WATER CONSERVATION MASTER PLAN UPDATE

2020

Draft

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City of Oceanside
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LIST OF ACRONYMS

AB	Assembly Bill
ACS	American Community Survey
AF	acre-foot/acre-feet
AFY	acre-foot/acre-feet per year
ag	agricultural
AMI	Advanced Metering Infrastructure
AWE	Alliance for Water Efficiency
AWWA	American Water Works Association
AWWARF	American Water Works Association Research Foundation
BMP	Best Management Practice
CII	Commercial, Industrial, and Institutional
City	City of Oceanside
CPI	Consumer Price Index
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DOF	Department of Finance
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ETo	evapotranspiration
FY	Fiscal Year
GPCD	gallons per capita per day
gpd	gallons per day
gpf	gallons per flush
gpm	gallons per minute
hcf	hundred cubic feet
HE	High Efficiency
HEU	High Efficiency Urinal
HOA	Homeowners association
HP	horsepower
IE	irrigation efficiency
ILI	Infrastructure Leakage Index
IRR	Irrigation
MAWA	Maximum Applied Water Allowance
MF	Multi-Family
MG	million gallons
MOU	Memorandum of Understanding
MRCD	Mission Resource Conservation District
MWD	Metropolitan Water District of Southern California
MWELO	Model Water Efficient Landscape Ordinance
NRW	Non-revenue water
PV	Present value
PWSS	Public Water System Statistics
SANDAG	San Diego Association of Governments
SB	Senate Bill
SB X7-7	2009 Water Conservation Act
SDCWA	San Diego County Water Authority
SF	Single Family
SLA	special landscape areas
SLRWRF	San Luis Rey Wastewater Treatment Water Reclamation Facility
SWRCB	State Water Resource Control Board
UHET	Ultra-High Efficiency Toilet
ULF	Ultra-Low Flow
ULFT	Ultra-Low Flow Toilet
UWMP	Urban Water Management Plan
WCMP	Water Conservation Master Plan
WF	Water factor

EXECUTIVE SUMMARY

ES.1 Introduction

The purpose of the Executive Summary is to provide an overview of the City of Oceanside's (City) Water Conservation Master Plan Update (2020 WCMP). The evaluation process and assumptions used to develop this Master Plan Update and recommendations for future implementation are included in the full report and appendices.

The City manages a robust water conservation program. Expanding existing efforts in a cost-effective way will help meet future water use objectives and support continued compliance with State-mandated per capita reduction targets according to the 2009 Water Conservation Act (SB X7-7).

The 2020 WCMP analyzes existing and potential conservation measures and programs using the Alliance for Water Efficiency Conservation Tracking Tool (AWE Tool). The evaluation included conservation measures implemented by existing customers, as well as measures to promote water efficiency for new residential and business customers. Three conservation programs, each comprising multiple conservation measures, were developed to evaluate the net effect of running multiple measures together over time. From this analysis, a Recommended Plan was selected in concert with the City's 2020 Urban Water Management Plan (UWMP). The City selected a plan that incorporates aggressive water conservation, advanced metering infrastructure (AMI), and further implementation of recycled water conversions.

The benefits of implementing the elements of the Master Plan Update are:

- Expands existing conservation efforts, along with the use of recycled water, to help meet future water use objectives per Senate Bill (SB) 606 and Assembly Bill (AB) 1668;
- Is cost-effective and less expensive than continuing to purchase additional imported water from San Diego County Water Authority (SDCWA);
- Helps the City become more self-sufficient with its water supply; and
- Is environmentally beneficial and promotes sustainable water resource management.

ES.2 Long-Term Demand and Conservation Program Analysis Results

The City's baseline water demands (i.e., average year demand before additional active conservation savings are incorporated) were forecasted from 2025 through 2045 using regional forecasts of population, housing, and employment. Separate indoor and outdoor unit demand factors were developed using customer billing data by sector, as well as historical demographic and housing information.

The baseline demand forecast incorporated estimated conservation resulting from changes in state and federal water efficiency requirements in the plumbing code, sometimes referred to as "passive conservation." These standards have resulted in a significant reduction in indoor water use over time. Going forward, recent codes and standards on fixtures and appliances will continue to reduce indoor water demands through the replacement of existing fixtures, and as more efficient technologies are used in new development in the City. Active conservation savings (i.e., those savings achieved through actions taken by property owners) are realized through implementation of different conservation measures, which have been organized into three conservation program scenarios the City may implement. The three conservation program scenarios are:

- **Program A**: "Current Regulation" option includes measures designed to meet existing regulations based around SB X7-7. Program A also continues to take advantage of conservation programs administered by Metropolitan Water District of Southern California (MWD) and SDCWA with minimal cost and effort to the City.
- **Program B**: "Anticipated Regulations" option includes individual measures that were selected by the City. The primary goal of Program B is to meet the new regulatory requirements under AB 1668 and SB 606. At the time

this 2020 WCMP was written, the final targets were still unknown so Program B can be adjusted when the final requirements are available.

- **Program C**: "Enhanced Conservation" presents a scenario where all 18 individual conservation measures are implemented. Program C represents a toolbox of options that are available to implement during a drought or to meet more stringent regulatory requirements, though the City may choose to implement only some of these options at any given time.

Table ES-1 presents all 18 conservation measures modeled in this analysis. The measures have been organized into four categories: 1) utility, 2) commercial, industrial and institutional (CII), 3) landscape, and 4) residential categories, which have been sorted into each Program.

Table ES-1. Conservation Measure Program Scenarios

	Measure Name	Program A	Program B	Program C
Utility Measures				
1	Advanced Metering Infrastructure (AMI)	✓	✓	✓
2	System Water Loss	✓	✓	✓
3	Public Information	✓	✓	✓
4	Public and School Education	✓	✓	✓
CII Measures				
5	CII Rebate Programs	✓	✓	✓
6	CII Water Surveys		✓	✓
7	CII Self Surveys			✓
8	CII Enhanced Outreach			✓
Landscape Measures				
9	Landscape Rebate Programs	✓	✓	✓
10	Large Landscape Outdoor Water Audits	✓	✓	✓
11	Large Landscape Water Budgeting/Monitoring			✓
12	Landscape Workshops and Trainings	✓	✓	✓
13	Agricultural Program	✓	✓	✓
14	Recycled Water Retrofits	✓	✓	✓
Residential Measures				
15	Residential Rebate Programs	✓	✓	✓
16	Residential Water Surveys	✓	✓	✓
17	Residential Enhanced Outreach			✓
18	Residential Device Giveaways			✓

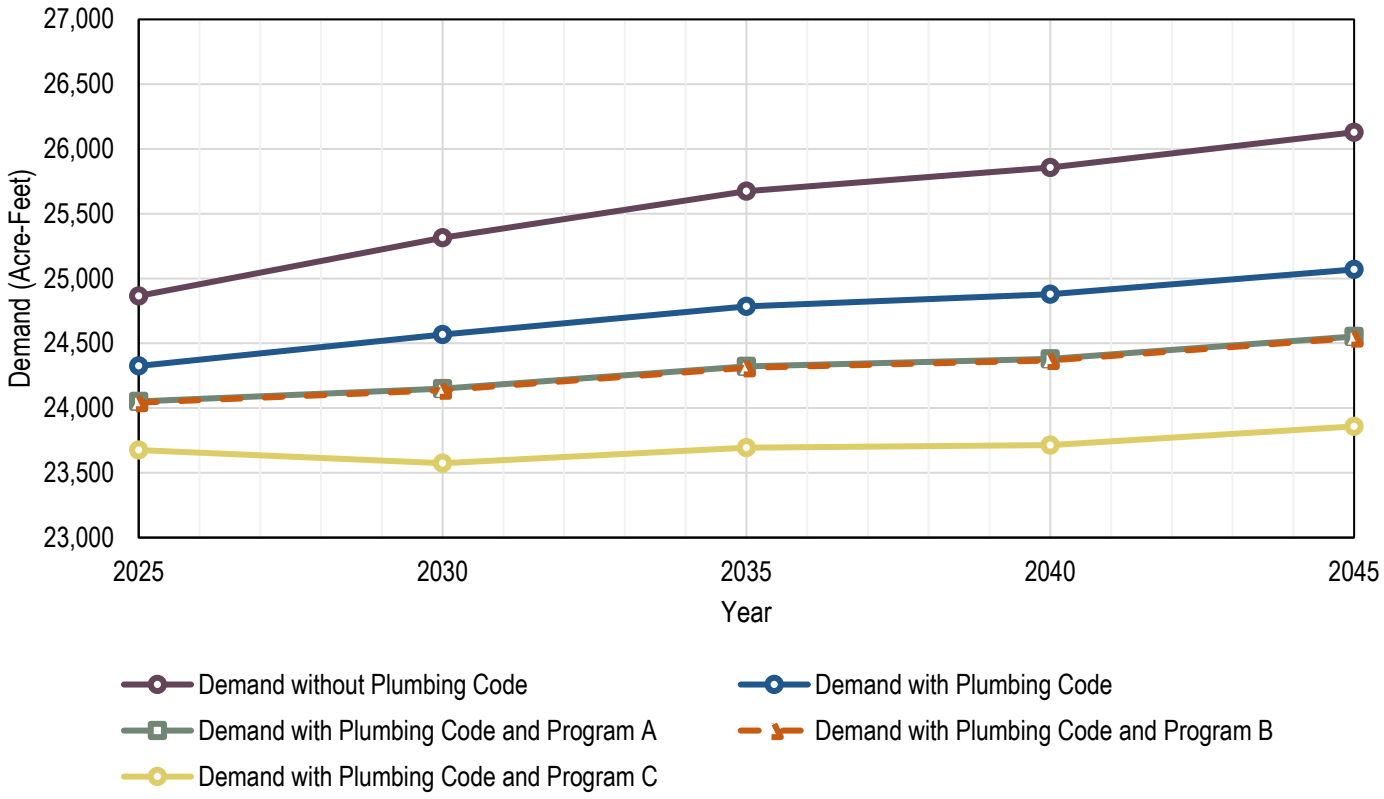
Table ES-2 presents the City's potable water use projections without plumbing code savings, with only plumbing code savings and no active conservation activity, and with plumbing code savings and Program A, Program B, and Program C active conservation program implementation savings. Figure ES-1 exhibits the same information as Table ES-2 in graphic form.

Table ES-1. Water Use Projections (Acre-Feet/Year)

	2025	2030	2035	2040	2045
Demand without Plumbing Code	24,865	25,315	25,673	25,857	26,129
Demand with Plumbing Code	24,325	24,567	24,785	24,878	25,070
Demand with Plumbing Code and Program A	24,051	24,150	24,322	24,380	24,552
Demand with Plumbing Code and Program B	24,041	24,138	24,310	24,368	24,540
Demand with Plumbing Code and Program C	23,676	23,574	23,695	23,713	23,858

Note: Total water use includes agricultural, recycled water use, and water loss.

Figure ES-1. Long Term Demands with Conservation Programs



Notes:

1. Program A and Program B scenarios are close in value and therefore Program B is shown as a dashed line.
2. Total water use includes agricultural, recycled water use, and water loss.

Table ES-3 shows the annual water savings for plumbing code savings only (passive conservation), plumbing code savings with Program A, Program B, and Program C implementation (passive plus active conservation) in five-year increments, as well as the City's direct costs in dollars per acre-foot to implement each program. The benefit to cost ratio for each conservation program from the perspective of the water utility (the City, MWD, and SDCWA) and the combined perspective of the utility plus the customers (community) is also presented.

Table ES-2. Water Demand Program Savings Projections

Conservation Program Water Savings (AFY)	2020	2025	2030	2035	2040	City-Only Unit Cost of Water Savings ($/AF)	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Plumbing Code	541	748	889	979	1,059	N/A	N/A	N/A
Program A with Plumbing Code	814	1,165	1,351	1,477	1,576	$1,244	0.83	1.13
Program B with Plumbing Code	824	1,177	1,363	1,489	1,588	$1,216	0.84	1.15
Program C with Plumbing Code	1,190	1,741	1,979	2,143	2,271	$573	1.33	1.49

Program B is the selected program for this 2020 WCMP, which has an estimated budget and associated water savings resulting in a benefit-cost ratio of 0.84 to the utility (combined cost for the City, MWD, and SDCWA). The City's cost to implement Program B is $1,216 per AF of water saved. While the City does not directly pay for regional conservation program costs, such as MWD's SoCal WaterSmart rebate programs, it supports regional programs indirectly as part of the cost of imported water supplies. The City's customers pay for these programs regardless of participation in regional conservation measures. As such, it is reasonable to compare program costs at both the utility level and at the City level. Program B is intended to be flexible and structured as "menu/toolbox," which enables the City to select or change measures for implementation as needed to reach its conservation goals, including to help meet future anticipated water use objectives.

1. INTRODUCTION

This section provides an overview of the issues facing the City of Oceanside (City) water system, describes the purpose and scope of the 2020 Water Conservation Master Plan (2020 WCMP), and provides a project history of the steps used to complete the Plan.

In this report, "demand management" and "water conservation" are used interchangeably. The evaluation includes measures directed at existing accounts, as well as new development measures that mandate that new residential and business customers use water efficiently. Three program scenarios were provided to help evaluate the net effect of running multiple measures together over time. Assumptions and results for the individual measures and three programs are described in detail in this report.

1.1 Overview of Oceanside Water System

The City Water Utilities Department operates and maintains the City's water treatment, distribution, and metering systems. Approximately 89% of the City's water was purchased from the San Diego County Water Authority (SDCWA) in calendar year 2020. SDCWA supplies are a combination of imported water from the State Water Project and Colorado River Aqueduct as well as desalinated seawater from the Claude "Bud" Lewis Carlsbad Desalination Plant, and are available as either untreated (raw) water or treated (potable) water. The City purchases both treated and raw water through five aqueduct connections. Raw water is treated at the Robert A. Weese Filtration Plant prior to delivery into the City's distribution system. Approximately 10% of the City's water comes from the Mission Basin, a groundwater sub-basin that stores water classified as subsurface flows from the San Luis Rey River. Brackish groundwater is extracted and treated through a desalting process at the Mission Basin Groundwater Purification Facility to serve as potable supply. The City also reclaims wastewater at the San Luis Rey Water Reclamation Facility (SLRWRF), which is delivered to four non-potable recycled water customers for irrigation uses. Additional recycled water produced at SLRWRF is delivered to Lake Whelan to support wildlife and habitat. This non-potable recycled water comprises approximately 1% of total water use, excluding deliveries to Lake Whelan, which are unmetered. The City's Water Utilities Department operates and maintains almost 600 miles of pipelines that distribute water throughout the City and 12 reservoirs with a combined capacity of 50.5 million gallons.

As a result of the decreasing reliability and increasing cost of imported supplies, the City and other water suppliers in the region are exploring or pursuing development of alternative supplies, such as increased desalination and recycled water, and potable reuse.

On the demand side, the City has completed a demand assessment for the 2020 Urban Water Management Plan (UWMP) and 2020 WCMP. This assessment will be instrumental in meeting existing and future urban water use objectives as defined by the California Department of Water Resources (DWR). As part of the 2020 UWMP, the City will use a combination of recycled water and water conservation to achieve its potable demand reduction targets while maintaining a high-quality, reliable, and cost-effective supply for its customers. This 2020 WCMP can also be used by the City to help plan for responses to drought, which may increase in frequency or intensity as a result of climate change.

1.2 Purpose and Scope of Plan

The 2020 WCMP builds on the previous 2015 WCMP update. The purpose of the WCMP is to evaluate water conservation demand management alternatives, general and sector-specific (residential, landscape, commercial, etc.) conservation programs, and other water efficiency measures the City is implementing or may choose to implement. These were evaluated in terms of their water savings, costs, and cost effectiveness from various perspectives, their acceptability, and their ability to be implemented. Preferred measures have been incorporated into the 2020 UWMP for the period of 2020 to 2045.

1.2.1 Objective of Plan

The 2020 WCMP's objective is to outline opportunities to attain the water efficiency goals in a cost-effective manner that is feasible to implement by City staff. Key components of the plan include:

- Updating and further examining the current water use by the City to identify the best method of achieving additional savings and the timing of achieving those savings; and
- A flexible approach to complying with forthcoming urban water use objectives.

1.2.2 Conservation Savings Goals

The City is committed to implementing a water demand reduction through conservation savings and water recycling. Program A is designed to address current water conservation and use goals (e.g., SB X7-7 requirements). The City has elected complete its water planning with the goal to implement Program B, which is designed to help the City meet anticipated future water use objectives, once those objectives have been established by the State.

1.2.3 Structure and Basis of Existing Oceanside Conservation Program

The City was a member of the California Urban Water Conservation Council (CUWCC) starting in 1997 until it was recently dissolved. Currently, the City partners with SDCWA and Metropolitan Water District of Southern California (MWD) for most of its current offering of programs, such as landscape site surveys. Over 25 separate rebate programs have been historically offered to the City's customers through MWD and SDCWA. These programs range from toilet and washing machine rebates for residential and business customers to "smart" irrigation controller rebates. The City is fortunate that its water wholesalers offer aggressive rebate and conservation programs. However, accessibility of these programs, without additional outreach, does not necessarily equate to large water savings. The actual participation in these programs by City customers determines how much water is being saved. Successful conservation using these programs will require that the City be proactive in marketing and educating customers about the benefits of installing water efficient devices and changing water use habits. It is anticipated that in the future many of these programs will no longer be sponsored or run by the water wholesalers and that the City will need to consider directly administering and funding these programs.

1.3 Content of Report

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

- Section 2 – Analysis of Historical Water Demand
- Section 3 – Demand Projections
- Section 4 – Current Water Conservation Program
- Section 5 – Comparison of Individual Conservation Measures
- Section 6 – Results of Conservation Program Evaluation
- Section 7 – Conclusions
- Appendix A – Assumptions for the Passive Savings Model
- Appendix B – Water Use Graphs for Production and Customer Categories
- Appendix C – Assumptions for Water Conservation Measures Evaluated in the AWE Tool
- Appendix D – List of Contacts
- Appendix E – References

2. ANALYSIS OF HISTORICAL WATER DEMAND

The City's water use patterns, including unaccounted for water, were analyzed based on water production and consumption data. Historical monthly water use data was analyzed, with data from the most recent five years (2016 to 2020) used to derive typical average water use. Data from each customer category was analyzed separately. Baseline water use data was segregated into indoor and outdoor water use by customer type using a comparison of seasonal water use in dedicated landscape meters.

2.1 Unaccounted for Water

Unaccounted for water is water produced that is not used by the City's customers (metered and unmetered), and includes apparent losses (metering accuracy) and real losses. Since passage of Senate Bill (SB) 555 in 2015, California urban water suppliers have been required to submit an annual water loss audit to DWR. SB 555 also directed the State Water Resources Control Board (SWRCB) to develop performance standards for volumetric water loss by July 2020. The current proposed standard is to quantify water loss in units of real losses and apparent losses per service connection per day (gallons per connection per day). Although final performance standards have not been released at the time of writing, the draft standards, released in December 2020, have a real water loss standard of 15.8 gallons per connection per day for the City as of 2028.

Unaccounted for water in the demand forecast is calculated using three years of available validated Water Loss Audit reports, which can be found on DWR's WUEdata Portal[1]. The Water Loss Reports calculate losses on a per connection basis. The "number of Service Connections" includes both active and inactive service lines that are connected to mains, as well as fire hydrant laterals. The real losses, apparent losses, and service connections from the most recent water loss audits and are shown in Table 2-1. The City's real water losses over this period are less than 3% of total water demands. Based on the State's draft performance standards, the City is within its long-term targets.

Table 2-1. Audited Water Loss Reporting

	2016	2017	2018	3-Year Average
Real Losses (acre-ft/yr)	479	744	1,140	585
Apparent Losses (acre-ft/yr)	800	591	532	844
Service Connections (Active and Inactive)	44,227	44,450	44,598	44,425
Real Losses (gallons/connection/day)	9.7	14.9	22.8	15.8
Apparent Losses (gallons/connection/day)	16.2	11.9	10.7	12.9
Total Losses (gallons/connection/day)	25.8	26.8	33.5	28.7

2.2 Consumption by User Category

The City has several different types of water users. The current and projected user categories in the City may be generally classified as *single family residential*, *multi-family residential*, *irrigation, commercial, industrial, agricultural,* and *recycled water*. A previous *governmental* customer category was phased out in 2015. The City is predominantly a residential community, with some agriculture, light commercial and industry. Appendix B presents historical customer category water use, showing the monthly average for the seven customer categories including recycled water.

The methodology used to create the water demand forecast relies on a baseline water use measured using a five-year average of monthly water use by sector from 2016 to 2020, as shown in Figure 2-1. The most recent five-year average

[1] Site: https://wuedata.water.ca.gov/

was selected in order to account for annual variations in water use from weather, as well as other irregularities that can occur over shorter periods. This baseline period includes the California Drought State of Emergency, which extended from January 2014 to April 2017, and mandated water use reductions. To account for depressed demands during this period, the pre-drought year of 2013 was included in the baseline water use as a drought adjustment. Through 2020 there has not been indication of a rebound in post-drought water use. Given climate change, drought periods, and new conservation legislation that will be implemented during the planning horizon, there is expected to be further downward pressure on water demands. For these reasons the selected baseline period is lower than the pre-drought water use. Figure 2-2 provides a breakdown of baseline water use by customer category.

Figure 2-1 Monthly Baseline Water Use

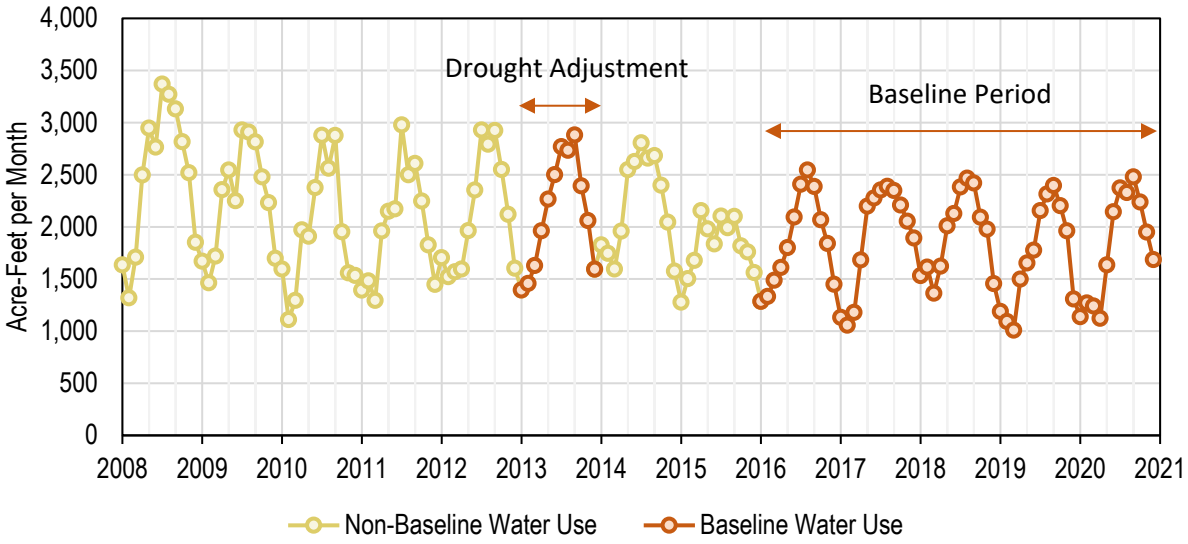
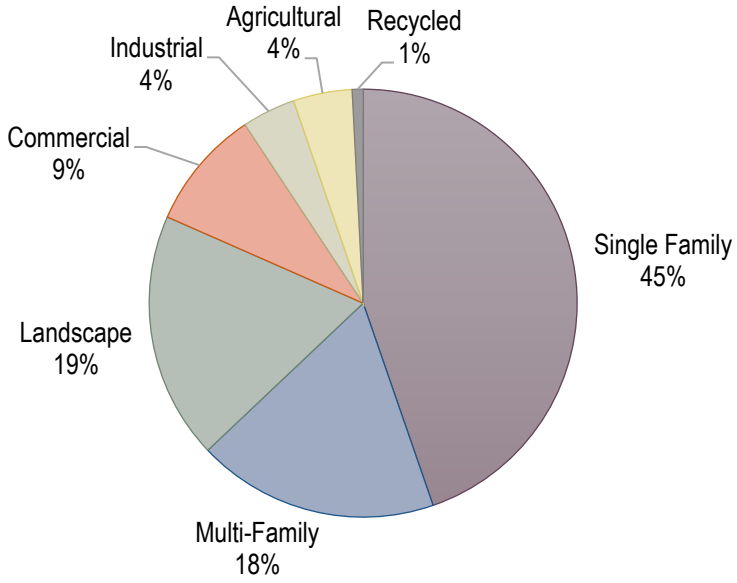


Figure 2-2. Annual Consumption by User Category in Baseline



2.2.1 Indoor and Outdoor Water Use

Outdoor water use is estimated for customer categories with mixed meters. An industry standard approach to measuring outdoor use, referred to as the "minimum month" method, assumes that all winter use is categorized as indoor consumption. However, this method tends to underestimate outdoor use. The water demand forecast in this

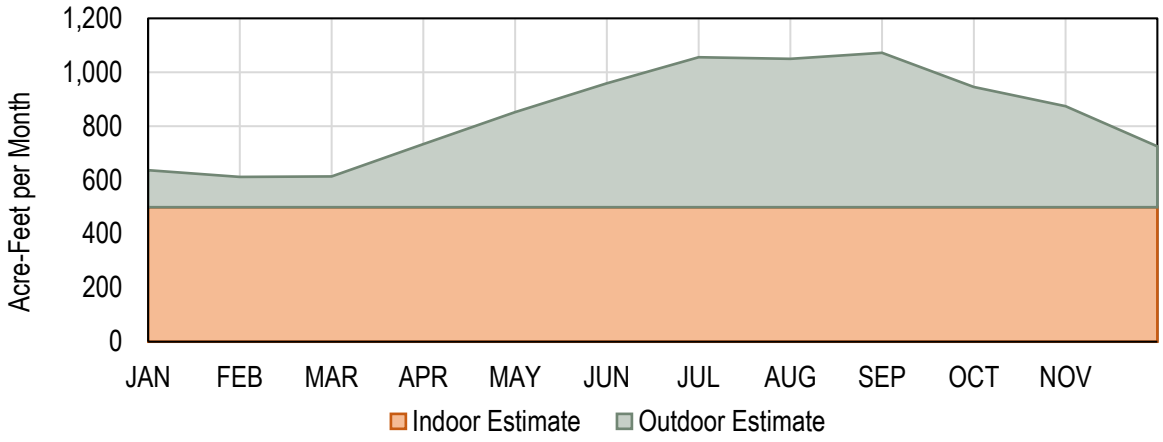
2020 WCMP instead uses the pattern of seasonal variation from dedicated irrigation meters and applies it to other sectors with mixed meters. This analysis was completed for the Single Family, Multi-Family, Commercial, and Industrial customer categories (see Appendix A). All categories exhibit a strong seasonal pattern where water use is higher in the summer. The Landscape, Agricultural, and Recycled Water customer categories are assumed to be all outdoor water use. The outdoor and indoor water use percentages are provided in Table 2-2.

Table 2-2. Outdoor Water Use by Customer Sector

Sector	Indoor Percentage	Outdoor Percentage
Single Family	62%	38%
Multi-Family	80%	20%
Landscape	0%	100%
Commercial	72%	28%
Industrial	90%	10%
Agricultural	0%	100%
Recycled Water	0%	100%

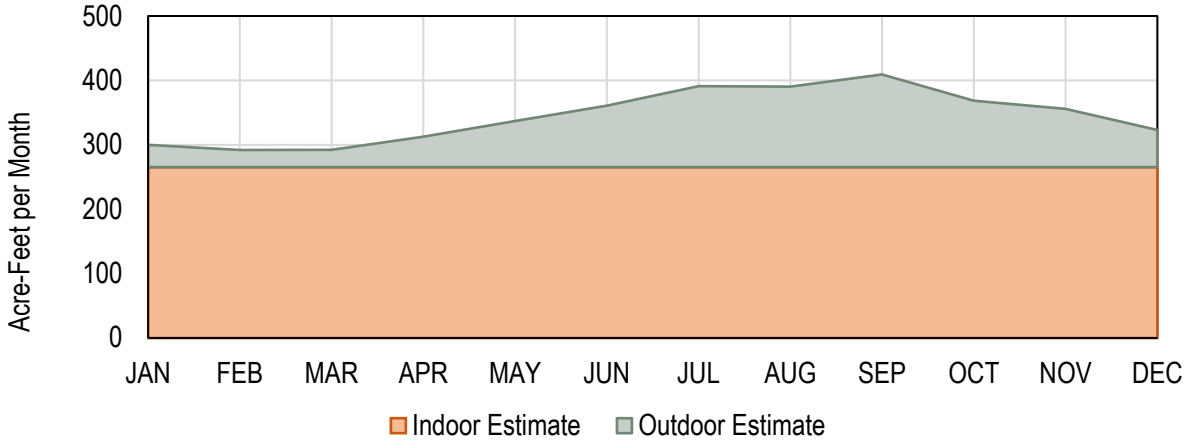
Residential use is approximately 62% of total demands, typical for a city without significant commercial industrial uses. Figure 2-3 shows the breakdown of single family residential use by month for the baseline period. Figure 2-4 shows the breakdown of multi-family residential use by month for the baseline period. In both cases there is a small amount of winter irrigation assumed.

Figure 2-1. Single Family Residential Water Use: Indoor vs. Outdoor



* Average 2016-2020 monthly Single Family indoor and outdoor water use.

Figure 2-4. Multi-Family Residential Water Use: Indoor vs. Outdoor



* Average 2016-2020 monthly Multi-Family indoor and outdoor water use.

2.3 Historical Growth Patterns

The historical population and housing units counts shown in Table 2-3 are from the California Department of Finance (DOF), which provides annual estimates from 1990 to 2020. These estimates are used to develop baseline estimates of population and housing, and to determine the types of plumbing fixtures that were installed when the buildings were constructed. As shown in Table 2-3, the majority of City homes are older, with about 75% of single-family homes built before 1990 and 82% of multi-family homes built before 1990. Typically, older homes have older fixtures and more leaks, leading to higher indoor water use than new homes. There was limited information on the ages of commercial and institutional buildings, so it is assumed that these are of a similar age to residential developments. As shown in the table, residential growth has slowed significantly since 2005, due to both the 2008 economic recession and the City's decreasing capacity for additional housing. In recent years, there has been a shift from single-family housing development towards multi-family housing units, which use less water when compared to single-family housing.

Annual DOF estimates are benchmarked to the Decennial Census. The 2010 Census is currently 10 years out of date, and 2020 Census data is not expected to be released until mid-2021. Once the 2020 Census is released, the City will be able to confirm the accuracy of recent DOF estimates.

Table 2-3. City of Oceanside Historical Housing and Population

Year	Total Population	Increase	Single Family	Increase	Multi Family	Increase
1990	128,090	35,290*--	31,555	—N/A**	19,469	—N/A**
1995	146,069	17,979	35,121	3,566	20,871	1,402
2000	161,624	15,555	38,342	3,221	21,104	233
2005	166,958	5,334	41,057	2,715	22,059	955
2010	167,086	128	41,543	486	22,839	780
2015	175,068	7,982	41,977	434	23,045	206
2020	177,335	2,267	42,243	266	23,835	790

Source: State of California, DOF, Tables E-4 & E-5.
*Population increase in 1990 shows increase compared to 1985 estimates not shown in this table
**Housing estimates prior to 1990 are not available from DOF Table E-5

3. DEMAND PROJECTIONS

The purpose of Section 3 is to document the demand projections developed for the 2020 WCMP This section presents:

- Demand methodology overview;
- Future population, housing and employment projections;
- Unit demand factors;
- Plumbing code savings;
- Water use targets; and
- Water demand projections with and without the plumbing code savings

3.1 Demand Forecast Overview

The City's baseline water demands (i.e., average year demand before additional active conservation savings are incorporated) were forecasted from 2025 through 2045 using regional forecasts of population, housing, and employment. Separate indoor and outdoor unit demand factors were developed based on the historical billing data by sector as well as historical demographic and housing information.

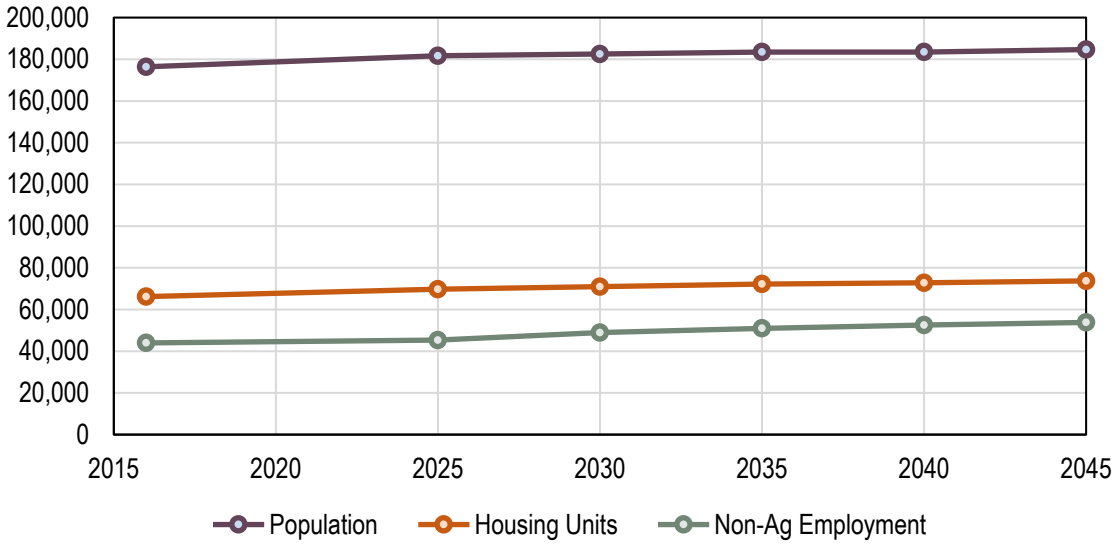
The baseline demand forecast estimates conservation that occurs as a result of changes in state and federal water efficiency requirements for plumbing fixtures, sometimes referred to as "passive conservation." These standards have resulted in a significant reduction in indoor water use over time. Going forward, recent codes and standards related to fixtures and appliances will continue to reduce indoor water demands through the replacement of existing fixtures, as will the more efficient technologies used in new developments.

3.2 Future Population, Housing, and Employment Projections

Socioeconomic projections of population, housing units, and employment are provided by the San Diego Association of Governments (SANDAG). These are based on the Series 14 Regional Growth Forecast, Version 17 (Interim Series 14) prepared for San Diego Forward: The 2019 Federal Regional Transportation Plan (2019 Federal RTP). The SANDAG regional growth forecast is currently the most recent and most detailed data available for the City of Oceanside. The forecast distributes regional growth based on a variety of factors, including available capacity for housing and accessibility to jobs and transportation. It does not allocate growth beyond what is allowed for by any jurisdiction's general plan.

The Interim Series 14 forecast uses a base year of 2016. From 2016 to 2045, the City is projected to increase its population by 8,270 (5%). Housing units are projected to increase by 7,535 (11%). Among those, single family units are projected to increase by 2,323 (5%) and multi-family units are projected to increase by 5,212 (22%). Non-agricultural employment is projected to grow by 9,824 (22%). The larger growth rate in housing units compared to population indicates a decline in the number of persons per household, which is projected to decrease from 2.9 in 2016 to 2.73 in 2045. Included in the following Table 3-1 and Figure 3-1 are the population, housing, and employment projections for the City. SANDAG estimates for 2020 have been omitted as they are part of the baseline period and have been replaced by actual growth and water use data for 2020. An additional adjustment was made to SANDAG's assumptions for persons per household in 2025 and 2030 in order to smooth out population growth between 2016 and 2035. This avoided a temporary flattening of population growth that resulted from SANDAG's model, and was determined to be unrealistic for the City.

Figure 3-1. Socioeconomic Growth Forecast for Planning Area



Note: Population per household assumptions were adjusted to smooth out population growth from 2016-2035.

Table 3-1. Historical and Projected Population, Housing, and Employment

Year	Population	Single Family Housing Units	Multi-Family Housing Units	Mobile Home Housing Units	Non-Ag Employment
2016	176,387	42,703	19,983	3,497	43,965
2025	181,659	43,471	22,740	3,497	45,336
2030	182,527	43,913	23,518	3,497	48,919
2035	183,483	44,396	24,334	3,497	50,960
2040	183,482	44,690	24,601	3,497	52,532
2045	184,657	45,026	25,195	3,497	53,789

Additional data on occupancy rates are used to split the population between single-family, multi-family, and mobile homes. This information is derived from the American Community Survey (ACS), conducted by the U.S. Census Bureau. Unlike the decennial census, the ACS is based on a sample and has a margin of error, so multi-year estimates are provided to increase the statistical reliability of the data. The most current ACS estimates are the five-year estimates from 2014 to -2018. The ACS identifies a single-family occupancy rate of 3.1 persons per household for single-family homes, 2.99 for multi-family homes, and 2.15 for mobile homes. The baseline and projected population by housing type is provided in Table 3-2.

Table 3-2. Historical and Projected Population by Housing Type

Year	Single Family Population	Multi-Family Population	Mobile Homes Population
2016	118,636	51,129	6,623
2025	119,397	55,680	6,582
2030	119,011	57,005	6,511
2035	118,655	58,388	6,440
2040	118,306	58,787	6,389
2045	118,505	59,801	6,351

3.3 Unit Demand Factors

Future projections of water use are based on unit factors developed for each customer category from the historical billing data. These unit factors are developed by dividing each sector's five-year average of baseline water demands by the baseline values of population, housing units, and employment from annual DOF estimates. Note that SANDAG's count of housing units varies from DOF estimates, because SANDAG relies on its own methodology which it considers to more accurately reflect local conditions. These differences have been accounted for when developing the unit factors. The baseline unit factors are calculated as follows:

- **Single-Family** – Future indoor water uses are based the single-family population and future outdoor water uses are based on single-family housing units as provided by SANDAG.
- **Multi-Family** – Indoor water use is based the single-family population and outdoor water use is based on single-family housing units as provided by SANDAG. Total population estimates from SANDAG were split into single-family and multi-family estimates based on Census values of persons per household. Mobile homes were included in the multi-family category.
- **Landscape** – Future water demand is based on total housing units, under the assumption that future landscape uses, such as common areas and parks, are driven generally by future residential developments.
- **Commercial and Industrial** – Future water demand is based on the total number employees, under the assumption that most of these uses occur indoors.
- **Recycled Water** – Recycled water projections are calculated separately based on planned uses. Increases in recycled water are assumed to occur from conversions of existing dedicated landscape meters.

The baseline unit factors calculations by sector are provided in Table 3-3 for indoor uses, and Table 3-4 for outdoor uses. These unit factors are applied to the future population, housing, and employment projections to develop a baseline municipal demand projection before conservation, recycled water, or unaccounted for water.

Table 3-3. Baseline Units Factor for Indoor Uses

Sector	Unit Factor Description	Unit Factor
Single-family	Gallons per Person Per Day (Single-Family)	45
Multi-family	Gallons per Persons Per Day (Multi-Family)	49
Landscape	Gallons per Housing Unit Per Day (Total)	0
Commercial	Gallons per Employee Per Day	30
Industrial	Gallons per Employee Per Day	17

Table 3-4. Baseline Unit Factor for Outdoor Uses

Sector	Unit Factor Description	Unit Factor
Single-family	Gallons per Housing Unit Per Day (Single-Family)	86
Multi-family	Gallons per Housing Unit Per Day (Multi-Family)	36
Landscape	Gallons per Housing Unit Per Day (Total)	57
Commercial	Gallons per Employee Per Day	11
Industrial	Gallons per Employee Per Day	2

3.4 Passive Water Conservation Savings

The passive conservation savings are based on a demographically-driven growth and replacement model that accounts for fixtures from new construction and natural replacement using the same demographic data as the regional growth forecast. Savings estimates are provided for the single-family residential, multi-family residential, and non-residential

sectors. The passive conservation model estimates water savings for toilets, clothes washers, dishwashers, and urinals. Even though showers and faucets are significant residential indoor uses, studies have shown that efficiency standards have had minimal impact on per capita usage rates. The model estimates the inventory of different types of water fixtures annually from 1990 to 2045.

The historical and current water efficiency standards used to estimate indoor passive conservation savings are shown in Appendix A. Water fixtures installed due to new construction are assumed to be in compliance with the plumbing codes in effect when the new construction occurs. Natural replacement rates vary by device and are linked to the expected life of the device. When devices are replaced due to failure, remodeling, or other reasons, the new devices are assumed to be compliant with the plumbing codes in effect when the replacement occurs.

The natural replacement rate for indoor plumbing fixtures is provided in Table 3-5. The useful life and associated annual replacement rates for each device are based on standard industry estimates, estimates from plumbing fixture saturation studies, and Best Management Practices reports from California Water Efficiency Partnership.

Table 3-5. Parameters Used in Indoor Water Savings Fixtures

Sector	Fixture	Useful Life (Years)	Replacement Rate (% per Year)
Residential	Toilets	25	4%
Residential	Clothes Washers	14	8.3%
Residential	Dishwashers	13	8%
Non-Residential	Toilets	40	2.5%
Non-Residential	Urinals	40	2.5%

The frequency of water use events is provided in Table 3-6. These were obtained from focused end-use studies. Residential fixtures are based on *2016 Residential End Uses of Water, Version 2* published by the Water Research Foundation (DeOreo et al. 2016). Non-residential fixtures are based on *Commercial and Institutional End Uses of Water* study published by the American Water Works Association Research Foundation (Dziegielewski et al. 2000). Both of these studies are the current industry benchmarks for residential and non-residential water uses. These factors are applied on a per person basis as described below.

Table 3-6. Parameters Used in Indoor Water Savings Fixtures

Sector	Fixture	Frequency of Use
Residential	Toilets	4.9 flushes per person per day
Residential	Clothes Washers	3.5 cubic feet per load 0.3 cycles per person per day
Residential	Dishwashers	0.3 cycles per person per day
Non-Residential	Toilets	2.6 flushes per employee per day
Non-Residential	Urinals	1.25 flushes per employee per day

3.5 Water Demand Projections with and without Plumbing Code Savings

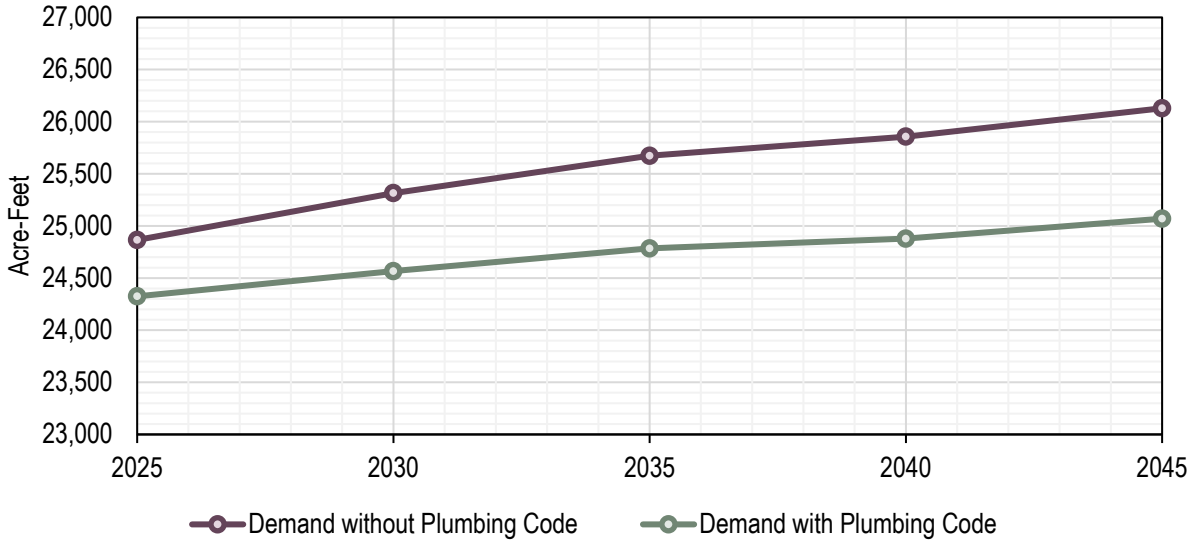
Water demand projections were developed from 2015 to 2045. Table 3-7 and Figure 3-2 show projected demands in five-year increments through 2045, with and without plumbing codes and appliance standards. Information and assumptions about plumbing code and appliance standards can be found in Appendix A. The demand projections reflect average water use assuming average weather conditions, and do not reflect drier and hotter drought conditions. Likewise, climate change (which might alter weather patterns), increased or decreased rainfall, and possibly increased irrigation demand in the spring and fall due to a warmer climate have not been addressed in this analysis.

Table 3-7. Water Use Projections (Acre-Feet/Year)

	2025	2030	2035	2040	2045
Demand without Plumbing Code (AFY)	24,865	25,315	25,673	25,857	26,129
Demand with Plumbing Code (AFY)	24,325	24,567	24,785	24,878	25,070
Plumbing Code Savings (AFY)	541	748	889	979	1,059

* Total water use includes agricultural, recycled water use, and unaccounted for water.

Figure 3-2. Water Use Projections for City of Oceanside (AFY)



* Total water use includes agricultural and recycled water use, and unaccounted for water.

The City's current and projected demands for each customer category, after plumbing code savings, are identified in Table 3-8. Total deliveries include agricultural water and recycled water use as well as unaccounted for water. It is anticipated that future recycled water demands will primarily offset current potable water uses for landscape irrigation and agriculture. Targeted customers for recycled water conversions include parks, golf courses, homeowner association (HOA) landscapes, medians, and agricultural operations.

Table 3-8. Demands and Accounts by Customer Category*

	2025	2030	2035	2040	2045
Single-family	9,977	9,900	9,859	9,824	9,831
Multi-family	4,305	4,327	4,388	4,391	4,443
Landscape	2,184	674	744	775	825
Commercial	1,913	1,930	2,013	2,076	2,126
Industrial	942	1,017	1,059	1,092	1,118
Agricultural	558	232	233	233	233
Existing Recycled Water	3,000	5,040	5,040	5,040	5,040
Unaccounted for Water	1,444	1,447	1,448	1,447	1,453
Total Deliveries	**24,325**	**24,567**	**24,785**	**24,878**	**25,070**

*Demands include plumbing code savings, but not additional conservation measures.

3.6 Water Conservation and Use Targets

SB X7-7, or "The Water Conservation Act of 2009," was enacted to ensure California continues to have reliable water supplies, requiring urban water agencies to collectively reduce statewide per capita water use by 20% by December 31, 2020. The law establishes that the base daily per capita use be based on total gross water use divided by the service area population.

In tracking per capita water use, which is measured in gallons per capita per day (GPCD), the primary project driver is the SB X7-7 compliance requirements that require tracking of baseline GPCD, a 2015 target, and a 2020 target. The 2020 GPCD target for the City was calculated using DWR's Method 1, which is 80% of the urban retail water supplier's baseline per capita daily water use. The City's SB X7-7 baseline is 171 GPCD. The resulting per capita demand target for 2020 is 137 GPCD, with an interim 2015 target of 154 GPCD, which the City achieved in 2015. Based on 2020 gross water use and estimated population, the City of Oceanside's 2020 actual water use is 116 GPCD. The City has met its 2020 water use reduction target under SB X7-7. Additional background information about the calculation of the water use targets can be found in the 2020 UWMP.

In 2018, California Senate Bill SB 606 and Assembly Bill (AB) 1668 was enacted and lays out a new long-term conservation framework for California. This new legislation requires DWR to develop and establish water use efficiency standards for 1) indoor residential, 2) outdoor residential, 3) commercial, industrial, and institutional (CII) water use for irrigation, and 4) water loss. These water use objectives will not be in place until 2023, and the first report will require information on what water conservation measures suppliers will implement to meet their stated objectives. Urban water suppliers will be required to stay within annual water budgets, based on these standards, for their service areas. It is important to build in flexibility within this WCMP as these specific objectives are still unknown. Urban water suppliers are encouraged to consider aligning conservation management actions and the changing urban use patterns in order to consider these future obligations. With the completion of SB X7-7 requirements in 2020, the water use objectives will serve as the statewide water use targets for the City moving forward.

4. CURRENT WATER CONSERVATION PROGRAM

The purpose of this section is to present the City's existing water conservation program. As a member of the California Urban Water Conservation Council (CUWCC) starting in 1997, the City has become a leader in water conservation management. While the CUWCC no longer exists, the City's alignment with CUWCC helped it to establish a comprehensive water conservation program that is now the foundation of its current conservation efforts. The City's water conservation program is a combination of the City's commitment to carrying out the CUWCC Best Management Practices (BMPs) and the City's desire to be water-efficient. Since July 2008, the City has been participating in three regional programs that focus on offering services and hardware that satisfied many of the CUWCC BMPs created in 1997. The 14 BMPs from the CUWCC were required of the CUWCC signatories until the end of 2008. In addition, former CUWCC members were expected to comply with the new and revised CUWCC BMPs which went into effect with the last Memorandum of Understanding (MOU) revision on January 4, 2016. The City's conservation program is generally organized around the Demand Management Measures (DMMs) outlined in the City's 2020 UWMP, which also correlate to the five BMPs established in the 2016 MOU:

- BMP 1.1: Utility Operations Programs
- BMP 1.2: Water Loss Control
- BMP 1.3: Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
- BMP 1.4: Retail Conservation Pricing
- BMP 2.1: Public Information Programs
- BMP 2.2: School Education Programs
- BMP 3: Residential Programs
- BMP 4: CII Programs
- BMP 5: Landscape Programs

SB 606 and AB 1668 lay out a new long-term water conservation framework for California. This new framework is far-reaching for both the urban and agricultural sectors of California and represents a major shift in focus. The legislation expands authority to implement a water budget-based approach to conservation and water use efficiency. New urban water use efficiency standards are anticipated to be adopted by the SWRCB, in coordination with DWR, in 2023. The City continues to implement numerous public outreach and education programs, and support rebate programs to manage demand. This 2020 WCMP identifies activities in the City's "toolbox" of conservation programs to be implemented to help achieve future water use objectives. The following sections describe the various components of City's current conservation program that are on-going or have been implemented over the past five years.

4.1 Water Waste Prevention Ordinances

The City has three ordinances in place to give the City the authority to prohibit water waste and encourage water use efficiency within the service area. Each ordinance is updated as needed to stay current with State regulations. The three ordinances are listed and described in further detail below.

- Updates to Water Conservation Program and Drought Response Conservation Measures (Ordinance No. 15-OR0276-1)
- Water Efficient Landscaping (Ordinance No. 10-OR0412-1)
- Recycled Water (Ordinance No. 14-OR0565-1)

The City will maintain and expand its water waste prevention ordinances as needed to meet demand management goals established in this 2020 WCMP.

4.1.1 Updates to Water Conservation Program and Drought Response Conservation Measures (Ordinance No. 15-OR0276-1)

The most recent amendments to the City's "Drought Ordinance" occurred in 2015 to incorporate Governor Brown's 2014 state of emergency proclamation for drought and the 2015 Executive Order for a 25% reduction of water use statewide. This ordinance clarifies four drought response levels and describes the water use restrictions and required reductions for each stage. A copy of the ordinance is included in Appendix E of the City's 2020 UWMP. The City is currently updating its drought ordinance to maintain consistency with SDCWA's 2021 Model Drought Ordinance, which was revised in 2021 to include the six state-mandated water shortage levels. The updated drought ordinance is expected to be adopted in conjunction with this WCMP and the City's 2020 UWMP in June 2021.

4.1.2 Water Efficient Landscaping (Ordinance No. 10-OR0412-1)

To ensure compliance with the State's Water Conservation in Landscaping Act, this ordinance was implemented to include 2006 development landscape design requirements and is written to be as effective as the State's Model Water Efficient Landscape Ordinance (MWELO). This ordinance was updated July 15, 2015 and a copy is included in Appendix F of the 2015 and 2020 UWMPs.

In California, about half of all urban water usage is for landscape irrigation. Substantial water savings can be achieved by proper landscape design, installation, and maintenance. To improve water savings in this sector, DWR updated the MWELO in 2015. MWELO promotes efficient landscapes in new developments and retrofitted landscapes while increasing water efficiency standards for new and retrofitted landscapes through more efficient irrigation systems, greywater usage, onsite storm water capture, and by limiting the portion of landscapes that can be covered in turf. The MWELO also requires reporting on the implementation and enforcement of local ordinances. To reduce the complexity and costs for the smaller landscapes now subject to ordinance, the 2015-revised MWELO has a prescriptive compliance approach for landscapes between 500 and 2,500 square feet. Landscapes within this size range can comply either through meeting the traditional MWELO approach or through the prescriptive approach. The size threshold for existing landscapes that are being rehabilitated has not changed, remaining at 2,500 square feet. Only rehabilitated landscapes that are associated with a building or landscape permit, plan check, or design review are subject to the Ordinance.

In typical non-residential landscapes, the reduction in Maximum Applied Water Allowance (MAWA) limits the planting of high water use plants to special landscape areas. The revised MWELO still uses a water budget approach and larger areas of high water use plants can be installed if the water use is reduced in the other areas, provided the overall landscape stays within the budget. The use of special landscape areas (SLA) was not changed in the revised MWELO. The SLA provides for an extra water allowance in non-residential areas for specific functional landscapes, such as recreation, areas for public assembly, and edible gardens or for areas irrigated with recycled water. The revised MWELO allows the irrigation efficiency to be entered for each area of the landscape.

4.1.3 Recycled Water (Ordinance No. 14-OR0565-1)

The Recycled Water Ordinance establishes the authority for the City to enforce connection to and use of recycled water where applicable and available. This ordinance supports the City's ongoing efforts to increase non-potable recycled water use in its service area. A copy of the ordinance is included in Appendix G of the 2020 UWMP.

4.2 Metering

Per California Water Code §527, the City is required to install water meters on all municipal and industrial service connections located within its service area on or before January 1, 2025. All water service connections are metered and billed according to water consumed. The City has an active water meter replacement program in place to continually

change out older meters. In addition, to comply with future water use objectives, the City will need to ensure that all meters are accurately classified.

With City Council approval in August 2020, the City is preparing to implement a service area-wide advanced metering infrastructure (AMI) program. AMI, in concert with a web-based interface software (WaterSmart), will provide real-time consumption data to facilitate early identification of water loss, allow customers to track daily water use, and provide a mechanism for ongoing outreach and communication between the City and its customers. It will also allow the City to notify customers of overwatering or leaks in real time the month rather than after the once a month read is taken. This program is anticipated to be fully implemented for customers citywide by March 2024.

4.3 Conservation Pricing

The City has and will continue to utilize a combination of uniform and increasing block or tiered conservation rate structures. Residential customers, composed of single-family, master-metered residential, and multi- family customer classes, are billed in increasing block structures in which the water rates increase with additional water units consumed. Table 4-1 shows the proposed residential customer billing rates for 2021. Commercial, agricultural, and irrigation customer classes have uniform rate structures in which a flat rate is billed for every unit consumed. Table 4-2 shows the proposed billing rates for commercial customers. The City chose not to include conservation pricing when developing program options. However, the City will maintain and expand its conservation pricing as needed to meet demand management goals established in this 2020 WCMP.

Table 4-1. Residential Customer Billing Rates

Tier	Block Structure	Cost per Unit
Single Family and Master – Metered (per dwelling unit)		
Tier 1	0 – 13 units	$2.65/unit
Tier 2	14 units and above	$3.56/unit
Multi-Family (per dwelling unit)		
Tier 1	0 – 7 units	$2.69/unit
Tier 2	8 units and above	$3.17 /unit

Table 4-2. Commercial Customer Billing Rates

Tier	Cost per Unit
Commercial Agriculture Rate	$2.87/unit
Special Agricultural Rate	$1.85/unit
Irrigation Rate	$2.90/unit
Commercial Rate	$2.77/unit

4.4 Public Education and Outreach

The City engages in a variety of public education and outreach efforts to improve water use management, education, and efficiency. These programs are described herein.

4.4.1 Outreach Activities

The City provides water conservation messaging to customers through their dedicated water conservation website www.SaveWaterOceanside.com which contains water conservation tips, rebate program information, water saving

videos, and important links to other water conservation websites and regional partners. Water conservation messaging is also distributed via public events and social media.

The City staffs a "Green Oceanside" booth dedicated to promoting water conservation at several events throughout the year. Displayed are brochure handouts containing indoor and outdoor water saving information and conservation tools as free giveaways. Giveaway items include California-friendly landscaping guides, pressure gauges, home water audit kits, reusable water bottles and student workbooks..

In order to reach a wide range of audiences, the City has brochures and handouts available at various community centers and City offices. Bill inserts are included with utility bills to announce available programs and important water conservation reminders. The City has consistently reached out to customers using various methods, including through its WaterSmart customer portal, every quarter within the last five years. In coordination with SDCWA, the City promotes opportunities for residents to participate in regional programs such as Green Oceanside Business Network certification, California-Friendly landscape contest, Speaker Bureaus, and Citizens Water Academy.

The City and other agencies in the region host the WaterSmart Landscape Contest, an annual contest for residents in San Diego County. The contest recognizes residents who have swapped their grass for drought-tolerant landscaping and brings awareness to the benefits of sustainable landscaping.

Residential outreach includes, but is not limited to, leak identification services, possible rebates, year-round outreach and education, and highlighting efforts during the Mayor's Challenge for Water Conservation. Additional outreach focuses on top CII water customers from each category, such as hotels, restaurants, stores, and schools.

4.4.2 Landscape Workshops

The City, often in coordination with SDCWA, provides landscape workshops and classes for residential customers and professional contractors. Workshop topics provided in the past include California Friendly Landscape Training and Fix-a-Leak. Workshops are offered for free and held at different locations through the City, with at least two workshops held in a City of Oceanside facility. Virtual Water Wise Landscape Workshops were hosted online from June through August 2020. Workshop topics included landscape installation and maintenance, irrigation, landscape design, and plant selection. Recordings and workshop materials are made available on the City's conservation website.

Workshop marketing includes strategically placed poster notices at various public locations such as libraries, community centers, and garden centers, and through email blasts and monthly bill inserts. The City also conducts outreach and workshop marketing on social media, through presentations at HOA groups, and in coordination with local stakeholders and stakeholder groups (e.g., MainStreet Oceanside, Chamber of Commerce).

4.4.3 School Education

The City offers two school education programs for local schools as well as education materials to teachers upon request through SDCWA. The Splash Lab offers assembly presentations available to grades K-6 to educate students on water science. For Grades 4-6, students can participate in a mobile water lab for a hands-on experience learning water-related topics. The City also provides virtual school assemblies, educational video series, Green Oceanside Presentations, and the Water Use Lesson Plan.

In conjunction with other agencies in northern San Diego County, the City holds a poster contest for 4th graders to compete for inclusion in an annual water conservation calendar. The top posters are incorporated into the calendar that

includes conservation tips and reminders. The poster is provided as a giveaway item to customers.

City staff plan to expand school outreach in FY 2022 with the development of several new programs. The City will increase outreach to the youth sector and is building partnerships with the YMCA, Boys and Girls Club, Boy Scouts, and Girl Scouts to support this effort. Water refill stations have been installed at all public high schools and middle schools, and the City is working to build awareness around tap water quality. The City is also developing lessons plans on water use, activities that can be used in the classroom in connection with the Mayor's Challenge for Water Conservation, and educational videos.

4.4.4 Giveaways

At past community events and City-led workshops, the City had provided giveaways for high-efficiency faucet aerators, showerheads, soil moisture sensors, irrigation equipment, and spray to drip kits.

4.5 Water Surveys and Audits

The City offers free water surveys and audits designed to improve water use management and promote water saving solutions. These programs are described below.

4.5.1 Water Smart Checkup Program

The City, in coordination with SDCWA, continues to offer the WaterSmart Checkup program to residential and CII customers. The program coordinates a property visit with a WaterSmart representative to provide water-saving recommendations and perform a water audit. The water audit includes an inventory of indoor and outdoor water fixtures, an evaluation of water use inefficiencies, and an adjustment of irrigation schedules where appropriate. A summary report with additional conservation advertising is left with the customer at the end of the appointment.

4.5.2 Large Landscape Water Budgeting/Monitoring

The WaterSmart online customer portal provides feedback to customers with large landscapes on water use and strategies for monitoring use-efficiency. This information can be used by customers to identify opportunities to use water more efficiently and implement changes to irrigation equipment or practices that can result in water and cost savings.

4.5.3 Agricultural Water Audit Program

The City actively promotes and provides agricultural water audits performed by the Mission Resource Conservation District (MRCD). Those customers with high water use are targeted, offered a survey, and provided a customized report on how to save water. Surveys are currently provided upon request.

4.6 Customer Rebate Programs

The City participates in a variety of regional rebate programs to improve water use management and increase water use efficiency. These programs are described herein.

4.6.1 Residential Customer Rebates

Multiple residential rebate programs are available through MWD's SoCal WaterSmart program. The program provides rebates to replace indoor and outdoor water fixtures with water-efficient devices. Table 4-3 provides a list of all rebates available and associated rebate amounts for residential customers. Rebates for clothes washers and premium high efficiency (HE) toilets continue to be popular programs gathering participation of 182 fixtures replaced in FY 2020. In addition, in FY 2020 the program provided rebates for a total of 379 outdoor water fixtures such as rain barrels, rotating sprinkler nozzles, and weather-based irrigation controllers, and removed approximately 73,500 square feet (sq. ft.) of turf.

Table 4-3. Residential Water Conservation Rebate

Rebate Program Name	Rebate Amount
Indoor Fixtures	
Clothes washer rebate	$85
Premium HE toilets	$40
Outdoor Fixtures	
Irrigation controllers	$35
Irrigation nozzles	$2/nozzle (minimum of 30)
Rain barrels	$35
Cisterns (50-199 gallons)	$35
Cisterns (200-500 gallons)	$250
Cisterns (501-999 gallons)	$300
Cisterns (1000+ gallons)	$350
Soil moisture sensors	$35/controller station
Turf removal rebate	$2/sq. ft. up to $5,000

Source: MWD, SoCal Water$mart Website: www.socalwatersmart.com

4.6.2 Commercial Customer Rebates

The City, in combination with MWD's SoCal WaterSmart Program, provides rebates geared towards commercial customers to promote water efficiency. Table 4-4 displays the rebates available grouped into market sectors with associated amounts available per rebate for commercial customers. The rebates most applied for by commercial customers in the last five years include premium HE toilets (209 in FY 2020) and weather-based irrigation controllers (22 in FY 2020)

Table 4-4. Commercial Water Conservation Rebates

Rebate Name	Rebate Amount
Indoor Fixtures	
Premium HE toilet	$40
ULF Urinal	$200
Zero Water urinal	$200
Flow valve restrictions	$5/valve (minimum of 10)
Outdoor Fixtures	
Turf removal	$2/sq. ft. up to $5,000
Irrigation controllers	$35/controller station
Irrigation nozzles	$2/nozzle (minimum of 30)
Large rotary nozzles	$13/set (minimum of 8)
Flow regulators	$1/regulator (minimum of 25)
Soil moisture sensors	$35/station
Restaurant Fixtures	
Connectionless food steamers	$485
Air-cooled ice machines	$1,000
Commercial Industrial	
Cooling tower conductivity controllers	$625
Cooling tower pH controllers	$1,750
Dry vacuum pump	$125/0.5 HP
Laminar flow restrictors	$10/restrictor (minimum of 10)

Source: MWD, SoCal Water$mart Website: www.socalwatersmart.com

4.6.3 Incentive for Recycled Water Conversions

The City has priced recycled water at rates that incentivize customers to convert approved uses from potable water to recycled water. The City is expanding its current recycled water system in phases, while at the same time implementing the new Pure Water Oceanside Program. Pure Water will serve to augment the Mission Basin groundwater supply with fully advanced treated (FAT) water to replenish local source water for the City's potable water system. In addition, it will be blended with non-potable recycled water to provide high-quality recycled water to meet the irrigation needs of agricultural and other customers in the City's Upper Conveyance System. This high-quality non-potable recycled was will also be provided at rates the incentivize customer use of this supply over potable water, saving customers money. The City's Lower Conveyance System, fed primarily by non-potable recycled water, is priced to provide customers even greater savings over potable water.

4.6.4 Require Plan Review for New CII

The City's Building Department reviews all plans per Green Building Code Requirements. As part of the recycled water system expansion described above, the City has hired a consultant tasked with facilitating the recycled water conversions for the large-use customers targeted in the expansion of the system. This consultant is providing site evaluations and planning reports to these customers, which will outline the process for the private conversion, estimated costs, and support through the process.

4.7 Programs to Assess and Manage Distribution System Real Loss

Real water losses are physical water losses from the pressurized distribution system and a utility's storage tanks up to the point of customer consumption (e.g., the water meter). After Senate Bill (SB) 555 was passed in 2015, urban water suppliers have been required to submit an annual water loss audit to DWR. This audit attempts to quantify all inputs and outputs of a supplier's potable distribution system along with many other factors related to quantifying water losses. SB 555 also directed the SWRCB to develop performance standards for volumetric water loss by July 2020. As of November 2020, the SWRCB has not completed final rulemaking for performance standards but has proposed to use an MS Excel-based economic model to calculate a unique volumetric standard for each water supplier. The standard is proposed to be quantified in units of real losses per service connection per day (gallons per connection per day).

The City has completed three years of validated Water Loss Audit reports and has determined that water losses are within the acceptable industry standard range. The City is proactive in reducing unaccounted-for water by ensuring water meters are regularly maintained, evaluated for functionality, and replaced at industry standards. Reported leaks are investigated and recorded in a tracking database that collects the time of report, leak location, and type of leaking pipe or fitting. Leaks are repaired to the extent that is cost-effective and prioritized based on potential water loss. The City will continue to survey and correct its own infrastructure system and processes to reduce system real loss.

The City maintains an excel spreadsheet to track water production and sales. WaterSmart leak alerts provide notification of leaks to help reduce losses. As stated in Section 4.2 Metering (above) the City also maintain as schedule for meter replacement to ensure more accurate meter reads. In addition, an AMI program is being implemented to help facilitate early identification of water loss.

4.8 Water Conservation Program Coordination and Staffing Support

Water conservation staffing is performed by a full-time Environmental Specialist and supervised by the Senior Management Analyst appointed as the Water Conservation Coordinator. The City's current conservation coordinator is Ms. Sarah Davis, (760) 435-5830, SDavis@oceansideca.org. The City will maintain its Water Conservation Coordinator to serve as a program manager and point of contact for demand management activities.

5. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

This section presents the conservation measure screening process, a description of the measures selected to be analyzed in the AWE Tool, measure design assumptions, and a comparison of the individual conservation measure costs and savings.

5.1 Selecting Conservation Measures to be Evaluated (Conservation Measure Screening)

An important step in updating the water conservation program is the review and screening of existing, recently implemented, and new water conservation measures. The first step in the conservation analysis was to review historical water conservation activity and savings. The purpose of this review was to look at historically successful programs, past penetration rates (activity levels) for individual measures, which customers – single-family, multi-family, commercial, etc.- engaged with the programs, and the types of programs that were implemented and by the City since the 2015 UWMP and 2015 WCMP.

A list of potential measures was developed based on the City's general experience and review of what other water agencies with conservation programs are currently implementing. Following a workshop with the City to review the preliminary conservation program list, the potential conservation measures were provided to the City to be considered for further evaluation in the AWE Tool. A second workshop was held with the City to determine a final list of conservation measures to be analyzed. These measures were screened by City staff to identify which had the highest level of interest and potential for implementation within its service area. The result of this process was a short list of 18 measures that were selected for further water savings and benefit-cost analysis using the AWE Tool. This evaluation was specific to the water use characteristics, economies of scale, demographics, and other factors that are unique to the region and the City.

The general discussion screening criteria included:

- Measure Cost Effectiveness
- Applicability to Service Area
- Amount of Water Savings Generated
- Cost to the City
- Ease of Implementation and Staffing Required
- Whether the Measure was Being Run by MWD or SDCWA
- Local Preferences
- Fulfill Regulatory Requirements

Based on the previously listed criteria, City staff determined whether a measure was eliminated from further conservation (given a "No") or passed into the next evaluation phase (given a "Yes"). The next evaluation phase was a cost-effectiveness analysis using the AWE Tool. Once finalized, the selected measures were inserted into the AWE Tool, along with the City's conservation program budget, in order to have a complete accounting for the benefits and costs of the measures.

5.2 Conservation Measures Evaluated

Table 5-1 includes the 18 water use efficiency measures that were analyzed using the AWE Tool. The table includes measures, devices, and programs that can be used to achieve water use efficiency; methods through which the device or

program will be implemented; and what distribution method or mechanism can be used to activate the device or program.

Table 5-1. Conservation Measure Descriptions

No.	Measure Name	Measure Description
		Utility Measures
1	Water Loss	Maintain a thorough annual accounting of water production, sales by customer class, and quantity of water produced but not sold. For real water loss reductions, measures include efforts to find and repair leaks in the distribution system. Leak repairs would be handled by existing crews at no extra cost. For distribution system pressure regulation, activities could include installing additional pressure regulators to maintain water pressure within recommended limits. This measure is based on SB 555 requirements for water loss auditing and efforts to reduce system water losses.
2	Advanced Metering Infrastructure (AMI)	Install more than 44,000 smart meters and purchase WaterSmart software. The AMI program was approved in August 2020, with citywide implementation of smart meters scheduled for completion by 2023. The AMI program will provide remote updates on an hourly basis, and customers will have access to near real-time use data through the WaterSmart customer portal, allowing them to view their current and past water usage to more quickly identify the possibility of leaks and opportunities to reduce water usage. Additionally, the AMI program will notify customers via text or email if a potential leak is detected, allowing for proactive management of leaks by customers.
3	Public Information	Engage in a variety of public information efforts to improve water use management, knowledge, and efficiency. Public information includes conservation messaging with water savings tips and rebate program information through bill inserts, a dedicated water conservation website, social media, brochures and handouts, and public events.
4	Public and School Education	Work with local school districts to develop classroom programs to promote water use efficiency education, such as poster contests and the Splash Lab. Some programs would require dedicated Utility staff to assist and present.
		CII Measures
5	CII Rebate Programs	Provide rebates for commercial indoor water using appliances. Program is currently part of the SoCal WaterSmart program administered MWD.
6	CII Water Surveys	Provide professional water surveys to large accounts such as hotels, restaurants, stores, and schools to evaluate ways for the business to save water and money. There is opportunity for this measure to be part of regional partnership.
7	CII Self Surveys	Provide self-auditing software and materials for smaller CII customers to evaluate ways to save water and money. The software would be promoted as part of a smaller user program. There is opportunity for this measure to be part of regional partnership.
8	CII Enhanced Outreach	Conduct additional targeted outreach to top water customers from each category, such as hotels, restaurants, stores, and schools.
		Landscape
9	Landscape Rebate Programs	Provide rebates for residential and commercial landscape products. Program is currently part of the SoCal WaterSmart program administered MWD.
10	Large Landscape Outdoor Water Audit	Offer outdoor water audits for existing large landscape customers. Those with high water use are targeted and provided a customized report on how to save water. All large multifamily residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. Program is currently part of

No.	Measure Name	Measure Description
		the WaterSmart Checkup. There is opportunity for additional outreach to CII customers.
11	Large Landscape Water Budgeting/Monitoring	Purchase software to compare water use to a budget benchmark based on site-specific characteristics and real-time weather. Combined with landscape survey. Program is not currently offered but is something the City may consider moving forward with, if needed to meet future water conservation targets.
12	Landscape Workshops and Trainings	Provide landscape workshops and classes, demonstration gardens, and trainings. Program is currently offered in coordination with SDCWA.
13	Agricultural Water Audit Program	Offer water audits for existing agricultural customers. Those with high water use are targeted, offered a survey, and provided a customized report on how to save water. Audits are currently performed by Mission Resource Conservation District.
14	Recycled Water Retrofit	Provide outreach and incentives for recycled water conversion. Program includes the SoCal WaterSmart On-site Retrofit Program, which provides financial incentives to commercial, industrial and institutional property owners, including Homeowner Associations, who convert potable water irrigation or industrial water systems to recycled water use.
Residential Measures		
15	Residential Rebate Programs	Provide rebates for residential indoor water using appliances. Program is currently part of the SoCal WaterSmart program, administered MWD.
16	Residential Water Surveys	Offer outdoor and indoor water surveys for existing residential customers. Targets customers with high water use and provides a customized report to owner. Program is currently part of the WaterSmart Checkup, which provides surveys for indoor and outdoor water savings.
17	Residential Enhanced Outreach	Conduct marketing campaign to raise awareness of conservation measures available to customers, including incentive programs offered.
18	Residential Device Giveaways	Purchase high-efficiency devices such as efficient showerheads and faucets in bulk and give them away at the Utility office or community events.

5.3 Targeted Participation in Conservation Measures

Customer participation assumptions varied for each individual measure. For rebate and survey programs, customer engagement was based on recent activity provided by the City. Assumptions for implementation of AMI with the WaterSmart software was based on a 2018 East Bay Municipal Utility District study of its WaterSmart pilot project (EBMUD, 2018). Based on this study, implementation of the WaterSmart software was assumed to contribute to an 85% increase in residential rebate program participation and a 115% increase in residential survey program participation. This WCMP assumes 50% of the City's customers will engage with the WaterSmart software. New program participation rates were based on comparable rates in existing programs as well as a review of participation targets and assumptions used in the 2015 WCMP. The enhanced outreach measures assume that engagement is doubled for the associated residential and CII measures. This is generally less than what was experienced during the 2014-2017 drought emergency and is considered realistic based on market saturation and recent program activity. See Appendix C for recent participation in current conservation programs.

5.4 Alliance for Water Efficiency Water Conservation Tracking Tool

The Alliance for Water Efficiency Water Conservation Tracking Tool version 3.0 (AWE Tool) was used to evaluate the benefit and costs for utilities in implementing water conservation activities. The AWE Tool has a library of 30 water conservation activities with predefined parameters. The tool was supplemented with City-specific information such as current rebate amounts for each device. To align with the list of measures included in the 2020 WCMP, four new

activities were added to the AWE Tool: Agricultural Program and Recycled Water Retrofits, CII Water Surveys, and CII Self Surveys. Appendix C contains detailed descriptions of the assumptions used for each of the activities.

Many of the activities from the AWE Tool are packaged into a single conservation measure. For example, residential rebate programs currently include clothes washers and premium high efficiency toilets. The list of measures does not include references to specific rebate programs because these change over time with updates to the plumbing code, as technologies improve, and as program saturation occurs. Table 5-2 presents the AWE tracking tool activities included in this analysis.

Savings and cost categories from the AWE Tool are defined below:

- **Unit** – used to measure the water savings and costs on a per device, per activity, or per customer basis.
- **Savings Per Unit** – the initial (first year) unit water savings of the activity in gallons per year (gpy).
- **Useful Life** – the useful life of savings from the activity. After the end of the useful life, the activity is assumed to be replaced with a less efficient activity.
- **Utility Cost** – the variable cost per unit for a utility (City of Oceanside or program partners, such as SDCWA or MWD) to implement the activity.
- **Participant Cost** – the out-of-pocket cost for the participant (customer) in 2020 dollars. For example, in a clothes washer rebate program the participant may pay for a portion of the new clothes washer as well as the cost of installation.

Table 5-2. Activities from AWE Conservation Tracking Tool

Activity	Unit	Savings Per Unit (gpy)	Useful Life (Years)	Utility Cost ($)	Participant Cost ($)
CII Measures					
CII Valve-Type HE Toilet	Device	15,000	25	$40	$139
CII 1/2 Gallon Urinal	Device	6,206	25	$200	$0.00
CII Food Steamer	Device	81,500	10	$485	$710
CII Cooling Tower	Device	209,880	5	$625	$2,470
CII Water Surveys	Device	173,960	10	$1,000	$500
CII Self Surveys	Survey	43,490	10	$0	$125
Landscape Measures					
Large Landscape Irrigation Controller	Device	7,600	10	$35	$1,665
Residential Rain Barrels	Device	1,300	5	$35	$100
Residential Cisterns	Device	1,300	5	$300	$1,000
Residential Efficient Irrigation Nozzles	Application	39,000	5	$60	$0.00
Residential Soil Moisture Sensor System	Device	1,500	10	$57	$165
Residential Irrigation Controller, SF	Device	7,600	10	$35	$278
Large Landscape Turf Replacement	Application	175,273	10	$30,000	$60,000
Residential Turf Replacement	Application	69,179	10	$1,125	$2,250
Large Landscape Surveys	Survey	9,660	5	$1,500	$1,000
Large Landscape Water Budgets	Survey	262,910	10	$3,277	$3,330
Agricultural Conservation	Device	32,585	5	$1,000	$7,500
Recycled Water Connection	Device	325,900	25	$11,700	$9,167
Residential Measures					
Residential Premium HE Toilets, SF	Device	15,000	25	$40	$320
Residential 4.0 WF Washer, SF	Device	5,000	15	$85	$166.50
Residential Surveys, SF	Device	12,373	5	$18.5	$50
Residential LF Showerhead, SF	Device	2,062	5	$6	$0.0
Residential LF Showerhead, MF	Device	1,898	5	$6	$0.0

5.5 Comparison of Individual Measures

Table 5-3 presents how much water the measures will save through 2045, how much the measures will cost to the utility and community, and what the benefit to the utility and community is. Overall, residential, CII, and landscape measures have the highest utility and community benefit cost ratios.

Cost categories are defined below:

- **Utility Costs** – to analyze each measure individually, utility costs are defined in this chapter as the total cost the City and regional agencies, SDCWA and MWD, will incur to implement the measure.
- **Utility Benefits** – the City's avoided cost of purchasing imported water from SDCWA.
- **Customer Costs** – the costs City customers will incur to implement a measure and maintain its effectiveness over the life of the measure.
- **Customer Benefits** – the savings other than from reduced water/sewer utility bills from reduced use of water.
- **Community Costs and Benefits** – Community Costs include Utility Costs plus Customer Costs, while Community Benefits include Utility Benefits plus Customer Benefits.

The column headings in Table 5-3 are defined as follows:

- **Present Value (PV) of Utility and Community Costs and Benefits ($):** the present value of the 25-year time stream of annual costs or benefits, discounted to the base year 2020.
- **Utility Benefit-Cost Ratio**: PV of Utility Costs divided by PV of Utility Benefits over 25 years.
- **Community Benefit-Cost Ratio**: PV of Community Benefits divided by PV of Community Costs, over 25 years.
- **Cumulative Water Savings (AFY):** cumulative water savings over 25 years.
- **Utility Cost of Water Saved per Unit Volume ($/AF):** PV of Utility Costs over 25 years divided by the 25-Year Benefits. This value is compared to the utility's avoided cost of water as one indicator of the cost effectiveness of conservation efforts.

Measures not associated with a specific device or activity (water loss, AMI, public information, public school education, and landscape workshops and trainings) provide ongoing conservation benefits but do not have quantified water savings in Table 5-3 to avoid double counting the water savings from other measures. City-specific costs are included in the City's Conservation Program budget are generally considered overhead and not accounted for on a measure-by-measure basis. City specific costs are provided in *Section 6 Results of Conservation Program Evaluation.*

Table 5-3. Conservation Measure Cost and Savings

Measure	PV of Water Utility Benefits	PV of Community Benefits	PV of Water Utility Costs	PV of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Cumulative Water Savings (AFY)	Utility Cost of Savings per Unit Volume ($/AF)
Water Loss	-	-	-	-	-	-	-	-
Advanced Metering Infrastructure (AMI)	-	-	-	-	-	-	-	-
Public Information	-	-	-	-	-	-	-	-
Public and School Education	-	-	-	-	-	-	-	-
CII Rebate Programs	$8,460,320	$22,668,565	$496,869	$1,912,350	17.0	11.9	5,400	$92
CII Water Surveys	$443,673	$781,553	$122,747	$184,120	3.6	4.2	281	$436
CII Self Surveys*	$221,836	$409,671	$20,000	$50,056	11.1	8.2	141	$142
CII Enhanced Outreach	$9,125,829	$23,859,789	$639,616	$2,146,526	14.3	11.1	5,400	$118
Landscape Rebate Programs	$5,540,957	$9,981,771	$5,523,786	$17,353,078	1.0	0.6	3,521	$1,569
Large Landscape Outdoor Water Audit	$88,829	$153,232	$589,291	$982,152	0.2	0.2	56	$10,464
Large Landscape Water Budgeting/Monitoring	$5,935,085	$10,238,123	$1,784,998	$3,599,021	3.3	2.8	3,771	$473
Landscape Workshops and Trainings	-	-	-	-	-	-	-	-
Ag Water Audit Program	$23,290	$37,946	$36,052	$306,444	0.6	0.1	15	$2,442
Recycled Water Retrofit	$2,488,306	$4,292,369	$796,852	$1,421,167	3.1	3.0	1,580	$504
Residential Rebate Programs	$1,328,651	$4,006,766	$334,061	$1,042,172	4.0	3.8	847	$394
Residential Water Surveys	$835,278	$2,050,202	$85,948	$318,241	9.7	6.4	529	$162
Residential Enhanced Outreach	$2,163,929	$6,056,968	$420,009	$3,241,223	5.2	1.9	1,155	$364
Residential Device Giveaways*	$1,822,118	$5,431,687	$163,425	$163,425	11.1	33.2	1,161	$141

* Utility costs associated with CII Self Surveys and Residential Device Giveaways are City-specific costs. These costs are included in the City's Conservation Program overhead when measures are totaled by Program option (see *Section 6 Results of Conservation Program Evaluation*).

6. RESULTS OF CONSERVATION PROGRAM EVALUATION

This section describes the process of selecting conservation measures for developing alternative conservation program scenarios and various cost, savings, and target results.

6.1 Selection of Measures for Programs

Eighteen conservation measures were incorporated into the City's AWE Conservation Tracking Tool for the water savings and benefit-cost analysis. Included in the AWE Conservation Tracking Tool was a list of measures in each of three alternative conservation programs (Programs A, B, and C), which were designed to illustrate a range of various measure combinations and resulting water savings. These programs are not intended to be rigid frameworks, but rather to demonstrate the range in savings that could be generated if selected measures were run together. The three program scenarios are organized as follows:

- **Program A**: "Current Regulation" scenario includes measures designed to meet existing conservation regulations based around SB X7-7. Program A also continues to take advantage of conservation programs administered by MWD and SDCWA with minimal cost and effort to the City.
- **Program B**: "Anticipated Regulations" scenario includes individual measures that were selected by the City. The primary goal of Program B will be to meet the new regulatory requirements under AB 1668 and SB 606. The final targets are still unknown so the measures in Program B can be adjusted when the final requirements are known.
- **Program C**: "Enhanced Conservation" scenario includes implementation of all 18 individual measures. The full complement of measures is intended to be a toolbox of options that could be implemented as needed during a drought or to meet more stringent regulatory requirements. The City may choose to implement one or more of these measures in the future as needed.

The AWE Conservation Tracking tool estimates the average annual savings for each of the alternative programs (Program A, B, and C). City staff reviewed the conservation program scenarios and tailored the programs to meet its needs. Table 6-1 presents the 18 measures by program.

Table 6-1. Conservation Measure Program Scenarios

	Measure Name	Program A	Program B	Program C
Utility Measures				
1	Advanced Metering Infrastructure (AMI)	✓	✓	✓
2	System Water Loss	✓	✓	✓
3	Public Information	✓	✓	✓
4	Public and School Education	✓	✓	✓
CII Measures				
5	CII Rebate Programs	✓	✓	✓
6	CII Water Surveys		✓	✓
7	CII Self Surveys			✓
8	CII Enhanced Outreach			✓
CII Measures				
9	Landscape Rebate Programs	✓	✓	✓
10	Large Landscape Outdoor Water Audits	✓	✓	✓
11	Large Landscape Water Budgeting/Monitoring			✓
12	Landscape Workshops and Trainings	✓	✓	✓
13	Agricultural Program	✓	✓	✓
14	Recycled Water Retrofits	✓	✓	✓
Residential Measures				
15	Residential Rebate Programs	✓	✓	✓
16	Residential Water Surveys	✓	✓	✓
17	Residential Enhanced Outreach			✓
18	Residential Device Giveaways			✓

6.2 Results of Program Evaluation

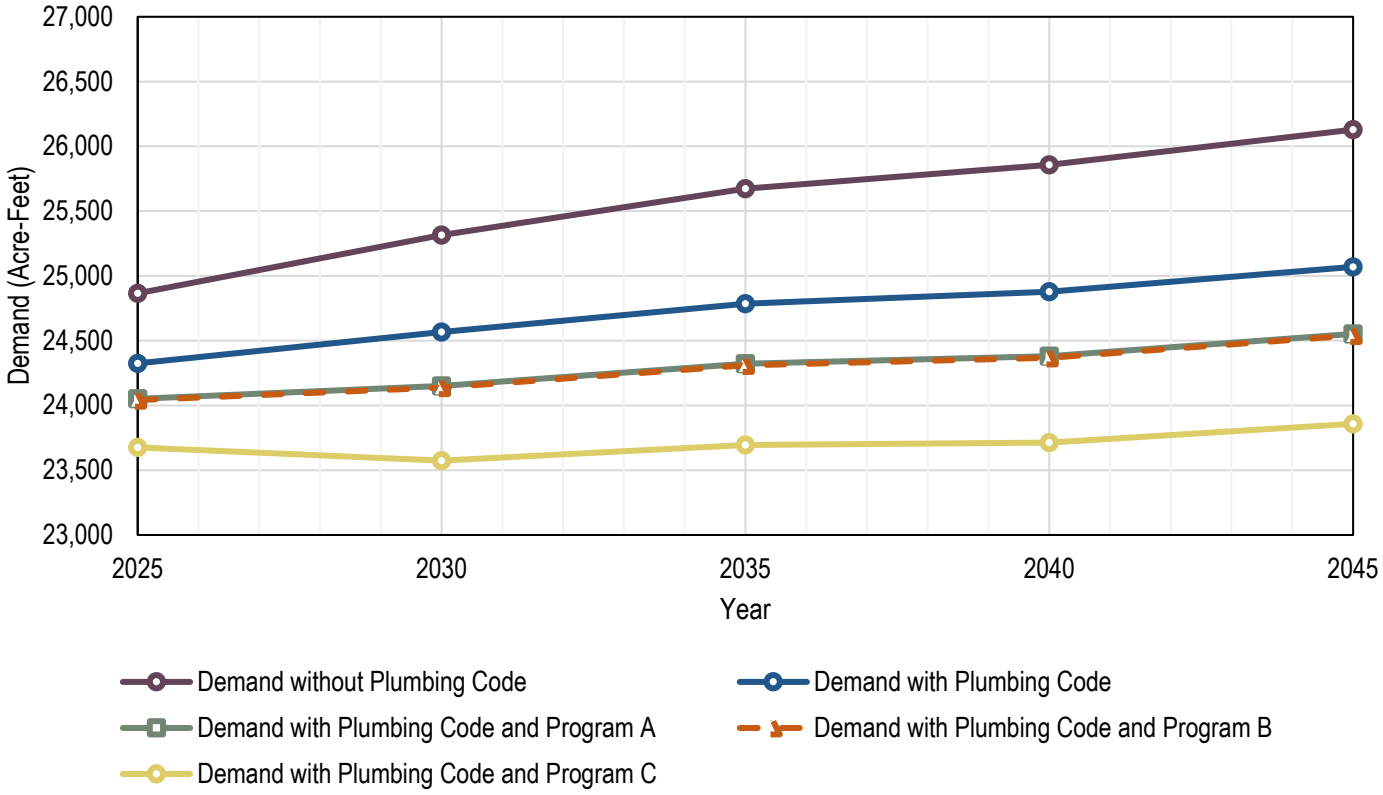
Table 6-2 and Figure 6-1 show annual baseline water demand with and without plumbing code-related conservation (but without other additional conservation), and the three conservation programs, all of which assume plumbing code savings. Program A and B result in similar projected water savings because the primary difference between these programs is the inclusion of CII water surveys in Program B. The plumbing code by itself achieves a 6.5% savings in the year 2045.

Table 6-2 Water Use Projections (Acre-Feet/Year)

	2025	2030	2035	2040	2045
Demand without Plumbing Code	24,865	25,315	25,673	25,857	26,129
Demand with Plumbing Code	24,325	24,567	24,785	24,878	25,070
Demand with Plumbing Code and Program A	24,051	24,150	24,322	24,380	24,552
Demand with Plumbing Code and Program B	24,041	24,138	24,310	24,368	24,540
Demand with Plumbing Code and Program C	23,676	23,574	23,695	23,713	23,858

Note: Total water use includes agricultural, recycled water use, and water loss.

Figure 6-1. Long Term Demands with Conservation Programs



Notes:

1. Program A and Program B scenarios are close in value and therefore Program B is shown as a dashed line. .
2. Total water use includes agricultural, recycled water use, and water loss.

Table 6-3 shows the water savings in five-year increments for all three conservation programs, including plumbing code savings. The difference in water savings is directly correlated to the variation in individual measures selected for each individual Program. Figure 6-2 shows how marginal returns change as more money is spent to achieve water savings. Program A and B are similar and thus produce similar water savings for similar costs.

Table 6-3. Water Demand Program Water Savings Projections (Acre-Feet/Year)

	2025	2030	2035	2040	2045
Program A with Plumbing Code	814	1,165	1,351	1,477	1,576
Program B with Plumbing Code	824	1,177	1,363	1,489	1,588
Program C with Plumbing Code	1,190	1,741	1,979	2,143	2,271

Figure 6-2. Present Value of Utility Costs vs. Cumulative Water Saved

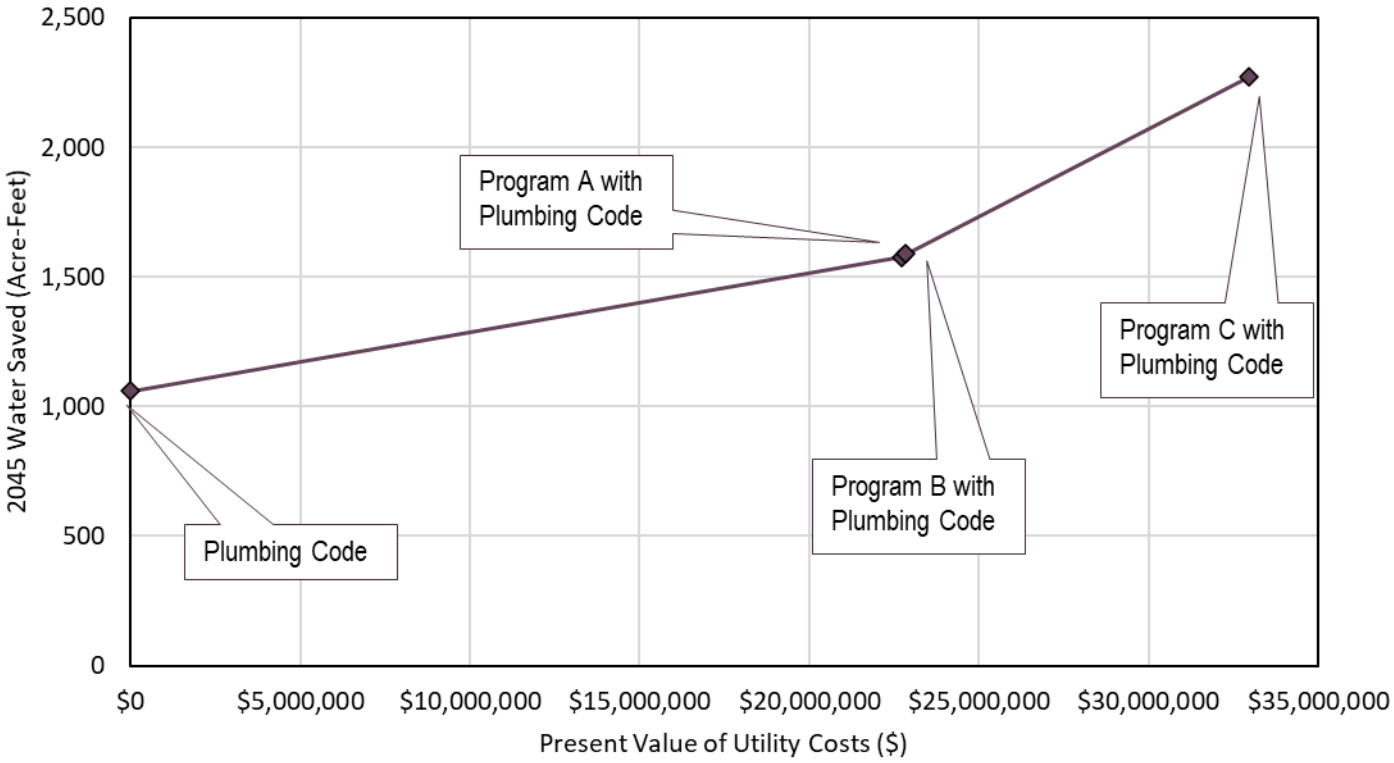


Table 6-4 presents key evaluation statistics compiled from the AWE Tool. Savings and costs in the following table are a result of each program's conservation measures and plumbing codes. Total present value costs and savings are estimated over the 25-year analysis period using an interest rate of 2.1%. The savings from water offsets due to conservation is presented for the utility, which includes the City, SDCWA, and MWD. In addition, City-only costs, which represent the City's Conservation Program budget, is presented. The City-only unit cost is significantly smaller for Program C, which includes enhanced outreach to increase participation in conservation measures, such as residential and CII rebate programs. However, because costs to administer the rebate programs are borne by regional partners, SDCWA and MWD, the City receives additional benefits without incurring costs associated with increase participation (e.g., rebates). While the City does not directly pay for regional conservation program costs, such as MWD's SoCal WaterSmart rebate programs, it supports regional utility programs indirectly through the purchase of imported water supplies, the purchase price of which helps fund the rebate programs. The City's customers pay for these programs regardless of participation in regional conservation measures. As such, it is reasonable to compare program costs at the utility level as well as at the City level.

Table 6-4. Comparison of Long-Term Conservation Programs – Utility Costs and Savings

	PV of Utility Water Savings ($)	PV of Utility Costs ($)	PV City-Only Costs ($)	PV of Community Costs ($)	Utility Unit Cost of Water Savings ($/AF)	City-Only Unit Cost of Water Savings ($/AF)	Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Program A with Plumbing Code	$18,765,631	$22,726,926	$14,864,066	$38,199,671	$1,902	$1,244	0.83	1.13
Program B with Plumbing Code	$19,209,304	$22,849,672	$14,864,066	$38,383,791	$1,869	$1,216	0.84	1.15
Program C with Plumbing Code	$43,886,052	$32,936,989	$16,013,682	$66,835,407	$1,179	$573	1.33	1.49

Note: Utility Cost of Water Saved per Unit Volume ($/AF) = PV of Utility Costs over 25 years divided by the 25-Year Water Savings. This value is compared to the utility's avoided cost of water as one indicator of the cost effectiveness of conservation efforts.

7. CONCLUSIONS

This section presents a discussion of the relative savings and cost effectiveness of the City's alternative conservation programs.

The City's service area has a relatively high portion of residential water use including outdoor use, providing opportunities for meaningful conservation savings. In addition, the CII sector's historically low participation in the current conservation program means that large potential water savings can be achieved if resources are focused on these measures. Based on the assumed avoided cost of water offset by conservation, water conservation programs are cost-effective for both customers and the City. The change in water demands from years 2025 to 2045 are provided in Table 7-1.

Overall conclusions of this 2020 WCMP are as follows:

- The plumbing code by itself achieves an 6.5% savings (year 2045).
- Additional water savings from implementation of Conservation Program A, Program B, and Program C would reduce water needs in 2045 by approximately 5.55%, 5.60%, and 6.52%, respectively, when compared to 2045 water demands *with* plumbing code savings.
- In addition to plumbing code savings, water savings contributed by each program is as follows:
    - Program A savings alone are 2,156 acre-feet in 2045
    - Program B savings alone are 2,168 acre-feet in 2045, an additional 12 acre-feet in savings compared to Program A
    - Program C savings alone are 2,850 acre-feet in 2045, an additional 682 acre-feet in savings compared to Program A
- Water Utility Benefit-Cost Ratios of Program A, Program B, and Program C conservation alternatives are 0.83, 0.84 (a 0.01 increase in benefit-cost ratio), and 1.33 (a 0.49 increase in benefit-cost ratio), respectively. This ratio includes both city specific overhead costs as well as other funding from MWD and SDCWA. The inclusion of the City's projected overhead costs reduces the benefit to cost ratio. This can be improved with strong program participation, or if the City chooses to move a given measures from Program C to Program B.

Table 7-1. Water Use Projections (Acre-Feet/Year)

	2025	2030	2035	2040	2045
Demand without Plumbing Code	24,865	25,315	25,673	25,857	26,129
Demand with Plumbing Code	24,325	24,567	24,785	24,878	25,070
Demand with Plumbing Code and Program A	24,051	24,150	24,322	24,380	24,552
Demand with Plumbing Code and Program B	24,041	24,138	24,310	24,368	24,540
Demand with Plumbing Code and Program C	23,676	23,574	23,695	23,713	23,858

Note: Total water use includes agricultural, recycled water use, and unaccounted for water.

The City has already achieved (and exceeded) its current conservation goals as required by SB X7-7. However, the City anticipates more stringent water use requirements with the passing of the 2018 water conservation legislation SB 606 and AB 1668, thus Program A is not recommended moving forward. Based on the analyses conducted in this report, is it recommended that the City implement Program B for this 2020 WCMP. The program is intended to be flexible and structured as a "menu/toolbox" to allow individual measures to change as necessary. This flexible format will facilitate adaptation to new or best available technology and will enable the City to select or change measures for

implementation as needed to reach its conservation goals. For example, the City may choose to move a measure from Program C to Program B if the current Program B measures are insufficient in meeting anticipated water use objectives. The City may also choose to focus efforts on increasing participation in current Program B measures in order to meet future water use objectives.