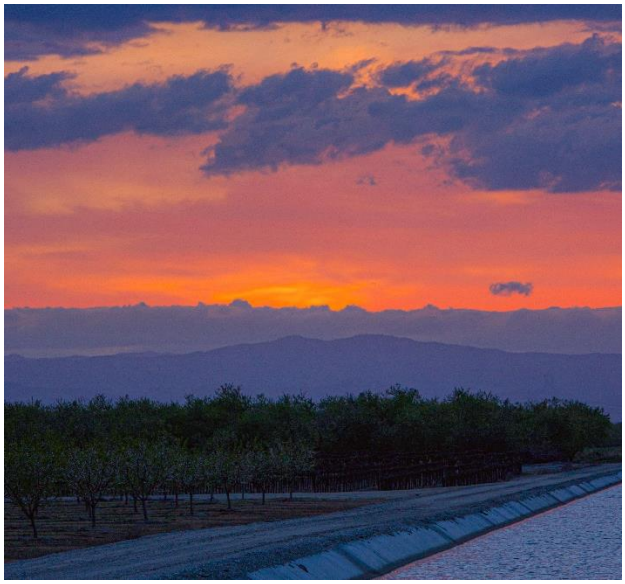
FINAL REPORT | JUNE 2021

City of Turlock
2020 Urban Water Management Plan



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PREPARED FOR

CITY OF TURLOCK INC. 1908

PREPARED BY

WEST YOST
Water. Engineered.

2020 Urban Water Management Plan

Prepared for

City of Turlock

Project No. 669-60-20-04

Project Manager: Monique Day, PE — 6-23-21 Date

QA/QC Review: Jim Connell, PE — 6-23-21 Date

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms Per Liter
AB	Assembly Bill
Act	Urban Water Management Planning Act
AFY	Acre-Feet of Water Annually
AMR	Automatic Meter Reading
BMPs	Best Management Practices
CII	Commercial, Institutional, and Industrial
CIMIS	California Irrrigation Management Information System
City	City of Turlock
CIWQS	California Integrated Water Quality System
Cr^{6+}	Hexavalent Chromium
CUWCC	California Urban Water Conservation Council
CVCWA	Central Valley Clean Water Association
CWC	California Water Code
DDM	Demand Management Measures
DMC	Delta-Mendota Canal
DOF	Department of Finance
DPWD	Del Puerto Water District
DRA	Drought Risk Assessment
DWR	Department of Water Resources
DWR Guidebook	2020 Urban Water Management Plans Guidebook for Urban Water Suppliers
DWR Methodologies	DWR Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (2016)
ECI	Environmental Compliance Inspector
EPA	Environmental Protection Agency
e-WRIMS	Electronic Water Rights Information Management System
FERC	Federal Energy Regulatory Commission
GMP	Turlock Groundwater Basin Groundwater Management Plan
GPCD	Gallons Per Capita Per Day
gpf	Gallons Per Flush
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
kWh	Kilowatt Hour
LHMP	Local Hazard Mitigation Plan
M&I	Municipal & Industrial
MCL	Maximum Contaminant Level
MG	Million Gallons
mg/L	Milligrams Per Liter

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MGD	Million Gallons per Day
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
NVRRWP	North Valley Regional Recycled Water Program
Reclamation	U.S. Bureau of Reclamation
RSWSP	Regional Surface Water Supply Project
RUWMP	Regional Urban Water Management Plan
RWQCF	Regional Water Quality Control Facility
SB X7-7	Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SGMA	Sustainable Groundwater Management Act of 2014
SRWA	Stanislaus Regional Water Authority
State Water Board	State Water Resources Control Board
SWRCB	State Water Resources Control Board
Target	2020 Urban Water Use Target
TDS	Total Dissolved Solids
TGBA	Turlock Groundwater Basin Association
TID	Turlock Irrigation District
TMC	Turlock Municipal Code
UAFW	Unaccounted-for Water
UWMP	Urban Water Management Plan
WEC	Walnut Energy Center
WRCC	Western Regional Climate Center
WSCP	Water Shortage Contingency Plan
WTP	Water Treatment Plant
WUE	Water User Efficiency

INTRODUCTION

An Urban Water Management Plan (UWMP) helps water suppliers assess the availability and reliability of their water supplies and current and projected water use to help ensure reliable water service under different conditions. This water supply planning is especially critical for California currently, as climate change is resulting in changes in rainfall and snowfall which impact water supply availability and development is occurring throughout the State resulting in increased needs for reliable water supplies. The Urban Water Management Planning Act (Act) requires larger water suppliers that provide water to urban users (whether directly or indirectly) to develop UWMPs every five years. UWMPs evaluate conditions for the next 20 years, so these regular updates ensure continued long-term planning.

Since the City of Turlock (City) provides water service directly to more than 3,000 connections in its service area, it is required to prepare a UWMP.

This Executive Summary serves as a Lay Description of the City's UWMP, as required by California Water Code §10630.5.

CALIFORNIA WATER CODE REQUIREMENTS

The California Water Code documents specific requirements for California water suppliers. The Act is included in the California Water Code and specifies the required elements of a UWMP, including discussing the City's water system and facilities, calculating how much water its customers use (i.e., water demand) and how much the City can supply, and detailing how the City would respond during a drought or other water supply shortage. Also, a UWMP must describe what specific coordination steps were taken to prepare, review, and adopt the plan.

The Act has been revised over the years. The Water Conservation Act of 2009 (also known as SB X7-7) required retail water agencies to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. In 2020, retail agencies are required to report on their compliance with SB X7-7.

The 2014 to 2017 drought has led to further revisions to the Act under the 2018 Water Conservation Legislation to improve water supply planning for long-term reliability and resilience to drought and climate change. Changes presented by the legislation include:

- Five Consecutive Dry-Year Water Reliability Assessment: Analyze water supply reliability for five consecutive dry years over the planning period of this UWMP (see Chapter 7).
- Drought Risk Assessment: Assess water supply reliability from 2021 to 2025 assuming that the next five years are dry years (see Chapter 7).
- Seismic Risk: Identify the seismic risk to the water supplier's facilities and have a plan to address the identified risks; the region's Local Hazard Mitigation Plan may address this requirement (see Chapter 8).
- Energy Use Information: Include reporting on the amount of electricity used to obtain, treat, and distribute water if data are available (see Chapter 6).

- Water Shortage Contingency Plan (WSCP): Update the water supplier's plan to include an annual process for assessing potential gaps between planned supply and demands; conform with the State's standard water shortage levels (including a shortage level greater than 50 percent) for consistent messaging and reporting; and provide water shortage responses that are locally appropriate (see Chapter 8).
- Lay Description: Provide a lay description of the findings of the UWMP; this Executive Summary serves as the Lay Description for this 2020 UWMP.

The major components of the City's 2020 UWMP, including its findings, are summarized below.

CITY WATER SERVICE AREA AND FACILITIES

The City water facilities produce, treat, store, and deliver drinking water to its customers. The City serves the entire City of Turlock.

The City's water supplies include groundwater for potable use and recycled water for non-potable use. The City's only source of potable water is groundwater supplied by 19 active wells within the City's service area. All of the Turlock Regional Water Quality Control Facility (RWQCF) effluent is used as recycled water either within the City's service area or by the North Valley Program. The City operates an extensive network of water pipelines, tanks, and pumping facilities to deliver both drinking water and recycled water to its customers.

CITY WATER USE

The City currently serves a population of approximately 74,300. It anticipates population growth and future planned development in its water service area, which would increase the demand for water. Thorough and accurate accounting of current and future water demands is critical for City planning efforts. To continue delivering safe and reliable drinking water, the City must know how much water its customers currently use and how much they expect to use in the future.

Projected future water demands have been estimated based on the anticipated growth as defined by the General Plan, adopted by the Turlock City Council in September 2012. Future study areas and planned development in the City water service area were reviewed and confirmed with the City's Planning Division. Based on the anticipated growth, water demands in the City water service area are expected to increase approximately 0.90 percent per year through 2045.

CITY WATER SUPPLIES

The City has the following existing potable water supplies:

- Groundwater pumped from City-owned and operated wells from the underlying Turlock Groundwater Subbasin

To reliably meet current and future water demands, the City plans to receive wholesale surface water from Turlock Irrigation District (TID) supplied by the Stanislaus Regional Water Authority (SRWA) Regional Surface Water Supply Project (RSWSP). The City plans to continue using groundwater as a source of potable water supply in the future and plans to maintain and replace groundwater wells as needed to provide a minimum emergency supply capacity in the future.

CONSERVATION TARGET COMPLIANCE

In accordance with SB X7-7, the City must meet a per capita water use target of 284 gallons per person per day by 2020 for its water service area. Looking at the City water service area population and water use in 2020, the City met and exceeded its water conservation target with a per capita water use of 249 gallons per person per day.

WATER SERVICE RELIABILITY

The California Water Code asks water suppliers to evaluate their water service reliability by examining the impact of drought on their water supplies and comparing those reduced supplies to water demands. Specifically, agencies should calculate their water supplies during a single dry year and five consecutive dry years using historical records.

The City is well-positioned to withstand the effects of a single dry year and a five-year drought at any period between 2025 and 2045. The City's drought risk was specifically assessed between 2021 and 2025, assuming that the next five years are dry years. In each case, water supplies comfortably exceed water demands. This remains true whether the drought occurs in 2021, 2045, or any year between.

WATER SHORTAGE CONTINGENCY PLAN

A WSCP describes an agency's plan for preparing and responding to water shortages. The City updated its WSCP to include its process for assessing potential gaps between planned water supply and demands for the current year and the next potentially dry year. It aligned its water service area's water shortage levels with the State's prescribed levels for consistent messaging and reporting and planned for locally appropriate water shortage responses. The WSCP may be used for foreseeable and unforeseeable events. The updated WSCP is adopted concurrently with this UWMP by separate resolution so that it may be updated as necessary to adapt to changing conditions.

UWMP PREPARATION, REVIEW, AND ADOPTION

While preparing its UWMP, the City notified other stakeholders (e.g., Stanislaus County and the general public) of its preparation, its availability for review, and the public hearing prior to adoption. The City encouraged community participation in the development of the 2020 UWMP using newspaper advertisements and web-based communication. These public notices included the time and place of the public hearing, as well as the location where the plan would be available for public inspection.

The public hearing provided an opportunity for City water users and the general public to become familiar with the 2020 UWMP and ask questions about the City's water supply, its continuing plans for providing a reliable, safe, high-quality water supply, and its plans to address potential water shortages. Following the public hearing, the Turlock City Council adopted the 2020 UWMP on May 25, 2021. A copy of the adopted Plan was provided to the Department of Water Resources and is available on the City's website: www.cityofturlock.org.

CHAPTER 1
Introduction

This chapter provides an introduction and overview of the City of Turlock (City) 2020 Urban Water Management Plan (UWMP) including the importance and extent of the City's water management planning efforts, changes since the preparation of the City's 2015 UWMP, and the organization of the City's 2020 UWMP. This 2020 UWMP has been prepared jointly by City staff and West Yost.

1.1 INTRODUCTION

The Urban Water Management Planning Act (Act) was originally established by Assembly Bill (AB) 797 on September 21, 1983. Passage of the Act was recognition by state legislators that water is a limited resource and a declaration that efficient water use and conservation would be actively pursued throughout the state. The primary objective of the Act is to direct "urban water suppliers" to develop an UWMP which provides a framework for long-term water supply planning, and documents how urban water suppliers are carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future water demands. A copy of the current version of the Act, as incorporated in Sections 10610 through 10657 of the California Water Code (CWC), is provided in Appendix A of this plan.

1.2 IMPORTANCE AND EXTENT OF CITY'S WATER MANAGEMENT PLANNING EFFORTS

The purpose of the UWMP is to provide a planning tool for the City for developing and delivering municipal water supplies to the City's water service area. This UWMP provides the City a water management action plan for guidance as water conditions change and management conditions arise.

The City has had a long history of providing clean and reliable water to its customers. The City's UWMP is a comprehensive guide for planning for a safe and adequate water supply.

1.3 CHANGES FROM 2015 UWMP

The Urban Water Management Planning Act has been modified over the years in response to the State's water shortages, droughts and other factors. A significant amendment was made in 2009, after the 2007 to 2009 drought, and as a result of the Governor's call for a statewide 20 percent reduction in urban water use by the year 2020. This call was the Water Conservation Act of 2009, also known as Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009 (SB X7-7). This act required agencies to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020. The 2014 to 2017 drought has led to further amendments to the California Water Code to improve on water supply planning for long-term reliability and resilience to drought and climate change.

Summarized below are the major additions and changes to the California Water Code since the City's 2015 UWMP was prepared.

- **Five Consecutive Dry-Year Water Reliability Assessment** [CWC §10635(a)]. The Legislature modified the dry-year water reliability planning from a "multiyear" time period to a "drought lasting five consecutive water years" designation. This statutory change requires the urban water supplier to analyze the reliability of its water supplies to meet its water use over an extended drought period. This requirement is addressed in the water use assessment presented in Chapter 4; the water supply analysis presented in Chapter 6; and the water reliability determinations in Chapter 7 of this plan.
- **Drought Risk Assessment** [CWC §10635(b)]. The California Legislature created a new UWMP requirement for drought planning because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change. The Drought Risk Assessment (DRA) requires the urban water supplier to assess water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years. The DRA is discussed in Chapter 7 based on the water use information in Chapter 4; the water supply analysis is presented in Chapter 6; and the water reliability determinations are discussed in Chapter 7 of this plan.
- **Seismic Risk** [CWC §10632.5]. The Water Code now requires urban water suppliers to specifically address seismic risk to various water system facilities and to have a mitigation plan. Water supply infrastructure planning is correlated with the regional hazard mitigation plan associated with the urban water supplier. The City's seismic risk is discussed in Chapter 8 of this plan.
- **Water Shortage Contingency Plan** [CWC §10632]. In 2018, the Legislature modified the UWMP laws to require a Water Shortage Contingency Plan (WSCP) with specific elements. The WSCP is a document that provides the urban water supplier with an action plan for a drought or catastrophic water supply shortage. Although the new requirements are more prescriptive than previous versions, many of these elements have long been included in WSCPs, other sections of UWMPs, or as part of the urban water supplier's standard procedures and response actions. Many of these actions were implemented by the urban water suppliers during the last drought to successfully meet changing local water supply challenges. The WSCP is used by DWR, the State Water Board, and the Legislature in addressing extreme drought conditions or statewide calamities that impact water supply availability. The City's WSCP is presented in Chapter 8 of this plan.
- **Groundwater Supplies Coordination** [CWC §10631(b)(4)]. In 2014, the Legislature enacted the Sustainable Groundwater Management Act to address groundwater conditions throughout California. Water Code now requires 2020 UWMPs to be consistent with Groundwater Sustainability Plans in areas where those plans have been completed by Groundwater Sustainability Agencies. This requirement is addressed in Chapter 6 of this plan.

- **Lay Description** [CWC §10630.5]. The Legislature included a new statutory requirement for the urban water supplier to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks. This section of the UWMP could be viewed as a go-to synopsis for new staff, new governing members, customers, and the media, and it can ensure a consistent representation of the Supplier's detailed analysis. This requirement is addressed in the next section below.
- **Water Loss Management** [CWC §10608.34(a) (1)]. The Legislature included a requirement for urban water suppliers to report on their plan to meet the water loss performance standards in their 2020 UWMPs. This requirement is addressed in the Demand Management Measures presented in Chapter 9 of this plan.

1.4 PLAN ORGANIZATION

This 2020 UWMP contains the appropriate sections and tables required per CWC Division 6, Part 2.6 (Urban Water Management Planning Act), included in Appendix A of this 2020 UWMP, and has been prepared based on guidance provided by the California Department of Water Resources (DWR) in their "2020 Urban Water Management Plans Guidebook for Urban Water Suppliers" (DWR Guidebook).

This 2020 UWMP is organized into the following chapters:

- Chapter 1: Introduction
- Chapter 2: Plan Preparation
- Chapter 3: System Description
- Chapter 4: Water Use Characterization
- Chapter 5: SB X7-7 Baselines, Targets, and 2020 Compliance
- Chapter 6: System Supplies
- Chapter 7: Water System Reliability
- Chapter 8: Water Shortage Contingency Plan
- Chapter 9: Demand Management Measures
- Chapter 10: Plan Adoption, Submittal and Implementation

This 2020 UWMP also contains the following appendices of supplemental information and data related to the City's 2020 UWMP:

- Appendix A: Legislative Requirements
- Appendix B: DWR 2020 Urban Water Management Plan Tables
- Appendix C: DWR 2020 Urban Water Management Plan Checklist
- Appendix D: Agency and Public Notices
- Appendix E: Turlock SB X7-7 Compliance Form
- Appendix F: TID SRWA Water Sales Agreement
- Appendix G: West Turlock GSA and East Turlock GSA Memorandum of Understanding
- Appendix H: Water Shortage Contingency Plan
- Appendix I: Municipal Code Title 6 Chapter 7
- Appendix J: Water Rates
- Appendix K: Water Audit
- Appendix L: UWMP Adoption Resolution

Furthermore, this 2020 UWMP contains all the tables recommended in the DWR Guidebook, both embedded into the UWMP chapters where appropriate and included in Appendix B.

DWR's Urban Water Management Plan Checklist, as provided in the DWR Guidebook, has been completed by West Yost to demonstrate the plan's compliance with applicable requirements. A copy of the completed checklist is included in Appendix C.

CHAPTER 2
Plan Preparation

This chapter describes the preparation of the City's 2020 UWMP and Water Shortage Contingency Plan (WSCP), including the basis for the preparation of the plan, individual or regional planning, fiscal or calendar year reporting, units of measure, and plan coordination and outreach.

2.1 BASIS FOR PREPARING A PLAN

The Act requires every "urban water supplier" to prepare and adopt an UWMP, to periodically review its UWMP at least once every five years and make any amendments or changes which are indicated by the review. An "urban water supplier" is defined as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually (AFY).

The City manages Water System CA5010019. As shown in Table 2-1 (DWR Table 2-1) the City provided water to 19,468 customer connections and supplied 7,188 million gallons (MG) of water in 2020 to retail customers. Of the water supplied to customer connections, 6,773 MG was potable water and 445 MG was raw water. The City primarily supplies water to retail customers. Because the City supplies more than 3,000 AFY and has more than 3,000 retail customers, the City is required to prepare an UWMP. The City's last UWMP, the 2015 UWMP, was adopted by the City Council on June 21, 2016.

Table 2-1. Public Water Systems (DWR Table 2-1 Retail)

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA5010019	City of Turlock	19,468	7,218
	TOTAL	19,468	7,218
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in MG. Total Volume supplied includes both potable and raw water supplies.			

2.2 REGIONAL PLANNING

As described in Section 2.3 below, the City has prepared this 2020 UWMP on an individual reporting basis, not part of a regional planning process.

2.3 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

This 2020 UWMP has been prepared on an individual reporting basis covering only the City's service area, see Table 2-2. The City is a member and participant in several regional water planning organizations. These groups include the Stanislaus Regional Water Authority, the East Stanislaus Regional Water Management Partnership, and the North Valley Regional Recycled Water Program. Although the City is closely involved with each of these regional organizations, the City has opted not to pursue a Regional Urban Water Management Plan (RUWMP) with any of these entities at this time. As described in Section 2.5, the City has notified and coordinated planning and compliance with appropriate regional agencies and constituents, as well as several local agencies.

Table 2-2. Plan Identification (DWR Table 2-2)

Select Only One	Type of Plan		Name of RUWMP or Regional Alliance *if applicable* (select from drop down list)
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		

2.4 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

The City is a water retailer.

The 2020 UWMP has been prepared on a calendar year basis, with the calendar year starting on January 1 and ending on December 31 of each year. Water use and planning data for the entire calendar year of 2020 has been included.

The water volumes in this 2020 UWMP are reported in units of MG.

The City's reporting methods for this 2020 UWMP are summarized in Table 2-3.

Table 2-3. Agency Identification (DWR Table 2-3)

Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP (select from drop down)	
Unit	MG

2.5 COORDINATION AND OUTREACH

This section includes a discussion of the City's inter-agency coordination and coordination with the general public. The UWMP Act requires the City to coordinate the preparation of its UWMP and WSCP with other appropriate agencies and all departments within the City, including other water suppliers that share a common source, water management agencies, and relevant public agencies. These agencies, as well as the public, participated in the coordination and preparation of this 2020 UWMP, and are summarized below.

2.5.1 Wholesale and Retail Coordination

The City is a member agency of the Stanislaus Regional Water Authority, the East Stanislaus Regional Water Management Partnership, and the North Valley Regional Recycled Water Program. These and other agencies, as well as the public, participated in the coordination and preparation of this 2020 UWMP, which includes the WSCP. The retail water supplier information exchange is summarized in Table 2-4 (DWR Table 2-4).

Table 2-4. Water Supplier Information Exchange (DWR Table 2-4 Retail)

The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Stanislaus Regional Water Authority

2.5.2 Coordination with Other Agencies and the Community

The City actively encourages community participation in water management activities and specific water-related projects. The City's public participation program includes both active and passive means of obtaining input from the community, such as mailings, public meetings, and web-based communication. The City's website and social media channels describe on-going projects and post announcements of planned rate increases to fund these water projects.

As part of the 2020 UWMP and WSCP update, the City facilitated a public review period. Public noticing, pursuant to Section 6066 of the Government Code, was conducted prior to commencement of a public comment period. Public hearing notices are included in Appendix D of this plan. During the public comment period, a hard copy of the Draft UWMP and WSCP update was made available at the City's Municipal Services Department during normal business hours and an electronic version was placed on the City's website.

The City also coordinated the preparation of this 2020 UWMP and WSCP with several neighboring agencies, including relevant public agencies that utilize the same water supplies. These agencies included the following:

- Stanislaus Regional Water Authority
- East Stanislaus Regional Water Management Partnership
- North Valley Regional Recycled Water Program
- Merced County Public Works Department
- Turlock Irrigation District
- City of Modesto
- City of Ceres
- City of Hughson
- Eastside Water District
- Denair Community Services District
- Keyes Community Services District
- Stanislaus County Public Works Department
- California State University, Stanislaus
- Turlock Groundwater Basin Association
- Merced Irrigation District
- Modesto Irrigation District
- City of Turlock
- East Turlock Groundwater Sustainability Agency
- West Turlock Groundwater Sustainability Agency

The public hearings provided an opportunity for all City water users and the general public to become familiar with the draft UWMP and WSCP and ask questions about the City's water supply, in addition to the City's continuing plans for providing a reliable, safe, high-quality water supply.

2.5.3 Notice to Cities and Counties

CWC Section 10621 (b) requires agencies to notify the cities and counties to which they serve water at least 60 days in advance of the public hearing that the plan is being updated and reviewed. On January 27, 2021, a notice of preparation was sent to the cities and counties and other stakeholders, to inform them of the UWMP update process and schedule, and to solicit input for the 2020 UWMP and WSCP. The notifications to cities and counties, the public hearing notifications, and the public hearing and adoption are discussed in Chapter 10.

CHAPTER 3
System Description

This chapter provides a description of the City's water system and service area. This description includes the water system facilities, climate, population, and housing within the City's service area.

3.1 GENERAL DESCRIPTION

The City, incorporated in 1908, is located in the California Central Valley along State Highway 99, and is referred to as the "Heart of the Valley," as it is located within one of the most productive agricultural regions in the world. Located in Stanislaus County, the City is about 100 miles east of the San Francisco Bay Area with Stockton and Sacramento to the north, and Fresno and Bakersfield to the south.

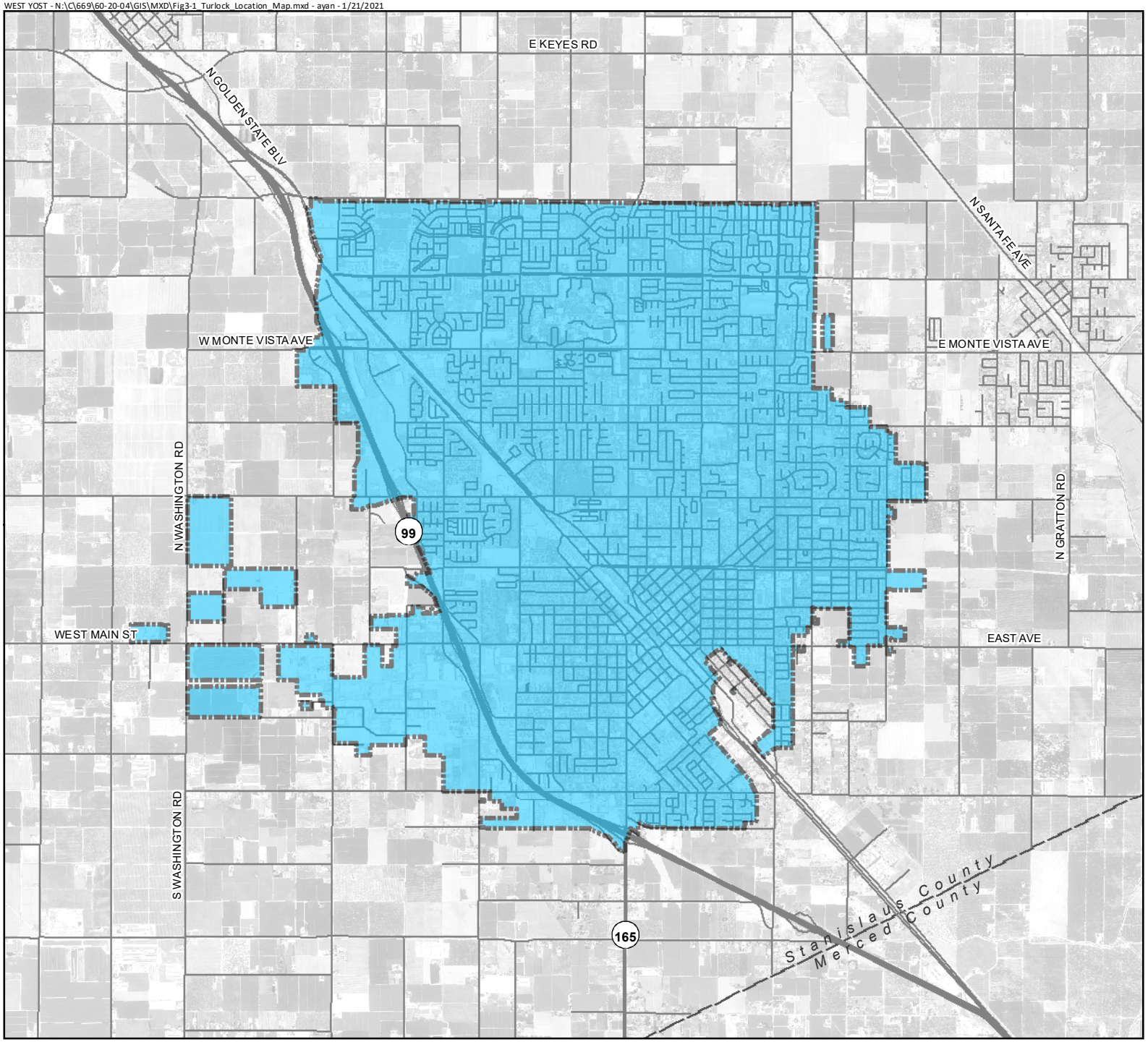
3.2 SERVICE AREA BOUNDARY MAPS

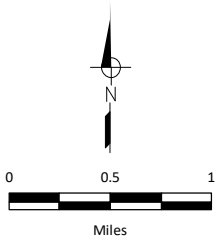
The City and water service area encompass an area of approximately 20 square miles. With the exception of three small residential areas served with groundwater from the City of Modesto, the City serves all areas within the City's limits, as well as several small unincorporated areas neighboring the City. The City's water service includes residential, commercial, industrial, and fire service connections. Municipal water supply for the City is currently almost entirely groundwater, with supplemental supplies from recycled and non-potable water (see more discussion in Chapter 6).

The City water system serves its population of about 74,297 through 19 active wells. The distribution system consists of approximately 250 miles of pipe ranging in diameter from 4 to 16 inches, with plans to expand for future surface water distribution (see more discussion in Chapter 6). The service area boundary is shown on Figure 3-1.

3.3 SERVICE AREA CLIMATE

The City of Turlock has a Mediterranean climate. Summers are hot and dry while winters are cold and wet, with an annual average precipitation of approximately 12.0 inches. The local annual average maximum daily temperature is 74.4 degrees Fahrenheit. The average rainfall over the last six years (2015-2020) was 12.2 inches. The region is subject to wide variations in annual precipitation. Water Year 2017 (October 2016 – September 2017) was a relatively wet year with 18.6 inches of rainfall while Water Year 2018 was relatively dry with only 9.2 inches of rain. The climatic data for the Turlock area is shown in Table 3-1.





Legend

Service Area

County Boundary

Notes:

1. The indicated service area includes three small areas which are served by the City of Modesto.

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Figure 3-1

City of Turlock
Water Service Area

City of Turlock
2020 Urban Water Management Plan

Table 3-1. Climate Data Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Et_o, inches[(a)]	1.2	2.1	3.6	5.2	6.8	8.1	8.4	7.3	5.4	3.6	1.8	1.2	54.6
Average Max Temperature, °F[(b)]	54.3	61.1	66.8	72.9	80.3	88.7	94.4	92.5	87.0	77.2	64.1	54.0	74.4
Average Min Temperature, °F[(b)]	38.9	42.2	45.1	49.0	53.7	59.3	63.1	61.5	58.4	52.1	43.3	38.4	50.3
Average Rainfall, inches[(b)]	2.3	2.0	1.9	1.1	0.4	0.1	0.0	0.0	0.2	0.6	1.3	2.1	12.0

(a) California Irrigation Management Information System (CIMIS) Website: www.cimis.water.ca.gov, Station 206 Denair II, California (April 2009 to November 2020), Monthly Average ET_o Report, Printed November 2020.

(b) Western Regional Climate Center (WRCC) website: www.wrcc.dri.edu, Station 049073 Turlock #2, California. Period of record: 1/1/1893 to 10/31/2020.

These climate characteristics highly influence the City's water use. As described in Chapter 4, the City's water use in the summer months is significantly higher than that in the winter, reflecting increased water use for irrigation purposes during the hot, dry summers.

3.4 SERVICE AREA POPULATION AND DEMOGRAPHICS

3.4.1 Service Area Population

The City's current (2020) service area population of 74,297 has been estimated by the California Department of Finance (DOF). Historical population data was obtained from the DOF and projected populations were developed using growth rates provided in the Turlock 2012 General Plan.

The City's population has grown at an average annual rate of 1.40 percent from 2010 through 2020 according to population estimates from DOF. Household size within the City is estimated at about 3.05 persons per household with approximately 24,986 total households in 2020.

Growth and development within the City's service area are subject to City and County growth management policies. Future population within the City's service area was extrapolated from the 2020 actual population based on a 1.90 percent growth rate stated in the City's 2012 General Plan. These results are summarized in Table 3-2 (DWR Table 3-1).

Table 3-2. Population – Current and Projected (DWR Table 3-1 Retail)

Population Served	2020[a]	2025[b]	2030[b]	2035[b]	2040[b]	2045*(opt)* [b]
	74,297	81,629	89,684	98,534	108,257	118,939

NOTES:
(a) Source: Department of Finance.
(b) Future population growth was extrapolated from the 2020 actual population based on a 1.90% growth rate stated in the City's 2012 General Plan.

3.4.2 Other Social, Economic, and Demographic Factors

The City of Turlock is composed of primarily residential and commercial areas, surrounded on all sides by arable land. The City's economy is primarily focused around agriculture, with several local companies supporting the food processing industry. Regionally, almonds are the largest agricultural export followed by alfalfa, corn, grapes, and peaches.

Land use planning within the City is administrated by the City's Development Services Planning Division, and guided by the City's 2012 General Plan. The General Plan promotes infill development prior to annexation of land to the City; however, the City has not seen a dramatic change in housing density over the past few years.

3.5 LAND USES WITHIN SERVICE AREA

The City's current land use is majority residential neighborhoods at 41 percent of City limits, 16 percent agriculture, 11 percent industrial, 9 percent commercial, 8 percent public facilities, 2 percent parks, and 1 percent office (City's 2012 General Plan).

According to the City's 2012 General Plan, there are four Master Plan Areas: Southeast 1 (SE1), Southeast 2 (SE2), Southeast 3 (SE3), and Montana-West. SE1 is 170 acres and will be developed as a primarily residential neighborhood with small office and commercial areas. SE2, with 320 acres, will also be a majority residential neighborhood with a small office center. The largest Master Plan Area at 700 acres is SE3, which will have a mix of land uses. SE3 includes land for residential neighborhoods, industrial area, public use, park, and a neighborhood center. Montana-West is 50 acres and includes seven unincorporated County Islands; this area will be majority low density residential and vacant lots.

3.6 REFERENCES

California Department of Finance (DoF). May 2020. *E-1 Population Estimates for Cities, Counties, and the State – January 1, 2019 and 2020*. Accessed at https://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/ on January 18, 2021.

California Department of Finance (DoF). May 2020. *E-5 Population and Housing Estimates for Cities, Counties, and the State, 2011-2020*. Accessed at https://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/ on January 20, 2021.

City of Turlock. September 2012. *Turlock General Plan.* Accessed at https://www.cityofturlock.org/_pdf/files/generalplancomplete.pdf on January 18, 2021.

CHAPTER 4
Water Use Characterization

This chapter describes and quantifies the City's past, current, and projected water use. Water demand projections are based on the selected SB X7-7 water use targets combined with the population projections from the City's 2012 General Plan. Accurately tracking and reporting current water demands allows the City to properly analyze the use of their resources and conduct good resource planning. As described in Chapter 3, the City's water service area is mostly residential, metered accounts.

4.1 NON-POTABLE VERSUS POTABLE WATER USE

The City serves its demand for water with different levels of treatment depending on the end use. Potable water deliveries are supplemented with recycled water from the wastewater treatment plant as well as raw water from several shallow, non-potable wells. Maintaining a variety of water sources allows the City to best meet its customers' needs, as some irrigation and industrial uses do not require the same water quality as is required for drinking water. Additional discussion of recycled water can be found in Chapter 6.

4.2 WATER USE BY SECTOR

Water production is the combined quantity of water produced by the City's groundwater wells, while water consumption is the quantity of water actually consumed or used. The difference between production and consumption is unaccounted-for water (UAFW).

This section describes the City's past, current and projected water use by sector through the year 2045 in five-year increments. Demand projections provide the basis for sizing and staging future water facilities to ensure adequate supply. This section identifies the usage among water use sectors including single-family residential, multi-family residential, commercial, industrial, institutional/governmental, and landscape irrigation. These classifications were used to analyze current consumption patterns among various types of customers. These classifications are defined by the DWR 2020 Guidebook and City as follows:

- Single-Family Residential – A single-family dwelling unit. A lot with a free-standing building containing one dwelling unit that may include a detached secondary dwelling
- Multi-Family Residential – Multiple dwelling units contained within one building or several buildings within one complex
- Commercial – A water user that provides or distributes a product or service
- Industrial – A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development
- Institutional/Governmental – A water user dedicated to public service
- Landscape – Water connections supplying water solely for landscape irrigation

4.2.1 Historical Water Use

Actual water use by the City's customers, by water use sector, in 2010 and 2015 is summarized in Table 4-1. Due to the metering program not yet being completed in 2010, past water use was based on groundwater well production records. In 2011, the metering program was fully implemented, allowing the City to track actual water use by customers and sector.

Table 4-1. City of Turlock Water Deliveries – Actual (2010 and 2015)		
Water Use Sectors	2010 Total Volume, MG	2015 Total Volume, MG
Single-Family	4,115.90	2,495.4
Multi-Family	686.5	559.7
Commercial	585.2	532.5
Industrial	1,091.90	1,075.1
Institutional/Governmental	41.8	105.92
Landscaping	572.6	269.4
Other (City Meters)	-	81.5
Other (Unmetered water)	-	442.9
Other (Parks – Non-Potable Wells)	-	112.7
Total	**7,093.90**	**5,675.1**

4.2.2 Current Water Use

Actual potable and non-potable water use by the City's customers, by water use sector, in 2020 is summarized in Table 4-2 and Table 4-3 (DWR Table 4-1). Current recycled water use is addressed in Chapter 6 and, therefore, is not included in the non-potable water use table below.

Table 4-2. Actual Demands for Potable Water (DWR Table 4-1 Retail)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Single Family		Drinking Water	2,964
Multi-Family		Drinking Water	715
Commercial		Drinking Water	430
Industrial		Drinking Water	1,504
Institutional/Governmental		Drinking Water	82
Landscape		Drinking Water	334
Other Potable	City Meters	Drinking Water	216
Other Potable	Unmetered water	Drinking Water	498
Other Potable	Flushing and City of Modesto accounts	Drinking Water	30
		TOTAL	6,773
** Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in MG.			

Table 4-3. Actual Demands for Non-Potable Water (DWR Table 4-1 Retail)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume[2]
Add additional rows as needed			
Other Non-Potable	Park Wells	Raw Water	445
		TOTAL	445
1 Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4. *2 Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in MG.			

4.2.3 Projected Water Use

The projected water use by the City's customers is based on the best available information at this time. The City was able to track actual water use by customers and sector type through the metering program, which was fully implemented in 2011. Per capita water demand declined after the meters were installed throughout the City. Per capita water demand also declined heavily from 2014 to 2016, likely due to the conservation efforts related to the drought. When the drought ended in 2017, per capita water demand started to increase again but not to pre-drought levels, likely due to continued conservation efforts and increased water rates. The City has assumed that 2020 represents a reasonable approximation for future per capita water use. Per capita water use in 2020 is approximately 249 gallons per capita per day (GPCD).

The City projected the annual water demands, assuming an annual water production growth of 1.90 percent, consistent with the population growth rate used in Chapter 3 *System Description*. Using this 1.90 percent projection to 2045 from the actual water use in 2020, and the percent water use by sector from 2020, the projected water use by water use sector, from 2025 to 2045, was approximated. These results are summarized in Table 4-4 and Table 4-5 (DWR Table 4-2).

The City does not know the estimated volume of water saved by its conservation measures so water savings resulting from conservation measures are not included in the projected water use estimates.

Table 4-4. Projected Use for Potable Water (DWR Table 4-2 Retail)

Use Type	Additional Description (as needed)	Projected Water Use * Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		3,271	3,594	3,949	4,338	4,767
Multi-Family		789	867	952	1,046	1,150
Commercial		474	521	572	629	691
Industrial		1,660	1,824	2,004	2,202	2,419
Institutional/Governmental		368	405	445	488	537
Landscape		90	99	109	119	131
Other Potable	City Meters	239	262	288	316	348
Other Potable	Unmetered Water	550	604	664	729	801
	TOTAL	7,441	8,176	8,982	9,869	10,843

** Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in MG.

Table 4-5. Projected Use for Non-Potable Water (DWR Table 4-2 Retail)

Use Type	Additional Description (as needed)	Projected Water Use[2] Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Other	Parks Non-Potable Wells	149	149	149	149	
	TOTAL	149	149	149	149	

[1] *Recycled water demands are NOT reported in this table. Recycled water demands are reported in Table 6-4.*

[2] *Units of measure (AF, CCF, MG) must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in MG.
Recycled Water is not included in this table. See DWR Table 4-3 for projected Recycled Water Demands.

Total actual and projected potable water demands are summarized in Table 4-6 (DWR Table 4-3) and total actual and projected non-potable water demands, including recycled water demands, are summarized in Table 4-7 (DWR Table 4-3).

Table 4-6. Total Potable Water Use (DWR Table 4-3 Retail)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water *From Tables 4-1R and 4-2 R*	6,773	7,441	8,176	8,982	9,869	10,843
TOTAL WATER USE	6,773	7,441	8,176	8,982	9,869	10,843
NOTES: Volumes are in MG.						

Table 4-7. Total Non-Potable Water Use (DWR Table 4-3 Retail)

	2020	2025	2030	2035	2040	2045 (opt)
Recycled Water Demand[1] *From Table 6-4*	3,474	4,056	4,639	5,221	5,804	
Raw and Other Non-potable *From Tables 4-1R and 4-2 R*	445	149	149	149	149	
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	3,919	4,205	4,788	5,370	5,953	

[1] Recycled water demand fields will be blank until Table 6-4 is complete

*[2] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*

NOTES: Volumes are in MG.

4.2.3.1 Characteristic Five-Year Water Use

Water Code Section 10635(b) requires urban suppliers to include a five-year DRA in their UWMP. A key component of the DRA is estimating demands for the next five years (2021-2025) without drought conditions (i.e., unconstrained demand) to account for climate change considerations. The five-year demand projections are summarized in Table 4-8, and the DRA is detailed in Chapter 7. Demand projections for 2021 through 2024 are interpolated between 2020 actual water demands and 2025 projected demands.

Table 4-8. Projected Water Demands for Drought Risk Assessment

	2021	2022	2023	2024	2025
Water Demand[(a)], MG	10,880	11,071	11,263	11,455	11,647

(a) Demand projections were interpolated between 2020 actual water demands and 2025 projected.

4.3 DISTRIBUTION SYSTEM WATER LOSSES

Water losses occur due to distribution system leaks and other unmetered water uses (such as firefighting, main flushing, etc.). Actual water losses within the City's water system, from 2016 to the most recent year of 2020, are summarized in Table 4-9 (DWR Table 4-4). There was a 6% water loss in 2020.

Table 4-9. Last Five Years of Water Loss Audit Reporting (DWR Table 4-4 Retail)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	687
01/2017	527
01/2018	327
01/2019	443
01/2020	451
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Volumes are in MG.	

At the time of preparation of this UWMP, DWR and the State Water Board are in the process of adopting water loss standards.

4.4 WATER USE FOR LOWER INCOME HOUSEHOLDS

Senate Bill 1087 (SB 1087) approved on October 7, 2005 added certain provisions to the Government Code and amended a portion of the UWMP Act. As it relates to the UWMP Act, SB 1087 requires the water use projections of an UWMP to include the projected demands for single-family and multi-family residential housing needed for lower income households as identified in the housing element of any city or county in the service area of the supplier (CWC § 10631(a).) A low-income household is any household that has an income below 80 percent of the area median income, adjusted for family size.

Table 4-10 shows projected demands for low income housing based on the most recent estimated percentages of Single Family Residential and Multi-Family Residential households derived from the January 2016 City of Turlock Housing Element.

Table 4-10. City of Turlock Low Income Projected Water Demands[a]

Low Income Water Demands[b]	2020	2025	2030	2035	2040	2045
Single Family Residential	1,704	1,881	2,067	2,271	2,495	2,741
Multi-Family Residential	304	335	368	405	445	489
Total	2,008	2,216	2,435	2,676	2,940	3,230

(a) Volumes are in MG.

(b) City of Turlock Housing Element (Revised Draft January 6, 2016) Table 3.2-9 says (with 2007-2011 data) that 2,650 of low-income households (including extremely low, very low, and low) were owners and 5,990 were renters. Citywide, it says 12,680 are owners and 10,100 are renters. Therefore, owners = 30.7% of low-income households and renters = 69.3% of low-income households. Citywide owners = 55.7% and renters = 44.3%. Table 3.3-1 shows (with 2013 data) that 93.9% of owners live in Single Family Residential and 41.4% of renters live in Single Family Residential. Therefore, it is estimated that 57.5% of low-income households are Single Family Residential and 42.5% are Multi-Family Residential. The dates of the data in the Housing Element are not the same so the percentages of Single Family and Multi-Family Residential are not exact.

Table 4-11 (DWR Table 4-5) indicates that both future water savings estimates and lower income residential demands have been included in the water demand projections, as described above.

Table 4-11. Inclusion in Water Use Projections (DWR Table 4-5 Retail)

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	No
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes

4.5 CLIMATE CHANGE CONSIDERATIONS

According to the fourth edition of the *California Climate Change Assessment, San Joaquin Valley Region Report Preview*, periods of drought will occur more frequently and be more intense as temperatures increase. Additional climate change impacts include more severe and frequent wildfires. These impacts are likely to increase stresses to agriculture, water resources, public health and climate justice.

The City currently relies on groundwater as its sole source of drinking water. There is an expected increase in water demand due to growing urbanization and agricultural pumping. However, due to climate change, specifically less precipitation and increased drought conditions, it is projected that the groundwater supply may not be adequate to meet water demands and have a greater likelihood of over-drafting the groundwater basins and ultimately impacting the Turlock Subbasin.

These data support the need for securing alternate water supplies to support resiliency against such drought periods. To diversify the City's water supply portfolio, the City has entered an agreement for delivery of wholesale Turlock Irrigation District surface water from the Stanislaus Regional Water Authority (SRWA) Regional Surface Water Supply Project (RSWSP). The addition of surface water will allow the City to rely less on groundwater and be able to reserve groundwater supply for periods of drought when surface water is in short supply, improving the City's long-term resiliency to drought. The project will also facilitate groundwater recharge of the basin and increase the emergency, operational, fire flow and potable water storage capacity of the City's system to meet increased demands.

Additional details about the potential impacts of climate change and the SRWA RSWSP are described in Chapter 6 *System Supplies.*

4.6 REFERENCES

Westerling, Leroy, Josue Medellin-Azuara, Joshua Viers. (University of California, Merced). 2018. *San Joaquin Valley Region Report Preview*. Accessed at https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-003_SanJoaquinValley_Preview_ADA.pdf on February 16, 2021.

CHAPTER 5
SB X7-7 Baselines, Targets, and 2020 Compliance

In November 2009, SB X7-7, the Water Conservation Act of 2009, was signed into law as part of a comprehensive water legislation package. SB X7-7 addressed both urban and agricultural water conservation. The legislation set a goal of achieving a 20 percent statewide reduction in urban per capita water use by December 31, 2020 (i.e., "20 by 2020"). To meet the urban water use target requirement, each retail supplier was required to determine its baseline water use, as well as its target water use for the year 2020. Per capita water use is measured in GPCD.

A discussion of the City's programs and policies for water conservation is provided in Chapter 9 Demand Management Measures of this plan. Therefore, the remainder of this chapter will only focus on SB X7-7 baselines and targets for the City's retail water service area.

This chapter also provides a review of the methodology the City used to calculate its 2020 Urban Water Use Target (Target), its baseline, and how the baseline was calculated. The City calculated baselines and targets on an individual reporting basis in accordance with SB X7-7 legislation requirements and DWR *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (2016) (DWR *Methodologies*).

In this chapter, it is demonstrated that the City has achieved its 2020 target reduction. Compliance with the urban water use target requirement is verified in the SB X7-7 Compliance Form, which is included as Appendix E.

5.1 OVERVIEW AND BACKGROUND

The City's compliance with SB X7-7 was first addressed in the City's 2010 UWMP. The City's baseline per capita water use was determined, and urban water use targets for 2015 and 2020 were established and adopted. Actual water use data and California DOF population estimates were used to calculate GPCD water use.

SB X7-7 included a provision that an urban water supplier may update its 2020 urban water use target in its 2015 UWMP and may use a different target method than was used in 2010. Also, the SB X7-7 methodologies developed by DWR in 2011 noted that water suppliers may revise population estimates for baseline years when the 2010 Census information became available.

The 2010 Census data was not finalized until 2012. In its 2015 UWMP, the City updated its population, baselines, and targets to reflect 2010 Census data. The City demonstrated that it successfully achieved its 2015 interim target and confirmed its 2020 target.

In this 2020 UWMP, the City verifies that it achieved its 2020 target per capita water use.

5.2 GENERAL REQUIREMENTS FOR BASELINE AND TARGETS

SB X7-7 required each urban water retailer to determine its baseline daily per capita water use over a 10-year or 15-year baseline period. The 10-year baseline period is defined as a continuous 10-year period ending no earlier than December 31, 2004 and no later than December 31, 2010. SB X7-7 also defined that for those urban water retailers that met at least 10 percent of their 2008 water demand using recycled water, the urban water retailers can extend the baseline GPCD calculation for a maximum of a continuous 15-year baseline period, ending no earlier than December 31, 2004 and no later than December 31, 2010. In 2008, the City delivered only 4.25 percent of its total deliveries as recycled water; therefore, the City's baseline GPCD was calculated over a 10-year period. In its 2015 UWMP, the 10-year

baseline period that the City selected was 1997 through 2007 (see Appendix E). This is the same 10-year baseline period reported in the City's 2010 UWMP.

SB X7-7 and DWR provided four different methods for calculation of an urban water retailer's 2020 target. Three of these methods are defined in Water Code Section 10608.20(a)(1), and the fourth method was developed by DWR. The 2020 water use target may be calculated using one of the following four methods:

- **Method 1**: 80 percent of the City's base daily per capita water use
- **Method 2**: Per capita daily water use estimated using the sum of performance standards applied to indoor residential use; landscaped area water use; and commercial, industrial, and institutional uses
- **Method 3**: 95 percent of the applicable State hydrologic region target as stated in the State's April 30, 2009, draft 20x2020 Water Conservation Plan
- **Method 4**: An approach that considers the water conservation potential from: 1) indoor residential savings, 2) metering savings, 3) commercial, industrial and institutional savings, and 4) landscape and water loss savings

The City selected Method 1 to calculate its 2020 target in its 2015 UWMP.

Daily average water use is divided by the service area population to obtain baseline and target GPCD. In 2015, the City adjusted its baseline and target GPCD to reflect its updated population estimates based on 2010 Census data results. To calculate the City's compliance year GPCD and compare it to the 2020 target, the population is updated to reflect population estimates for 2020. Details of determining 2020 service area population are provided in Section 5.3.

The City's baselines and targets are summarized in Section 5.5. The City's 2020 compliance water use is provided in Section 5.6.

5.3 SERVICE AREA POPULATION

To correctly calculate its compliance year GPCD, the City must determine the population that it served in 2020. At the time of preparation of this UWMP, the 2020 Census results were unavailable.

The method used to estimate the service area population is shown on Table 5-1 (SB X7-7 Table 2). The DOF uses U.S. Census data, combined with changes to the housing stock, estimated occupancy of housing units, and the number of persons per household to estimate annual population within jurisdictional boundaries. Because the City's current water service area is substantially the same as the City limits, DOF population data for the City of Turlock is valid for use as the service area population. DOF estimates City of Turlock's 2020 population to be 74,297 as shown in Table 5-2 (SB X7-7 Table 3).

Table 5-1. Method for Population Estimates (SB X7-7 Table 2)

Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review

Table 5-2. Service Area Population (SB X7-7 Table 3)

2020 Compliance Year Population	
2020	74,297
NOTES: Population is from the Department of Finance.	

5.4 GROSS WATER USE

Annual gross water use, as defined in CWC §10608.12(h), is the water that enters the City's distribution system over a 12-month period (calendar year) with certain exclusions. This section discusses the City's annual gross water use for each year in the baseline periods, as well as 2020, in accordance with Methodology 1: Gross Water of DWR's *Methodologies* document.

Annual gross water use for the baseline periods and 2020 are summarized in Appendix E. The baseline values reported in Appendix E are the same as documented in the City's 2010 and 2015 UWMP. The City's 2020 actual gross water use for Calendar Year 2020 is 7,218 MG as presented in Chapter 4 of this plan.

5.5 BASELINES AND TARGETS SUMMARY

Daily per capita water use is reported in GPCD. Annual gross water use is divided by annual service area population to calculate the annual per capita water use for each year in the baseline periods. As discussed in Section 5.1, the City updated its population data, adjusted its baseline, and confirmed its 2020 target in its 2015 UWMP. The City's 10-year base daily per capita water use is 356 GPCD. Using Method 1 for 2020 water use target calculation as described in Section 5.2, the City's confirmed 2020 compliance target is 284 GPCD. The City's baseline and target are summarized in Table 5-3 (SB X7-7 Table 5-1).

Table 5-3. Supplier: Baseline and Targets Summary (DWR Table 5-1 Retail)

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*1997*	*2006*	*356*	*284*
5 Year	*2003*	*2007*	*352*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				

The baseline and 2020 target are included in the SB X7-7 compliance form, Appendix E.

5.6 2020 COMPLIANCE DAILY PER CAPITA WATER USE

In Sections 5.3 and 5.4, the City's 2020 population and gross water use are presented, respectively. The City calculated its actual 2020 water use for the 2020 calendar year in accordance with Methodology 1 of DWR's *Methodologies* document. As shown in Table 5-4 (DWR Table 5-2), urban per capita water use in 2020 was 250 GPCD, which is well below the confirmed 2020 water use target of 284 GPCD. Therefore, the City has met its 2020 final water use target. The complete set of SB X7-7 compliance tables used to document this compliance is included in Appendix E.

Table 5-4. Supplier: 2020 Compliance (DWR Table 5-2 Retail)

2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 TOTAL Adjustments*	Adjusted 2020 GPCD* *(Adjusted if applicable)*		
250	-	*250*	*284*	*YES*
**All cells in this table should be populated manually from the supplier's SBX7-7 2020 Compliance Form and reported in Gallons per Capita per Day (GPCD)*				
NOTES: Volumes are in MG.				

As detailed in DWR's *Methodologies* document, adjustments are allowed that can be made to an agency's gross water use in 2020 for unusual weather, land use changes, or extraordinary institutional water use.

The City has elected not to make the adjustments allowed by Water Code Section 10608.24 because these exceptions are not needed to demonstrate compliance with SB X7-7 for 2020. Water use in 2020 in the City's service area was significantly reduced as compared to baseline years as a result of increased water conservation efforts by the City and its customers.

5.7 REGIONAL ALLIANCE

The City has chosen to comply with the requirements of SB X7-7 on an individual basis. The City has elected not to participate in a regional alliance.

CHAPTER 6
System Supplies

This chapter characterizes the City's water supply portfolio. Currently available water supplies, as well as future anticipated water supplies, are described and quantified. The management of each supply in correlation with other supplies are discussed. Potential effects of climate change and regulations are also discussed. The energy intensity required to treat and distribute the City's water supply within its service area is provided.

6.1 WATER SUPPLY ANALYSIS OVERVIEW

The City currently utilizes only groundwater and recycled water. Projected future supplies include surface water from the Tuolumne River and expansion of the recycled water system.

The City's groundwater is the only current source of potable water. It is supplied by 40 local wells within the City's service area. Details of the City's groundwater supply are described further in Section 6.2.2.

The City's surface water supplies are planned to be supplied by the SRWA RSWSP and are described in further detail in Section 6.2.1.

The City's recycled water supply is used for non-potable applications and is described further in Section 6.2.5.

6.2 WATER SUPPLY CHARACTERIZATION

The following sections characterize the following water supply types: purchased or imported water, groundwater, surface water, wastewater and recycled water. The availability of these sources under single dry, five-year droughts, and any other water year conditions are discussed in Chapter 7.

6.2.1 Purchased or Imported Water

Currently the City does not purchase or import water from any other water supply or entity. However, as a member of the SRWA, the City will receive wholesale surface water from TID (sourced from the Tuolumne River) as SRWA has entered into a Water Sales Agreement for delivery of up to 26.8 million gallons per day (MGD) (or 30,000 AFY). Although the SRWA has an agreement to receive up to 26.8 MGD from TID, the RSWSP under design and construction includes a water treatment plant (WTP) with a capacity of 15 MGD, easily expandable to 20 MGD. Per the February 2020 RSWSP Phase 3 Project Design and Construction Funding Agreement with the City of Ceres, City of Turlock, TID and SRWA, the City has a dedicated capacity of the SRWA WTP of 66.7 percent (or 10 MGD). This portion of WTP capacity amounts to 3,650 MG per year for the City. Copies of the 2015 water sales agreement and an amendment to the agreement approved in 2020, and the Phase 3 Funding Agreement are included in Appendix F. The SRWA RSWSP, which will construct the raw water pump station, raw water pipeline, WTP, and finished water transmission mains to deliver surface water to the Cities of Ceres and Turlock, is currently in the design and construction phase and is scheduled to be operational in mid-2023.

It should be noted that while SRWA is initially going to provide 10 MGD to the City, the SRWA plans to re-rate the filter capacity within the WTP to increase the overall WTP capacity from 15 MGD to 20 MGD. It is anticipated that the WTP can be re-rated within the first year or two of operation. Once the WTP is re-rated the capacity available to the City will be roughly 13 MGD.

6.2.2 Groundwater

Through 2020, groundwater supplies were used to meet all potable water needs in the management area. The local groundwater source is the Turlock Subbasin, which is a subunit of the San Joaquin Valley Groundwater Basin. The City currently possesses 40 wells. The number of wells considered active, inactive/abandoned, or non-potable are as follows:

- 19 active
- 21 inactive/abandoned
- 4 non-potable (irrigation only)

The City does not currently have any standby wells.

Since the 2010 UWMP, four wells have been removed from active status due to water quality concerns. In addition to evaluating opportunities to reduce contamination in these wells, diversification of supplies away from groundwater (surface water from TID through SRWA - as described above) will help mitigate any future groundwater quality degradation. Quality constraints and their potential impacts on water supply reliability are discussed further in Chapter 7.

The Turlock Subbasin is discussed in detail in the 2008 Turlock Groundwater Basin Groundwater Management Plan (GMP) produced by the Turlock Groundwater Basin Association (TGBA). A description of topics relevant to the 2020 UWMP follows.

6.2.2.1 Basin Description

The Turlock Subbasin lies on the eastern side of California's San Joaquin Valley and encompasses portions of both Stanislaus and Merced counties. The groundwater system is bounded by the Tuolumne River on the north, the Merced River on the south, and the San Joaquin River on the west. The eastern boundary of the system is the western extent of the outcrop of crystalline basement rock in the foothills of the Sierra Nevada. Land uses in the Turlock Subbasin are diverse and include agriculture, urban, and commercial or industrial uses distributed in a mosaic throughout the region.

The Turlock Subbasin underlies an area of approximately 347,000 acres, with irrigated crops (245,000 acres), native vegetation (69,000 acres), and urban development (20,000 acres) as the predominant land uses. The general trend in land use throughout the subbasin has been an increase in urbanization from less than 4,000 acres in 1952 to approximately 20,000 acres in 2006.

The majority of this urbanization has occurred within unincorporated urban areas and cities within the TID boundary. Land in the Eastside Water District, Ballico-Cortez Water District, and Merced Irrigation District has not seen the substantial increase in urbanization that has occurred in other portions of the subbasin. However, in the Eastside Water District, there has been a shift from non-irrigated lands to irrigated agriculture as the principal land use. The majority of this agricultural development occurred between 1952 and 1984; land use patterns in the Eastside Water District have generally stabilized since the mid-1980s. The shift to irrigated agriculture has occurred to a lesser extent in the Ballico-Cortez Water District. Land use patterns in the foothill areas in the eastern portion of the subbasin have also shifted from non-irrigated to irrigated agriculture, but most of this shift has occurred in recent years. Between 1952 and 1992, irrigated agriculture in the foothills non-district area increased gradually from 8,600 acres to 10,800 acres. Following 1992, irrigated area grew rapidly, reaching 19,500 acres in 2006, and 35,100 in 2014.

Although expansion of irrigation has, and will continue to increase overall water demand, a portion of water used for irrigation is passively recaptured by the groundwater basin. Unlike water for Municipal & Industrial (M&I) use, irrigation water does not ultimately flow to the City's wastewater treatment plant. Due to its application outdoors, a percentage of irrigation water will percolate downwards through soil and contribute to groundwater aquifer recharge. The benefits of this recharge will become further apparent when the City's groundwater is supplemented by Tuolumne River surface water (through SRWA), as a portion of the recharge water will have originated outside of the basin, contributing towards a net basin inflow.

A map displaying the boundaries of the Turlock Subbasin can be found in Figure 6-1.

Source: Figure from Turlock Subbasin GSA's Turlock Subbasin Fact Sheet.

Figure 6-1. Turlock Groundwater Basin Location and Boundaries

6.2.2.2 Basin Overdraft Conditions

Overdraft of an aquifer occurs when groundwater extraction is faster than aquifer recharge. It is unsustainable to overdraft an aquifer over long periods of time. Overdraft can eventually lead to subsidence and water quality problems. The Turlock Subbasin is neither listed as adjudicated, nor critically overdrafted (DWR).

Groundwater conditions within the Turlock Subbasin vary. Groundwater levels in the eastern areas have declined significantly since the 1960s while levels in the western areas of the subbasin are high to the point of requiring pumping in certain areas to keep the groundwater from encroaching into the root zone of agricultural crops. Local agencies will continue their efforts to ensure a sustainably managed groundwater basin and prevent activities that could lead to overdraft.

6.2.2.3 Groundwater Basin Management

The City has taken initiative in management of the Turlock Subbasin by pursuing a hydrogeological and water quality assessment study. This study was completed in July 2016 and provided the City with a groundwater "road map" intended to provide direction to further protect and develop the City's groundwater resources. Deliverables of the study included:

- A Conceptual Hydrogeologic Model of the Turlock Subbasin
- Groundwater Elevation Hydrographs & Contour Maps
- Groundwater Quality Maps
- An Aquifer Evaluation
- A Well Field Interference Analysis
- A Contamination Mitigation Evaluation
- Recommendations for Future Well Locations
- Well Head Treatment Cost Estimates
- Well Tests
- Well Rehabilitation Recommendations
- Future Well Design Guidelines

Background information regarding the constraints placed on the City's groundwater resources are further discussed in Section 7.1.

6.2.2.4 Groundwater Sustainability

The Sustainable Groundwater Management Act of 2014 (SGMA), a three-bill legislative package composed of AB 1739 (Dickinson), SB 1168 (Pavley), and SB 1319 (Pavley), was passed in September 2014. The legislation provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention when necessary to protect the resource. The legislation lays out a process and a timeline for local authorities to achieve sustainable management of groundwater basins. It also provides tools, authorities, and deadlines to take the necessary steps to achieve the goal. For local agencies involved in implementation, the requirements are significant and can be expected to take years to accomplish. The State Water Resources Control Board may intervene if local agencies do not form a Groundwater Sustainability Agency (GSA) and/or fail to adopt and implement a Groundwater Sustainability Plan (GSP).

The SGMA implementation steps and deadlines are shown in Table 6-1.

Table 6-1. Sustainable Groundwater Management Act and Deadlines			
Implementation Step	Implementation Measure	Deadlines	Status
Step One	Local agencies must form local GSAs within two years	June 30, 2017	West Turlock Subbasin GSA formed November 2016
Step Two	Agencies in basins deemed high- or medium-priority must adopt GSPs within five to seven years, depending on whether a basin is in critical overdraft	January 31, 2020 for critically overdrafted basins January 31, 2022 for high- and medium-priority basins not currently in overdraft	The West and East Turlock Subbasin GSA's joint GSP will be completed by January 1, 2022
Step Three	Once plans are in place, local agencies have 20 years to fully implement them and achieve the sustainability goal	January 31, 2040 for critically overdrafted basins January 31, 2042 for high- and medium-priority basins not currently in overdraft	TBD

SGMA applies to basins or subbasins designated by DWR as high or medium priority basins, based on a statewide ranking that uses criteria including population and extent of irrigated agriculture dependent on groundwater. The SGMA 2019 Basin Prioritization findings indicate that 94 of California's 515 groundwater basins and subbasins are high and medium priority basins. These high and medium priority basins account for 98 percent of California's annual groundwater pumping and supply 83 percent of the population which resides over the groundwater basins. The ranking for the Turlock Subbasin is shown in Table 6-2. As shown, the Turlock Subbasin has been ranked as a high Priority Basin.

Table 6-2. Groundwater Basin Prioritization for Sustainable Groundwater Management Act[(a)]			
Basin Number	Subbasin Name	Overall Basin Ranking Score	Overall Basin Priority
5-22.03	Turlock	26	High
(a) SGMA Basin Prioritization Dashboard, run version May 2020.			

6.2.2.5 GSA and GSP Formation

The area's commitment to comply with SGMA was outlined in a Memorandum of Understanding (MOU) signed by local water agencies, including the City, on December 14, 2017. The MOU can be found in Appendix G. The agencies developed two GSAs and submitted the required documentation to DWR before the June 30, 2017 deadline. The two GSAs formed were the West Turlock Subbasin GSA and the East Turlock GSA. The City is part of the West Turlock Subbasin GSA.

The West and East Turlock GSAs are in the process of monitoring groundwater levels, conducting outreach, and working through data needs and other issues to develop a joint GSP by the required deadline of January 31, 2022.

6.2.2.6 Turlock Groundwater Basin Association

The majority of water agencies located within the Turlock Subbasin, including the City, are part of the TGBA (see Figure 6-1). Formed in 1995, the TGBA has completed numerous studies to better understand the Turlock Subbasin groundwater system. The TGBA has also developed and implemented multiple Groundwater Management Plans, and coordinates groundwater monitoring for the subbasin. The TGBA facilitated the formation of the West Turlock Subbasin GSA and the East Turlock GSA and continues to serve as the primary mechanism for coordination between the two GSAs.

All of the member agencies in TGBA agree that groundwater and surface water within the Turlock Subbasin are vitally important resources that provide the foundation for maintaining current and future water needs. Preservation of these resources is essential to maintaining the economic viability and prosperity of the subbasin area. It is the overall goal of the TGBA that groundwater will continue to be a reliable, safe, efficient, and cost-effective water supply. Basin Management objectives include:

- Maintain an adequate water level in the groundwater basin;
- Protect groundwater quality and implement measures, where feasible, to reduce the potential movement of existing contaminants;
- Monitor groundwater extraction to reduce the potential for land subsidence;
- Promote conjunctive use of groundwater and surface waters;
- Support and encourage water conservation;
- Develop and support alternate water supplies, and educate users on the benefits of water recycling; and
- Continue coordination and cooperation between the TGBA members and customers.

6.2.2.7 Groundwater Use – Past Five Years

Groundwater pumping by the City over the last five years is summarized in Table 6-3 (DWR Table 6-1).

Table 6-3. Groundwater Pumped in Last Five Years (DWR Table 6-1 Retail)

☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Turlock Subbasin within the San Joaquin Valley Groundwater Basin	5,812	6,139	6,108	6,465	7,218
	TOTAL	5,812	6,139	6,108	6,465	7,218
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes are in MG.						

6.2.3 Surface Water

The City does not currently have a surface water supply. As mentioned in Section 6.2.1, as a member of the SRWA, the City has entered into an agreement with TID for the diversion of up to 3,650 MG per year (10 MGD). This surface water is then treated and delivered to the City from facilities constructed as part of the SRWA RSWSP.

TID and Modesto Irrigation District (MID) jointly operate the Don Pedro Reservoir, from which water is diverted for end use by both TID and MID's agricultural and M&I customers. The quality of this surface water supply is exceptionally high, with the City of Modesto regularly blending it with local groundwater to help the groundwater meet U.S. Environmental Protection Agency (EPA) MCL requirements.

TID has both pre- and post-1914 water rights on the Tuolumne River. A full listing of these water rights can be found through the State Water Resources Control Board's (SWRCB) California Integrated Water Quality System's (CIWQS) Electronic Water Rights Information Management System (e-WRIMS). TID has committed pre- and/or post-1914 water rights to the SRWA as part of Amendment No. 1 to the Water Sales Agreement (included in Appendix F).

Surface water supplies more than 50 percent of the total irrigation water applied to land in the Turlock Subbasin boundaries. Therefore, a majority of recharge originates from the Tuolumne River, and to a much lesser extent, the Merced River. The average volume of surface water imported into the subbasin between 1997 and 2006 was 540,000 AFY (176,000 MG per year). A significant part of applied irrigation water percolates past the root zone to become groundwater, with deep percolation of applied surface water being the largest single component of groundwater recharge. The City's addition of surface water supply will likely not only reduce the necessity for groundwater pumping but will also increase the rate of groundwater recharge in the Turlock Subbasin.

6.2.4 Stormwater

The City's stormwater system includes about 130 miles of storm drain collection/conveyance piping, 49 pump stations, 45 detention basins, and use of the TID open channel irrigation system.

The majority of the City's stormwater drains to local detention basins. Although the primary purpose of these detention facilities is for urban runoff and flood control, they passively contribute to groundwater recharge through percolation of stored supplies. These detention facilities are managed in a way to maximize stored volume to maximize groundwater recharge as long as flood control concerns are low. As soon as wet weather events are in the forecast, the detention facilities are drained to create more space for stormwater detention.

A portion of the City's stormwater drains to TID laterals. Although this drainage does not directly increase supply for the City, stormwater delivered to TID may help offset TID demands. The City works closely with TID to ensure there is adequate capacity in the laterals for stormwater discharges. The City implements best management practices to improve water quality for the stormwater discharges.

The remainder of the City's stormwater that is not captured in detention basins or flows to TID laterals eventually drains through a combined sewer system to the Turlock RWQCF.

6.2.5 Wastewater and Recycled Water

Since 2006, the City has operated a disinfected tertiary wastewater treatment system, the Turlock RWQCF. This section provides information on the wastewater and its current and potential reuse as a recycled water resource in the City.

6.2.5.1 Recycled Water Coordination

The Cities of Turlock, Modesto, Ceres, and the Del Puerto Water District (DPWD) worked together to develop a cooperative project, the North Valley Regional Recycled Water Program (North Valley Program). The North Valley Program is an effort to regionalize recycled water use in Stanislaus County. Starting in December 2017, the North Valley Program began producing and delivering up to 30,600 AFY (9,970 MG per year) of disinfected tertiary treated recycled water to western Stanislaus County. By 2045, the North Valley Program could deliver up to 59,900 AFY (19,500 MG per year) of recycled water. The source of recycled water includes treated wastewater from the Cities of Turlock and Modesto. As part of the project, the City of Turlock installed 7.3 miles of conveyance pipeline to convey recycled water directly from its RWQCF's tertiary treatment plant to the City of Modesto pumping facility, who then pumps the recycled water to the Delta-Mendota Canal (DMC). The DMC is used to convey the blended canal-recycled water to DPWD in the west side of the County.

In addition to the above regional program, the City operates its own recycled water program for customers within the City's service area. The City coordinates both internally and externally with its recycled water customers. The City also coordinates with businesses and residences in the surrounding geographic areas adjacent to and within the City.

6.2.5.2 Wastewater Collection, Treatment, and Disposal

The RWQCF is designed to treat an average of 20 MGD and is currently treating an average influent flow of 10.8 MGD. The raw wastewater received at the City's RWQCF is a combination of domestic and industrial wastewater flows. Influent consists of wastewater from the City of Turlock, Community Service Districts of Keyes and Denair and up to 2 MGD of primary treated wastewater from the City of Ceres. The RWQCF produces disinfected tertiary treated water that meets Title 22 standards for unrestricted use pursuant to Title 22 section 60301.230(a)(1).

The RWQCF treatment system consists of influent screening, grit removal, primary flotation, secondary treatment (which consists of activated bio-filtration for biological oxygen demand (BOD)/total suspended solids (TSS) reduction and nitrification), secondary clarification, tertiary treatment (which consists of high rate clarification with chemical addition followed by cloth disk filters), disinfection via chlorination, and dechlorination by sodium bisulfite. Solids handling at the RWQCF consists of gravity belt thickening, two-stage anaerobic digestion via acid phase and methane phase digesters, and sludge drying beds. Biosolids are beneficially reused for land application to farmland and co-compost.

Since the North Valley Program was implemented, the City no longer discharges any effluent. All of the RWQCF effluent is used as recycled water either within the City's service area or by the North Valley Program. Prior to the implementation of the North Valley Program, final effluent from the RWQCF that was not recycled within the City's service area was discharged to the San Joaquin River. The pipeline and pump station have been added to the North Valley Regional Recycled Water Program (NVRRWP) and the 36-inch diameter outfall facilities remain as a backup discharge location to the San Joaquin River.

Wastewater facilities also include a 37.2 MG earthen storage basin, allowing the emergency diversion and storage of flow when necessary. Constructed with a 6-inch bentonite liner on the bottom and sides, the basin can be used to store either excess wet weather influent, or effluent that does not meet permit requirements.

6.2.5.2.1 Wastewater Collected Within Service Area

Table 6-4 (DWR Table 6-2) summarizes information on collection of wastewater within the City's service area. As noted above, wastewater generated outside the City's service area, including wastewater from Community Service Districts of Keyes and Denair and the City of Ceres, is treated within the service area.

Table 6-4. Wastewater Collected Within Area in 2020 (DWR Table 6-2 Retail)

☐	There is no wastewater collection system. The supplier will not complete the table below.
	Percentage of 2020 service area covered by wastewater collection system *(optional)*
	Percentage of 2020 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
City of Turlock	Metered	3,909	City of Turlock	Turlock Regional Water Quality Control Facility	Yes	No
Total Wastewater Collected from Service Area in 2020:		3,909				

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3* **.**

NOTES: Volumes are in MG.
Wastewater generated outside the City's service area, including wastewater from Community Service Districts of Keyes and Denair and the City of Ceres, is treated within the City's service area.

6.2.5.2.2 Wastewater Treatment and Discharge Within Service Area

Table 6-5 (DWR Table 6-3) identifies the volume of treated wastewater either recycled or disposed of within the service area.

Table 6-5. Wastewater Treatment and Disposal Within Area in 2020 (DWR Table 6-3 Retail)

☐	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)* [2]	Method of Disposal ***Drop down list***	Does This Plant Treat Wastewater Generated Outside the Service Area? ***Drop down list***	Treatment Level ***Drop down list***	**2020 volumes** [1]				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Turlock Regional Water Quality Control Facility	Harding Drain Bypass Pipeline	San Joaquin River		River or creek outfall	Yes	Tertiary	4,246	776	298	3,172	0
						Total	4,246	776	298	3,172	0

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.
[2] If the **Wastewater Discharge ID Number** is not available to the UWMP preparer, access the SWRCB CIWQS regulated facility website at https://ciwqs.waterboards.ca.gov/ciwqs/readOnly/CiwqsReportServlet?inCommand=reset&reportName=RegulatedFacility

NOTES: Volumes are in MG.

6.2.5.3 Recycled Water System Description

Although the City has operated an established recycled water program since 1990, it does not operate a large pipeline distribution system, and has instead opted to evaluate, design, and build facilities on a per connection basis.

Currently, the City provides up to 2.0 MGD of recycled water to the Walnut Energy Center (WEC) Co-Generation Facility (owned by TID) for cooling, and an average of 0.10 MGD to the City's Pedretti Sports Fields for landscape irrigation.

The remaining treated water is utilized by the North Valley Program, which is used for agricultural irrigation.

6.2.5.4 Potential, Current, and Projected Recycled Water Uses

Approved uses of disinfected tertiary recycled water may include, but are not limited to: agricultural irrigation, water for industrial purposes (including process cooling water), residential landscape irrigation, construction water, and other uses as approved by the City identified within Title 22 California Code of Regulations.

Table 6-6 (DWR Table 6-4) shows the current and projected recycled water direct beneficial uses within the service area.

Table 6-7 (DWR Table 6-5) shows a comparison between the recycled water use that was projected in the 2015 UWMP for 2020 and the actual water use for 2020. Actual recycled water use for landscape irrigation (Pedretti Sports Fields) and energy production (Walnut Energy Center Cooling Tower) was much lower than projected in the 2015 UWMP while recycled water use for agricultural irrigation was more than projected in the previous UWMP because of the implementation of the North Valley Program. The recycled water used at the Pedretti Sports Fields was much less than previously projected since the City's non-potable wells can also provide irrigation water to these fields. Now that the North Valley Program is online, the City reserves the recycled water for that program while only using the recycled water to supplement the non-potable well water for irrigation of the Pedretti Sports Fields when needed.

Table 6-6. Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4 Retail)

☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.
Name of Supplier Producing (Treating) the Recycled Water:	Turlock Regional Water Quality Control Facility (RWQCF)
Name of Supplier Operating the Recycled Water Distribution System:	City of Turlock
Supplemental Water Added in 2020 (volume) *Include units*	None
Source of 2020 Supplemental Water	N/A

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units*[1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020[1]	2025[1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Agricultural irrigation	Transported by North Valley Regional Recycled Water Pipeline (NVRRWP) for agricultural irrigation		Transported by NVRRWP for agricultural irrigation	Tertiary	3,172	3,755	4,337	4,919	5,502	
Landscape irrigation (exc golf courses)	Irrigation at Pedretti Sports Fields		Irrigation at Pedretti Sports Fields	Tertiary	1	1	1	1	1	
Golf course irrigation										
Commercial use										
Industrial use										
Geothermal and other energy production	Walnut Energy		Walnut Energy	Tertiary	297	301	301	301	301	
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)	Recycled Water Filling Stations		Recycled Water Filling Stations	Tertiary	0	Varies	Varies	Varies	Varies	
				Total:	3,470	4,056	4,639	5,221	5,804	
				2020 Internal Reuse	0					

[1] ***Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in MG.
The City began its recycled water filling station in 2018. The City has not set a limit on the amount of recycled water that can be trucked off-site other than 300 gallons per vehicle per trip. The City plans on conducting more outreach to promote the recycled water filling station program and, therefore, is not sure what volume of recycled water to assume will be needed for this program in future years.

Table 6-7. 2015 Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5 Retail)

☐	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below. If recycled water was not used in 2020, and was not predicted to be in 2015, then check the box and do not complete the table.

Beneficial Use Type	2015 Projection for 2020 [1]	2020 Actual Use [1]
Insert additional rows as needed.		
Agricultural irrigation	0	3,172
Landscape irrigation (exc golf courses)	18	1
Golf course irrigation	0	0
Commercial use	0	0
Industrial use	0	0
Geothermal and other energy production	471	297
Seawater intrusion barrier	0	0
Recreational impoundment	0	0
Wetlands or wildlife habitat	0	0
Groundwater recharge (IPR)	0	0
Reservoir water augmentation (IPR)	0	0
Direct potable reuse	0	0
Other (Description Required)	Varies	0
Total	489	3,470

[1] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.

NOTE: Volumes in MG.
The "Other" beneficial use type is the City's recycled water filling stations.

6.2.5.5 Actions to Encourage and Optimize Future Recycled Water Use

The City has many plans for encouraging and expanding future recycled water use in its service area. These plans are discussed in the following sections and summarized in Table 6-8 (DWR Table 6-6).

6.2.5.5.1 Expansion of Recycled Water to TID

As part of SRWA's Water Sales Agreement with TID, beginning in 2022, SRWA will provide 2,000 AFY (652 MG per year) of recycled water from the City to TID for agricultural irrigation purposes.

6.2.5.5.2 Outreach for Recycled Water for Residential and Commercial Filling Stations

In 2018, as an addition to the recycled water distribution system, recycled water was made available to commercial and residential users through an on-site filling station at the City's RWQCF. Users can fill properly identified recycled water tanks in their vehicle for appropriate uses off-site, up to a maximum volume of 300 gallons per visit. To prevent cross-contamination, all portable recycled water containers are prohibited from being connected to any potable water supply system. Additionally, commercial users are required to maintain a logbook detailing date of delivery, name and address of delivery/recipient, type

of use, volume delivered/used and intended use of water delivered. The quantity of recycled water provided by this filling station has not been estimated but is assumed to be negligible.

Currently, the City plans to conduct more outreach regarding the availability of recycled water and encouraging the use of it in an effort to reduce the use of drinking water. The City will also offer recycled water to contractors who may be interested in obtaining a hydrant meter for construction use. There are no planned implementation dates for these actions, therefore they are not included in Table 6-8 (DWR Table 6-6).

Table 6-8. Methods to Expand Future Recycled Water Use (DWR Table 6-6)

☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
Recycled Water to TID[(a)]	Agriculture Irrigation	2022	652
		Total	652
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volumes are in MG. (a) These actions will result in recycled water supplied to areas outside of the City's service area.			

6.2.6 Desalinated Water

Because the City is not located in a coastal area, seawater desalination is not applicable to the City and is not currently considered technically or economically feasible. In addition, the groundwater that underlies the City is not brackish in nature and does not require desalination. As such, the City does not have any plans to incorporate desalinated or treated brackish water into its supply portfolio.

6.2.7 Water Exchanges and Transfers

Currently there is no alternative potable water supply source in the area that would lend itself to transfer or exchange opportunities. Although there are three small potable water systems within the City's limits (owned and operated by the City of Modesto), these systems do not have excess capacity and already use the City of Turlock as a backup water source.

Although the City has entered into a water sales agreement for TID surface water, the infrastructure is not in place at this time. Additionally, because TID's currently available irrigation water is designated for agricultural use, there are practical and legal issues to consider if an exchange or transfer were to occur.

6.2.8 Future Water Projects

As stated in Section 6.1, as a member of the SRWA, the City will be able to purchase up to 3,650 MG per year (10 MGD) of TID surface water starting in 2023 when the RSWSP is operational.

In 2020, the SRWA awarded a contract for design and construction of a WTP, raw water pump station, and transmission pipeline to provide surface water from TID to the City for M&I use. Water will be released from the Don Pedro Reservoir, diverted from the Tuolumne River at an existing infiltration gallery, and pumped to the WTP by TID. It is currently anticipated that TID water will be available to the City by 2023. Constraints and reliability of the project water are further discussed in Chapter 7. A summary of the City's expected future water supply programs is provided in Table 6-9 (DWR Table 6-7).

Table 6-9. Expected Future Water Supply Projects or Programs (DWR Table 6-7 Retail)

☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.
	Provide page location of narrative in the UWMP

Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
Stanislaus Regional Surface Water Supply Project	Yes	Stanislaus Regional Water Authority		2023	All Year Types	3,650

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in MG.

6.2.9 Summary of Existing and Planned Sources of Water

The City's current and planned sources of water can be summarized as such:

- The City is currently contracted to purchase 3,650 MGY (10 MGD) of TID surface water
- The City maintains 19 active, potable groundwater wells
- The City neither currently uses nor plans to use surface water that is not mentioned above
- The City maintains a series of stormwater detention basins that contribute to groundwater recharge
- The City currently utilizes and has future plans to expand recycled water usage
- The City neither currently uses nor plans to use desalinated water
- The City neither currently exchanges or transfers nor plans to exchange or transfer water with other water systems

The actual potable (2020) water supplies for the City are summarized in Table 6-10(DWR Table 6-8) and the actual non-potable water supplies are summarized in Table 6-11 (DWR Table 6-8).

Table 6-10. Water Supplies – Actual Potable (DWR Table 6-8 Retail)

Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Groundwater (not desalinated)	City's domestic supply wells	6,773	Drinking Water	
	Total	6,773		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Volumes are in MG.				

Table 6-11. Water Supplies - Actual Non-Potable (DWR Table 6-8 Retail)

Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times.These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Recycled Water		3,474	Recycled Water	
Other	Park Wells	445	Other Non-Potable Water	
	Total	3,919		0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Volumes are in MG.				

The projected future potable water supplies for the City are summarized in Table 6-12(DWR Table 6-9) and projected future non-potable supplies are summarized in Table 6-13 (DWR Table 6-9).

Table 6-12. Water Supplies - Projected Potable (DWR Table 6-9 Retail)

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025**		**2030**		**2035**		**2040**		**2045** (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Groundwater (not desalinated)		7,441		8,176		8,982		9,869		10,843	
Surface water (not desalinated)		3,650		3,650		3,650		3,650		3,650	
	Total	11,091	0	11,826	0	12,632	0	13,519	0	14,493	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*											

NOTES: Volumes are in MG.
The Stanislaus Regional Water Supply Project will have a maximum surface water capacity of 3,650 MG during the first phase of build-out in mid-2023. However, there is no timeline for the project expansion so the same volume was assumed for future years.

Table 6-13. Water Supplies – Projected Non-Potable (DWR Table 6-9 Retail)

Water Supply	Additional Detail on Water Supply	Projected Water Supply* Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		**2025**		**2030**		**2035**		**2040**		**2045** (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Recycled Water		4,056		4,639		5,221		5,804			
Other		149		149		149		149			
	Total	4,205	0	4,788	0	5,370	0	5,953	0		
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*											
NOTES: Volumes are in MG.											

6.2.10 Special Conditions

6.2.10.1 Climate Change Impacts

As mentioned in Section 6.2.2, the City relies on groundwater as its sole source of drinking water. Land use changes have impacted the overall groundwater basin supply and quality. Combined with below average rainfall, increased agricultural pumping and urbanization, groundwater pumping for urban water has adversely impacted groundwater levels. Climate change impacts include more frequent and more severe droughts in the future in California and specifically in the Central Valley. Increased drought conditions equate to less precipitation and less recharge of the groundwater basins. With the lack of diversified water supplies in the City, it is projected that the groundwater supply may not be adequate to meet water demands and have a greater likelihood of over-drafting the groundwater basins and ultimately impacting the Turlock Subbasin.

The SRWA RSWSP, mentioned in Section 6.2.1, allows the City to manage its land and water resources to adapt to changes in the environment. The role of a conjunctive use system will enable the City to utilize surface water supplies to the maximum extent possible, when surface water is readily available, and rely more on groundwater in periods of drought. The SRWA RSWSP will build long-term resiliency to drought by diversifying the City's water supply portfolio through implementing required infrastructure to access a new surface water source, specifically the Tuolumne River, and reducing the City's reliance on the groundwater basin. The project will increase the emergency, operational, fire flow and potable water storage capacity of the City's system and allow the City to meet SB610 requirements of securing an assured water supply for a minimum of 20 years.

In addition, an alternative analysis was conducted to determine the best practices to manage water resources in the Turlock Subbasin and to adapt to changes in the environment due to climate change and increasing periods of drought, which is contributing to a significant decline in groundwater levels in the Turlock Subbasin. This decline in groundwater is causing surface depressions, higher concentrations of contaminants and may result in increases in salinity if the groundwater levels continue to lower. The proposed project to provide a new water supply source from the Tuolumne River will facilitate groundwater recharge of the basin. Recharging of the groundwater basin is a long-term necessity for all urban and agricultural users of the Turlock Subbasin.

West Turlock and East Turlock Groundwater Sustainability Agencies (total of 17 agencies) are working together to jointly develop a Groundwater Sustainability Plan by 2022 (as described in Section 6.2.2.5), which requires consideration of climate change per SGMA requirements.

6.2.10.2 Regulatory Conditions

Aside from the SRWA RSWSP, the City currently doesn't anticipate any emerging regulatory conditions or future projects that affects characterization of future water supply availability and analysis.

6.2.10.3 Other Locally Applicable Criteria

The City is not aware of any other locally applicable criteria that warrants discussion in this UWMP.

6.3 ENERGY INTENSITY

In accordance with CWC §10631.2(a), the energy intensity to provide water service to the City's customers over a one-year period is presented in this section to the extent that the information is available. The amount of energy to pump and distribute the City's water supply within the system it owns and operates is included.

Water energy intensity is the total amount of energy, calculated on a whole-system basis, used to deliver water to the City's customers for use. Energy intensity is the total amount of energy in kilowatt hour (kWh) expended on a per acre-foot basis to take water from the City's sources to its points of delivery. Understanding the whole-system energy intensity would allow the City make informed strategies in managing its water supplies and operating its system as follows:

- Identifying energy saving opportunities as energy consumption is often a large portion of the cost of delivering water
- Calculating energy savings and greenhouse gas emissions reductions associated with water conservation programs
- Potential opportunities for receiving energy efficiency funding for water conservation programs
- Informing climate change mitigation strategies
- Benchmarking of energy use at each water acquisition and delivery step and the ability to compare energy use among similar agencies

In Table 6-14 (DWR Table O-1C) below, the energy intensity of the City's water service is calculated for 2020. The total energy intensity for the City's water service is 1590.1 kWh/MG.

Table 6-14. Recommended Energy Reporting - Multiple Water Delivery Products (DWR Table O-1C)

Enter Start Date for Reporting Period	1/1/2020			Urban Water Supplier Operational Control					
End Date	12/31/2020			Water Management Process					
			☐ Is upstream embedded in the values reported?						
				Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility
Water Volume Units		*Total Volume of Water Entering Process (volume units)*		*6773*	*0*	*0*	*0*	*6773*	*N/A*
MG			*Retail Potable Deliveries (%)*	*100%*	*0%*	*0%*	*0%*	*100%*	
			Retail Non-Potable Deliveries (%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Wholesale Potable Deliveries(%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Wholesale Non-Potable Deliveries (%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Agricultural Deliveries (%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Environmental Deliveries (%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Other (%)	*0%*	*0%*	*0%*	*0%*	*0%*	
			Total Percentage [must equal 100%]	*100%*	*0%*	*0%*	*0%*	*100%*	*N/A*
			Energy Consumed (kWh)	*10051244.07*	*0*	*0*	*0*	*670643.6*	*10721888*
		Energy Intensity (kWh/vol. converted to MG)		*1484.0*	*0.0*	*0.0*	*0.0*	*99.0*	*N/A*

Water Delivery Type			*Production Volume (volume units defined above)*	*Total Utility (kWh/volume)*	*Net Utility (kWh/volume)*
		Retail Potable Deliveries	*6773*	*1583.0*	*1583.0*
		Retail Non-Potable Deliveries	*445*	*0.0*	*0.0*
		Wholesale Potable Deliveries	*0*	*0.0*	*0.0*
		Wholesale Non-Potable Deliveries	*0*	*0.0*	*0.0*
		Agricultural Deliveries	*0*	*0.0*	*0.0*
		Environmental Deliveries	*0*	*0.0*	*0.0*
		Other	*0*	*0.0*	*0.0*
		All Water Delivery Types	*7218*	*1485.4*	*1485.4*

Quantity of Self-Generated Renewable Energy

kWh

Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*

dropdown menu

Data Quality Narrative:

The City's retail potable water energy bills start on 12/09/2019 and end on 12/09/2020. However, the total volume of water associated with the January to December 2020 time period is recorded from 1/1/2020 to 12/31/2020. The total utility of retail non-potable deliveries is shown as zero because the City does not keep track of the energy usage for the non-potable water facilities.

6.4 REFERENCES

California Department of Water Resources (DWR). 2019. *2018 Critically Overdrafted Basins Map and List*. Accessed at https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118/Critically-Overdrafted-Basins on February 3, 2021.

California Department of Water Resources (DWR). 2020. *Adjudicated Area Annual Reports*. Accessed at https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118/Critically-Overdrafted-Basins on February 3, 2021.

California Department of Water Resources (DWR). 2020. *Basin Prioritization*. Accessed at https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization on February 3, 2021.

Turlock Groundwater Basin Association (TGBA). 2008. *Turlock Groundwater Basin.* Accessed at http://www.turlockgba.org/documents/docs/2008_march_18_turlock%20groundwater%20basin%20groundwater%20management%20plan.pdf on February 3, 2021.

Turlock Subbasin Groundwater Sustainability Agencies. *Turlock Subbasin Fact Sheet.* Accessed at https://static1.squarespace.com/static/5d7933d76e273f425b42ae8b/t/5e39d134c4f4d238763c44fc/1580847415080/turlock-groundwater-fact-sheet_English_final_web.pdf on February 3, 2021.

CHAPTER 7
Water System Reliability

This chapter describes the long-term reliability and vulnerability of the City's water supplies through 2045. It also provides a rational basis for future decision-making related to supply management, demand management, and project development. The City's planned and implemented water management tools for increasing the reliability of water supplies are also addressed. In assessing the City's water supply reliability, a comparison of projected water supplies and projected water demand in normal, single-dry, and five consecutive dry years is provided. A DRA that enables the City to evaluate its risk under a severe drought period lasting for the next five consecutive years in included in this chapter. Other short-term reliability planning that may require immediate action, such as a short-term drought or a catastrophic supply interruption, is addressed in Chapter 8.

Where applicable, each section in this chapter addresses groundwater, surface water, and recycled water in a separate sub-section. The groundwater sub-section refers to the City's current supplies from the Turlock Subbasin, the surface water sub-section refers to the SRWA's water sales agreement of Tuolumne River water from TID (as described in Chapter 6), and the recycled water sub-section refers to the current and future recycled water produced from the Turlock RWQCF.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

The City's water supply reliability reflects its ability to meet the needs of its water customers with its various water supplies under varying conditions. Details from Chapter 4, which describes the City's water demand characteristics, and Chapter 6, which describes the City's water supply characteristics, are incorporated in this chapter to conduct the assessment. Conclusions from this assessment affect the City's water management decisions.

7.1.1 Constraints on Water Sources

The City's water supply currently consists of local groundwater and recycled water.

The types of constraints on the City's water supplies include environmental, regulatory, and water quality. The factors and constraints specific to each of the City's individual water supplies are described in Chapter 6.

This section addresses potential effects on the reliability of water supply sources through the year 2045.

Constraints on water resources for specific communities are addressed by CWC section 10631(c)(2) and section 10634, which state the following:

> *CWC 10631(c)(2) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand in management measures, to the extent practicable.*
>
> *CWC 10634 The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.*

The City has (or will have) the following sources of water supply:

- Treated surface water
- Groundwater
- Recycled water

The major constraints on each of these supplies are discussed in the following sections:

- Environmental constraints
- Legal constraints
- Water quality constraints

7.1.1.1 Environmental Constraints

Environmental factors can limit the reliability of surface water supplies in the event that dry year supply reductions are necessary to maintain the health of aquatic species and the environment in general.

Given the fragile state of many of California's ecosystems, environmental concerns inevitably arise during the water planning process. The delicacy of these systems can, in turn, cause a lack of supply due to the enforcement of environmental legislation. The recent legal actions involving the Endangered Species Act in the Delta are an example of the clash between environmental concerns and water supply. To ensure reliability of the City's water supply, during unexpected environmental constraints that may be placed on TID's water rights, the City will use local groundwater in place of surface water.

A further concern is the potential for overdraft and diminished water quality of the Turlock Subbasin, which prompted the City to seek an alternative primary water supply (i.e., surface water). However, for the purposes of this UWMP, the concern of overdraft is considered a long-term groundwater basin issue rather than a supply inconsistency. The TGBA GMP includes actions to address cooperative management of groundwater to prevent further overdraft and the new TGBA SGMA process, of which the City is taking part, will address overdraft prevention in its GSP in 2022.

7.1.1.2 Legal Constraints

Legal issues, including place of use and water rights issues, are not expected to limit supply reliability for the City.

7.1.1.2.1 Groundwater

The Turlock Subbasin is not an adjudicated groundwater basin, as defined by DWR. Therefore, there are no defined legal pumping rights for the City, and there are no legal constraints on groundwater pumping. In California, the State is not currently authorized by the Water Code to manage groundwater. California landowners have a correlative right to extract groundwater for beneficial use. As a municipal water supplier, the City acts on behalf of the overlying landowners, who rescind their water rights to the City when the land is annexed into the City.

The implementation of SGMA, described in Section 6.2.2 of Chapter 6, has introduced provisions whereby the state can step in to manage a groundwater basin if a local GSA does not properly implement sustainable groundwater management. While the information included in this section is current as of early 2021, conditions may change between the writing of this UWMP and the adoption of the 2020 UWMP.

7.1.1.2.2 Surface Water

Through the SRWA, the City is purchasing Tuolumne River water from TID. TID has both pre- and post-1914 water rights and, through a Water Sales Agreement with TID, SRWA will have access to one or both of these water rights. Use of the post-1914 water rights is dependent on a State Water Resources Control Board (State Water Board) action to both change the point of diversion and modify the use from agricultural to M&I supply. One outstanding protest remains on this water right action from the U.S. Bureau of Reclamation (Reclamation). Reclamation is claiming that their operations may be harmed by the post-1914 water transfer. TID's hydraulic modeling does not support Reclamation's claim and TID is working diligently with the State Water Board to get this protest dismissed.

TID's pre-1914 water right is not subject to State Board jurisdiction. Because the pre-1914 water right is not jurisdictional this water can be used right away without constraint and is not subject to cutbacks. In the Water Sales Agreement between SRWA and TID (see Appendix F) it does say that SRWA supplies will be cutback by the same percentage as TID customers are cutback. So, for example, if farmers receive 75-percent of their allocation from TID then SRWA receives 75-percent of their allocation.

Additionally, the Federal Energy Regulatory Commission (FERC) operations license for the Don Pedro Reservoir, which is used to store TID's Tuolumne River surface water, expired in April 2016. TID is going through a FERC relicensing agreement process and the terms of that agreement are not yet known but have the potential to impact TID operations.

7.1.1.2.3 Recycled Water

As described in Chapter 6, the City plans to greatly enhance the use of recycled water produced at the City's RWQCF. Future expansion of recycled water facilities must be pursuant to the requirements set forth in its SWRCB Order WQ 2016-0068-DDW (https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2016/wqo2016_0068_ddw.pdf). No major legal issues associated with recycled water facility expansion are anticipated.

7.1.1.3 Water Quality Constraints

The potential water quality constraints on groundwater, surface water, and recycled water supplies are discussed below.

7.1.1.3.1 Groundwater

The 2016 Hydrogeologic and Water Quality Assessment Report identified several groundwater constituents that may lead to groundwater quality concerns in the basin. Contaminants in the area include: salinity, arsenic, hexavalent chromium, nitrates, fuel, solvents, and synthetic organic compounds. Of the above contaminants, those with the highest potential for future impacts (i.e. salinity, arsenic, hexavalent chromium, and nitrates) are further discussed below.

7.1.1.3.1.1 Salinity

Salinity has been identified as a source of contamination in the Turlock Groundwater Sub-Basin. The DDW recommended maximum contaminant level (MCL) of salinity is 500 milligrams per liter (mg/L), measured in total dissolved solids (TDS). The City reported an average groundwater salinity value of 282 (mg/L) in its drinking water supply in its 2016 Hydrogeologic and Water Quality Assessment Report. One of the City's wells slightly exceeded the recommended MCL at 510 mg/L and is on "stand-by" status. Salinity appears to be increasing; however, the average levels are within the recommended MCL.

It should be noted, however, that several other water suppliers in the area are members of the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) program, with the stated objective to organize, facilitate and fund efforts needed for the efficient management of salinity in the Central Valley. Although the City is not currently a member of CV-SALTS, it does participate through its membership with Central Valley Clean Water Association (CVCWA). The City will continue to monitor salinity levels in the basin and act accordingly.

7.1.1.3.1.2 Arsenic

Arsenic has been identified as a source of contamination in the Turlock Groundwater Subbasin. The City has had several wells with arsenic concentrations slightly over the MCL value of 10 micrograms per liter (µg/L). These wells were removed from active status, with one on "standby" status, which is only available in the event of an emergency. In its 2019 Annual Water Quality Report, the City indicated an average arsenic concentration of 8.53 µg/L in its drinking water supply. The City continues to regularly monitor arsenic contamination in its water supplies.

7.1.1.3.1.3 Hexavalent Chromium

Hexavalent Chromium (Cr^{6+}) has been identified as a source of contamination in the Turlock Groundwater Sub-Basin. In its 2016 Hydrogeologic and Water Quality Assessment Report, the City reported an average Cr^{6+} value of 5.6 µg/L, which was below the MCL value in effect at that time of 10 µg/L. It should be noted that, as of September 2017, by court order, the MCL for Hexavalent Chromium is no longer in effect. The state will likely establish a new MCL for Hexavalent Chromium but for the time being, no MCL for this constituent is currently in effect.

7.1.1.3.1.4 Nitrates

Nitrates have been identified as a source of contamination in the Turlock Groundwater Subbasin. While nitrate in irrigation water is not a major concern for most crops, high concentrations of nitrate in groundwater is a concern for potable water supplies.

Historically, the City has reported nitrate concentrations as mg/L nitrate (as Nitrate, NO_3), however as of January 1, 2016, the SWRCB has mandated that all nitrate results be reported in the form of mg/L nitrate (as Nitrogen, N). The SWRCB reports that this change does not represent a functional change in the MCL, but is to reduce confusion and ease reporting of results to U.S. EPA. The MCL for nitrate (as Nitrate, NO_3) in public drinking water supplies is 45 mg/L and for nitrate (as Nitrogen, N) is 10 mg/L.

In its 2016 Hydrogeologic and Water Quality Assessment Report, the City reported an average nitrate concentration of 26 mg/L (as Nitrate, NO_3). Under the new reporting methodology, this represents an average concentration of 5.8 mg/L nitrate (as Nitrogen, N). In its 2019 Annual Water Quality Report, the City indicated an average nitrate concentration of 6.17 mg/L (as Nitrogen, N) in its drinking water supply. These values, irrespective of reporting methodology, are still well below the MCL, and show that nitrate concentrations are generally within a safe range and should not pose a problem in the near future. It should be noted, however, that the City has closed several wells due to measured nitrate levels exceeding the MCL. The City continues to regularly monitor nitrate contamination in its water supplies.

7.1.1.3.1.5 1,2,3-TCP

On December 14, 2017 the State Water Resources Control Board's Division of Drinking Water established an MCL and monitoring frequencies for 1,2,3-trichloropropane (1,2,3-TCP) that went into effect January 2018. Due to the newly adopted MCL, the City has three wells that have exceeded the allowable limits for the contaminant. As a result, the City is required to increase monitoring frequencies for 1,2,3-TCP, develop a corrective action plan, and distribute a public notice to all drinking water customers every three months until the wells are no longer producing levels of 1,2,3-TCP above the MCL. Testing results from November 2020 show the City's water system exceeds the MCL of 0.005 µg/L (micrograms per liter). The average level of 1,2,3-TCP for the period of December 2019 – November 2020 for three out of the eighteen drinking water wells was 0.01941 µg/L, ranging from 0.0059 µg/L to 0.0431 µg/L.

The City is in the process of addressing the 1,2,3-TCP MCL exceedance problem by continuing to evaluate water quality in its aquifers. Wells drawing water from an aquifer with unacceptable water quality will be modified and receive wellhead treatment as necessary.

7.1.1.3.2 Surface Water

According to the 2013 Don Pedro Water Quality Assessment (http://www.donpedro-relicensing.com/Documents/P-2299_DP_ISR_W-AR-01_WtrQltyAssmt_StdyRept_130117.pdf) the Tuolumne River water has low specific conductivity and hardness, is prone to acidification, and potential sources of local contamination are limited. The majority of analytes were reported as either non-detectable or just above reporting limit concentrations. Further, there does not appear to be a pattern of increasing chemical concentrations from upstream to downstream of Don Pedro Dam, implying that contamination due to retention in the reservoir is not an issue.

7.1.1.3.3 Recycled Water

All water produced or intended for use as recycled water within the City's limits, including water produced from the RWQCF, meets all regulations set forth by Title 22 of the California Division of Drinking Water's 2018 update of Regulations Related to Recycled Water.

7.1.2 Year Type Characterization

Water supply reliability is assessed based on the characteristics of the City's water supplies during various water year types which are provided in this section.

7.1.2.1 Types of Years

CWC §10635(a) requires that the City's water service reliability be assessed based on the following three (3) water year types:

1. **Normal Year** - This condition represents the water supplies the City considers available during normal conditions. This could be a single year or averaged range of years in the historical sequence that most closely represents the median or average water supply available. The year 2014, which had water use closest to the average water use in the past 10 years, represents a Normal Year for the City. This year represents the City's typical year where all of its combined water supply sources are available to meet demands.

2. **Single Dry Year** – This condition represents the year with the lowest water supply availability to the City. The year 2015, which had the lowest water use in the past 25 years, represents the Single Dry Year for the City.
3. **Five-Consecutive-Year Drought** – This condition represents a five-consecutive year dry period such as the lowest average water supply available to the Supplier for five years in a row since 1903. The years 2015 through 2019, the five-year period with lowest water use in recent past, represent the Five-Consecutive-Year Drought years for the City.

The basis of the water year data is provided in Table 7-1 (DWR Table 7-1) for the City's supply.

Table 7-1. Basis of Water Year Data (DWR Table 7-1)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	% of Average Supply
Average Year	2014	6,363	100%
Single-Dry Year	2016	5,380	85%
Consecutive Dry Years 1st Year	2015	5,562	87%
Consecutive Dry Years 2nd Year	2016	5,380	85%
Consecutive Dry Years 3rd Year	2017	6,026	95%
Consecutive Dry Years 4th Year	2018	5,979	94%
Consecutive Dry Years 5th Year	2019	6,080	96%

Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES:
Volumes are in MG.
Volume available for average year reflects the 10-year average from 2011-2020. The actual water usage in 2014 was actually 6,565 MG but 2014 was the year with usage closest to the average.
In all year types, groundwater is assumed to be sufficient to supply all demand.

7.1.3 Water Service Reliability

In this section, the City's Normal, Single-Dry, and Five-Consecutive-Year Drought projected supplies and demands are integrated and compared. Projected water demands are detailed in Chapter 4 and projected water supplies are detailed in Chapter 6. Under the various water year types, the total annual water supply sources available to the City are compared to the total annual projected water use from 2025 to 2045 (for potable and 2025 to 2040 for non-potable water) in five-year increments. For the water supply and demand assessment, demand projections for the period of 2025 through 2040 and 2045 are taken from Table 4-7 and 4-8 (DWR Table 4-3) in Chapter 4 of this document. The supply projections are assumed to equal the sum of the surface water, groundwater, and recycled water supplies summarized above.

7.1.3.1 Water Service Reliability – Normal Year

The availability of the City's potable supplies in Normal Years are described in detail in Chapter 6 and summarized below:

- 7,441 MG (year 2025) – 10,843 MG (year 2045) of groundwater from the City's wells in the Turlock Subbasin; and
- 3,650 MG (year 2025-2045) of surface water from the Stanislaus Regional Water Supply Project.

The City's expected use of non-potable water in Normal Years is described in Chapter 4 and 6 and summarized below:

- 4,056 MG (year 2025) – 5,804 MG (year 2040) of recycled water from the City's RWQCF; and
- 149 MG (year 2025) – 149 MG (year 2040) of park non-potable well water.

The City's Normal Year demands are described in detail in Chapter 4 and 6 and are summarized below:

- 7,441 MG (year 2025) – 10,843 MG (year 2045) of potable water demands from the City's projected population of 81,629 (year 2025) – 118,939 (year 2045) and associated residential and CII accounts; and
- 4,205 MG (year 2025) – 5,953 MG (year 2040) of non-potable water demand from various sources.

As shown in Table 7-2 and Table 7-3 (DWR Table 7-2), the City's Normal Year supplies for both potable and non-potable water are adequate to meet projected Normal Year demands. The City's primary potable water sources in the future will be surface water from the Tuolumne River and local groundwater. Groundwater supply will be used conjunctively with the surface water supplies to meet increased water demands primarily in the summer months. If necessary, the City plans to meet any additional demand through increased groundwater pumping, ensuring the City will maintain 100 percent supply reliability. In short, no potable water supply shortage is anticipated during Normal Years through 2045. Likewise, no non-potable water supply shortage is anticipated in Normal Years through 2040 as the ample supply of treated wastewater is more than enough to meet all non-potable water demands.

Table 7-2. Normal Year Supply and Demand Comparison – Potable (DWR Table 7-2)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	11,091	11,826	12,632	13,519	14,493
Demand totals *(autofill from Table 4-3)*	7,441	8,176	8,982	9,869	10,843
Difference	3,650	3,650	3,650	3,650	3,650
NOTES: Volumes are in MG. In all year types, if potable demand cannot be met from Surface Water alone, it is assumed that groundwater will supply all remaining demand. The City expects 3,650 MG of surface water from the Stanislaus Regional Water Supply Project will be available by 2023.					

Table 7-3. Normal Year Supply and Demand Comparison – Non-Potable (DWR Table 7-2)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	4,205	4,788	5,370	5,953	
Demand totals *(autofill from Table 4-3)*	4,205	4,788	5,370	5,953	
Difference	0	0	0	0	
NOTES: Volumes are in MG.					

7.1.3.2 Water Service Reliability – Single Dry Year

The City's water supplies and demands for a Single Dry Year are assumed to be equivalent to those for a Normal Year.

As shown in Table 7-4 and Table 7-5 (DWR Table 7-3), the City's Single Dry Year supplies are adequate to meet projected Single Dry Year demands. If necessary, the City plans to meet any additional potable demand through increased groundwater pumping, ensuring that the City will maintain 100 percent supply reliability. If there is any disruption in surface water supply, the City will increase groundwater pumping to compensate.

No non-potable water supply shortage is anticipated in Normal Years through 2040 as the ample supply of treated wastewater will be more than enough to meet all non-potable water demands.

Table 7-4. Single Dry Year Supply and Demand Comparison - Potable (DWR Table 7-3)

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	11,091	11,826	12,632	13,519	14,493
Demand totals*	7,441	8,176	8,982	9,869	10,843
Difference	3,650	3,650	3,650	3,650	3,650
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Volumes are in MG. In all year types, if potable demand cannot be met from Surface Water alone, it is assumed that groundwater will supply all remaining demand. The City expects 3,650 MG of surface water from the Stanislaus Regional Water Supply Project will be available by 2023.					

Table 7-5. Single Dry Year Supply and Demand Comparison – Non-Potable (DWR Table 7-3)

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	4,205	4,788	5,370	5,953	
Demand totals*	4,205	4,788	5,370	5,953	
Difference	0	0	0	0	
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Volumes are in MG.					

7.1.3.3 Water Service Reliability – Five Consecutive Dry Years

The City's water supplies and demands for five consecutive dry years are assumed to be equivalent to those for a Normal Year and Single Dry Year. To be conservative, the City has assumed that demands would remain constant between normal, single dry, and a five consecutive dry year period. It is likely that by the third, fourth, and fifth year of an extended dry period, customers would ramp up conservation activities and effectively reduce the demands below normal year conditions. The City's five consecutive dry year potable supply is anticipated to be 14,493 MG from combined surface water and groundwater through 2045.

As shown in Table 7-6 and Table 7-7 (DWR Table 7-4), the City's five consecutive dry year supplies are adequate to meet projected five consecutive dry year demands. If necessary, the City plans to meet any additional potable demand through increased groundwater pumping and water conservation, ensuring that the City will maintain 100 percent supply reliability. Additionally, if there is any disruption in surface water supply, the City will increase groundwater pumping to compensate. In this scenario, potable supplies will remain reliable but water quality consistency may suffer as water from the City's native groundwater wells will likely vary in quality noticeably from the surface water. However, this aesthetic water quality issue is considered acceptable in an extreme scenario such as a 5-year drought.

If necessary, the City may also initiate a water shortage emergency stage to extend available water supplies, as described in Chapter 8.

Table 7-6. Five Consecutive Dry Years Supply and Demand Comparison - Potable (DWR Table 7-4)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	11,091	11,826	12,632	13,519	14,493
	Demand totals	7,441	8,176	8,982	9,869	10,843
	Difference	3,650	3,650	3,650	3,650	3,650
Second year	Supply totals	11,091	11,826	12,632	13,519	14,493
	Demand totals	7,441	8,176	8,982	9,869	10,843
	Difference	3,650	3,650	3,650	3,650	3,650
Third year	Supply totals	11,091	11,826	12,632	13,519	14,493
	Demand totals	7,441	8,176	8,982	9,869	10,843
	Difference	3,650	3,650	3,650	3,650	3,650
Fourth year	Supply totals	11,091	11,826	12,632	13,519	14,493
	Demand totals	7,441	8,176	8,982	9,869	10,843
	Difference	3,650	3,650	3,650	3,650	3,650
Fifth year	Supply totals	11,091	11,826	12,632	13,519	14,493
	Demand totals	7,441	8,176	8,982	9,869	10,843
	Difference	3,650	3,650	3,650	3,650	3,650
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Volumes are in MG. In all year types, if potable demand cannot be met from Surface Water alone, it is assumed that groundwater will supply all remaining demand.						

Table 7-7. Five Consecutive Dry Years Supply and Demand Comparison – Non-Potable (DWR Table 7-4)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	4,205	4,788	5,370	5,953	
	Demand totals	4,205	4,788	5,370	5,953	
	Difference	0	0	0	0	
Second year	Supply totals	4,205	4,788	5,370	5,953	
	Demand totals	4,205	4,788	5,370	5,953	
	Difference	0	0	0	0	
Third year	Supply totals	4,205	4,788	5,370	5,953	
	Demand totals	4,205	4,788	5,370	5,953	
	Difference	0	0	0	0	
Fourth year	Supply totals	4,205	4,788	5,370	5,953	
	Demand totals	4,205	4,788	5,370	5,953	
	Difference	0	0	0	0	
Fifth year	Supply totals	4,205	4,788	5,370	5,953	
	Demand totals	4,205	4,788	5,370	5,953	
	Difference	0	0	0	0	

***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Volumes are in MG.

7.2 DROUGHT RISK ASSESSMENT

CWC §10635(b) requires that the City prepare a DRA, which evaluates the risk of a severe drought occurring for the next five consecutive years (2021-2025). Supply conditions for the DRA are based on the five driest consecutive years on record, with adjustments to consider plausible changes in climate, regulations, and other locally applicable criteria. This analysis requires the City to consider management of its water supplies in relation to variations in customer water use. It also provides the City the opportunity to use its WSCP response actions described in Chapter 8 and understand the degree of response necessary in managing its water supplies. This evaluation may help identify risks and assist in planning for steps to address them.

This section reviews the data and methods used to define the DRA water shortage condition and evaluates each water source's reliability under the proposed drought condition. Finally, total water supplies during the five-year drought are compared to projected demands, accounting for any applicable supply augmentation or demand reduction measures available to the City.

7.2.1 Data, Methods, and Basis for Water Shortage Condition

The water shortage condition for the DRA is the same as the five-year drought described in Section 7.1.3.3. Since the DRA can be updated outside of the UWMP five-year plan cycle, the narrative description of the data and basis for the water shortage condition is repeated in this section.

To estimate supplies during a five-year drought, it was assumed that 2015 was the first year of a five-year drought. While surface water supplies could be cut back in dry years, it was assumed that groundwater supplies would not be reduced in dry years. Based on the operational yield estimates for the Turlock Subbasin, it was assumed that groundwater supplies could provide up to 7,441 MG, the projected demand in 2025, throughout a five-year drought if necessary to supplement surface water supplies that may be unavailable.

7.2.2 DRA Water Source Reliability

The City's multiple dry year potable supplies include:

- Projected base purchased surface water supplies from SRWA starting in mid-2023 (with 10 percent reduction from Normal Year supplies during 2023 and an additional 10 percent reduction in each successive dry year); and
- Groundwater pumping.

Table 7-8 summarizes the available supplies for each year of the DRA.

Table 7-8. Projected Supplies for Drought Risk Assessment

Supply Source	Available Supply, AFY				
	2021	2022	2023	2024	2025
SRWA[(a)]	0	0	1,643	2,920	2,555
Groundwater[(b)]	7,441	7,441	7,441	7,441	7,441
Total	**7,441**	**7,441**	**9,084**	**10,361**	**9,996**

(a) Surface water supplies are not expected to be available until the second half of 2023. However, due to the drought conditions, it is assumed that the projected supplies from SRWA in 2023 are reduced 10 percent from normal and an additional 10 percent in subsequent dry years.

(b) Based on operational yield estimates for the Turlock Subbasin it is assumed the groundwater supply will not be reduced in dry years.

7.2.3 Total Water Supply and Use Comparison

As shown in Table 7-9 and Table 7-10 (DWR Table 7-5), during a five-year drought beginning in 2021, the City's supplies are adequate to meet both potable and non-potable projected demands through 2025, even without water conservation.

7.3 REGIONAL SUPPLY RELIABILITY

Requirements for water supply and demand assessment are addressed in CWC section 10620(f), which states the following:

> *CWC 10620(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.*

All water consumed by the City, including the future surface water from TID, is under the jurisdiction of the Central Valley Regional Water Quality Control Board, and is therefore considered from local supply sources. No water is imported from other regions, nor does the City anticipate importing water from other regions throughout the UWMP planning period.

Table 7-9. Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b) - Potable (DWR Table 7-5)

2021	Total
Total Water Use - *Potable*	6,674
Total Supplies - *Potable*	7,083
Surplus/Shortfall w/o WSCP Action	409
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	409
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use [Use Worksheet]	6,866
Total Supplies [Supply Worksheet]	7,083
Surplus/Shortfall w/o WSCP Action	217
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	217
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	7,058
Total Supplies [Supply Worksheet]	8,726
Surplus/Shortfall w/o WSCP Action	1,668
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	1,668
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use [Use Worksheet]	7,250
Total Supplies [Supply Worksheet]	10,003
Surplus/Shortfall w/o WSCP Action	2,753
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use [Use Worksheet]	7,441
Total Supplies [Supply Worksheet]	9,638
Surplus/Shortfall w/o WSCP Action	2,197
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	2,197
Resulting % Use Reduction from WSCP action	0%

Table 7-10. Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b) – Non-Potable (DWR Table 7-5)

2021	Total
Total Water Use - Non-potable	4,205
Total Supplies	4,205
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2022	Total
Total Water Use [Use Worksheet]	4,205
Total Supplies [Supply Worksheet]	4,205
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2023	Total
Total Water Use [Use Worksheet]	4,205
Total Supplies [Supply Worksheet]	4,205
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2024	Total
Total Water Use [Use Worksheet]	4,205
Total Supplies [Supply Worksheet]	4,205
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

2025	Total
Total Water Use [Use Worksheet]	4,205
Total Supplies [Supply Worksheet]	4,205
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%

CHAPTER 8
Water Shortage Contingency Plan

This chapter describes the City's WSCP, seismic risk to the City facilities, and WSCP adoption procedures. The WSCP establishes actions and procedures for managing water supply and water demand during water shortages. The WSCP's purpose is to minimize non-essential uses of water and conserve remaining supplies for the benefit of the public.

8.1 WATER SHORTAGE CONTINGENCY PLANNING BACKGROUND

A water shortage may occur due to a number of reasons, such as population growth, climate change, drought, and catastrophic events. Drought, regulatory action constraints, and natural and manmade disasters may occur at any time. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. A WSCP presents how an urban water supplier plans to act in response to an actual water shortage condition and helps prevent catastrophic service disruptions.

In 2018, the California State Legislature enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)) (2018 Water Conservation Legislation), to establish a new foundation for long-term improvements in water conservation and drought planning to adapt to climate change and the resulting longer and more intense droughts in California. The 2018 Water Conservation Legislation set new requirements for water shortage contingency planning. The City's WSCP has been updated to be consistent with these requirements.

8.2 CITY WATER SHORTAGE CONTINGENCY PLAN

The City's WSCP is included in this UWMP as Appendix H. The WSCP describes the City's strategic plan in preparation for and in response to water shortages. The WSCP includes water shortage stages and associated shortage response actions that will be implemented in the event of a water supply shortage. As part of the WSCP, the City's legal authorities, communication protocols, compliance and enforcement, and monitoring and reporting are included. Turlock Municipal Code (TMC) Chapter 6-5 Water Code and Chapter 6-7 Water Conservation and Education supports the City's WSCP actions.

The City intends for its WSCP to be dynamic so that it may assess response action effectiveness and adapt to foreseeable and unforeseeable events. It may also be updated to conform to State legislative and regulatory requirements. The City's WSCP is included as Appendix H so that it may be updated outside of the UWMP preparation process.

When an update to the WSCP is proposed, the revised WSCP will undergo the process described in Section 8.4.

8.3 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

CWC §10632.5(a) requires that the UWMP include a seismic risk assessment and mitigation plan to assess and mitigate the vulnerability of the City's water system. Local Hazard Mitigation Plans (LHMP) may be incorporated in this UWMP to satisfy this requirement if the LHMP addresses seismic risk.

The Stanislaus County LHMP (County LHMP, updated in 2017) addressed seismic risk and is incorporated into this UWMP by reference. It identified risks posed by disasters (including earthquakes) and ways to minimize damage from those disasters. The County LHMP was adopted by Stanislaus County on July 11,

2017 and submitted the Federal Emergency Management Agency (FEMA), which found it in conformance with Title 44 Code of Federal Regulations Part 201.6 Local Mitigation Plans. The County's LHMP is updated periodically. It can be found at www.stanoes.com and is incorporated into this UWMP by reference.

While California experiences hundreds of earthquakes each year, most are below 3.0 on the Richter Scale (i.e., magnitude 3.0) and cause minimal damage. The United States Geological Survey (USGS) roughly defines strong earthquakes (which can cause moderate damage to structures) as measuring greater than 5.0 on the Richter Scale, while major earthquakes measure more than 7.0 on the Richter Scale. Generally, in California, strong earthquakes occur every two to three years, and major earthquakes occur once a decade.

Seismic activity within Stanislaus County has been historically rare, but earthquakes still present a significant risk. As described in the County LHMP, there are no known active faults within the County, though inactive faults are found on the extreme eastern parts of the County and within the Diablo Range. Since 1930, only one earthquake with a magnitude greater than 4.0 has occurred in the County. Nevertheless, USGS estimates more than an 80 percent chance of a strong earthquake occurring within 50 kilometers (31 miles) of the County in the next 50 years. Shaking and aftershocks from nearby earthquakes could damage facilities within the County.

Section Six of the County LHMP identifies earthquake hazard mitigation activities that achieve stated hazard mitigation goals (e.g., minimize loss of life and reduce property damage) and objectives (e.g., continue critical business operations). Mitigation activities from the County LHMP potentially applicable to the City include the following:

- Conduct public outreach about earthquake risk and mitigation activities;
- Integrate LHMP priorities into Capital Improvement Plans and other planning activities; and
- Develop, adopt, maintain, and update a continuity of operations plan.

8.4 WATER SHORTAGE CONTINGENCY PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

The City's WSCP (Appendix H) is adopted concurrently with the City's 2020 UWMP, by separate resolution. Prior to adoption, a duly noticed public hearing was conducted. A hard copy of the WSCP will be submitted to DWR within 30 days of adoption, along with an electronic copy.

No later than 30 days after submittal to DWR, a copy of this WSCP will be available at the City's offices. A copy will also be provided to Stanislaus County. An electronic copy of the WSCP will also be available for public review and download on the City's website.

The City's WSCP is an adaptive management plan. It is subject to refinements as needed to ensure that the City's shortage response actions and mitigation strategies are effective and produce the desired results. When a revised WSCP is proposed, the revised WSCP will undergo the process described in this section for adoption by City Council and distribution to Stanislaus County, the City's customers, and the general public.

8.5 REFERENCES

Stanislaus County Office of Emergency Services (Stanislaus County OES). July 2017. *Local Hazard Mitigation Plan*.

CHAPTER 9
Demand Management Measures

The City implements Demand Management Measures (DMMs) to increase water conservation thereby helping to sustainably manage its water resources. If not mitigated, an increase in water demand and/or changes in water supplies due to climate change and other factors reduce water reliability. The implementation of demand management measures can help improve water service reliability and help meet City and State water conservation goals.

This chapter describes the City's historical and existing water conservation program and status of the implementation of DMMs. The CWC requires that UWMPs include a comprehensive description of historical, current, and projected water conservation programs.

> *CWC 10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:*
>
> *(1) (A) … a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years. The narrative shall describe the water demand management measure that the supplier plans to implement to achieve its water use targets pursuant to Section 10608.20.*
>
> *(B)The narrative pursuant to this paragraph shall include descriptions of the following water demand management measures:*
>
> *(i) Water waste prevention ordinances.*
>
> *(ii) Metering.*
>
> *(iii) Conservation pricing.*
>
> *(iv) Public education and outreach.*
>
> *(v) Programs to assess and manage distribution system real loss.*
>
> *(vi) Water conservation program coordination and staffing support.*
>
> *(vii) Other demand management measures that have a significant impact on water use as measured in gallons per capita per day, including innovative measures, if implemented.*

In previous UWMPs, a substantial amount of data was required to document a water supplier's progress in implementing fourteen specific DMMs. In 2014, Assembly Bill 2067 simplified, clarified, and updated reporting requirements for DMMs. Starting with the 2015 UWMP, focus has turned away from detailed descriptions of each of the fourteen DMMs and has turned to key water conservation measures that are being implemented to achieve compliance with SB X7-7. For retail agencies, the number of DMMs has been reduced from fourteen to six (plus an "other" category). A narrative description of the status of the DMMs and how the DMMs help the water supplier achieve its water efficiency goals are required. Detailed data are not required.

9.1 WATER CONSERVATION PROGRAM OVERVIEW

The City actively promotes water conservation through customer education and other DMMs described in the following sections. The City educates customers through outreach methods such as direct mail, web site alerts, social media outreach, messages on customer bills and school-based education programs that reinforce the need for customers and their families to take prompt action to reduce water use to conserve precious drinking water.

As described in this chapter, the City has an active and comprehensive conservation program that offers a full range of helpful programs for customers to reduce their water use.

9.2 EXISTING DEMAND MANAGEMENT MEASURES FOR RETAIL SUPPLIERS

In this section, the City describes the nature and extent of each demand management measure implemented over the past five years.

9.2.1 Water Waste Prevention Ordinances

Title 6, Chapter 7 of the Turlock Municipal Code (Appendix I), most recently amended by Ordinance No. 1286-CS (June 2021) (Appendix I), contains a water wasting prohibition section that prohibits the wasteful use of water during normal water years. This section prohibits specific water wasting appurtenances (such as "once-through" cooling systems and "slip-n-slides"), general water waste, and requires proper maintenance of water pipes and fixtures to prevent leaks. This City Code is in line with the goals of the California Urban Water Conservation Council (CUWCC) MOU.

9.2.1.1 Implementation Over the Past Five Years

Table 9-1 lists the number of documented water waste violations recorded by the City from 2016 through 2020. As shown, there was a substantial increase in the number of recorded violations from 2016 to 2018, but a dramatic decrease in 2019 and 2020. Although there was a 15.1 percent increase in per capita water use from 2016 with 216 GCPD to 2020 with 249 GPCD, the recorded violations decreased due to the adherence to the water waste prevention ordinances.

Table 9-1. Documented Water Waste Violations[(a)]

	2016	2017	2018	2019	2020
Number of Violations	631	861	1,410	190	223

(a) Written warnings and notices to customers, excludes informal interactions.

For dry year conditions and other water supply shortages, the City has a Water Shortage Contingency Plan (Appendix H) that includes specific water use restrictions. The City's Water Shortage Contingency Plan is further described in Chapter 8.

9.2.1.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by minimizing the nonessential uses of water to increase availability for human consumption, sanitation, and fire protection.

9.2.2 Metering

The City commenced meter-based billing for all its water accounts on January 1, 2011. In conjunction with a thorough public education campaign, the move to meter-based billing has resulted in a significant decrease in water consumption.

The installation of meters appears to have significantly modified customer behavior and is largely responsible for the 20 percent reduction in total City-wide water use from 2007 to 2011. The per capita water use, likewise, declined by 21.6 percent City-wide, 22.65 percent for single family residential and 7.54 percent for multi-family residential, between 2011 and 2015 as customers began receiving and responding to their commodity based monthly water bills.

In addition to motivating water use behavior change in ratepayers, the City's metering program also provides detailed usage information that has helped customers use water more efficiently. For example, the Automatic Meter Reading (AMR) systems installed at schools, religious institutions, City parks and other large, landscaped areas provides near real-time water usage information, empowering the customers with large irrigated landscapes to maximize the efficiency of its watering schedule.

9.2.2.1 Implementation Over the Past Five Years

From 2016 to 2020, the per capita water use increased by 15.1 percent City-wide. However, the per capita water use values from the past five years, as shown in Table 9-2, were still well below the 2010 value of 284 GPCD before the meters were installed.

Table 9-2. Per Capita Water Use Over the Past Five Years

	2016	2017	2018	2019	2020
Per Capita Water Use	216	225	223	225	249

9.2.2.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by providing accurate water use information to the customer and the City.

9.2.3 Conservation Pricing

Municipal Financial Services conducted a water rate and capacity charge study in January 2014. Based on that study, the City adopted rates that went into effect July 1, 2014, and increased every year on January 1st through 2019. In 2017, the City adopted another five-year water rate increase schedule that went into effect March 1st of 2018; where water rates would increase every January 1st. The final water rate increase of that schedule will take effect January 1, 2022. The City's current water rates are included in Appendix J.

The current pricing structure is comprised of three components. The first is the commodity charge, which is the cost of the water supply. Customers are charged per 1,000 gallons of water based on the account type. This component of the pricing structure is what financially incentivizes customers to conserve. The second component of the pricing structure is the capacity charge. This charge accounts for the cost of the meter, operation and maintenance, as well as other facility costs. This charge is based on the meter size. The third component of the pricing structure is the customer charge, which accounts for the cost of mailing and processing bills along with other administrative costs. The customer charge is the same amount regardless of meter size or account type.

9.2.3.1 Implementation Over the Past Five Years

Since the implementation of these rates, water production has declined approximately 15 percent. Overall, with the installation of water meters and the conversion of all customers to meter-based billing, and the watering restrictions currently in place there has been approximately a 17 percent reduction in water use from 2008 to 2020.

9.2.3.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by ensuring water customers pay the true cost of water. Implementation of this DMM will also continue to help adequately fund water system operations and maintenance, including capital repair and replacement programs, and water conservation programs.

9.2.4 Public Education and Outreach

The City has an active public information and outreach program. This program consists of distributing information to the public through a variety of methods, such as utility billing publication inserts, press releases via radio and newspaper, school curriculum, educational flyers, commercials on television, social media outreach, and water conservation tips and videos on the City's webpage.

9.2.4.1 Implementation Over the Past Five Years

Since 2007, the City has implemented an aggressive and prominent environmental stewardship program known as "Go Green Week." The program is broad but focuses specifically on conservation education. Program components include water use efficiency and conservation, stormwater pollution prevention, recycling, composting, and sanitary sewer overflow prevention. The "Go Green" educational activities related to water conservation over the past nine years include, but are not limited to:

- Website information
- Utility bill inserts
- Press releases
- Print media campaigns/columns
- Local cable TV public information
- Booths at fairs/exhibitions
- Presentation to local service organizations and similar groups

The City's primary school-age public education campaign is the "Go Green Week" program, which engages students in activities that teach the importance of environmentally-responsible behavior. Currently in its thirteenth year, "Go Green Week" is coordinated each year with participating schools in Turlock. Through a partnership of City staff, teachers, administrators, community organizations, and volunteers, students learn about conservation and pollution prevention strategies such as recycling, composting, water conservation and waste reduction. City staff also conduct periodic classroom presentations on water conservation and other environmental issues, as well as provide student tours of the City's wastewater treatment facility.

9.2.4.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by educating water users about the importance of improving water use efficiency and avoiding water waste.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

A water audit is a method of accounting water use throughout a water system to quantify unaccounted for water. Unaccounted for water is the difference between metered production and metered usage on a system-wide basis. With the implementation of meter-based billing for all water accounts, the City is better able to track water losses and unaccounted for water use.

9.2.5.1 Implementation Over the Past Five Years

As a member of the California Water Efficiency Partnership (CalWEP), the City uses AWWA's software to complete an annual Water Audits and Balance Analysis. A copy of the City's 2020 AWWA audit can be found in Appendix K.

In addition to the AWWA water audits, the City's loss prevention program involves leak detection and repair, focusing primarily on areas with a high probability for leakage. Due to the flat nature of the San Joaquin Valley and the shallow depth of the City's water mains, water leaks are detected fairly easily. Utility staff monitor for water leaks as part of their daily operations and respond to calls from customers concerned about potential leaks. Although the City does not perform "formal" pipeline inspections at regular intervals, these "spot check" inspections help contribute to approximately 100 leak repairs per year.

9.2.5.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by identifying sources of water loss quickly so repairs can be made and losses minimized.

9.2.6 Water Conservation Program Coordination and Staffing Support

In line with the CUWCC's MOU, the City has designated staff to actively develop, promote, enforce, and maintain water conservation programs. Currently, two full time employees allot a portion of their time to serve the duties of a Water Conservation Coordinator. These employees are responsible for implementing and monitoring the City's water conservation activities. Further, two twenty hour per week year-round employees assist the conservation coordinator by responding to water complaints, monitoring water waste, and checking for excess landscape water use.

9.2.6.1 Implementation Over the Past Five Years

The effectiveness of this DMM will be evaluated in conjunction with the success of the City's water conservation efforts as a whole. As the City grows and water resources become more limited and expensive, the water conservation programs will gain in importance. As the water conservation program grows, these duties will increase, and additional staffing may be necessary.

9.2.6.2 Implementation to Achieve Water Use Targets

Implementation of this DMM will continue to help the City achieve its water use targets by making implementation of the City's water conservation program a top priority.

9.2.7 Other Demand Management Measures

In addition to the six DMMs described above, the City also implements the following programs:

- Residential Water Survey Program
- Residential High-Efficiency Toilet Rebate Program
- High Efficiency Washing Machine Rebate Program
- Large Landscape Conservation Program
- Conservation for Commercial and Industrial Accounts

These programs are described below.

9.2.7.1 Residential Water Survey Program

The City began implementation of its residential water survey program in 2010. The program was developed by City staff based on training provided by the then CUWCC (now CalWEP) and consists of offering residential water survey kits to the City's customers. The survey kits allow customers to perform a home water audit, gauging how efficient they are with their water use. By performing the audit, the customer is able to identify areas of potential improvement, as well as identify potential leaks. Free water saving devices (low-flow shower heads and faucet aerators) are provided to customers who complete and submit a survey response form.

9.2.7.2 Residential WaterSense Toilet Rebate Program

This program provides incentives for residential customers to replace existing toilets with high efficiency models that meet the EPA's WaterSense specifications. The City offers a rebate of $75 per toilet for the replacement of a 3.6 or greater gallons per flush (gpf) model with one that uses 1.28 gpf or less.

9.2.7.3 High-Efficiency Washing Machine Rebate Program

The City's Municipal Services Department offers a high-efficiency washing machine rebate program which provides financial incentives to qualifying customers who install high-efficiency washing machines in their homes. Rebates for the purchase of high-efficiency clothes washers are available for up to $100 per washer. In addition to the City's rebate, the City's main electrical utility (TID) currently offers a $35 rebate for customers who purchase a high-efficiency clothes washer (Energy Star compliant). These rebates can be combined for additional savings.

9.2.7.4 Large Landscape Conservation Program

Beginning in 2006, the City began monitoring water use of landscape and irrigation customers. This program was further enhanced by the installation of a fixed-based AMR system that allows the City to monitor water consumption on a daily basis. The City has worked with large landscape customers such as the Turlock Unified School District and a number of religious institutions to increase efficiency and reduce overall water use. The City has also installed meters and AMR devices at all City parks and City-owned landscaped areas to ensure efficient landscape irrigation.

9.2.7.5 Conservation for Commercial and Industrial Accounts

Compared to residential customers, the City's commercial, institutional, and industrial (CII) customers have significant economic incentive to conserve water, as CII customers pay for both water and sewer services volumetrically (meter-based). The incentive to conserve is especially strong for those commercial and light industrial customers who do not have a separate landscape water meter, as their monthly sewer charge is based on their water meter reading (which in this case likely includes landscape irrigation water). Since the Regional Board required the City to convert its RWQCF to disinfected tertiary treatment, the City's sewer utility rates are higher than the City's water rates. High volumetric sewer utility rates make conservation appealing to CII facilities, because it reduces the use of metered water and therefore, reduces the volume of sewage.

The City's Environmental Compliance Inspector (ECI) reviews CII water meter readings on a monthly basis, and conducts annual inspections of all significant industrial users. By analyzing meter data and production processes, the City's ECI has been able to reduce water consumption for a variety of CII accounts.

9.3 MEMBERS OF THE CALIFORNIA WATER EFFICIENCY PARTNERSHIP

In 1991 (amended September 16, 1999), an MOU regarding urban water conservation in California was made to formalize an agreement between DWR, water agencies, environmental organizations, and other interested groups to implement Best Management Practices (BMPs) and make a cooperative effort to reduce the consumption of California's water resources. Until 2018, this MOU was administered by the CUWCC. In 2018 the CUWCC was sunset and a new organization, CalWEP, was launched to carry forward the expertise and collaboration established by the CUWCC but with a new name and broader framework.

In August 2009, the City became a member of the CUWCC and in May 2011 submitted its first BMP annual report for 2009-2010 to the Council. The City maintained its membership with CUWCC and CalWEP until 2019. The City rejoined the CalWEP in 2021.

9.4 WATER USE OBJECTIVES (FUTURE REQUIREMENTS)

In 2018, the State Legislature enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)), to establish long-term water conservation and drought planning to adapt to climate change and the associated longer and more intense droughts in California. These two policy bills build on SB X7-7 and set authorities and requirements for urban water use efficiency. The legislation sets standards for indoor residential use and requires DWR, in coordination with the State Water Board, to adopt efficiency standards for outdoor residential use, water losses, and CII outdoor landscape areas with dedicated irrigation meters by October 1, 2021. At the time of preparation of this UWMP, DWR and the State Water Board had not yet adopted water loss standards. Water loss standards for urban retail water suppliers are expected in 2021 along with new standards for indoor and outdoor residential water use. These standards will require urban water retailers to develop agency-wide water use objectives, provide annual reports and update their UWMP.

The State Legislature established indoor residential water use standards as 55 gpcd until January 2025, 52.5 gpcd from 2025 to 2029, and 50 gpcd in January 2030, or a greater standard recommended by DWR and the State Water Board. By June 30, 2022, the State Water Board is anticipated to adopt an outdoor residential use standard, a standard for CII outdoor landscape area with dedicated irrigation meters, and performance measures for CII water uses. At that time, the State Water Board will adopt guidelines and

methodologies for calculating the water use objectives. In accordance with CWC §10609.20(c), the water use objective for urban water retailers will be based on the estimated efficient indoor and outdoor residential water use, efficient outdoor irrigation of CII landscaped areas, estimated water losses, and estimated water use for variances approved by the State Water Board aggregated across the population in its water service area.

By November 1, 2023, and November 1 of every year thereafter, the City will calculate its urban water use objective and actual water use and provide an annual report to the State. By January 1, 2024, the City will prepare an UWMP supplemental incorporating DMMs and other water efficiency standards that it plans to implement to achieve its water use objective by January 1, 2027.

CHAPTER 10
Plan Adoption, Submittal, and Implementation

This chapter provides information regarding the notification, public hearing, adoption, and submittal of the City's 2020 UWMP. It also includes discussion on plan implementation and the process of amending the UWMP and the WSCP.

10.1 INCLUSION OF ALL 2020 DATA

Because 2020 is the final compliance year for SB X7-7, the 2020 UWMPs must contain data through the end of 2020. If the water supplier bases its accounting on a calendar year, the data must be through the end of the 2020 calendar year (December 2020).

As indicated in Section 2.4 of this plan, the City uses a calendar year for water supply and demand accounting, and; therefore this 2020 UWMP includes data through December 2020.

10.2 NOTICE OF PUBLIC HEARING

In accordance with the UWMP Act, the City must provide an opportunity for the public to provide input on this 2020 UWMP and WSCP update. The City must consider all public input prior to its adoption. There are two audiences to be notified for the public hearing; cities and counties, and the public.

10.2.1 Notices to Cities and Counties

The City provided greater than a 60-day notice regarding the preparation of its 2020 UWMP, including the WSCP, to cities and counties in its service area as discussed in Section 2.5 of this plan. In addition, the City provided notices to the following agencies:

- California State University, Stanislaus
- City of Ceres
- City of Hughson
- City of Modesto
- Denair Community Services District
- East Stanislaus Regional Water Management Partnership
- East Turlock Groundwater Sustainability Agency
- Eastside Water District
- Keyes Community Services District
- Merced County Public Works Department
- Merced Irrigation District
- Modesto Irrigation District
- North Valley Regional Recycled Water Program
- Stanislaus Regional Water Authority
- Turlock Groundwater Basin Association
- Turlock Irrigation District
- West Turlock Groundwater Sustainability Agency

The City coordinated the preparation of its UWMP internally, with Stanislaus County, and with the above listed agencies. The notices of preparation are included as Appendix D. Upon substantial completion of this 2020 UWMP, the City provided the agencies listed above, including internally within the City and Stanislaus County, notice of public hearing (Appendix D.)

Notifications to cities and counties in accordance with the UWMP Act, is summarized in Table 10-1.

Table 10-1. Notification to Cities and Counties (DWR Table 10-1 Retail)

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
City of Turlock	Yes	Yes
City of Ceres	Yes	Yes
City of Hughson	Yes	Yes
City of Modesto	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Stanislaus County	Yes	Yes

10.2.2 Notice to the Public

The City issued a notice of public hearing to the public and provided a public review period following the notice, and prior to adoption, to allow ample time for public comments to be prepared and received.

A notice of public hearing was issued in accordance with Government Code Section 6066 and was published in the local newspaper (Turlock Journal) to notify all customers and local governments of the public hearing and availability of the UWMP and WSCP for review. In addition, the notice was posted on the City's website, cityofturlock.org. A copy of the published Notice of Public Hearing is included in Appendix D.

10.3 PUBLIC HEARING AND ADOPTION

The City encouraged community participation in the development of this 2020 UWMP, including its WSCP, using public notices and web-based communication. The notice included time and place of hearing, as well as the location where the plan is available for public inspection.

The public hearing provided an opportunity for City water users and the general public to become familiar with the 2020 UWMP, and ask questions about its water supply, the City's continuing plans for providing a reliable, safe, high-quality water supply, and the plans to mitigate various potential water shortage conditions. Copies of the draft UWMP were made available for public inspection on the City website.

10.3.1 Public Hearing

A public hearing was held on May 25, 2021. As part of the public hearing, the City provided a report on the City's compliance with the Water Conservation Act of 2009. The report included information on the City's baseline, water use targets, compliance, and implementation, as discussed previously in Chapter 5 of this plan.

10.3.2 Adoption

Subsequent to the public hearing, this 2020 UWMP was adopted by the City Council on May 25, 2021. A copy of the adopted resolution is included in Appendix L.

10.4 PLAN SUBMITTAL

This 2020 UWMP will be submitted to DWR within 30 days of adoption and by July 1, 2021. The adopted 2020 UWMP, including the WSCP, will be submitted electronically to DWR using the Water User Efficiency (WUE) data submittal tool. A CD or hardcopy of the adopted 2020 UWMP and WSCP will also be submitted to the California State Library.

No later than 30 days after adoption, a copy of the adopted 2020 UWMP, including the WSCP, will be provided to the County.

10.5 PUBLIC AVAILABILITY

No later than 30 days after submittal to DWR, copies of this Plan, including the adopted WSCP, will be available at the City's Municipal Services for public review during normal business hours. An electronic copy of this 2020 UWMP will also be available for review and download on the City's website.

10.6 AMENDING AN ADOPTED UWMP OR WATER SHORTAGE CONTINGENCY PLAN

The City may amend its 2020 UWMP and Water Shortage Contingency Plan jointly or separately. If the City amends one or both documents, the City will follow the notification, public hearing, adoption, and submittal process described in Sections 10.2 through 10.4 above. In addition to submitting amendments to DWR through the WUE data portal, copies of amendments or changes to the plans will be submitted to the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption.