established yet.
Require Plumbing for Gray Water In New SF Development	SF Outdoor	Require builders of single family homes to provide plumbing for and/or install a gray water system in new homes.	NO	Workgroup felt there were too many issues with this. The State legalized it, but gave implementation responsibility to each public health department. No programs are established yet.
Low Impact New and Remodeled Development	ALL	Cities would require developers of new and remodeled sites to follow Low Impact Development concepts/standards/Best Management Practices for storm water and water conservation benefits. Encourage or require use of bio-retention facilities, rain water cisterns, use of recycled water if available, gray water plumbing, etc.	NO	Too early for this program in this area. Could consider in the future.
Require Efficient Toilets and Urinals	ALL	Require all new development to utilize HETs (1.28 gal/flush or less) and HEUs (0.5 gal/flush or less). City and County building departments to implement through normal permitting and inspection process.	YES	

**Key to Categories**

All – All customer categories: SF, MF, and CII

System – WCWCD’s Distribution System

## Public School Retrofit Program, Riverside County, California Eastern Municipal Water District

According to their CALFED Water Use Efficiency Grant Program summary:

“In 2008 the Public School Retrofit Program (PSR Program) was launched to save water in public schools, through the installation of water efficient devices. The program was jointly funded by Eastern Municipal Water District (Eastern), the United State Bureau of Reclamation (USBR), the CALFED Bay Delta Program (CALFED) and the Metropolitan Water District of Southern California (Metropolitan) with a budget of \$670,000. The program had three goals; (1) save water, (2) encourage water use efficiency, and (3) remove barriers limiting school participation in conservation programs. The PSR Program provided the direct installation of water efficient devices at no cost to schools. Devices installed include: toilets, urinals, faucets, aerators, pre-rinse spray valves, irrigation controllers and sprinkler nozzles. The program enabled schools to participate in regional conservation programs by eliminating the need for up front funding and lengthy forms and applications. Eastern staff met with school district facility planners to communicate the goals and objectives of the PSR Program. With input from school districts, eleven eligible schools were targeted and eight schools chose to participate. Each school received a site evaluation, resulting in a list of devices to be installed. Selecting devices for installation was based on evaluation results, savings assumptions, lifespan of devices and average cost per acre-feet saved. Upon completion of the initial eight schools, the program was made available to all schools within Eastern’s service area. Eastern’s staff began education schools on the benefits of water efficient technology available to encourage participation in the program. By the end of the program 48 schools participated, receiving varying combinations of high efficiency nozzles, ET controllers, and indoor water conservation devices. This highly successful program was a visible demonstration of water use efficiency for both students and the community. Eastern’s Board of Directors recognized participating schools and provided them with banners that displayed their participation in the program and identified them as Water-Wise Schools. The PSR Program intended to retrofit eleven schools with water conserving devices, and have an estimated water savings of 79.63 acre feet per year (AFY). At the conclusion of the program, 48 schools received devices installed at no cost, with water savings estimated at 206 AFY. Eastern staff dedicated more than 300 hours to implementing the program. Staff performed landscape evaluations, shared knowledge of irrigation technology, process paperwork and prepared reports for funding partners. Schools were not required to process paperwork associated with regional conservation programs. The final cost of the program amounted to \$682,000; of which USBR with CALFED contributed \$300,000 and Metropolitan rebates amounted to \$260,000.”

More information can be found here: <http://www.usbr.gov/lc/socal/reports/PublicSchoolRetrofitRiversideCty.pdf>

**Figure B-1 CALFED Public School Retrofit Program for Riverside County, WUE Grant Program**

**CALFED WATER USE EFFICIENCY  
GRANT PROGRAM**

**PUBLIC SCHOOL RETROFIT PROGRAM**  
Riverside County, California



**Eastern Municipal Water District**  
**2270 Trumble Road**  
**P.O. Box 8300**  
**Perris, California 92570-8300**

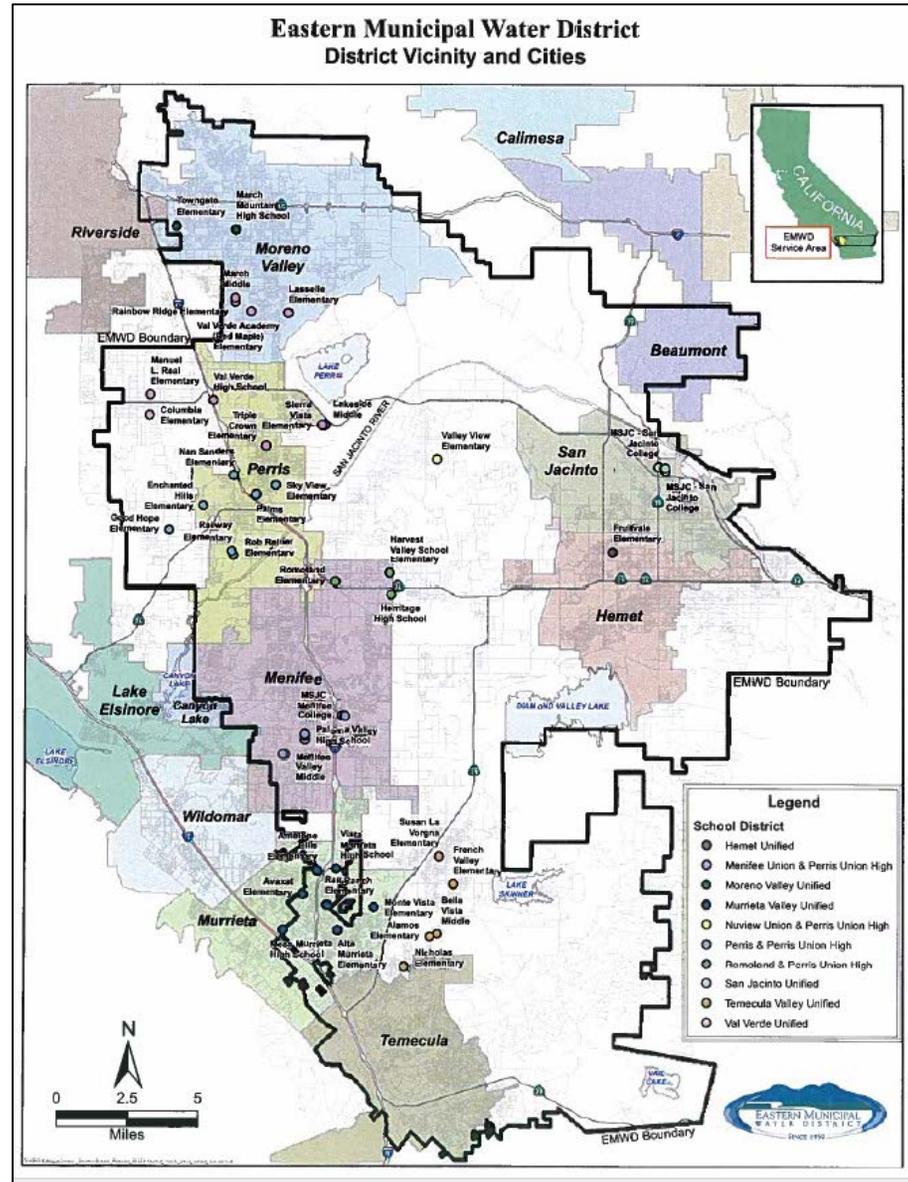
Project Manager: Helen Stratton, Conservation Analyst

**Figure B-2 CALFED Public School Retrofit Program for Riverside County, Public Campaign**



Source: <http://www.usbr.gov/lc/socal/reports/PublicSchoolRetrofitRiversideCty.pdf>

Figure B-3 CALFED Public School Retrofit Program for Riverside County, EMWD District Vicinity & Cities



Source: <http://www.usbr.gov/lc/socal/reports/PublicSchoolRetrofitRiversideCty.pdf>

## Water Submetering in Mobile Home Parks, Santa Clara Valley Water District, Water Use Efficiency Unit

As published in their August 13, 2007 report: “in 2000, the Santa Clara Valley Water District (District) began a pilot program to provide water submeters to mobile home parks in order to assist them in conserving water. In 2002, the District equipped four large mobile home parks with submeters, replacing one-meter systems in which residents in the same complex split water costs evenly, with submeters at each unit. A total of 754 submeters were installed through this program...The District provided the water submeters to the mobile home park management companies, who in turn agreed to install the submeters. Additionally, the District asked the mobile home parks to all receive an Irrigation Technical Assistance Program (ITAP) evaluation to help improve irrigation efficiency. The District also offered residents the opportunity to participate in the Water Wise House Call Program, a home water survey program that can help residents save water indoors and outdoors.”

More information can be found here: <http://www.valleywater.org/programs/submeterrebateprogram.aspx>

“It is estimated that tenants in submetered dwellings, with billing based upon actual use, reduce water use in the 10% to 20% range. This is partly due to changed habits caused by the pricing signal and partly due to the identification and repair of leaks. Tenants who are individually metered can benefit by being able to monitor and control their water use—with submetering, they only pay for what they use, not what others use. A study by the Seattle Public Utilities found that about 10% of the monitored tenants used 50% of the water; 80% of the tenants consumed water at a rate of \$15 or less per month; and 20% consumed water at a rate in excess of \$50 per month. Some tenants were found to be conducting water-intensive businesses in the units, such as laundries and photo labs.

The mobile home park management companies agreed to track water bills for the submetered complexes so that water savings could be determined. In August 2007, the property management company provided water use information for the aforementioned mobile home parks for the last 10 years (about two to three years before the submeters were installed and the years following installation up until 2007). The water usage data for the four mobile home parks examined shows an annual water savings of 15-30%. The data was analyzed and it was determined that the average water savings was 24.8 CCF or about 18,500 gallons per household per year. The data was normalized for weather and tenant occupancy. The submeters were installed during 2002 and so were not included in the pre- or post-installation water use average.”

More information can be found here: <http://www.allianceforwaterefficiency.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=4694>  
<http://www.allianceforwaterefficiency.org/submetering.aspx>

Figure B-4 Screenshot of Santa Clara Valley Water District Submeter Rebate Program Website

**Santa Clara Valley Water District**

Home Services Newsroom Business Jobs About Search GO

Font Size: A A A

**SAFE, CLEAN WATER PROGRAM**  
**CLEAN SAFE CREEKS PLAN**  
**WATER CONSERVATION**

- Rebates
  - Homes
  - Businesses
    - Commercial Washer Rebate Program
    - Commercial Rebate Program
    - **Submeter Rebate Program**
    - Commercial And Apartment High-Efficiency Toilet Program
  - Landscaping
    - Agriculture
    - Free Conservation Items
    - Events And Workshops
    - Conservation Program Reports & Studies

**GRANTS AND PARTNERSHIPS**  
**TEACHERS & STUDENTS**  
**ADOPT A CREEK**  
**FIVE-YEAR CAPITAL IMPROVEMENT PROGRAM (CIP)**  
**CREEKSIDE PROPERTY PROGRAM**  
**DAM SAFETY PROGRAM**

Programs > Water Conservation > Conservation for Business > Submeter Rebate Program

## Submeter Rebate Program

### PROGRAM UPDATE

**Receive up to \$150 per installed submeter**  
The Santa Clara Valley Water District is offering a rebate (up to **\$150** per installed submeter) to mobile home parks and condominium complexes for adding residential submeters.

**Why install water submeters?**  
Just as residents are responsible for their own electric bill, water submetering:

- makes residents responsible for their own water use.
- can help keep rents low because water costs are taken out.
- encourages residents to fix or report leaks, helping with long-term maintenance.

**How much water will my complex save?**  
In a pilot study, the District found that complexes reduce their water use by an average of 25 percent!

**Participation is easy:**

1. Applicant must contact the Santa Clara Valley Water District before the start of the project: (408) 630-2707.
2. If the site has an acre or more of irrigated landscape, schedule a landscape water-use survey with the Santa Clara Valley Water District. Surveys are provided free of charge. [Click here for more information.](#)
3. Submit a completed [Commercial Rebate Program Application](#) before the submeters are installed.
4. Confirm device qualification for reimbursement:
  - Select meters that are compliant with the Uniform Plumbing Code
  - Certify the selected equipment with the Department of Weights & Measures <http://www.sccgov.org/sites/weights/Pages/Weights-and-Measures.aspx>
  - Mobile Homes: Apply for permits with the California Department of Housing & Community Development <http://www.hcd.ca.gov/>



Overview	
Name	Smart Irrigation Controller Rebates
Abbr	2
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$150.00	\$150.00	1
MF	\$400.00	\$400.00	2
COM	\$400.00	\$400.00	2
INST	\$400.00	\$400.00	4

Administration Costs	
Markup Percentage	30%

**Description**  
Provide a 50% cost-share up to \$150 for SF and \$400 for MF, COM, INST for the purchase of a SMART irrigation controller. Require customer to have a "Water Check" and education.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show ers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishw ashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
itchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Dow n	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Comments**  
Existing program. Should test program after 10 years and continue if savings and costs are effective.

Results	
Average Water Savings (mgd)	
0.408189	
Lifetime Savings - Present Value (\$)	
Utility	\$9,919,020
Community	\$9,919,020
Lifetime Costs - Present Value (\$)	
Utility	\$1,866,884
Community	\$3,302,949
Benefit to Cost Ratio	
Utility	5.31
Community	3.00
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$278

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%
MF Irrigation	15.0%
COM Irrigation	15.0%
INST Irrigation	15.0%
SF External Leakage	10.0%
MF External Leakage	10.0%
COM External Leakage	10.0%
INST External Leakage	10.0%

Targets		
Target Method	Percentage	
% of Accts Targeted / yr	0.750%	
Only Effects New Accts	<input type="checkbox"/>	

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$119,183	\$91,679	\$210,862
2017	\$123,421	\$94,939	\$218,361
2018	\$127,811	\$98,316	\$226,127
2019	\$132,356	\$101,812	\$234,169
2020	\$137,063	\$105,433	\$242,497
2021	\$142,406	\$109,543	\$251,949
2022	\$147,957	\$113,813	\$261,769
2023	\$153,724	\$118,249	\$271,973
2024	\$159,715	\$122,858	\$282,574
2025	\$165,941	\$127,647	\$293,588
2026	\$171,352	\$131,809	\$303,161
2027	\$176,939	\$136,107	\$313,046
2028	\$182,709	\$140,545	\$323,254
2029	\$188,667	\$145,128	\$333,795
2030	\$194,819	\$149,861	\$344,679

Targets					
View:	Accounts				
	SF	MF	COM	INST	Total
2016	382	18	21	2	423
2017	395	18	22	2	438
2018	410	19	23	2	453
2019	424	20	24	2	470
2020	439	20	25	2	486
2021	456	21	26	2	505
2022	474	22	27	3	525
2023	493	23	28	3	545
2024	512	24	29	3	567
2025	532	25	30	3	589
2026	549	25	31	3	608
2027	567	26	32	3	628
2028	585	27	33	3	648
2029	604	28	34	3	669
2030	624	29	35	3	691

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.025227
2017	0.051352
2018	0.078406
2019	0.106422
2020	0.135434
2021	0.165577
2022	0.196895
2023	0.229434
2024	0.263241
2025	0.298365
2026	0.334635
2027	0.372088
2028	0.410762
2029	0.450697
2030	0.491935

Overview	
Name	Distribute Retrofit Kits
Abbr	3
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2025	Years	5
Measure Length	10	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$25.00	\$25.00	1

Administration Costs	
Markup Percentage	25%

**Description**  
Provide owners of pre-1992 homes with retrofit kits that contain easy-to-install high efficiency showerheads, faucet aerators, hose shut off nozzles, timers, and toilet tank retrofit devices.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input checked="" type="checkbox"/>				
Urinals					
Faucets	<input checked="" type="checkbox"/>				
Showers	<input checked="" type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process					
Kitchen Spray Rinse					
Internal Leakage	<input checked="" type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor					
Hotel-Motel					
Cooling					

Results	
Average Water Savings (mgd)	
0.004377	
Lifetime Savings - Present Value (\$)	
Utility	\$176,546
Community	\$499,116
Lifetime Costs - Present Value (\$)	
Utility	\$81,893
Community	\$147,407
Benefit to Cost Ratio	
Utility	2.16
Community	3.39
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,138

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	10.0%
SF Faucets	10.0%
SF Showers	10.0%
SF Internal Leakage	5.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Existing program. When distributing kits assume some people will find and fix leaks when adding retrofit kits.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$7,955	\$6,364	\$14,320
2017	\$8,238	\$6,591	\$14,829
2018	\$8,531	\$6,825	\$15,356
2019	\$8,835	\$7,068	\$15,903
2020	\$9,149	\$7,319	\$16,468
2021	\$9,506	\$7,604	\$17,110
2022	\$9,876	\$7,901	\$17,777
2023	\$10,261	\$8,209	\$18,470
2024	\$10,661	\$8,529	\$19,190
2025	\$11,077	\$8,861	\$19,938
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	SF	Total
2016	255	255
2017	264	264
2018	273	273
2019	283	283
2020	293	293
2021	304	304
2022	316	316
2023	328	328
2024	341	341
2025	354	354
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.003377
2017	0.006862
2018	0.010458
2019	0.014168
2020	0.017996
2021	0.018609
2022	0.019256
2023	0.019936
2024	0.020652
2025	0.021406
2026	0.017407
2027	0.013272
2028	0.008995
2029	0.004573
2030	0.000000

Overview	
Name	Toilet Leak Detection
Abbr	4
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2025	Years	5
Measure Length	10	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$5.00	\$25.00	1

Administration Costs	
Markup Percentage	15%

**Description**  
Distribute leak detection tablets for homeowners to test toilets for leaks; offer advice on toilet leak repair.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input checked="" type="checkbox"/>				
Urinals					
Faucets	<input type="checkbox"/>				
Showers	<input type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process					
Kitchen Spray Rinse					
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor					
Hotel-Motel					
Cooling					

Results	
Average Water Savings (mgd)	
0.002245	
Lifetime Savings - Present Value (\$)	
Utility	\$90,723
Community	\$90,723
Lifetime Costs - Present Value (\$)	
Utility	\$30,137
Community	\$161,165
Benefit to Cost Ratio	
Utility	3.01
Community	0.56
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$817

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Existing program.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$2,928	\$12,729	\$15,656
2017	\$3,032	\$13,181	\$16,213
2018	\$3,140	\$13,650	\$16,790
2019	\$3,251	\$14,136	\$17,387
2020	\$3,367	\$14,638	\$18,005
2021	\$3,498	\$15,209	\$18,707
2022	\$3,634	\$15,802	\$19,436
2023	\$3,776	\$16,418	\$20,194
2024	\$3,923	\$17,058	\$20,981
2025	\$4,076	\$17,722	\$21,799
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	SF	Total
2016	509	509
2017	527	527
2018	546	546
2019	565	565
2020	586	586
2021	608	608
2022	632	632
2023	657	657
2024	682	682
2025	709	709
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.001790
2017	0.003624
2018	0.005502
2019	0.007422
2020	0.009383
2021	0.009653
2022	0.009933
2023	0.010224
2024	0.010527
2025	0.010841
2026	0.008763
2027	0.006643
2028	0.004478
2029	0.002265
2030	0.000000

Overview	
Name	High Efficiency Toilets (HET) Rebates
Abbr	5
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2025		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$75.00	\$50.00	2
MF	\$75.00	\$50.00	5
COM	\$75.00	\$50.00	4
INST	\$75.00	\$50.00	10

Administration Costs	
Markup Percentage	25%

**Description**

Provide a \$75 rebate or voucher for the installation of a high efficiency toilet (HET) to replace year 2000 and older toilet models. HETs are defined as any toilet to flush 20% less than an ULFT and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. Program will be shorter lived as it is intended to be a market transformation measure and eventually would be stopped as 1.28 gpf units reach saturation.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show ers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishw ashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
itchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Dow n	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Comments**

Existing measure. Should test program after 10 years and continue if savings and costs are effective.

Results	
Average Water Savings (mgd)	
0.120846	
Lifetime Savings - Present Value (\$)	
Utility	\$3,142,175
Community	\$3,142,175
Lifetime Costs - Present Value (\$)	
Utility	\$997,612
Community	\$1,529,671
Benefit to Cost Ratio	
Utility	3.15
Community	2.05
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$502

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	62.8%
MF Toilets	62.8%
COM Toilets	62.8%
INST Toilets	62.8%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.750%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Utility	Customer	Total
2016	\$96,912	\$51,687	\$148,599
2017	\$100,359	\$53,525	\$153,884
2018	\$103,928	\$55,428	\$159,356
2019	\$107,624	\$57,400	\$165,024
2020	\$111,452	\$59,441	\$170,893
2021	\$115,796	\$61,758	\$177,554
2022	\$120,309	\$64,165	\$184,474
2023	\$124,999	\$66,666	\$191,665
2024	\$129,871	\$69,265	\$199,136
2025	\$134,933	\$71,964	\$206,898
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets					
View:	SF	MF	COM	INST	Total
2016	382	18	21	2	423
2017	395	18	22	2	438
2018	410	19	23	2	453
2019	424	20	24	2	470
2020	439	20	25	2	486
2021	456	21	26	2	505
2022	474	22	27	3	525
2023	493	23	28	3	545
2024	512	24	29	3	567
2025	532	25	30	3	589
2026	0	0	0	0	0
2027	0	0	0	0	0
2028	0	0	0	0	0
2029	0	0	0	0	0
2030	0	0	0	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.013317
2017	0.027004
2018	0.041046
2019	0.055427
2020	0.070133
2021	0.085132
2022	0.100458
2023	0.116100
2024	0.132047
2025	0.148291
2026	0.147146
2027	0.146016
2028	0.144901
2029	0.143801
2030	0.142716

Overview	
Name	Single Family Water Surveys
Abbr	6
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	7
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$75.00	\$10.00	1
MF	\$0.00	\$0.00	0

Administration Costs	
Markup Percentage	25%

**Description**  
Outdoor water surveys for existing single family residential customers. Normally those with high water use are targeted and provided a customized report to the homeowner on how to save water in their home.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>			
Urinals					
Faucets	<input type="checkbox"/>	<input type="checkbox"/>			
Showers	<input type="checkbox"/>	<input type="checkbox"/>			
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>			
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>			
Process					
Kitchen Spray Rinse					
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>			
Baths	<input type="checkbox"/>	<input type="checkbox"/>			
Other	<input type="checkbox"/>	<input type="checkbox"/>			
Irrigation	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Pools	<input type="checkbox"/>	<input type="checkbox"/>			
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>			
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>			
External Leakage	<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Outdoor					
Hotel-Motel					
Cooling					

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective.

Results	
Average Water Savings (mgd)	
0.174135	
Lifetime Savings - Present Value (\$)	
Utility	\$4,040,063
Community	\$4,040,063
Lifetime Costs - Present Value (\$)	
Utility	\$2,204,091
Community	\$2,439,194
Benefit to Cost Ratio	
Utility	1.83
Community	1.66
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$770

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	10.0%
SF External Leakage	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$47,733	\$5,091	\$52,824
2017	\$49,430	\$5,273	\$54,703
2018	\$51,188	\$5,460	\$56,648
2019	\$53,009	\$5,654	\$58,663
2020	\$54,894	\$5,855	\$60,749
2021	\$57,033	\$6,084	\$63,117
2022	\$59,256	\$6,321	\$65,577
2023	\$61,566	\$6,567	\$68,133
2024	\$63,966	\$6,823	\$70,789
2025	\$66,459	\$7,089	\$73,548
2026	\$68,626	\$7,320	\$75,946
2027	\$70,864	\$7,559	\$78,423
2028	\$73,175	\$7,805	\$80,980
2029	\$75,561	\$8,060	\$83,621
2030	\$78,025	\$8,323	\$86,347

Targets			
View:	Accounts		
	SF	MF	Total
2016	509	23	533
2017	527	24	552
2018	546	25	571
2019	565	26	591
2020	586	27	613
2021	608	28	636
2022	632	29	661
2023	657	30	687
2024	682	31	714
2025	709	33	742
2026	732	34	766
2027	756	35	791
2028	781	36	817
2029	806	37	843
2030	832	38	871

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.013269
2017	0.027011
2018	0.041241
2019	0.055977
2020	0.071237
2021	0.087092
2022	0.103565
2023	0.107411
2024	0.111452
2025	0.115697
2026	0.120039
2027	0.124478
2028	0.128966
2029	0.133498
2030	0.138074

Overview	
Name	Multifamily Washer Rebate
Abbr	7
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2027		
Measure Length	12		

Fixture Costs			
	Utility	Customer	Fix/Acct
MF	\$300.00	\$450.00	2

Administration Costs	
Markup Percentage	30%

**Description**

Provide a \$300 rebate to apartment complexes (5 or more units) for efficient washing machines in buildings over a certain size that has a common laundry room. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets		<input checked="" type="checkbox"/>			
Urinals					
Faucets		<input checked="" type="checkbox"/>			
Showers		<input checked="" type="checkbox"/>			
Dishwashers		<input checked="" type="checkbox"/>			
Clothes Washers		<input checked="" type="checkbox"/>			
Process					
Kitchen Spray Rinse					
Internal Leakage		<input checked="" type="checkbox"/>			
Baths		<input checked="" type="checkbox"/>			
Other		<input checked="" type="checkbox"/>			
Irrigation		<input checked="" type="checkbox"/>			
Pools		<input checked="" type="checkbox"/>			
Wash Down		<input checked="" type="checkbox"/>			
Car Washing		<input checked="" type="checkbox"/>			
External Leakage		<input checked="" type="checkbox"/>			
Outdoor					
Hotel-Motel					
Cooling					

Results	
Average Water Savings (mgd)	
0.005417	
Lifetime Savings - Present Value (\$)	
Utility	\$141,047
Community	\$515,014
Lifetime Costs - Present Value (\$)	
Utility	\$113,838
Community	\$245,189
Benefit to Cost Ratio	
Utility	1.24
Community	2.10
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,279

End Use Savings Per Replacement	
	% Savings per Account
MF Clothes Washers	62.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**

Not an existing measure. Utility cost includes inspection costs. This measure used to be offered by St. George City but is no longer being offered. Should test program after 10 years and continue if savings and costs are effective. Assume change from a 34 gallons per load machine to a 13 gallons per load.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$9,155	\$10,564	\$19,719
2017	\$9,481	\$10,939	\$20,420
2018	\$9,818	\$11,328	\$21,146
2019	\$10,167	\$11,731	\$21,899
2020	\$10,529	\$12,149	\$22,677
2021	\$10,939	\$12,622	\$23,561
2022	\$11,366	\$13,114	\$24,480
2023	\$11,809	\$13,625	\$25,434
2024	\$12,269	\$14,156	\$26,425
2025	\$12,747	\$14,708	\$27,455
2026	\$13,163	\$15,188	\$28,350
2027	\$13,592	\$15,683	\$29,275
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	MF	Total
2016	12	12
2017	12	12
2018	13	13
2019	13	13
2020	13	13
2021	14	14
2022	15	15
2023	15	15
2024	16	16
2025	16	16
2026	17	17
2027	17	17
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.000599
2017	0.001209
2018	0.001831
2019	0.002462
2020	0.003094
2021	0.003723
2022	0.004346
2023	0.004957
2024	0.005554
2025	0.006133
2026	0.006694
2027	0.007257
2028	0.007089
2029	0.006934
2030	0.006793

Overview	
Name	Public Information Program
Abbr	8
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	2
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$2.50	\$0.00	1

Administration Costs	
Markup Percentage	10%

**Description**

Public education would be used to raise awareness of other conservation measures available to customers. Programs could include school programs, poster contests, speakers to community groups, radio and television time, and printed educational material such as bill inserts, etc. Program would continue indefinitely. Combine with Xeriscape Demonstration Gardens measure: Donate or acquire a portion of public or private land to create a demonstration garden displaying living examples of low water-using gardens and landscaping. The Utility would provide signs and brochures to educate those people visiting the garden.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input checked="" type="checkbox"/>				
Urinals					
Faucets	<input checked="" type="checkbox"/>				
Showers	<input checked="" type="checkbox"/>				
Dishwashers	<input checked="" type="checkbox"/>				
Clothes Washers	<input checked="" type="checkbox"/>				
Process					
Kitchen Spray Rinse					
Internal Leakage	<input checked="" type="checkbox"/>				
Baths	<input checked="" type="checkbox"/>				
Other	<input checked="" type="checkbox"/>				
Irrigation	<input checked="" type="checkbox"/>				
Pools	<input checked="" type="checkbox"/>				
Wash Down	<input checked="" type="checkbox"/>				
Car Washing	<input checked="" type="checkbox"/>				
External Leakage	<input checked="" type="checkbox"/>				
Outdoor					
Hotel-Motel					
Cooling					

**Comments**

Existing measure.

Results	
Average Water Savings (mgd)	
0.263688	
Lifetime Savings - Present Value (\$)	
Utility	\$6,339,244
Community	\$11,280,182
Lifetime Costs - Present Value (\$)	
Utility	\$3,232,667
Community	\$3,232,667
Benefit to Cost Ratio	
Utility	1.96
Community	3.49
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$746

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	0.5%
SF Faucets	0.5%
SF Showers	0.5%
SF Dishwashers	0.5%
SF Clothes Washers	0.5%
SF Baths	0.5%
SF Internal Leakage	0.5%
SF Other	0.5%
SF Irrigation	0.5%
SF Pools	0.5%
SF Wash Down	0.5%
SF Car Washing	0.5%
SF External Leakage	0.5%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	50.000%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$70,008	\$0	\$70,008
2017	\$72,497	\$0	\$72,497
2018	\$75,076	\$0	\$75,076
2019	\$77,746	\$0	\$77,746
2020	\$80,511	\$0	\$80,511
2021	\$83,649	\$0	\$83,649
2022	\$86,909	\$0	\$86,909
2023	\$90,297	\$0	\$90,297
2024	\$93,817	\$0	\$93,817
2025	\$97,473	\$0	\$97,473
2026	\$100,652	\$0	\$100,652
2027	\$103,934	\$0	\$103,934
2028	\$107,323	\$0	\$107,323
2029	\$110,822	\$0	\$110,822
2030	\$114,436	\$0	\$114,436

Targets		
View:	Accounts	
	SF	Total
2016	25,457	25,457
2017	26,363	26,363
2018	27,300	27,300
2019	28,271	28,271
2020	29,277	29,277
2021	30,418	30,418
2022	31,603	31,603
2023	32,835	32,835
2024	34,115	34,115
2025	35,445	35,445
2026	36,601	36,601
2027	37,794	37,794
2028	39,027	39,027
2029	40,299	40,299
2030	41,613	41,613

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.066149
2017	0.134542
2018	0.139207
2019	0.144025
2020	0.148984
2021	0.154342
2022	0.160130
2023	0.166114
2024	0.172304
2025	0.178708
2026	0.184776
2027	0.190493
2028	0.196402
2029	0.202510
2030	0.208821

Overview	
Name	Conservation Pricing
Abbr	9
Category	
Measure Type	Pricing Measure

Customer Class	
Customer Class	Single Family

Time Period	
First Year	2016

Description
Existing single family water rates would be changed to create an added price incentive to use less water. Modifications could include adjusting the tiers or rates in the upper tiers to increase the incentives to reduce landscape watering. County would suggest and support a water rate study to develop specific pricing levels. Rates would be left to be decided by the individual cities.

Comments
Existing measure. Elasticity: -0.05 indoor; -0.2 outdoor. 100% market penetration by end of program.

Costs			
	Utility	Customer	Total (Community)
2016	\$10,000	\$0	\$10,000
2017	\$10,000	\$0	\$10,000
2018	\$10,000	\$0	\$10,000
2019	\$10,000	\$0	\$10,000
2020	\$10,000	\$0	\$10,000
2021	\$60,000	\$0	\$60,000
2022	\$10,000	\$0	\$10,000
2023	\$10,000	\$0	\$10,000
2024	\$10,000	\$0	\$10,000
2025	\$10,000	\$0	\$10,000
2026	\$60,000	\$0	\$60,000
2027	\$10,000	\$0	\$10,000
2028	\$10,000	\$0	\$10,000
2029	\$10,000	\$0	\$10,000
2030	\$10,000	\$0	\$10,000

Planned Rate Increases			
Add Rate Increase			
Change Year	Price Incr (%)	Price Incr Adjusting for Inflation	
2016	3.5%	1.5%	<a href="#">Delete</a>
2017	3.5%	1.5%	<a href="#">Delete</a>
2018	3.5%	1.5%	<a href="#">Delete</a>
2019	3.5%	1.5%	<a href="#">Delete</a>
2020	3.5%	1.5%	<a href="#">Delete</a>
2021	3.5%	1.5%	<a href="#">Delete</a>
2022	3.5%	1.5%	<a href="#">Delete</a>
2023	3.5%	1.5%	<a href="#">Delete</a>
2024	3.5%	1.5%	<a href="#">Delete</a>
2025	3.5%	1.5%	<a href="#">Delete</a>
2026	3.5%	1.5%	<a href="#">Delete</a>
2027	3.5%	1.5%	<a href="#">Delete</a>
2028	3.5%	1.5%	<a href="#">Delete</a>
2029	3.5%	1.5%	<a href="#">Delete</a>
2030	3.5%	1.5%	<a href="#">Delete</a>
2031	3.5%	1.5%	<a href="#">Delete</a>
2032	3.5%	1.5%	<a href="#">Delete</a>
2033	3.5%	1.5%	<a href="#">Delete</a>
2034	3.5%	1.5%	<a href="#">Delete</a>
2035	3.5%	1.5%	<a href="#">Delete</a>
2036	3.5%	1.5%	<a href="#">Delete</a>
2037	3.5%	1.5%	<a href="#">Delete</a>
2038	3.5%	1.5%	<a href="#">Delete</a>
2039	3.5%	1.5%	<a href="#">Delete</a>
2040	3.5%	1.5%	<a href="#">Delete</a>

Projected Price Index		
	Price Index	Cummulative Index Increase
2016	1.0	0%
2017	1.0	2%
2018	1.0	4%
2019	1.1	6%
2020	1.1	8%
2021	1.1	10%
2022	1.1	13%
2023	1.1	15%
2024	1.2	17%
2025	1.2	20%
2026	1.2	22%
2027	1.2	24%
2028	1.3	27%
2029	1.3	29%
2030	1.3	32%

Results	
Average Water Savings (mgd)	
2.132162	
Lifetime Savings - Present Value (\$)	
Utility	\$3,152,072
Community	\$3,152,073
Lifetime Costs - Present Value (\$)	
Utility	\$469,440
Community	\$469,440
Benefit to Cost Ratio	
Utility	6.71
Community	6.71
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$13

Price Elasticity		
Overall	Indoor	Outdoor
-0.14	-0.05	-0.20

Utility Costs	
Rate Study Cost	\$50,000
Rate Study Frequency (every # yrs)	5
First Year of Rate Study	2021
Annual Maintenance Cost	\$10,000

Consumer Price Index	
First Year Index	1.0
Annual Increase	2%

Water Savings	
	Total Savings (mgd)
2016	0.055565
2017	0.113080
2018	0.172607
2019	0.234213
2020	0.297963
2021	0.364137
2022	0.432819
2023	0.504098
2024	0.578067
2025	0.654820
2026	0.733980
2027	0.815628
2028	0.899845
2029	0.986717
2030	1.076329

Overview	
Name	Rotating Sprinkler Nozzle Rebates
Abbr	10
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$7.50	\$1.50	20
MF	\$7.50	\$1.50	30
COM	\$7.50	\$1.50	50
INST	\$7.50	\$4.50	50

Administration Costs	
Markup Percentage	10%

**Description**  
Offer a rebate of up to \$500 total for all irrigation incentives including rotating nozzles for SF, MF, and COM properties. 50% rebate for INST. Work with irrigation supply companies to promote.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input checked="" type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input checked="" type="checkbox"/>				
Urinals	<input checked="" type="checkbox"/>				
Faucets	<input checked="" type="checkbox"/>				
Show ers	<input checked="" type="checkbox"/>				
Dishw ashers	<input checked="" type="checkbox"/>				
Clothes Washers	<input checked="" type="checkbox"/>				
Process	<input checked="" type="checkbox"/>				
itchen Spray Rinse	<input checked="" type="checkbox"/>				
Internal Leakage	<input checked="" type="checkbox"/>				
Baths	<input checked="" type="checkbox"/>				
Other	<input checked="" type="checkbox"/>				
Irrigation	<input checked="" type="checkbox"/>				
Pools	<input checked="" type="checkbox"/>				
Wash Down	<input checked="" type="checkbox"/>				
Car Washing	<input checked="" type="checkbox"/>				
External Leakage	<input checked="" type="checkbox"/>				
Outdoor	<input checked="" type="checkbox"/>				
Hotel-Motel	<input checked="" type="checkbox"/>				
Cooling	<input checked="" type="checkbox"/>				

Results	
Average Water Savings (mgd)	
0.259536	
Lifetime Savings - Present Value (\$)	
Utility	\$6,306,738
Community	\$6,306,738
Lifetime Costs - Present Value (\$)	
Utility	\$1,206,255
Community	\$1,430,311
Benefit to Cost Ratio	
Utility	5.23
Community	4.41
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$283

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	10.0%
MF Irrigation	10.0%
COM Irrigation	10.0%
INST Irrigation	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.750%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$77,008	\$14,304	\$91,312
2017	\$79,747	\$14,813	\$94,559
2018	\$82,583	\$15,339	\$97,922
2019	\$85,520	\$15,885	\$101,405
2020	\$88,561	\$16,450	\$105,011
2021	\$92,013	\$17,091	\$109,104
2022	\$95,600	\$17,757	\$113,357
2023	\$99,326	\$18,449	\$117,775
2024	\$103,197	\$19,168	\$122,366
2025	\$107,220	\$19,916	\$127,135
2026	\$110,716	\$20,565	\$131,281
2027	\$114,326	\$21,236	\$135,562
2028	\$118,054	\$21,928	\$139,982
2029	\$121,904	\$22,643	\$144,547
2030	\$125,879	\$23,381	\$149,260

Targets					
View:	Accounts				
	SF	MF	COM	INST	Total
2016	382	18	21	2	423
2017	395	18	22	2	438
2018	410	19	23	2	453
2019	424	20	24	2	470
2020	439	20	25	2	486
2021	456	21	26	2	505
2022	474	22	27	3	525
2023	493	23	28	3	545
2024	512	24	29	3	567
2025	532	25	30	3	589
2026	549	25	31	3	608
2027	567	26	32	3	628
2028	585	27	33	3	648
2029	604	28	34	3	669
2030	624	29	35	3	691

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.016040
2017	0.032651
2018	0.049852
2019	0.067665
2020	0.086112
2021	0.105278
2022	0.125190
2023	0.145879
2024	0.167374
2025	0.189707
2026	0.212769
2027	0.236582
2028	0.261172
2029	0.286564
2030	0.312783

Overview	
Name	CII Rebates to Replace Inefficient
Abbr	11
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$5,000.00	\$2,500.00	1
INST	\$5,000.00	\$2,500.00	1

Administration Costs	
Markup Percentage	30%

**Description**  
Provide 50% cost share for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replace once through cooling, and add conductivity meters on cooling towers.

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.250%
Only Effects New Accts	<input type="checkbox"/>

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets			<input type="checkbox"/>	<input type="checkbox"/>	
Urinals			<input type="checkbox"/>	<input type="checkbox"/>	
Faucets			<input type="checkbox"/>	<input type="checkbox"/>	
Showers			<input type="checkbox"/>	<input type="checkbox"/>	
Dishwashers			<input type="checkbox"/>	<input type="checkbox"/>	
Clothes Washers			<input type="checkbox"/>	<input type="checkbox"/>	
Process			<input type="checkbox"/>	<input type="checkbox"/>	
Kitchen Spray Rinse			<input type="checkbox"/>	<input type="checkbox"/>	
Internal Leakage			<input type="checkbox"/>	<input type="checkbox"/>	
Baths			<input type="checkbox"/>	<input type="checkbox"/>	
Other			<input type="checkbox"/>	<input type="checkbox"/>	
Irrigation			<input type="checkbox"/>	<input type="checkbox"/>	
Pools			<input type="checkbox"/>	<input type="checkbox"/>	
Wash Down			<input type="checkbox"/>	<input type="checkbox"/>	
Car Washing			<input type="checkbox"/>	<input type="checkbox"/>	
External Leakage			<input type="checkbox"/>	<input type="checkbox"/>	
Outdoor			<input type="checkbox"/>	<input type="checkbox"/>	
Hotel-Motel			<input type="checkbox"/>	<input type="checkbox"/>	
Cooling			<input type="checkbox"/>	<input type="checkbox"/>	

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective. Patterned after San Diego County Water Authority or Seattle Water Department programs. Assume 15% market saturation. Assume average rebate of \$5,000.

Utility	
Community	
Utility	
Community	
Utility	
Community	
Utility	

Savings	
COM Toilets	15.0%
COM Urinals	15.0%
COM Faucets	15.0%
COM Showers	15.0%
COM Dishwashers	15.0%
COM Process	15.0%
COM Kitchen Spray Rinse	15.0%
COM Internal Leakage	15.0%
INST Toilets	15.0%
INST Urinals	15.0%
INST Faucets	15.0%
INST Showers	15.0%
INST Dishwashers	15.0%
INST Internal Leakage	15.0%
INST Other	15.0%
COM Hotel-Motel	15.0%
COM Clothes Washers	15.0%
INST Clothes Washers	15.0%
INST Kitchen Spray Rinse	15.0%
COM Cooling	15.0%
INST Cooling	15.0%

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$50,652	\$19,481	\$70,133
2017	\$52,453	\$20,174	\$72,628
2018	\$54,319	\$20,892	\$75,211
2019	\$56,251	\$21,635	\$77,885
2020	\$58,251	\$22,404	\$80,655
2021	\$60,522	\$23,278	\$83,799
2022	\$62,881	\$24,185	\$87,065
2023	\$65,332	\$25,128	\$90,459
2024	\$67,878	\$26,107	\$93,985
2025	\$70,524	\$27,125	\$97,648
2026	\$72,823	\$28,009	\$100,832
2027	\$75,198	\$28,922	\$104,120
2028	\$77,650	\$29,865	\$107,516
2029	\$80,182	\$30,839	\$111,021
2030	\$82,797	\$31,845	\$114,642

Targets			
View:	Accounts		
	COM	INST	Total
2016	7	1	8
2017	7	1	8
2018	8	1	8
2019	8	1	9
2020	8	1	9
2021	9	1	9
2022	9	1	10
2023	9	1	10
2024	10	1	10
2025	10	1	11
2026	10	1	11
2027	11	1	12
2028	11	1	12
2029	11	1	12
2030	12	1	13

Targets	
	Total Savings (mgd)
2016	0.002732
2017	0.005560
2018	0.008488
2019	0.011516
2020	0.014648
2021	0.017892
2022	0.021254
2023	0.024737
2024	0.028346
2025	0.032084
2026	0.035952
2027	0.039938
2028	0.044046
2029	0.048280
2030	0.052643

Overview	
Name	Replace Spray Nozzles
Abbr	12
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2020		
Measure Length	5		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$150.00	\$0.00	1

Administration Costs	
Markup Percentage	25%

**Description**  
Provide free installation of 1.15 gpm spray nozzles for the rinse and clean operation in restaurants and other commercial kitchens. Current federal standard is a 1.6 gpm valve.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$2,670	\$0	\$2,670
2017	\$2,765	\$0	\$2,765
2018	\$2,864	\$0	\$2,864
2019	\$2,965	\$0	\$2,965
2020	\$3,071	\$0	\$3,071
2021	\$0	\$0	\$0
2022	\$0	\$0	\$0
2023	\$0	\$0	\$0
2024	\$0	\$0	\$0
2025	\$0	\$0	\$0
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Customer Classes					
	SF	MF	COM	INST	2ndUse
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUse
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Showers	<input type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
Kitchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

Targets		
View:	Accounts	
	COM	Total
2016	14	14
2017	15	15
2018	15	15
2019	16	16
2020	16	16
2021	0	0
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Results	
Average Water Savings (mgd)	
0.003209	
Lifetime Savings - Present Value (\$)	
Utility	\$85,151
Community	\$548,565
Lifetime Costs - Present Value (\$)	
Utility	\$13,494
Community	\$13,494
Benefit to Cost Ratio	
Utility	6.31
Community	40.65
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$256

End Use Savings Per Replacement	
	% Savings per Account
COM Kitchen Spray Rinse	54.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective. Assume 54% water savings based on replacing a 2.5 gpm valve with a 1.15 gpm valve.

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.000627
2017	0.001275
2018	0.001947
2019	0.002643
2020	0.003363
2021	0.003363
2022	0.003363
2023	0.003363
2024	0.003363
2025	0.003363
2026	0.003363
2027	0.003363
2028	0.003363
2029	0.003363
2030	0.003363

Overview	
Name	High Efficiency Urinal Rebate (
Abbr	13
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2025		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$200.00	\$200.00	10
INST	\$200.00	\$200.00	10

Administration Costs	
Markup Percentage	25%

**Description**  
Provide a rebate of \$200 for high efficiency urinals to High Efficiency existing high use CII customers (such as restaurants). Eligible replacements would include urinals flushing with no more than 0.5 gpf and best available technology.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Showers	<input type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
Kitchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

Results	
Average Water Savings (mgd)	
0.004056	
Lifetime Savings - Present Value (\$)	
Utility	\$106,156
Community	\$106,156
Lifetime Costs - Present Value (\$)	
Utility	\$401,084
Community	\$721,951
Benefit to Cost Ratio	
Utility	0.26
Community	0.15
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$6,016

End Use Savings Per Replacement	
	% Savings per Account
COM Urinals	50.0%
INST Urinals	50.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$38,963	\$31,170	\$70,133
2017	\$40,349	\$32,279	\$72,628
2018	\$41,784	\$33,427	\$75,211
2019	\$43,270	\$34,616	\$77,885
2020	\$44,808	\$35,847	\$80,655
2021	\$46,555	\$37,244	\$83,799
2022	\$48,370	\$38,696	\$87,065
2023	\$50,255	\$40,204	\$90,459
2024	\$52,214	\$41,771	\$93,985
2025	\$54,249	\$43,399	\$97,648
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets			
View:	Accounts		
	COM	INST	Total
2016	14	1	16
2017	15	1	16
2018	15	1	17
2019	16	1	17
2020	16	2	18
2021	17	2	19
2022	18	2	19
2023	18	2	20
2024	19	2	21
2025	20	2	22
2026	0	0	0
2027	0	0	0
2028	0	0	0
2029	0	0	0
2030	0	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.000461
2017	0.000937
2018	0.001426
2019	0.001928
2020	0.002439
2021	0.002956
2022	0.003482
2023	0.004013
2024	0.004551
2025	0.005094
2026	0.005047
2027	0.004999
2028	0.004951
2029	0.004902
2030	0.004853

Overview	
Name	Irrigation Water Surveys (Water)
Abbr	14
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	3
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
INST	\$1,500.00	\$1,000.00	1

Administration Costs	
Markup Percentage	30%

**Description**  
 All public and private irrigators of landscapes would be eligible for free landscape water surveys upon request. Normally those with high water use would be targeted and provided a customized report. Assume 10 percent of large turf areas are surveyed per year.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results	
Average Water Savings (mgd)	
0.030775	
Lifetime Savings - Present Value (\$)	
Utility	\$731,610
Community	\$731,610
Lifetime Costs - Present Value (\$)	
Utility	\$484,054
Community	\$732,287
Benefit to Cost Ratio	
Utility	1.51
Community	1.00
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$957

End Use Savings Per Replacement	
	% Savings per Account
INST Irrigation	15.0%
INST External Leakage	15.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	2.000%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
 Not an existing measure. Should test program after 10 years and continue if savings and costs are effective.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$10,483	\$5,376	\$15,859
2017	\$10,856	\$5,567	\$16,423
2018	\$11,242	\$5,765	\$17,007
2019	\$11,642	\$5,970	\$17,612
2020	\$12,056	\$6,182	\$18,238
2021	\$12,525	\$6,423	\$18,949
2022	\$13,014	\$6,674	\$19,687
2023	\$13,521	\$6,934	\$20,455
2024	\$14,048	\$7,204	\$21,252
2025	\$14,595	\$7,485	\$22,080
2026	\$15,071	\$7,729	\$22,800
2027	\$15,563	\$7,981	\$23,544
2028	\$16,070	\$8,241	\$24,312
2029	\$16,594	\$8,510	\$25,104
2030	\$17,135	\$8,787	\$25,923

Targets		
View:	Accounts	
	INST	Total
2016	5	5
2017	6	6
2018	6	6
2019	6	6
2020	6	6
2021	6	6
2022	7	7
2023	7	7
2024	7	7
2025	7	7
2026	8	8
2027	8	8
2028	8	8
2029	9	9
2030	9	9

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.005084
2017	0.010349
2018	0.015801
2019	0.016363
2020	0.016945
2021	0.017567
2022	0.018233
2023	0.018943
2024	0.019682
2025	0.020449
2026	0.021201
2027	0.021936
2028	0.022651
2029	0.023390
2030	0.024152

Overview	
Name	Xeriscape Demonstration Gard
Abbr	15
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	10
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$900.00	\$2,000.00	1

Administration Costs	
Markup Percentage	10%

**Description**  
 Donate or acquire a portion of public or private land to create a demonstration garden displaying living examples of low water-using gardens and landscaping. The Utility would provide signs and brochures to educate those people visiting the garden.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results	
Average Water Savings (mgd)	
0.088543	
Lifetime Savings - Present Value (\$)	
Utility	\$2,019,370
Community	\$2,019,370
Lifetime Costs - Present Value (\$)	
Utility	\$2,327,520
Community	\$7,029,581
Benefit to Cost Ratio	
Utility	0.87
Community	0.29
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,599

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	40.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.100%
Only Effects New Accts	<input type="checkbox"/>

**Comments**

Existing measure. Two gardens completed. Possibly combine with Public Information Program. The goal of our garden is to encourage large-scale replacement of traditional landscaping with xeriscaping or the xeriscaping of new homes. The utility cost of \$900 represents a \$1M capital cost for garden plus \$75k per year O&M over 45 years, with a total of 4,800 participants over 45 years. The customer cost of \$2,000 represents the landscape follow-up work.  
 The savings per account irrigation of 40% is based on replacing turf with xeriscape. Accounts targeted per year = 0.1%.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$50,406	\$101,829	\$152,235
2017	\$52,198	\$105,451	\$157,649
2018	\$54,055	\$109,201	\$163,256
2019	\$55,977	\$113,085	\$169,062
2020	\$57,968	\$117,107	\$175,074
2021	\$60,227	\$121,671	\$181,898
2022	\$62,575	\$126,414	\$188,989
2023	\$65,014	\$131,341	\$196,355
2024	\$67,548	\$136,461	\$204,008
2025	\$70,181	\$141,779	\$211,960
2026	\$72,469	\$146,403	\$218,872
2027	\$74,832	\$151,177	\$226,009
2028	\$77,272	\$156,106	\$233,379
2029	\$79,792	\$161,196	\$240,989
2030	\$82,394	\$166,453	\$248,847

Targets		
View:	Accounts	
	SF	Total
2016	51	51
2017	53	53
2018	55	55
2019	57	57
2020	59	59
2021	61	61
2022	63	63
2023	66	66
2024	68	68
2025	71	71
2026	73	73
2027	76	76
2028	78	78
2029	81	81
2030	83	83

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.004996
2017	0.010169
2018	0.015526
2019	0.021074
2020	0.026819
2021	0.032788
2022	0.038989
2023	0.045433
2024	0.052127
2025	0.059082
2026	0.061269
2027	0.063512
2028	0.065813
2029	0.068174
2030	0.070595

Overview	
Name	Train Landscape Maintenance
Abbr	16
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	5
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
MF	\$100.00	\$500.00	1
COM	\$100.00	\$500.00	1
INST	\$100.00	\$500.00	1

Administration Costs	
Markup Percentage	30%

**Description**  
 Utility would sponsor training for managers and workers in landscape maintenance methods that will save irrigation water. Work with USU Extension. QWEL program certification.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Showers	<input type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
Kitchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

**Comments**  
 Existing measure. Should test program after 10 years and continue if savings and costs are effective. Educate 50% of contractors over 5 years.

Results	
Average Water Savings (mgd)	
0.025408	
Lifetime Savings - Present Value (\$)	
Utility	\$596,596
Community	\$596,596
Lifetime Costs - Present Value (\$)	
Utility	\$164,014
Community	\$794,838
Benefit to Cost Ratio	
Utility	3.64
Community	0.75
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$393

End Use Savings Per Replacement	
	% Savings per Account
MF Irrigation	5.0%
COM Irrigation	5.0%
INST Irrigation	5.0%
MF External Leakage	10.0%
COM External Leakage	10.0%
INST External Leakage	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$3,552	\$13,661	\$17,213
2017	\$3,678	\$14,147	\$17,825
2018	\$3,809	\$14,650	\$18,459
2019	\$3,945	\$15,171	\$19,116
2020	\$4,085	\$15,711	\$19,796
2021	\$4,244	\$16,323	\$20,567
2022	\$4,409	\$16,960	\$21,369
2023	\$4,581	\$17,621	\$22,202
2024	\$4,760	\$18,307	\$23,067
2025	\$4,945	\$19,021	\$23,966
2026	\$5,107	\$19,641	\$24,748
2027	\$5,273	\$20,282	\$25,555
2028	\$5,445	\$20,943	\$26,388
2029	\$5,623	\$21,626	\$27,249
2030	\$5,806	\$22,331	\$28,137

Targets				
View:	Accounts			
	MF	COM	INST	Total
2016	12	14	1	27
2017	12	15	1	28
2018	13	15	1	29
2019	13	16	1	30
2020	13	16	2	31
2021	14	17	2	33
2022	15	18	2	34
2023	15	18	2	35
2024	16	19	2	37
2025	16	20	2	38
2026	17	20	2	39
2027	17	21	2	41
2028	18	22	2	42
2029	19	23	2	43
2030	19	23	2	45

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.002612
2017	0.005318
2018	0.008119
2019	0.011020
2020	0.014024
2021	0.014533
2022	0.015071
2023	0.015639
2024	0.016239
2025	0.016872
2026	0.017506
2027	0.018142
2028	0.018777
2029	0.019411
2030	0.020044

Overview	
Name	Real Water Loss Reduction
Abbr	17
Category	
Measure Type	Water Loss Measure

Time Period	
First Year	2016

Backlog Costs	
Total Backlog Work Costs	\$2,921,667
Years to Complete Backlog	10

Maintenance Costs	
Annual Maintenance Costs	\$275,000

Target	
Total GPCD Reduction	6.3

Description
Measure covers efforts to find and repair leaks in the distribution system to reduce real water loss and take other actions (such as meter replacement) to reduce apparent water losses thereby improving the system water balance. A ten year program to reduce unaccounted for water to 10 percent of production or less is proposed for this measure. Actions could include installation of data loggers and proactive leak detection; accelerated meter replacement could be done over 10 years. Leak repairs would be handled by existing crews at no extra cost. Specific goals and methods to be developed by Utility Operations Department.

Results	
Average Water Savings (mgd)	
2.133287	
Lifetime Savings - Present Value (\$)	
Utility	\$48,857,485
Community	\$48,857,485
Lifetime Costs - Present Value (\$)	
Utility	\$7,084,477
Community	\$7,084,477
Benefit to Cost Ratio	
Utility	6.90
Community	6.90
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$202

Comments
Existing measure.

Costs	
	Utility
2016	\$292,167
2017	\$292,167
2018	\$292,167
2019	\$292,167
2020	\$292,167
2021	\$292,167
2022	\$292,167
2023	\$292,167
2024	\$292,167
2025	\$292,167
2026	\$275,000
2027	\$275,000
2028	\$275,000
2029	\$275,000
2030	\$275,000

Targets	
	Projected NRW Percent
2016	9.8%
2017	9.6%
2018	9.4%
2019	9.2%
2020	9.0%
2021	8.8%
2022	8.6%
2023	8.4%
2024	8.2%
2025	8.0%
2026	8.0%
2027	8.0%
2028	8.0%
2029	8.0%
2030	8.0%

Water Savings	
	Total Savings
2016	0.107633
2017	0.222922
2018	0.346276
2019	0.478121
2020	0.618907
2021	0.771637
2022	0.935332
2023	1.110617
2024	1.298145
2025	1.498605
2026	1.547471
2027	1.597931
2028	1.650036
2029	1.703840
2030	1.759399

Overview	
Name	Turf Removal
Abbr	18
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$1,500.00	\$1,500.00	1
MF	\$2,500.00	\$2,500.00	1
COM	\$2,500.00	\$2,500.00	1
INST	\$2,500.00	\$2,500.00	1

Administration Costs	
Markup Percentage	30%

**Description**  
 A \$1.50 per square foot incentive is available for removing existing turf and replacing with desert landscaping or synthetic turf. Maximum rebate of \$5,000. Average rebate of \$1,500 for SF accounts and \$2,500 for Non-SF accounts. The replacement of irrigated vegetation with desert landscaping or synthetic turf may significantly reduce outdoor watering needs.

Customer Classes				
	SF	MF	COM	INST
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

End Uses				
	SF	MF	COM	INST
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Show ers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishw ashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Comments**

Results	
Average Water Savings (mgd)	
0.346048	
Lifetime Savings - Present Value (\$)	
Utility	\$8,408,983
Community	\$8,408,983
Lifetime Costs - Present Value (\$)	
Utility	\$4,583,437
Community	\$8,109,157
Benefit to Cost Ratio	
Utility	1.83
Community	1.04
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$806

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	40.0%
MF Irrigation	40.0%
COM Irrigation	40.0%
INST Irrigation	40.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.250%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$292,608	\$225,083	\$517,692
2017	\$303,015	\$233,088	\$536,103
2018	\$313,791	\$241,378	\$555,169
2019	\$324,951	\$249,962	\$574,914
2020	\$336,508	\$258,852	\$595,360
2021	\$349,624	\$268,942	\$618,566
2022	\$363,252	\$279,425	\$642,677
2023	\$377,411	\$290,316	\$667,727
2024	\$392,122	\$301,632	\$693,754
2025	\$407,406	\$313,389	\$720,795
2026	\$420,690	\$323,608	\$744,298
2027	\$434,408	\$334,160	\$768,568
2028	\$448,573	\$345,056	\$793,630
2029	\$463,200	\$356,308	\$819,508
2030	\$478,304	\$367,926	\$846,231

Targets					
View:	Accounts				
	SF	MF	COM	INST	Total
2016	127	6	7	1	141
2017	132	6	7	1	146
2018	137	6	8	1	151
2019	141	7	8	1	157
2020	146	7	8	1	162
2021	152	7	9	1	168
2022	158	7	9	1	175
2023	164	8	9	1	182
2024	171	8	10	1	189
2025	177	8	10	1	196
2026	183	8	10	1	203
2027	189	9	11	1	209
2028	195	9	11	1	216
2029	201	9	11	1	223
2030	208	10	12	1	230

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.021387
2017	0.043534
2018	0.066470
2019	0.090220
2020	0.114816
2021	0.140370
2022	0.166920
2023	0.194505
2024	0.223166
2025	0.252943
2026	0.283692
2027	0.315443
2028	0.348229
2029	0.382085
2030	0.417044

Overview	
Name	Washer Rebates for High Effici
Abbr	19
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2027		
Measure Length	12		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$200.00	\$550.00	1

Administration Costs	
Markup Percentage	30%

**Description**  
Homeowners would be eligible to receive a rebate on a new water efficient clothes washer. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results	
Average Water Savings (mgd)	
0.036525	
Lifetime Savings - Present Value (\$)	
Utility	\$950,978
Community	\$3,472,380
Lifetime Costs - Present Value (\$)	
Utility	\$823,006
Community	\$2,563,982
Benefit to Cost Ratio	
Utility	1.16
Community	1.35
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,371

End Use Savings Per Replacement	
	% Savings per Account
SF Clothes Washers	62.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**  
Not an existing measure. Utility cost includes inspection costs. This measure used to be offered by St. George City but is no longer being offered. Should test program after 10 years and continue if savings and costs are effective. Assume change from a 34 gallons per load machine to a 13 gallons per load.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$66,189	\$140,015	\$206,205
2017	\$68,543	\$144,995	\$213,538
2018	\$70,981	\$150,152	\$221,132
2019	\$73,505	\$155,492	\$228,997
2020	\$76,119	\$161,022	\$237,141
2021	\$79,086	\$167,298	\$246,384
2022	\$82,169	\$173,819	\$255,988
2023	\$85,372	\$180,594	\$265,966
2024	\$88,699	\$187,633	\$276,333
2025	\$92,157	\$194,947	\$287,103
2026	\$95,162	\$201,304	\$296,465
2027	\$98,265	\$207,868	\$306,132
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	SF	Total
2016	255	255
2017	264	264
2018	273	273
2019	283	283
2020	293	293
2021	304	304
2022	316	316
2023	328	328
2024	341	341
2025	354	354
2026	366	366
2027	378	378
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.004036
2017	0.008153
2018	0.012344
2019	0.016601
2020	0.020863
2021	0.025105
2022	0.029301
2023	0.033424
2024	0.037449
2025	0.041352
2026	0.045134
2027	0.048932
2028	0.047793
2029	0.046754
2030	0.045802

Overview	
Name	CII Surveys
Abbr	20
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$2,000.00	\$2,000.00	1
INST	\$2,000.00	\$2,000.00	1

Administration Costs	
Markup Percentage	25%

**Description**  
High water use accounts would be offered a free water survey that would evaluate ways for the business to save water and money.

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Customer Classes					
	SF	M/F	COM	INST	2ndUs
	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	M/F	COM	INST	2ndUs
Toilets			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Urinals			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Faucets			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Showers			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Dishwashers			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Clothes Washers			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Process			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Kitchen Spray Rinse			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Internal Leakage			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Baths					
Other				<input checked="" type="checkbox"/>	
Irrigation			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Pools				<input checked="" type="checkbox"/>	
Wash Down					
Car Washing					
External Leakage			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Outdoor					
Hotel-Motel			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Cooling			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

**Comments**  
Existing measure. Should test program after 10 years and continue if savings and costs are effective.

Results	
Average Water Savings (mgd)	
0.126720	
Lifetime Savings - Present Value (\$)	
Utility	\$3,082,987
Community	\$5,447,304
Lifetime Costs - Present Value (\$)	
Utility	\$610,318
Community	\$1,098,573
Benefit to Cost Ratio	
Utility	5.05
Community	4.96
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$293

End Use Savings Per Replacement	
	% Savings per Account
COM Toilets	10.0%
COM Urinals	10.0%
COM Faucets	10.0%
COM Showers	10.0%
COM Dishwashers	10.0%
COM Process	10.0%
COM Kitchen Spray Rinse	10.0%
COM Internal Leakage	10.0%
COM External Leakage	10.0%
INST Toilets	10.0%
INST Urinals	10.0%
INST Faucets	10.0%
INST Showers	10.0%
INST Dishwashers	10.0%
INST Internal Leakage	10.0%
INST Other	10.0%
INST External Leakage	10.0%
COM Irrigation	10.0%
INST Irrigation	10.0%
COM Hotel-Motel	10.0%
COM Clothes Washers	10.0%
INST Clothes Washers	10.0%
INST Kitchen Spray Rinse	10.0%
INST Pools	10.0%
COM Cooling	10.0%
INST Cooling	10.0%

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$38,963	\$31,170	\$70,133
2017	\$40,349	\$32,279	\$72,628
2018	\$41,784	\$33,427	\$75,211
2019	\$43,270	\$34,616	\$77,885
2020	\$44,808	\$35,847	\$80,655
2021	\$46,555	\$37,244	\$83,799
2022	\$48,370	\$38,696	\$87,065
2023	\$50,255	\$40,204	\$90,459
2024	\$52,214	\$41,771	\$93,985
2025	\$54,249	\$43,399	\$97,648
2026	\$56,018	\$44,814	\$100,832
2027	\$57,845	\$46,276	\$104,120
2028	\$59,731	\$47,785	\$107,516
2029	\$61,679	\$49,343	\$111,021
2030	\$63,690	\$50,952	\$114,642

Targets			
View:	Accounts		
	COM	INST	Total
2016	14	1	16
2017	15	1	16
2018	15	1	17
2019	16	1	17
2020	16	2	18
2021	17	2	19
2022	18	2	19
2023	18	2	20
2024	19	2	21
2025	20	2	22
2026	20	2	22
2027	21	2	23
2028	22	2	24
2029	23	2	25
2030	23	2	25

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.007901
2017	0.016082
2018	0.024553
2019	0.033320
2020	0.042393
2021	0.051806
2022	0.061576
2023	0.071713
2024	0.082232
2025	0.093145
2026	0.104425
2027	0.116062
2028	0.128068
2029	0.140454
2030	0.153233

Overview	
Name	School Building Retrofit
Abbr	21
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2025		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
INST	\$5,000.00	\$10,000.00	1

Administration Costs	
Markup Percentage	30%

Description
School receives a grant to replace fixtures and upgrade irrigation systems.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets				<input type="checkbox"/>	
Urinals				<input type="checkbox"/>	
Faucets				<input type="checkbox"/>	
Showers				<input type="checkbox"/>	
Dishwashers				<input type="checkbox"/>	
Clothes Washers				<input type="checkbox"/>	
Process					
Kitchen Spray Rinse				<input type="checkbox"/>	
Internal Leakage				<input type="checkbox"/>	
Baths					
Other				<input type="checkbox"/>	
Irrigation				<input type="checkbox"/>	
Pools				<input type="checkbox"/>	
Wash Down					
Car Washing					
External Leakage				<input type="checkbox"/>	
Outdoor					
Hotel-Motel					
Cooling				<input type="checkbox"/>	

Comments
Patterned after MWD of Southern California's school retrofit program. Should test program after 10 years and continue if savings and costs are effective. Do one older school/yr; 10 total.

Results	
Average Water Savings (mgd)	
0.025822	
Lifetime Savings - Present Value (\$)	
Utility	\$655,303
Community	\$1,104,664
Lifetime Costs - Present Value (\$)	
Utility	\$53,955
Community	\$136,963
Benefit to Cost Ratio	
Utility	12.15
Community	8.07
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$127

End Use Savings Per Replacement	
	% Savings per Account
INST Toilets	25.0%
INST Urinals	25.0%
INST Faucets	25.0%
INST Showers	25.0%
INST Dishwashers	25.0%
INST Internal Leakage	25.0%
INST Other	25.0%
INST Irrigation	25.0%
INST External Leakage	25.0%
INST Clothes Washers	25.0%
INST Kitchen Spray Rinse	25.0%
INST Pools	25.0%
INST Cooling	25.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.300%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$5,241	\$8,064	\$13,305
2017	\$5,428	\$8,350	\$13,778
2018	\$5,621	\$8,647	\$14,268
2019	\$5,821	\$8,955	\$14,776
2020	\$6,028	\$9,273	\$15,301
2021	\$6,263	\$9,635	\$15,898
2022	\$6,507	\$10,011	\$16,517
2023	\$6,760	\$10,401	\$17,161
2024	\$7,024	\$10,806	\$17,830
2025	\$7,298	\$11,227	\$18,525
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	INST	Total
2016	1	1
2017	1	1
2018	1	1
2019	1	1
2020	1	1
2021	1	1
2022	1	1
2023	1	1
2024	1	1
2025	1	1
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.002444
2017	0.004975
2018	0.007597
2019	0.010311
2020	0.013122
2021	0.016042
2022	0.019077
2023	0.022229
2024	0.025505
2025	0.028908
2026	0.028908
2027	0.028908
2028	0.028908
2029	0.028908
2030	0.028908

Overview	
Name	Billing Report Educational Tool
Abbr	22
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	2
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$12.00	\$0.00	1

Administration Costs	
Markup Percentage	10%

**Description**  
 Example: Water Smart Software with online access to customer billed consumption and customized suggestions to save water.

Targets	
Target Method	Percentage
% of Accts Targeted / yr	15.000%
Only Effects New Accts	<input type="checkbox"/>

Costs			
Year	Summary	Customer	Total
2016	\$100,811	\$0	\$100,811
2017	\$104,396	\$0	\$104,396
2018	\$108,109	\$0	\$108,109
2019	\$111,954	\$0	\$111,954
2020	\$115,936	\$0	\$115,936
2021	\$120,455	\$0	\$120,455
2022	\$125,150	\$0	\$125,150
2023	\$130,028	\$0	\$130,028
2024	\$135,096	\$0	\$135,096
2025	\$140,362	\$0	\$140,362
2026	\$144,939	\$0	\$144,939
2027	\$149,665	\$0	\$149,665
2028	\$154,545	\$0	\$154,545
2029	\$159,584	\$0	\$159,584
2030	\$164,788	\$0	\$164,788

Customer Classes					
	SF	MF	COM	INST	2ndUse
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses					
	SF	MF	COM	INST	2ndUse
Toilets	<input checked="" type="checkbox"/>				
Urinals					
Faucets	<input checked="" type="checkbox"/>				
Showers	<input checked="" type="checkbox"/>				
Dishwashers	<input checked="" type="checkbox"/>				
Clothes Washers	<input checked="" type="checkbox"/>				
Process					
Kitchen Spray Rinse					
Internal Leakage	<input checked="" type="checkbox"/>				
Baths	<input checked="" type="checkbox"/>				
Other	<input checked="" type="checkbox"/>				
Irrigation	<input checked="" type="checkbox"/>				
Pools	<input checked="" type="checkbox"/>				
Wash Down	<input checked="" type="checkbox"/>				
Car Washing	<input checked="" type="checkbox"/>				
External Leakage	<input checked="" type="checkbox"/>				
Outdoor					
Hotel-Motel					
Cooling					

Comments	

Targets		
Year	Accounts	Total
2016	7,637	7,637
2017	7,909	7,909
2018	8,190	8,190
2019	8,481	8,481
2020	8,783	8,783
2021	9,125	9,125
2022	9,481	9,481
2023	9,851	9,851
2024	10,235	10,235
2025	10,633	10,633
2026	10,980	10,980
2027	11,338	11,338
2028	11,708	11,708
2029	12,090	12,090
2030	12,484	12,484

Results	
Average Water Savings (mgd)	
0.791064	
Lifetime Savings - Present Value (\$)	
Utility	\$19,017,732
Community	\$33,840,545
Lifetime Costs - Present Value (\$)	
Utility	\$4,655,040
Community	\$4,655,040
Benefit to Cost Ratio	
Utility	4.09
Community	7.27
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$358

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	5.0%
SF Faucets	5.0%
SF Showers	5.0%
SF Dishwashers	5.0%
SF Clothes Washers	5.0%
SF Baths	5.0%
SF Internal Leakage	5.0%
SF Other	5.0%
SF Irrigation	5.0%
SF Pools	5.0%
SF Wash Down	5.0%
SF Car Washing	5.0%
SF External Leakage	5.0%

Water Savings (mgd)	
Year	Total Savings (mgd)
2016	0.198446
2017	0.403626
2018	0.417620
2019	0.432075
2020	0.446953
2021	0.463027
2022	0.480390
2023	0.498343
2024	0.516913
2025	0.536124
2026	0.554329
2027	0.571478
2028	0.589207
2029	0.607531
2030	0.626464

Overview	
Name	Mobile Home Park Submetering
Abbr	23
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2021		
Measure Length	6		

Fixture Costs			
	Utility	Customer	Fix/Acct
MF	\$500.00	\$1,000.00	1

Administration Costs	
Markup Percentage	25%

**Description**  
 Require or provide a partial cost rebate to meter all remaining mobile home parks, multi-family residences or homeowners associations that are currently master metered but not separately metered.

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$7,336	\$11,737	\$19,073
2017	\$7,597	\$12,155	\$19,752
2018	\$7,867	\$12,587	\$20,454
2019	\$8,147	\$13,035	\$21,182
2020	\$8,437	\$13,498	\$21,935
2021	\$8,765	\$14,025	\$22,790
2022	\$0	\$0	\$0
2023	\$0	\$0	\$0
2024	\$0	\$0	\$0
2025	\$0	\$0	\$0
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Customer Classes					
	SF	MF	COM	INST	2ndUs

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets		<input checked="" type="checkbox"/>			
Urinals					
Faucets		<input checked="" type="checkbox"/>			
Showers		<input checked="" type="checkbox"/>			
Dishwashers		<input checked="" type="checkbox"/>			
Clothes Washers		<input checked="" type="checkbox"/>			
Process					
Kitchen Spray Rinse					
Internal Leakage		<input checked="" type="checkbox"/>			
Baths		<input checked="" type="checkbox"/>			
Other		<input checked="" type="checkbox"/>			
Irrigation		<input checked="" type="checkbox"/>			
Pools		<input checked="" type="checkbox"/>			
Wash Down		<input checked="" type="checkbox"/>			
Car Washing		<input checked="" type="checkbox"/>			
External Leakage		<input checked="" type="checkbox"/>			
Outdoor					
Hotel-Motel					
Cooling					

Comments	

Targets		
View:	Accounts	
	MF	Total
2016	12	12
2017	12	12
2018	13	13
2019	13	13
2020	13	13
2021	14	14
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Results	
Average Water Savings (mgd)	
0.013297	
Lifetime Savings - Present Value (\$)	
Utility	\$351,864
Community	\$709,010
Lifetime Costs - Present Value (\$)	
Utility	\$44,629
Community	\$116,034
Benefit to Cost Ratio	
Utility	7.88
Community	6.11
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$204

End Use Savings Per Replacement	
	% Savings per Account
MF Toilets	15.0%
MF Faucets	15.0%
MF Showers	15.0%
MF Dishwashers	15.0%
MF Clothes Washers	15.0%
MF Baths	15.0%
MF Internal Leakage	15.0%
MF Other	15.0%
MF Irrigation	15.0%
MF Pools	15.0%
MF Wash Down	15.0%
MF Car Washing	15.0%
MF External Leakage	15.0%

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.002228
2017	0.004530
2018	0.006909
2019	0.009367
2020	0.011903
2021	0.014528
2022	0.014501
2023	0.014472
2024	0.014441
2025	0.014408
2026	0.014375
2027	0.014345
2028	0.014316
2029	0.014289
2030	0.014263

Overview	
Name	Install High Efficiency Fixtures
Abbr	24
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2025		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
INST	\$500.00	\$1,000.00	10

Administration Costs	
Markup Percentage	15%

**Description**  
Provide rebates or grants to install high efficiency faucets, toilets, urinals and showerheads in local and state government facilities.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets				<input type="checkbox"/>	
Urinals				<input type="checkbox"/>	
Faucets				<input type="checkbox"/>	
Showers				<input type="checkbox"/>	
Dishwashers				<input type="checkbox"/>	
Clothes Washers				<input type="checkbox"/>	
Process					
Kitchen Spray Rinse				<input type="checkbox"/>	
Internal Leakage				<input type="checkbox"/>	
Baths					
Other				<input type="checkbox"/>	
Irrigation				<input type="checkbox"/>	
Pools				<input type="checkbox"/>	
Wash Down					
Car Washing					
External Leakage				<input type="checkbox"/>	
Outdoor					
Hotel-Motel					
Cooling				<input type="checkbox"/>	

Results	
Average Water Savings (mgd)	
0.019642	
Lifetime Savings - Present Value (\$)	
Utility	\$498,467
Community	\$894,272
Lifetime Costs - Present Value (\$)	
Utility	\$79,549
Community	\$217,895
Benefit to Cost Ratio	
Utility	6.27
Community	4.10
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$246

End Use Savings Per Replacement	
	% Savings per Account
INST Toilets	63.0%
INST Urinals	50.0%
INST Faucets	75.0%
INST Showers	50.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

**Comments**

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$7,728	\$13,440	\$21,167
2017	\$8,003	\$13,917	\$21,920
2018	\$8,287	\$14,412	\$22,700
2019	\$8,582	\$14,925	\$23,507
2020	\$8,887	\$15,456	\$24,343
2021	\$9,234	\$16,058	\$25,292
2022	\$9,593	\$16,684	\$26,278
2023	\$9,967	\$17,335	\$27,302
2024	\$10,356	\$18,010	\$28,366
2025	\$10,760	\$18,712	\$29,472
2026	\$0	\$0	\$0
2027	\$0	\$0	\$0
2028	\$0	\$0	\$0
2029	\$0	\$0	\$0
2030	\$0	\$0	\$0

Targets		
View:	Accounts	
	INST	Total
2016	1	1
2017	1	1
2018	1	1
2019	1	1
2020	2	2
2021	2	2
2022	2	2
2023	2	2
2024	2	2
2025	2	2
2026	0	0
2027	0	0
2028	0	0
2029	0	0
2030	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.001859
2017	0.003785
2018	0.005778
2019	0.007843
2020	0.009981
2021	0.012203
2022	0.014511
2023	0.016909
2024	0.019401
2025	0.021989
2026	0.021989
2027	0.021989
2028	0.021989
2029	0.021989
2030	0.021989

Overview	
Name	Install or Rebate High Efficiency
Abbr	25
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$200.00	\$200.00	10
INST	\$200.00	\$200.00	10

Administration Costs	
Markup Percentage	25%

**Description**  
 Consider direct install program, rebates or grants for installation of high efficiency faucet fixtures in all or selected high-use commercial and institutional buildings.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Showers	<input type="checkbox"/>				
Dishwashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
Kitchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

**Comments**  
 Assume replace a 2.0 gpm faucet down to a 0.5 gpm faucet.

Results	
Average Water Savings (mgd)	
0.025248	
Lifetime Savings - Present Value (\$)	
Utility	\$613,522
Community	\$1,170,018
Lifetime Costs - Present Value (\$)	
Utility	\$305,159
Community	\$549,287
Benefit to Cost Ratio	
Utility	2.01
Community	2.13
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$735

End Use Savings Per Replacement	
	% Savings per Account
COM Faucets	75.0%
INST Faucets	75.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.250%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$19,481	\$15,585	\$35,067
2017	\$20,174	\$16,139	\$36,314
2018	\$20,892	\$16,713	\$37,605
2019	\$21,635	\$17,308	\$38,943
2020	\$22,404	\$17,923	\$40,328
2021	\$23,278	\$18,622	\$41,900
2022	\$24,185	\$19,348	\$43,533
2023	\$25,128	\$20,102	\$45,230
2024	\$26,107	\$20,886	\$46,992
2025	\$27,125	\$21,700	\$48,824
2026	\$28,009	\$22,407	\$50,416
2027	\$28,922	\$23,138	\$52,060
2028	\$29,865	\$23,892	\$53,758
2029	\$30,839	\$24,671	\$55,511
2030	\$31,845	\$25,476	\$57,321

Targets			
View:	Accounts		
	COM	INST	Total
2016	7	1	8
2017	7	1	8
2018	8	1	8
2019	8	1	9
2020	8	1	9
2021	9	1	9
2022	9	1	10
2023	9	1	10
2024	10	1	10
2025	10	1	11
2026	10	1	11
2027	11	1	12
2028	11	1	12
2029	11	1	12
2030	12	1	13

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.001560
2017	0.003176
2018	0.004850
2019	0.006583
2020	0.008377
2021	0.010241
2022	0.012179
2023	0.014191
2024	0.016282
2025	0.018455
2026	0.020698
2027	0.023015
2028	0.025407
2029	0.027877
2030	0.030428

Overview	
Name	Water Budgeting/ Monitoring
Abbr	26
Category	
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2030		
Measure Length	15		

Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$200.00	\$500.00	1
INST	\$200.00	\$500.00	1

Administration Costs	
Markup Percentage	25%

Description
Website that provides feedback on irrigation water use (budget vs. actual).

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hotel-Motel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Results	
Average Water Savings (mgd)	
0.068048	
Lifetime Savings - Present Value (\$)	
Utility	\$1,653,582
Community	\$1,653,582
Lifetime Costs - Present Value (\$)	
Utility	\$61,032
Community	\$183,096
Benefit to Cost Ratio	
Utility	27.09
Community	9.03
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$55

End Use Savings Per Replacement	
	% Savings per Account
COM Irrigation	10.0%
COM External Leakage	10.0%
INST Irrigation	10.0%
INST External Leakage	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Comments
Modeled after MWDOC's Landscape Certification Program.

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$3,896	\$7,793	\$11,689
2017	\$4,035	\$8,070	\$12,105
2018	\$4,178	\$8,357	\$12,535
2019	\$4,327	\$8,654	\$12,981
2020	\$4,481	\$8,962	\$13,443
2021	\$4,656	\$9,311	\$13,967
2022	\$4,837	\$9,674	\$14,511
2023	\$5,026	\$10,051	\$15,077
2024	\$5,221	\$10,443	\$15,664
2025	\$5,425	\$10,850	\$16,275
2026	\$5,602	\$11,204	\$16,805
2027	\$5,784	\$11,569	\$17,353
2028	\$5,973	\$11,946	\$17,919
2029	\$6,168	\$12,336	\$18,504
2030	\$6,369	\$12,738	\$19,107

Targets			
View:	Accounts		
	COM	INST	Total
2016	14	1	16
2017	15	1	16
2018	15	1	17
2019	16	1	17
2020	16	2	18
2021	17	2	19
2022	18	2	19
2023	18	2	20
2024	19	2	21
2025	20	2	22
2026	20	2	22
2027	21	2	23
2028	22	2	24
2029	23	2	25
2030	23	2	25

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.004206
2017	0.008561
2018	0.013071
2019	0.017741
2020	0.022578
2021	0.027603
2022	0.032824
2023	0.038248
2024	0.043884
2025	0.049740
2026	0.055786
2027	0.062030
2028	0.068477
2029	0.075135
2030	0.082010

Overview	
Name	Require Efficient Toilets and Urinals
Abbr	27
Category	
Measure Type	Standard Measure

Time Period	Measure Life
First Year	2016
Last Year	2060
Measure Length	45
	Permanent <input checked="" type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$10.00	\$100.00	2
MF	\$10.00	\$200.00	5
COM	\$10.00	\$200.00	10
INST	\$10.00	\$200.00	10

Administration Costs	
Markup Percentage	10%

**Description**  
 Require all new development to utilize High Efficiency Toilets (HETs)(1.28 gal/flush or less) and High Efficiency Urinals (HEUs) 0.5 gal/flush or less. City and County building departments to implement through normal permitting and inspection process.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Show ers	<input type="checkbox"/>				
Dishw ashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
itchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Dow n	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

**Comments**  
 Ordinance.

Results	
Average Water Savings (mgd)	
0.971600	
Lifetime Savings - Present Value (\$)	
Utility	\$20,822,231
Community	\$27,718,495
Lifetime Costs - Present Value (\$)	
Utility	\$2,170,693
Community	\$27,369,823
Benefit to Cost Ratio	
Utility	9.59
Community	1.01
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$136

End Use Savings Per Replacement	
	% Savings per Account
SF Toilets	20.0%
SF Faucets	10.0%
MF Toilets	20.0%
MF Faucets	10.0%
COM Toilets	20.0%
COM Urinals	50.0%
COM Faucets	10.0%
INST Toilets	20.0%
INST Urinals	50.0%
INST Faucets	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	100.000%
Only Effects New Accts	<input checked="" type="checkbox"/>

Costs			
View:	Utility	Customer	Total
Summary			
2016	\$60,606	\$703,562	\$764,168
2017	\$60,606	\$703,562	\$764,168
2018	\$62,761	\$728,583	\$791,345
2019	\$64,993	\$754,495	\$819,488
2020	\$67,305	\$781,328	\$848,633
2021	\$76,389	\$886,782	\$963,171
2022	\$79,366	\$921,347	\$1,000,713
2023	\$82,460	\$957,259	\$1,039,719
2024	\$85,674	\$994,572	\$1,080,246
2025	\$89,013	\$1,033,338	\$1,122,351
2026	\$77,368	\$898,154	\$975,522
2027	\$79,891	\$927,441	\$1,007,332
2028	\$82,496	\$957,682	\$1,040,179
2029	\$85,186	\$988,910	\$1,074,097
2030	\$87,964	\$1,021,157	\$1,109,121

Targets					
View:	SF	MF	COM	INST	Total
Accounts					
2016	1,811	83	101	10	2,005
2017	1,811	83	101	10	2,005
2018	1,875	86	105	10	2,076
2019	1,942	90	109	10	2,150
2020	2,011	93	112	11	2,227
2021	2,282	105	128	12	2,527
2022	2,371	109	133	13	2,626
2023	2,464	114	138	13	2,728
2024	2,560	118	143	14	2,834
2025	2,659	123	149	14	2,945
2026	2,312	107	129	12	2,560
2027	2,387	110	134	13	2,643
2028	2,465	114	138	13	2,729
2029	2,545	117	142	13	2,818
2030	2,628	121	147	14	2,910

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.034729
2017	0.069292
2018	0.104868
2019	0.141436
2020	0.178982
2021	0.221122
2022	0.264405
2023	0.308825
2024	0.354382
2025	0.401077
2026	0.441311
2027	0.482495
2028	0.524657
2029	0.567830
2030	0.612047

Overview	
Name	Efficient Outdoor Use Education and Tra
Abbr	28
Category	Default
Measure Type	Standard Measure

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2060	Years	10
Measure Length	45	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$25.00	\$25.00	1
MF	\$25.00	\$25.00	1
COM	\$25.00	\$25.00	1
INST	\$25.00	\$25.00	1

Administration Costs	
Markup Percentage	25%

**Description**  
 WCWCD would offer, organize and sponsor a series of educational workshops for homeowners in efficient landscaping and irrigation principals. Utilize guest speakers, Xeriscape demonstration gardens, incentives, such as a nursery plant coupon.

Customer Classes					
	SF	MF	COM	INST	2ndUs
	<input type="checkbox"/>				

End Uses					
	SF	MF	COM	INST	2ndUs
Toilets	<input type="checkbox"/>				
Urinals	<input type="checkbox"/>				
Faucets	<input type="checkbox"/>				
Show ers	<input type="checkbox"/>				
Dishw ashers	<input type="checkbox"/>				
Clothes Washers	<input type="checkbox"/>				
Process	<input type="checkbox"/>				
itchen Spray Rinse	<input type="checkbox"/>				
Internal Leakage	<input type="checkbox"/>				
Baths	<input type="checkbox"/>				
Other	<input type="checkbox"/>				
Irrigation	<input type="checkbox"/>				
Pools	<input type="checkbox"/>				
Wash Down	<input type="checkbox"/>				
Car Washing	<input type="checkbox"/>				
External Leakage	<input type="checkbox"/>				
Outdoor	<input type="checkbox"/>				
Hotel-Motel	<input type="checkbox"/>				
Cooling	<input type="checkbox"/>				

**Comments**  
 Customer costs represent follow-up action costs. Utility cost represents advertising, day-of site coordination, etc. Measure includes 2 workshops per month with 10-30 participants each.

Results	
Average Water Savings (mgd)	
0.101663	
Lifetime Savings - Present Value (\$)	
Utility	\$2,318,596
Community	\$2,318,596
Lifetime Costs - Present Value (\$)	
Utility	\$406,775
Community	\$732,195
Benefit to Cost Ratio	
Utility	5.70
Community	3.17
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$243

End Use Savings Per Replacement	
	% Savings per Account
SF Irrigation	5.0%
MF Irrigation	5.0%
COM Irrigation	5.0%
INST Irrigation	5.0%
SF External Leakage	5.0%
MF External Leakage	5.0%
COM External Leakage	5.0%
INST External Leakage	5.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
View:	Summary		
	Utility	Customer	Total
2016	\$8,809	\$7,047	\$15,857
2017	\$9,123	\$7,298	\$16,421
2018	\$9,447	\$7,558	\$17,005
2019	\$9,783	\$7,826	\$17,609
2020	\$10,131	\$8,105	\$18,236
2021	\$10,526	\$8,421	\$18,946
2022	\$10,936	\$8,749	\$19,685
2023	\$11,362	\$9,090	\$20,452
2024	\$11,805	\$9,444	\$21,249
2025	\$12,265	\$9,812	\$22,078
2026	\$12,665	\$10,132	\$22,798
2027	\$13,078	\$10,463	\$23,541
2028	\$13,505	\$10,804	\$24,309
2029	\$13,945	\$11,156	\$25,101
2030	\$14,400	\$11,520	\$25,920

Targets					
View:	Accounts				
	SF	MF	COM	INST	Total
2016	255	12	14	1	282
2017	264	12	15	1	292
2018	273	13	15	1	302
2019	283	13	16	1	313
2020	293	13	16	2	324
2021	304	14	17	2	337
2022	316	15	18	2	350
2023	328	15	18	2	364
2024	341	16	19	2	378
2025	354	16	20	2	392
2026	366	17	20	2	405
2027	378	17	21	2	419
2028	390	18	22	2	432
2029	403	19	23	2	446
2030	416	19	23	2	461

Water Savings (mgd)	
	Total Savings (mgd)
2016	0.005736
2017	0.011676
2018	0.017827
2019	0.024196
2020	0.030793
2021	0.037646
2022	0.044767
2023	0.052165
2024	0.059851
2025	0.067837
2026	0.070348
2027	0.072924
2028	0.075566
2029	0.078276
2030	0.081055

## REFERENCES

---

Alliance for Water Efficiency.

Online: <http://www.allianceforwaterefficiency.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=4694> <http://www.allianceforwaterefficiency.org/submetering.aspx>

CALFED Public School Retrofit Program for Riverside County.

Online: <http://www.usbr.gov/lc/socal/reports/PublicSchoolRetrofitRiversideCty.pdf>

Consortium for Efficient Energy. Online: <http://www.cee1.org/>

DeOreo, W.B., P.W. Mayer, Leslie Martien, Matthew Hayden, Andrew Funk, Michael Kramer-Duffield, Renee Davis, James Henderson, Bob Raucher, Peter Gleick, and Matt Heberger. *California Single Family Water Use Efficiency Study*. Sacramento, California: Department of Water Resources, 2011. Online:

[http://www.energy.ca.gov/appliances/2013rulemaking/documents/responses/Water\\_Appliances\\_12-AAER-2C/California\\_IOW\\_Response\\_to\\_CEC\\_Invitation\\_to\\_Participate-Water\\_Meters\\_REFERENCE/DeOreo\\_2011\\_California\\_Single-Family\\_Water\\_Use\\_Efficiency\\_Study.pdf](http://www.energy.ca.gov/appliances/2013rulemaking/documents/responses/Water_Appliances_12-AAER-2C/California_IOW_Response_to_CEC_Invitation_to_Participate-Water_Meters_REFERENCE/DeOreo_2011_California_Single-Family_Water_Use_Efficiency_Study.pdf)

DeOreo, W.B., P.W. Mayer, E.M. Opitz, B. Dziegielewski, J.C. Kiefer, W.Y. Davis, and J.O. Nelson. *Residential End Uses of Water: Final Report*. Denver, Colorado: AWWA Research Foundation, 1999, 2015 update pending.

Online: [http://www.waterrf.org/PublicReportLibrary/RFR90781\\_1999\\_241A.pdf](http://www.waterrf.org/PublicReportLibrary/RFR90781_1999_241A.pdf)

Dziegielewski, B., J. C. Kiefer, W. DeOreo, P. Mayer, E. M. Opitz, G. A. Porter, G. L. Lantz, and J. O. Nelson. *Commercial and Institutional End Uses of Water*. Denver, Colorado: AWWA, Research Foundation and American Water Works Association with Cooperation of the U.S. Bureau of Reclamation, 2000. Online: <http://ufdc.ufl.edu/WC13511002/00001>

Governor's Office of Planning and Budget, 2012 Baseline Projections. Online: <http://gomb.utah.gov/budget-policy/demographic-economic-analysis/>

Koeller & Company. California Urban Water Conservation Council Potential Best Management Practice report, *High Efficiency Plumbing Fixtures - Toilets and Urinals*, 2005.

Lake Powell Pipeline Study, Water Needs Assessment (WNA), Phase I Report, Final Draft, 2008.

Oak Ridge National Laboratory, Energy Division, *Bern Clothes Washer Study, Final Report*, prepared for U.S. Department of Energy, March 1998. Online: [www.energystar.gov](http://www.energystar.gov)

United States Census Bureau 2010 census. Online: <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>

Utah Board of Water Resources (UBWR). Lake Powell Pipeline, Modified Draft Study Report 10, *Socioeconomics and Water Resource Economics*, prepared for Utah Board of Water Resources, 2012.



533 E Waterworks Drive  
 St. George, UT 84770  
 435.673.3617  
 wcwcd.org

## Water Smart Irrigation Upgrade Rebate Application Existing Single-Family Residential Form

*October 1, 2019 through September 30, 2021*

**Important:** Please read this application carefully. It is the applicant’s responsibility to complete the application and submit it with the required documentation. Rebates are available only for EXISTING sprinkler systems of single-family residential homes located in Washington County. The application must be signed by the customer of the utility account. Rebates will not be paid for ineligible or incomplete applications. Rebates will be paid in the form of a credit issued on the utility account. **The maximum rebate amount per property is \$500.**

**Funding is limited** and submitting a rebate application does not guarantee you will receive a rebate. Rebates will be issued on a first-come, first-serve basis contingent upon fulfilling requirements of rebate and until funding is exhausted. Rebate applications are available online and may also be available at retail stores. Rebate program is subject to change. Rebate amount will be credited to utility account. All products purchased for rebate must be new.

**Customer Information**

Water Provider:	Account #:
Customer Name:	How did you find out about the program (please circle all that apply)?
Daytime Phone:	Radio      TV      Spectrum      SGNews.org
Alt. Phone:	SU Family & Kids      Email      Website
Other: _____	
Service Address:	City:
Mailing Address (if different than service address):	City:
Email Address:	
<b>If property is a rental and rebate is to go to landlord, please provide the following information:</b>	
Landlord Name:	Phone:
Mailing Address:	

Date of Post-Inspection		Process Date		Rebate Amount

**Irrigation System Upgrade Information\***

Total # of zones/stations/valves: \_\_\_\_\_

Installation done by:  WaterSense/QWEL Landscape Professional or  Property owner

**\* Rebate is for existing irrigation systems only; new systems or expansions are not eligible.**

**New Equipment to be Rebated**

Pressure Regulating Valve (Limit 1 valve.)

Cost: \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(Cost up to \$100)

Station changed to high-efficiency nozzles.

(The entire station must be converted to high-efficiency nozzles. See [wcwcd.org](http://wcwcd.org) for qualifying devices.)

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
( Cost up to \$60 per station)

Conversion of a spray zone to drip (must include filter and pressure regulating components).

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(Cost up to \$60 per station)

Capping a station (station valve must be removed and kept for final inspection.

Cap on the system must remain visible until final inspection is completed. Limit 2 stations.)

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(\$60 per station)

Certified Landscape Irrigation Audit (must be performed by an active WaterSense/QWEL Landscape Professional)

Auditor's Name \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(the cost up to \$75)

Total Amount: \_\_\_\_\_  
**(Maximum Amount is \$500)**

**Application Procedure:**

***Qualifying devices or service for rebates are:***

- High-efficiency sprinkler nozzles ([www.wcwcd.org/wp-content/uploads/2012/08/Qualified-High-efficiency-Nozzles.pdf](http://www.wcwcd.org/wp-content/uploads/2012/08/Qualified-High-efficiency-Nozzles.pdf))
- Pressure reducer valves
- Conversion of a spray zone to drip
- The capping of a station (station valve must be removed and kept for final inspection. Cap on the system must remain visible until final inspection is completed.)
- Install a pressure reducer valve on the irrigation system.
- The cost for a WaterSense Landscape Professional system audit only for up to \$75.

1. Complete upgrades as approved either by hiring a *WaterSense/QWEL* landscape professional (<http://www.wcwcd.org/conservation/find-a-landscaper/>); or property owner may do the work themselves.
2. After work is complete have a landscape irrigation audit performed on the new upgraded system by a *WaterSense/QWEL* landscape professional or participate in a free water check (program only runs through May 15 thru September 30). If WCWCD personnel performs the post site visit, paperwork can be collected at time of visit.
3. Please make sure application is completed before submitting.
  - a. Include the following supporting documentation and attach it to the application:
    - Original and itemized receipt or invoice which clearly details:
      - Date (between October 1, 2019 and September 30, 2021)
      - Retailer/Landscape company name, address and phone number.
    - Include copy of the Landscape Irrigation Audit/Water Check Report with receipt.
  - b. Review acceptance terms and **sign application**.
  - c. Keep a copy of documents for your records.
4. Rebates will be made as a credit to your utility account. Please allow 6 to 8 weeks after a successful post-inspection for rebate to be completed.

**Customer Agreement:**

I have read and understand the Terms and Conditions for Participation. I will provide receipts and documentation that qualifies me for the rebate program. I understand that WCWCD reserves the right to cancel or modify the program without notice, and that rebates are subject to funding availability. I waive and release WCWCD, participating water agencies, and their contractors or agents from any and all claims and causes of action arising out of the installation or use of qualified products. I understand and agree that my water utility account may be monitored by WCWCD for the sole purpose of evaluating prior and post rebate water use in order to determine the effectiveness of the program. I understand that submission of this application DOES NOT relieve me of my obligation to pay my utility account on time and in full while waiting for the rebate to be processed.

Customer Signature: \_\_\_\_\_ Dated: \_\_\_\_\_

**WCWCD is not responsible if your retailer or contractor provides inaccurate information about the amount and/or conditions of the actual rebate and for devices that are mislabeled or misrepresented by dealers regarding rebate qualifications.**

For more information on this program, visit [www.wcwcd.org](http://www.wcwcd.org) or contact Julie at 435.673.3617 or [julie@wcwcd.org](mailto:julie@wcwcd.org).

Smart Controller Rebates for residential homes are available through the state at [www.utahwatersavers.com](http://www.utahwatersavers.com).



533 E Waterworks Drive  
 St. George, UT 84770  
 435.673.3617  
 wcwcd.org

**Water Smart Irrigation Upgrade Rebate Application  
 Commercial/Multi-family Form**

*March 1, 2019 through February 28, 2021*

**Important:** Please read this application carefully. It is the applicant's responsibility to complete the application and submit it with the required documentation. Rebates are available only for EXISTING properties located in Washington County. The application must be signed by the customer of the utility account. Rebates will not be paid for ineligible or incomplete applications. Rebates will be paid in the form of a credit issued on the utility account. **The maximum rebate amount per application is \$1,000, not to exceed half the cost of the entire project or \$10,000.**

**Funding is limited** and submitting a rebate application does not guarantee you will receive a rebate. Rebates will be issued on a first-come, first-serve basis contingent upon fulfilling requirements of rebate and until funding is exhausted. Rebate applications are available online and may also be available at retail stores. Rebate program is subject to change. Rebate amount will be credited to utility account. All products purchased for rebate must be new.

**Customer Information**

Water Provider:		Account #:	
Customer Name:		How did you find out about the program (please circle all that apply)?  Radio    Spectrum    StGNews.org  Email                      Website  Other: _____	
Daytime Phone:			
Alt. Phone:			
Service Address:		City:	
Mailing Address (if different than service address):		City:	
Email Address:			
If a rental and improvements made by landlord, please provide the following information:			
Landlord Name:		Phone:	
Mailing Address:			

Date of Post-Inspection	Date Processed	Rebate Amount

**Pre-approval (required to qualify for rebate)**

Estimated Rebate Amount: \_\_\_\_\_ Preapproval Accepted: \_\_\_\_\_ Date: \_\_\_\_\_

**All work and documents must be completed and submitted before June 30, 2019.**

**Irrigation System Upgrade Information\***

Total # of zones/stations: \_\_\_\_\_

Installation done by:  WaterSense/QWEL Landscape Professional

**\* Rebate is for existing irrigation systems only; new systems or expansions are not eligible.**

**New Equipment to be Rebated**

Pressure Regulating Valve

Cost: \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(1/2 the cost up to \$300)

Station changed to high-efficiency nozzles.

(The entire station must be converted to high-efficiency nozzles. See <http://www.wcwcd.org/wp-content/uploads/2012/08/Qualified-High-efficiency-Nozzles.pdf> for qualifying devices.)

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(\$60 per station)

Conversion of a spray zone to drip (must include filter and pressure regulating components).

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(\$60 per station)

Capping a station (station valve must be removed and kept for final inspection.

Cap on the system must remain visible until final inspection is completed. Limit 2 stations.)

# of valves converted \_\_\_\_\_

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(\$60 per station)

SWAT Controller (Any controller that irrigates using ET or soil moisture content. Limit 1 controller.)

Cost \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(1/2 the cost)

Certified Landscape Irrigation Audit (ONLY spray valves need an audit and the audit must be performed by an active WaterSense Landscape Professional)

Auditor's Name \_\_\_\_\_

Rebate Amt: \_\_\_\_\_  
(the cost up to \$100 per application)

Total Amount: \_\_\_\_\_

**(Maximum Amount is \$1,000 not to exceed 1/2 the cost of the total project)**

**Program Specifics:**

1. Applicant must be pre-approved. Request a pre-approval by calling Julie at 435.673.3617. If needed, an appointment will be scheduled for a site visit with a WCWCD representative.

***Qualifying devices or service for rebates are:***

SWAT (Smart) controllers. (Controller must have capability to irrigate using to ET or soil moisture content.)

High-efficiency sprinkler nozzles (see [www.wcwcd.org](http://www.wcwcd.org))

Pressure reducer valves

Conversion of a spray zone to drip

Capping of a station (station valve must be removed and kept for final inspection; cap on the system must remain visible until final inspection is completed.)

Install a pressure reducer valve on the irrigation system.

Cost for a WaterSense Landscape Professional system audit only for up to \$100 per application (only necessary for spray valves).

2. After pre-approval, complete upgrades as approved by hiring a *WaterSense/QWEL* landscape professional (see [wcwcd.org](http://wcwcd.org))
3. After work is complete have a landscape irrigation audit performed on the new upgraded system by a *WaterSense/QWEL* landscape professional or participate in a free water check (program only runs through May 15 thru September 30). If audit performed by *WaterSense/QWEL* landscape professional, call for a post-inspection. Otherwise, WCWCD personnel can collect the paperwork needed for processing.
4. Please make sure application is completed as directed before submitting.
  - a. Include the following supporting documentation and attach it to the application:
    - Original and itemized receipt or invoice which clearly details:  
Date (between *October 1, 2019 through September 30, 2021*)  
Retailer/Landscape company name, address and phone number.
    - Include copy of the Landscape Irrigation Audit/Water Check Report with receipt.
  - b. Review acceptance terms and **sign application**.
  - c. Keep a copy of documents for your records.
5. Rebates will be made as a credit to your utility account. Please allow 6 to 8 weeks after a successful post-inspection for rebate to be completed.

**Customer Agreement:**

I have read and understand the Terms and Conditions for Participation. I will provide receipts and documentation that qualifies me for the rebate program. I understand that WCWCD reserves the right to cancel or modify the program without notice, and that rebates are subject to funding availability. I waive and release WCWCD, participating water agencies, and their contractors or agents from any and all claims and causes of action arising out of the installation or use of qualified products. I understand and agree that my water utility account may be monitored by WCWCD for the sole purpose of evaluating prior and post rebate water use in order to determine the effectiveness of the program. I understand that submission of this application DOES NOT relieve me of my obligation to pay my utility account on time and in full while waiting for the rebate to be processed.

Customer Signature: \_\_\_\_\_ Dated: \_\_\_\_\_

**WCWCD is not responsible if your retailer or contractor provides inaccurate information about the amount and/or conditions of the actual rebate and for fixtures that are mislabeled or misrepresented by dealers regarding rebate qualifications.**

For more information on this program, visit [www.wcwcd.org](http://www.wcwcd.org) or contact Julie at 435.673.3617 or [julie@wcwcd.org](mailto:julie@wcwcd.org).



533 E Waterworks Drive  
 St. George, UT 84770  
 435.673.3617  
 wccd.org

**Water Smart Irrigation Upgrade Rebate Application  
 Institutional Form**

*October 1, 2019 through September 30, 2021*

**Important:** Please read this application carefully. It is the applicant’s responsibility to complete the application and submit it with the required documentation. Rebates are available only for EXISTING properties located in Washington County. The application must be signed by the customer of the utility account. Rebates will not be paid for ineligible or incomplete applications. Rebates will be paid in the form of a credit issued on the utility account. **The maximum rebate amount per application is \$5,000.**

**Funding is limited** and submitting a rebate application does not guarantee you will receive a rebate. Rebates will be issued on a first-come, first-serve basis until funding is exhausted. Rebate applications are available online and may also be available at retail stores. Rebate program is subject to change. Rebate amount will be credited to utility account. All products purchased must be new.

**Customer Information**

Water Provider:	Account #:
Customer Name:	How did you find out about the program (please circle all that apply)?
Daytime Phone:	Radio    TV    Spectrum    StgNews.org
Alt. Phone:	SU Family & Kids    Email    Website
	Other: _____
Service Address:	City:
Mailing Address (if different than service address):	City, State, Zip:
Email Address:	
If a rental and rebate is to go to the landlord, please provide the following information:	
Landlord Name:	Phone:
Mailing Address:	City, State, Zip

Date of Post-Inspection	Date Processed	Rebate Amount

**Eligible Retrofits:**

- Install a pressure reducer valve on the irrigation system.
- Conversion of spray or rotor zone to high-efficiency nozzles—converting an existing turf area watered by traditional, pop-up spray heads to multi-stream, rotating heads.
- Conversion of a spray zone to micro drip—converting areas such as a plant bed, a parkway strip (area between sidewalk and street), a parking lot island or turf area that is currently irrigated by pop-up heads into a micro drip zone. Drip zones must have appropriate pressure regulation and a filter.
- Capping a zone—the removal and capping of an existing irrigation zone. This may occur because the area has been converted to hardscape, or plants are mature and do not require supplemental irrigation.
- Replace a traditional controller with a SWAT (Smart) Controller on the system.
- Audit performed by certified Qualified Water Efficient Landscaper (QWEL) or Certified Landscape Irrigation Auditor (CLIA) or WaterSense Landscape Professional.

**Pre-approval (required to qualify for rebate)**

Estimated Rebate Amount: \_\_\_\_\_ Preapproval Accepted: \_\_\_\_\_ Date: \_\_\_\_\_  
 (All work and documents must be completed and submitted before September 30, 2019.)

**Irrigation System Upgrade Information\***

Total # of zones/stations: \_\_\_\_\_

Installation done by:  WaterSense Landscape Professional or  QWEL

**\* Rebate is for existing irrigation systems only; new systems or expansions are not eligible.**

**New Equipment to be Rebated**

- Pressure Regulating Valve  
 Cost: \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (the cost up to \$300)
- Station changed to high-efficiency nozzles.  
 (The entire station must be converted to high-efficiency nozzles. See <http://www.wcwc.org/wp-content/uploads/2012/08/Qualified-High-efficiency-Nozzles.pdf> for qualifying devices.)  
 # of valves converted \_\_\_\_\_ Cost \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (\$60 per station)
- Conversion of a spray zone to drip (must include filter and pressure regulating components).  
 # of valves converted \_\_\_\_\_ Cost \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (\$60 per station)
- Capping a station (station valve must be removed and kept for final inspection.  
 Cap on the system must remain visible until final inspection is completed. Limit 2 stations.)  
 # of valves converted \_\_\_\_\_ Cost \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (\$60 per station)
- SWAT Controller (Any controller that irrigates using ET or soil moisture content. Limit 1 controller.)  
 Cost \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (1/2 the cost)
- Landscape Irrigation Audit (must be performed by an active WaterSense/QWEL Landscape Professional)  
 Auditor's Name \_\_\_\_\_ Rebate Amt: \_\_\_\_\_  
 (the cost up to \$300)

Total Amount: \_\_\_\_\_  
**(Maximum Amount is \$5,000)**

***Application Procedure:***

1. Applicant must be pre-approved. Request a pre-approval by calling Julie at 435.673.3617. If needed, an appointment will be scheduled for a site visit with a WCWCD representative.
2. After pre-approval, complete upgrades as approved either by hiring a *WaterSense/QWEL* landscape professional ([www.wcwcd.org/wp-content/uploads/2012/08/Statewide-and-Area-Irrigation-Specialists-1.pdf](http://www.wcwcd.org/wp-content/uploads/2012/08/Statewide-and-Area-Irrigation-Specialists-1.pdf)).
3. After work is complete have a landscape irrigation audit performed on the new upgraded system by a *WaterSense/QWEL* landscape professional or participate in a free water check (program only runs through May 15 thru September 30). If audit performed by *WaterSense/QWEL* landscape professional, call for a post-inspection. Otherwise, WCWCD personnel can collect the paperwork needed for processing.
4. Please make sure application is completed as directed before submitting.
  - a. Include the following supporting documentation and attach it to the application:
    - Original and itemized receipt or invoice which clearly details:
      - Date (between October 1, 2019 and September 30, 2021)
      - Retailer/Landscape company name, address and phone number.
    - Include copy of the Landscape Irrigation Audit/Water Check Report with receipt.
  - b. Review acceptance terms and **sign application**.
  - c. Keep a copy of documents for your records.
5. Rebates will be made as a credit to your utility account. Please allow 6 to 8 weeks after a successful post-inspection for rebate to be completed.

**Customer Agreement:**

I have read and understand the Terms and Conditions for Participation. I will provide receipts and documentation that qualifies me for the rebate program. I understand that WCWCD reserves the right to cancel or modify the program without notice, and that rebates are subject to funding availability. I waive and release WCWCD, participating water agencies, and their contractors or agents from any and all claims and causes of action arising out of the installation or use of qualified products. I understand and agree that my water utility account may be monitored by WCWCD for the sole purpose of evaluating prior and post rebate water use in order to determine the effectiveness of the program. I understand that submission of this application DOES NOT relieve me of my obligation to pay my utility account on time and in full while waiting for the rebate to be processed.

Customer Signature: \_\_\_\_\_ Dated: \_\_\_\_\_

**WCWCD is not responsible if your retailer or contractor provides inaccurate information about the amount and/or conditions of the actual rebate and for fixtures that are mislabeled or misrepresented by dealers regarding rebate qualifications.**

For more information on this program, visit [www.wcwcd.org](http://www.wcwcd.org) or contact Julie at 435.673.3617 or [julie@wcwcd.org](mailto:julie@wcwcd.org).

**RESOLUTION AUTHORIZING SUBMISSION OF A WATERSMART GRANT PROPOSAL  
TO THE U.S. BUREAU OF RECLAMATION AND AUTHORIZING A COOPERATIVE  
AGREEMENT WITH RECLAMATION AND GRANT MATCH FUNDS**

WHEREAS, a primary purpose and goal of the Washington County Water Conservancy District (District) is to efficiently manage and conserve the use of the available water resources of the county.

WHEREAS, the District has already achieved a 26 percent reduction in water use since 2000 and is targeting further reductions.

WHEREAS, the District's water conservation plan identifies rebate programs that promote adoption of technologies, practices and devices that yield improvements in efficient use and management of water as a measure the District will engage in to enhance water conservation.

WHEREAS, the District finds these incentives encourage action toward efficient use of water and desires to continue its rebate programs for residents of Washington County.

---

WHEREAS, a WaterSMART grant for water efficiency programs, including rebate programs, is available through the United States Bureau of Reclamation (Reclamation) for entities that will provide matching funds and that will work with Reclamation to meet the established deadlines for entering into a cooperative agreement.

WHEREAS, the attached grant proposal, entitled WaterSMART Water and Energy Efficiency Projects Funding for Washington County Water Conservation Programs Irrigation Measures 2019-2021, must be submitted to Reclamation in order to be considered for selection of the WaterSMART grant.

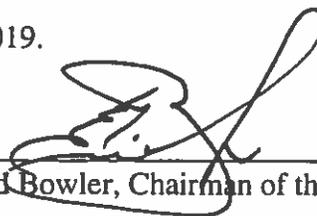
WHEREAS, the attached grant proposal provides that the District will match grant funds up to \$100,000 for the grant period of October 1, 2019 through September 30, 2021.

WHEREAS, the District is authorized by law, including but not limited to the Utah Interlocal Cooperation Act (Utah Code Sections 11-13-101 *et seq.*), to enter into a cooperative agreement with Reclamation.

NOW THEREFORE, BE IT RESOLVED by the Washington County Water District Board of Trustees that:

- A. If selected for the WaterSMART grant, the District is authorized to enter into an agreement with Reclamation regarding the attached grant proposal.
- B. The attached grant proposal that will be submitted to Reclamation has been reviewed and is approved.
- C. If selected for the WaterSMART grant, the District will provide the amount of match funding specified in the grant proposal funding plan in the amount of \$100,000; and
- D. If selected for the WaterSMART grant, the District will work with Reclamation to meet established deadlines for entering into a cooperative agreement to provide progress reports on expenditures key milestones completed.

DATED this 29 day of March, 2019.



Ed Bowler, Chairman of the Board

ATTEST



Roberta McMullin, Secretary

---



# St. George

THE BRIGHTER SIDE

## Exhibit F

February 11, 2019

Julie Gillins  
Washington County Water Conservancy District  
533 E Water Works Dr.  
St. George UT 84770

Dear Julie,

The City of St. George is pleased to offer support for the Washington County Water Conservancy District's (WCWCD) water conservation programs.

The City has approximately 27,000 meter connections and serves a population of approximately 85,000. During the irrigation season, approximately 60% of water consumption is for outdoor purposes. A program targeting outdoor water use will greatly assist goal to reduce water consumption and waste from overwatering.

The programs offered by the WCWCD benefit city water customers as well as customers throughout the county. WCWCD programs complement the City's water conservation efforts to improve water efficiency by.

- Helping to reduce overall demand during the high use months of the irrigation season.
- Reducing the peak system demand.
- Increasing efficiency which results in a drop of per capita use.
- Educating customers regarding the importance of using water wisely.

I look forward to continued opportunities in developing a community wide conservation ethic. If there is anything I can do to further assist with your efforts, please let me know.

Regards

René Fleming  
Manager of Energy and Water Customer Services

CITY OF ST. GEORGE



# City of Hurricane

---

*Water Department*  
*Ken Richins, Superintendent*

March 11, 2019

Julie Gillins  
Washington County Water Conservancy District  
533 E Waterworks Drive  
St. George UT 84770

Dear Ms. Gillins:

Hurricane City supports the efforts of Washington County Water Conservancy District to:

- Reduce the overall demand
- Promote water conservation
- Reduce per capita water use
- Provide valuable information and incentives for customers in reducing water use

The work of the Washington County Water Conservancy District to conserve water for our future is appreciated and supported by Hurricane City residents, businesses and guests.

Sincerely,

Hurricane City Water Department