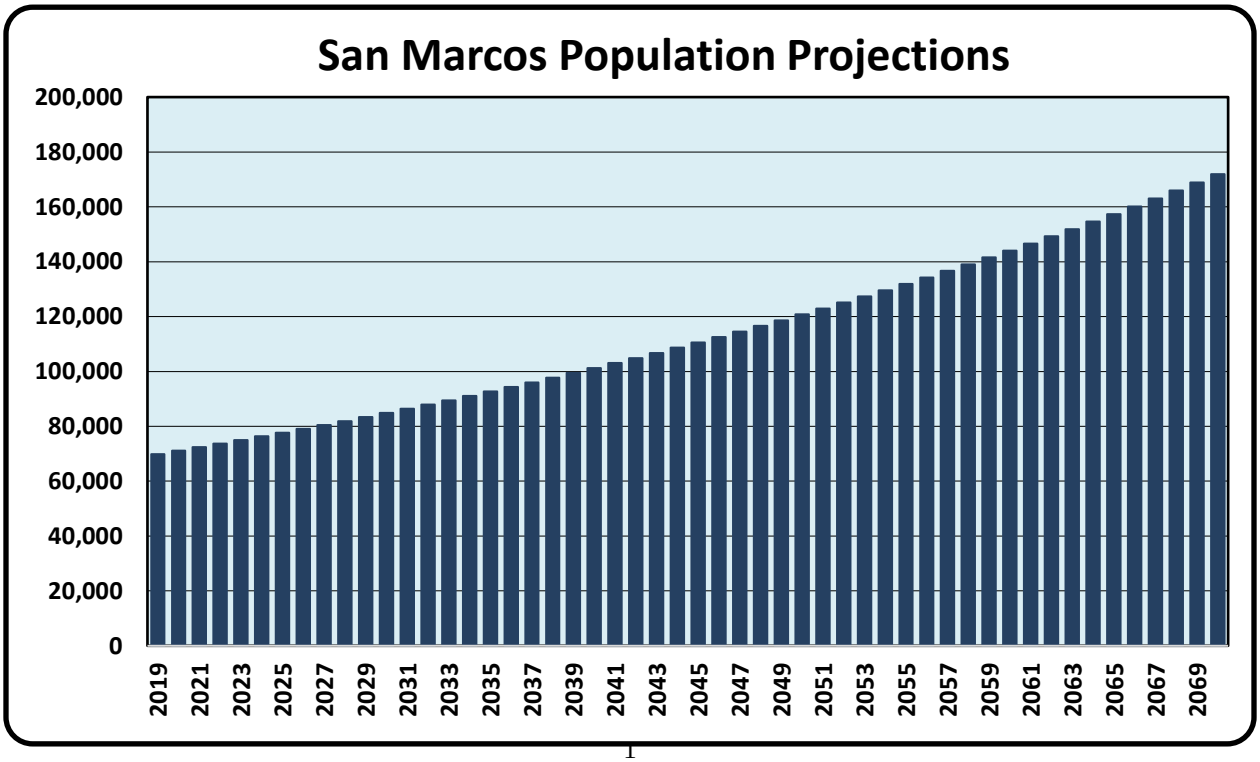
TABLE OF CONTENTS

Water Conservation Plan
for the City of San Marcos, Texas

1.0 Introduction

The objectives of the City of San Marcos Water Conservation Plan (the Plan) are to improve efficiency of water use and to decrease per capita consumption in order to provide additional water supplies for future growth. Projections for the San Marcos area indicate that by 2038 current water supplies may be insufficient to meet the needs of a rapidly growing population. To address future water needs the City is investigating several water supply strategies including purchase of additional water rights, conservation of existing water resources, and reuse of existing resources. The City of San Marcos Water Supply Master Plan and South Central Texas (Region L) Water Planning Group have identified conservation of existing resources as an essential water management strategy for San Marcos and the south central Texas region.

The City of San Marcos currently utilizes both surface and ground water resources to meet its water needs. The majority of the water, about eighty percent, is obtained from Canyon Lake under contract with the Guadalupe Blanco River Authority (GBRA). The City is presently able to withdraw up to 10,000 acre-feet annually from Canyon Lake under the terms of the contract. The remainder of the City water supply is pumped from the Edwards Aquifer, which prior to 1999 was the sole water source for San Marcos. The City has a permit to use up to 5,433



acre-feet of Edwards Aquifer groundwater per year. These groundwater withdrawals may be reduced by up to 44% when aquifer levels fall below certain triggers, resulting in a firm groundwater supply of 3,043 acre-feet per year.

The agencies that govern these resources require preparation and implementation of effective water conservation plans. In addition to providing for the needs of a rapidly growing population, this Plan fulfills the requirements of the agencies that govern use of state waters. Section 13.146 of the Texas Water Code requires retail public utilities that provides potable water service to 3,300 connection or more to submit a water conservation plan to the Texas Water Development Board (TWDB). Texas Administrative Code (TAC) 31, Chapter 363 requires that entities applying for or receiving financial assistance of more than $500,000 develop, submit and implement a water conservation plan. TAC 30, Chapter 288, enforced by the Texas Commission on Environmental Quality (TCEQ), requires surface water right holders to develop, submit and implement water conservation plans. The Edwards Aquifer Authority (EAA) requires groundwater permit holders to implement water conservation plans and to document their conservation efforts.

This Plan is applicable to all persons, customers, and properties located within the City of San Marcos Water/Wastewater Utility service area and to all persons, customers and properties using water provided by the City of San Marcos Water/Wastewater Utility. The Plan is also applicable to wholesale water customers. Every wholesale water supply contract that the City enters into requires that the wholesale customer adopt and implement a Water Conservation Plan that conforms to the TWDBs requirements and submit it to the TWDB.

2.0 System Profile

The City of San Marcos Water/Wastewater Utility is comprised of several components including groundwater pumping stations, a surface water production and treatment system, a water distribution system, a wastewater collection system, and a wastewater treatment facility. Over 75 City employees and contractors work to maintain these systems.

The groundwater system is comprised of six active Edwards Aquifer wells, which produce an average of 1.75 MGD, providing about twenty percent of the City's annual water usage.

The Regional Surface Water Treatment Plant began operation in January 2000 and has helped to drastically reduce the City's reliance on the Edwards Aquifer. The 20 mile long raw water pipeline and water treatment facility are operated and maintained by the GBRA. In 2008 the plant was expanded to operate at 21 MGD in order to accommodate additional users north of San Marcos. The facility currently produces about 6.40 MGD for San Marcos, supplying about eighty percent of the City's water needs.

The City maintains about 283 miles of water pipelines, ranging in size from 1.5 inch diameter water lines to 30 inch diameter mains. Nine storage tanks provide a combined storage capacity of approximately 5.9 million gallons.

The City maintains approximately 231 miles of wastewater collection mains, with 43 lift stations. The mains deliver wastewater to a 9 MGD wastewater treatment plant. Because much of the treated wastewater is discharged into the San Marcos River, the City is required to use advanced tertiary treatment in order to meet the 5-5-6-2-1 treatment quality standard.

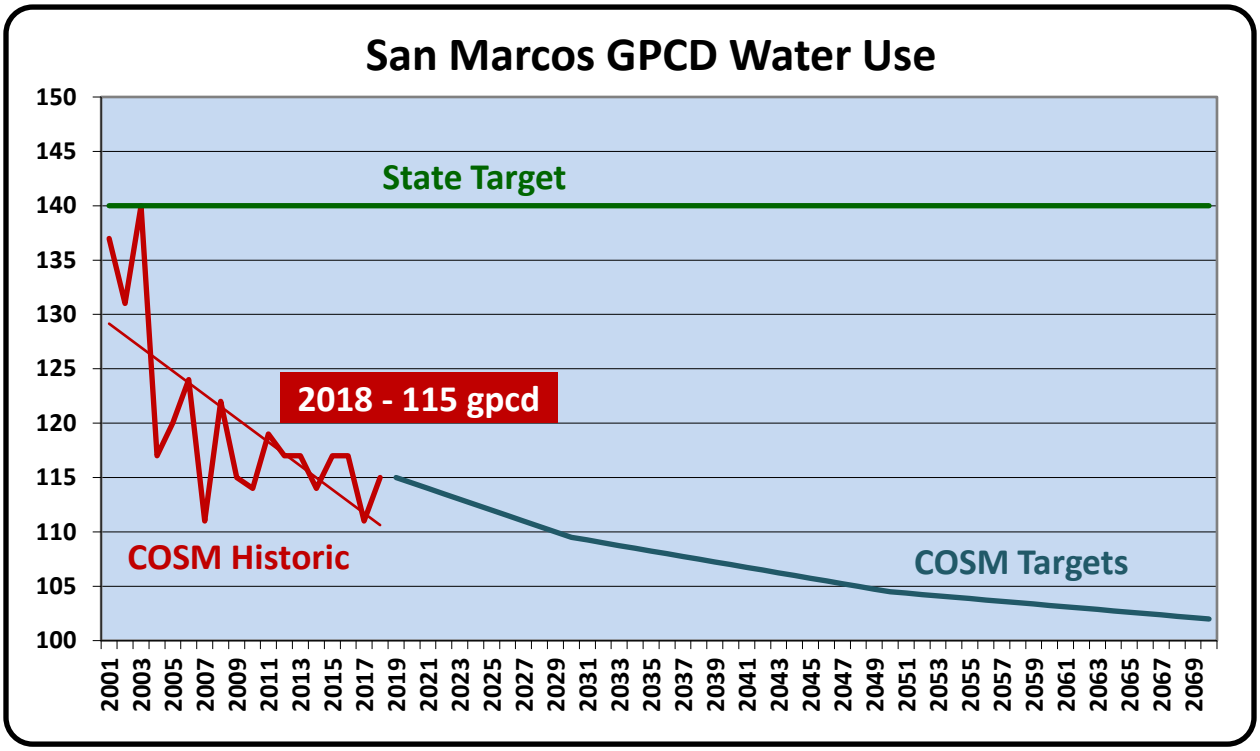
3.0 Customer Profile

The City of San Marcos Water/Wastewater Utility currently provides water service to a population of 71,153 residents. The population is projected to double by 2058 and to exceed 170,000 by 2070 (Figure 1).

Water service is provided to approximately 12,942 system connections. About 86% of the connections are classified as Residential users, which includes single-family homes, duplexes, triplexes and fourplexes, apartment communities, and mobile home parks. The residential user class consumes about 56% of the annual water supply.

The Commercial classification makes up about 11% of total connections and is comprised of service establishments such as restaurants, hotels, retail stores, and offices. Commercial users consume approximately 24% of the annual supply. Governmental and Institutional users, about 3% of the customer base, include local, state, and federally owned facilities and community organizations such as schools, churches, and medical facilities. This user class consumes about 9% of the annual water supply. San Marcos has only 35 Industrial accounts which use only a small fraction of the annual supply.

In 2018 City of San Marcos water customers used an average of 115 gallons per capita per day (gpcd), with a residential gpcd of 56. Since 2009, per capita usage has ranged from 119 to 111 gallons per day, with anaverage use of 116 gpcd, and an average downward trend of 0.7 gpcd per year.



4.0 Conservation Goals

The City of San Marcos has implemented numerous programs to reduce water consumption and improve efficiency. The City plans to continue development of current programs and to implement additional programs as needed, with a goal of reducing per capita usage as follows:

Year	Municipal GPCD	Residential GPCD	Water Loss GPCD
2024 (5-year target)	113	55	14
2029 (10-year target)	110	54	13
2044 (25-year target)	106	52	13
2069 (50-year target)	102	50	12

In order to reach these goals the City will employ a variety of water conservation best management practices (BMPs) including:

- Maintain unaccounted water usage at or below 12%;
- Continue meter replacement and testing programs;
- Continue system-wide leak detection programs;
- Expand public information and education programs;
- Acquire additional water conservation staff as needed;
- Continue residential and ICI water survey programs;
- Implement Large-scale ICI water conservation incentives;
- Expansion of reclaim water distribution system;
- Implement efficient irrigation rebate program;
- Install xeriscape, rainwater harvesting and condensate collection demonstration sites;
- Expand efficient landscape incentive program;
- Continued use of Advanced Metering Infrastructure (AMI) system for water conservation.

5.0 Best Management Practices

The City has already implemented numerous BMPs as a means of reaching water conservation goals. BMPs are defined as established practices and techniques that have shown documented improvements in water use efficiency.

5.1 Water Audit and Leak Detection/Repair Program

The City conducts monthly and annual pre-screening water audits in an effort to determine and control unaccounted water usage. Unaccounted usage is determined through metered water production, metered sales, and other verifiable water uses such as fire-fighting and line flushing. The City also estimates water losses from known leaks.

In 2000, the City implemented a system-wide leak detection program, with one quarter of the system surveyed each year. Leaks are detected through sonic sounding of all service lines, fire hydrants and valves using leak detection equipment. Reports are generated throughout the survey period and leaks are repaired as soon as practicable, with precedence given to larger leaks.

In addition to the annual leak survey, the City conducts ongoing leak detection activities such as periodic visual inspection of lines and a 24-hour leak report hotline. Suspected and reported leaks are investigated immediately and repaired as soon as possible.

The City's aggressive leak detection and water audit program has lowered unaccounted water use to below 15%, the goal established by the American Water Works Association (AWWA). The City will continue to refine these programs with a goal of reducing and maintaining unaccounted usage below 12%.

5.2 Universal Metering

The City meters all water connections within the service area, and estimates unmetered uses such as fire-fighting, line flushing and water leaks. Construction water from hydrants is allowed only through portable metering devices controlled by the City. Compound water meters are used for customers that are likely to experience periodic low flows, such as apartment complexes and restaurants. Turbo meters are used for customers that are likely to experience only high flows such as car washes, laundromats and irrigation.

In 1987, the City implemented a meter replacement program in which all water meters within the service area are replaced on a ten-year cycle. In 1996 the City added a large meter testing program in which meters four inches and larger are tested annually and repaired or replaced as needed. Testing is accomplished through flow comparison with a calibrated digital water meter, with each meter tested at high, medium, and low flows. In addition to scheduled replacement and testing, meters that are suspected of malfunction are investigated immediately and repaired or replaced as needed.

In 2013 the City completed installation of an Advanced Metering Infrastructure (AMI) system for both water and electric meters. The AMI system provides hourly water usage data which City staff uses in water conservation audits and to identify customer-side leaks. The City utilizes AMI data to provide weekly Continuous Flow Reports to customers that appear to have customer-side water leaks. The City will continue to develop methods for utilizing AMI data and to expand use of this data in conservation programs.

5.3 Water Conservation Ordinances

In 1994, the City adopted its first year-round water conservation ordinance along with the drought management rules.

In 2006 the City adopted a water conservation plumbing code which sets forth requirements for commercial car washes, cooling systems, decorative water features, commercial dining facilities, on-premise laundry facilities and landscape irrigation systems. Irrigation system codes were updated in 2009 to reflect changes to state regulations.

The water conservation and drought response ordinance includes year-round rules that prohibit water waste, use of sprinklers during daytime hours, charity car washes, non-recirculating decorative water features and at-home car washing using open hoses. This ordinance is reviewed and updated periodically, with the latest amendment occurring in 2015.

The recently revised San Marcos Land Development Code also includes landscape water conservation measures for new development. These rules require developers and homebuilders to offer xeriscape options for new single-family homes, require use of low-water landscape materials, provide limitations of turf grass areas, and require minimum soil depths and quality.

5.4 Conservation Pricing

In 1994, the City implemented an increasing block rate structure for all water customers. The rates have been amended numerous times to arrive at the current rate schedule. Each active account is charged a minimum bill based on water meter size, and additional charges based on water use. Costs are higher for rural water customers than for customers within the corporate City limits, and the City offers a Lifeline rate for customers that qualify for financial assistance.

Single-family residential wastewater charges are based on average winter use, while all other users are based on actual metered water consumption. Accounts with dedicated landscape meters are not charged for wastewater service.

The City plans to continue the increasing block rate structure, with rate adjustments implemented as needed. Future adjustments may include seasonal water rates, drought surcharges, or higher rates for irrigation accounts.

5.5 Public Information and Education

The City maintains an active public information program to educate water users about the importance of water conservation, and to inform them of effective water conservation techniques. The goal is to reach all water customers and K-12 students through various methods including:

- written materials such as press releases, newsletter articles, and bill inserts;

- water conservation website;
- social media such as Facebook and Twitter;
- representation at public events such as the Business Expo;
- presentations for local groups, clubs, and organizations; and
- classroom presentations and sponsorship of water conservation curriculum.

The City will continue to develop and expand the public information program as additional resources become available. Future public information programs may include expanded use of social media and participation in state or region-wide conservation campaigns.

5.6 Conservation Staff

In April 2001, the City created a water conservation position to develop, coordinate, and implement the City's water conservation and drought management programs. The position has evolved into a joint conservation coordinator for both the water and electric utilities. A full-time conservation technician position was added in 2009. Conservation staff are responsible for:

- development and management of the water conservation budget;
- execution and analysis of residential and ICI water audits;
- development and distribution of public information materials;
- coordination of water conservation school education program;
- development and implementation of rebate/incentive programs;
- preparation of mandated water conservation and drought management plans; and
- enforcement of conservation and drought ordinances.

Additional full or part-time conservation staff will be employed as the water conservation program develops.

5.7 Water Audit Program

In May 2001, the City implemented a water audit program for single and multi-family residential water customers. Each audit includes an evaluation of household leaks, measurement of shower and faucet flow rates, measurement of toilet flush volumes, and assessment of other water uses within the home. Each customer receives general water conservation information as well as individualized information detailing specific water conservation strategies.

In 2002, the City implemented a water audit program for ICI customers. Each audit includes an analysis of known water uses including domestic water usage, process water usage, and equipment water usage which are used to determine water conservation opportunities.

The City will continue to offer water surveys for both residential and ICI water customers.

5.8 Plumbing Retrofit Program

The Plumbing Retrofit Program has been suspended due to mandated water-efficient plumbing codes and regional saturation.

The program was conducted in conjunction with the water audit program and other rebate/incentive programs. Customers that received a water audit or participated in City rebate/incentive programs were also eligible to receive free replacement showerheads, kitchen and bathroom faucet aerators, and toilet leak detection tablets. The City also distributed plumbing devices at public events and through direct door-to-door delivery.

5.9 High-Efficiency Appliance Rebate Program

The High-Efficiency Appliance Rebate Program has been suspended due to wide availability and competitive pricing of low-water use appliances.

The Wash-Smart Rebate Program was introduced in 2002 for single-family residential water customers, and encouraged use of efficient machines through monetary rebates determined by the level of efficiency of the machine. Criteria were obtained from the Consortium for Energy Efficiency (CEE).

In 2011 the City expanded the washer rebate program to include multi-family and ICI water customers, with higher rebates offered for commercial and coin-operated clothes washers.

5.10 Toilet Replacement Program

The Toilet Replacement Program has been suspended due to mandated efficiency standards, availability of efficient products, and market saturation.

The residential low-flow toilet replacement program was originally implemented in 1995 through funding received from the Edwards Underground Water District (EUWD). The City continued the toilet incentive program until 2017, with various adjustments to the program throughout the years including making the rebate available to multi-family residential and ICI

customers, offering rebates for low-flow urinals, offering rebates for installation of high-efficiency fixtures in new construction, and free high-efficiency toilet distribution events.

5.11 ICI Conservation Programs

The City has historically implemented various programs for ICI water customers such as the annual Water Efficiency Achievement (WEA) awards introduced in 2003, and the Pre-Rinse Spray Valve Exchange program launched in 2004.

These programs have been suspended but the City will continue to research and develop additional cost-effective water conservation programs for ICI customers, including a large-scale commercial rebate program which can be customized for various conservation initiatives.

5.12 Reuse of Treated Effluent

In 2001, the City began delivery of reclaimed wastewater to the American National Power (ANP) facility located near San Marcos. ANP uses the reclaimed water along with Guadalupe River water to cool their power-producing turbines. The reclaimed water is used instead of treated potable water to dilute the high total suspended solids (TSS) of the river water. Once used, the water goes to an onsite reverse osmosis treatment facility where it is treated and recirculated back into the cooling system.

In 2013 the City began delivering reclaim water to the TXI Hunter Cement Plant for use in plant process water and dust control. In 2016 the City added Brookfield Residential as a reclaim water customer for irrigation of the Kissing Tree Golf Course and streetscape areas.

As per the Direct Water Reuse Expansion Feasibility Study completed in 2014 through a partnership with Texas State University and the Texas Water Development Board, the City has installed reclaim water mains to provide reclaim water to the University thermal plants. The University is expected to make connection and begin utilizing the reclaim water in 2021. These reclaim water mains will also be used to irrigate City parks and athletic fields along the route.

5.13 Rainwater Harvesting Rebate Program

In 2009 the City implemented a rebate program for purchase of rain barrels. The City has also provided distribution of free rain barrels in conjunction with Native Plant Sales, and has sponsored rain barrel sales through contractor partnerships. The rebate program has been expanded to include rebates for large rainwater and condensate collections systems.

5.14 Efficient Landscape and Irrigation Rebate Program

In 2013 the City implemented an irrigation system evaluation program. Through this program the City provides free irrigation system check-ups for residential and commercial water customers to insure their irrigation systems are operating efficiently. The evaluation includes checking for leaks, making sure heads are adjusted properly, checking pressure, and making sure the controller is set properly.

In 2017 the City launched the Soil Saver Rebate Program to encourage development of healthy, drought-tolerant soils. The program includes rebates for core aeration, compost application and use of mulch, and is open to all City of San Marcos water customers.

In 2020 the City implemented a Grass Removal Rebate to encourage single-family water customers to replace water-intensive lawn areas with low or no-water use alternatives such as xeriscape beds, decorative stone, pervious patis and artivcial turf grass.

6.0 Implementation, Tracking and Enforcement

The Water Conservation Plan is implemented by the Water/Wastewater Utilities Director and conservation staff. Funding for water conservation programs is provided through water rates.

The water conservation program is tracked both as a whole and individually for each program. GPCD is the primary method of tracking success of the conservation program overall. Individual programs are tracked through measured or estimated water savings when possible, or through participation rates or other means. Water conservation program information is reported annually to the TWDB.

City of San Marcos water conservation ordinances are enforced by the Water/Wastewater Utilities Director and conservation staff, code compliance officers, the San Marcos Police Department and Municipal Court, and other City employees as appropriate. First offenses generally receive a verbal or written notice of violation, along with public education materials. Repeat offenses may result in assessment of civil penalties, misdemeanor fines, and suspension of water service.

7.0 Conclusion

Water conservation is an effective and cost-effective method of reducing municipal water demand, and is a necessary component of a successful water supply plan. Through conservation the City of San Marcos plans to reduce water use to 102 gpcd by 2070. The City has already implemented numerous best management practices, and plans to implement additional best management practices as needed to meet its conservation goals.