



City of
**Santa
Monica**

Water Conservation Master Plan

Prepared by:



MADDAUS
WATER
MANAGEMENT

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LIST OF ABBREVIATIONS AND ACRONYMS

AB	Assembly Bill	PHET	Premium High Efficiency Toilet
acct	Account	MF	Multi-Family
AMI	Advanced Metering Infrastructure	MG	million gallons
AF	acre-feet or acre-foot	MGD	million gallons per day
AFY	acre-feet per year	MGY	million gallons per year
AWE	Alliance for Water Efficiency	MWELO	Model Water Efficient Landscape Ordinance
AWWA	American Water Works Association	MWM	Maddaus Water Management
AWWARF	American Water Works Association Research Foundation	N/A	not applicable
BMP	Best Management Practice	Plan	Water Conservation Master Plan
CalWEP	California Water Efficiency Partnership	psi	pounds per square inch
CEC	California Energy Commission	RES	Residential
COM	Commercial	SB	Senate Bill
CII	Commercial, Industrial, and Institutional	SF	Single Family
CPUC	California Public Utilities Commission	SWRCB	State Water Resources Control Board
DIM	Dedicated Irrigation Meter	SWMP	Sustainable Water Master Plan
DSS Model	Demand Side Management Least Cost Planning Decision Support System	SMURRF	Santa Monica Urban Runoff Recycling Facility
DWR	California Department of Water Resources	ULWU	Ultra Low Water Urinal
EPA	Environmental Protection Agency	UWMP	Urban Water Management Plan
FTE	Full-Time Equivalent	WBIC	weather based irrigation controller
GPCD	gallons per capita per day	WELIS	Water Efficient Landscape and Irrigation Standards
gpd	gallons per day	WTP	Water Treatment Plant
gpf	gallons per flush	WUE	Water Use Efficiency
gpm	gallons per minute	ZWU	Zero Water Urinal
HCF	Hundred Cubic Feet		
IRR	Irrigation		

WATER VOLUME UNITS AND CONVERSIONS

1 Hundred Cubic Feet (HCF) = 748 gallons

1 Acre-Foot (AF) = 325,851 gallons

1 Million Gallons (MG) = 3.068887 AF

1 EXECUTIVE SUMMARY

1.1 Introduction

Water conservation is a key component of the City of Santa Monica (City) Water Resources Division's mission to provide safe, sustainable, high-quality drinking water to the community. As described in the City's 2018 Sustainable Water Master Plan (SWMP), water conservation helps attain the SWMP goals of diversifying the City's water supply portfolio, enhancing water supply resiliency in the face of climate change and periods of extreme drought, and reducing reliance on imported water supplies (water self-sufficiency).

Water conservation activities are outlined in the SWMP; however, three significant developments have occurred since it was last updated in 2018:

- **Pandemic:** The three-year COVID-19 pandemic has significantly impacted the City's finances and staffing. As a result, the water conservation staff was reduced from 6 FTEs to 2 FTEs in 2020 and can now only maintain the status quo on the City's existing water conservation program and policies (e.g., Water Neutrality and Cash for Grass Landscape Rebates).
- **Drought:** 2020-2022 was the driest three-year period on record in California.
- **Legislation:** New mandatory California water conservation regulations have been passed that start on January 1, 2025. These regulations include:
 - *Making Water Conservation a California Way of Life:* Senate Bill 606 (Hertzberg), Assembly Bill 1668 (Friedman), and Senate Bill 1157 (Hertzberg)¹
 - *Potable Water Nonfunctional Turf:* Assembly Bill 1572 (Friedman)

As such, this Water Conservation Master Plan (Plan) presents a comprehensive program to realign the City's water conservation efforts in light of the above recent developments to achieve the SWMP goals and comply with the new California legislative requirements. The Plan analyzes new and existing water conservation measures and provides scheduling and resource recommendations to implement the selected measures, collectively called a Program.

1.2 Plan Objective

The Plan's objective is to help the City realign and advance its water conservation efforts by providing a program that will attain the SWMP water self-sufficiency and sustainability goals while taking into account the impacts of the Pandemic, ongoing drought, and new state regulatory requirements. This analysis is designed to be used in support of the City's water conservation program planning for budgeting, staffing, and workload prioritization.

1.3 Plan Process

City staff and Maddaus Water Management (MWM) worked together as a team to develop the WCMP using the following step-by-step process summarized in Figure 1-1.

¹ California Department of Water Resources, et al. (2018). *Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning* Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman).

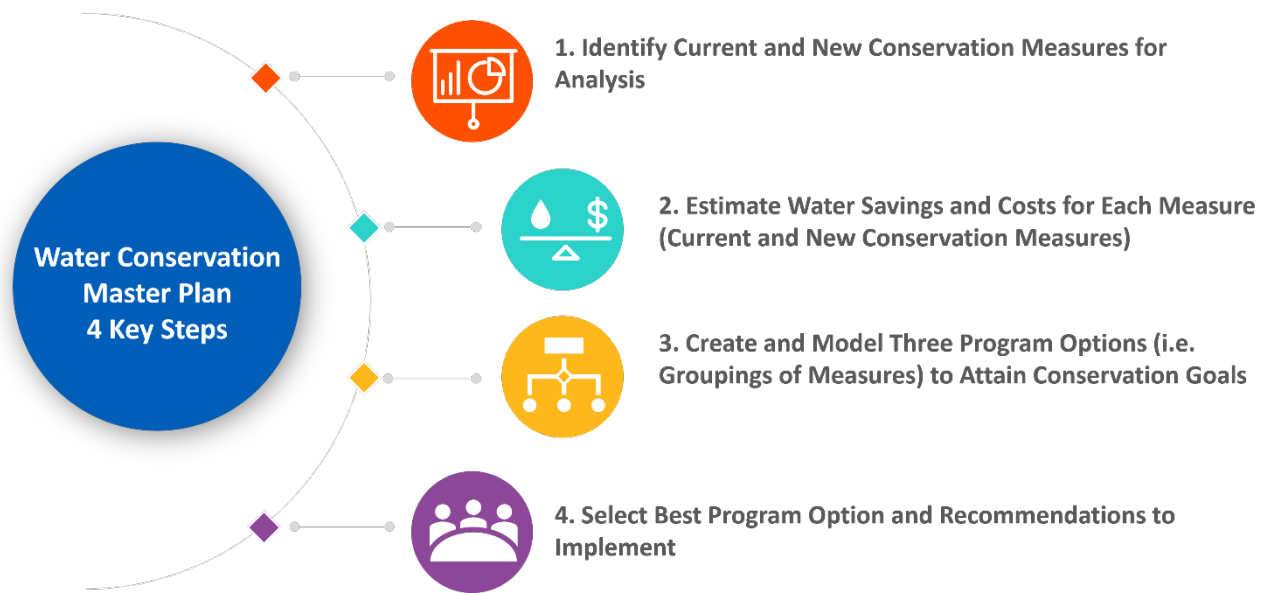


Figure 1-1. Water Conservation Master Plan Key Steps

1.3.1 Identify Conservation Measures for Analysis

First, City staff conducted a screening of more than 100 water conservation measures targeting residential and commercial customers, irrigation systems, and system-wide issues. The screening followed the methodology presented in the American Water Works Association Manual of Practice, M52 Water Conservation Programs – A Planning Manual (AWWA, 2017). The screening process resulted in the City selecting 16 applicable conservation measures (11 existing and five new), listed below in Figure 1-2, for detailed analysis and modelling.

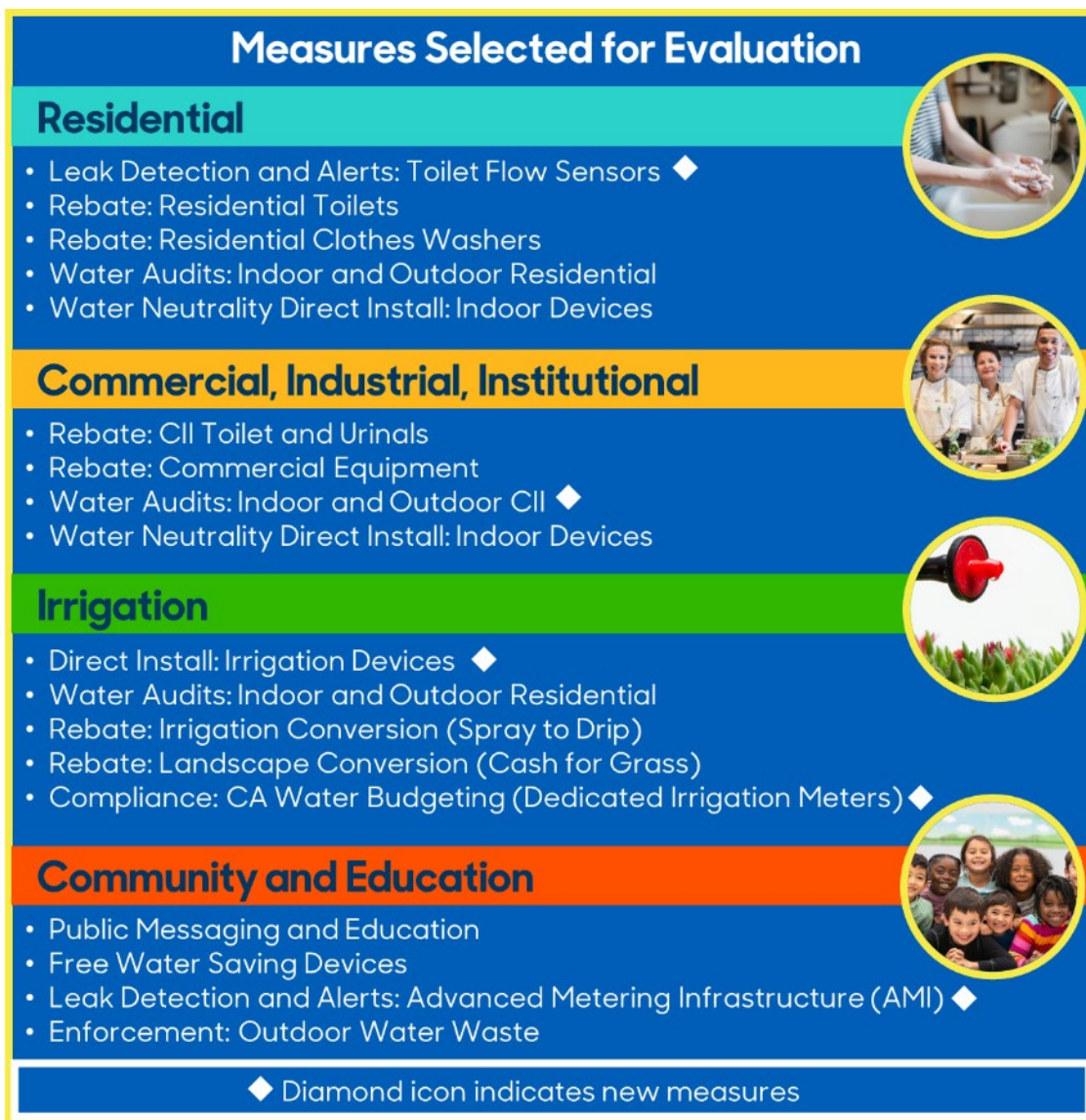


Figure 1-2. Measures Selected for Evaluation

1.3.2 Estimate Water Savings and Cost for Each Measure

An analysis of each of the selected 16 measures was then conducted by MWM using the Least Cost Planning Decision Support System (DSS Model). All 16 evaluated measures are described in Table 4-1 and the DSS Model outputs for each measure are in Appendix B. See Appendix A for details about the DSS Model itself.

1.3.3 Create and Model Three Program Options

After modeling, the 16 selected conservation measures were combined into three different suites for further evaluation as Program options.

- A. **Program A (Current)** includes the existing 11 measures only. This suite generally reflects the City's current conservation efforts.
- B. **Program B (Strategic)** includes 13 measures (nine existing and four new) that balance water savings with cost to save significant amounts of water and provide enhanced community outreach and education. *This is the Plan's recommended program.*

- C. **Program C (All-Inclusive)** includes all 16 measures modeled, making it the most expensive suite of measures as well as the one that will achieve the most water savings.

Table 1-1. Measures by Program

Measure Name	New	Program		
		A Current	B Strategic	C All-Inclusive
1. Leak Detection and Alerts: Advanced Metering Infrastructure (AMI)	◆		✓	✓
2. Leak Detection and Alerts: Toilet Flow Sensors	◆			✓
3. Free Water Saving Devices		✓	✓	✓
4. Public Messaging and Education		✓	✓	✓
5. Rebate: Toilets (Residential)		✓	✓	✓
6. Rebate: Toilet/Urinals (CII)		✓	✓	✓
7. Rebate: Clothes Washers (Residential)		✓	✓	✓
8. Rebate: Commercial Equipment (CII)		✓	✓	✓
9. Rebate: Irrigation Conversion (Spray to Drip)		✓		✓
10. Rebate: Landscape Conversion (Cash for Grass)		✓	✓	✓
11. Water Neutrality Direct Install: Indoor Devices		✓	✓	✓
12. Direct Install: Irrigation Devices	◆		✓	✓
13. Water Audits: Indoor and Outdoor Residential		✓	✓	✓
14. Water Audits: Indoor and Outdoor CII	◆		✓	✓
15. Enforcement: Outdoor Water Waste		✓		✓
16. Compliance: CA Water Budgeting (Dedicated Irrigation Meters)	◆		✓	✓

A comparison of the water savings and costs resulting from the DSS Model analysis for the three programs is provided in Table 1-2 below. Actual savings will depend on a variety of factors including staff resources, implementation schedule, population dynamics, and climate variability. For instance, by 2040, one measure has ended (Measure 16: Compliance- CA Water Budgeting (Dedicated Irrigation Meters), see Figure 6-1) and population growth has slowed. As a result, annual savings slightly decline.

Table 1-2. Water Savings and Costs of Evaluated Water Conservation Programs

Water Savings	Program A (Current)			Program B (Strategic)			Program C (All-Inclusive)		
Year	MGY	AFY	%	MGY	AFY	%	MGY	AFY	%
2025	77	236	2.2%	101	310	2.8%	106	327	3.0%
2030	162	496	4.6%	255	782	7.3%	264	810	7.6%
2035	220	675	6.5%	330	1013	9.7%	340	1043	10.0%
2040	241	740	7.1%	300	922	8.9%	310	953	9.2%
2045	243	747	7.4%	301	924	9.1%	311	956	9.4%
Lifetime Present Value of Water Savings (2023-2045)	\$8,075,000			\$11,301,000			\$11,704,000		
Lifetime Present Value of Utility Costs (2023-2045)	\$13,873,000			\$13,001,000			\$18,699,000		
Water Utility Average Cost of Water Saved (2023-2045)	\$3,290/MG		\$1,070/AF	\$2,250/MG		\$730/AF	\$3,120/MG		\$1,020/AF
2024-2028 Average Annual Utility Cost	\$980,000			\$932,000			\$1,331,000		

Notes:

1. Water savings are relative to the Plan baseline period (2017-2019, 2022) average annual demand of 3,599 MGY (11,045 AFY). The Plan baseline is 18.3% below the 2013 baseline (used in other analysis and reporting) of 13,519 AFY.
2. Program savings do not include savings from plumbing codes.
3. Costs are attributable only to the utility's conservation team.
4. Present value costs and savings are rounded to the nearest \$1,000.
5. Water utility cost of water saved is rounded to the nearest \$10.
6. 2024-2028 average annual utility cost is rounded to the nearest \$1,000.
7. 2024-2028 average annual utility cost for all three programs includes all direct City costs but does not include any costs related to partners' programs or grants.

	A	B	C
	Current	Strategic	All-Inclusive
# of Measures	11	13	16
Average Water Savings	183 MGY 563 AFY	252 MGY 772 AFY	260 MGY 799 AFY
Cost of Savings by Unit	\$3,290/MG \$1,070/AFY	\$2,250/MG \$730/AF	\$3,120/MG \$1,020/AF

Figure 1-3. Water Conservation Programs Comparison Summary

1.3.4 Selected Program and Implementation Recommendations

The final step in the Plan process was to select a program and develop recommendations to successfully implement the selected program including the staffing and resources. Based on MWM's analysis of the DSS Model output, the City selected Program B (Strategic) for implementation for the following reasons:

- Projected savings will provide the necessary conservation water supply (or water demand reduction) to help meet the City's SWMP goal of water self-sufficiency.
- The cost of water savings is approximately \$730/AF which is in the same range as the City's local groundwater supply, but less than the cost of MWD imported water (approximately \$1,250/AF in 2024).
- Program B has the highest cost-effectiveness of the three programs, offering the most water savings per unit cost.
- Excludes measures that have been determined to be a cost burden for little savings or water conserved.

Recommendations to assist with Program B implementation include:

- **Prioritize Measures for Implementation:** Measures that are relatively easy to operate with limited staff and contribute the most to meeting water saving targets should be prioritized for implementation. For example, each of the following are low in cost, result in significant water savings, and require less than 0.3 FTE to implement:
 - Compliance: CA Water Budgeting (Dedicated Irrigation Meters)
 - Water Audits: Indoor and Outdoor (Commercial, Industrial, and Institutional - CII)
 - Rebate: Toilet/Urinals (CII)
- **Prepare an Annual Work Plan:** Annually review the prior year's measures including their performance and contribution to water conservation goals (e.g., overall demand, projected water savings, and gallons per capita demand). Prepare an updated annual work plan that accounts for budget, staff resources, regulation compliance dates, and contracts. Consider partnerships, grants, and new contracts where appropriate.
- **Maintain Program Data Management:** Track and measure participation, cost, and other data to gauge successes and areas that need improvement. This data can also assist staff in preparing required DWR reports and plans such as the Annual Water Supply and Demand Assessment (Annual Assessment), Annual Water Shortage Assessment Report (Annual Shortage Report), and, every five years, the Urban Water Management Plan (UWMP).
- **Increase Staff Resources:** To implement Program B (Strategic), MWM recommends that the City increase the water conservation staff by two full-time equivalent (FTE). MWM recommends increasing staff by two FTEs (one Sustainability Analyst and one Program Support Assistant) to account for additional unforeseen programming to comply with upcoming state reporting requirements. (Many details of the new California water conservation legislation have yet to be finalized. When requirements are formally adopted, the Plan may need to be modified to include any new or revised actions needed by the City for compliance.)

2 INTRODUCTION

This section provides an overview of the City's water system and service area. This section also describes the purpose and objectives of the Plan, and the steps used to complete it.

2.1 Overview of the Santa Monica Water System

The City is an urban coastal community, bordered to the west by the Pacific Ocean and the City of Los Angeles to the north, east, and south. The City's Water Resources Division provides water, wastewater, and recycled water service to approximately 18,000 metered customers. The City maintains three well fields (total of 11 groundwater production wells), two well head treatment facilities to remove industrial contaminants (Charnock Treatment Plant and Olympic Advanced Water Treatment Facility), a brackish groundwater desalination facility (Arcadia Water Treatment Plant), four water storage reservoirs, two stormwater harvesting tanks, and two advanced water recycling facilities (Santa Monica Urban Runoff Recycling Facility and the Sustainable Water Infrastructure Advanced Water Treatment Facility). The City's water service area consists entirely of the City of Santa Monica with limited service in the City of Los Angeles (Figure 2-1).

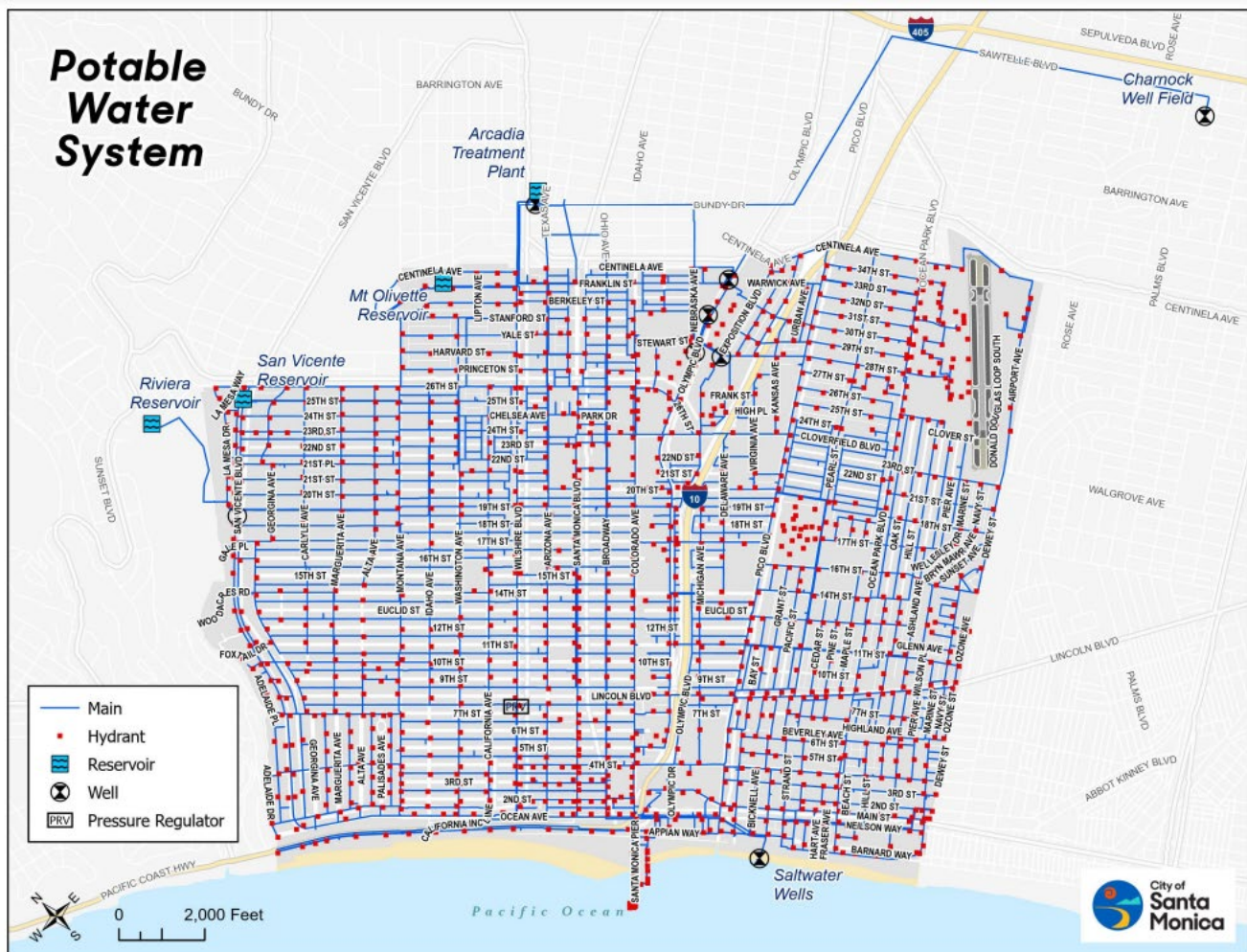


Figure 2-1. City of Santa Monica Potable Water System

The City experiences a Mediterranean climate, ranging from warm and generally dry summers to cool, relatively wet winters. Water usage in the City varies with changes in temperature and rainfall throughout the year. Climate change and a significant increase in housing units in the coming decades is expected to test the City's ability to sustainably manage its local water resources and maintain its goal of reducing its reliance on imported water supplies.

Besides local groundwater, the City’s current potable water supply also includes imported water from Northern California and the Colorado River, provided through the wholesale water agency Metropolitan Water District of Southern California (MWD). Santa Monica’s water supply profile² according to the City’s 2018 SWMP is displayed in Figure 2-2.

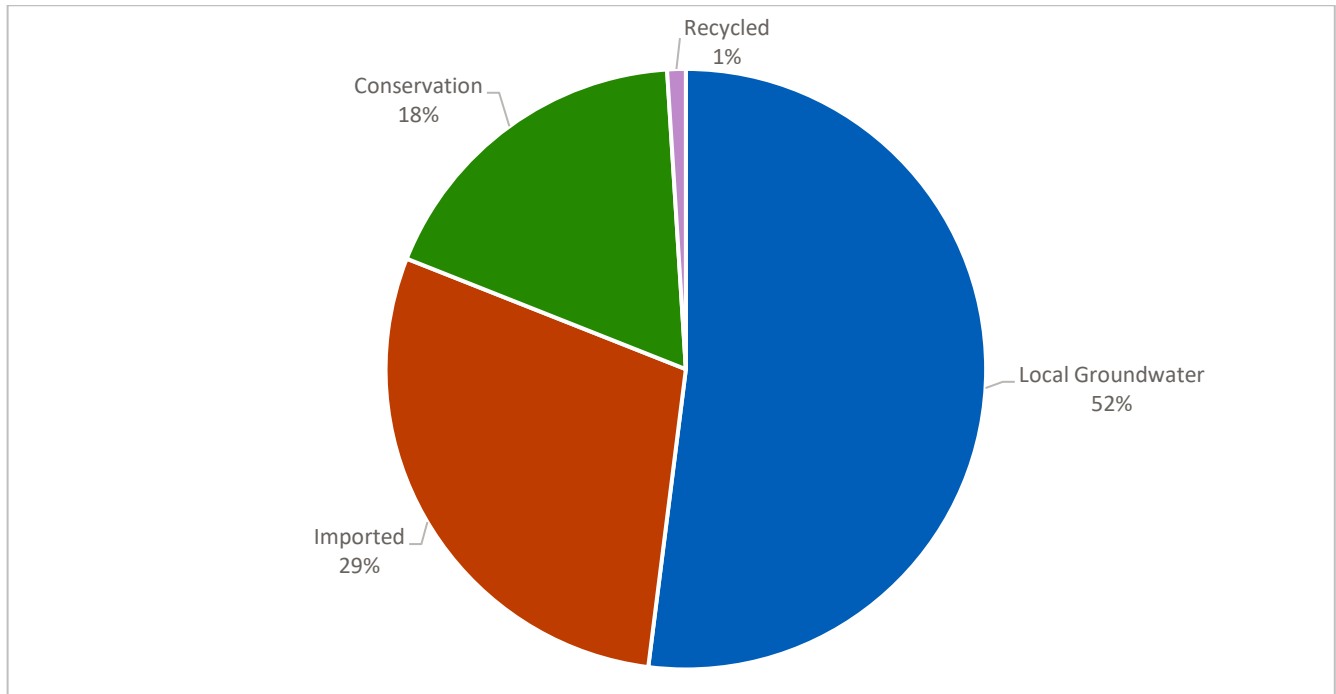


Figure 2-2. City of Santa Monica Water Supply Profile

As described in the City’s 2018 SWMP, the City was working towards a goal of water self-sufficiency by meeting 99% or more of the City’s water demand using local water sources. The 2018 SWMP outlined a comprehensive approach to achieve this goal with a combination of water demand reduction strategies, increased development of local water supplies, and implementation of alternative water supply projects to collectively offset imported water purchases from MWD. The original 99% water self-sufficiency goal has been impacted by the COVID-19 pandemic and revised to approximately 80% in the City’s 2020 Urban Water Management Plan if water conservation efforts are not realigned and advanced. With increased water conservation efforts, the City may be able to meet roughly 90% of its water supply through local water resources.

To increase local groundwater and alternative water supplies, the City has implemented several projects scheduled to be completed in 2023 and early 2024:

- **The Sustainable Water Infrastructure Project (SWIP):** SWIP will collect and treat stormwater, dry weather urban runoff, brackish groundwater, and municipal wastewater for permitted non-potable reuse applications and indirect potable reuse via aquifer recharge. The SWIP and upgrades to the Santa Monica Urban Runoff Recycling Facility (SMURRF) are expected to produce up to 1,680 AFY of advanced treated recycled water.
- **Olympic Well Field Restoration:** This project will restore the well field’s pumping capacity which has been limited due to prior industrial activities that contaminated the groundwater water aquifer. Restoring the Olympic Well Field will expand local groundwater production by up to 3,200 AFY.
- **Arcadia Water Treatment Plant (WTP) Expansion:** By retrofitting the plant’s existing reverse osmosis system with innovative Flow Reversal Reverse Osmosis (FRRO) technology, production efficiency will increase from 82% to 90% or greater. This will allow the City to produce additional high-quality drinking water from the same amount of raw

² Data in this figure represents the percentage of the City’s demand that was met by each source received in 2017.

groundwater. Upon project completion, the raw water treatment capacity of the Arcadia WTP will expand from 10 million gallons per day (MGD) to approximately 13 MGD.

2.2 Plan Purpose

The primary purpose of this Plan is to help the City realign and advance its water conservation efforts by providing a program that will attain the SWMP water self-sufficiency and sustainability goals while taking into account the impacts of the Pandemic, ongoing drought, and new state regulatory requirements. The Plan details the assessment and analysis of existing conservation measures and identifies new water use efficiency (WUE) opportunities. The Plan analyzes program costs and water savings, thereby evaluating whether expanding existing efforts is a feasible and cost-effective way to meet future water needs in comparison to using and/or developing other sources of water. This analysis is designed to be used in support of the City's water conservation program planning for budgeting, staffing, and workload prioritization.

Other purposes of the Plan are to refine water demand forecasts through the year 2045 using the most recent data available, and to support the City's parallel update of the Water and Sewer Master Plan and development of the Recycled Water Master Plan.

Through identification and prioritization of conservation measures, the City can project long-range demands, advance, and identify attainable conservation goals, develop strategies, and raise awareness. Additionally, potential water savings from the individual conservation measures and/or combinations thereof were determined in this Plan to assess potential per capita water use reduction. By combining new initiatives with existing activities, water conservation can contribute even further to the sustainable management of water supplies in the City's service area.

A key driver of the Plan is the need to achieve compliance with the new California state legislative requirements (described in Section 2.2.1 below) whereby the City is required to meet a water use objective and submit an annual report on progress.

Moreover, this Plan also aims to support compliance with the AWWA G480-20 Water Conservation and Efficiency Program Operation and Management Standard (G480 Standard), which is a voluntary standard that can be adopted by water providers at their own discretion. The G480 Standard describes the critical elements of an effective water conservation program and encompasses activities undertaken by a utility within its own operations to improve water use on the supply side through distribution system management and on the demand side through customer billing and education practices. An agency's water conservation program meeting this standard has the potential to impact all water users.³

2.2.1 California Legislation and the Water Use Objectives

In the aftermath of yet another drought from 2014-2017, the California Legislature established a framework centered on "Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman)."⁴ This framework was designed to help the state better prepare for droughts and climate change by establishing statewide water efficiency standards and incentivizing recycled water. The supporting state legislation, SB 606 and AB 1668, established guidelines for efficient water use and a framework for the implementation and oversight of the new standards by 2024. These efforts and requirements, along with any future regulations, will have profound effects on water providers over the coming years by requiring annual water budgets for urban retail water suppliers, per-person indoor water use goals, and documented preparation for long-term droughts.

In addition to performance measures for Commercial, Industrial, and Institutional (CII) water use, and with stakeholder input, the SWRCB will adopt long-term efficiency standards for outdoor water use and water loss through leaks. The legislation will require each urban retail water supplier to calculate and report an urban water use objective, which is an estimate of aggregate efficient water use for the previous year based on the adopted water use efficiency standards. As of March 1, 2024, reports are due by January 1, 2025, and every year thereafter. Senate Bill 1157 (Hertzberg), signed into law

³ American Water Works Association. G480 Standard and AWE Leaderboard web page:
<https://www.allianceforwaterefficiency.org/resources/topic/g480-standard-and-awe-leaderboard>

⁴ California Department of Water Resources, et al. (2018). Making Water Conservation a California Way of Life: Primer of 2018 Legislation on Water Conservation and Drought Planning Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman).

in September 2022 by Governor Gavin Newsom, lowered limits for indoor residential water use even further than those established just four years prior.

The bills grant the State Water Resources Control Board (SWRCB) the authority to enforce compliance with the Urban Water Use Objectives, which is expected to include monetary penalties for non-compliance. The bills also establish a schedule for state agencies to develop the methodology for implementing the requirements. This Plan will be used for compliance in meeting the many requirements of recent legislation and additional expected state mandates. A list of key requirements and proposed regulations from the legislation is included in Table 2-1.

This Plan is aligned to the state legislative framework; however, as illustrated in Table 2-1, details of the final state regulations have yet to be released. When detailed guidance becomes available, this Plan may need to be modified to include any new or revised actions needed by the City. Per the SWRCB, draft regulations will be released in the fall of 2024.

City staff plans to track state legislation metrics as the standards are developed through the state's stakeholder process by the California Department of Water Resources (DWR) and the SWRCB.

Table 2-1. SB 606 and AB 1668 Key Requirements - Completed and Proposed as of March 1, 2024

Date	AB 1668/SB 606 Key Requirements
Completed	- California Legislature standards for indoor residential water SB 1157 (Hertzberg) was signed by Governor Newsom in September 2022 with the following standards: 55 gallons per capita per day (GPCD) until 2025 47 GPCD from 2025 until January 2030 42 GPCD beginning in 2030 - DWR provided each urban retail water supplier with data regarding irrigable lands at level of detail sufficient to verify accuracy at the parcel level
September 30, 2022	DWR recommended standards for outdoor residential use, performance measures for CII water, variance provisions, incentive provisions for recycled water and standards for outdoor irrigation of landscape areas with dedicated irrigation meters (DIMs).
March 22, 2023	SWRCB staff provided alternate recommendations to the Board on standards, measures, incentives, and CII Performance Measures. Notable revisions include lowering the outdoor residential and CII standard to an evapotranspiration factor of 0.55 and 0.45 after Oct. 1, 2035 respectively, replacing the CII-DIM conversion threshold of 1 acre with a volumetric water usage of 500 thousand gallons or more annually (process water excluded), and changing the CII classification categories from the 19 NAICS codes recommended by DWR to the 18 categories used by the U.S. EPA's ENERGYSTAR Portfolio Manager tool.
Pending August 2024	- SWRCB to adopt long-term standards for efficient water use: Outdoor residential Outdoor irrigation of landscape with dedicated irrigation meters at CII customer sites Water loss (consistent with Senate Bill 555) - SWRCB to adopt performance measures for CII water use
Pending 2025	Urban water supplier shall calculate its urban water use objective and report its actual water demand for the previous calendar or fiscal year: Efficient indoor residential water use, <u>plus</u> Efficient outdoor residential water use, <u>plus</u> Efficient outdoor water use through dedicated irrigation meters (DIMS) at CII customer sites, <u>plus</u> Efficient water loss, <u>plus</u> Variances and incentives as appropriate

2.3 Plan Background and Development

This Plan provides detailed information for planning a conservation program that aligns with the following:

- Current and pending state regulations.
- California Public Utilities Commission (CPUC) resolutions.
- Urban Water Management Plan (UWMP) guidelines.
- Utility supply reliability goals.
- American Water Works Association Manual of Practice, M52 Water Conservation Programs – A Planning Manual (AWWA, 2017).

The Plan development (see Figure 2-3) included review of past documentation and data analyses. The City provided data per a list of requirements. The information requested and received included:

- Water production and consumption data on a bi-monthly basis for the different classes of water users.
- Complete descriptions of past, present, and proposed future conservation programs including historical annual participation rates.
- Results of any independent analyses of water savings due to prior City programs.
- Historical and projected water system service area population, employment, land use data, and growth projections through the year 2045, or other suitable end year, along with maps of the water system, political jurisdiction boundaries, and study area(s).
- Customer characteristics and data needed to characterize water conservation measures such as the number of facilities or businesses of a particular type.

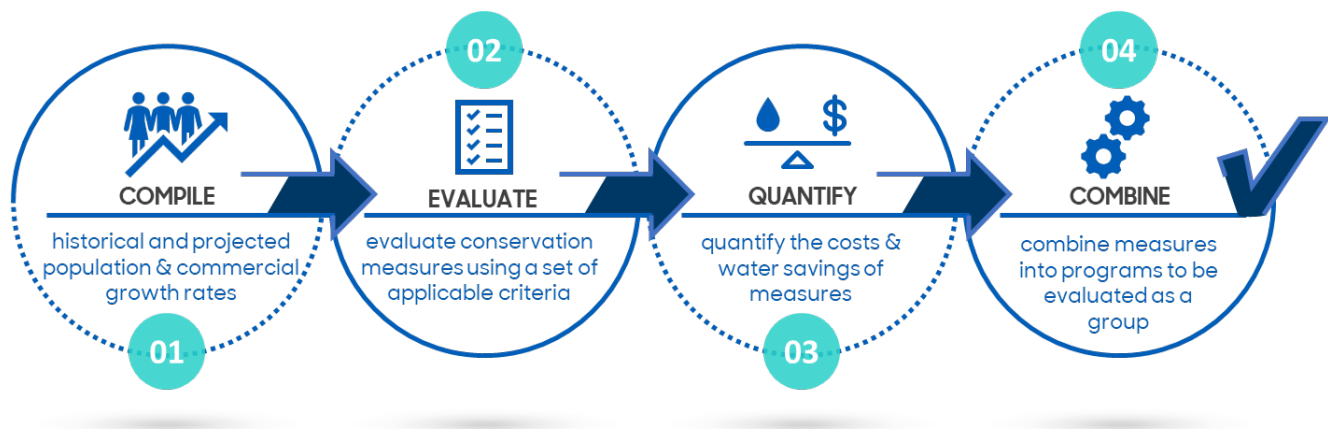


Figure 2-3. Plan Development Process

City staff worked closely with MWM to compile the data which was then input into MWM’s Least Cost Planning Decision Support System (DSS Model). This DSS Model, developed by MWM, provided an update to the DSS Model which was initially developed as part of the 2018 SWMP. The project team at MWM verified and tested data against historical records to ensure accuracy and logic as the DSS Model was developed. More detailed information about the DSS Model can be found in the appendices of this Plan, including a description of the assumptions, analysis, and methodology used.

MWM reviewed existing City practices and procedures to create a comprehensive list of water use conservation measures currently in place. The team also reviewed relevant literature and practices of other agencies to determine potential measures that could be implemented by the City. MWM used its master database of over 100 measures and followed the screening process outlined in the American Water Works Association Manual of Practice, M52 Water Conservation Programs – A Planning Manual (AWWA, 2017).

Throughout the planning process, the City and MWM conducted multiple meetings, primarily to complete the individual measure design sheets of the DSS Model which identify criteria such as fixture costs, applicable customer classes, length of implementation, measure life, administrative costs, end uses, end-use savings per replacement, and a target number or

percentage of accounts per measure year. Following the DSS Model completion and evaluation of program options, the draft and final Water Conservation Master Plan reports were prepared.

With detailed measure information readily available, the City has the flexibility to use this Plan as a guide to implement additional measures to help increase water savings whenever statewide drought occurs.

3 ANALYSIS OF WATER DEMAND

This section presents information about the data collection process, historical production, and customer category consumption data, as well as a summary of the City's conservation efforts.

3.1 Information Review and Data Collection Methods

A thorough collection and review of information relevant to this effort was conducted and entered into the City's Data Collection Workbook. Using the provided consumption and accounts values from the City, MWM and City staff confirmed the number and types of customers within the service area and identified the unique customer categories to be tracked.

Figure 3-1 presents data topics and items requested, gathered, and stored in the City's Data Collection Workbook.



Figure 3-1. Data Collection Workbook Topics and Items

3.2 Total Consumption

The City's water use patterns were analyzed based on twelve years of water consumption data provided by the City (years 2010 to 2022). Figure 3-2 illustrates the total consumption for the City's service area, not including recycled water consumption. Water consumption data was measured at the customer meters. Note the overall decreased water use since 2013 (approximately 20%) is related to the severe California drought from 2013-2017 and the water conservation efforts implemented during this period. Consumption can also be measured using gallons per capita per day (GPCD). Figure 3-3 illustrates the historical GPCD demand and how it has decreased as population has increased.

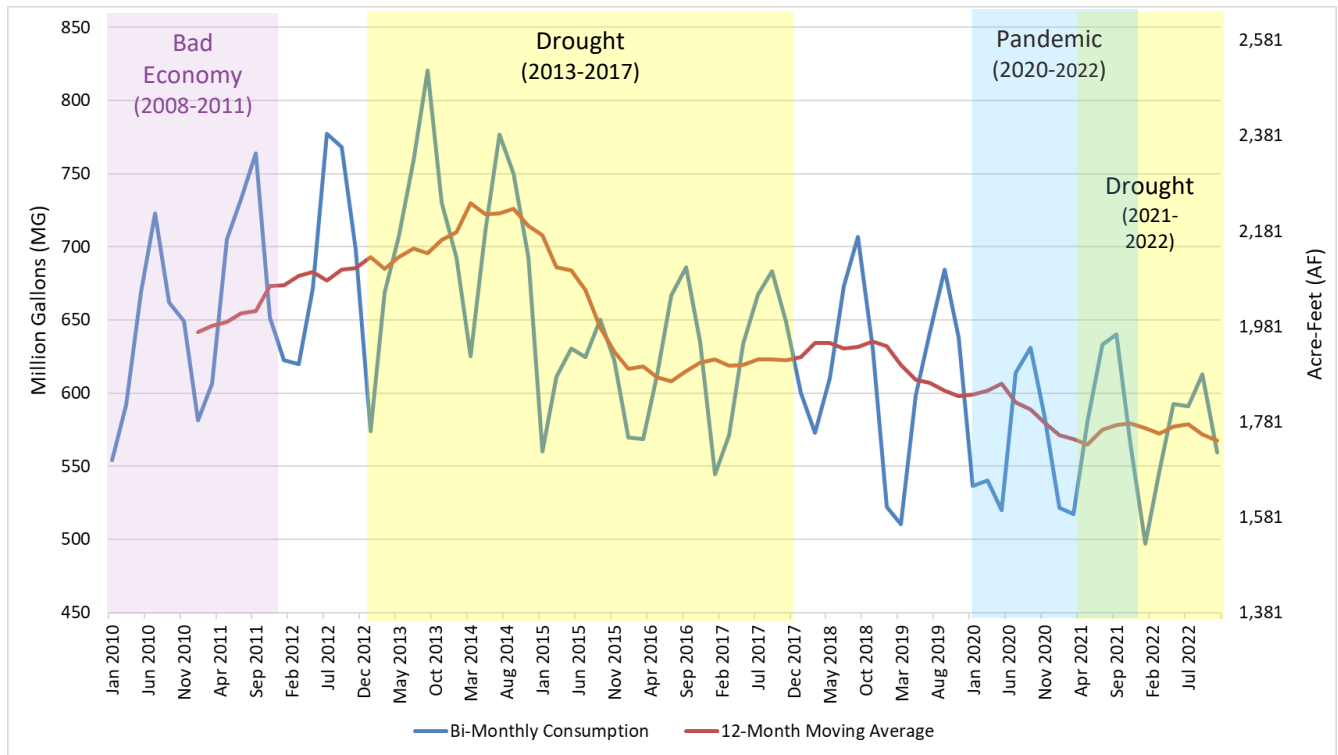


Figure 3-2. Bi-Monthly Consumption

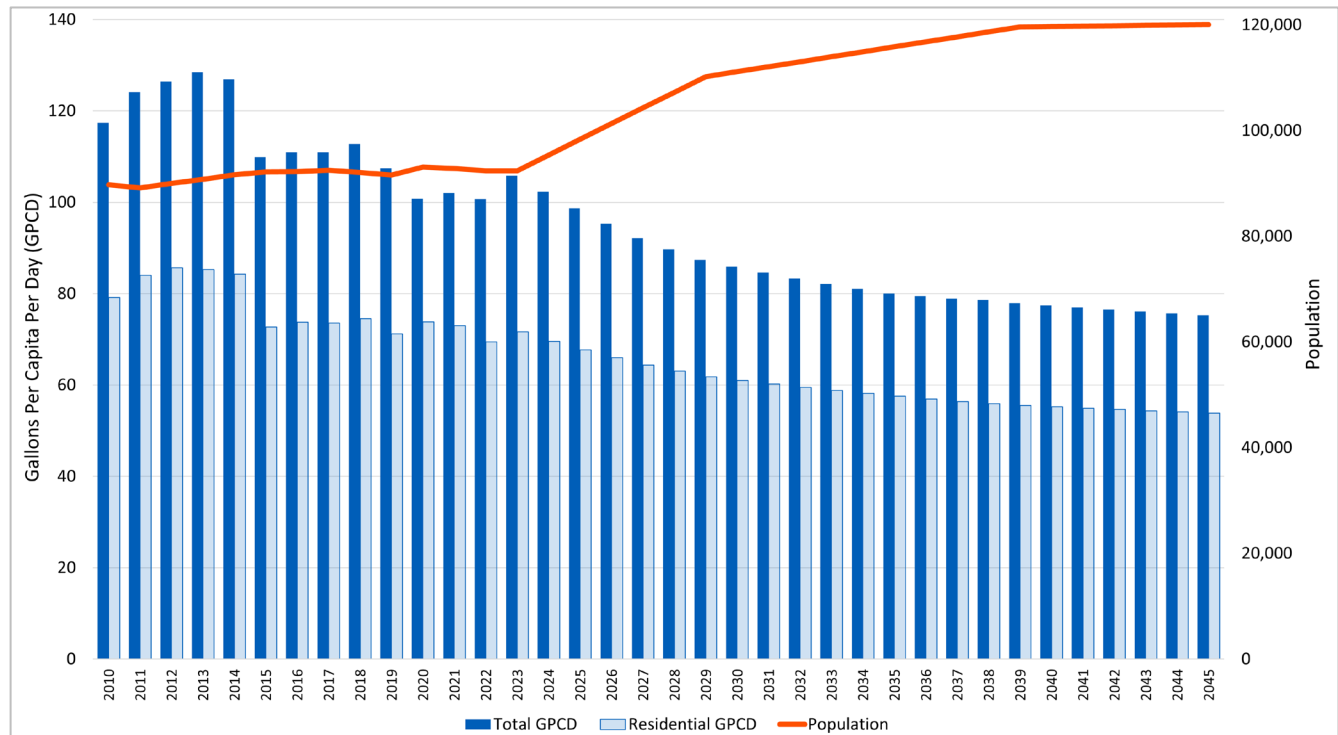


Figure 3-3. Gallons Per Capita Per Day and Population

Note: GPCD values include both indoor and outdoor water use.

3.3 Consumption by User Category

The City has a variety of customer categories utilized in their billing system. Data from each customer category was analyzed separately. This Plan has organized users into Single Family Residential, Multi-Family Residential, Commercial/Industrial, Institutional, Landscape Irrigation, and Fire categories to align with the City's 2020 UWMP customer categories. Figure 3-4 illustrates the water use breakdowns within the City based on water use data. The period 2017-2019, 2022 was selected as the baseline period for the water use profiles in this section to avoid potential abnormal impacts to the data from drought and the Covid-19 pandemic.

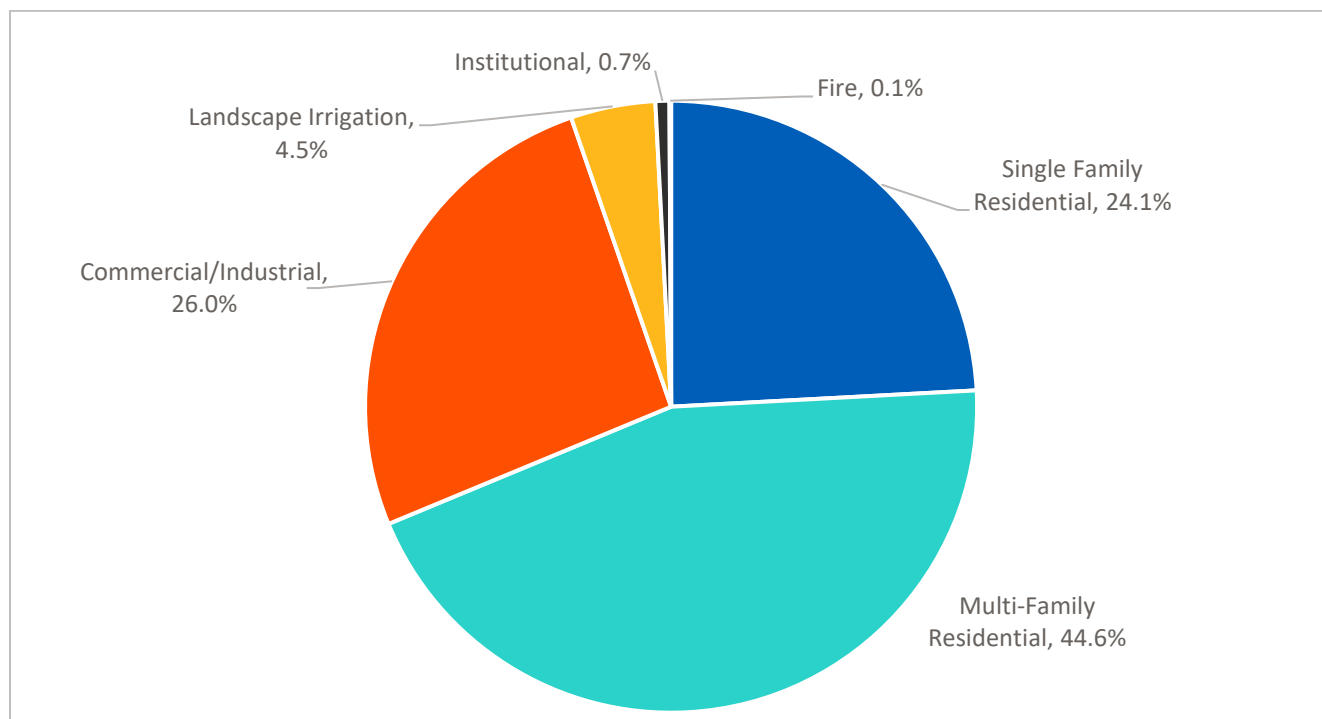


Figure 3-4. Consumption by Customer Category 2017-2019, 2022 (Baseline Period)

Note: Customer category water use is based on averaging 2017, 2018, 2019, and 2022 (Plan baseline period) historical water use per account by customer category, representing post-drought and non-Covid conditions.

Approximately 70% of the City's service area water usage is associated with residential water use. Consequently, residential and irrigation conservation programs will produce the most savings. The City's service area does include significant commercial and industrial activity as well (approximately 25% of total water use), and thus the conservation potential for this sector should not be overlooked.

Using the DSS Model, historical data was segregated into indoor and outdoor water use by customer type. To determine the indoor and outdoor water use split, it was assumed that indoor use is approximately equal to the minimum use in the winter. While there may be minimal landscape watering in the winter, or leakage from irrigation systems, it is assumed this is minor, at less than 5-10% of the average winter water use. Figure 3-5 shows the breakdown of water use into indoor and outdoor components based on these assumptions.

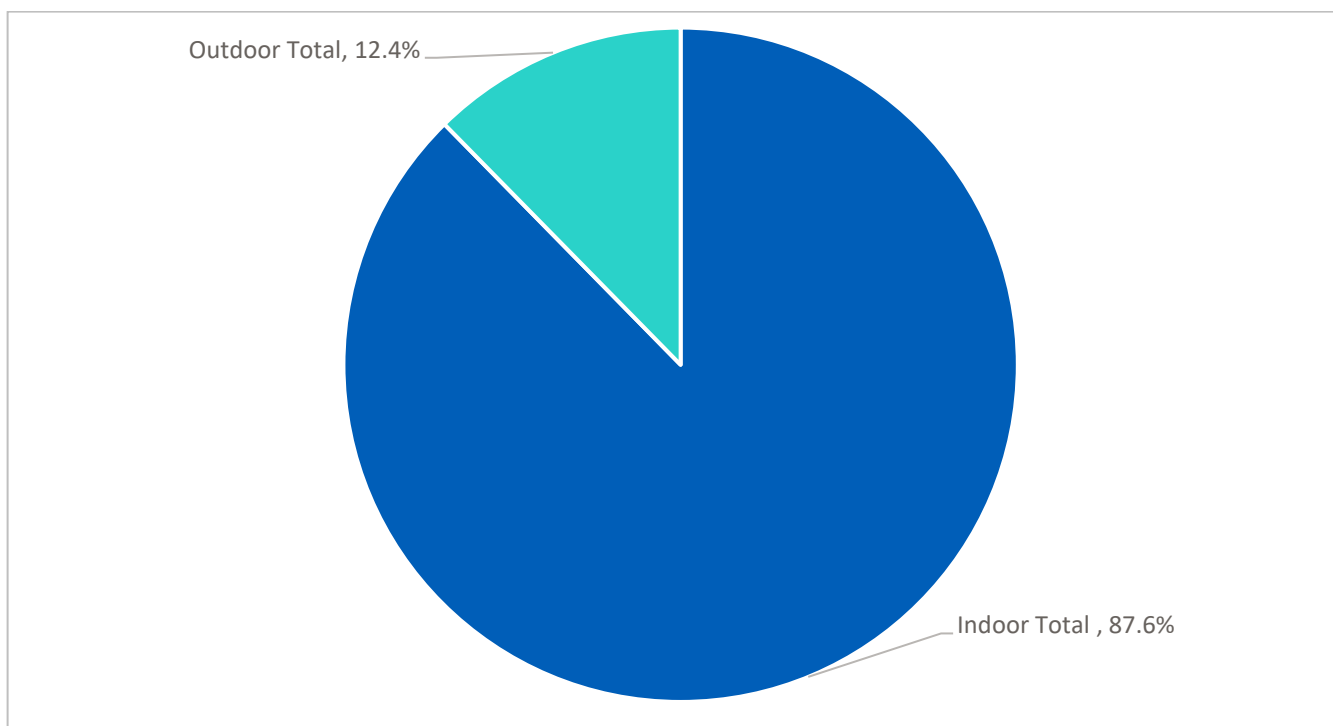


Figure 3-5. Overall Use: Indoor vs. Outdoor 2017-2019, 2022 (Baseline Period)

Note: Figure is based on average 2017-2019 and 2022 estimated indoor water use (Plan baseline period).

4 CONSERVATION MEASURE EVALUATION

The analysis for this Plan examined existing and new conservation measures the City could implement and how their savings contribute to water conservation. To estimate savings, MWM and City staff conducted a robust evaluation process to limit and define the appropriate conservation measures. City staff identified 16 conservation measures for further evaluation in the DSS Model, consisting of both existing and new measures. This section presents descriptions, baseline assumptions, and output comparison of the conservation measures that were evaluated as part of this Plan's development, as well as an overview of the conservation measure evaluation process conducted.

4.1 Conservation Measure Screening

The experience of many utilities has shown there is a reasonable limit to how many conservation measures can be feasibly implemented at one time. Programs that consist of many measures are historically difficult to implement successfully. Therefore, prioritization of measures is important both as an outcome of this planning effort and as the program is implemented.

The approach to program implementation is viewed as a "living" process where opportunities may arise and be adopted as new technologies become available and as conditions change over time. Program timelines can also be adjusted, with the recognition that doing so may impact the savings objectives.

An important step in developing this Plan included the identification and screening of a library list of over 100 measures to a short-list for detailed evaluation (benefit-cost analysis). The library list of measures was drawn from MWM and City experience and a review of what other water agencies with innovative and effective conservation programs are implementing. Each measure screened included devices and/or activities to achieve water conservation and the distribution method, or mechanism (direct install, incentive, ordinance, etc.). A thorough screening process was necessary to identify a reasonable short-list of measures for evaluation in the DSS Model. City staff reduced the library list of existing and new measures down to 16 measures based on a quantitative and qualitative ranking of each measure's estimated water savings, cost to the City, public acceptance, and ease of implementation. The 16 selected measures target water conservation across all relevant customer categories. Figure 4-1 shows the City's measure screening criteria.

MEASURE SCREENING CRITERIA



Figure 4-1. Measure Screening Criteria

4.2 Conservation Measures Evaluated

Table 4-1 defines all 16 measures that were thoroughly analyzed for the Plan. Information about the DSS Model analysis approach to measure unit costs, water savings, and lifetimes are in Appendix C. Actual measure inputs used in the DSS Model to evaluate the water conservation measures selected by the City, and their results, can be found in individual measure screenshots from the DSS Model provided in Appendix B.

Table 4-1. Measure Descriptions

Measure Name	Description
1. Leak Detection and Alerts: Advanced Metering Infrastructure (AMI)	The City plans to have AMI fully deployed and operational by 2026. The rollout includes web portals to access AMI data: one for the utility, and one for customers (which includes a mobile app). This measure consists of two aspects: 1) Water resources or billing staff will reach out to customers when usage is flagged as a leak by the web portal if there are no immediate response by the customer, and 2) Education for customers on accessing the web portal/mobile app and setting up their own leak detection alerts (which has been shown to improve accountability and reduce water use). Note: this measure does not include watering restrictions, monitoring, or enforcement.
2. Leak Detection and Alerts: Toilet Flow Sensors	The City will provide rebates or other financial incentives to Multi-Family (MF) property owners for a toilet leak detection technology system (e.g., Sensor Industries SI-Flush Sensor). These sensors send data to a server that alerts property owners of potential leaks. This measure can be a starting component of a follow-on comprehensive MF program (modeled after Santa Clarita Valley Water's MF program).
3. Free Water Saving Devices	The City's Water Resources Division bulk purchases high efficiency showerheads, faucet aerators, toilet dye strips, and hose nozzles and gives them away for free at the City office or community events. The City is planning to add pre-rinse spray valves for restaurants. Free devices are also included in the Office of Sustainability's residential sustainability kit. The City also partners with Sustainable Works to distribute devices through their Green Business Program.
4. Public Messaging and Education	The City conducts several public education and training efforts including: • Printed and electronic materials to raise awareness of conservation measures available to customers. This includes newsletters, bill stuffers, brochures, working with local newspapers, signage at retailers, signs on public buses, social media campaigns, and website updates. • Community outreach: Conducting presentations at various neighborhood groups, BIDs, and booths at relevant community events with free device giveaways. Workshops or other means for educating customers, landscapers, and contractors in efficient landscaping and irrigation principles (e.g., Sustainable Landscape Workshops at the Airport Demonstration Gardens). • School education program. • Recognition program for water saving businesses- through Green Business Program efforts by Sustainable Works • Non-Functional Turf Education • Fixture replacement compliance (SB 407) • Signage in public landscape areas (e.g., using recycled water, reduced watering, etc.)

Measure Name	Description
5. Rebate: Toilets (Residential)	The City provides a rebate for installing a Premium High Efficiency Toilet (PHET: i.e., a toilet that uses 1.06 gpf (4 liters/flush) or less) that replaces a toilet using ≥ 1.6 gpf in residential properties. The current rebate covers up to nine toilets (SF only, unlimited for MF) and covers the material cost up to \$200/toilet (\$40 from MWD and supplemental \$160 from the City). A new incentive amount going forward would provide \$70 in supplemental funds from the City per toilet for a total rebate of \$110. California (CA) code requires toilets flush at 1.28 gpf or less.
6. Rebate: Toilet/Urinals (CII)	The City provides a rebate for the installation of a Premium High Efficiency Toilet (PHET: i.e., a toilet that uses 1.06 gpf (4 liters/flush) or less) that replaces a toilet using ≥ 1.6 gpf in CII properties. The current rebate covers the material cost up to \$200/toilet (\$40 from MWD and supplemental \$160 from the City). A new incentive going forward would provide a \$70 rebate from the City per toilet for a total rebate of \$110. CA code requires toilets flush at 1.28 gpf or less. The City provides a rebate for the installation of an Ultra-Low Water Urinal (ULWU: 0.125 gpf) or Zero Water Urinal (ZWU) that replaces a urinal using ≥ 1.5 gpf. The current rebate covers the material cost up to \$400/urinal (\$200 from MWD and supplemental \$200 from the City). The City proposes to keep the same incentive amount moving forward. CA code requires urinals flush at 0.125 gpf or less.
7. Rebate: Clothes Washers (Residential)	The City provides a rebate for High Efficiency Clothes Washers (meet or exceeds the CEE Tier 1 standard) to Single Family homes. The current rebate covers the material cost up to \$400/HECW (\$85 from MWD and supplemental \$315 from the City). A new incentive amount going forward would provide \$120 in supplemental funds from the City for a total rebate of \$205.
8. Rebate: Commercial Equipment (CII)	The City provides rebates for water efficient indoor commercial equipment. This includes air-cooled ice machines, steamers, dry vacuum pumps, and controllers on cooling towers. The City can add cooling tower submeters as an additional item, but this would be a City rebate and not through MWD.
9. Rebate: Irrigation Conversion (Spray to Drip)	The City's Spray to Drip program provides a rebate for water-efficient landscape irrigation retrofits that replace overhead spray irrigation (sprinklers) in non-turf areas (e.g., hedges and planter beds) with highly efficient drip irrigation. The rebate is \$2.00/sqft up to \$4,000 for SF, \$6,000 for MF and CII.
10. Rebate: Landscape Conversion (Cash for Grass)	The City's Cash for Grass program provides a landscape conversion rebate for water-efficient landscape retrofits that remove turf grass, cap sprinklers, and install low-water plants, compost, mulch, and drip irrigation. The rebate is \$3.50/sqft up to \$6,000 for SF. The rebate is \$3.50/sqft up to \$10,000 for MF, \$20,000 for CII. The City uses Eagle Aerial's WaterView to identify

Measure Name	Description
	large turf areas to target outreach for landscape conversion. This measure will be further encouraged by the passing of Assembly Bill 1572 (Friedman): <i>Potable Water Nonfunctional Turf</i> , banning nonfunctional turf in commercial landscapes.
11. Water Neutrality Direct Install: Indoor Devices	The Water Neutrality Direct Install Program installs high efficiency indoor fixtures in SF, MF, and CII buildings. This includes Santa Monica-Malibu Unified School District, Santa Monica College, and private schools. Replacements include high efficiency toilets, showerheads, faucet aerators, and high efficiency urinals. Installations are performed by a contracted third-party installer. The “Water Neutrality Direct Install Program” is funded by Water Neutrality offset fees for new development which are determined during plan check.
12. Direct Install: Irrigation Devices	For SF, MF, CII, and IRR customers with landscape, this measure would provide for the installation of water efficient irrigation upgrades. This could be in conjunction with the WaterWise landscape surveys or via one of CalWEP's turnkey programs for administration assistance. Included in the menu of installations are rotary nozzles, WBICs, soil moisture sensors, rain sensors, and rain barrels. The City uses Eagle Aerial's WaterView to identify large turf areas to target outreach. This program could be funded by Water Neutrality fees.
13. Water Audits: Indoor and Outdoor Residential	The City may provide a free water survey for Residential customers. The City is working on a contract with WaterWise Consulting to provide water surveys for residential customers. Those with high water use or that have received a Notice of Violation (NOV) for outdoor water waste are targeted. This measure assumes these customers are different than those targeted with AMI leak alerts. This measure includes an onsite visit and customized report on how to save water. Outdoor surveys would include simple irrigation repairs, spray head alignment, retrofits with rotary nozzles, and installation and programming of WBICs. These surveys can link with the Irrigation Devices Direct Install program. An outdoor survey is the primary offering, with indoor water surveys also available upon request. Indoor surveys include free installation of efficient showerheads and aerators.
14. Water Audits: Indoor and Outdoor CII	The City would provide a free water survey for CII customers, targeting top users including hotels, hospitals, and restaurants. This measure assumes these audits are contracted but could be administered in-house with additional staff. After the free water use survey, the City would provide recommendations in a report and describe if the site qualifies for rebates, direct installs, and/or MWD's WSIP (Water Savings Incentive Program). Recommendations would be tailored to each site based on water savings potential. This measure could link to the Equipment Rebates measure and the Irrigation Devices Direct Install program. This is modeled after the West Basin pilot program.

Measure Name	Description
15.Enforcement: Outdoor Water Waste	The City's Water Conservation requirements SMMC 7.16.020 prohibits the waste of water outdoors, including failure to repair leaks in a timely manner. Water waste enforcement is handled for reported violations with Notices of Violation sent to the property's account holder. A contract is pending for nighttime water waste patrols. A component of this program could be to provide coupons for saving water and money at a certified water smart car wash. Water smart car washes recycle water on-site or send it to a water treatment facility where the water is treated, recycled, and reused. Some establishments may go waterless, providing car cleaning services with environmentally friendly products using little or no water. Coupons may only be redeemed at a participating retailer. Coupons could be presented at the time of purchase. Water Resources Protection could provide coupons when addressing water runoff issues.
16.Compliance: CA Water Budgeting (Dedicated Irrigation Meters)	This measure would include conducting detailed landscape area measurements for CII dedicated irrigation accounts. The City can use aerial imagery including freely available National Agricultural Aerial Program (NAIP) Imagery. The recommended state standard would require urban retail water suppliers to identify dedicated irrigation meters (DIMs) and measure the associated irrigated CII landscapes within five years after the State Water Board adopts the regulation. The total landscape area will be incorporated into a landscape water use equation/standard (provided by DWR) to produce a supplier level CII landscape budget in gallons. The state will not enforce CII landscape budgets for individual parcels/customers. This also includes requirements for new MF and CII developments and SF accounts with greater than 5,000' of irrigation to install a dedicated landscape meter. This is already specified in the City's WELIS and enforced in plan check.

4.3 Conservation Measure Analysis

MWM conducted an economic evaluation of each selected water conservation measure using the DSS Model. Appendix B presents detailed results including how much water each measure will save annually through 2045, how much each will cost, and the cost of saved water per unit volume if the measure were to be implemented on a stand-alone basis (i.e., without interaction or overlap from other measures that might address the same end use/uses). Dollar savings from reduced water demand was quantified annually and based on avoided costs provided by the City.⁵ Actual measured design parameter inputs can be found in Appendix B. While each measure was analyzed independently, it is important to note very few measures operate independently. For example, higher efficiency indoor fixtures go together with indoor water checkups and public education.

It should be noted that the water savings from the education measure is not double counted with other conservation measures. As a result, costs appear significantly higher for education than for other measures due to the very minimal water savings estimated for the singular cost investment. However, other measures certainly would be less effective or possibly infeasible without an active outreach program. Without community and school education initiatives, customers would be unaware of other conservation measures and participation would likely be reduced.

⁵ Santa Monica's weighted unit cost of imported water in fiscal year 2022 was \$3,508/MG (\$1,143/AF).

Figures 4-2, 4-3, and 4-4 below summarize the comparison of cost of savings per unit volume and projected water savings of all modeled measures. Measures that have low cost of savings would be most cost effective for the utility to implement since they have the lowest costs it would take per AF of water saved. However, the cost of savings should not be the only factor considered for measure selection, as there are many additional benefits or considerations. This analysis demonstrates that the most cost-effective measures include commercial equipment rebates, water neutrality direct installations, and dedicated irrigation meter compliance. On the other hand, some of the least cost-effective measures for the utility to implement include Spray to Drip rebates, outdoor water waste enforcement, and toilet flow sensors. Comparing cost-effective measures to measures with high savings, we can see that most of the high savings' measures are the most cost-effective as well, but there are a few distinctions; for example, the commercial equipment rebate is the most cost-effective measure but does not rank very high in terms of savings. So, while this measure may be a good choice to implement during times of budget constraints, the City may elect to implement other measures with greater savings potential when they have the capital to go after the most water savings possible.

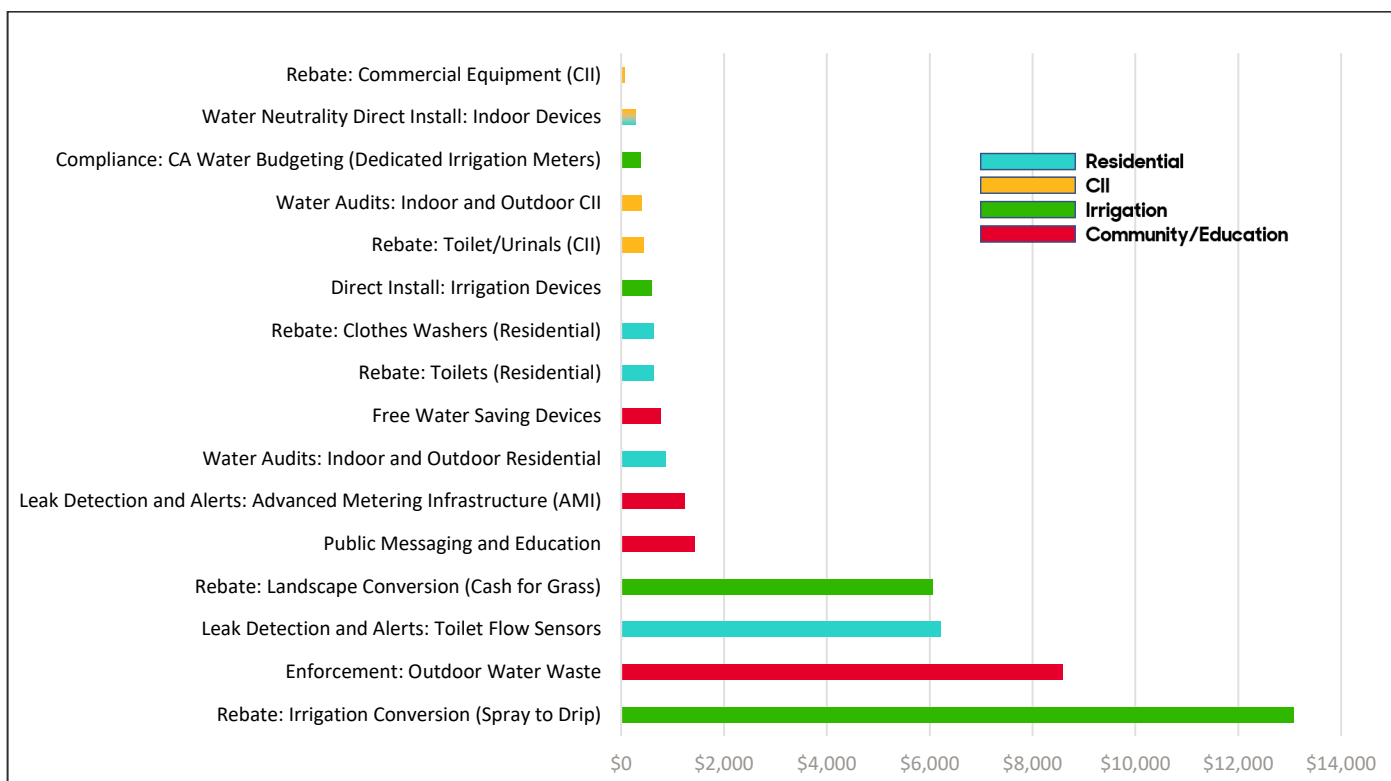


Figure 4-2. Cost of Savings per Unit Volume (\$/AF) based on cumulative water savings in 2035

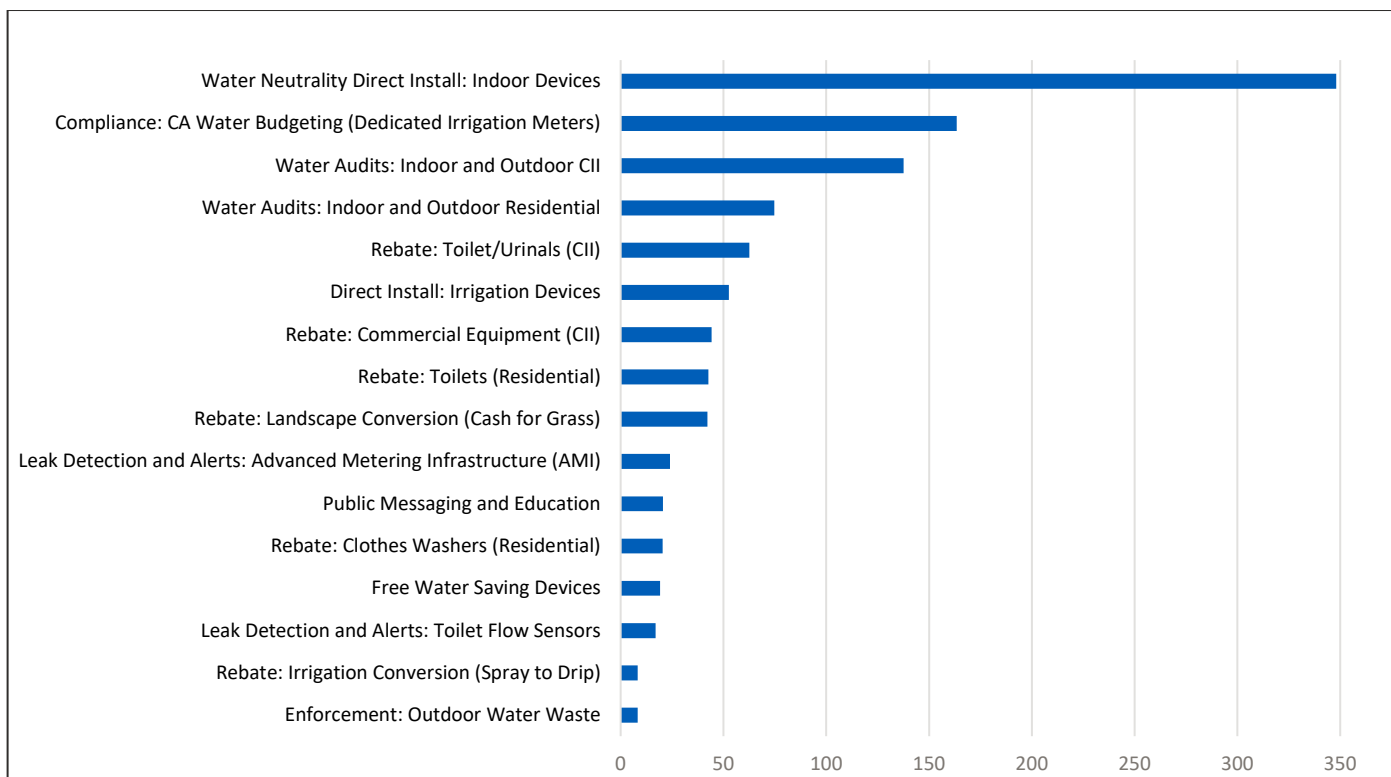


Figure 4-3. Cumulative Projected Water Savings in 2035 (AF)

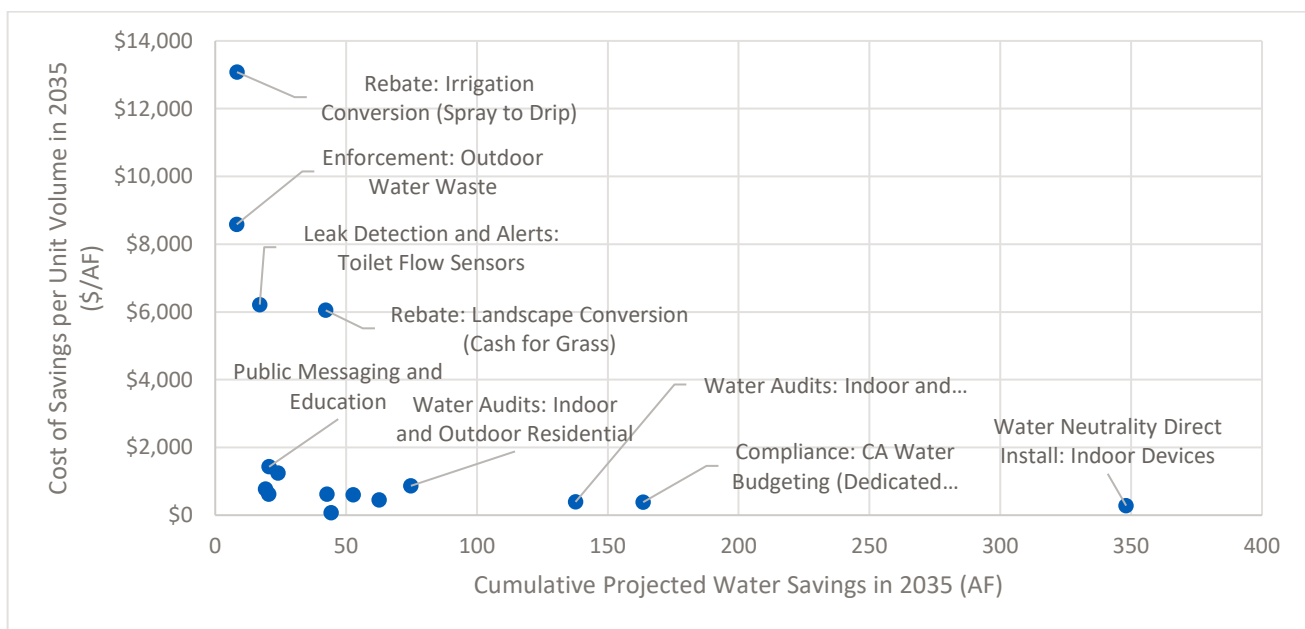


Figure 4-4. Cumulative Projected Water Savings vs. Cost of Savings per Unit Volume (2035)

5 CONSERVATION PROGRAM EVALUATION

This section provides a summary of which measures were included in each of the three conservation programs (Programs A, B, and C) as well as the program implementation strategy selected by the City. The three programs were designed to illustrate a range of various measure combinations and resulting water savings.

The following key items were taken into consideration during measure selection for Programs A, B, and C:

- Existing conservation measures eases implementation and enhancement
- Measures run by MWD – funding and administration provided
- Conservation measures recommended by AWWA, CalWEP (California Water Efficiency Partnership – formerly CUWCC), DWR, and others – success seen from previous implementation and/or pilot studies
- New and innovative measures – creates new water savings opportunities
- Equitability among customer categories – promotes accessibility for all customers to participate
- Customer demographics – to align measure offerings with customer needs

In addition, this section identifies and prioritizes the conservation programs and projects by cost effectiveness, quantifiable water savings, and compliance with American Water Works Association G480 Water Conservation Program Operation and Management Standard (G480 Standard). The G480 Standard is defined on the AWWA web page as follows:

5.1 Measure Selection for Conservation Program Alternatives

Using the data gathered, MWM created a list of all potential program concepts that were appropriate for the City service area to meet future regulatory and conservation compliance mandates. The list included existing program elements and traditional conservation measures as well as concepts that had yet to be implemented or considered by the City. Factors for determining which measure should be in each program included budgeting, feasibility to implement the program, and the time at which each measure would need to be introduced to promote conservation efforts. Programs also needed to address water conservation across all relevant customer categories. These program scenarios were not intended to be rigid but rather to demonstrate the range in savings that could be generated if selected measures were run at the same time. When programs were analyzed, any overlap in water savings (and benefits) from individual measures was considered to provide a total combined water savings (and benefits).

Programs A, B and C involve the following measures:

- **Program A (Current):** Current conservation program with no changes; includes 11 measures.

- **Program B (Strategic):** This is the recommended program selected by the City including 13 measures. In addition to nine existing measures from Program A, Program B includes four new measures that the City is already in progress on or plans to start soon:
 - Advanced Metering Infrastructure (AMI) for Leak Detection
 - Direct Install of Irrigation Devices
 - Commercial/Industrial/Institutional Water Audits (CII), Indoor and Outdoor
 - Water Budgeting (Dedicated Irrigation Meters)

These additional measures are a high priority for the City to implement due to several factors such as cost effectiveness, community benefits, and legislative compliance. However, the availability of staff bandwidth may present a challenge to implement all four additional measures.

Program B does not include two current measures from Program A due to high costs and low savings: Spray to Drip Rebate and Outdoor Water Waste Enforcement.

- **Program C (All-Inclusive):** This program includes all modeled measures, which includes all 11 from Program A and the four new additional measures from Program B. In addition, Program C includes a new Toilet Flow Sensors for Leak Detection measure, for a total of 16 measures.

Table 5-1 and Figure 5-1 summarize the three program alternatives:

Table 5-1. Measures by Program

Measure Name	New	Program		
		A Current	B Strategic	C All-Inclusive
1. Leak Detection and Alerts: Advanced Metering Infrastructure (AMI)	◆		✓	✓
2. Leak Detection and Alerts: Toilet Flow Sensors	◆			✓
3. Free Water Saving Devices		✓	✓	✓
4. Public Messaging and Education		✓	✓	✓
5. Rebate: Toilets (Residential)		✓	✓	✓
6. Rebate: Toilet/Urinals (CII)		✓	✓	✓
7. Rebate: Clothes Washers (Residential)		✓	✓	✓
8. Rebate: Commercial Equipment (CII)		✓	✓	✓
9. Rebate: Irrigation Conversion (Spray to Drip)		✓		✓
10. Rebate: Landscape Conversion (Cash for Grass)		✓	✓	✓
11. Water Neutrality Direct Install: Indoor Devices		✓	✓	✓
12. Direct Install: Irrigation Devices	◆		✓	✓
13. Water Audits: Indoor and Outdoor Residential		✓	✓	✓
14. Water Audits: Indoor and Outdoor CII	◆		✓	✓
15. Enforcement: Outdoor Water Waste		✓		✓
16. Compliance: CA Water Budgeting (Dedicated Irrigation Meters)	◆		✓	✓

5.2 Conservation Program Analysis

Table 5-2 shows the estimated annual savings in five-year increments for all three programs, as well as the present value of water savings and utility costs. Program B has the lowest cost per unit of water saved, making it the most cost effective of the three programs. Program C offers a little more water savings, but at a higher cost. Overall, all three programs reduce demand significantly compared to demand without conservation (Figure 5-2).

Table 5-2. Water Savings and Costs of Evaluated Water Conservation Programs

Water Savings	Program A (Current)			Program B (Strategic)			Program C (All-Inclusive)		
Year	MGY	AFY	% of demand	MGY	AFY	% of demand	MGY	AFY	% of demand
2025	77	236	2.2%	101	310	2.8%	106	327	3.0%
2030	162	496	4.6%	255	782	7.3%	264	810	7.6%
2035	220	675	6.5%	330	1013	9.7%	340	1043	10.0%
2040	241	740	7.1%	300	922	8.9%	310	953	9.2%
2045	243	747	7.4%	301	924	9.1%	311	956	9.4%
Lifetime Present Value of Water Savings (2023-2045)	\$8,075,000			\$11,301,000			\$11,704,000		
Lifetime Present Value of Utility Costs (2023-2045)	\$13,873,000			\$13,001,000			\$18,699,000		
Water Utility Average Cost of Water Saved (2023-2045)	\$3,290/MG		\$1,070/AF	\$2,250/MG		\$730/AF	\$3,120/MG		\$1,020/AF
2024-2028 Average Annual Utility Cost	\$980,000			\$932,000			\$1,331,000		

Notes:

1. Water savings are relative to the Plan baseline period (2017-2019, 2022) average annual demand of 3,599 MGY (11,045 AFY). The Plan baseline is 18.3% below the 2013 baseline (used in other analysis and reporting) of 13,519 AFY.
2. Program savings do not include savings from plumbing codes.
3. Costs are attributable only to the utility's conservation team.
4. Present value costs and savings are rounded to the nearest \$1,000.
5. Water utility cost of water saved is rounded to the nearest \$10.
6. 2024-2028 average annual cost is rounded to the nearest \$1,000.
7. 2024-2028 average annual utility cost for all three programs includes all direct City costs but does not include any costs related to partners' programs or grants.

	A	B	C
	Current	Strategic	All-Inclusive
# of Measures	11	13	16
Average Water Savings	183 MGY 563 AFY	252 MGY 772 AFY	260 MGY 799 AFY
Cost of Savings by Unit	\$3,290/MG \$1,070/AFY	\$2,250/MG \$730/AF	\$3,120/MG \$1,020/AF

Figure 5-1. Conservation Programs Comparison Summary

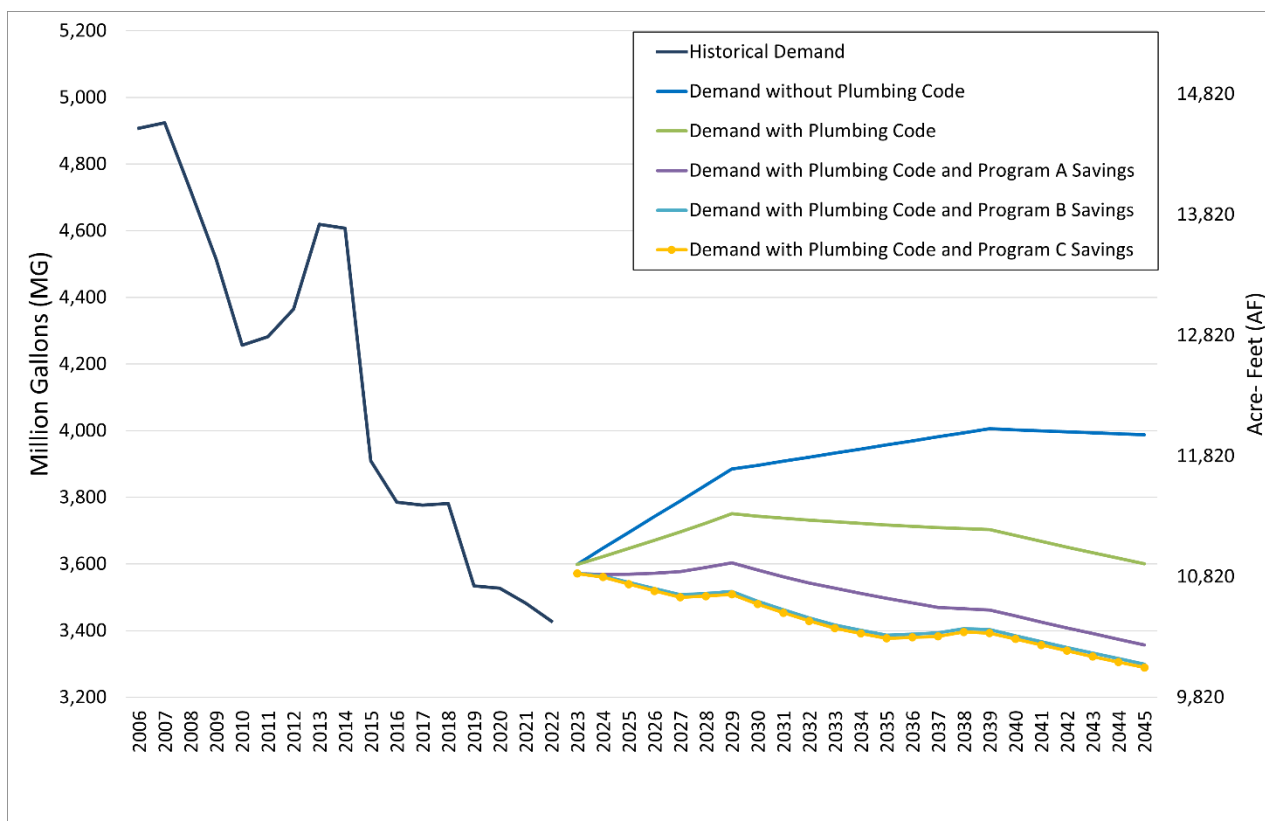


Figure 5-2. Water Demand with Different Program Options

It is best practice to use an average of multiple years and not start a demand forecast on a single abnormal year which can reflect a drought year, or a high water use year. The years 2020-2021 were pandemic and drought years for the City. Therefore, the average baseline demand in Figure 5-2 for the first year of the projection (2023) is an average of 2017-2019 and 2022 water consumption data. This methodology explains the gap observed between historical demand ending in 2022 and the baseline demand in 2023 in Figure 5-2.

Figures 5-3 presents estimated average per capita per day demand including plumbing code and active conservation. Active conservation results from the effort of water providers and their customers, in other words actively implementing and participating in conservation measures. On the other hand, passive conservation, otherwise known as plumbing code savings, results from the natural replacement of fixtures and appliances due to local, state, and national plumbing codes and standards.

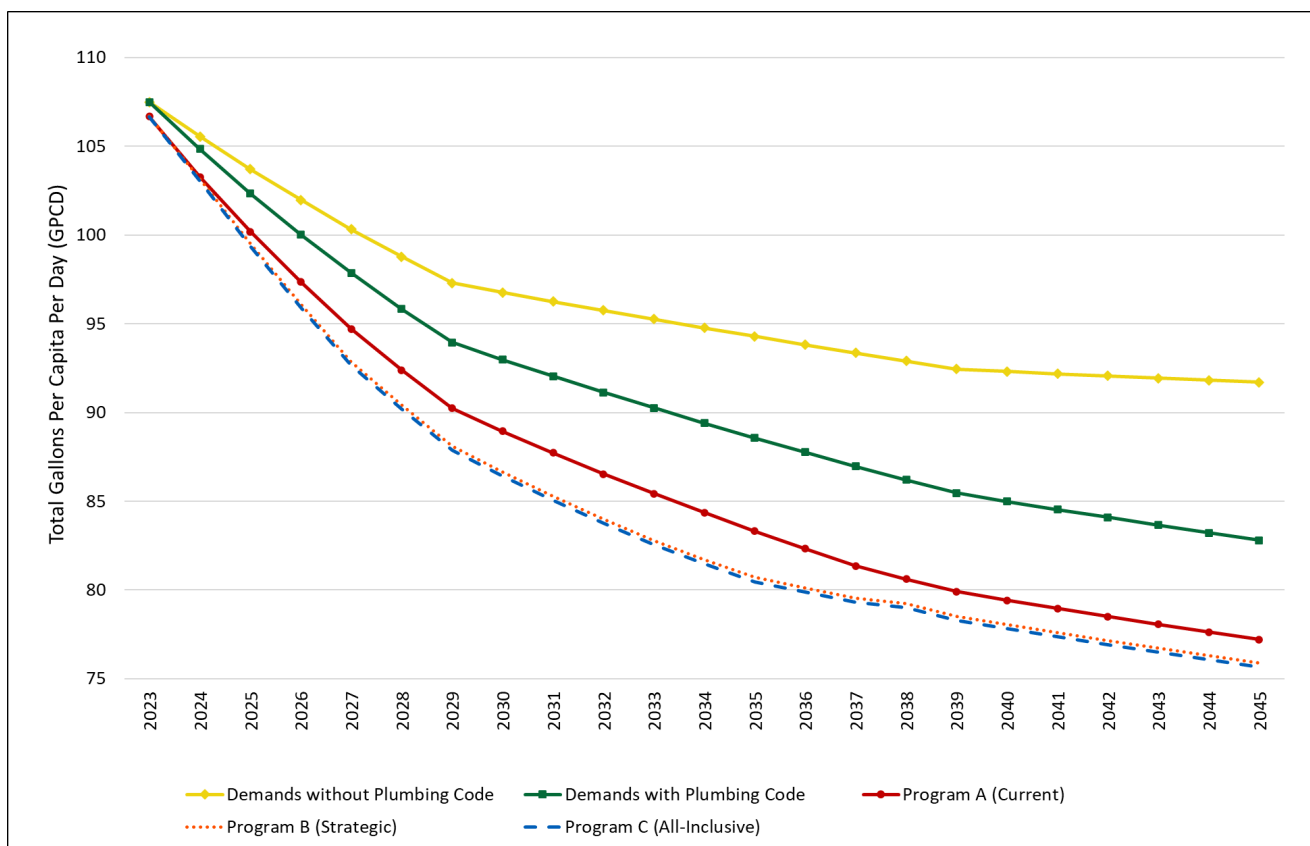


Figure 5-3. GPCD Demand

5.3 Selected Program B (Strategic)

Current conditions have encouraged the City to implement Strategic Program B and pursue the additional measures in Program C only as needed to achieve their water use objective or if drought conditions return and call for more drastic conservation measures.

However, water use in a service area is very dynamic and responds to changes in population, economy, weather, efficiency of devices, and types of industry. In the future, as the Santa Monica community evolves and water use patterns and weather change, there remains the possibility that the City will elect to adjust measure implementation targets and schedules. This may include expounding upon, or scaling back, various program components and measures to increase efficiency; meet benefit-cost ratios; adopt better technology or methods; or meet budget and staffing restrictions.

Whether additional measures become necessary would be dependent on several factors, including potential future drought conditions; compliance with the annual aggregate water use objectives as provided by the state; and the City's ability to support new and more innovative programs. With individual measures clearly defined and water saving objectives and customer target goals measurable, the City has quantifiable performance goals to track on both an individual measure and overall program level basis.

Program B has the highest cost-effectiveness of the three programs, offering the most water savings per unit cost. Program B was also selected because many of the current measures and the additional measures could be reasonably accomplished with existing staffing supplemented with contracted services or consulting assistance. Program B also excludes measures that, through this Plan analysis, have been determined to be a cost burden for little savings. Program C offers little more savings for more cost to both the City's water utility and City customers. The additional measures in Program C can be pursued if the current drought continues and more drastic conservation measures are required.

The estimated cost to the City to implement the Strategic Program B as described in the Plan is approximately \$932,000/year for 2024-2028. The costs include utility expenses (materials, rebates, giveaways, admin etc.). Costs covered by MWD and other partners are not included. The opportunities for cost sharing partnership with other utilities (energy, sewer, or

neighboring water utilities), or other means for lowering the cost of a conservation measure, will lower the budgetary needs for implementation.

Overall conclusions for the Plan’s selected Program B (Strategic) are depicted in Figure 5-4.

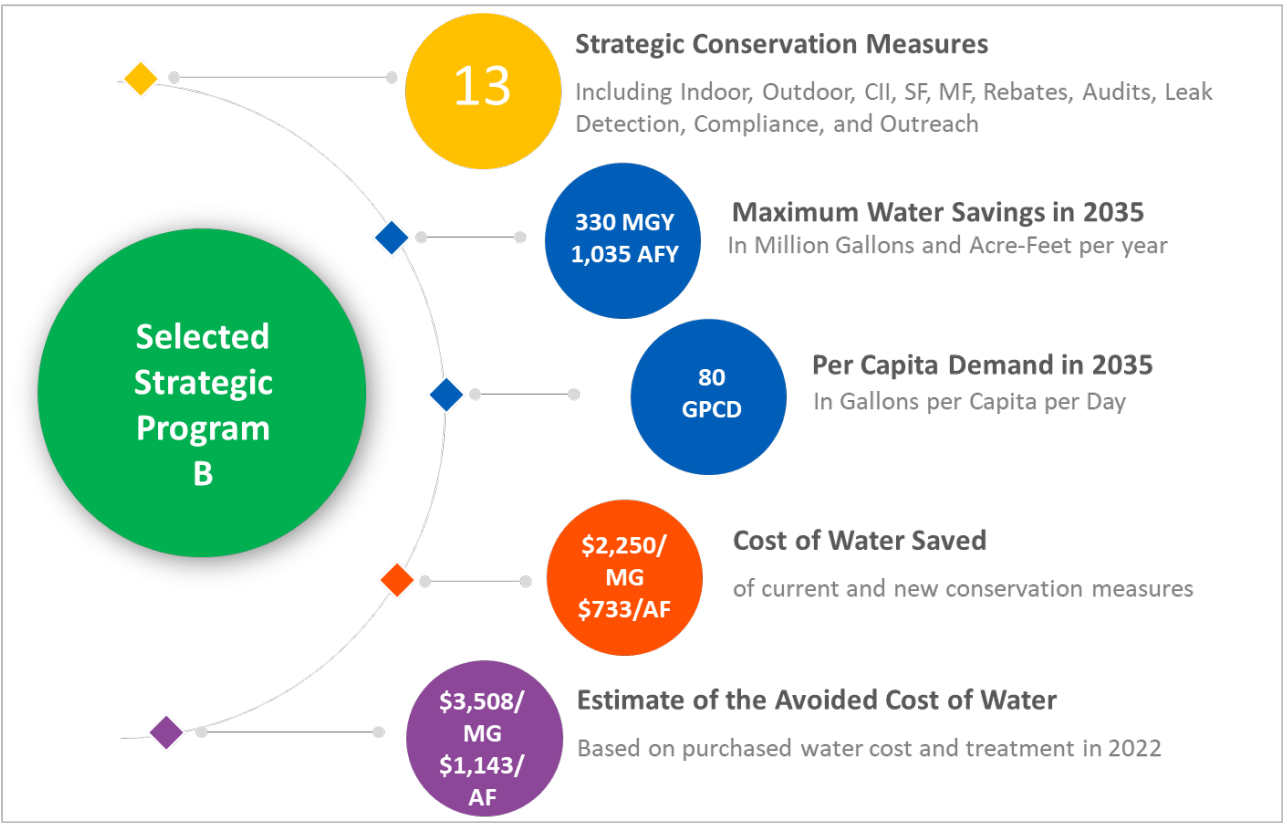


Figure 5-4. Program B (Strategic) Results Summary

Table 5-3. Program B (Strategic) Water Demand, Savings, GPCD, and Costs

Program B (Strategic)	Population	Water Demand		Water Savings ^{3,4}			Total GPCD	Utility Program Costs	Utility Admin Costs	Total Utility Cost (Program + Admin)
Year		MG	AF	MG	AF	% of demand	Gallons	Program Cost ⁶	Program Cost ⁶	Program Cost ⁶
Baseline ^{1,2}	92,408 ²	3,599 ¹	11,045 ¹	N/A	N/A	N/A	108 ¹	-	-	-
2023	92,412	3,572	10,963	26	81	0.7%	106	\$727,000	\$304,000	\$1,032,000
2024	95,377	3,564	10,938	58	179	1.6%	102	\$842,000	\$363,000	\$1,206,000
2025	98,342	3,545	10,880	101	310	2.8%	99	\$922,000	\$406,000	\$1,328,000
2026	101,307	3,526	10,821	145	444	4.1%	95	\$961,000	\$448,000	\$1,409,000
2027	104,272	3,508	10,766	188	578	5.4%	92	\$965,000	\$448,000	\$1,413,000
2028	107,237	3,512	10,778	211	648	6.0%	90	\$969,000	\$448,000	\$1,417,000
2029	110,202	3,517	10,794	233	716	6.6%	87	\$973,000	\$448,000	\$1,421,000
2030	111,143	3,488	10,705	255	782	7.3%	86	\$973,000	\$448,000	\$1,422,000
2035	115,848	3,387	10,393	330	1013	9.7%	80	\$977,000	\$448,000	\$1,425,000
2040	119,704	3,385	10,387	300	922	8.9%	77	\$892,000	\$405,000	\$1,298,000
2045	120,034	3,299	10,125	301	924	9.1%	75	\$889,000	\$404,000	\$1,294,000
Totals (2023-2045) ⁷	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$21,124,000	\$9,610,000	\$30,734,000
Averages (2023-2045) ⁷	N/A	3,434 MGY	10,538 AFY	252 MGY	772 AFY	7.3%	84 GPCD	\$918,000/YR	\$418,000/YR	\$1,336,000/YR

Notes:

1. Baselines for Water Demand and GPCD are the average annual for the years 2017-2019 and 2022.
2. Baseline for Population is for the year 2022.
3. Water savings are relative to the baseline demand of 3,599 MGY (11,045 AFY).
4. Program savings do not include savings from plumbing codes.
5. Costs are attributable only to the utility's conservation team.
6. Utility program costs are rounded to the nearest \$1,000.
7. Totals and averages are for the complete modeling period (2023-2045). Not all years are included in this table.

6 PROGRAM B IMPLEMENTATION

This section presents an overview of the conservation planning options proposed for the City, including budgeting, data monitoring strategies, an implementation schedule and staffing needs. Conservation is the least expensive means of meeting future water supply needs for the area. The implementation of these conservation measures should reduce per capita water use and have the potential to defer the need for further infrastructure expansion. While the conservation actions identified can have a significant cost, the cost of not doing conservation and having to address increased demands through engineering solutions are even higher. Furthermore, with climate change, long-term drought, and environmental restrictions on the delivery of imported water, additional water supplies may not be available to meet future increases in demands without conservation.

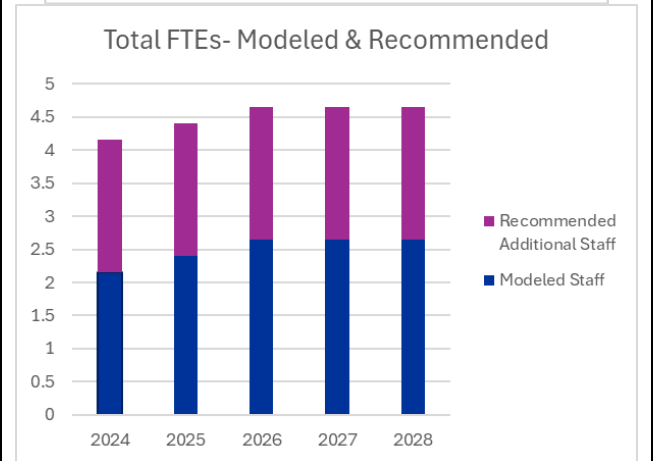
6.1 Implementation Costs and Schedule

Table 6-1 (following page) depicts the modeled labor (FTEs) and utility expense to implement Program B (Strategic) through 2028. Expenses for each measure are calculated from the fully burdened Water Resources Specialist FTE cost and device and material expenses. In addition, individual measure cost is based on target implementation metrics. For example, some measures are based on a percentage of accounts and therefore may grow or decline as the customer populations change, while others are based on the number of accounts and may therefore remain steady.

Figure 6-1 presents an implementation schedule for each individual measure in Program B (Strategic) illustrated through 2040, with arrows indicating which measures extend through 2045. A description of each measure can be found in Table 4-1.

Table 6.1 Program B (Strategic): Total Modeled Utility Expenses Through 2028

		Annual Labor + Expense				
		Full Time Equivalent (FTEs)				
	Conservation Measure Activity	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Community and Education	Leak Detection and Alerts: AMI	\$0 0	\$0 0	\$79,280 0.25	\$81,790 0.25	\$84,310 0.25
	Free Water Saving Devices	\$22,190 0.1	\$22,190 0.1	\$22,190 0.1	\$22,190 0.1	\$22,190 0.1
	Public Messaging and Education	\$47,110 0.25	\$47,110 0.25	\$47,110 0.25	\$47,110 0.25	\$47,110 0.25
	Community and Education Total	\$128,130 0.35	\$128,130 0.35	\$165,780 0.6	\$168,320 0.6	\$170,850 0.6
Residential	Rebate: Residential Toilets	\$39,200 0.02	\$39,200 0.02	\$39,200 0.02	\$39,200 0.02	\$39,200 0.02
	Rebate: Residential Clothes Washers	\$16,430 0.03	\$16,430 0.03	\$16,430 0.03	\$16,430 0.03	\$16,430 0.03
	Water Audits: Indoor and Outdoor Residential	\$96,180 0.1	\$96,180 0.1	\$96,180 0.1	\$96,180 0.1	\$96,180 0.1
	Water Neutrality Direct Install (residential + commercial)	\$126,600 0.75	\$126,600 0.75	\$126,600 0.75	\$126,600 0.75	\$126,600 0.75
	Residential Total	\$430,160 0.9	\$430,160 0.9	\$430,160 0.9	\$430,160 0.9	\$430,160 0.9
Commercial, Industrial, Institutional	Rebate: CII Toilet and Urinals	\$41,270 0.02	\$41,230 0.02	\$41,190 0.02	\$41,160 0.02	\$41,120 0.02
	Rebate: Commercial Equipment	\$4,220 0.02	\$4,220 0.02	\$4,220 0.02	\$4,220 0.02	\$4,220 0.02
	Water Audits: Indoor and Outdoor CII	\$72,540 0.1	\$72,480 0.1	\$72,410 0.1	\$72,350 0.1	\$72,280 0.1
	Commercial, Industrial, Institutional Total	\$143,180 0.14	\$143,060 0.14	\$142,940 0.14	\$142,820 0.14	\$142,690 0.14
Irrigation	Direct Install: Irrigation Devices	\$42,200 0.25	\$42,200 0.25	\$42,200 0.25	\$42,200 0.25	\$42,200 0.25
	Rebate: Landscape Conversion (Cash for Grass)	\$334,390 0.51	\$334,810 0.51	\$335,240 0.51	\$335,660 0.51	\$336,090 0.51
	Compliance: CA Water Budgeting (Dedicated Irrigation Meters)	\$0 0	\$79,410 0.25	\$80,530 0.25	\$81,650 0.25	\$82,770 0.25
	Irrigation Total	\$504,210 0.76	\$626,350 1.01	\$628,000 1.01	\$629,660 1.01	\$631,310 1.01



City of Santa Monica's Sustainable Water Master Plan

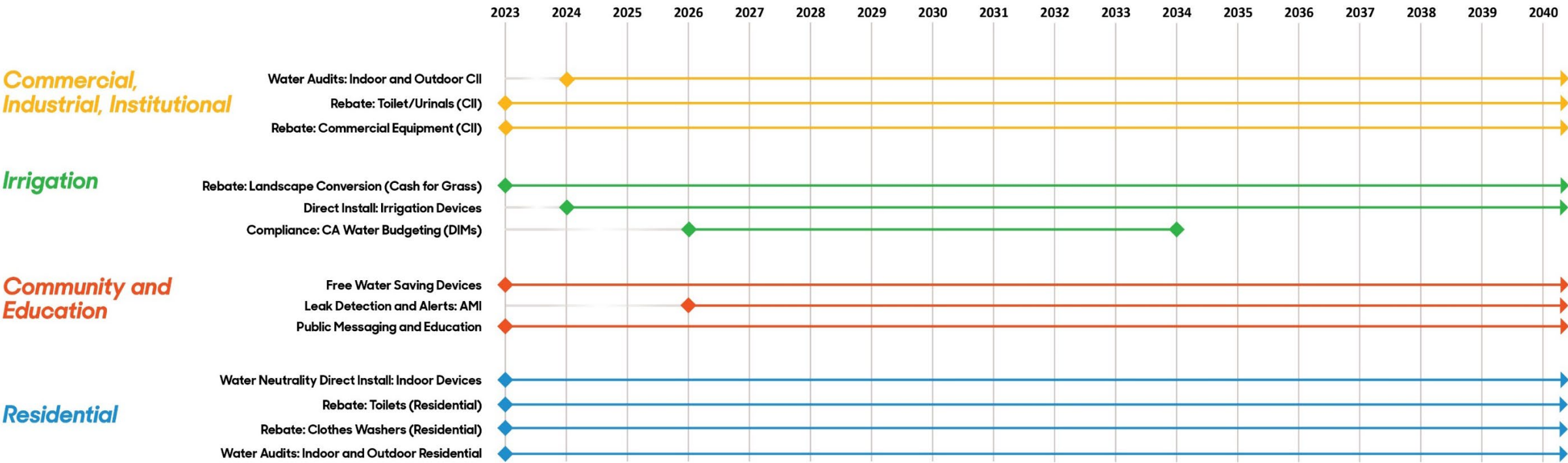


Figure 6-1. Program B (Strategic): Implementation Schedule (2023-2040+)

- Notes:
- 1. This schedule only includes the 13 measures in Program B (Strategic).
 - 2. Conservation measures are described in Table 4-1.

6.2 Staffing for Modeled Programs and Future Legislation Compliance

As part of the analysis, staffing needs for each of the conservation programs was considered. Annual staff needed and recommended for Program B is displayed in Figure 6-2. The City is currently running their conservation program with 2 FTE staff (a Senior Sustainability Analyst and a Water Resources Specialist). The City will need to increase the FTE water conservation team by at least two staff with water conservation experience (for a total of 4 FTEs) to implement Program B and to address future legislation compliance (see section 6.2.1 below for details).

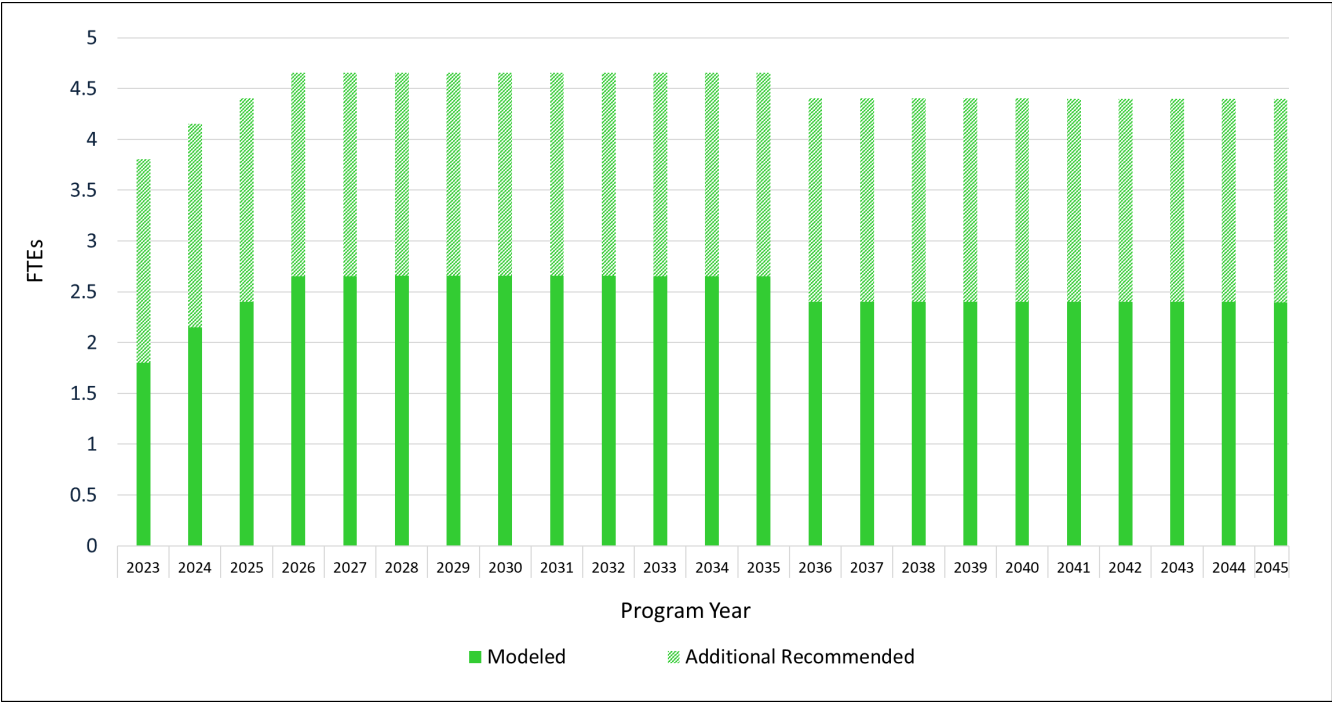


Figure 6-2. Program B Staffing: Modeled and Additional Recommended (2023-2045)

6.2.1 Recommended Staffing for Program B

To implement Program B along with the state legislative framework measures and reporting required by SB 606 and AB 1668 (see Figure 6-3), the City will require at least two additional staff to supplement the modeled FTEs. Thus, the minimum total FTEs recommended for Program B is four (two modeled, plus two recommended additions).

As the regulations have yet to be finalized (see Table 2-1), modelling the draft framework measures was outside of the scope of this Plan. However, the additional draft measures primarily target CII Best Management Practices (BMPs) and performance standards. Dependent on the track selected, by 2025, suppliers must design a conservation program for the top 20% of CII accounts, by consumption, in each of up to 22 categories, depending on what is present in the service area, as well as programs for those in the top 2.5% of water use. Additional measures include initial and ongoing CII classification, identifying disclosable buildings and conducting annual reporting on their water use, implementing a ban on irrigation of non-functional turf, mandatory conversion of mixed-use meters to dedicated irrigation meters, and starting in 2028, calculating and reporting the CII dedicated irrigation meter water use.

MWM has and continues to intensely monitor, track, and provide feedback on the development of the state legislative framework regulations, and fully understands the significant impact that compliance will have on water agencies’ staff and resources. Thus, given the regulations’ heavy burden on additional program design, implementation, and reporting—even without modelling--MWM recommends two additional FTEs to implement the extra measures needed to comply with the State water conservation framework regulations. This additional staff will provide resources to enhance the effectiveness of Program B’s measures as well.

Table 6-1 below outlines the recommended City staffing necessary to support Program B.

Table 6-2. Recommended Staffing for Program B (Strategic)

FTEs	Title	Core Responsibilities
1	Water Conservation Coordinator (Existing – Reclassify from Senior Sustainability Analyst)	• Oversee management of program and measures. • Annual work plan development. • State regulation tracking/compliance reporting. • Implement and lead new, selected, and CA regulation measures. • Supervisory and budgeting.
1	Water Resources Specialist (Existing)	• Landscape rebate lead. • Landscape inspections for Green Building Ordinance and rebates. • Landscape rebate administration, application tracking. • Water Use Consultations. • AMI leak outreach.
1	Sustainability Analyst (NEW)	• Water Neutrality and Landscape plan checks. • State regulation tracking/compliance reporting support. • Implement selected measures, including extra CA regulation measures.
1	Sustainability Analyst (NEW)	• Outreach and marketing lead: social media posts, etc. • Website content migration and updates. • State regulation tracking/compliance reporting support. • Implement selected measures, including extra CA regulation measures. • AMI leak outreach.

Making Water Conservation a California Way of Life Regulatory Requirements

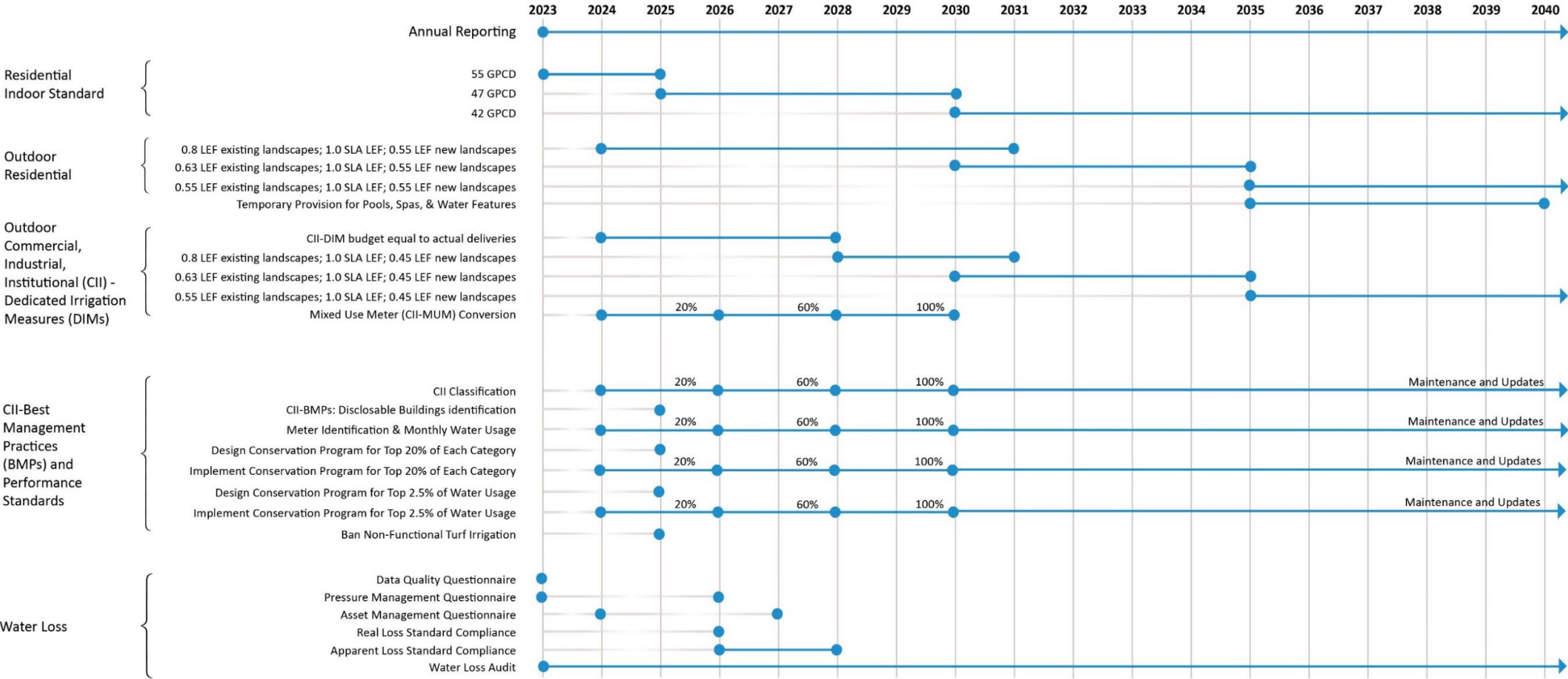


Figure 6-3. State Regulations Implementation Timeline

Figure 6-3 illustrates the reporting timelines and objectives related to “Making Water Conservation a California Way of Life” as of March 1, 2024. However, it cannot capture the full scope and depth of the requirements, including the practical design and manual implementation of specific conservation measures tailored to dozens of CII customer classifications with high water use. The legislative requirements also entail initial and ongoing classification of CII customer accounts, a process without end as businesses continue to change.

6.3 2024-2030 Implementation: Strategic Recommendations

Strategic recommendations to assist implementing Program B over the next five years are as follows:

- Consider hiring two additional FTEs to implement additional measures needed to comply with the forthcoming State water conservation framework regulations and to enhance current measures.
- Prioritize measures that contribute the most to meeting water conservation targets and are relatively easy to operate with limited staff.
- Identify and target measures to the largest 100 water using customers to reduce their demand.
- Develop an annual work plan for each plan year as soon as the budget is adopted (or in concert with the budget planning process).
- Form partnerships and apply for grants where appropriate.
- Define steps for each measure in the work plan detailing how it will be implemented.
- Track water use each month by customer class and overall per capita water use. Use the Data Collection Workbook to enter data or an online tool (e.g., WaterView™ by Eagle Aerial).
- Use aerial imagery tools (e.g., WaterView™ by Eagle Aerial) to identify areas of turf grass to target outreach for landscape conversion rebates and removal of non-functional turf grass.
- Employ a SaaS tool (e.g., ConserveTrack by RightThere, LLC) to track measure progress, including participation, cost, projected water savings, and other data to gauge successes and areas that need improvement/added attention.
- Consider conducting a device potentiality study to determine market saturation of installed indoor high-efficiency fixtures (toilets, showerheads, aerators, clothes washers) to inform rebate and direct install programs.
- Continue enforcing existing City ordinances that reduce water use as previously required by the statewide drought emergency declaration (recently lifted) and the Governor's Executive Orders (e.g., only serving water upon request, no watering for 48 hours after a rain event).
- Annually update the Plan, including individual measure participation and savings, overall projected water savings, and projected per capita water use reductions, to ensure the City is on track to meet conservation goals.
- Consider launching pilot studies for new measures.
- Consider soliciting and tracking community input and feedback via online or phone surveys or at outreach and education events.
- Continue to utilize the information and support offered to urban water agencies provided by CalWEP and AWE.
- As a U.S. Environmental Protection Agency WaterSense Partner take advantage of their many resources including outreach in the form of infographics, videos, template press releases, social media graphics, advertisements, bill stuffers and more.

6.4 Suggestions for Future DSS Model Updates

There are two types of updates envisioned for the DSS Model: 1) regular monitoring of costs and water savings; and 2) model recalibrations with updated base year data and model inputs and assumptions. The following describes each type of update in more detail:

- Annual model monitoring updates. The conservation measure worksheets can be used to track actual activities and compare them to the planned activities defined as part of the model development for this program. It is recommended that this update be done in conjunction with the development of an annual work plan and budget. At minimum, it should happen every 3-5 years.
- Recalibration of the baseline. The DSS Model baseline demand is the average annual demand of 2017-2019 and 2022. Depending on actual water demand and account growth rates, it is advisable to update the baseline on a

five-year basis. This update requires reviewing historical demand trends, future population and demand forecasts, fixture models calibration, new or updated conservation measures, and cost and water savings assumptions.

Specific triggers for updates may include:

- Significant shift in the cost of water (more than 10-20% energy or chemical cost increase or decrease would modify the DSS Model savings worksheet and change the benefit-cost ratios).
- Significant change in population accounts for one of the billing categories (more than a 5% shift).
- Significant changes to the water system balance (e.g., more than 10% change in water losses or other parameter on the Demands Section of the DSS Model).
- New codes or regulations that affect natural replacement rates of fixtures.
- New codes or regulations that affect conservation goals or requirements (historically including but not limited to SB 555, AB 1668, SB 606, SB 1157).
- Alternatives for staffing versus outsourced contracting or other changes to cost of implementation of a conservation measure (change to conservation measure DSS Model worksheet only).
- New technologies for the conservation measure being considered (change or addition of new conservation measure DSS Model worksheet).
- Any other change in conservation measures (i.e., updates to the DSS Model measure worksheets can be changed or modified at any time without altering the water system balance worksheets or affecting fixture model calibration).

6.5 Recommended Funding Sources and Partnerships

It is recommended the City seek out additional funding sources and partnership opportunities both nationally and regionally to supplement or expand the conservation measures with high potential for water savings in the City.

Partnership and funding sources may include the following:

- City Water Enterprise Fund
- City Water Neutrality Offset Fees
- MWD Member Agency Administered Program funds
- State and federal grants
- MWD programs to achieve regional water conservation goals for minimum cost and maximize outreach and customer awareness and/or participation amongst its member agencies.

6.6 Track and Update for New Codes and Emerging Technologies

Tracking changes in the consumer marketplace for the vast array of water-using appliances and plumbing fixtures in both the residential and commercial sectors is challenging. The following are options for tracking the latest in national standards and building codes as well as technologies and emerging trends in customer preferences:

- The governor signed SB 606 and AB 1668 into state law to create a more permanent conservation standard as part of implementing the “Making Water Conservation a California Way of Life” legislation. City staff should track development of the DWR framework into new state mandates for 2024 and beyond and update this Plan as necessary to comply with those new mandates.
- Engage in state processes to establish the requirement associated with implementation of legislation. Review state documents, present key information to City stakeholders and receive feedback, submit written comments as needed, and participate in public workshops and stakeholder groups.
- Participate on the AWWA Water Conservation Division’s committees with attendance at the Annual Conference Committee meetings and conference calls, in particular the Water Efficiency Programs and Technology Committee.

- Monitor the Alliance for Water Efficiency (AWE) for updates on changes in National Standards and Codes as well as opportunities to comment on future national changes to codes and regulations.
- Track the U.S. Environmental Protection Agency (EPA) WaterSense new technologies and updated equipment lists of newly labeled products and services.⁶ Frequently, AWE or CalWEP have performance testing results posted on their websites that provide very useful information to consumers. Performance information may also be available through Consumer Reports or Consortium for Energy Efficiency (<http://www.cee1.org>).
- Attend the WaterSmart Innovations Conference and CalWEP Plenaries for exposure to the vendors participating in the exhibition and information on emerging trends in water conservation programs.
- Maintain and use a network of 10-20 key contacts at progressive utilities to inquire about new technologies (e.g., through known contacts or new contacts made at conferences).
- Attend events with other partner utilities and applicable stakeholders on related water loss control programs or conservation measures.

Staying on or ahead of the curve with tracking new technologies could lead to water savings through incentive programs. Emerging products may be worthy of pilot programs and potentially attractive for grant funding through agencies like the U.S. EPA or U.S. Bureau of Reclamation. However, precautions should be taken prior to adopting new technologies that have yet to be adequately researched or tested.

6.7 Tracking and Monitoring Progress

It will be imperative to track the Program's measures to ensure that the Plan is being implemented effectively and on target to meet its water conservation goals. Key components of tracking and monitoring are depicted in Figure 6-4 below. As new and promising technologies and methodologies emerge, they should be researched and tested and could replace measures that are underachieving.

⁶ <https://www.epa.gov/watersense/watersense-products>



Figure 6-4. Program Tracking and Monitoring

At the time this report was published, the City has elected to utilize two third party Software as a Service (SaaS) tools to track and monitor individual measure implementation:

- **ConserveTrack** by RightThere, LLC helps administer and track program implementation via “cases” (a customer engagement in a program) and “steps” (the sequence of actions for each program). ConserveTrack also tracks program metrics to calculate water savings for each measure.
- **WaterView™** (Eagle Aerial) is a water efficiency and data management SaaS custom-designed to help water agencies meet the state water conservation framework requirements under SB606 & AB1668 and comply with the new efficiency standards. It uses aerial photography, sophisticated image analysis to identify landscape types, actual water use data, and other tools to target high impact water conservation actions and to help comply with state regulations.

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APPENDIX A. DSS MODEL DESCRIPTION AND ASSUMPTIONS

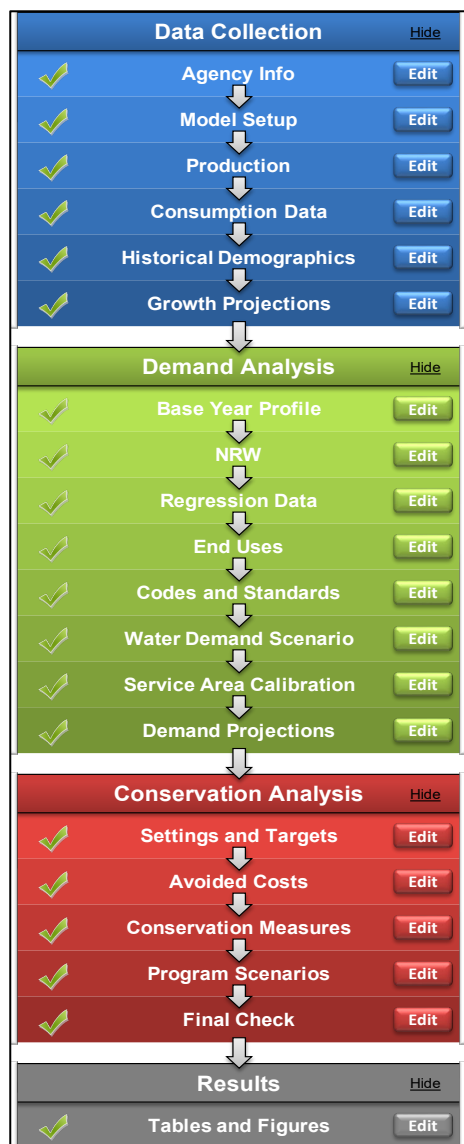
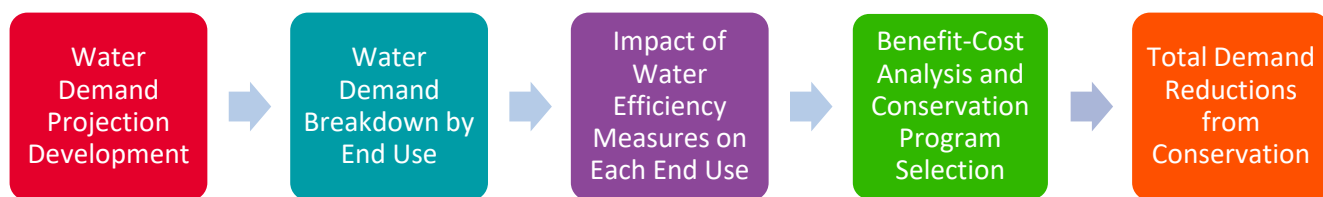


Figure A-1. DSS Model Main Page

DSS Model Overview: The Demand Side Management Least Cost Planning Decision Support System (DSS Model) as shown in the left figure is used to prepare long-range, detailed demand projections. The purpose of the extra detail 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.

Originally developed in 1999 and continuously updated, the DSS Model is an “end-use” model that breaks down total water production (water demand in the service area) to specific water end uses, such as plumbing fixtures and appliance uses. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility-prepared water demand forecast.

Demand Forecast Development and Model Calibration: To forecast urban water demands using the DSS Model, customer demand data is obtained from the water agency being modeled. Demand data is reconciled with available demographic data to characterize water usage for each customer category in terms of number of users per account and per capita water use. 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 is 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 those social norms from end studies on water use behavior (e.g., flushes per person per day) are not exceeded or drop below reasonable use limits.

Passive Water Savings Calculations: The DSS Model is used to forecast service area water fixture use. Specific end-use type, average water use, and lifetime are compiled for each fixture. Additionally, state, and national plumbing codes and appliance standards are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This process yields two demand forecasts, one with plumbing codes and one without plumbing codes.

Active Conservation Measure Analysis Using Benefit-Cost Analysis: The DSS Model evaluates active conservation measures using benefit-cost analysis with the present value of the cost of water saved (\$/Million Gallons or \$/Acre-Feet). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M) and any deferred capital expenditures. The figures on the previous page illustrate the processes for forecasting conservation water savings, including the impacts of fixture replacement due to existing plumbing codes and standards.

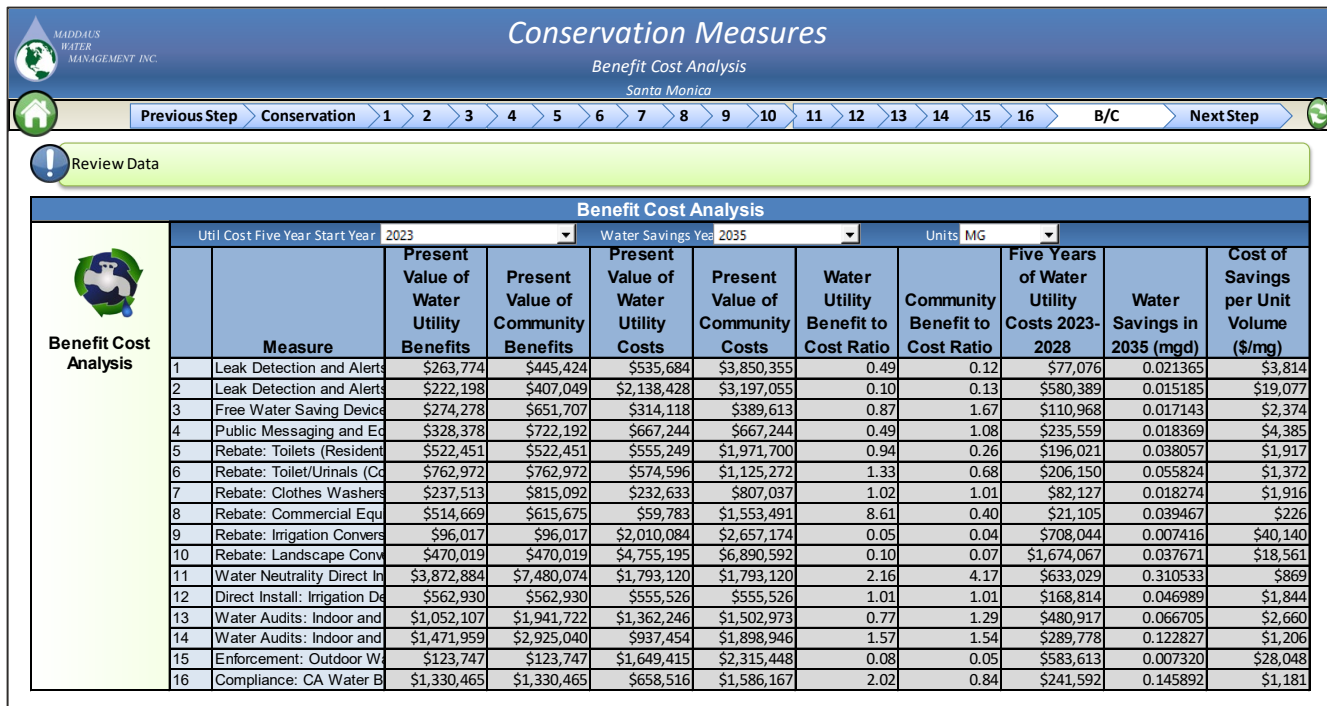


Figure A-2. Sample Benefit-Cost Analysis Summary

Model Use and Validation: The DSS Model has been used for over 20 years for practical applications of conservation planning in over 300 service areas representing 60 million people, including extensive efforts nationally and internationally in Australia, New Zealand, and Canada. The California Water Efficiency Partnership, or CalWEP, has peer reviewed and endorsed the model since 2006. It is offered to all CalWEP members for use to estimate water demand, plumbing code, and conservation program savings.

The DSS Model can use one of the following: 1) a statistical approach to forecast demands (e.g., an econometric model); 2) a forecasted increase in population and employment; 3) predicted future demands; or 4) a demand projection entered into the model from an outside source. For the City, baseline demand was developed based on an increase in residential population and to align with the 2020 UWMP. The following figure presents the flow of information in the DSS Model Analysis.

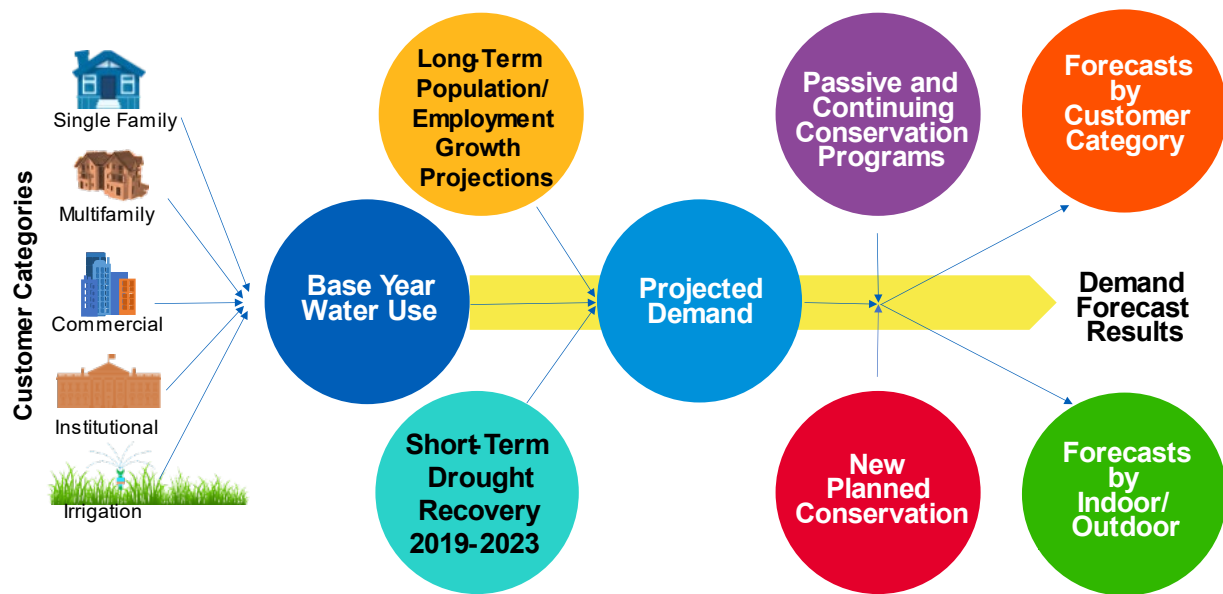


Figure A-3. DSS Model Analysis Flow

PLUMBING CODE ASSUMPTIONS

This section presents the methodology used to determine the City's passive water savings, information regarding national and state plumbing codes, and key inputs and assumptions used in the DSS Model including fixture replacement and estimates.

National Plumbing Codes

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 pounds per square inch (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 – 1.0 to 1.2.8 gal/min dependent on spray force



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, further reducing indoor water demands. 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 this 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 machine 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. Energy Star washing machines have a water factor of 6.0 or less – the equivalent of using 3.1 cubic feet (or 23.2 gallons) of water per load. The maximum water factor for residential clothes washers under current federal standards is 6.5. The water factor equals the number of gallons used per cycle per cubic foot of capacity.



Prior to the year 2000, the water factor for a typical new residential clothes washer was around 12. In March 2015, the federal standard reduced the maximum water factor for top- and front-loading machines to 8.4 and 4.7, respectively. In 2018, the maximum water factor for top-loading machines was further reduced to 6.5. For commercial washers, the maximum water factors were reduced in 2010 to 8.5 and 5.5 for top- and front-loading machines, respectively. Beginning in 2015, the maximum water factor for Energy Star certified washers was 3.7 for front-loading and 4.3 for top-loading machines. In 2011, the U.S. Environmental Protection Agency estimated that Energy Star washers comprised more than 60% of the residential market and 30% of the commercial market (Energy Star, 2011). A new Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s.

State Plumbing Codes

This section describes California state codes applicable to the City's water use.

California State Law – AB 715

Plumbing codes for toilets, urinals, showerheads, and faucets were initially adopted by California in 1991, mandating the sale and use of ultra-low flush toilets using 1.6 gpf, urinals using 1 gpf, and low-flow showerheads and faucets. AB 715 led to an update to California Code of Regulations Title 20 (see Section C.2.3) mandating that all toilets and urinals sold and installed in California as of January 1, 2014, must be high efficiency versions having flush ratings that do not exceed 1.28 gpf (toilets) and 0.5 gpf (urinals).



California State Laws – SB 407 and SB 837

SB 407 addresses plumbing fixture retrofits on resale or remodel. The DSS Model carefully considers the overlap with SB 407, the plumbing code (natural replacement), CALGreen, AB 715 and rebate programs (such as toilet rebates). SB 407 (enacted in 2009) requires that properties built prior to 1994 be fully retrofitted with water conserving fixtures by the year 2017 for single family residential houses and 2019 for multi-family and commercial properties. SB 407 program length is variable and continues until all the older high flush toilets have been replaced in the service area. The number of accounts with high flow fixtures is tracked to make sure that the situation of replacing more high flow fixtures than exist does not occur. Additionally, SB 407 conditions issuance of building permits for major improvements and renovations upon retrofit of non-compliant plumbing fixtures. SB 837 (enacted in 2011) requires that sellers of real estate property disclose on their Real Estate Transfer Disclosure Statement whether their property complies with these requirements. Both laws are intended to accelerate the replacement of older, low efficiency plumbing fixtures, and ensure that only high efficiency fixtures are installed in new residential and commercial buildings.

2019 CALGreen and 2020 CA Code of Regulations Title 20 Appliance Efficiency Regulations

Fixture characteristics in the DSS Model are tracked in new accounts, which are subject to the requirements of the 2019 California Green Building Code and 2020 California Code of Regulations Title 20 Appliance Efficiency Regulations adopted by the California Energy Commission (CEC) on December 9th, 2020. The CEC 2020 appliance efficiency standards apply to the following new appliances, if they are sold in California: showerheads, lavatory faucets, kitchen faucets, metering faucets, replacement aerators, wash fountains, tub spout diverters, public lavatory faucets, commercial pre-rinse spray valves, urinals, and toilets. The DSS Model accounts for plumbing code savings resulting from the standards set for showerheads, faucet aerators, urinals, toilets, and clothes washers.

- Showerheads – July 2016: 2.0 gpm; July 2018: 1.8 gpm
- Wall Mounted Urinals – January 2016: 0.125 gpf (pint)
- Lavatory Faucets and Aerator – July 2016: 1.2 gpm at 60 psi
- Kitchen Faucets and Aerator – July 2016: 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi
- Public Lavatory Faucets – July 2016: 0.5 gpm at 60 psi
- Commercial Pre-Rinse Spray Valves – January 2019: 1.28 gpm at more than 8.0 ounces per force (ozf) and shall be equipped with an integrated automatic shutoff.

In summary, the controlling law for **toilets** is Assembly Bill 715, requiring high efficiency toilets of 1.28 gpf sold in California beginning in 2014. The controlling law for wall-mounted urinals is the 2020 California Code of Regulations Title 20 Appliance Efficiency Regulations requiring that ultra-high efficiency pint **urinals** (0.125 gpf) be exclusively sold in California beginning January 1, 2016. This is an efficiency progression for urinals from AB 715's requirement of high efficiency (0.5 gpf) urinals starting in 2014.

Standards for **residential clothes washers** fall under the regulations of the U.S. Department of Energy. In 2018, the maximum water factor for standard top-loading machines was reduced to 6.5.

Showerhead flow rates are regulated under 2020 CEC Title 20 regulations that are exclusively for appliances sold in California. Showerheads manufactured on or after July 1, 2016, and prior to July 1, 2018, should have a flow rate no higher than 2.0 gpm at 80 psi. Showerheads manufactured on or after July 1, 2018, should have a flow rate no higher than 1.8 gpm at 80 psi. The WaterSense specification applies to showerheads that have a maximum flow rate of 2.0 gpm or less. This represents a 20% reduction in showerhead flow rate over the current federal standard of 2.5 gpm, as specified by the Energy Policy Act of 1992.

Faucet flow rates have likewise been regulated by the 2020 CEC Title 20 regulations exclusively for appliances sold in California. Residential faucets and aerators manufactured on or after July 1, 2016, should have a flow rate no greater than

1.2 gpm at 60 psi. Public lavatory and kitchen faucets/aerators sold or offered for sale on or after July 1, 2016, should have a flow rate no greater than 0.5 gpm at 60 psi, and 1.8 gpm with optional temporary flow of 2.2 gpm at 60 psi, respectively. Previously, all faucets were regulated by the 2010 California Green Building Code at 2.2 gpm at 60 psi.

Commercial Pre-Rinse Spray Valves flow rates have been regulated in Title 10 of the Code of Federal Regulations. Pre-rinse spray valves manufactured on or after January 28, 2019, shall have a maximum flow rate of 1.28 gpm at more than 8.0 ounces per force (ozf) and shall be equipped with an integrated automatic shutoff.

KEY BASELINE POTABLE DEMAND INPUTS, PASSIVE SAVINGS ASSUMPTIONS, AND RESOURCES

The following table presents the key assumptions and references that are used in the DSS Model in determining projected demands. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and the percentage of estimated real water losses.

Table A-1. List of Key Assumptions

Parameter	Model Input Value, Assumptions, and Key References			
Model Start Year for Analysis	2023			
Water Demand Basis	2017-2019, 2022 (4-year average)			
Population Projection Source	Forecasted population data is based on Housing Element projections and Regional Housing Needs Allocation (RHNA) requirements as provided from City Planning Department. This includes existing and new SF, MF, ADU and group quarters population.			
Avoided Cost of Water	\$3,508/MG			
Potable Water System Base Year Water Use Profile				
Customer Categories	Start Year Accounts	Start Year Total Water Use Distribution	Start Year Demand Factors (gpd/acct)	Start Year Indoor Use %
Single Family Residential	8,098	24%	294	81%
Multi-Family Residential (2022)	6,957	45%	632	97%
Commercial/Industrial	2,227	26%	1,149	93%
Landscape Irrigation	666	4%	663	N/A
Institutional	247	1%	294	76%
Fire	1,321	0%	6	N/A
New Accessory Dwelling Units (post 2023)	1	0%	55	100%
New Multi-Family Residential (post 2023)	1	0%	85	100%
Total/Avg	19,518	100%	397	88%

Table A-2. Key Assumptions Resources

Parameter	Resource
Residential End Uses	Key Reference: CA DWR Report “California Single Family Water Use Efficiency Study,” (DeOreo, 2011 – Page 28, Figure 3: Comparison of household end-uses) and AWWA Research Foundation (AWWARF) Report “Residential End Uses of Water, Version 2 – 4309” (DeOreo, 2016). Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances – 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition. 2013. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the “End Uses” section of the DSS Model on the “Breakdown” worksheet.

Parameter	Resource
Non-Residential End Uses, percent	Key Reference: AWWARF Report “Commercial and Institutional End Uses of Water” (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Santa Clara Valley Water District Water Use Efficiency Unit. “SCVWD CII Water Use and Baseline Study.” February 2008. Model Input Values are found in the “End Uses” section of the DSS Model on the “Breakdown” worksheet.
Efficiency Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Key Reference: GMP Research, Inc. (2019). 2019 U.S. WaterSense Market Penetration Industry Report. Key Reference: Consortium for Efficient Energy (www.cee1.org). Model Input Values are found in the “Codes and Standards” green section of the DSS Model by customer category fixtures.
Water Savings for Fixtures, gal/capita/day	Key Reference: AWWARF Report “Residential End Uses of Water, Version 2 – 4309” (DeOreo, 2016). Key Reference: 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. Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Model Input Values are found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model.
Non-Residential Fixture Efficiency Current Installation Rates	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. California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Santa Clara Valley Water District Water Use Efficiency Unit. “SCVWD CII Water Use and Baseline Study.” February 2008. Model Input Values are found in the “Codes and Standards” green section of the DSS Model by customer category fixtures.
Residential Frequency of Use Data, Toilets, Showers, Faucets, Washers, Uses/user/day	Key Reference: AWWARF Report “Residential End Uses of Water, Version 2 – 4309” (DeOreo, 2016). Summary values can be found in the full report: http://www.waterrf.org/Pages/Projects.aspx?PID=4309 Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Key Reference: Alliance for Water Efficiency, The Status of Legislation, Regulation, Codes & Standards on Indoor Plumbing Water Efficiency, January 2016. 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.

Parameter	Resource
Non-Residential Frequency of Use Data, Toilets, Urinals, and Faucets, Uses/user/day	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). Key Reference: California Energy Commission, Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD, 2014. Fixture uses over a 5-day work week are prorated to 7 days. Non-residential 0.5gpm faucet standards per Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances – 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition, 2012. http://www.map-testing.com/content/info/menu/perc.html 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.
Natural Replacement Rate of Fixtures (percent per year)	Residential Toilets 2%-4% Non-Residential Toilets 2%-3% Residential Showers 4% (corresponds to 25-year life of a new fixture) Residential Clothes Washers 10% (based on 10-year washer life). Key References: “Residential End Uses of Water” (DeOreo, 2016) and “Bern Clothes Washer Study, Final Report” (Oak Ridge National Laboratory, 1998). Residential Faucets 10% and Non-Residential Faucets 6.7% (every 15 years). CEC uses an average life of 10 years for faucet accessories (aerators). A similar assumption can be made for public lavatories, though no hard data exists and since CII fixtures are typically replaced less frequently than residential, 15 years is assumed. CEC, Analysis of Standards Proposal for Residential Faucets and Faucet Accessories, a report prepared under CEC’s Codes and Standards Enhancement Initiative, Docket #12-AAER-2C, August 2013. Model Input Value is found in the “Codes and Standards” green section on the “Fixtures” worksheet of the DSS Model.
Residential Future Water Use	Increases Based on Population Growth and Demographic Forecast
Non-Residential Future Water Use	Increases Based on Employment Growth and Demographic Forecast

FIXTURE ESTIMATES

Determining the current level of efficient fixtures in a service area while evaluating the passive savings in the DSS Model is part of the standard process and is called “initial fixture proportions.”

MWM used the DSS Model to perform a saturation analysis for toilets, urinals, showerheads, faucets, and clothes washers. The process included a review of the age of buildings from census data, number of rebates per device, and assumed natural replacement rates. MWM presumed the fixtures that were nearing saturation and worth analysis would include residential toilets and residential clothes washers, as both have been included in recommended conservation practices for over two decades.

In 2014, the Water Research Foundation updated its 1999 Residential End Uses of Water Study (REUWS). Water utilities, industry regulators, and government planning agencies consider it the industry benchmark for single family home indoor water use. This Plan incorporates study results that reflect the change to the water use profile in residential homes including adoption of more water efficient fixtures over the 15 years that transpired from 1999 to 2014. REUWS results were combined with the City’s historical rebate and billing data to enhance and verify assumptions made for all customer accounts, including saturation levels on the above-mentioned plumbing fixtures. The DSS Model presents the estimated current and projected proportions of these fixtures by efficiency level within the service area. These proportions were calculated by:

- Using standards in place at the time of building construction.
- Taking the initial proportions of homes by age (corresponding to fixture efficiency levels).
- Adding the net change due to natural replacement.
- Adding the change due to rebate measure minus the “free rider effect.”⁷

Further adjustments were made to initial proportions to account for the reduction in fixture use due to lower occupancy and based on field observations. The projected fixture proportions do **not** include any future active conservation measures implemented by the City. More information about the development of initial and projected fixture proportions can be found in the DSS Model “Codes and Standards” section.

The model is capable of modeling multiple types of fixtures, including ones with different designs. For example, currently toilets can be purchased that flush at a rate of 0.8 gpf, 1.0 gpf or 1.28 gpf. The 1.6 gpf and higher toilets still exist but can no longer be purchased in California. Therefore, they cannot be used for replacement or new installation. So, the DSS Model utilizes fixture replacement rates to determine what type of fixture should be used for a new construction installation or replacement. The replacement of fixtures is listed as a percentage within the DSS Model. A value of 100% would indicate that all toilets installed would be of one flush volume. A value of 75% means that three out of every four toilets installed would be of that flush volume.

The DSS Model provides inputs and analysis of the number, type, and replacement rates of fixtures for each customer category (e.g., single family toilets, commercial toilets, residential clothes washing machines.). For example, the DSS Model incorporates the effects of the 1992 Federal Energy Policy Act and AB 715 on toilet fixtures. A DSS Model feature determines the “saturation” of 1.6 gpf toilets as the 1992 Federal Energy Policy Act was in effect from 1992-2014 for 1.6 gpf toilet replacements. AB 715 now applies for the replacement of toilets at 1.28 gpf. Further consideration and adjustments were made to replacement rates to account for the reduction in fixture use and wear, due to lower occupancy and based on field observations.

⁷ It is important to note that in water conservation program management the “free rider effect” occurs when a customer applies for and receives a rebate on a targeted high efficiency fixture that they would have purchased even without a rebate. In this case, the rebate was not the incentive for their purchase but a “bonus.” Rebate measures are designed to target those customers needing financial incentive to install the more efficient fixture.

DSS MODEL MEASURE ASSUMPTIONS

The following presents an overview of the water reduction methodology, benefit-cost perspectives, present value analysis, and costs and savings assumptions for the measure analysis.

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; multi-family residential; commercial, industrial, and institutional; and so forth. Measures may apply to more than one water user group. Targeted end uses include indoor and outdoor use. 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 multi-family 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 multi-family 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. Essentially, the market penetration goal identifies how many fixtures, rebates, surveys, and so forth that the wholesale customer would have to offer or conduct over time to reach its water savings goal for that conservation measure. This is often expressed in terms of the number of fixtures, rebates, or surveys offered or conducted per year.

The potential for error in market penetration goal estimates for each measure can be significant because the estimates are based on previous experience, chosen implementation methods, projected utility effort, and funds allocated to implement the measure. The potential error can be corrected through reevaluation of the measure as the implementation of the measure progresses. For example, if the market penetration required to achieve specific water savings turns out to be different than predicted, adjustments to the implementation efforts can be made. Larger rebates or additional promotions are often used to increase 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.

Present Value Analysis and 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 using the DSS Model, which calculates the 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.

Present value analysis using present-day 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, perspectives most 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 the 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 is defined to include 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 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 aggregate for reasons described previously. 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. For this reason, a planning period of 10 years or longer is used because costs and benefits that occur beyond 10 years have very little influence on the total present value of costs and benefits. The value of all future costs and benefits is discounted to the first year in the DSS Model (the base year) at the real interest rate of 5.0%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 7.1%) by the assumed rate of inflation (2.0%).

The formula to calculate the real interest rate is:

$$(\text{nominal interest rate} - \text{assumed rate of inflation}) / (1 + \text{assumed rate of inflation})$$

Cash flows discounted in this manner are herein referred to as "Present Value" sums.

Measure Cost and Water Savings Assumptions

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 are found to be adequate for each individual measure. The values in most cases are in the range of what is currently offered by other water utilities in the region, excluding the landscape conversion/turf removal program.
- **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 the City. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the cost 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 are used in marketing the measure. Measure costs are estimated each year through 2045. 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 water conservation measures evaluated herein generally take effect over a long span of time. This span is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

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 single family residential account than for a multi-family residential 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:

- $$\text{Annual Utility Cost} = \text{annual market penetration rate} \times \text{total accounts in category} \times \text{unit cost per account} \times (1 + \text{administration and marketing markup percentage})$$

- Annual Customer Cost = annual number of participants x unit customer cost
- Annual Community Cost = annual utility cost + annual customer cost

Data necessary to forecast water savings of measures include specifics 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 3 to 10 years after the start of implementation, depending upon the implementation schedule.

For every water use efficient activity or replacement with more efficient devices, there is a useful life. The useful life is called the “Measure Life” and is defined to be how long water conservation 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 behavior-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 the new homeowners may have less efficient water using practices). Surveys typically have a measure life of about five years.

APPENDIX B. INDIVIDUAL CONSERVATION MEASURE DESIGN INPUTS AND RESULTS

The following figures present the DSS Model starting values for the conservation measures that were analyzed for possible inclusion into the City’s conservation program. While the model forecasts through 2045, in most cases results through 2035 are shown for easier visibility of values.

Measure 1: Leak Detection and Alerts: Advanced Metering Infrastructure (AMI)

Overview

Name

Leak Detection and Alerts: Advanced Metering Infrastructure

Abbr

1

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2026

Last Year

2045

Measure Length

20

Measure Life

Permanent

☐

Years

5

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$168.00	\$600.00	1
MF_2022	\$168.00	\$1,200.00	1
CI	\$168.00	\$1,500.00	1
INST	\$168.00	\$1,500.00	1
NEW ADU	\$168.00	\$1,000.00	1
NEW MF	\$168.00	\$1,200.00	1

Administration Costs

Method:

Percent

Markup Percentage

1%

Description

The City plans to have AMI fully deployed and operational by 2026. The rollout includes web portals to access AMI data: one for the utility, and one for customers (which includes a mobile app). This measure consists of two aspects: 1) Water resources staff will reach out to customers on a daily basis where usage is flagged as a leak by the web portal, and 2) Education for customers on accessing the web portal/mobile app and setting up their own leak detection alerts (which has been shown to improve accountability and reduce water use). Could roll out program by targeting certain customer classes, high volume users, or ongoing leaks. Note: this measure does not include watering restrictions, monitoring, and enforcement.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW ADU	NEW MF
	☒	☒	☒	☐	☐	☐	☒	☒

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW ADU	NEW MF
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☐	☐	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐	☐	☐
Internal Leakage	☒	☒	☒	☐	☒	☐	☒	☒
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☒	☒	☒	☐	☒	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐	☐	☐	☐	☐

Comments

>Utility & Admin Costs: The water conservation dept does not fund the fixture (AMI device) costs of this measure, but water conservation dept staff time is dedicated to this leak detection and customer outreach component. It is estimated that approx. 1/4 of an FTE is spent on this measure per year collaborating with approx. 250 accounts per year, yielding ~\$168/acct.
(Assume Specialist is administering this measure- total burdened salary of \$168,827; .25= about \$42,000 annually.) This is tracked in the fixture costs to better understand the per acct cost. Staffing roll-ups will account for this cost appropriately.
>A negligible admin percentage input value of 1% is included for modeling tracking purposes.
>Customer Cost: Assume \$600-\$1500 per account for leak repairs. Based on SFPUC survey to customers.
>End Use Savings: Savings based on significant reductions to leakage since targeting accounts with leaks. Water use savings also assumed for irrigation end use due to behavioral changes. Assumes MF and CII buildings will have 1/7 the savings due to higher number of fixtures onsite.
>Targets: Per Tom;
 > 250 outreach contacts/year by staff (contact 5 customers/week with leaks), or ~1% of total accounts.
 > 9,000 accounts (50% customer signup rate for mobile customer AMI app)

Results

Units

MG

Average Water Savings (mgd)

0.016720

Lifetime Savings - Present Value (\$)

Utility

\$263,774

Community

\$445,424

Lifetime Costs - Present Value (\$)

Utility

\$535,684

Community

\$3,850,355

Benefit to Cost Ratio

Utility

0.49

Community

0.12

Cost of Savings per Unit Volume (\$/mg)

Utility

\$3,814

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Internal Leakage	90.0%	32.8
MF_2022 Internal Leakage	12.5%	81.8
CI Internal Leakage	12.5%	105.0
INST Internal Leakage	12.5%	21.9
NEW ADU Internal Leakage	90.0%	7.4
NEW MF Internal Leakage	12.5%	11.3
SF Irrigation	10.0%	45.5
MF_2022 Irrigation	1.5%	13.6
CI Irrigation	1.5%	63.2
INST Irrigation	1.5%	51.7
SF External Leakage	90.0%	3.8
MF_2022 External Leakage	12.5%	1.1
CI External Leakage	12.5%	5.7
INST External Leakage	12.5%	5.0

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

1.000%

Only Affects New Accts

☐

Costs

View:

Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$0	\$0	\$0
2024	\$0	\$0	\$0
2025	\$0	\$0	\$0
2026	\$36,913	\$369	\$37,282
2027	\$39,400	\$394	\$39,794
2028	\$41,887	\$419	\$42,305
2029	\$44,374	\$444	\$44,817
2030	\$45,151	\$452	\$45,603
2031	\$45,929	\$459	\$46,388
2032	\$46,707	\$467	\$47,174
2033	\$47,484	\$475	\$47,959
2034	\$48,262	\$483	\$48,744
2035	\$49,039	\$490	\$49,530
2036	\$49,817	\$498	\$50,315
2037	\$50,595	\$506	\$51,101
2038	\$51,372	\$514	\$51,886
2039	\$52,150	\$522	\$52,672
2040	\$52,211	\$522	\$52,733
2041	\$52,250	\$522	\$52,772
2042	\$52,289	\$523	\$52,811
2043	\$52,327	\$523	\$52,851
2044	\$52,366	\$524	\$52,890
2045	\$52,405	\$524	\$52,929

Targets

View

Accounts

	SF	MF_2022	CI	INST	NEW ADU	NEW MF	Total
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	81	70	22	3	1	43	220
2027	81	70	22	3	2	58	235
2028	81	70	22	3	2	72	249
2029	81	70	22	3	2	87	264
2030	81	70	22	3	3	91	269
2031	81	70	21	3	3	96	273
2032	81	70	21	3	3	100	278
2033	81	70	21	3	3	105	283
2034	81	70	21	3	3	109	287
2035	81	70	21	3	3	114	292
2036	81	70	21	3	3	119	297
2037	81	70	21	3	4	123	301
2038	81	70	21	3	4	128	306
2039	81	70	21	3	4	132	310
2040	81	70	21	3	4	133	311
2041	81	70	20	3	4	133	311
2042	81	70	20	3	4	133	311
2043	81	70	20	3	4	134	311
2044	81	70	20	3	4	134	312
2045	81	70	20	3	4	134	312

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.000000
2024	0.000000
2025	0.000000
2026	0.004183
2027	0.008389
2028	0.012616
2029	0.016865
2030	0.021120
2031	0.021198
2032	0.021260
2033	0.021305
2034	0.021335
2035	0.021365
2036	0.021395
2037	0.021424
2038	0.021454
2039	0.021484
2040	0.021508
2041	0.021524
2042	0.021534
2043	0.021537
2044	0.021533
2045	0.021527

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Measure 2: Leak Detection and Alerts: Toilet Flow Sensors

Overview

Name

Leak Detection and Alerts: Toilet Flow Sensors

Abbr

2

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2024

Last Year

2025

Measure Length

22

Measure Life

Permanent

Years

4

Repeat

Fixture Cost per Device

	Utility	Customer	Fix/Acct
MF_2022	\$120.00	\$60.00	7
NEW MF	\$120.00	\$60.00	1

Administration Costs

Method: Percent

Markup Percentage

1%

Description

Provide rebates or other financial incentive to MF property owners for a toilet leak detection technology system (e.g. Sensor Industries SI-Flush Sensor). These sensors send data to a server that then alerts property owners of potential leaks. This measure can be a starting component of a follow-on comprehensive MF program (modeled after Santa Clarita's MF program).

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets								
Urinals								
Lavatory Faucets								
Show ers								
Dishw ashers								
Clothes Washers								
Process								
Kitchen Spray Rinse								
Internal Leakage								
Baths								
Other								
Irrigation								
Pools								
Wash Dow n								
Cooling								
Car Washing								
External Leakage								
Outdoor								
Non-Lavatory/Kitchen Faucets								

Comments

>Utility & Admin Costs: The utility unit cost is estimated to be approximately \$35 per toilet for the sensor and network hardware. It is estimated that approx. 1/10 of an FTE is spent on this measure per year collaborating with approx. 200 accounts per year, yielding ~\$85/acct. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.1= about \$16,830 annually.) Included admin costs in the fixture costs to better understand the per acct cost. Staffing roll-ups will account for this cost appropriately.

>A negligible admin percentage input value of 1% is included for modeling tracking purposes.

>Customer Cost: Per Tom, customer cost will be \$35/toilet for the sensor and network hardware and an additional \$25/toilet for the software subscription.

>End Use Savings: Savings similar to AMI - slightly less since smaller investment and likely investment would be by bldg owner and not renter. Sensor Industries (device manufacturer) estimates 15-25% savings.

> Devices typically have 3 year warranty, assumed 4 year savings life.

>Targets: Per Tom, annual target should be at least 40 accounts (out of 6,957 MF 2023 accounts); but should target 1,100 toilets. Targeting 1,100 toilets yields about 200 accounts at start year.

Results

Units

MG

Average Water Savings (mgd)

0.013343

Lifetime Savings - Present Value (\$)

Utility

\$222,198

Community

\$407,049

Lifetime Costs - Present Value (\$)

Utility

\$2,138,428

Community

\$3,197,055

Benefit to Cost Ratio

Utility

0.10

Community

0.13

Cost of Savings per Unit Volume (\$/mg)

Utility

\$19,077

End Use Savings Per Replacement

Method: Percent

% Savings/Acct

Avg GPD/Acct

MF_2022 Internal Leakage

25.0%

81.8

NEW MF Internal Leakage

25.0%

11.3

Targets

Target Method: Percentage

% of Accts Targeted/Yr

2.200%

Only Affects New Accts

Costs

View: Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$0	\$0	\$0
2024	\$136,809	\$1,368	\$138,177
2025	\$141,377	\$1,414	\$142,791
2026	\$145,944	\$1,459	\$147,404
2027	\$150,512	\$1,505	\$152,017
2028	\$155,079	\$1,551	\$156,630
2029	\$159,647	\$1,596	\$161,243
2030	\$161,096	\$1,611	\$162,707
2031	\$162,545	\$1,625	\$164,170
2032	\$163,993	\$1,640	\$165,633
2033	\$165,442	\$1,654	\$167,097
2034	\$166,891	\$1,669	\$168,560
2035	\$168,340	\$1,683	\$170,023
2036	\$169,789	\$1,698	\$171,487
2037	\$171,238	\$1,712	\$172,950
2038	\$172,687	\$1,727	\$174,413
2039	\$174,135	\$1,741	\$175,877
2040	\$174,240	\$1,742	\$175,982
2041	\$174,345	\$1,743	\$176,088
2042	\$174,449	\$1,744	\$176,194
2043	\$174,554	\$1,746	\$176,299
2044	\$174,658	\$1,747	\$176,405
2045	\$174,763	\$1,748	\$176,510

Targets

View: Fixtures

	MF_2022	NEW MF	Total
2023	0	0	0
2024	1,102	38	1,140
2025	1,102	76	1,178
2026	1,102	114	1,216
2027	1,102	152	1,254
2028	1,102	190	1,292
2029	1,102	228	1,330
2030	1,102	240	1,342
2031	1,102	253	1,355
2032	1,102	265	1,367
2033	1,102	277	1,379
2034	1,102	289	1,391
2035	1,102	301	1,403
2036	1,102	313	1,415
2037	1,102	325	1,427
2038	1,102	337	1,439
2039	1,102	349	1,451
2040	1,102	350	1,452
2041	1,102	351	1,453
2042	1,102	352	1,454
2043	1,102	353	1,455
2044	1,102	353	1,455
2045	1,102	354	1,456

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.000000
2024	0.003219
2025	0.006528
2026	0.009927
2027	0.013415
2028	0.013775
2029	0.014134
2030	0.014432
2031	0.014668
2032	0.014843
2033	0.014957
2034	0.015071
2035	0.015185
2036	0.015299
2037	0.015413
2038	0.015527
2039	0.015641
2040	0.015728
2041	0.015790
2042	0.015824
2043	0.015832
2044	0.015841
2045	0.015849

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Measure 3: Free Water Saving Devices

Overview

Name

Free Water Saving Devices

Abbr

3

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

5

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$13.00	\$15.00	1
MF_2022	\$13.00	\$15.00	7
CI	\$63.00	\$15.00	1
INST	\$63.00	\$15.00	1

Administration Costs

Method:

Fixed

Annual Admin Costs	\$16,830
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Description

The City's water resources division bulk purchases high efficiency showerheads, faucet aerators, toilet dye strips, and hose nozzles and gives them away for free at the City office or community events. Planning to add spray valves for restaurants. Free devices are also included in the Office of Sustainability's residential sustainability kit. The City partners with Sustainable Works to distribute devices through their Certified Green Business program.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEWA	NEWM
	☒	☒	☒	☐	☒	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEWA	NEWM
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☒	☒	☒	☐	☒	☐	☐	☐
Showers	☒	☒	☒	☐	☒	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☒	☐	☒	☐	☐	☐
Internal Leakage	☒	☒	☒	☐	☒	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☐	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☒	☒	☒	☐	☒	☐	☐	☐

Comments

>Utility & Admin Costs: Devices are ordered in bulk. Some devices are given away individually, and some are given away as a "kit". Aerators, Hand sink (1.0 gpm): \$0.85 each; Aerators, Kitchen (1.5 gpm): \$1.89 each; Showerheads (1.5 gpm): \$4.19 each; Hose Nozzles: \$5.65 each; Toilet Dye Strips: \$280 / 1,000 packets; Pre-rinse Spray Valve (1.15 gpm): \$50 each . Assume one kit per unit/account with one fixture each but PRSV only for commercial and institutional. It is estimated that approx. 1/10 of an FTE is spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827x0.1= about \$16,830 annually.)
> Customer Costs - Assumes minimal cost for installation since some customers will self-install, and others will not.
> End Use Savings - Assume kits save 27.6% overall (reduced to be conservative by assuming only 50% of kits are actually installed in the homes and yield water savings). Assumed Kit savings of 27.6% * 0.5 installed = 13.8% actual savings. Some accounts will only get hoses so higher outdoor savings. Some will only get indoor fixtures; maybe even just one, and so this is an overall average savings estimate.
> Targets: Approx. 100 accounts per year. In recent years (2020-2022) the following devices were distributed annually:
> 300 SF+MF Showerheads (1.5 gpm)
> 300 SF+MF Aerators (1.0 gpm)
> 200 SF+MF Aerators (1.5 gpm)
> 250 CII Aerators (0.5 gpm)
> 1,000 Toilet Dye Strip packets
> 500 Hose Nozzles

Results

Units

MG

Average Water Savings (mgd)

0.015752

Lifetime Savings - Present Value (\$)

Utility

\$274,278

Community

\$651,707

Lifetime Costs - Present Value (\$)

Utility

\$314,118

Community

\$389,613

Benefit to Cost Ratio

Utility

0.87

Community

1.67

Cost of Savings per Unit Volume (\$/mg)

Utility

\$2,374

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Lavatory Faucets	13.8%	9.2
MF_2022 Lavatory Faucets	13.8%	29.1
CI Lavatory Faucets	13.8%	44.1
INST Lavatory Faucets	13.8%	18.9
SF Showers	13.8%	49.5
MF_2022 Showers	13.8%	115.1
CI Showers	13.8%	94.5
INST Showers	13.8%	21.9
CI Kitchen Spray Rinse	13.8%	52.5
INST Kitchen Spray Rinse	13.8%	10.9
SF Internal Leakage	13.8%	32.8
MF_2022 Internal Leakage	13.8%	81.8
CI Internal Leakage	13.8%	105.0
INST Internal Leakage	13.8%	21.9
SF Irrigation	13.8%	45.5
MF_2022 Irrigation	13.8%	13.6
CI Irrigation	13.8%	63.2
INST Irrigation	13.8%	51.7
SF Non-Lavatory/Kitchen Faucets	13.8%	30.5
MF_2022 Non-Lavatory/Kitchen Faucets	13.8%	74.5
CI Non-Lavatory/Kitchen Faucets	13.8%	92.4
INST Non-Lavatory/Kitchen Faucets	13.8%	16.1

Targets

Target Method:

Percentage

% of Accts Targeted/Yr	0.600%
Only Affects New Accts	☐

Costs

View:

Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$5,365	\$16,830	\$22,195
2024	\$5,365	\$16,830	\$22,195
2025	\$5,364	\$16,830	\$22,194
2026	\$5,363	\$16,830	\$22,193
2027	\$5,362	\$16,830	\$22,192
2028	\$5,361	\$16,830	\$22,191
2029	\$5,360	\$16,830	\$22,190
2030	\$5,357	\$16,830	\$22,187
2031	\$5,355	\$16,830	\$22,185
2032	\$5,352	\$16,830	\$22,182
2033	\$5,349	\$16,830	\$22,179
2034	\$5,346	\$16,830	\$22,176
2035	\$5,343	\$16,830	\$22,173
2036	\$5,340	\$16,830	\$22,170
2037	\$5,337	\$16,830	\$22,167
2038	\$5,334	\$16,830	\$22,164
2039	\$5,332	\$16,830	\$22,162
2040	\$5,328	\$16,830	\$22,158
2041	\$5,324	\$16,830	\$22,154
2042	\$5,320	\$16,830	\$22,150
2043	\$5,317	\$16,830	\$22,147
2044	\$5,313	\$16,830	\$22,143
2045	\$5,309	\$16,830	\$22,139

Targets

View

Accounts

	SF	MF_2022	CI	INST	Total
2023	49	42	13	1	105
2024	49	42	13	2	105
2025	49	42	13	2	105
2026	49	42	13	2	105
2027	49	42	13	2	105
2028	49	42	13	2	105
2029	49	42	13	2	105
2030	49	42	13	2	105
2031	49	42	13	2	105
2032	49	42	13	2	105
2033	49	42	13	2	105
2034	49	42	13	2	105
2035	49	42	13	2	105
2036	49	42	13	2	105
2037	49	42	13	2	105
2038	49	42	12	2	105
2039	49	42	12	2	105
2040	49	42	12	2	105
2041	49	42	12	2	105
2042	49	42	12	2	104
2043	49	42	12	2	104
2044	49	42	12	2	104
2045	49	42	12	2	104

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.003795
2024	0.007508
2025	0.011149
2026	0.014722
2027	0.018236
2028	0.018073
2029	0.017918
2030	0.017772
2031	0.017633
2032	0.017501
2033	0.017376
2034	0.017256
2035	0.017143
2036	0.017035
2037	0.016933
2038	0.016835
2039	0.016741
2040	0.016651
2041	0.016565
2042	0.016482
2043	0.016402
2044	0.016326
2045	0.016252

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Measure 4: Public Messaging and Education

Overview

Name

Public Messaging and Education

Abbr

4

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

2

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$0.18	\$0.00	1
MF_2022	\$0.18	\$0.00	7

Administration Costs

Method:

Fixed

Annual Admin Costs

\$42,000

Description

The City conducts and plans to conduct several public education and training efforts including:

> Printed and electronic materials to raise awareness of conservation measures available to customers, including incentive programs offered by Utility. This includes newsletters, bill stuffers, brochures, working with local newspapers, signage at retailers, signs on public buses, social media campaigns, and website updates.

> Community outreach: Conducting presentations at various neighborhood groups, BIDs, and booths at relevant community events with free device giveaways.

> Workshops or other means for educating customers, landscapers, and contractors in efficient landscaping and irrigation principals (e.g. Sustainable Landscape Workshops at the Airport Demonstration Gardens).

> School education program

> Recognition program for water saving businesses-through Green Business program efforts by Sustainable Works

> Non-Functional Turf Education

> Fixture replacement compliance (SB 407)

> Signage in public landscape areas (e.g. using recycled water, reduced watering, etc.)

Customer Classes

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☐	☐	☐	☐	☐	☐

End Uses

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
Toilets	☒	☒						
Urinals								
Lavatory Faucets	☒	☒						
Showers	☒	☒						
Dishwashers	☒	☒						
Clothes Washers	☒	☒						
Process								
Kitchen Spray Rinse								
Internal Leakage	☒	☒						
Baths	☒	☒						
Other	☒	☒						
Irrigation	☒	☒						
Pools	☒	☒						
Wash Down	☒	☒						
Cooling								
Car Washing	☒	☒						
External Leakage	☒	☒						
Outdoor								
Non-Lavatory/Kitchen Faucets	☒	☒						

Comments

>Utility & Admin Costs: Per Tom, this measure costs the utility \$5,000 annually primarily for printing and mailing. It is estimated that approx. .25 of an FTE is spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.25= about \$42,000 annually.)

>Customer Cost: Assume no cost for the customer.

>End Use Savings: Assumes savings lasts 2 year, assume minimal savings on all end uses due to behavioral changes.

>Targets: 50% of accounts per year.

>Per Tom:

> 50 Social Media postings on various topics (~1/week)

> Two Landscape Workshops

> Two newspaper ads

> Public landscape signage (parks, medians).

Results

Units

MG

Average Water Savings (mgd)

0.018113

Lifetime Savings - Present Value (\$)

Utility

\$328,378

Community

\$722,192

Lifetime Costs - Present Value (\$)

Utility

\$667,244

Community

\$667,244

Benefit to Cost Ratio

Utility

0.49

Community

1.08

Cost of Savings per Unit Volume (\$/mg)

Utility

\$4,385

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Toilets	0.3%	49.3
MF_2022 Toilets	0.3%	146.6
SF Lavatory Faucets	0.3%	9.2
MF_2022 Lavatory Faucets	0.3%	29.1
SF Showers	0.3%	49.5
MF_2022 Showers	0.3%	115.1
SF Dishwashers	0.3%	2.8
MF_2022 Dishwashers	0.3%	7.3
SF Clothes Washers	0.3%	35.4
MF_2022 Clothes Washers	0.3%	103.0
SF Internal Leakage	0.3%	32.8
MF_2022 Internal Leakage	0.3%	81.8
SF Baths	0.3%	6.3
MF_2022 Baths	0.3%	16.4
SF Other	0.3%	18.8
MF_2022 Other	0.3%	32.1
SF Irrigation	0.3%	45.5
MF_2022 Irrigation	0.3%	13.6
SF Pools	0.3%	1.1
MF_2022 Pools	0.3%	0.3
SF Wash Down	0.3%	2.2
MF_2022 Wash Down	0.3%	0.7
SF Car Washing	0.3%	2.2
MF_2022 Car Washing	0.3%	0.7
SF External Leakage	0.3%	3.8
MF_2022 External Leakage	0.3%	1.1
SF Non-Lavatory/Kitchen Faucets	0.3%	30.5
MF_2022 Non-Lavatory/Kitchen Faucets	0.3%	74.5

Targets

Target Method:

Percentage

% of Accts Targeted/Yr	50.000%
Only Affects New Accts	☐

Costs

View:

Utility Details

	Fixture Costs	Admin Costs	Util Total
2023	\$5,112	\$42,000	\$47,112
2024	\$5,112	\$42,000	\$47,112
2025	\$5,112	\$42,000	\$47,112
2026	\$5,112	\$42,000	\$47,112
2027	\$5,112	\$42,000	\$47,112
2028	\$5,112	\$42,000	\$47,112
2029	\$5,112	\$42,000	\$47,112
2030	\$5,112	\$42,000	\$47,112
2031	\$5,112	\$42,000	\$47,112
2032	\$5,112	\$42,000	\$47,112
2033	\$5,112	\$42,000	\$47,112
2034	\$5,112	\$42,000	\$47,112
2035	\$5,112	\$42,000	\$47,112
2036	\$5,112	\$42,000	\$47,112
2037	\$5,112	\$42,000	\$47,112
2038	\$5,112	\$42,000	\$47,112
2039	\$5,112	\$42,000	\$47,112
2040	\$5,112	\$42,000	\$47,112
2041	\$5,112	\$42,000	\$47,112
2042	\$5,112	\$42,000	\$47,112
2043	\$5,112	\$42,000	\$47,112
2044	\$5,112	\$42,000	\$47,112
2045	\$5,112	\$42,000	\$47,112

Targets

View:

Accounts

	SF	MF_2022	Total
2023	4,049	3,479	7,528
2024	4,049	3,479	7,528
2025	4,049	3,479	7,528
2026	4,049	3,479	7,528
2027	4,049	3,479	7,528
2028	4,049	3,479	7,528
2029	4,049	3,479	7,528
2030	4,049	3,479	7,528
2031	4,049	3,479	7,528
2032	4,049	3,479	7,528
2033	4,049	3,479	7,528
2034	4,049	3,479	7,528
2035	4,049	3,479	7,528
2036	4,049	3,479	7,528
2037	4,049	3,479	7,528
2038	4,049	3,479	7,528
2039	4,049	3,479	7,528
2040	4,049	3,479	7,528
2041	4,049	3,479	7,528
2042	4,049	3,479	7,528
2043	4,049	3,479	7,528
2044	4,049	3,479	7,528
2045	4,049	3,479	7,528

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.010009
2024	0.019847
2025	0.019684
2026	0.019528
2027	0.019380
2028	0.019238
2029	0.019101
2030	0.018971
2031	0.018845
2032	0.018724
2033	0.018603
2034	0.018484
2035	0.018369
2036	0.018256
2037	0.018145
2038	0.018036
2039	0.017930
2040	0.017826
2041	0.017723
2042	0.017623
2043	0.017524
2044	0.017428
2045	0.017333

Measure 5: Rebate: Toilets (Residential)

Overview

Name

Rebate: Toilets (Residential)

Abbr

5

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☒

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$70.00	\$200.00	2
MF_2022	\$70.00	\$200.00	8

Administration Costs

Method:

Percent

Markup Percentage

12%

Description

Provide a rebate for installing a Premium High Efficiency Toilet (PHET: i.e. a toilet that uses 1.06 gpf (4 liters/flush) or less) that replaces a toilet using >= 1.6 gpf in residential properties. Current rebate covers up to nine toilets (SF only, unlimited for MF) and covers the material cost up to \$200/toilet (\$40 from MWD and supplemental \$160 from Santa Monica). New incentive amount going forward would provide \$70 supplemental funds from Santa Monica per toilet. CA code requires toilets flush at 1.28 gpf or less.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☐	☐	☐	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets	☒	☒						
Urinals								
Lavatory Faucets	☐	☐						
Show ers	☐	☐						
Dishw ashers	☐	☐						
Clothes Washers	☐	☐						
Process								
Kitchen Spray Rinse								
Internal Leakage	☐	☐						
Baths	☐	☐						
Other	☐	☐						
Irrigation	☐	☐						
Pools	☐	☐						
Wash Dow n	☐	☐						
Cooling								
Car Washing	☐	☐						
External Leakage	☐	☐						
Outdoor								
Non-Lavatory/Kitchen Faucets	☐	☐						

Comments

>Utility & Admin Costs: Rebate of \$70/toilet from City, up to 9 toilets per SFR account, unlimited for MFR accounts. Assumes MFR accounts will have 7 units per account and 1.2 toilets/unit. Per Tom, this is an MWD administered rebate. City allocates a single amount of supplemental funding for all rebates administered by MWD. It is estimated that approx. 10% of an FTE is spent on all MWD rebate measures annually- distributing .025 to each measure. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.025= about \$4,220 annually. Equates to a 12% markup on fixture cost.)

> Customer Cost: Estimated remaining cost of fixture and installation.

>End Use Savings: Assumes 1.6 gpf toilets are replaced with 1.06 gpf or less toilets.

>Targets: Per Tom, 500 toilets per year.

Results

Units

MG

Average Water Savings (mgd)

0.034477

Lifetime Savings - Present Value (\$)

Utility

\$522,451

Community

\$522,451

Lifetime Costs - Present Value (\$)

Utility

\$555,249

Community

\$1,971,700

Benefit to Cost Ratio

Utility

0.94

Community

0.26

Cost of Savings per Unit Volume (\$/mg)

Utility

\$1,917

End Use Savings Per Replacement

Method:

Percent

% Savings/Acct

Avg GPD/Acct

SF Toilets

34.0%

49.3

MF_2022 Toilets

34.0%

146.6

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

0.670%

Only Affects New Accts

☐

Costs

View:

Utility Deta

	Fixture Costs	Admin Costs	Util Total
2023	\$35,004	\$4,200	\$39,204
2024	\$35,004	\$4,200	\$39,204
2025	\$35,004	\$4,200	\$39,204
2026	\$35,004	\$4,200	\$39,204
2027	\$35,004	\$4,200	\$39,204
2028	\$35,004	\$4,200	\$39,204
2029	\$35,004	\$4,200	\$39,204
2030	\$35,004	\$4,200	\$39,204
2031	\$35,004	\$4,200	\$39,204
2032	\$35,004	\$4,200	\$39,204
2033	\$35,004	\$4,200	\$39,204
2034	\$35,004	\$4,200	\$39,204
2035	\$35,004	\$4,200	\$39,204
2036	\$35,004	\$4,200	\$39,204
2037	\$35,004	\$4,200	\$39,204
2038	\$35,004	\$4,200	\$39,204
2039	\$35,004	\$4,200	\$39,204
2040	\$35,004	\$4,200	\$39,204
2041	\$35,004	\$4,200	\$39,204
2042	\$35,004	\$4,200	\$39,204
2043	\$35,004	\$4,200	\$39,204
2044	\$35,004	\$4,200	\$39,204
2045	\$35,004	\$4,200	\$39,204

Targets

View

Fixtures

	SF	MF_2022	Total
2023	109	392	500
2024	109	392	500
2025	109	392	500
2026	109	392	500
2027	109	392	500
2028	109	392	500
2029	109	392	500
2030	109	392	500
2031	109	392	500
2032	109	392	500
2033	109	392	500
2034	109	392	500
2035	109	392	500
2036	109	392	500
2037	109	392	500
2038	109	392	500
2039	109	392	500
2040	109	392	500
2041	109	392	500
2042	109	392	500
2043	109	392	500
2044	109	392	500
2045	109	392	500

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.003232
2024	0.006408
2025	0.009528
2026	0.012596
2027	0.015612
2028	0.018578
2029	0.021496
2030	0.024367
2031	0.027193
2032	0.029974
2033	0.032711
2034	0.035405
2035	0.038057
2036	0.040668
2037	0.043238
2038	0.045769
2039	0.048262
2040	0.050717
2041	0.053136
2042	0.055518
2043	0.057865
2044	0.060177
2045	0.062455

City of Santa Monica Water Conservation Management Plan

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Measure 6: Rebate: Toilet/Urinals (CII)

Overview

Name

Rebate: Toilet/Urinals (CII)

Abbr

6

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☒

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	\$375.00	\$400.00	2
INST	\$375.00	\$400.00	2

Administration Costs

Method:

Percent

Markup Percentage

11%

Description

Provide a rebate for the installation of a Premium High Efficiency Toilet (PHET: i.e. a toilet that uses 1.06 gpf (4 liters/flush) or less) that replaces a toilet using >= 1.6 gpf in CII properties. Current rebate covers the material cost up to \$200/toilet (\$40 from MWD and supplemental \$160 from Santa Monica). New incentive going forward would provide a \$70 rebate from the City per toilet for a total rebated cost of \$110. CA code requires toilets flush at 1.28 gpf or less.

Provide a rebate for the installation of a Ultra-Low Water Urinal (ULWU: 0.125 gpf) or Zero Water Urinal (ZWU) that replaces a urinal using >= 1.5 gpf. Current rebate covers the material cost up to \$400/urinal (\$200 from MWD and supplemental \$200 from Santa Monica). Proposing to keep the same incentive amount moving forward. CA code requires urinals flush at 0.125 gpf or less.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☐	☐	☒	☐	☒	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets			☒		☒			
Urinals			☒		☒			
Lavatory Faucets			☐		☐			
Show ers			☐		☐			
Dishw ashers			☐		☐			
Clothes Washers			☐		☐			
Process			☐					
Kitchen Spray Rinse			☐		☐			
Internal Leakage			☐		☐			
Baths								
Other			☐		☐			
Irrigation			☐		☐			
Pools					☐			
Wash Dow n								
Cooling			☐		☐			
Car Washing								
External Leakage			☐		☐			
Outdoor								
Non-Lavatory/Kitchen Faucets			☐		☐			

Comments

>Utility & Admin Costs: Rebate of \$70/toilet and \$200/urinal from City. Participants would receive \$200/urinal and \$40/toilet from MWD additionally. Per Tom, this is an MWD administered rebate. City allocates a single amount of supplemental funding for all rebates administered by MWD. It is estimated that approx. 10% of an FTE is spent on all MWD rebate measures annually-distributing .025 to each measure. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.025= about \$4,220 annually. Equates to about an 11.3% markup on fixture cost.) Measure includes City fixture costs only and NOT MWD rebate amounts.

> Customer Cost: Estimated remaining cost for fixture and installation.

>End Use Savings: Assumes 1.6 gpf toilets are replaced with 1.06 gpf or less toilets (34% savings), and 1.5 gpf urinals are replaced with 0.125 gpf urinals (92% savings).

>Targets: Per Tom, target about 250 toilets and 100 urinals per year.

> Costs and savings assume 5 toilets and 2 urinals per account. This is to capture all potential savings as many sites have multiple unique commercial units.

Results

Units

MG

Average Water Savings (mgd)

0.049842

Lifetime Savings - Present Value (\$)

Utility

\$762,972

Community

\$762,972

Lifetime Costs - Present Value (\$)

Utility

\$574,596

Community

\$1,125,272

Benefit to Cost Ratio

Utility

1.33

Community

0.68

Cost of Savings per Unit Volume (\$/mg)

Utility

\$1,372

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
CI Toilets	34.0%	157.6
INST Toilets	34.0%	43.7
CI Urinals	92.0%	63.0
INST Urinals	92.0%	13.1

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

2.000%

Only Affects New Accts

☐

Costs

View:

Utility Deta

	Fixture Costs	Admin Costs	Util Total
2023	\$37,110	\$4,193	\$41,303
2024	\$37,077	\$4,190	\$41,267
2025	\$37,044	\$4,186	\$41,230
2026	\$37,011	\$4,182	\$41,193
2027	\$36,978	\$4,179	\$41,157
2028	\$36,945	\$4,175	\$41,120
2029	\$36,912	\$4,171	\$41,083
2030	\$36,798	\$4,158	\$40,956
2031	\$36,684	\$4,145	\$40,829
2032	\$36,570	\$4,132	\$40,702
2033	\$36,456	\$4,119	\$40,575
2034	\$36,342	\$4,107	\$40,448
2035	\$36,228	\$4,094	\$40,321
2036	\$36,113	\$4,081	\$40,194
2037	\$35,999	\$4,068	\$40,067
2038	\$35,885	\$4,055	\$39,940
2039	\$35,771	\$4,042	\$39,813
2040	\$35,623	\$4,025	\$39,648
2041	\$35,474	\$4,009	\$39,482
2042	\$35,325	\$3,992	\$39,316
2043	\$35,175	\$3,975	\$39,150
2044	\$35,026	\$3,958	\$38,984
2045	\$34,877	\$3,941	\$38,818

Targets

View:

Fixtures

	CI	INST	Total
2023	89	10	99
2024	89	10	99
2025	88	11	99
2026	88	11	99
2027	87	11	99
2028	87	11	99
2029	87	12	98
2030	86	12	98
2031	86	12	98
2032	85	12	98
2033	85	12	97
2034	85	12	97
2035	84	12	97
2036	84	12	96
2037	83	13	96
2038	83	13	96
2039	83	13	95
2040	82	13	95
2041	82	13	95
2042	81	13	94
2043	81	13	94
2044	81	13	93
2045	80	13	93

Water Savings

Units:

mgd

	Total Savings (mgd)
2023	0.005102
2024	0.010054
2025	0.014862
2026	0.019529
2027	0.024060
2028	0.028460
2029	0.032732
2030	0.036877
2031	0.040899
2032	0.044802
2033	0.048588
2034	0.052261
2035	0.055824
2036	0.059280
2037	0.062633
2038	0.065887
2039	0.069044
2040	0.072107
2041	0.075078
2042	0.077960
2043	0.080755
2044	0.083467
2045	0.086097

City of Santa Monica Water Conservation Management Plan

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Measure 7: Rebate: Clothes Washers (Residential)

Overview

Name

Rebate: Clothes Washers (Residential)

Abbr

7

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

Years

10

Repeat

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$120.00	\$400.00	1
MF_2022	\$120.00	\$400.00	3

Administration Costs

Method: Percent

Markup Percentage35%

Description

Provides a rebate for High Efficiency Clothes Washers (meet or exceeds the CEE Tier 1 standard) to single family homes. Current rebate covers the material cost up to \$400/HECW (\$85 from MWD and supplemental \$315 from Santa Monica). New incentive amount going forward would provide \$120 supplemental funds from Santa Monica.

Customer Classes

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☐	☐	☐	☐	☐	☐

End Uses

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
Toilets	☐	☐						
Urinals								
Lavatory Faucets	☐	☐						
Showers								
Dishwashers	☐	☐						
Clothes Washers	☒	☒						
Process								
Kitchen Spray Rinse								
Internal Leakage	☐	☐						
Baths	☐	☐						
Other	☐	☐						
Irrigation	☐	☐						
Pools	☐	☐						
Wash Down	☐	☐						
Cooling								
Car Washing	☐	☐						
External Leakage	☐	☐						
Outdoor								
Non-Lavatory/Kitchen Faucets	☐	☐						

Comments

>Utility & Admin Costs: Rebate of \$120/HECW from City (on top of \$85 from MWD). Per Tom, this is an MWD administered rebate. City allocates a single amount of supplemental funding for all rebates administered by MWD. It is estimated that approx. 10% of an FTE is spent on all MWD rebate measures annually- distributing .025 to each measure. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.025= about \$4,220 annually. Equates to ~35% markup on fixture cost.) Measure includes City fixture costs only and NOT MWD rebate amounts.
> Customer Cost: Estimated remaining cost of fixture and installation. Per Tom, this averages \$400.
>End Use Savings: Assumes 55% savings based on SoCal Water Smart HECW rebate page, "Qualifying washers use 55% less water than standard clothes washers".
>Targets: Per Tom, approx. 100 washers per year.

Results

UnitsMG

Average Water Savings (mgd)0.014449

Lifetime Savings - Present Value (\$)Utility\$237,513Community\$815,092

Lifetime Costs - Present Value (\$)Utility\$232,633Community\$807,037

Benefit to Cost RatioUtility1.02Community1.01

Cost of Savings per Unit Volume (\$/mg)Utility\$1,916

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg GPD/Acct
SF Clothes Washers	55.0%	35.4
MF_2022 Clothes Washers	55.0%	103.0

Targets

Target Method: Percentage

% of Accts Targeted/Yr	0.350%
Only Affects New Accts	☐

Costs

View: Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$12,167	\$4,258	\$16,425
2024	\$12,167	\$4,258	\$16,425
2025	\$12,167	\$4,258	\$16,425
2026	\$12,167	\$4,258	\$16,425
2027	\$12,167	\$4,258	\$16,425
2028	\$12,167	\$4,258	\$16,425
2029	\$12,167	\$4,258	\$16,425
2030	\$12,167	\$4,258	\$16,425
2031	\$12,167	\$4,258	\$16,425
2032	\$12,167	\$4,258	\$16,425
2033	\$12,167	\$4,258	\$16,425
2034	\$12,167	\$4,258	\$16,425
2035	\$12,167	\$4,258	\$16,425
2036	\$12,167	\$4,258	\$16,425
2037	\$12,167	\$4,258	\$16,425
2038	\$12,167	\$4,258	\$16,425
2039	\$12,167	\$4,258	\$16,425
2040	\$12,167	\$4,258	\$16,425
2041	\$12,167	\$4,258	\$16,425
2042	\$12,167	\$4,258	\$16,425
2043	\$12,167	\$4,258	\$16,425
2044	\$12,167	\$4,258	\$16,425
2045	\$12,167	\$4,258	\$16,425

Targets

View: Fixtures

	SF	MF_2022	Total
2023	28	73	101
2024	28	73	101
2025	28	73	101
2026	28	73	101
2027	28	73	101
2028	28	73	101
2029	28	73	101
2030	28	73	101
2031	28	73	101
2032	28	73	101
2033	28	73	101
2034	28	73	101
2035	28	73	101
2036	28	73	101
2037	28	73	101
2038	28	73	101
2039	28	73	101
2040	28	73	101
2041	28	73	101
2042	28	73	101
2043	28	73	101
2044	28	73	101
2045	28	73	101

Water Savings

Unitsmgd

	Total Savings (mgd)
2023	0.001931
2024	0.003854
2025	0.005764
2026	0.007662
2027	0.009544
2028	0.011410
2029	0.013258
2030	0.015088
2031	0.016898
2032	0.018683
2033	0.018558
2034	0.018421
2035	0.018274
2036	0.018117
2037	0.017952
2038	0.017779
2039	0.017600
2040	0.017415
2041	0.017225
2042	0.017029
2043	0.016829
2044	0.016626
2045	0.016418

City of Santa Monica Water Conservation Management Plan

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Measure 8: Rebate: Commercial Equipment (CII)

Overview

Name

Rebate: Commercial Equipment

Abbr

8

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Life

Permanent

☐

Years

10

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	\$0.00	\$1,000.00	1
INST	\$0.00	\$1,000.00	1

Administration Costs

Method: Fixed

Annual Admin Costs

\$4,220

Description

Provide rebates for water efficient indoor commercial equipment. Includes air-cooled ice machines, steamers, dry vacuum pumps, and controllers on cooling towers. Can add cooling tower submeters as an additional item but would be a City rebate not through MWD.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☐	☐	☒	☐	☒	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets			☐		☐			
Urinals			☐		☐			
Lavatory Faucets			☐		☐			
Show ers			☐		☐			
Dishw ashers			☐		☐			
Clothes Washers			☐		☐			
Process			☒					
Kitchen Spray Rinse			☐		☐			
Internal Leakage			☒		☒			
Baths								
Other			☒		☒			
Irrigation			☒		☒			
Pools					☐			
Wash Down								
Cooling			☒		☒			
Car Washing								
External Leakage			☒		☒			
Outdoor								
Non-Lavatory/Kitchen Faucets			☐		☐			

Comments

>Utility & Admin Costs: Per Tom, City currently uses the MWD base amount for these CII rebates and does not add supplemental funding, so City's utility cost is \$0. It is estimated that approx. 10% of an FTE is spent on all MWD rebate measures annually- distributing .025 to each measure. (Assume Specialist is administering this measure- total burdened salary of \$168,827x.025= about \$4,220 annually.
>Customer Cost: Per Tom, the average customer cost is \$1,000.
>End Use Savings: Based on recent average fixture type participation shown below.
>Targets: Assume hit 100% of accounts over the next 23 measure length. This is consistent with recent participation rates. Per Tom, recent 2022 participation is as follows:
- Plumbing Flow Control Valve: 0
- Laminar Flow Restrictors: 100 (health care?)
- WBIC: 20 (also in Irrigation DI program)
- CCIC: 0 (also in Irrigation DI program)
- Soil Moisture Sensor: 20 (also in Irrigation DI program)
- Hose Bib Irrigation Controller: 0 (also in Irrigation DI program)
- pH-Cooling Tower Controller: 3
- Cooling Tower Conductivity Controller: 3
- Dry Vacuum Pump (\$125 per 0.5 HP): 5
- Connectionless Food Steamers (\$485 per compartment): 5
- Ice-Making Machines: 5

Results

Units

MG

Average Water Savings (mgd)

0.031534

Lifetime Savings - Present Value (\$)

Utility

\$514,669

Community

\$615,675

Lifetime Costs - Present Value (\$)

Utility

\$59,768

Community

\$1,553,476

Benefit to Cost Ratio

Utility

8.61

Community

0.40

Cost of Savings per Unit Volume (\$/mg)

Utility

\$226

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg GPD/Acct
CI Process	10.0%	147.1
CI Internal Leakage	10.0%	105.0
INST Internal Leakage	10.0%	21.9
CI Other	10.0%	73.5
INST Other	10.0%	28.4
CI Irrigation	10.0%	63.2
INST Irrigation	10.0%	51.7
CI Cooling	10.0%	12.1
INST Cooling	10.0%	10.6
CI External Leakage	10.0%	5.7
INST External Leakage	10.0%	5.0

Targets

Target Method: Percentage

% of Accts Targeted/Yr

4.340%

Only Affects New Accts

☐

Costs

View: Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$0	\$4,220	\$4,220
2024	\$0	\$4,220	\$4,220
2025	\$0	\$4,220	\$4,220
2026	\$0	\$4,220	\$4,220
2027	\$0	\$4,220	\$4,220
2028	\$0	\$4,220	\$4,220
2029	\$0	\$4,220	\$4,220
2030	\$0	\$4,220	\$4,220
2031	\$0	\$4,220	\$4,220
2032	\$0	\$4,220	\$4,220
2033	\$0	\$4,220	\$4,220
2034	\$0	\$4,220	\$4,220
2035	\$0	\$4,220	\$4,220
2036	\$0	\$4,220	\$4,220
2037	\$0	\$4,220	\$4,220
2038	\$0	\$4,220	\$4,220
2039	\$0	\$4,220	\$4,220
2040	\$0	\$4,220	\$4,220
2041	\$0	\$4,220	\$4,220
2042	\$0	\$4,220	\$4,220
2043	\$0	\$4,220	\$4,220
2044	\$0	\$4,220	\$4,220
2045	\$0	\$4,220	\$4,220

Targets

View: Accounts

	CI	INST	Total
2023	97	11	107
2024	96	11	107
2025	96	11	107
2026	95	12	107
2027	95	12	107
2028	94	12	107
2029	94	13	107
2030	94	13	106
2031	93	13	106
2032	93	13	106
2033	92	13	105
2034	92	13	105
2035	91	13	105
2036	91	14	104
2037	91	14	104
2038	90	14	104
2039	90	14	103
2040	89	14	103
2041	89	14	103
2042	88	14	102
2043	88	14	102
2044	87	14	101
2045	87	14	101

Water Savings

Units

mgd

Total Savings (mgd)

20230.004056

20240.008098

20250.012127

20260.016142

20270.020142

20280.024129

20290.028103

20300.032059

20310.035999

20320.039923

20330.039774

20340.039622

20350.039467

20360.039309

20370.039149

20380.038986

20390.038820

20400.038653

20410.038485

20420.038316

20430.038145

20440.037974

20450.037801

City of Santa Monica Water Conservation Management Plan

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Measure 9: Rebate: Irrigation Conversion (Spray to Drip)

Overview

Name

Rebate: Irrigation Conversion (Spray to Drip)

Abbr

9

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

10

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$2,000.00	\$1,000.00	1
MF 2022	\$2,500.00	\$1,000.00	1
CI	\$3,000.00	\$1,000.00	1
LS	\$3,000.00	\$1,000.00	1
INST	\$3,000.00	\$1,000.00	1

Administration Costs

Method: Fixed

Annual Admin Costs

\$33,800

Description

The City's Spray to Drip program provides a rebate for water-efficient landscape irrigation retrofits that replace overhead spray irrigation (sprinklers) in non-turf areas with highly efficient drip irrigation. Rebate is \$2.00/sqft up to \$4,000 for SF, \$6,000 for MF and CII.

Customer Classes

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☒	☒	☒	☐	☐	☐

End Uses

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☐	☐	☐	☐	☐	☐	☐	☐
Show ers	☐	☐	☐	☐	☐	☐	☐	☐
Dishw ashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Dow n	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☒	☒	☒	☒	☒	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐	☐	☐	☐	☐

Comments

>Utility & Admin Costs: The City provides a rebate of \$2.00 per sqft up to \$4,000 for SF accounts and up to \$6,000 for MF and CII accounts. Per Tom, the average utility cost is \$2,200 per rebate. It is estimated that approx. 0.20 of an FTE is spent on this measure per year collaborating with approx. 45 accounts per year. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .2= about \$33,800 annually.)
>Customer Cost: Per Tom, the average customer cost for installation and any remaining materials is \$1,000.
>End Use Savings: Drip/micro-irrigation have an efficiency of 80-95%, compared to landscape spray systems which ranges from 40-65% efficiency (Irrigation Association). Thus, switching from the latter to the former, water savings could be between 15-55%. It really depends on initial irrigation efficiency, but on average, drip saves 30-50% more water when compared to conventional sprinkler irrigation.
-Per Tom, average savings of 4.18 gallons/sqft. For 60,000 sqft targeted per year, assumes 250,800 gal/year saved, or 687 gal/day (.000687 mgd). This equates to about 25% savings/account.
>Targets: Per Tom, recent participation is as follows:
> 45 rebate projects (assumed 1 rebate project per account) which is 0.2% of all SF, MF, CII, LS start year accounts (18,159).
> 60,000 sq.ft. (includes areas over max rebate amount but were converted as part of rebated project)

Results

Units

MG

Average Water Savings (mgd)

0.005961

Lifetime Savings - Present Value (\$)

Utility

\$96,017

Community

\$96,017

Lifetime Costs - Present Value (\$)

Utility

\$2,010,084

Community

\$2,657,174

Benefit to Cost Ratio

Utility

0.05

Community

0.04

Cost of Savings per Unit Volume (\$/mg)

Utility

\$40,140

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Irrigation	25.0%	45.5
MF_2022 Irrigation	25.0%	13.6
CI Irrigation	25.0%	63.2
SF External Leakage	25.0%	3.8
MF_2022 External Leakage	25.0%	1.1
CI External Leakage	25.0%	5.7
LS Irrigation	25.0%	606.8
LS External Leakage	25.0%	45.7
INST Irrigation	25.0%	51.7
INST External Leakage	25.0%	5.0

Targets

Target Method:

Percentage

% of Accts Targeted/Yr	0.250%
Only Affects New Accts	☐

Costs

View: Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$107,521	\$33,800	\$141,321
2024	\$107,665	\$33,800	\$141,465
2025	\$107,809	\$33,800	\$141,609
2026	\$107,953	\$33,800	\$141,753
2027	\$108,096	\$33,800	\$141,896
2028	\$108,240	\$33,800	\$142,040
2029	\$108,384	\$33,800	\$142,184
2030	\$108,378	\$33,800	\$142,178
2031	\$108,372	\$33,800	\$142,172
2032	\$108,365	\$33,800	\$142,165
2033	\$108,359	\$33,800	\$142,159
2034	\$108,353	\$33,800	\$142,153
2035	\$108,347	\$33,800	\$142,147
2036	\$108,341	\$33,800	\$142,141
2037	\$108,334	\$33,800	\$142,134
2038	\$108,328	\$33,800	\$142,128
2039	\$108,322	\$33,800	\$142,122
2040	\$108,253	\$33,800	\$142,053
2041	\$108,182	\$33,800	\$141,982
2042	\$108,111	\$33,800	\$141,911
2043	\$108,040	\$33,800	\$141,840
2044	\$107,969	\$33,800	\$141,769
2045	\$107,898	\$33,800	\$141,698

Targets

View

Accounts

	SF	MF_2022	CI	LS	INST	Total
2023	20	17	6	2	1	45
2024	20	17	6	2	1	46
2025	20	17	6	2	1	46
2026	20	17	5	2	1	46
2027	20	17	5	2	1	46
2028	20	17	5	2	1	46
2029	20	17	5	2	1	46
2030	20	17	5	2	1	46
2031	20	17	5	2	1	46
2032	20	17	5	2	1	46
2033	20	17	5	2	1	46
2034	20	17	5	2	1	46
2035	20	17	5	2	1	46
2036	20	17	5	2	1	46
2037	20	17	5	2	1	46
2038	20	17	5	2	1	46
2039	20	17	5	2	1	46
2040	20	17	5	2	1	46
2041	20	17	5	2	1	46
2042	20	17	5	2	1	46
2043	20	17	5	2	1	46
2044	20	17	5	2	1	46
2045	20	17	5	2	1	46

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.000690
2024	0.001389
2025	0.002097
2026	0.002813
2027	0.003537
2028	0.004270
2029	0.005012
2030	0.005756
2031	0.006503
2032	0.007251
2033	0.007312
2034	0.007367
2035	0.007416
2036	0.007459
2037	0.007495
2038	0.007526
2039	0.007550
2040	0.007571
2041	0.007590
2042	0.007607
2043	0.007620
2044	0.007631
2045	0.007640

City of Santa Monica Water Conservation Management Plan

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Measure 10: Rebate: Landscape Conversion (Cash for Grass)

Overview

Name

Rebate: Landscape Conversion (Cash for Grass)

Abbr

10

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

15

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$3,500.00	\$2,500.00	1
MF_2022	\$4,500.00	\$2,500.00	1
CI	\$5,000.00	\$2,500.00	1
LS	\$5,000.00	\$2,500.00	1
INST	\$5,000.00	\$2,500.00	1

Administration Costs

Method: Percent

Markup Percentage

34%

Description

The City's Cash for Grass program provides a landscape conversion rebate for water-efficient landscape retrofits that remove turf grass, cap sprinklers, and install low-water plants, compost, mulch and drip irrigation. Rebate is \$3.50/sqft up to \$6,000 for SF. Rebate is \$3.50/sqft. up to \$10,000 for MF, \$20,000 for CII. Use Eagle Aerial's WaterView to identify large turf areas to target outreach for landscape conversion.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW N
	☒	☒	☒	☒	☒	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW N
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☐	☐	☐	☐	☐	☐	☐	☐
Show ers	☐	☐	☐	☐	☐	☐	☐	☐
Dishw ashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Down	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☒	☒	☒	☒	☒	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐	☐	☐	☐	☐

Comments

>Utility & Admin Costs: The City provides a rebate of \$3.50 per sqft up to \$6,000 for SF accounts, up to \$10,000 for MF, and up to \$20,000 for CII accounts. Per Tom, the average utility cost is \$4,100 per rebate. It is estimated that approx. .50 of an FTE is spent on this measure per year collaborating with approx. 60 accounts per year, yielding ~\$1,406/acct. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .5= about \$84,400 annually.)>Customer Cost: Per Tom, the average customer cost for installation and any remaining materials is \$2,500.>End Use Savings:

- Research by Southern Nevada Water Authority (source: Public Policy Institute of California, Lawns and Water Demand in California) estimates that conversion from turf to low-water landscaping resulted in up to a 76 percent savings.
- Other savings estimates range from 15%- over 50%. Santa Clarita Water Agency estimates 25%, Liberty Utilities (Park Water Company) estimates 18%.
- Initially assumed a conservative estimate of 50% average account irrigation and leakage savings based on California estimates and SNWA research.
- Per Tom, average of 21.66 gal saved per sqft. Applied to target of 85,000 sqft/year, equates to 1,841,100 gal saved= 5,044 gal/day or 0.00504 mgd. Updated savings to 75% estimate to align more closely to Santa Monica specific savings.

> Targets: Per Tom, design per recent (2022) participation which is as follows:

- 60 rebate projects (assumed 1 rebate project per account) which is ~0.4% of all SF, MF, CI, and Inst start year accounts (17,529).
- 85,000 sq.ft. (includes areas over max rebate amount but were converted as part of rebated project)

Results

Units

MG

Average Water Savings (mgd)

0.030497

Lifetime Savings - Present Value (\$)

Utility

\$470,019

Community

\$470,019

Lifetime Costs - Present Value (\$)

Utility

\$4,755,195

Community

\$6,890,592

Benefit to Cost Ratio

Utility

0.10

Community

0.07

Cost of Savings per Unit Volume (\$/mg)

Utility

\$18,561

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg GPD/Acct
SF Irrigation	75.0%	45.5
MF_2022 Irrigation	75.0%	13.6
CI Irrigation	75.0%	63.2
INST Irrigation	75.0%	51.7
SF External Leakage	75.0%	3.8
MF_2022 External Leakage	75.0%	1.1
CI External Leakage	75.0%	5.7
INST External Leakage	75.0%	5.0
LS Irrigation	75.0%	606.8
LS External Leakage	75.0%	45.7

Targets

Target Method: Percentage

% of Accts Targeted/Yr

0.330%

Only Affects New Accts

☐

Costs

View: Utility Deta

	Fixture Costs	Admin Costs	Util Total
2023	\$248,653	\$85,310	\$333,964
2024	\$248,970	\$85,419	\$334,389
2025	\$249,286	\$85,527	\$334,813
2026	\$249,602	\$85,636	\$335,238
2027	\$249,919	\$85,744	\$335,663
2028	\$250,235	\$85,853	\$336,088
2029	\$250,551	\$85,961	\$336,513
2030	\$250,538	\$85,957	\$336,494
2031	\$250,524	\$85,952	\$336,476
2032	\$250,510	\$85,947	\$336,458
2033	\$250,497	\$85,943	\$336,439
2034	\$250,483	\$85,938	\$336,421
2035	\$250,469	\$85,933	\$336,403
2036	\$250,456	\$85,929	\$336,385
2037	\$250,442	\$85,924	\$336,366
2038	\$250,429	\$85,919	\$336,348
2039	\$250,415	\$85,915	\$336,330
2040	\$250,263	\$85,863	\$336,126
2041	\$250,107	\$85,809	\$335,916
2042	\$249,950	\$85,755	\$335,706
2043	\$249,794	\$85,702	\$335,496
2044	\$249,638	\$85,648	\$335,286
2045	\$249,482	\$85,595	\$335,076

Targets

View

Accounts

	SF	MF_2022	CI	LS	INST	Total
2023	27	23	7	2	1	60
2024	27	23	7	2	1	60
2025	27	23	7	2	1	60
2026	27	23	7	2	1	60
2027	27	23	7	2	1	60
2028	27	23	7	3	1	60
2029	27	23	7	3	1	60
2030	27	23	7	3	1	60
2031	27	23	7	3	1	60
2032	27	23	7	3	1	60
2033	27	23	7	3	1	60
2034	27	23	7	3	1	60
2035	27	23	7	3	1	60
2036	27	23	7	3	1	60
2037	27	23	7	3	1	60
2038	27	23	7	3	1	60
2039	27	23	7	3	1	60
2040	27	23	7	3	1	60
2041	27	23	7	3	1	60
2042	27	23	7	3	1	60
2043	27	23	7	3	1	60
2044	27	23	7	3	1	60
2045	27	23	7	3	1	60

Water Savings

Units

mgd

Total Savings (mgd)

2023

0.002734

2024

0.005501

2025

0.008303

2026

0.011138

2027

0.014007

2028

0.016910

2029

0.019847

2030

0.022794

2031

0.025750

2032

0.028716

2033

0.031691

2034

0.034676

2035

0.037671

2036

0.040675

2037

0.043688

2038

0.043978

2039

0.044243

2040

0.044474

2041

0.044670

2042

0.044831

2043

0.044957

2044

0.045049

2045

0.045130

City of Santa Monica Water Conservation Management Plan

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Measure 11: Water Neutrality Direct Install: Indoor Devices

Overview

Name

Water Neutrality Direct Install: Indoor D

Abbr

11

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

15

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$0.00	\$0.00	1
MF_2022	\$0.00	\$0.00	5
CI	\$0.00	\$0.00	1
INST	\$0.00	\$0.00	1

Administration Costs

Method: Fixed

Annual Admin Costs

\$126,600

Description

The Water Neutrality Direct Install Program installs high efficiency indoor fixtures in SF, MF, and CII buildings. This includes SMMUSD, SMC, and private schools. Replacements include high efficiency toilets, showerheads, faucet aerators, and high efficiency urinals. Installations are performed by a contracted third-party installer. The “Water Neutrality Direct Install Program” is funded by the Water Neutrality Ordinance offset and in-lieu fees for new development

Customer Classes

	%	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☒	☐	☒	☐	☐	☐

End Uses

	%	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets	☒	☒	☒	☐	☒	☐	☐	☐
Urinals	☐	☒	☒	☐	☒	☐	☐	☐
Lavatory Faucets	☒	☒	☐	☐	☒	☐	☐	☐
Show ers	☒	☒	☒	☐	☒	☐	☐	☐
Dishw ashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☐	☐	☐	☐	☐	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Dow n	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☒	☒	☒	☐	☒	☐	☐	☐

Comments

>Utility & Admin Costs: There is no cost to the utility for this measure, it is funded by Water Neutrality fees. It is estimated that approx. .75 of an FTE is spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .75= about \$126,600 annually.)>Customer Cost: There is no customer cost for this measure. Fixture and installation are covered by the Neutrality Fees.> End Use Savings: Assumes participating accounts upgrade all eligible fixtures. Per customer category initial proportions (see code section), conservatively assumes the following fixtures (1.6 gpf toilets, 2.5 gpm showerheads, 2.2 gpm aerators, 1.0 gpf urinals) are being replaced with ultra-low-flow devices (listed below).> Targets: Per Tom CY 2019 direct install stats are as follows:
- 1,000 SF+ MF Toilets (0.8 gpf)
- 500 SF+MF Showerheads (1.5 gpm)
- 300 SF+MF Aerators (1.0 gpm)
- 250 SF+MF Aerators (1.5 gpm)
- 50 CII Tank Toilets (0.8 gpf)
- 150 CII Flushvalve Toilets (>=1.28 gpf)
- 150 CII Urinals (0.125 gpf)
- 750 CII Aerators (0.5 gpm)
- participation in this measure significantly declined in 2020-2022 as compared to 2019. Range of 2019-2022 annual account participation is residential (7-191) and CII (1-30). Targeted accounts selected based on targeted ~30 MGY savings.
> On July 1, 2017, the City’s Water Neutrality Ordinance went into effect for all new developments. Water Neutrality is a code that caps water use for new developments by limiting the project to the historical use for that individual parcel. If a new project is projected to use more water than the historical usage for the site, the new development applicant is responsible to offset that water somewhere else in the city. One of the offset options the applicant can choose to meet compliance is a fee-based City sponsored offset program. The City’s Water Neutrality Direct Install Program is fully funded by new development applicants who choose this compliance option. Because toilets are the highest indoor water using fixture, replacing older, water-wasting toilets with the newest water efficient models can save significant amounts of water.

Results

Units

MG

Average Water Savings (mgd)

0.245764

Lifetime Savings - Present Value (\$)

Utility

\$3,872,884

Community

\$7,480,074

Lifetime Costs - Present Value (\$)

Utility

\$1,793,036

Community

\$1,793,036

Benefit to Cost Ratio

Utility

2.16

Community

4.17

Cost of Savings per Unit Volume (\$/mg)

Utility

\$868

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Toilets	50.0%	49.3
MF_2022 Toilets	50.0%	146.6
CI Toilets	50.0%	157.6
INST Toilets	50.0%	43.7
CI Urinals	87.5%	63.0
INST Urinals	87.5%	13.1
SF Lavatory Faucets	54.5%	9.2
MF_2022 Lavatory Faucets	54.5%	29.1
CI Lavatory Faucets	77.3%	44.1
INST Lavatory Faucets	77.3%	18.9
SF Show ers	40.0%	49.5
MF_2022 Show ers	40.0%	115.1
CI Show ers	40.0%	94.5
INST Show ers	40.0%	21.9
SF Non-Lavatory/Kitchen Faucets	31.8%	30.5
MF_2022 Non-Lavatory/Kitchen Faucets	31.8%	74.5
CI Non-Lavatory/Kitchen Faucets	31.8%	92.4
INST Non-Lavatory/Kitchen Faucets	31.8%	16.1

Targets

Target Method:

Percentage

% of Accts Targeted/Yr	1.300%
Only Affects New Accts	☐

Costs

View:

Summary

	Utility	Customer	Total
2023	\$126,600	\$0	\$126,600
2024	\$126,600	\$0	\$126,600
2025	\$126,600	\$0	\$126,600
2026	\$126,600	\$0	\$126,600
2027	\$126,600	\$0	\$126,600
2028	\$126,600	\$0	\$126,600
2029	\$126,600	\$0	\$126,600
2030	\$126,600	\$0	\$126,600
2031	\$126,600	\$0	\$126,600
2032	\$126,600	\$0	\$126,600
2033	\$126,600	\$0	\$126,600
2034	\$126,600	\$0	\$126,600
2035	\$126,600	\$0	\$126,600
2036	\$126,600	\$0	\$126,600
2037	\$126,600	\$0	\$126,600
2038	\$126,600	\$0	\$126,600
2039	\$126,600	\$0	\$126,600
2040	\$126,600	\$0	\$126,600
2041	\$126,600	\$0	\$126,600
2042	\$126,600	\$0	\$126,600
2043	\$126,600	\$0	\$126,600
2044	\$126,600	\$0	\$126,600
2045	\$126,600	\$0	\$126,600

Targets

View

Accounts

	SF	MF_2022	CI	INST	Total
2023	105	90	29	3	228
2024	105	90	29	3	228
2025	105	90	29	3	228
2026	105	90	29	4	228
2027	105	90	28	4	228
2028	105	90	28	4	228
2029	105	90	28	4	228
2030	105	90	28	4	228
2031	105	90	28	4	228
2032	105	90	28	4	227
2033	105	90	28	4	227
2034	105	90	28	4	227
2035	105	90	27	4	227
2036	105	90	27	4	227
2037	105	90	27	4	227
2038	105	90	27	4	227
2039	105	90	27	4	227
2040	105	90	27	4	227
2041	105	90	27	4	226
2042	105	90	26	4	226
2043	105	90	26	4	226
2044	105	90	26	4	226
2045	105	90	26	4	226

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.027607
2024	0.054420
2025	0.080500
2026	0.105901
2027	0.130671
2028	0.154854
2029	0.178490
2030	0.201609
2031	0.224245
2032	0.246429
2033	0.268189
2034	0.289550
2035	0.310533
2036	0.331159
2037	0.351443
2038	0.348027
2039	0.344719
2040	0.341512
2041	0.338398
2042	0.335382
2043	0.332458
2044	0.329620
2045	0.326867

City of Santa Monica Water Conservation Management Plan

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Measure 12: Direct Install: Irrigation Devices

Overview

Name

Direct Install: Irrigation Devices

Abbr

12

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2024

Last Year

2045

Measure Length

22

Measure Life

Permanent

☐

Years

10

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$0.00	\$0.00	1
MF_2022	\$0.00	\$0.00	1
CI	\$0.00	\$0.00	1
LS	\$0.00	\$0.00	1
INST	\$0.00	\$0.00	1

Administration Costs

Method:

Fixed

Annual Admin Costs

\$42,200

Description

For SF, MF, CI, and IRR customers with landscape, provide for the installation of water efficient irrigation upgrades. This could be in conjunction with the WaterWise landscape surveys or via one of CalWEP's turnkey programs for administration assistance. Included in the menu of installations are: rotary nozzles, WBIC, soil moisture sensor, rain sensors, rain barrels. Use Eagle Aerial's WaterView to identify large turf areas to target outreach. This program could be funded by Water Neutrality fees and become part of that program.

Customer Classes

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☒	☒	☒	☐	☐	☐

End Uses

	SF	MF_2022	CI	LS	INST	FI	NEW A	NEW M
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☐	☐	☐	☐	☐	☐	☐	☐
Show ers	☐	☐	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☐	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☒	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Dow n	☐	☐	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☐	☐	☐	☐	☐
Car Washing	☐	☐	☐	☐	☐	☐	☐	☐
External Leakage	☒	☒	☒	☒	☒	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐	☐	☐	☐	☐

Comments

>Utility & Admin Costs: Per Tom there are no utility costs for this measure. Measure can be funded by Water Neutrality fees paid by building permit applicants. It is estimated that approx. .25 of an FTE is spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .25= about \$42,200 annually.)

>Customer Cost: There is no customer cost for this measure. Fixture and installation are covered by the Neutrality Fees.

>End Use Savings: Participating fixtures typically save between 5%-35% of irrigation water use. Assuming average of 20%.

>Targets: Per Tom, recent participating includes the following:

- 250 Rotary Nozzles
- 35 WBICS
- 35 Soil Moisture Sensors
- 20 Rain Sensors
- 20 Rain Barrels

Assume 1 of these fixtures per participating account, so about 360 accounts/yr.

Results

Units

MG

Average Water Savings (mgd)

0.035867

Lifetime Savings - Present Value (\$)

Utility

\$562,930

Community

\$562,930

Lifetime Costs - Present Value (\$)

Utility

\$555,479

Community

\$555,479

Benefit to Cost Ratio

Utility

1.01

Community

1.01

Cost of Savings per Unit Volume (\$/mg)

Utility

\$1,844

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Irrigation	20.0%	45.5
MF_2022 Irrigation	20.0%	13.6
CI Irrigation	20.0%	63.2
LS Irrigation	20.0%	606.8
INST Irrigation	20.0%	51.7
SF External Leakage	20.0%	3.8
MF_2022 External Leakage	20.0%	1.1
CI External Leakage	20.0%	5.7
LS External Leakage	20.0%	45.7
INST External Leakage	20.0%	5.0

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

1.980%

Only Affects New Accts

☐

Costs

View:

Summary

	Utility	Customer	Total
2023	\$0	\$0	\$0
2024	\$42,200	\$0	\$42,200
2025	\$42,200	\$0	\$42,200
2026	\$42,200	\$0	\$42,200
2027	\$42,200	\$0	\$42,200
2028	\$42,200	\$0	\$42,200
2029	\$42,200	\$0	\$42,200
2030	\$42,200	\$0	\$42,200
2031	\$42,200	\$0	\$42,200
2032	\$42,200	\$0	\$42,200
2033	\$42,200	\$0	\$42,200
2034	\$42,200	\$0	\$42,200
2035	\$42,200	\$0	\$42,200
2036	\$42,200	\$0	\$42,200
2037	\$42,200	\$0	\$42,200
2038	\$42,200	\$0	\$42,200
2039	\$42,200	\$0	\$42,200
2040	\$42,200	\$0	\$42,200
2041	\$42,200	\$0	\$42,200
2042	\$42,200	\$0	\$42,200
2043	\$42,200	\$0	\$42,200
2044	\$42,200	\$0	\$42,200
2045	\$42,200	\$0	\$42,200

Targets

View

Accounts

	SF	MF_2022	CI	LS	INST	Total
2023	0	0	0	0	0	0
2024	160	138	44	14	5	361
2025	160	138	44	14	5	361
2026	160	138	43	14	5	361
2027	160	138	43	15	6	362
2028	160	138	43	15	6	362
2029	160	138	43	16	6	363
2030	160	138	43	16	6	363
2031	160	138	42	16	6	363
2032	160	138	42	16	6	362
2033	160	138	42	16	6	362
2034	160	138	42	16	6	362
2035	160	138	42	17	6	362
2036	160	138	41	17	6	362
2037	160	138	41	17	6	362
2038	160	138	41	17	6	362
2039	160	138	41	17	6	362
2040	160	138	41	17	6	362
2041	160	138	40	17	6	362
2042	160	138	40	17	6	362
2043	160	138	40	17	6	362
2044	160	138	40	17	6	361
2045	160	138	40	17	6	361

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.000000
2024	0.004428
2025	0.008910
2026	0.013447
2027	0.018038
2028	0.022683
2029	0.027382
2030	0.032096
2031	0.036826
2032	0.041571
2033	0.046332
2034	0.046680
2035	0.046989
2036	0.047259
2037	0.047490
2038	0.047682
2039	0.047835
2040	0.047972
2041	0.048092
2042	0.048196
2043	0.048282
2044	0.048352
2045	0.048405

Measure 13: Water Audits: Indoor and Outdoor Residential

Overview

Name

Water Audits: Indoor and Outdoor Residential

Abbr

13

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

☐

Years

5

Repeat

☐

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$400.00	\$50.00	1
MF_2022	\$400.00	\$50.00	1

Administration Costs

Method:

Percent

Markup Percentage

21%

Description

Provide a free water survey for Residential customers. The City is working on a contract with WaterWise Consulting to provide water surveys for residential customers. Those with high water use or that have received a Notice of Violation (NOV) for outdoor water waste are targeted. Assumes these customers are different than those targeted with AMI leak alerts. Includes an onsite visit and customized report on how to save water. Simple irrigation repairs, spray head alignment, retrofits with rotary nozzles, and installation and programming of WBICS is included. Outdoor survey is the primary offering, with indoor water surveys also available upon request. Includes the free installation of efficient showerheads and aerators. These surveys can link with the Irrigation Devices Direct Install program.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW N
	☒	☒	☐	☐	☐	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW N
Toilets	☒	☒						
Urinals								
Lavatory Faucets	☒	☒						
Show ers	☒	☒						
Dishw ashers	☒	☒						
Clothes Washers	☒	☒						
Process								
Kitchen Spray Rinse								
Internal Leakage	☒	☒						
Baths	☒	☒						
Other	☒	☒						
Irrigation	☒	☒						
Pools	☒	☒						
Wash Dow n	☒	☒						
Cooling								
Car Washing	☒	☒						
External Leakage	☒	☒						
Outdoor								
Non-Lavatory/Kitchen Faucets	☒	☒						

Comments

>Utility Costs: This measure has a utility cost of \$400 per audit using a contractor to perform the audit. Giveaway device costs and device rebates as a result of this measure are not included since these are covered in separate measures.

>Admin Costs: Estimated that 0.1 FTE time will be spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .1 = about \$17,000 annually- equates to about \$85 per targeted account.

>Customer Cost: Customer costs represent average customer cost to implement any survey suggestions.

>End Use Savings: Savings represents average account savings. Indoor savings based off of California Urban Water Agencies water savings study (4/13/15). Approximate 5.8% savings for indoor. Slightly lower value of 5% water savings were selected to account for efficient devices installed during the recent CA drought, and more efficient homes built to CALGreen on the market in the past 5 years. Outdoor savings higher since targeting those with high water use/outdoor water waste.

>Targets: Per Tom, target ~ 200 surveys annually.

Results

Units

MG

Average Water Savings (mgd)

0.060961

Lifetime Savings - Present Value (\$)

Utility

\$1,052,107

Community

\$1,941,722

Lifetime Costs - Present Value (\$)

Utility

\$1,362,246

Community

\$1,502,973

Benefit to Cost Ratio

Utility

0.77

Community

1.29

Cost of Savings per Unit Volume (\$/mg)

Utility

\$2,660

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
SF Toilets	5.0%	49.3
MF_2022 Toilets	5.0%	146.6
SF Lavatory Faucets	5.0%	9.2
MF_2022 Lavatory Faucets	5.0%	29.1
SF Show ers	5.0%	49.5
MF_2022 Show ers	5.0%	115.1
SF Dishw ashers	5.0%	2.8
MF_2022 Dishw ashers	5.0%	7.3
SF Clothes Washers	5.0%	35.4
MF_2022 Clothes Washers	5.0%	103.0
SF Internal Leakage	75.0%	32.8
MF_2022 Internal Leakage	75.0%	81.8
SF Baths	5.0%	6.3
MF_2022 Baths	5.0%	16.4
SF Other	5.0%	18.8
MF_2022 Other	5.0%	32.1
SF Irrigation	25.0%	45.5
MF_2022 Irrigation	25.0%	13.6
SF Pools	5.0%	1.1
MF_2022 Pools	5.0%	0.3
SF Wash Dow n	5.0%	2.2
MF_2022 Wash Dow n	5.0%	0.7
SF Car Washing	5.0%	2.2
MF_2022 Car Washing	5.0%	0.7
SF External Leakage	75.0%	3.8
MF_2022 External Leakage	75.0%	1.1
SF Non-Lavatory/Kitchen Faucets	5.0%	30.5
MF_2022 Non-Lavatory/Kitchen Faucets	5.0%	74.5

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

1.320%

Only Affects New Accts

☐

Costs

View:

Summary

	Utility	Customer	Total
2023	\$96,183	\$9,936	\$106,120
2024	\$96,183	\$9,936	\$106,120
2025	\$96,183	\$9,936	\$106,120
2026	\$96,183	\$9,936	\$106,120
2027	\$96,183	\$9,936	\$106,120
2028	\$96,183	\$9,936	\$106,120
2029	\$96,183	\$9,936	\$106,120
2030	\$96,183	\$9,936	\$106,120
2031	\$96,183	\$9,936	\$106,120
2032	\$96,183	\$9,936	\$106,120
2033	\$96,183	\$9,936	\$106,120
2034	\$96,183	\$9,936	\$106,120
2035	\$96,183	\$9,936	\$106,120
2036	\$96,183	\$9,936	\$106,120
2037	\$96,183	\$9,936	\$106,120
2038	\$96,183	\$9,936	\$106,120
2039	\$96,183	\$9,936	\$106,120
2040	\$96,183	\$9,936	\$106,120
2041	\$96,183	\$9,936	\$106,120
2042	\$96,183	\$9,936	\$106,120
2043	\$96,183	\$9,936	\$106,120
2044	\$96,183	\$9,936	\$106,120
2045	\$96,183	\$9,936	\$106,120

Targets

View

Accounts

	SF	MF_2022	Total
2023	107	92	199
2024	107	92	199
2025	107	92	199
2026	107	92	199
2027	107	92	199
2028	107	92	199
2029	107	92	199
2030	107	92	199
2031	107	92	199
2032	107	92	199
2033	107	92	199
2034	107	92	199
2035	107	92	199
2036	107	92	199
2037	107	92	199
2038	107	92	199
2039	107	92	199
2040	107	92	199
2041	107	92	199
2042	107	92	199
2043	107	92	199
2044	107	92	199
2045	107	92	199

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.013704
2024	0.027333
2025	0.040891
2026	0.054385
2027	0.067818
2028	0.067661
2029	0.067512
2030	0.067368
2031	0.067230
2032	0.067096
2033	0.066963
2034	0.066833
2035	0.066705
2036	0.066581
2037	0.066459
2038	0.066340
2039	0.066223
2040	0.066108
2041	0.065995
2042	0.065885
2043	0.065776
2044	0.065670
2045	0.065566

City of Santa Monica Water Conservation Management Plan

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Measure 14: Water Audits: Indoor and Outdoor CII

Overview

Name

Water Audits: Indoor and Outdoor CII

Abbr

14

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2024

Last Year

2045

Measure Length

22

Measure Life

Permanent

Years

10

Repeat

Fixture Cost per Device

	Utility	Customer	Fix/Acct
CI	\$750.00	\$1,000.00	1
INST	\$750.00	\$1,000.00	1

Administration Costs

Method:

Percent

Markup Percentage

30%

Description

Provide a free water survey for CII customers. Target top users including hotels, hospitals, and restaurants. Assumes contracted out at this time, but could add staff to be administered in-house. After the free water use survey has been completed at each site, Santa Monica would analyze the recommendations on the findings report that is provided and determine if site qualifies for rebates, direct installs, and/or MWD's WSIP (Water Savings Incentive Program). Recommendations are tailored to each individual site as each site has varying water savings potential. Link to CII Equipment Rebates measure and the Irrigation Devices Direct Install program. Modeled after the West Basin pilot program.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets								
Urinals								
Lavatory Faucets								
Show ers								
Dishw ashers								
Clothes Washers								
Process								
Kitchen Spray Rinse								
Internal Leakage								
Baths								
Other								
Irrigation								
Pools								
Wash Dow n								
Cooling								
Car Washing								
External Leakage								
Outdoor								
Non-Lavatory/Kitchen Faucets								

Comments

>Utility Cost: This measure has an estimated utility cost of \$750 per audit. Giveaway device costs and device rebates as a result of this measure are not included since these are covered in separate measures.

>Admin Cost: Estimated that 0.1 FTE time will be spent on this measure per year coordinating surveys- surveys will be performed by a contractor. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .1 = about \$17,000 annually. Divided by 75 accounts targeted is about \$225 or 30% markup.)

>Customer Cost: Reflects cost/time to install fixtures and address survey recommendations. Assumes \$1,000/site on average in addition to any giveaways provided.

>End Use Savings: BAWSCA Phase 1 (YEAR) study on Making Conservation a California Way of Life found savings of 10-15% per site. Assume 10% on indoor devices to be conservative, and 20% for outdoor. Assume high leak savings from addressing identified leaks.

>Targets: Per Tom, target ~75 audits annually.

Results

Units

MG

Average Water Savings (mgd)

0.092504

Lifetime Savings - Present Value (\$)

Utility

\$1,471,959

Community

\$2,925,040

Lifetime Costs - Present Value (\$)

Utility

\$937,454

Community

\$1,898,946

Benefit to Cost Ratio

Utility

1.57

Community

1.54

Cost of Savings per Unit Volume (\$/mg)

Utility

\$1,206

End Use Savings Per Replacement

Method:

Percent

	% Savings/Acct	Avg GPD/Acct
CI Toilets	10.0%	157.6
INST Toilets	10.0%	43.7
CI Urinals	10.0%	63.0
INST Urinals	10.0%	13.1
CI Lavatory Faucets	10.0%	44.1
INST Lavatory Faucets	10.0%	18.9
CI Show ers	10.0%	94.5
INST Show ers	10.0%	21.9
CI Dishw ashers	10.0%	63.0
INST Dishw ashers	10.0%	13.1
CI Clothes Washers	10.0%	157.6
INST Clothes Washers	10.0%	30.6
CI Process	10.0%	147.1
CI Kitchen Spray Rinse	10.0%	52.5
INST Kitchen Spray Rinse	10.0%	10.9
CI Internal Leakage	75.0%	105.0
INST Internal Leakage	75.0%	21.9
CI Other	10.0%	73.5
INST Other	10.0%	28.4
CI Irrigation	20.0%	63.2
INST Irrigation	20.0%	51.7
INST Pools	10.0%	3.5
CI Cooling	10.0%	12.1
INST Cooling	10.0%	10.6
CI External Leakage	10.0%	5.7
INST External Leakage	10.0%	5.0
CI Non-Lavatory/Kitchen Faucets	10.0%	92.4
INST Non-Lavatory/Kitchen Faucets	10.0%	16.1

Targets

Target Method:

Percentage

% of Accts Targeted/Yr

3.010%

Only Affects New Accts

Costs

View:

Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$0	\$0	\$0
2024	\$55,801	\$16,740	\$72,541
2025	\$55,751	\$16,725	\$72,477
2026	\$55,702	\$16,711	\$72,412
2027	\$55,652	\$16,696	\$72,348
2028	\$55,602	\$16,681	\$72,283
2029	\$55,553	\$16,666	\$72,219
2030	\$55,381	\$16,614	\$71,995
2031	\$55,209	\$16,563	\$71,772
2032	\$55,038	\$16,511	\$71,549
2033	\$54,866	\$16,460	\$71,326
2034	\$54,694	\$16,408	\$71,102
2035	\$54,522	\$16,357	\$70,879
2036	\$54,351	\$16,305	\$70,656
2037	\$54,179	\$16,254	\$70,433
2038	\$54,007	\$16,202	\$70,209
2039	\$53,835	\$16,151	\$69,986
2040	\$53,612	\$16,084	\$69,696
2041	\$53,388	\$16,016	\$69,404
2042	\$53,163	\$15,949	\$69,112
2043	\$52,939	\$15,882	\$68,821
2044	\$52,714	\$15,814	\$68,529
2045	\$52,490	\$15,747	\$68,237

Targets

View:

Accounts

	CI	INST	Total
2023	0	0	0
2024	67	8	74
2025	66	8	74
2026	66	8	74
2027	66	8	74
2028	66	9	74
2029	65	9	74
2030	65	9	74
2031	65	9	74
2032	64	9	73
2033	64	9	73
2034	64	9	73
2035	63	9	73
2036	63	9	72
2037	63	9	72
2038	62	10	72
2039	62	10	72
2040	62	10	71
2041	62	10	71
2042	61	10	71
2043	61	10	71
2044	61	10	70
2045	60	10	70

Water Savings

Units

mgd

	Total Savings (mgd)
2023	0.000000
2024	0.012867
2025	0.025628
2026	0.038287
2027	0.050847
2028	0.063312
2029	0.075684
2030	0.087959
2031	0.100139
2032	0.112227
2033	0.124224
2034	0.123525
2035	0.122827
2036	0.122130
2037	0.121432
2038	0.120735
2039	0.120037
2040	0.119342
2041	0.118651
2042	0.117962
2043	0.117277
2044	0.116593
2045	0.115912

City of Santa Monica Water Conservation Management Plan

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Measure 15: Enforcement: Outdoor Water Waste

Overview

Name

Enforcement: Outdoor Water Waste

Abbr

15

Category

Default

Measure Type

Standard Measure

Time Period

First Year

2023

Last Year

2045

Measure Length

23

Measure Life

Permanent

Years

3

Repeat

Fixture Cost per Device

	Utility	Customer	Fix/Acct
SF	\$110.00	\$50.00	1
MF_2022	\$110.00	\$100.00	1
CI	\$110.00	\$100.00	1
INST	\$110.00	\$100.00	1

Administration Costs

Method: Percent

Markup Percentage63%

Description

The City's Water Conservation requirements SMMC 7.16.020 prohibits the waste of water outdoors, including failure to repair leaks in a timely manner. Water waste enforcement is handled for reported violations with Notices of Violation sent to the property's account holder. A contract is being finalized for nighttime water waste patrols. A component of this program could be to provide coupons for saving water and money at a certified water smart car wash. Water smart car washes recycle water on-site or send it to a water treatment facility where the water is treated, recycled and reused. Some establishments may go waterless, providing car cleaning services with environmentally-friendly products using little or no water. Coupons may only be redeemed at a participating retailer. Coupons could be presented at the time of purchase. Water Resources Protection could provide coupons when addressing water runoff issues.

Customer Classes

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☒	☒	☒	☐	☒	☐	☐	☐

End Uses

	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets	☐	☐	☐	☐	☐	☐	☐	☐
Urinals	☐	☐	☐	☐	☐	☐	☐	☐
Lavatory Faucets	☐	☐	☐	☐	☐	☐	☐	☐
Showers	☐	☐	☐	☐	☐	☐	☐	☐
Dishwashers	☐	☐	☐	☐	☐	☐	☐	☐
Clothes Washers	☐	☐	☐	☐	☐	☐	☐	☐
Process	☐	☐	☐	☐	☐	☐	☐	☐
Kitchen Spray Rinse	☐	☐	☐	☐	☒	☐	☐	☐
Internal Leakage	☐	☐	☐	☐	☐	☐	☐	☐
Baths	☐	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐	☐
Irrigation	☒	☒	☒	☐	☒	☐	☐	☐
Pools	☐	☐	☐	☐	☐	☐	☐	☐
Wash Down	☒	☒	☐	☐	☐	☐	☐	☐
Cooling	☐	☐	☐	☒	☐	☐	☐	☐
Car Washing	☒	☒	☐	☐	☐	☐	☐	☐
External Leakage	☒	☒	☒	☐	☒	☐	☐	☐
Outdoor	☐	☐	☐	☐	☐	☐	☐	☐
Non-Lavatory/Kitchen Faucets	☐	☐	☐	☐	☐	☐	☐	☐

Comments

>Utility & Admin Costs: This measure will cost the utility \$450 per 4-hour patrol. Per Tom, an estimated 150 nighttime patrols are targeted for this measure. Assuming these 150 nighttime patrols are 4 hours each yields an annual utility cost of \$67,000. It is estimated that approx. .25 of an FTE is spent on this measure per year. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .25= about \$42,200 annually.)>Customer Cost: Assume \$50/SF customer cost and \$100 MF/CII cost to fix irrigation water waste/leak - most visible water waste is irrigation.>End Use Savings: Savings of 6% approximately equates to an account having a leak of 33 gallons per day. Assumed 3% water savings per account for outdoor uses to be conservative since not all site visits reveal water waste which yield water savings. Assumes 95% savings for external leakage since targeting high leaks reported.>Targets: Per Tom, recent involvement in this measure (2022) is as follows:> 150 Nighttime Patrols> 350 NOVs> 50 Car Wash Coupons

Results

UnitsMG

Average Water Savings (mgd)0.007000

Lifetime Savings - Present Value (\$)

Utility	\$123,747
Community	\$123,747

Lifetime Costs - Present Value (\$)

Utility	\$1,549,306
Community	\$2,215,339

Benefit to Cost Ratio

Utility	0.08
Community	0.06

Cost of Savings per Unit Volume (\$/mg)

Utility	\$26,346
---------	----------

End Use Savings Per Replacement

Method: Percent

	% Savings/Acct	Avg GPD/Acct
SF Irrigation	3.0%	45.5
MF_2022 Irrigation	3.0%	13.6
CI Irrigation	3.0%	63.2
INST Irrigation	3.0%	51.7
SF Wash Down	3.0%	2.2
MF_2022 Wash Down	3.0%	0.7
SF Car Washing	3.0%	2.2
MF_2022 Car Washing	3.0%	0.7
SF External Leakage	95.0%	3.8
MF_2022 External Leakage	95.0%	1.1
CI External Leakage	95.0%	5.7
INST External Leakage	95.0%	5.0

Targets

Target Method: Percentage

% of Accts Targeted/Yr	3.500%
Only Affects New Accts	☐

Costs

View: Utility Data

	Fixture Costs	Admin Costs	Util Total
2023	\$67,487	\$42,179	\$109,666
2024	\$67,478	\$42,174	\$109,652
2025	\$67,470	\$42,169	\$109,638
2026	\$67,461	\$42,163	\$109,625
2027	\$67,453	\$42,158	\$109,611
2028	\$67,444	\$42,153	\$109,597
2029	\$67,436	\$42,147	\$109,583
2030	\$67,407	\$42,129	\$109,536
2031	\$67,377	\$42,111	\$109,488
2032	\$67,348	\$42,093	\$109,441
2033	\$67,319	\$42,074	\$109,393
2034	\$67,289	\$42,056	\$109,345
2035	\$67,260	\$42,038	\$109,298
2036	\$67,231	\$42,019	\$109,250
2037	\$67,202	\$42,001	\$109,203
2038	\$67,172	\$41,983	\$109,155
2039	\$67,143	\$41,964	\$109,107
2040	\$67,105	\$41,941	\$109,046
2041	\$67,067	\$41,917	\$108,983
2042	\$67,028	\$41,893	\$108,921
2043	\$66,990	\$41,869	\$108,859
2044	\$66,952	\$41,845	\$108,797
2045	\$66,913	\$41,821	\$108,734

Targets

View: Accounts

	SF	MF_2022	CI	INST	Total
2023	283	243	78	9	614
2024	283	243	78	9	613
2025	283	243	77	9	613
2026	283	243	77	9	613
2027	283	243	77	10	613
2028	283	243	76	10	613
2029	283	243	76	10	613
2030	283	243	75	10	613
2031	283	243	75	10	613
2032	283	243	75	11	612
2033	283	243	74	11	612
2034	283	243	74	11	612
2035	283	243	74	11	611
2036	283	243	73	11	611
2037	283	243	73	11	611
2038	283	243	73	11	611
2039	283	243	72	11	610
2040	283	243	72	11	610
2041	283	243	72	11	610
2042	283	243	71	11	609
2043	283	243	71	11	609
2044	283	243	71	11	609
2045	283	243	70	11	608

Water Savings

Unitsmgd

	Total Savings (mgd)
2023	0.002455
2024	0.004909
2025	0.007363
2026	0.007360
2027	0.007358
2028	0.007355
2029	0.007353
2030	0.007349
2031	0.007344
2032	0.007338
2033	0.007332
2034	0.007326
2035	0.007320
2036	0.007314
2037	0.007308
2038	0.007302
2039	0.007296
2040	0.007289
2041	0.007282
2042	0.007274
2043	0.007267
2044	0.007259
2045	0.007251

City of Santa Monica Water Conservation Management Plan

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Measure 16: Compliance: CA Water Budgeting (Dedicated Irrigation Meters)

Overview			
Name	Compliance: CA Water Budget		
Abbr	16		
Category	Default		
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2025	Permanent	☐
Last Year	2035	Years	3
Measure Length	11	Repeat	☐
Fixture Cost per Device			
	Utility	Customer	Fix/Acct
LS	\$87.50	\$250.00	1
Administration Costs			
Method:		Fixed	
Annual Admin Costs		\$42,200	
Description			
Conduct detailed landscape area measurements for CII dedicated irrigation accounts. Can use aerial imagery including freely-available National Agricultural Aerial Program (NAIP) Imagery. The recommended standard would require urban retail water suppliers to identify dedicated irrigation meters (DIMs) and measure the associated irrigated CII landscapes within five years after the State Water Board adopts the regulation. The total landscape area will be incorporated into a landscape water use equation/standard (provided by DWR) to produce a supplier level CII landscape budget in gallons. The state will not enforce CII landscape budgets for individual parcels/customers. Also includes requirements for new MF and CII developments to install dedicated irrigation meters and SF accounts with greater than 5,000' of irrigation to install a dedicated landscape meter. This is already specified in Santa Monica's WELIS and enforced in plan check.			

Customer Classes								
	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
	☐	☐	☐	☒	☐	☐	☐	☐
End Uses								
	SF	MF_20	CI	LS	INST	FI	NEW A	NEW M
Toilets								
Urinals								
Lavatory Faucets								
Showers								
Dishwashers								
Clothes Washers								
Process								
Kitchen Spray Rinse								
Internal Leakage								
Baths								
Other								
Irrigation				☒				
Pools								
Wash Down								
Cooling								
Car Washing								
External Leakage				☒				
Outdoor								
Non-Lavatory/Kitchen Faucets								
Comments								
As of March 2023, SWRCB timeline states the CII DIM requirement will go into effect in summer 2024, thus starting measure in 2025. >Utility & Admin Costs: Per Tom, the estimated annual utility cost will be \$35,000 for the WaterView subscription. Assume this cost for conducting 400 CII DIM assessments annually. It is estimated that approx. 0.25 of an FTE is spent on this measure per year collaborating. (Assume Specialist is administering this measure- total burdened salary of \$168,827 x .25= about \$42,200 annually.) Subscription costs are tracked as utility fixture costs; whereas staff mgmt. time is tracked in admin costs to better track staffing accurately. >Customer Cost: Customer cost represents average cost to implement any water saving actions done by customers as a result of their budget. >End Use Savings: Using various program estimates, on average, customers are 15% over budget or "expected" water use. Customers will become slightly more efficient on average due to the cost of being inefficient. >Targets: Per Tom, target 400 CII DIM Accounts (estimate). This would be 60% of the 666 start year LS accounts.								

Results	
Units	MG
Average Water Savings (mgd)	
0.066371	
Lifetime Savings - Present Value (\$)	
Utility	\$1,330,465
Community	\$1,330,465
Lifetime Costs - Present Value (\$)	
Utility	\$658,516
Community	\$1,586,167
Benefit to Cost Ratio	
Utility	2.02
Community	0.84
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,181

End Use Savings Per Replacement		
Method:		Percent
	% Savings/Acct	Avg GPD/Acct
LS Irrigation	15.0%	606.8
LS External Leakage	15.0%	45.7

Targets		
Target Method:		Percentage
% of Accts Targeted/Yr		60.000%
Only Affects New Accts		☐

Costs			
View: Summary			
	Utility	Customer	Total
2023	\$0	\$0	\$0
2024	\$0	\$0	\$0
2025	\$79,409	\$106,310	\$185,719
2026	\$80,531	\$109,516	\$190,046
2027	\$81,652	\$112,721	\$194,373
2028	\$82,774	\$115,926	\$198,700
2029	\$83,896	\$119,131	\$203,028
2030	\$84,252	\$120,149	\$204,401
2031	\$84,608	\$121,166	\$205,774
2032	\$84,964	\$122,183	\$207,147
2033	\$85,320	\$123,200	\$208,521
2034	\$85,676	\$124,218	\$209,894
2035	\$86,032	\$125,235	\$211,267
2036	\$0	\$0	\$0
2037	\$0	\$0	\$0
2038	\$0	\$0	\$0
2039	\$0	\$0	\$0
2040	\$0	\$0	\$0
2041	\$0	\$0	\$0
2042	\$0	\$0	\$0
2043	\$0	\$0	\$0
2044	\$0	\$0	\$0
2045	\$0	\$0	\$0

Targets		
View: Accounts		
	LS	Total
2023	0	0
2024	0	0
2025	425	425
2026	438	438
2027	451	451
2028	464	464
2029	477	477
2030	481	481
2031	485	485
2032	489	489
2033	493	493
2034	497	497
2035	501	501
2036	0	0
2037	0	0
2038	0	0
2039	0	0
2040	0	0
2041	0	0
2042	0	0
2043	0	0
2044	0	0
2045	0	0

Water Savings	
Units	mgd
	Total Savings (mgd)
2023	0.000000
2024	0.000000
2025	0.041620
2026	0.084495
2027	0.128625
2028	0.132389
2029	0.136154
2030	0.139062
2031	0.141113
2032	0.142308
2033	0.143502
2034	0.144697
2035	0.145892
2036	0.097659
2037	0.049029
2038	0.000000
2039	0.000000
2040	0.000000
2041	0.000000
2042	0.000000
2043	0.000000
2044	0.000000
2045	0.000000