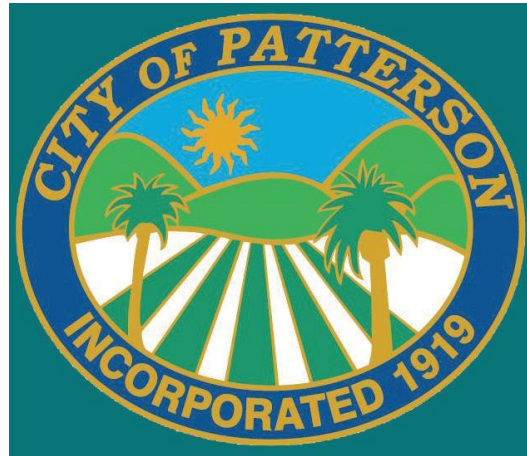


2020 URBAN WATER MANAGEMENT PLAN

City of Patterson



Prepared with Assistance From Water Resource Management Services

DRAFT 2020 UWMP - March 2021

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LIST OF ACROYNMS AND ABBREVIATIONS

AB = Assembly Bill

Act = Urban Water Management Planning Act

AF = Acre-feet

AFY = Acre-feet per year

AWWA = American Water Works Association

BMP = Best Management Practice

CAP = Corrective Action Plan

CDP = Census designated place

City = City of Patterson

Code = Municipal Code

CUWCC = California Urban Water Conservation Council

CVP = Central Valley Project

CWC = California Water Code

DCP = Drought Contingency Plan

DDW = Department of Drinking Water

DMC = Delta-Mendota Canal

DMM = Demand Management Measure

DWR = Department of Water Resources

ET_o = Reference Evapotranspiration

oF = Degrees Fahrenheit

gpcd = Gallons per capita per day

GPU = General Plan Update

GSA = Groundwater Sustainability Agency

GSP = Groundwater Sustainability Plan

Guidebook = 2020 UWMP Guidebook for Urban Water Suppliers

KSA = Kenneth D. Schmidt and Associates

MCL = Maximum Contaminant Level

NPWP = Non-Potable Water Program

OYS = Operational Yield Study

SB = Senate Bill

SGMA = Sustainable Groundwater Management Act

SLDMWA = San Luis and Delta-Mendota Water Authority

SWP = State Water Project

TDS = Total dissolved solids

UWMP = Urban Water Management Plan

WMP = Water Master Plan

WQCF = Water Quality Control Facility

WSCP = Water Shortage Contingency Plan

CHAPTER 1

Introduction and Overview

The City of Patterson is classified as an urban water supplier (UWS) and therefore must comply with the Urban Water Management Planning Act (Act). This Urban Water Management Plan (UWMP) has been prepared to comply with the 2020 UWMP requirements as defined in the California Water Code. The intent of an UWMP is to ensure that an UWS has adequate water supplies to meet future water demands projected over the next 20-25 years. The City's 2020 UWMP evolves from foundational resource management planning work completed in the City's 2010 and 2015 UWMPs. This chapter discusses the purpose and requirements of an UWMP and summarizes the content of the 2020 UWMP document.

Section 1-1: Urban Water Management Planning/California Water Code

Urban Water Management Planning Act (Act)

The Act was created by Assembly Bill (AB) 797 which was signed into law by Governor Deukmejian on September 21, 1983. The Act requires that urban water suppliers (i.e. municipal water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually) prepare and adopt Urban Water Management Plans containing certain specified elements.

The Act was amended by AB 2661, which was signed into law by Governor Deukmejian on July 18, 1990. AB 2661 deleted the January 1, 1991 termination date specified in AB 797. AB 2661 also expanded the elements which are to be addressed in Urban Water Management Plans. The Act was also amended by AB 1869, which was signed by Governor Wilson on October 13, 1991. AB 1869 requires that urban water suppliers update (not just review) Urban Water Management Plans every five years to include projections of both potable and recycled water use, identify current reclamation practices, address additional alternative conservation measures, and describe findings, actions, and planning related to a number of water conservation and reclamation measures.

The Act was further amended by AB 11X signed by Governor Wilson on October 13, 1991. AB 11X requires that urban water suppliers prepare an Urban Water Shortage Contingency Plan as an amendment to its Urban Water Management Plan. Water Shortage Contingency Plans must be updated every five years and specify proposed measures for response to short- and long-term water shortages.

Water Conservation Bill of 2009

On November 10, 2009, the state legislature passed the Water Conservation Bill of 2009 (also referred to as Senate Bill (SB) X7-7) as a water conservation component to the Delta legislative package. The bill seeks a 20 percent statewide reduction in urban per capita water use in California by December 31, 2020. SB X7-7 requires that each retail agency preparing a 2010

UWMP to calculate baseline water use as well as an interim (for 2015) and final (for 2020) water use reduction target. The methodologies used to calculate both the baseline per capita water use and targets were outlined in the Draft and Final UWMP guidelines published by the Department of Water resources (DWR) in December 2010 and March 2011, respectively. Updates to those methodologies were released with the guidelines for the 2015 and 2020 UWMPs.

Water Bills of 2018

The Act was most recently amended in 2018 by AB 1668 and SB 606 which call for standards on indoor and outdoor residential water use, CII water use and water loss control standards. In addition, these bills intend to improve water shortage planning and readiness to better manage future drought conditions by standardizing Water Shortage Contingency Plan elements.

Appendices A and B contain more information on the UWMP Act and California Water Code requirements, and changes since the 2015 UWMP was prepared.

Section 1-2: Urban Water Management Plan Organization

The City's 2020 UWMP has been prepared in accordance with the recommended table of contents contained in the California Department of Water Resources (DWR) 2020 UWMP Guidebook (Guidebook) including referenced appendices. The City's 2020 UWMP document includes the following chapters containing the required information for a DWR compliant plan.

2020 UWMP Chapter Number	2020 UWMP Chapter Title
1	Introduction and Purpose
2	Plan Preparation
3	System Description
4	Water Use Characterization
5	SBX7-7 Baseline and Targets
6	Water Supply Characterization
7	Water Service Reliability and Drought Risk Assessment
8	Water Shortage Contingency Plan
9	Demand Management Measures
10	Plan Preparation/Submittal/Implementation

The City's 2020 UWMP also includes various appendices as recommended in the Guidebook covering the water code requirements, compliance checklist, DWR Data Tables, water loss control information, and related information required in a complete 2020 UWMP. The Bay-Delta appendix is not included since the City does not rely on Delta related water sources.

2020 UWMP Appendix	2020 UWMP Appendix Title
A	California Water Code
B	California Water Code Changes From 2015 UWMP
C	Public Notices and Resolutions
D	Regional Water Planning and Reporting
E	2020 UWMP DWR Data Tables and SBX7-7 Verification
F	Checklist
G	Glossary
H	References
I	Considering Climate Change Impacts
J	Industrial Process Water Exclusion
K	Estimating Future Water Savings
L	Water Loss Auditing
M	Recycled Water
N	Rate Study
O	Reporting of Energy Intensity
P	Annual Water Supply and Demand Assessment

Additional appendices may be added as necessary to prepare a compliant 2020 UWMP that is approved by DWR upon submittal prior to the July 1, 2021 submittal deadline.

Section 1-3: Urban Water Management Plan Summary

The City of Patterson is a retail water service provider located in the Central Valley within Stanislaus County between Interstate 5 and the San Joaquin River. The City is an UWS with approximately 6,600 water connections that is completely reliant on local groundwater sources from the Delta-Mendota Subbasin (in the San Joaquin Valley Basin) for its water supply. The City currently provides more than 3,600 acre-feet per year to meet its water needs through a network of local water wells tapping into the shallow and deep aquifer system.

The City's 2020 UWMP builds upon its 2010 and 2015 UWMPs which focused on quantifying the safe yield of the groundwater aquifer system, identifying alternative water sources (recycled water and storm water sources) to consider adding to its future water supply portfolio, and implementing effective demand management measures to reliably meet its gpcd water use targets over the planning horizon. Concurrently the City has updated its Water Master Plan (WMP) to take a comprehensive perspective in developing local groundwater sources and alternative supplies to meet build-out water demand conditions while not exceeding the safe yield of the subbasin. Maintaining system demands within stated water use targets will stretch the reliability of the City's groundwater resources for future water needs.

The City has the potential for future urban growth over the UWMP planning horizon which is expected to average more than 2 percent on an average annual basis. The City has coordinated its land use and water planning to ensure future water supplies will be adequate to meet future water demand projections. The City is also an active stakeholder in regional resource planning efforts related to SGMA compliance and IRWMP implementation.

The City's groundwater has potential water quality challenges that could impact the cost of developing future groundwater supplies. Hexavalent Chromium (Chromium VI or Chrome 6) concentrations were above the previously established Maximum Contaminant Level (MCL) standard, and has a Corrective Action Plan (CAP) in place with the California Division of Drinking Water (DDW) to keep the City's water supply in compliance with the SDWA standards should a renewed Chromium VI standard be approved by the SWRCB that impacts the City's ability to comply with drinking water quality regulations. The City is watching nitrate and 1,2,3-TCP levels that have the potential to impact the City's current groundwater supplies.

The City has indicated a preferred future water supply portfolio which includes additional groundwater pumping (potable and non-potable), with scenarios that could include recycled water use, stormwater capture and recharge, and additional conservation. The City could benefit from improvements made on Del Puerto Creek through implementation of the Del Puerto Canyon Reservoir Project (sponsored by other agencies) that could increase future groundwater recharge to the sub-basin. This diverse water portfolio will ensure the reliability of City's future water supply to meet system build-out demands. The City confirmed its baseline and future water use targets in its 2015 UWMP (included in Chapter 5) which calculated the City's 2020 and 2015 target per capita water use to be 164 and 167 gallons per capita per day (gpcd) respectively. Due to the City's proactive water use efficiency program (Chapter 9), the City's gpcd water use has been between 140-150 gpcd over the past three years. During statewide drought conditions the City's gpcd water use has been less than 140 gpcd. The City will continue its comprehensive demand management program with plans to deploy an AMI metering system by 2025 to improve utility management efficiency and reduce City water losses. The City is also updating its WSCP (Chapter 8) to comply with DWR's six stage plan included in the 2020 UWMP Guidebook requirements.

The City has been working to diversify its water supply portfolio by: developing non-potable well supplies to meet irrigation needs; evaluating the option of upgrading its wastewater treatment plant to produce tertiary treated recycled water to expand non-potable uses; developing a stormwater capture system for a major creek water source, and continued conservation program implementation to consistently maintain per capita water use below target levels (Chapter 6). The City is updating its CIP Plan based on the latest WMP update which will lead to project implementation of priority actions to reliably meet future water supply needs over the UWMP planning horizon.

CHAPTER 2

Plan Preparation

The chapter provides information on the development of the City’s 2020 UWMP including the basis for plan development, compliance strategy, agency coordination and outreach efforts.

Section 2-1: Plan Preparation

This UWMP updates the City’s 2015 UWMP and includes all information necessary to meet the 2020 requirements of California Water Code, Division 6, Part 2.6. The City acts as an urban, retail public water system with over 6,600 water service connections and providing more than 3,600 AF of water supplied annually (Table 2-1).

Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020
CA5010017	City of Patterson	6,588	3,894
TOTAL		6,588	3,894
NOTES: Volume of water supplied in acre-feet excluding non-potable irrigation use (source: City of Patterson Public Works Department).			

Section 2-2: Basis For Preparing A Plan

The City is an individual retail UWS that is responsible for preparing its 2020 UWMP in accordance with Guidebook requirements has been prepared in accordance with the recommended table of contents contained in the California Department of Water Resources (DWR) 2020 UWMP Guidebook (Guidebook) including referenced appendices. The City’s 2020 UWMP document includes the following chapters containing the required information for a DWR compliant plan.

Table 2-2: Plan Identification		
Select Only One	Type of Plan	Name of RUWMP or Regional Alliance <i>if applicable</i> <i>drop down list</i>
<input checked="" type="checkbox"/>	Individual UWMP	
<input type="checkbox"/>	Water Supplier is also a member of a RUWMP	
<input type="checkbox"/>	Water Supplier is also a member of a Regional Alliance	
<input type="checkbox"/>	Regional Urban Water Management Plan (RUWMP)	
NOTES: The City of Patterson does participate as a member agency in regional water management activities through integrated regional water management and SGMA groundwater sustainability coordination and collaboration.		

Section 2-3: Planning and Compliance/Year Type/Units of Measure

The City of Patterson is a retail groundwater only service provider located in the Central Valley within Stanislaus County. The City is an UWS with approximately 6,600 water connections reliant on local groundwater sources from the Delta-Mendota Subbasin (in the San Joaquin Valley Basin) for its water supply. The City currently provides more than 3,600 acre-feet per year to meet its water needs through a network of local wells tapping into the subbasin aquifer system. The City does not provide water to any major water user outside of its service area and prepared this UWMP individually (Table 2-4) including stakeholders in the process as discussed in Section 2-6.

This information and data used to prepare the City’s 2020 UWMP were prepared based on a calendar year basis and water volumes are presented in units of acre-feet (AF) as summarized in DWR Table 2-3 below.

Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
<input type="checkbox"/>	Supplier is a wholesaler
<input checked="" type="checkbox"/>	Supplier is a retailer
Fiscal or Calendar Year (select one)	
<input checked="" type="checkbox"/>	UWMP Tables are in calendar years
<input type="checkbox"/>	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	AF
NOTES: City water production data is collected in million gallons and converted to AF, and customer demand data is collected in CCF and converted to AF for the 2020 UWMP.	

Section 2-4: Regional Planning and Coordination

The City participates in regional land use and water resource planning activities and coordinates with those organizations on a regular basis. The City’s 2020 UWMP has been prepared in accordance with the DWR 2020 UWMP Guidebook provisions and considers regional implications to its land and water planning processes. The City’s water resource planning efforts are coordinated with on-going large scale regional collaborations with the goal of managing limited water resources in a sustainable manner. The City’s 2020 UWMP reflects the status and intent of regional policies and programs being implemented consistent with agreed to resource document parameters. An overview of relevant on-going regional planning activities is summarized below. Periodically resource documents are updated to reflect implementation progress, new information, and/or state requirements. Stakeholder engagement is included throughout the regional planning process.

Regional Planning Focus	Regional Planning Organization	Regional Planning Resource Document
GSAs in high and medium priority groundwater basins are required to submit a GSP to DWR that provides for sustainably managed groundwater that meets SGMA requirements. The plan must outline how GSAs will implement, manage and measure specific actions for the health and viability of the subbasins including safe yield.	Northern & Central Delta-Mendota Subbasin Region Groundwater Sustainability Agency (GSA) – City is a stakeholder participating through an MOA	2020 Groundwater Sustainability Plan (GSP, adopted and submitted to DWR for approval)
A collaborative effort to manage all regional water resources. IRWM crosses jurisdictional, watershed, and political boundaries, and involves multiple agencies, stakeholders, individuals, and groups. The goal is to address the issues and differing perspectives of all entities involved through mutually beneficial solutions.	Westside-San Joaquin Integrated Regional Water Management Group – City is a stakeholder	2019 Westside-San Joaquin IRWMP (adopted and submitted to DWR for approval)
Land Use Policy and Decisions	City of Patterson Stanislaus County LAFCO State of California	City General Plan Stanislaus County General Plan/Regional Plan Updates LAFCO Service Reviews State Land Use Policy

Section 2-5: Coordination and Outreach

The City encouraged public participation in the development of its 2020 UWMP and provided opportunities for public review and comment on the Draft and Final 2020 UWMP documents. In February 2021, the City distributed letters to its regional stakeholders to inform them of the City’s intent to prepare its 2020 UWMP and welcome any comments or questions that may arise in the plan development process. Key stakeholders notified included Stanislaus County and members of the local Groundwater Sustainability Agency (Ag and Urban entities). The City did not notify any wholesale supplier (Table 2-4) as it serves as its own water supplier. The City made the draft and final 2020 UWMP documents available for stakeholder review in a timely manner on the City’s website during the 2020 UWMP development process. Additional information regarding outreach and public participation is included in Chapter 10 of this plan.

CHAPTER 3

System Description

This chapter provides a general description of the City of Patterson's water supply system, including a description of the service area, climate, future population projections, and service area land use designations.

Section 3-1: General Description

The City of Patterson was incorporated in 1919 after an interesting history. The Patterson Ranch Company, led by Thomas Patterson, subdivided 18,462 acres into ranches and set in motion the design of the town of Patterson. Determined to make Patterson unique among communities of its size, he modeled his town after the radiating street designs of Washington D.C. and Paris, France, following the design of the famous French architect and engineer Pierre Charles L'Enfant. Major streets were lined with Palm, Eucalyptus and Sycamore trees.

Patterson is located in Stanislaus County on Highway 33, along the Interstate 5 corridor, 280 miles north of Los Angeles, 92 miles south of Sacramento, 89 miles southeast of San Francisco and 45 miles southeast of Livermore. The City is located between Interstate 5 to the west and the San Joaquin River to the east, sloping from southwest to northeast. The City's sphere of influence covers approximately 12 square miles. A map of the service area is presented in Figure 3-2.

The City's service area is a mix of residential, commercial, and industrial land uses embedded in a rich agricultural region. Since agriculture is the primary economic base, orchards of apricots, almonds and walnuts, as well as row crops of dry beans, tomatoes, broccoli, spinach, peas and melons have and continue to play an important role in the City's economy. Further proof of this comes from the city's other name, the "Apricot Capital of the World." The City is part of the urban growth planned to occur in the region through 2060, putting a premium on sustainable water resource management practice and policy.

The City's existing potable well field is primarily located in the eastern portion of the city service area between East Las Palmas Avenue, South 2nd Street and the Patterson Irrigation District Canal. The City supplies potable groundwater for residential, industrial, and commercial uses through seven (7) potable wells augmented by non-potable irrigation wells, water storage tanks, and a water distribution pipeline network mostly sized from 6 to 12-inch diameters. All existing water services are metered and new connections are required to install water meters prior to occupancy. Water meters are read on a monthly basis for utility management and equitable billing purposes. The City is responsible for operating, maintaining and replacing the water system up to the water meter for each service.

The City is continually evaluating and updating its water supply portfolio in order to reliably meet current and future water needs in a cost-effective manner. For example, the City approved its Non-Potable Water Program (NPWP) more than a decade ago initially designed to use lower quality groundwater supplies for irrigation of public and commercial landscaped areas and sites.

As of 2020, the City had developed three (3) non-potable wells now in operation helping to meet annual water supply needs for the community. The City is looking to rely more on non-potable sources as part of its long-term water supply portfolio when feasible for public and commercial landscaping which is estimated to account for up to 20% of the City’s total annual water use. The primary benefit of using non-potable water supplies for irrigation purposes is reducing the impact on peak system demands during the summer months when maximum day and peak hour demands are highest.

The City’s NPWP is perpetual and could be expanded as the City grows to the east with potential benefits summarized below. The City is currently evaluating the merits of recycled water and stormwater capture as potential elements of the City’s future water portfolio.

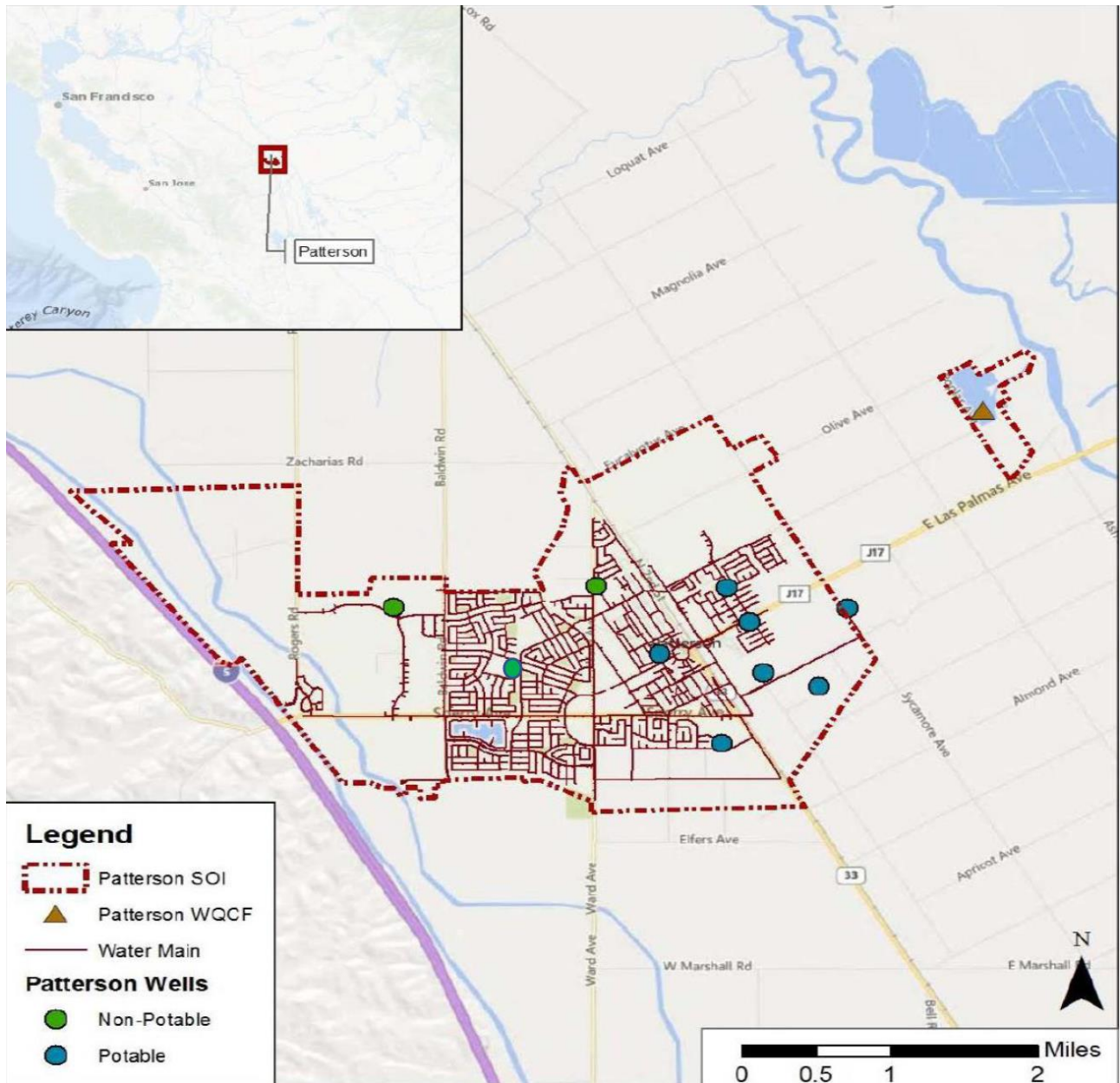
NPWP Program Sources of Supply	Potential Benefit to Water Supply Portfolio
Non-potable wells	Could offset 10-20% of total City water demands by 2030
Recycled Water	Could offset 5-15% of total City water demands by 2035
Stormwater	Could offset 5% of total City water demands by 2035

The City’s NPWP is evaluating the feasibility of using treated wastewater effluent from the City’s Water Quality Control Facility (WQCF), located to the east of the City and adjacent to the San Joaquin River, for irrigation and industrial uses. Recycled water use has the potential for providing 200-800 acre-feet per year at build-out if cost-effective treatment and distribution projects can be designed and constructed with necessary regulatory approvals. As the City expands its NPWP program, dedicated distribution system components are being designed and constructed to receive treated recycled water in the future. Several thousand feet of pipe have already been installed and are being utilized for irrigating some of the City’s largest landscaped areas. The City is also evaluating the possibility of future stormwater management projects with multiple benefits that could improve the resiliency of the City’s water portfolio.

Section 3-2: Service Area Boundary

The City’s service area boundary is determined by local and regional land use planning policies and decisions which drive urban growth projections and planned regional growth patterns desired by agencies with land use authorities. The service area boundary is also a function of natural barriers such the San Joaquin River to the east, Interstate 5 to the west, and other agency service areas to the north and south. Future growth is occurring in a planned fashion through regular City General Plan and Housing Element updates, County General Plan updates, LAFCO service area reviews and assessments, and business sector interest in the local and regional economy. The City’s water resource planning efforts are synchronized with changes to future land use policies and decisions that impact future water supply needs for the community. Figure 3-2 depicts the City’s current service area boundary with water supply sources identified that are included in the City’s water system permit.

Figure 3-2: City of Patterson Service Area Boundary



The City’s Water Quality Control Facility is located to the east, adjacent to the San Joaquin River.

Section 3-3: Service Area Climate

The City of Patterson is located in the Central Valley region in California with hot dry summers and moderately cool winters with little rainfall during the year. The City is fortunate to have a DWR CIMIS Weather Station (Patterson Station #161) in the vicinity to track local weather patterns on a regular basis including daily wind, temperature, solar radiation, rainfall and evapotranspiration (ET_o) data. Temperatures average about 75°F annually, ranging from average winter morning lows in the mid to upper 30's, to average summer afternoon highs in the low to mid 90's. During the summer months, temperatures may exceed 100 degrees increasing water demands significantly. Average annual rainfall is approximately 12 inches, with most rainfall occurring between November and March. The combination of warmer temperatures (higher ET_o) and highly infrequent precipitation during the summer results in peak water demands during that period for irrigation needs. Reference evapotranspiration (ET_o) values, which serve as indicators of how much water is required to maintain healthy agriculture and urban plant landscaping, range from 1.38 inches during December to 8.72 inches in June. Taking rainfall into account, irrigation needs are typically minimal or not necessary during the winter months. ET_o, rainfall and temperature averages for the City's local climate conditions are presented below.

Month	Avg. Annual ET _o (inches)	Avg. Annual Rainfall (inches)	Avg. Temperature Min/Max (Degrees Fahrenheit)
Jan.	1.42	2.2	37/54
Feb.	2.21	2.1	41/62
March	4.09	2.0	43/67
April	5.44	1.1	47/74
May	7.87	0.4	51/82
June	8.72	0.1	57/89
July	8.21	0	60/94
August	7.22	0	59/92
September	5.74	0.2	56/87
October	4.06	0.7	50/78
November	2.05	1.4	42/64
December	1.38	2.1	37/53
TOTAL	58.41	12.2	
<i>City service area weather data based on local CIMIS Station #161 and National Weather Service sources.</i>			

The typical climate patterns experienced in the City service area indicate peak summer demands driven by high ET_o rates coupled with no rainfall. In months with rainfall exceeding ET_o rates irrigation demands are zero or very infrequent. Summer irrigation demands are expected to be in the 0.55-0.7 ET_o range assuming a typical landscaped area with a mix of turfgrass and other lower water use plants based on the City's local climate conditions and plant water needs.

Section 3-4: Service Area Population and Demographics

The City’s 2020 population is approximately 23,764 residents served through about 6,600 metered water service connections. The City is part of the regional urban growth planning process with future growth projections showing steady growth potential for the City over the 2020 UWMP planning horizon (to 2045). The City expects primarily residential sector growth with increases expected in commercial and industrial development. This development expectation is expected to result in an increase of Low Density Residential development, which is intended to support complete neighborhoods with a range of housing products and a complementary range of neighborhood-serving commercial and public uses. The City’s updated service area population projections through 2045, which are estimated based on the expected annual growth rate of 2.26%, are included in Table 3-1.

Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045(opt)
	23,764	26,607	29,790	33,354	37,344	41,812
NOTES: 2020 population is from the DOF and projected population based on expected local and regional urban growth rates (2.26% annually) over the 2020-2045 planning period.						

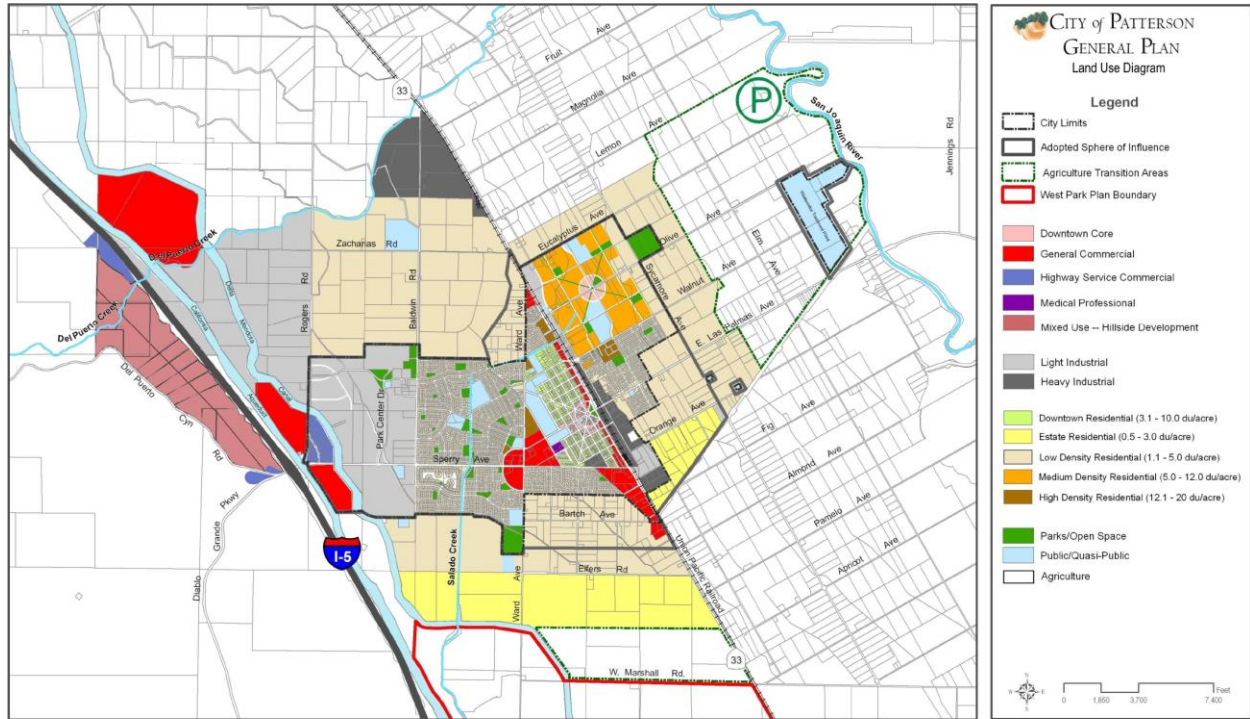
The City’s demographic information is summarized below from data collected through the American Community Survey (ACS) website from its 2015-2019 ACS data set.

Demographic Factor	Data Source	Data
Population	State of California DOF	23,764
Median Household Income	2015-2019 ACS 5-Year Estimates	\$69,233
Persons in Poverty	2015-2019 ACS 5-Year Estimates	12.1%
Educational Attainment (High School or >)	2015-2019 ACS 5-Year Estimates	73.6%
Persons w/out Health Insurance	2015-2019 ACS 5-Year Estimates	5.5%
Median Housing Value	2015-2019 ACS 5-Year Estimates	\$306,900
Total Housing Units	2015-2019 ACS 5-Year Estimates	6,354
Number of Firms	2015-2019 ACS 5-Year Estimates	1,300-1,400
Male Median Income	2015-2019 ACS 5-Year Estimates	\$37,544
Female Median Income	2015-2019 ACS 5-Year Estimates	\$21,202
Veterans	2015-2019 ACS 5-Year Estimates	857
% Households w/Internet Service	2015-2019 ACS 5-Year Estimates	87.6%

Section 3-5: Land Uses Within Service Area

The City’s General Plan determines the land uses and development patterns for growth that occurs within the City service area. The City is predominantly a residential community with single family residential land uses representing the majority of land use designations within the service area for current and future land use growth. The land use designations within the City service area are depicted in Figure 3.5.

Figure 3.5: City of Patterson Land Uses Within Service Area



CITY OF PATTERSON General Plan

CHAPTER 4

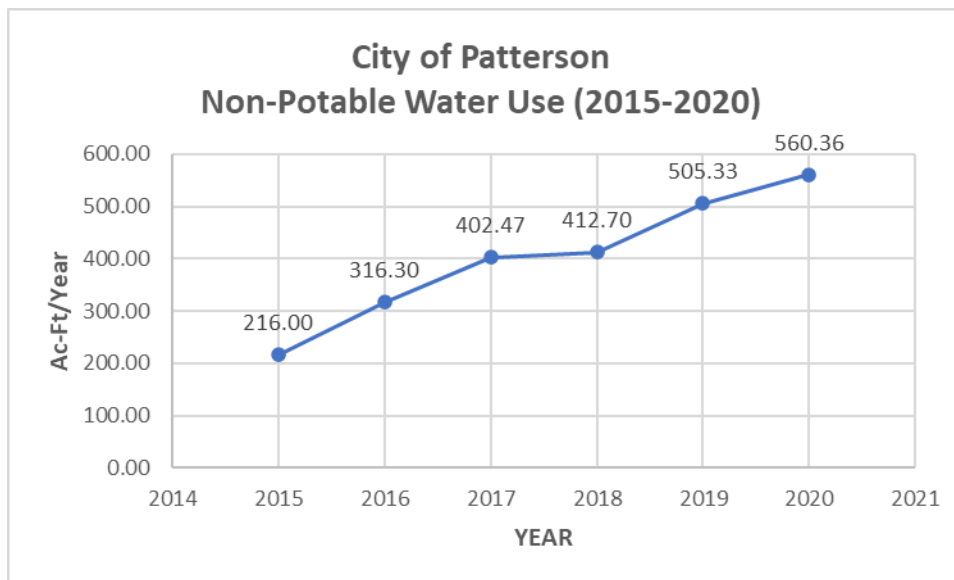
Water Use Characterization

This chapter describes the City of Patterson’s past, current and projected water uses through 2045, and includes updated water demand projections to serve as the basis for planning changes to the City’s future water supply portfolio and corresponding water infrastructure improvements.

Section 4-1: Potable and Non-Potable Water Uses

Patterson’s water supply is currently limited to raw and treated groundwater pumped from City wells and conveyed through its distribution system pipeline network to customers. Potable wells are chlorinated before delivery to customers. The City does not currently provide recycled water to any of its customers. However, it does provide non-potable groundwater supplies to some current irrigation customers (public and commercial sites). Patterson’s past and current water demands are primarily for residential uses with almost two-thirds (61%) of total system demands serving residential customers with 59% serving single family residential and 1.7% serving multi-family residential customers. Landscape irrigation is the second largest water demand, with approximately twenty percent of total system demands serving either potable supply for landscaping (9.2%) and about twelve percent of all demands served by shallow, raw non-potable water wells (12%).

The City has been developing its non-potable irrigation supplies with three (3) wells now dedicated to irrigation service. The graph below shows the trend toward increased non-potable irrigation supplies which are plumbed to receive recycled water when available in the future.

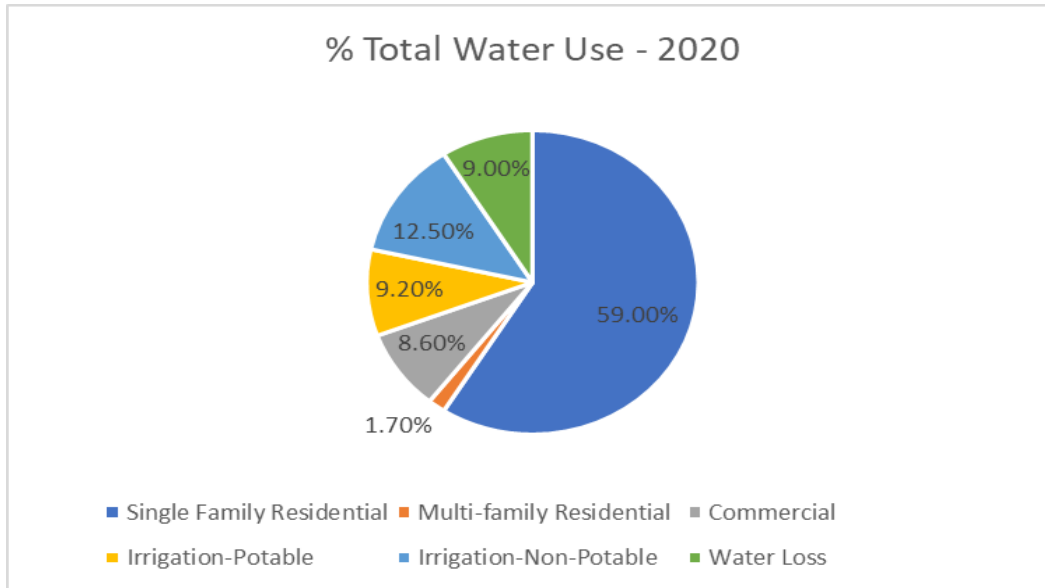


Lastly, commercial, industrial and institutional demand comprises about eight percent of all City water uses (listed as “Commercial” in Table 4-1). A summary of 2020 water demands by user

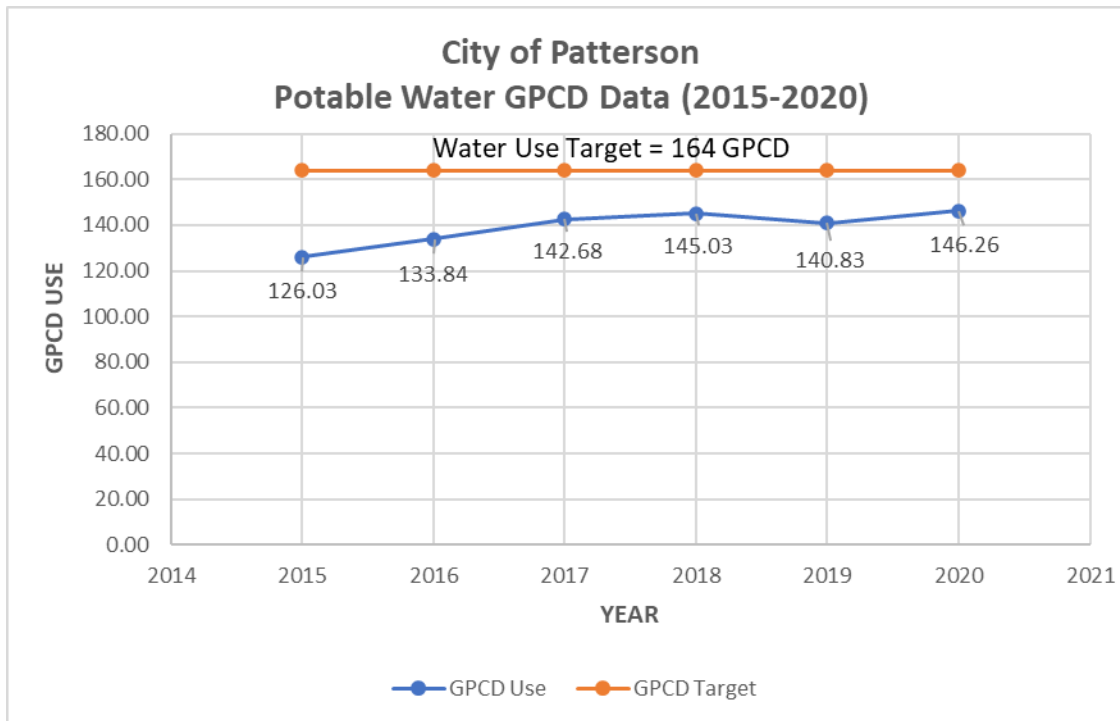
category in acre-feet per year can be found in DWR Table 4-1 and a breakdown by water user class is depicted in Figure 4-1.

Table 4-1 Retail: Demands for Potable and Non-Potable Water - Actual			
Use Type <i>(Add additional rows as needed)</i>	2020 Actual		
<i>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</i>	Additional Description <i>(as needed)</i>	Level of Treatment When Delivered <i>Drop down list</i>	Volume
Single Family	Local groundwater supply	Drinking Water	2,625
Multi-Family	Local groundwater supply	Drinking Water	74
Commercial	Local groundwater supply	Drinking Water	381
Landscape	Local groundwater supply	Drinking Water	411
Landscape	Local groundwater supply	Other Non-Potable Water	560
Groundwater recharge	N/A.		
Saline water intrusion barrier	N/A.		
Agricultural irrigation	N/A.		
Wetlands or wildlife habitat	N/A.		
Sales/Transfers/Exchanges to other agencies	N/A.		
Losses	Local groundwater supply system	Drinking Water	402
Other			
TOTAL			4,454
NOTES: Based on City of Patterson 2020 water production, metered water consumption, and 2020 water audit water loss data including real and apparent losses (source: City of Patterson Public Works Department).			

A breakdown of the City’s 2020 water use by category follows in Figure 4.1 based on the City’s 2020 water production, water consumption, and water audit data.



The City is planning to grow during the 2020 UWMP planning horizon (2020-2045) which will increase the number of water service connections and customers relying on the City’s water system. The City has managed its potable per capita water use consistently over the five years since its 2015 UWMP, with 2013 use of 182 gpcd and 2018-2020 potable water use within the 140-150 gpcd range averaging less than 145 gpcd. Thus, while the City has seen steady growth in recent years, it has not seen a large spike in its overall water use.



Aside from short term drought effects on system water use, the reason water use lags the actual population growth rate is that the City has been implementing an effective water conservation program. The City meters all of its water services and has a conservation-oriented water rate structure in place with increasing tiered rates that charge more per billing unit as usage increases to encourage efficient water use. The City has ordinances in place to discourage water waste, including odd-even watering, and penalties for irrigation “run-off.” Over the past decade the City has implemented a water loss control program to reduce system real losses from leaking pipes, and through leak repairs on hydrants, valves, meters and services with the highest frequency of leakage. The City will continue this program to reduce water losses to within industry standards (less than 8% of non-revenue water). Distribution system water loss information is included in Appendix L.

The City’s existing potable well field is primarily located in the eastern portion of the city service area between East Las Palmas Avenue, South 2nd Street and the Patterson Irrigation District Canal. The City supplies potable groundwater for residential, industrial, and commercial uses through seven (7) potable wells augmented by non-potable irrigation wells, water storage tanks, and a water distribution pipeline network mostly sized from 6 to 12-inch diameters. All existing water services are metered and new connections are required to install water meters prior to occupancy. Water meters are read on a monthly basis for utility management and equitable billing purposes. The City is responsible for operating, maintaining and replacing the water system up to the water meter for each water service.

The City is continually evaluating and updating its water supply portfolio in order to reliably meet current and future water needs in a cost-effective manner. For example, the City approved its Non-Potable Water Program (NPWP) more than a decade ago initially designed to use lower quality groundwater supplies for irrigation of public and commercial landscaped areas and sites. As of 2020, the City had developed three (3) non-potable wells now in operation helping to meet annual water supply needs for the community. The City is looking to rely more on non-potable sources as part of its long-term water supply portfolio when feasible for public and commercial landscaping which is estimated to account for up to 20% of the City’s total annual water use. The primary benefit of using non-potable water supplies for irrigation purposes is reducing the impact on peak system demands during the summer months when maximum day and peak hour demands are highest.

The City’s NPWP is perpetual and could be expanded as the City grows with potential benefits summarized below. The City is currently evaluating the merits of recycled water and stormwater capture as potential elements of the City’s future water portfolio.

NPWP Program Sources of Supply	Potential Benefit to Water Supply Portfolio
Non-potable wells	Could offset 10-20% of total City water demands by 2030
Recycled Water	Could offset 5-15% of total City water demands by 2035
Stormwater	Could offset 5% of total City water demands by 2035

The City’s NPWP is evaluating the feasibility of using treated wastewater effluent from the City’s Water Quality Control Facility (WQCF), located to the east of the City and adjacent to the San Joaquin River, for irrigation and industrial uses. Recycled water use has the potential for providing 200-800 acre-feet per year at build-out if cost-effective treatment and distribution projects can be designed and constructed with necessary regulatory approvals. As the City expands its NPWP program, dedicated distribution system components are being designed and constructed to receive treated recycled water in the future. Several thousand feet of pipe have already been installed and are being utilized for irrigating some of the City’s largest landscaped areas with non-potable well supplies. The City is also evaluating the possibility of future stormwater management projects with multiple benefits that could add to groundwater recharge and help to improve the resiliency of the City’s water portfolio.

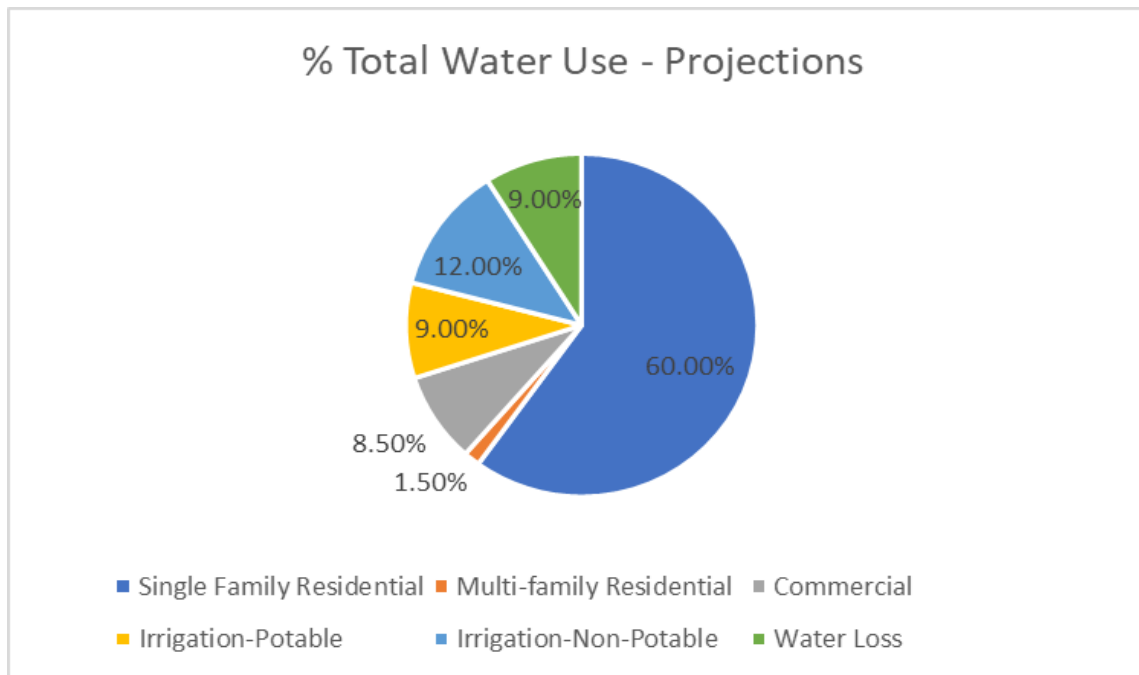
Section 4-2: Past, Current and Projected Water Use By Sector

The City’s service area boundary is determined by local and regional land use planning policies and decisions which drive urban growth projections and planned regional growth patterns desired by agencies with land use authorities. Projected water use will be impacted by population growth, higher non-potable water usage, lower water system losses, and saturation of water use efficiency measures in older single family residential sector housing stock. The City plans to implement an AMI metering project which will allow higher resolution of actual end water uses by user class for future projections. The City’s projected water use by category for potable and non-potable uses is characterized in DWR Table 4.2 which follows.

Table 4-2 Retail: Use for Potable and Non-Potable Water - Projected						
Use Type <i>(Add additional rows as needed)</i>	Additional Description <i>(as needed)</i>	Projected Water Use <i>Report To the Extent that Records are Available</i>				
<i>Drop down list</i> <i>May select each use multiple times</i> <i>These are the only Use Types that will be recognized by the WUEdata online submittal tool</i>		2025	2030	2035	2040	2045 (opt)
Single Family		2,933	3,284	3,676	4,116	4,609
Multi-Family		73	82	92	103	115
Commercial		415	465	521	583	653
Industrial		0	0	0	0	0
Institutional/Governmental		0	0	0	0	0
Landscape	Irrigation	440	493	551	617	691
Groundwater recharge		0	0	0	0	0
Saline water intrusion barrier		0	0	0	0	0
Agricultural irrigation		0	0	0	0	0
Wetlands or wildlife habitat		0	0	0	0	0
Sales/Transfers/Exchanges to other agencies		0	0	0	0	0
Sales/Transfers/Exchanges to other agencies		0	0	0	0	0
Losses		440	493	551	617	691
Other Potable		0	0	0	0	0
Other Non-Potable	Irrigation	587	657	735	823	922
Other		0	0	0	0	0
TOTAL		4,888	5,473	6,127	6,860	7,681

NOTES: Based on population projections and total potable and non-potable water uses in accordance with City’s 2020 164 gpcd water use target.

The City's water use projections are based on the following average annual water use breakdown by user class which will vary year to year. The City will update water user class breakdown assumptions for future projections as dictated by the availability of new factual water use data.



Future growth patterns could impact total water use projection assumptions by user class. The City will closely monitor actual water use projections by user class and update key assumptions in the City's 2025 UWMP. The City's water resource planning efforts are synchronized with changes to future land use policies and decisions that can impact future water supply needs for the community and will be updated accordingly.

Water Loss Control – Compliance With SB 555

Patterson's water system is entirely metered, allowing the City to more accurately track its water losses by comparing actual water production and consumption records on a monthly basis. Since the City's 2015 UWMP (with the City's loss rate of less than 10%), water system losses have been increasing in recent years due to increasing real losses in the water system. Historically the City's water system loss rate has been around 10 to 12 percent. As noted in the previous section, the City has implemented a plan to replace older and leakier pipes which has helped reduce the system losses. Using the American Water Works Association (AWWA) Water Audit software, the City's 2015 water loss was calculated to be approximately 235 AF (Table 4-4). The City's 2020 water loss rate was approximately 402 AF, lower than the previous three years. The City expects its water loss rate to decline to less than eight percent as it continues its pipe replacement program and implements its AMI metering project. The City is assuming a nine (9) percent loss rate as the baseline for its future water use projections with the goal for improvement in future years through water loss control program implementation. Results of the City's distribution system water audits from 2016 to 2020 are included in Appendix L.

Section 4-3: Water Use – Potable vs. Non-Potable DWR Tables

The City’s total water use is comprised of potable and non-potable water uses. As indicated in Section 4-1, the City’s non-potable water usage has grown substantially since the 2015 UWMP from 216 AFY to 560 AFY in 2020. The City’s primary use of its non-potable water source is for irrigation purposes which provides the City with improved resiliency in its water portfolio to respond to future water shortage conditions. The non-potable sources tap the shallower aquifer which has lower overall water quality, matching use with quality to preserve the deeper aquifer for potable water sources with its higher overall water quality characteristics. The City’s non-potable irrigation systems are designed to accommodate non-potable irrigation well or recycled water sources depending on the source allocation in its future water portfolio. The City’s water uses are broken down by potable vs. non-potable uses below using DWR Table 4.3.

Potable Uses Only (used to calculate City’s 2020 per capita water use)

Table 4-1 Retail: Demands for Potable Water - Actual			
Use Type <i>(Add additional rows as needed)</i>	2020 Actual		
<i>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</i>	Additional Description <i>(as needed)</i>	Level of Treatment When Delivered <i>Drop down list</i>	Volume
Single Family	Local groundwater supplies (*)	Drinking Water	2,626
Multi-Family	From local groundwater supplies	Drinking Water	74
Commercial	From local groundwater supplies	Drinking Water	381
Landscape	From local groundwater supplies	Drinking Water	412
Institutional/Governmental	From local groundwater supplies	Drinking Water	
Landscape	From local groundwater supplies	Other Non-Potable Water	
Losses	Non-revenue water losses (*)	Drinking Water	402
TOTAL			3,894
NOTES: Based on the actual water consumption by City water customers from its seven (7) potable drinking water wells (source: City of Patterson Public Works Department). (*) rounded to highest whole number.			

The potable water uses = City’s total water production - non-potable water uses in 2020.

Non-Potable Uses may increase over time or shift to recycled water use in the future.

Table 4-1 Retail: Demands for Non-Potable Water - Actual			
Use Type <i>(Add additional rows as needed)</i>	2020 Actual		
<i>Drop down list</i> <i>May select each use multiple times</i> <i>These are the only Use Types that will be recognized by the WUEdata online submittal tool</i>	Additional Description <i>(as needed)</i>	Level of Treatment When Delivered <i>Drop down list</i>	Volume
Landscape	Untreated groundwater for irrigation purposes.	Other Non-Potable Water	560
TOTAL			560
NOTES: Based on the actual water use of the City's three (3) non-potable irrigation wells during calendar year 2020 (source: City of Patterson Public Works Department).			

The City added a third non-potable irrigation well since the 2015 UWMP, thereby enabling the City to increase its non-potable water use since 2015.

Section 4-4: Water Use For Lower Income Households

California Water Code (CWC) Section 10631.1(a) requires suppliers to estimate projected water use for single-family (SFR) and multi-family (MFR) residential housing needed for lower income households, as identified in the Housing Element of the General Plan for the service area of the supplier. It does not require quantification of current water use by lower income households. According to the City’s current *Housing Element 2015-2023* (Patterson, 2015), an estimated 33% of households in the City are lower-income, defined as having income below 80% of the area household median income. The City’s Housing Element indicates the Regional Housing Need Allocation for 2015 through 2023 for lower income housing is 1,044 units. The Regional Housing Need Allocation does not break down the housing need by housing type (single family vs. multi-family). Therefore, the projected water demands for lower income housing was conservatively estimated, based on the average SFR 2020 water demand of 0.37 AF per household and 2,175 lower income household units, to be 805 AF in 2020. This is a conservative estimate because MFR housing uses less water per-dwelling unit than SFR housing. Water use for lower income households is incorporated into the City’s updated water demand projections assuming lower income housing grows proportionally to City population growth.

Section 4-5: Climate Change Considerations

Climate change will continue to affect water management throughout California and could eventually have significant impacts on the City of Patterson. The City is not likely to see any increased risk of flooding or be directly impacted by rising sea level issues as would be the case for a coastal city or agency. However, the region may experience changes in temperature and rainfall volume, intensity and/or seasonal patterns which could have a large impact on the San Joaquin River and other ecosystems in the region. Changes to the volume and seasonality of

riverine flows may impact erosion and sedimentation and other water quality constituents in the river. These changes could impact the various migratory and endangered species in the area. The City will coordinate efforts with the County and relevant State and Federal agencies to address possible ecosystem loss and impacts to endangered species. Discussion of the City's water demands are included in Chapter 4, and potential impacts on the City's water supply is elaborated upon in Chapter 6. Appendix I has more information on climate change efforts.

A bigger concern is the trend toward climate change-induced snowpack reductions in the Sierra range which in turn reduces inflow and infiltration (I&I) rates into the Bay-Delta system and associated reservoirs, lakes and streams. Large water users, such as agricultural operators, could experience less reliability from regional surface water supplies which could in turn increase their total groundwater use vs. historic levels causing higher than expected groundwater level declines. This type of impact could require local agencies and GSAs to recalibrate safe yield targets and appropriate management actions that GSA members may need to consider in future GSP updates. While concerning, the ag sector has been migrating to more efficient irrigation practices (less flood and more low volume systems), thereby reducing per acre crop water needs in high demand. Climate change will be addressed in future IRWMP and GSP policy updates.

CITY CLIMATE CHANGE - ADAPTATION ACTIONS

Short-term measures

- Incorporate climate change considerations into CIP and Master Plans as necessary.
- Monitor reduced indoor water use trends that may impact wastewater influent quality.
- Monitor changes in drinking water quality that may impact wastewater quality.
- Monitor influent total dissolved solids concentrations to prevent impacts to the secondary treatment process at the wastewater treatment plant.
- Reduce I&I sources that could impact wastewater quality, flow rates and disposal.

Long-term measures

- Consider a range of climate change outcomes for identifying climate change strategies.
- Monitor changes in drinking water quality entering the City's water/wastewater systems.
- Monitor changes in safe yield thresholds reflected in long term GSP policy actions.
- Reduce sediment from entering the sewer system resulting from climate change.
- Reduce collection system I&I to reduce the impact of high intensity storm events on the wastewater collection and treatment systems.
- Develop corrosion prevention plans as necessary to mitigate water quality concerns.
- Coordinate with other water and wastewater agencies on long-term protection strategies for water, wastewater and wet weather facilities depending on climate change impacts.

CHAPTER 5

SBX7-7 Baseline and Targets

This chapter describes the City's compliance with SB X7-7. The Water Conservation Act of 2009 (SBX7-7) requires that water agencies classified as urban water suppliers reduce their potable water demands 20% by 2020. The SBX7-7 legislation requires the calculation of baseline criteria to determine future water use targets for water agency planning purposes based on the preferred methodology.

Section 5-1: Updating Calculations From 2015 UWMP

The DWR 2020 UWMP Guidebook for Urban Water Suppliers (Guidebook) requires water agencies preparing 2020 UWMPs to verify 2020 water use targets identified in their 2015 UWMP. Requirements for updating calculations for baselines and targets would be based on the need to incorporate updated data or desire of the urban water supplier to change the SBX7-7 compliance methodology.

The overall baseline and target development approach is as follows:

1. Update population and gross water use figures for historical baseline calculations;
2. Select methodology for applying baseline data and calculating targets; and
3. Compare actual vs. target gpcd water use to determine target compliance.

Regarding updated baseline data, the City plans to use the same baseline data as were used to calculate the 2015 UWMP future water use targets. This data is representative of the City's water use patterns during the baseline periods available for the City to select for the baseline calculations. The City's population is based on published data from the Department of Finance accounting for growth during the 2020 calendar year. The City's population data corresponds very precisely to the City's service area delineation. Population figures have been updated to reflect current City population figures and projected population over the 2020 UWMP planning horizon. The City's population data corresponds with information about updating baselines and targets for SBX7-7 compliance. Section 5.2.2 of the Guidebook specifically requires that agencies update calculations if required for compliance. As the City's service area and boundary are congruent, the City could utilize methodology for a Census Designated Place (which requires a 95 percent mutual intersect between the service area and boundary). Therefore, the method to determine baseline populations and the resultant populations used in the 2015 UWMP for calculating the baseline and target water use are accurate.

Section 5-2: General Requirements For Baselines and Targets

The Guidebook identifies requirements for establishing baselines in the determination of an urban water supplier's 2020 per capita water use target. Urban water suppliers must define a 10- to 15-year baseline period for water use and calculate the average water use, in GPCD, over that length of time. If recycled water use is less than 10% of gross total water use in 2008, a 10-year baseline period is used to establish the baseline over a continuous period ending between December 31, 2004, and December 31, 2010. The City selected the 10-year gross water use period from 2001-2010 for its baseline period for the 10-year interval. For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010. The City used the 2006-2010 period for its 5-year interval in its 2015 UWMP SBX7-7 calculations. These baseline periods

were established in the City’s 2015 UWMP in developing its 2015 Interim and 2020 water use targets and confirmed for use in the City’s 2020 UWMP development process.

Urban water suppliers such as the City of Patterson whose service area boundaries correspond by 95 percent or more with the boundaries of a city during the baseline period and compliance year 2020 will be able to obtain population estimates from tables prepared by DOF. The City will be using DOF population figures plus 2020 growth as the basis for calculating 2020 per capita water use compliance.

The City used Method 1, Five-Year Baseline - 2020 Target Confirmation method to calculate its 2020 per capita water use target, similar to its 2015 UWMP, and confirmed for use in the City’s 2020 UWMP.

SB X7-7 Table 7: 2020 Target Method		
<i>Select Only One</i>		
Target Method	Supporting Documentation	
<input checked="" type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>See UWMP DWR webpage or contact staff for these tables</i>
<input type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator
NOTES: 95% of 5-Year Baseline calculation for maximum target.		

Section 5-3: Service Area Population

In the City’s 2015 UWMP, the service area population for baseline calculations were determined using finalized 2000 and 2010 Census data for the City of Patterson. Using the population and number of connections in 2000 and 2010, a person-per-connection factor was determined, and then interpolated for non-Census years. This person per connection number was multiplied by Patterson’s recorded number of water service connections to estimate the service/city population for baseline years. This methodology is consistent with that used in the DWR population tool, and was used in place of results from the DWR tool due to discrepancies between the Census population for Patterson and results of the tool (likely stemming from partially inaccurate historical service area boundary files and the use of Census block data not completely representative of the City’s service area population. The current Department of Finance data reflects the updated 2010 census data and is representative of the City’s service area population. Therefore, the baseline population projections used in the 2015 UWMP calculations over the same baseline period are validated for use in the 2020 UWMP baseline calculations with no further analysis required.

The Department of Finance estimate for the City of Patterson 2020 population was 23,074 (as of 1/1/2020). For the City’s 2020 UWMP an estimate of the City’s 2020 population was 23,764 accounting for growth in calendar year 2020 that will be used to determine the daily per capita water use for 2020.

SB X7-7 Table 3: Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	2001	13,759
Year 2	2002	14,092
Year 3	2003	14,568
Year 4	2004	16,307
Year 5	2005	19,843
Year 6	2006	21,474
Year 7	2007	21,609
Year 8	2008	21,130
Year 9	2009	20,662
Year 10	2010	20,260
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2006	21,474
Year 2	2007	21,609
Year 3	2008	21,130
Year 4	2009	20,662
Year 5	2010	20,260
2020 Compliance Year Population		
	2020	23,764
NOTES: Baseline population from 2015 UWMP, 2020 population from DOF.		

Section 5-4: Gross Water Use

Over the baseline period, the City experienced a steady increase in its gross water use, consistent with growth and development occurring during the baseline period. Per capita water use decreased significantly in 2015 in response to the on-going drought in California through SWRCB cutbacks continuing water conservation as a top priority for urban water suppliers. Gross water use decreased from 3,869 AF in 2014 to 3,216 AF in 2015, roughly 17%. The City is not eligible for any deductions as it does not use recycled water, export water, deliver water

for agricultural use, have industrial exemptions, or has had any changes in the distribution system storage.

Prior to the 2015 SWRCB cutback policy, the City’s base year per capita water use was 182 gpcd in 2013 and has been within the 140-150 gpcd range during the 2018-2020 period. Gross annual potable water use in 2020 was 3,894 AF. A summary of the water usage during the baseline years and 2020 have been included in the DWR SBX7-7 Table 4 below.

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use	
		Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>		
10 to 15 Year Baseline - Gross Water Use								
Year 1	2001	2,380	-	-	-	-	-	2,380
Year 2	2002	3,001			-		-	3,001
Year 3	2003	2,837			-		-	2,837
Year 4	2004	2,840			-		-	2,840
Year 5	2005	3,356			-		-	3,356
Year 6	2006	4,083			-		-	4,083
Year 7	2007	4,165			-		-	4,165
Year 8	2008	4,398			-		-	4,398
Year 9	2009	3,836			-		-	3,836
Year 10	2010	3,869			-		-	3,869
Year 11	2011	-			-		-	-
Year 12	2012	-			-		-	-
Year 13	2013	-			-		-	-
Year 14	2014	-			-		-	-
Year 15	2015	-			-		-	-
10 - 15 year baseline average gross water use								3,477
5 Year Baseline - Gross Water Use								
Year 1	2006	4,083			-		-	4,083
Year 2	2007	4,165			-		-	4,165
Year 3	2008	4,398			-		-	4,398
Year 4	2009	3,836			-		-	3,836
Year 5	2010	3,869			-		-	3,869
5 year baseline average gross water use								4,070
2020 Compliance Year - Gross Water Use								
2020		3,894	-		-		-	3,894
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES: Annual Gross Water Use in AF.								

Section 5-5: Baseline and Target Summary

The City’s baseline population and gross water use figures from the 2015 UWMP were confirmed, and maximum 2020 per capita water use target of 164 gpcd determined by using 95% of the 5-year baseline as specified in the DWR Guidebook. The calculation for the City’s maximum allowable target can be found in DWR Table 5-1 below.

Table 5-1 Baselines and Targets Summary <i>Retail Supplier or Regional Alliance Only</i>				
Baseline Period	Start Year	End Year	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	2000	2010	169	164
5 Year	2006	2010	173	164
*All values are in Gallons per Capita per Day (GPCD)				
NOTES: Confirmed target is equal to 95% of 5-Year baseline period.				

Section 5-6: 2020 Compliance Daily Per Capita Water Use (GPCD)

In its 2015 UWMP the City established an interim 2015 water use target of 167 gpcd. The City’s actual 2015 daily per capita water use was 135 gpcd, well below the 2015 interim target of 167 gpcd. Therefore, no water usage adjustments (such as weather normalization or economic adjustments) were calculated. The 2015 actual use of 135 gpcd was also well below the City’s 2020 water use target of 164 gpcd. While annual fluctuations in water use are likely due to weather, growth, economics, water use efficiency and demographics, the City has consistently maintained its gpcd water use since the 2015 UWMP below its 2020 per capita water use target of 164 gpcd as summarized below.

Year	Use-GPCD Actual	Use-GPCD 2020 Target	% 2020 Target
2016	134	164	82%
2017	143	164	87%
2018	145	164	88%
2019	141	164	86%
2020	146	164	89%
Average	142	-	86%
<i>City per capita water use calculations based on annual City population and total potable water uses.</i>			

The City’s 2020 per capita water use was 146 gpcd, below its 2020 water use target of 164 gpcd. The City’s compliance with its 2020 water use target is verified in the following DWR Table 5.

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	2001	13,759.00	2,380.00	154.42
Year 2	2002	14,092.00	3,001.00	190.12
Year 3	2003	14,568.00	2,837.00	173.85
Year 4	2004	16,307.00	2,840.00	155.48
Year 5	2005	19,843.00	3,356.00	150.99
Year 6	2006	21,474.00	4,083.00	169.74
Year 7	2007	21,609.00	4,165.00	172.07
Year 8	2008	21,130.00	4,398.00	185.82
Year 9	2009	20,662.00	3,836.00	165.74
Year 10	2010	20,260.00	3,869.00	170.48
<i>Year 11</i>	0	-	-	
<i>Year 12</i>	0	-	-	
<i>Year 13</i>	0	-	-	
<i>Year 14</i>	0	-	-	
<i>Year 15</i>	0	-	-	
10-15 Year Average Baseline GPCD				169
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2006	21,474.00	4,083.00	169.74
Year 2	2007	21,609.00	4,165.00	172.07
Year 3	2008	21,130.00	4,398.00	185.82
Year 4	2009	20,662.00	3,836.00	165.74
Year 5	2010	20,260.00	3,869.00	170.48
5 Year Average Baseline GPCD				173
2020 Compliance Year GPCD				
2020		23,764.00	3,894.00	146.29
NOTES: 2020 Population from DOF; 2020 Annual Gross Water Use from City in AF.				

CHAPTER 6

Water Supply Characterization

This chapter describes the current and future water supplies available to the City. The City currently relies on local groundwater supplies for 100% of its water portfolio. Energy intensity information is now required to be included in the 2020 UWMP through completion of DWR provided tables.

Section 6-1: Water Supply Analysis Overview

The City is a local retail water provider who relies on groundwater for 100% of its water supply portfolio. The factors that drive how the City may update its future water supply portfolio are based on the following factors:

Factor	Drivers	Planning Analysis
Reliability	Operations Available All Year	Safe Yield Operational Efficiency
Dry Year Resiliency	Available in droughts	Real shortage vs. State Cutbacks
SDWA Act Compliance	Drinking Water Health/Safety	Current and Future Regulations
Rate Affordability	Water Rates < EPA Affordability criteria	Rate/Financial Planning
Local vs. Regional	City Only vs. Regional Partner	Establish Regional Participation Criteria
Water Rights	Entitlement Security Availability - All Years	Purchase/Transfer/Permit Legal Integrity
Portfolio Diversification	Resiliency Reliability	Project Development Regulatory Approval Timing/Cost Allocation

Traditional water supplies for urban water suppliers in the Central Valley consist primarily of surface and groundwater supplies. That has been changing over the past few decades as urban water agencies plan ahead for a more uncertain future. Diversifying water supply portfolios where practical is a growing trend with recycled water and non-potable uses, reduced water use targets, and recharge projects become more popular and in some cases necessary for a resilient water future.

Surface water sources include local rivers, reservoirs, and state/federal water project storage and conveyance systems. In California, surface water is allocated, hence acquiring surface water entitlements requires purchase or transfers and agreed to resource allocation sharing of a limited resource. Surface water entitlements are ever more valuable in the water market and only make sense with strong partnerships with mutual interests. Surface water can be obtained from a current holder of the entitlement through purchase, transfer, exchange, dedication, etc. Surface waters on the west side of the Central

Valley are supplied through manmade canals owned and operated by the U.S. Bureau of Reclamation (Central Valley Project (CVP)), state of California (State Water Project (SWP)), or from the San Joaquin River watershed.

Surface Water

Opportunities for the delivery of surface water from state or federal water projects are limited for non-federal or non-state water contractors unless area-of-origin water rights are possible. The City is neither a state nor a federal contractor. Irrigation districts surrounding the City are federal contractors and receive water from the CVP through the Delta Mendota Canal (DMC), including areas within the City general plan boundaries (H2O Group, 2012). Some local surface water is pumped directly from the San Joaquin River by some irrigation districts, but only for irrigation since the state prohibits its use as a source for drinking water. The City most recently updated its water supply analysis through its Water Master Plan update that describes multiple water supply options considered by the City for meeting future City water needs. While still a long-term potential option, the City does not consider a surface water supply to be feasible in its 2020 UWMP planning horizon due to constraints related to water right and permit security, high life cycle costs, rate affordability, and dry year resiliency. More information on surface water alternatives is available from the City of Patterson Public Works Department upon request.

Storm Water

The City does not currently recover and reuse stormwater, however it has evaluated capturing flows from nearby Del Puerto Creek to recharge its groundwater basin. Stormwater flows from the creek would be diverted to infiltration basins which would recharge either the shallow or deep aquifer (pending additional studies of the underlying geology and potential for injection to the deep aquifer). Initial estimates indicate that stormwater capture could provide up to 1,700 AFY of water on a long-term annual average basis for groundwater recharge which could then be pumped for potable use. The City will continue to evaluate the alternative of using storm water for groundwater recharge however is not expected to be a part of the City's water portfolio until at least 2030 and beyond.

Recycled Water

The City collects and treats all wastewater within the City limits at its WQCF, where it also treats wastewater from Diablo Grande, a small community approximately 6 miles west of the City. The wastewater is collected by a gravity system that carries influent to the City wastewater plant about 2.5 miles east of the City on Poplar Avenue near the San Joaquin River. The City received approximately 1,793 AFY of influent flows in 2020 at its WQCF representing the current recycled water potential.

The current treatment facility uses three treatment trains. The first is an activated sludge treatment process with an oxidation ditch and two clarifiers, the second is an advanced integrated ponds system (AIPS), and the third is an activated sludge process with an oxidation ditch and one clarifier. Excess biosolids (sludge) from the two oxidation ditches receive additional digestion in four aerobic digesters. Digested sludge is then dewatered using chemically enhanced plastic media drying beds. After treatment, the effluent is discharged to percolation ponds adjacent to the WQCF. A summary of the wastewater treated and discharge by Patterson is presented in Tables 6-2 and 6-3.

The City's wastewater treatment plant does not currently produce recycled water nor does the City import recycled water from neighboring water agencies. The City's 2010 UWMP did not anticipate recycled water use in 2015, but did project recycled water use beginning in 2025. As part of its WMP, the City has explored implementing a recycled water program to serve non-potable irrigation demands in the service area. This would include upgrading the WQCF to become Title 22 compliant and connecting the WQCF

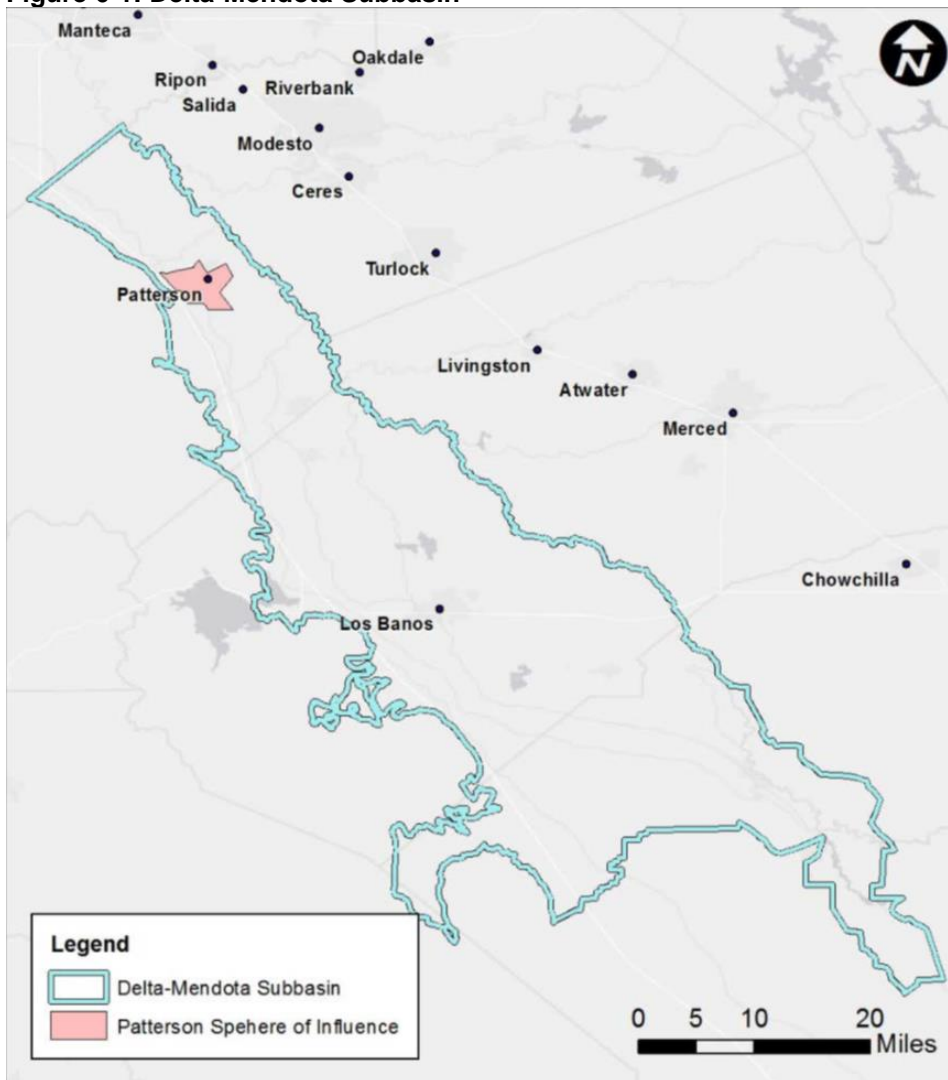
outlet to the non-potable pipe network. Implementation of this program would likely put the City on track to begin delivery recycled water by 2025. A summary of the City’s projected recycled water deliveries is presented in Table 6-4 and a comparison of its previous projections to existing use is presented in Table 6-5. The City is currently planning for a 2030 time horizon for developing and implementing a recycled water project if it is feasible from the life cycle cost, regulatory compliance, and rate affordability perspectives.

Section 6-2: Water Supply Characterization

Groundwater

Local groundwater from the Delta-Mendota Subbasin (in the San Joaquin Valley Basin), as shown in Figure 6-1, is the sole source of the City’s water supplies for the community.

Figure 6-1: Delta-Mendota Subbasin



The City’s groundwater supplies are distributed to customers through its water distribution system network. The City operates seven potable water production wells with water storage tanks for potable water needs and 3 non-potable water production wells to serve public and commercial irrigations needs.

Basin Description

The Delta-Mendota Subbasin is approximately bounded on the west by the Coast Range, on the north by the Stanislaus/San Joaquin County line, on the east by the San Joaquin River and follows the boundary of the Tranquility Irrigation District at its southernmost reach. Groundwater studies of the local basin from 2002 through 2010, conducted by Kenneth D. Schmidt and Associates, Groundwater Consultants (KSA) based in Fresno, California, state: “Groundwater is present in two aquifers beneath the City of Patterson ...water levels in both aquifers have apparently been relatively stable over the long term” (KSA, 2010). The studies concluded that there are essentially two aquifers underlying the City; a lower confined zone, and an upper unconfined zone. The two aquifers are separated by the thick, semi-impermeable Corcoran Clay layer. Much of the Subbasin includes the Corcoran Clay formation, which underlies the basin at depths of about 100 to 500 feet and acts as a confining bed. The aquifers are generally quite thick in the San Joaquin Valley sub-basins, with groundwater wells commonly extending to depths of up to 800 feet to tap into the sub-Corcoran aquifer. A map of the Subbasin can be found in Figure 6-1.

KSA estimated that natural inflows to the two basins are approximately 3,500 AFY (upper) and 8,900 AFY (lower), based on basin hydraulic conductivity, transmissivity, and gradients. Additional recharge to the upper aquifer is expected from canal seepage, percolation of applied irrigation water, and stream flow seepage. Hence, total inflow to the local basin underlying the City is upwards of 12,500 AFY (KSA, 2010). The City uses 12,000 AFY as the safe yield for its groundwater subbasin.

Water quality above the clay (reachable within about 25 feet of the land surface) is suitable for non-potable use, though recent monitoring suggests that total dissolved solids (TDS) and Nitrate levels are on the rise. Water quality below the clay layer is generally suitable for potable use, however there are some instances of high TDS, Chrome 6, and 1,2,3-TCP levels. Chrome 6 levels in the Subbasin had been compliant with State and Federal regulations until the California SWRCB established a primary drinking water MCL for Chrome 6 to be implemented through the Division of Drinking Water (DDW) in 2014 (reducing the acceptable limit from 50 micrograms per liter to 10 micrograms per liter). In response the City coordinated with the Division of Drinking Water and prepared a Corrective Action Plan (CAP) to address Chrome 6 levels in the City’s water sources through a compliance order. The SWRCB rescinded the Chrome 6 regulation in 2018 before requiring water agency compliance. The SWRCB is now considering promulgation of a subsequent Chrome 6 drinking water MCL possible in FY21-22. If the SWRCB adopts an updated Chrome 6 primary drinking water standard that impacts the City’s water sources, the City’s CAP will be updated and long-term compliance solutions identified with the lowest possible life cycle cost to ratepayers.

Groundwater Management

Since 1995 the subbasin has been managed as a part of the San Luis and Delta-Mendota Water Authority (SLDMWA), of which the City is a participating member. SLDMWA’s most recent groundwater management plan (pre-SGMA) is available online and has the following management objectives:

- Assure an affordable groundwater supply for the long term needs of the users.
- Prevent long-term groundwater depletion and maintain adequate groundwater supplies for all users.
- Maintain groundwater quality to meet the long-term needs of users.
- Attempt to reduce or prevent inelastic land subsidence due to groundwater overdraft.
- Maintain general continuity between groundwater management practices and activities undertaken by the participating agencies.

Following the passage of the 2014 Sustainable Groundwater Management Act (SGMA), the City began discussion with the members of SLDMWA regarding the formation of a Groundwater Sustainability Agency (GSA) as a prudent strategy to cost-effectively meet the new SGMA requirements. A GSA was subsequently established and approved by DWR that governs water management activities in the City and

regional vicinity as part of SLDMWA’s regional groundwater management strategy with multiple GSAs and subbasins included to cover the entire region. The City participates in the GSA as a stakeholder through a Memorandum of Agreement (MOA) to facilitate regional cooperation and maintain SGMA compliance. Each GSA incorporated SLDMWA’s management objectives into the newly developed SGMA-compliant Groundwater Sustainability Plan (GSP) for each GSA. The GSA approved its initial SGMA-compliant GSP in January 2020 (classified as a high priority basin) which was submitted to DWR for review and approval as required per SGMA requirements. The City notifies GSA member agencies of its intent to prepare its 2020 UWMP and provides opportunities for stakeholder review as documented in Section 10.1 of this document.

Delta-Mendota Subbasin – Safe Yield and Overdraft Conditions

Changes in groundwater levels have been monitored by DWR and various cooperators for many decades in the region. The Delta-Mendota Subbasin was included on DWR’s final list of critically overdraft basins (released January 2016). As a result, the subbasin must be managed by a SGMA-compliant GSP which characterizes documented overdraft conditions and identifies the safe yield thresholds which are addressed through GSP management objectives and implementation activities. This analysis builds off the foundational framework of groundwater management activities implemented by SLDMWA over recent decades. Additional information regarding the management of the subbasin by the GSA through its prepared GSP includes annual monitoring and reporting of its groundwater monitoring network (water levels and water quality data), documentation of subbasin overdraft as a whole and within the City’s service area portion of the subbasin, and analysis by the City to determine its safe yield of the subbasin in meeting its future community water needs.

The City prepared an Operational Yield Study (OYS) through its recent Master Water Plan update which identified the safe yield of the subbasin in the City service area assuming General Plan build-out by 2060. The OYS, which leveraged previous similar studies, estimated the volume of groundwater the City could pump from the subbasin within its service area without: impacting the use of groundwater resources in the area surrounding the City’s sphere of influence, exceeding the identified safe yield subbasin target, or impacting City groundwater infrastructure. Using the C2VSim numerical groundwater model for California’s Central Valley, the operational yield of the subbasin within the City’s build-out service area boundary was determined as follows:

Source	Operational Safe Yield (OSY)	Subbasin Safe Yield
City Operational Safe Yield Study	10,000 AFY	12,000 AFY
	OSY target allows City to assess potential groundwater impacts below subbasin safe yield	Average annual recharge calculated = 12,500 AFY, 12,000 AFY safe yield target
City Groundwater Use Projections (2020-2045 period)	3,800-8,300 AFY (164 gpcd use/2.26% growth rate)	70% of safe yield target
City Subsidence Monitoring Network	Bi-annual observations to track subsidence trends	City data ties in with larger regional subsidence monitoring program
City Average Static Water Level Monitoring	Monitor monthly average static water levels to identify declining water level trends	City data ties in with larger regional groundwater modeling calibrations
Water Quality	SDWA Compliance	Shallow vs. Deep Aquifer

This safe yield estimate serves as a range to be used for planning purposes and periodic reassessment as additional SGMA GSP information and data are collected and evaluated allowing further calibration of groundwater modeling to quantify and update safe yield targets as warranted. The City will update future groundwater subbasin safe yield projections through additional analysis and WMP updates.

Historical Pumping

While the Subbasin as a whole is in overdraft, the City's groundwater pumping represents only a small fraction of the pumping that occurs on a regular basis within the basin. The basin is a source of supply for urban suppliers, agricultural users, and private wells. The City has been monitoring its groundwater levels at its wells and has not noticed any significant changes in groundwater elevations to date. As the City participates in its GSP implementation and maintains compliance with SGMA regulation, additional groundwater data will be collected and analyzed in order to keep the safe yield target updated to avoid any future overdraft related groundwater impacts.

The City's annual groundwater production varies depending on weather, economic, land use, and demographic factors. Overall, the trend will be increasing City groundwater pumping if planned City growth occurs during the 2020 UWMP planning horizon. The rate of groundwater pumping increases will depend primarily on actual growth rates and per capita water use by City water customers. Projected total gross water use figures in this plan assume a 164 gpcd water use rate. Lower per capita water use levels during this period would result in a lower rate of groundwater pumping increases allowing the City to stay within the safe yield of the subbasin for a more extended period.

Another City strategy for managing groundwater pumping within its safe yield is to shift non-potable water uses to zones above the Corcoran clay while maintaining drinking water use extractions from the zones below the Corcoran clay which have superior water quality. The above and below Corcoran clay aquifers are separated by this clay layer allowing these aquifers to be operated independently. The City has already shifted more than 200 AFY of its groundwater pumping to the above (shallow) Corcoran aquifer using non-potable irrigation wells which are more easily recharged naturally and through conjunctive use and stormwater management actions to reduce pumping on the below Corcoran higher quality aquifer. By matching its groundwater use with the quality of the source (aquifer), the City is better positioned to manage its potable water sources in the below Corcoran aquifer within the safe yield without negative drawdown effects on a local or regional scale.

Section 6-3: Water Supply - DWR Tables

The City's 2020 UWMP includes the various required DWR water supply related data tables which capture available and potential water supplies for the City. The data tables included in this chapter are listed below. The idea of these tables is to characterize currently available water supplies and identify water supplies that could be developed as needed over the 2020 UWMP planning horizon.

DWR Data Table	Table Title	Table Information
6-1R	Groundwater Volume Pumped	Annual AF: 2016-2020
6-2R	Wastewater Collected Within Service Area - 2020	Annual AF: 2020
6-3R	Wastewater Treated/Discharged Within Service Area-2020	Annual AF: 2020
6-4R	Recycled Water Direct Beneficial Use	Annual AF: 2020-2040
6-5R	Recycled Water Use Projection 2015 UWMP vs. 2020 Actual	Annual AF: 2015 and 2020
6-6R	Methods To Expand Future Recycled Water Use	Annual AF: By Year/Source
6-7R	Expected Future Water Supply Projects-2020 to 2040	Annual AF: By Year/Project
6-8R	Water Supplies-Actual	Annual AF: 2020
6-9R	Water Supplies-Projected	Annual AF: 2025-2045

The City relies on local groundwater resources for 100% of its water supply portfolio. The DWR tables that follow indicate past, current, and future water supplies that are or could be available to meet the City's 2045 gross total water use projections with updated population projections. The City plans to further evaluate expanding its NPWP as feasible by further expanding non-potable well sources, adding tertiary treated recycled water sources, or adding stormwater related sources based on the City's actual future water needs over the planning horizon.

The City can only control groundwater pumping within its portion of the Delta-Mendota sub-basin. There are many other groundwater users in the region who utilize groundwater as part of their annual water supplies with higher use rates during dry year period. The City is a relatively low volume user of groundwater resources as compared to other groundwater users in the region. The City has established safe yield thresholds to control its use of groundwater to meet its current and future water needs.

DWR Table 6-1R below indicates actual annual groundwater pumping through the City's well and distribution network system from 2016 through 2020. Annual pumping varies depending on a number of factors including number of customers, hydrologic conditions (normal or dry year conditions), water conservation program implementation, SWRCB policies, and other factors that may impact per capita water use trends and patterns.

Table 6-1 Retail: Groundwater Volume Pumped						
<input type="checkbox"/>	Supplier does not pump groundwater. The supplier will not complete the table below.					
<input type="checkbox"/>	All or part of the groundwater described below is desalinated.					
Groundwater Type <i>Drop Down List</i> <i>May use each category multiple times</i>	Location or Basin Name	2016	2017	2018	2019	2020
<i>Add additional rows as needed</i>						
Alluvial Basin	City of Patterson: Delta-Mendota	2,529.29	2,590.26	3,706.66	3,622.07	4,454.00
TOTAL		2,529	2,590	3,707	3,622	4,454
NOTES: Total volume of groundwater pumped annually (ac-ft per year) from City owned water production wells for both potable and non-potable water uses.						

DWR Table 6-2R includes the annual volume of wastewater collected in 2020 as wastewater influent at the City’s WQCF. The City treats and disposes of discharge to the San Joaquin River.

Table 6-2 Retail: Wastewater Collected Within Service Area in 2020						
<input type="checkbox"/>	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2020 service area covered by wastewater collection system <i>(optional)</i>					
	Percentage of 2020 service area population covered by wastewater collection system <i>(optional)</i>					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? <i>Drop Down List</i>	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? <i>Drop Down List</i>	Is WWTP Operation Contracted to a Third Party? <i>(optional)</i> <i>Drop Down List</i>
<i>Add additional rows as needed</i>						
City of Patterson	Metered	1,793	City of Patterson	Water Quality Control Facility	Yes	No
Total Wastewater Collected from Service Area in 2020:		1,793				
NOTES: Total wastewater volume (ac-ft per year) is metered as influent flows into the City’s wastewater treatment facility.						

DWR Table 6-3R includes the annual volume of wastewater treated and disposed as discharge to the San Joaquin River via the City’s NPDES Permit.

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020											
<input type="checkbox"/> No wastewater is treated or disposed of within the UWMP service area. Supplier will not complete the table below.											The
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number (optional)	Method of Disposal <i>Drop down list</i>	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level <i>Drop down list</i>	2020 volumes				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Patterson Water Quality Control Facility	San Joaquin River near Patterson	Discharge to the River	RWQCB WDR Order No. R5-2018-0070	Percolation Ponds	Yes	Secondary, Undisinfected	1,793	1,793	0	0	0
Total							1,793	1,793	0	0	0

NOTES: The City of Patterson discharges treated wastewater effluent through its NPDES permit to the San Joaquin River near Patterson.

DWR Table 6-4R includes the volume of recycled water direct beneficial uses from 2020 to 2040 with projections for future use.

Table 6-4 Retail: Recycled Water Direct Beneficial Uses Within Service Area											
<input type="checkbox"/> 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:						City of Patterson					
Name of Supplier Operating the Recycled Water Distribution System:						City of Patterson					
Supplemental Water Added in 2020 (volume) <i>Include units</i>						n/a					
Source of 2020 Supplemental Water						n/a					
Beneficial Use Type	Potential Beneficial Uses of Recycled Water (Describe)	Amount of Potential Uses of Recycled Water (Quantity) <i>Include volume units</i>	General Description of 2020 Uses	Level of Treatment <i>Drop down list</i>	2020	2025	2030	2035	2040	2045 (opt)	
Agricultural irrigation	n/a	n/a	n/a								
Landscape irrigation (excludes golf courses)	n/a	Tertiary	n/a				187	187	374	561	
Golf course irrigation	n/a	n/a	n/a								
Commercial use	n/a	n/a	n/a								
Industrial use	n/a	Tertiary	n/a				27	27	54	81	
Geothermal and other energy production	n/a	n/a	n/a								
Seawater intrusion barrier	n/a	n/a	n/a								
Recreational impoundment	n/a	n/a	n/a								
Wetlands or wildlife habitat	n/a	n/a	n/a								
Groundwater recharge (IPR)*	n/a	n/a	n/a								
Surface water augmentation (IPR)*	n/a	n/a	n/a								
Direct potable reuse	n/a	n/a	n/a								
Other (Provide General Description)	n/a	n/a	n/a								
					Total:	0	0	214	214	428	642
Internal Reuse (not counted towards Statewide Recycled Water volume).											
*IPR - Indirect Potable Reuse											

NOTES: Based on the City developing a recycled water project either through expanding its own wastewater treatment facility or partnering with City of Modesto for tertiary treated water by 2030.

DWR Table 6-5R includes recycled water projections from the 2015 UWMP vs. 2020 actual uses for 2020. The City did not project any recycled water for 2020.

Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual			
<input checked="" type="checkbox"/>		Recycled water was not used in 2015 nor projected for use in 2020. The Supplier will not complete the table below.	
Use Type		2015 Projection for 2020	2020 Actual Use
Agricultural irrigation			
Landscape irrigation (excludes golf courses)			
Golf course irrigation			
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	Type of Use		
Total		0	0
NOTES: There were no 2020 recycled water use projections or 2020 actual recycled water uses by the City of Patterson.			

DWR Table 6-6R includes information on methods to expand future recycled water use within the City service area.

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
<input type="checkbox"/>		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
Tertiary Treatment	Additional wastewater treatment for re-use	2030	214
Total			214
NOTES: The soonest future recycled water use could be expanded would be 2030 based on necessary regulatory approvals, and project planning, funding, design, construction, and implementation efforts.			

DWR Table 6-7R includes information regarding expected future water supply projects during the 2020-2040 planning period.

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
<input type="checkbox"/>	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.					
<input type="checkbox"/>	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 <i>Drop Down List</i>	Expected Increase in Water Supply to Supplier <i>This may be a range</i>
	<i>Drop Down List (y/n)</i>	<i>If Yes, Agency Name</i>				
<i>Add additional rows as needed</i>						
Tertiary Treatment	No	City WQCF	Treatment Expansion	2030	All Year Types	214
AMI Meter Project	No		Advanced Meter System	2025	All Year Types	375
New Water Wells	No		New Wells for growth	2025	All Year Types	645
NOTES: If the City pursues a recycled water project a preferred project will be selected between upgrading the City's existing wastewater plant or City of Modesto regional tie-in project based on total project lifecycle costs, implementation schedule, funding opportunities, regulatory compliance, and overall rate impact to the community.						

DWR Table 6-8R includes information regarding actual water supplies delivered in 2020.

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2020		
<i>Drop down list</i> <i>May use each category multiple times.</i> <i>These are the only water supply categories that will be recognized by the WUEdata online submittal tool</i>		Actual Volume	Water Quality <i>Drop Down List</i>	Total Right or Safe Yield <i>(optional)</i>
<i>Add additional rows as needed</i>				
Groundwater (not desalinated)	Existing water production from wells and storage	4,454	Drinking Water	12,000
Total		4,454		12,000
NOTES: Actual volume is based on total water production during calendar year 2020 within the safe yield identified in the City's Water Master Plan consistent with the regional Groundwater Sustainability Plan.				

DWR Table 6-9R includes projected water supplies over the 2025-2045 planning period.

Table 6-9 Retail: Water Supplies — Projected											
Water Supply <i>Drop down list</i> <i>May use each category multiple times.</i> <i>These are the only water supply categories that will be recognized by the WUEData online submittal tool</i>	Additional Detail on Water Supply	Projected Water Supply <i>Report To the Extent Practicable</i>									
		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)
<i>Add additional rows as needed</i>											
Groundwater (not desalinated)	Wells and water storage facilities	5,582	12,000	5,582	12,000	6,389	12,000	7,196	12,000	8,003	12,000
Total		5,582	12,000	5,582	12,000	6,389	12,000	7,196	12,000	8,003	12,000
<small>NOTES: Reasonably available volume is based on having the City's largest well offline to be conservative with available water supply volumes, consistent with State definition of firm water supply capacity. Assumes new and replacement well capacity improvements are implemented over the planning horizon within the safe yield of the City controlled portion of the sub-basin.</small>											

Section 6-4: Energy Intensity

DWR is providing guidance to urban water suppliers in the preparation of their 2020 UWMPs to provide calculation or estimation of the energy intensity associated with providing a safe reliable water supply to its customers. DWR has provided data tables to complete to help streamline the process of reporting energy intensity for the City of Patterson water system. Reporting energy intensity information is now required in 2020 UWMPs, whereas it was voluntary for completing 2015 UWMPs.

Water Code Section 10631.2(a)

In addition to the requirements of Section 10631, an urban water management plan shall include any of the following information:

- (1) An estimate of the amount of energy used to extract or divert water supplies.
- (2) An estimate of the amount of energy used to convey water supplies to the water treatment plants or distribution systems.
- (3) An estimate of the amount of energy used to treat water supplies.
- (4) An estimate of the amount of energy used to distribute water supplies through its distribution systems.
- (5) An estimate of the amount of energy used for treated water supplies in comparison to the amount used for nontreated water supplies.
- (6) An estimate of the amount of energy used to place water into or withdraw from storage.
- (7) Any other energy-related information the urban water supplier deems appropriate.

Energy intensity reporting Benefits – For Water Suppliers and Customers

- Identifying energy saving opportunities as energy consumption is often a large portion of the cost of delivering water.
- Calculating energy savings and greenhouse gas (GHGs) 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.

Water energy intensity is the total amount of energy, calculated on a whole system basis, required for the use of a given amount of water in a specific location (Wilkinson 2000). This guidance provides a methodology and tools for calculating the operational energy intensity, which is defined as the total amount of energy expended by the urban water supplier on a per acre-foot (AF) basis to take water from the location where the urban water supplier acquires the water to its point of delivery. Energy intensity is typically accounted for as kWh/AF.

For the purposes of the required water energy reporting for urban water management plans, urban water suppliers are only expected to report the *energy intensity* associated with *water management processes* occurring within their *operational control*. Any energy embedded in water supplies by an upstream water supplier (such as a water wholesaler) is not intended to be included in the energy intensity reported in Table O-1.

The City’s energy intensity information for providing water service and collecting and treating associated wastewater flows is included in the energy intensity table required by DWR for compliant 2020 UWMPs. The City is providing energy intensity data for calendar year 2019 to complete the DWR tables using the total utility approach.

Table O-1B: Water Energy Intensity – All City Water Facilities (Jan.-Dec. 2019)

Table O-1B: Recommended Energy Intensity - Total Utility Approach			
Enter Start Date for Reporting Period 1/1/2019 End Date 12/31/2019	Urban Water Supplier Operational Control		
	Sum of All Water Management Processes	Non-Consequential Hydropower	
	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (AF)	4,130	0	4129.578967
Energy Consumed (kWh)	2,660,206	0	2660206
Energy Intensity (kWh/AF)	644.2	0.0	644.2

Table O-2: Wastewater Energy Intensity = All Wastewater Facilities (Jan.-Dec. 2019)

Table O-2: Recommended Energy Intensity - Wastewater & Recycled Water				
Enter Start Date for Reporting Period 1/1/2019 End Date 12/31/2019	Urban Water Supplier Operational Control			
	Water Management Process			
	Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Wastewater Entering Process (AF)	1,745	0	0	0
Wastewater Energy Consumed (kWh)	221289	0	0	221289
Wastewater Energy Intensity (kWh/AF)	126.8	0.0	0.0	0.0
Volume of Recycled Water Entering Process (AF)	0	0	0	0
Recycled Water Energy Consumed (kWh)	0	0	0	0
Recycled Water Energy Intensity (kWh/AF)	0.0	0.0	0.0	0.0

The City has a relatively low energy intensity factor (kWh/AF) for their combined water and wastewater service energy intensity calculations because of its solar array project at its wastewater treatment facility which significantly reduces the energy intensity associated with processing treated wastewater generated from indoor water uses from the City’s service area. More information on the City’s energy intensity is included in Appendix O.

CHAPTER 7

Water Service Reliability and Drought Risk Assessment

This chapter describes the overall water service reliability of the City's water supply in current and future water years and assesses the resiliency of the City's water portfolio during drought and water shortage conditions.

Section 7-1: Introduction

The City currently relies solely on groundwater from the Delta-Mendota Subbasin for its water supply. As discussed in Section 6, the Subbasin has been characterized as a high priority (in critically overdraft) by DWR and must be properly managed to ensure a sustainable water supply for current and future water needs. The City has conducted various groundwater sustainability studies the most recent being the 2015 Operation Yield Study (OYS) which estimated the average annual inflows to the local groundwater basin. Natural inflows to the local basin were estimated to be approximately 12,500 AFY with 3,500 AFY (above the Corcoran Clay) and 8,900 AFY (below the clay), based on basin hydraulic conductivity, transmissivity, and gradients. Additional recharge to the upper aquifer is expected from canal seepage, percolation of applied irrigation water, and stream flow seepage. All local basin natural inflows combined underlying the City are conservatively estimated to be upwards of 12,500 AFY (KSA, 2010). Both the KSA and OYS estimates imply that the City will have an adequate groundwater supply to meet its current land use build-out scenario with proactive basin management objectives to be implemented through the approved Groundwater Sustainability Plan (which complies with SGMA requirements). While the City has an adequate quantity of groundwater resources available to meet its future needs, it has the option to treat or zone-isolate individual wells as needed to keep developed groundwater supplies online during their useful life to ensure future water supply resiliency during all water year types.

As discussed in Section 6 the City closely monitors its local basin groundwater conditions and evaluates the data to ensure that the safe yield target is sustainable or needs to be updated to meet the City's water supply reliability criteria (factors). The City also monitors current and future water quality regulations that could impact the City's groundwater system reliability. The SWRCB is considering a renewed primary drinking water MCL for Chrome 6 (potentially in FY21-22) which would require the City to update its existing Chrome 6 Corrective Action Plan in coordination with DDW and consider well improvements as required to meet a new standard. The SWRCB is currently considering potential Chrome 6 MCL levels between 10 and 25 parts per billion. The City's Chrome 6 compliance strategy would be to first zone-isolate pumping from existing wells from strata with low Chrome 6 levels below a new MCL standard, then develop new wells that tap into strata with SDWA-compliant water quality. The City may resort to Wellhead treatment if required depending on the actual Chrome 6 MCL standard approved by the SWRCB. Well site conditions may determine the best course of action depending on site setback clearances, access issues, and surrounding land uses.

Water supply improvements will be planned to maintain safe reliable water supplies through the UWMP planning horizon while meeting demand projections contained in this plan. The table below summarizes the factors that will be considered to determine the best water supply options for the City to implement.

Factor	Drivers	Planning Analysis
Reliability	Operations-All Year	Safe Yield/Operational Efficiency
Dry Year Resiliency	5-Yr. dry period	Real shortage vs. State Cutbacks
SDWA Act Compliance	Drinking Water	Current and Future Regulations
Rate Affordability	EPA Criteria	Rate/Financial Planning
Local vs. Regional	Mutual Benefits	Regional Participation Criteria
Water Rights	Entitlements	Purchase/Transfer/Permit
Portfolio Diversification	Resiliency	Project planning/regulatory approvals

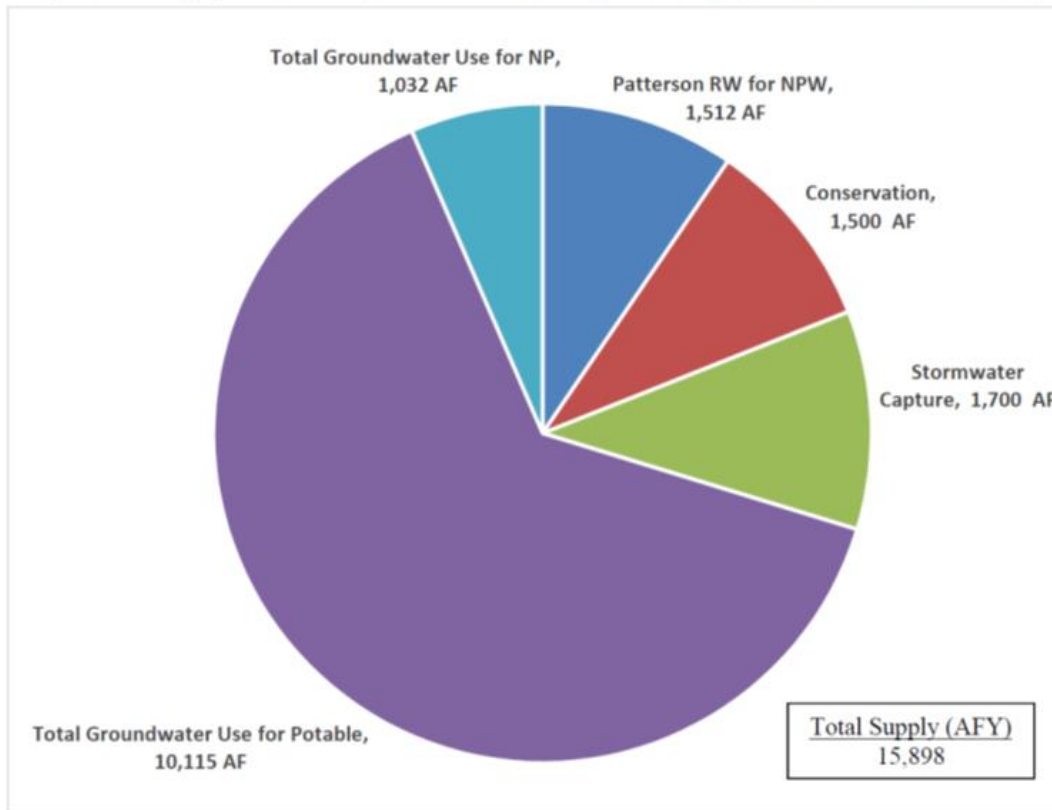
Section 7-2: Water Service Reliability Assessment

DWR Table 7-1 below indicates that the City’s current water system capacity can reliably meet current water needs during normal or representative severe five consecutive dry year periods without demand reduction or supply augmentation measures.

Year Type	Base Year <i>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</i>	Available Supplies if Year Type Repeats																															
		<input type="checkbox"/>	<input checked="" type="checkbox"/>																														
		<input type="checkbox"/>	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____																														
		<input checked="" type="checkbox"/>	Quantification of available supplies is provided in this table as either volume only, percent only, or both.																														
			<table border="1"> <thead> <tr> <th>Volume Available</th> <th>% of Average Supply</th> </tr> </thead> <tbody> <tr> <td>Average Year</td> <td>2013</td> <td>4,776</td> <td>90%</td> </tr> <tr> <td>Single-Dry Year</td> <td>2015</td> <td>4,776</td> <td></td> </tr> <tr> <td>Consecutive Dry Years 1st Year</td> <td>2012</td> <td>4,776</td> <td></td> </tr> <tr> <td>Consecutive Dry Years 2nd Year</td> <td>2013</td> <td>4,776</td> <td></td> </tr> <tr> <td>Consecutive Dry Years 3rd Year</td> <td>2014</td> <td>4,776</td> <td></td> </tr> <tr> <td>Consecutive Dry Years 4th Year</td> <td>2015</td> <td>4,776</td> <td></td> </tr> <tr> <td>Consecutive Dry Years 5th Year</td> <td>2016</td> <td>4,776</td> <td></td> </tr> </tbody> </table>	Volume Available	% of Average Supply	Average Year	2013	4,776	90%	Single-Dry Year	2015	4,776		Consecutive Dry Years 1st Year	2012	4,776		Consecutive Dry Years 2nd Year	2013	4,776		Consecutive Dry Years 3rd Year	2014	4,776		Consecutive Dry Years 4th Year	2015	4,776		Consecutive Dry Years 5th Year	2016	4,776	
Volume Available	% of Average Supply																																
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Consecutive Dry Years 4th Year	2015	4,776																															
Consecutive Dry Years 5th Year	2016	4,776																															
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.																																	
Volume available is based on firm capacity of the City's water system with the City's largest producing well offline to provide a conservative water supply availability estimate consistent with State firm water supply capacity criteria. The recent severe five year drought cycle (2012-2016) is selected as the consecutive five year dry period.																																	

The City’s water service reliability assessment reflects the future water planning and preferred water portfolio (water supply mix) identified in the City’s Water Master Plan. A summary of the City’s long range water portfolio to meet City build-out conditions while maintaining a balance between future demand projections and water supply needs is depicted below.

Figure 6-3: Supply Mix After Implementation of Preferred Portfolio (Portfolio 2 “Local Control”)



The City will periodically update its water portfolio as needed to maintain a balance between community water supply and demand with high resiliency to manage water supplies through extended dry year cycles.

Section 7-3: Drought Risk Assessment

The following DWR tables depict the City’s drought risk assessment with water supply availability by water year type. These numbers reflect that the City’s available water supply will be equal to or greater than the updated water demand projections for each potential water year type through 2045 as the City has adequate groundwater supply capacity within its safe yield to meet its projected water demands.

DWR Table 7-2 depicts normal year supply and demand conditions through 2045 indicating the City has adequate groundwater supplies to meet future water needs during normal year conditions.

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals (autofill from Table 6-9)	5,582	5,582	6,389	7,196	8,003
Demand totals (autofill from Table 4-3)	4,888	5,473	6,127	6,860	7,681
Difference	694	109	262	336	322
NOTES: City has ample water supplies to meet projected water demands during Normal Year Supply conditions. This assumes the City uses 164 gpcd or less (its 2020 water use target) while meeting future demands based on population projections.					

DWR Table 7-3 depicts single dry year supply and demand conditions through 2045 indicating the City has adequate groundwater supplies to meet future water needs during a single dry year condition as a single dry year does not impact the City’s available groundwater supplies. The supply in a single-dry year is expected to be equivalent to an average year, as billing records and State-wide trends indicate that there is limited water use reduction in a single dry year due to delayed reaction to the limited rainfall.

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045 (Opt)
Supply totals	5,582	5,582	6,389	7,196	8,003
Demand totals	4,888	5,473	6,127	6,860	7,681
Difference	694	109	262	336	322
NOTES: No impact on City's water supply reliability during a Single Dry Year condition under normal demand conditions.					

DWR Table 7-4 depicts supply and demand conditions through 2045 for a multiple dry year supply (five consecutive dry years), similar to the 2012-2016 drought cycle. This information indicates that the City has adequate groundwater supplies to meet future water needs during an extended five-year drought condition and projected through a six-year consecutive dry year scenario. Even in 2045, with growth projections assumed to occur, the City will be using well less than the safe yield of its groundwater subbasin as presented in the City’s Groundwater Sustainability Plan.

The storage capabilities of the Delta-Mendota Subbasin, along with prudent basin management and City demand management measures, will allow Patterson to meet its future water demands. The preferred water supply portfolio selected for the 2016 Water Master Plan was developed to diversify City supply and meet buildout City demand. Therefore, for the supply and demand

analysis, water supplies were set equal to projected water demands for all water year types even though the supply capability of the groundwater wells likely exceed the demands in the planning horizon of this UWMP.

Even during an extended multiple dry year cycle the City will be pumping groundwater at 70% of the safe yield of its subbasin and thereby has adequate groundwater supplies to meet projected demands under those conditions. It is highly likely that the City would implement some level of demand reduction during an extended dry year cycle to conservatively manage its available groundwater supplies in the event of a prolonged dry period.

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045 (Opt)
First year	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322
Second year	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322
Third year	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322
Fourth year	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322
Fifth year	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322
Sixth year (optional)	Supply totals	5,582	5,582	6,389	7,196	8,003
	Demand totals	4,888	5,473	6,127	6,860	7,681
	Difference	694	109	262	336	322

The City has shown the ability to cutback its water use to 126 gpcd during the 2012-2016 dry year period which is well below its 2020 water use target of 164 gpcd. The City has an established water conservation program with the ability to manage demands during extended dry periods. The demand in the first several years of an extended dry period are likely to remain at average supply levels as the City's groundwater reserves will provide ample supply during average use conditions. The City would implement its Water Shortage Contingency Plan as necessary during an extended dry year period consistent with local, regional or state-wide water management strategies in response to mitigating more severe drought impacts until dry conditions abate. For this reliability section, however, the City has applied the future demand basis equivalent to the City's 2020 water use target in Chapter 5 given that the City would be able to meet its target-based demands with current and planned water sources. Not to mention during future extended dry conditions the City plans to have additional non-potable water supplies available to manage potable water consumption levels as required to meet the City's water supply needs with the least impact to the community.

Section 7-4: Regional Supply Reliability

The Westside Stanislaus Integrated Water Resource Management Plan (IRWMP, update finalized in 2019) describes the region's water supplies and water management practices. According to DWR, the region is heavily groundwater reliant, with groundwater accounting for about 30 percent of the annual supply used for agricultural and urban purposes in the region. Regular users of local groundwater include the City of Patterson, local irrigation districts, and private land owners, though the irrigation districts use mostly surface water, including Central Valley Project and California Aqueduct water supplies, and rely on groundwater primarily for a backup supply. During most years the irrigation districts in the region have ample surface water supplies to meet the majority of their water needs except during critical dry years when there's surface water cutbacks which increases their reliance on local groundwater supplies. The regular application of surface water to large irrigation district lands provides a regular recharge element to augment natural groundwater recharge sources.

The region has implemented and encourages a number of methods to reduce water demand and manage its water resources. Westside Stanislaus participating agencies promote urban and agricultural water use efficiency through fixture or hardware replacements, water-use tracking, evapotranspiration reduction measures, and, for urban users, plumbing and building code updates. Additionally, the region seeks to reduce conveyance losses through vigilant canal and pipeline maintenance. Aside from reducing water loss and demands, the Westside Stanislaus region also has plans in place to improve and manage water quality through collaborative projects and programs. The Westside Regional Drainage Plan lays the groundwork for controlling salt loads and selenium discharges to the San Joaquin River, which could have devastating effects on the local economy. Participating agencies also promote modification of production processes to eliminate or reduce high-toxicity substances. Reducing pollution both improves water quality in the region and eliminates the cost for treatment that would be required once pollution occurs (RMC, 2014). More information on regional water supply reliability planning and implementation actions can be found in the Westside Stanislaus IRWMP available

online at the following website link: <http://www.ci.patterson.ca.us/668/Integrated-Regional-Water-Management-Pla>

A summary of regional water supply reliability actions follows from the adopted 2019 IRWMP document submitted to DWR for review and approval.

Table 4-2: Alignment of Plan Objectives with Resource Management Strategies

Plan Objective	RMS																														
	Ag Water Use Efficiency	Urban Water Use Efficiency	Conveyance - Delta	Conveyance - Regional/Local	System Reoperation	Water Transfers	Conjunctive Management/	Desalination - Brackish and Seawater	Precipitation Enhancement	Recycled Water	Surface Storage - CAJED	Surface Storage - Regional/Local	Drinking Water Treat and Distribute	Groundwater Remediation	Sediment Management	Other Storage (crop lifting, etc.)	Matching Quality to Use	Pollution Prevention	Salinity Management	Urban Runoff Management	Ag Lands Stewardship	Economic Incentives	Ecosystem Restoration	Forest Management	Land Use Plan and Management	Recharge Area Protection	Water-Dependent Recreation	Watershed Management	Flood Management	Outreach	Water and Culture
Objective A: Provide for more reliable water supply south of the Delta	•	•	•	•	•	•	•			•	•	•					•														•
Objective B: Improve regional self-reliance for water through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts	•	•		•	•	•	•	•				•	•	•					•		•	•	•		•	•					
Objective C: Provide reasonable opportunity to advance ecosystem restoration through balanced project implementation															•				•	•	•	•		•	•	•			•		•
Objective D: Provide potential for environmental and habitat improvement, including wetlands						•	•				•				•	•			•	•	•	•		•	•	•	•	•	•	•	•
Objective E: Promote projects that meet the needs of disadvantaged communities							•				•		•	•					•		•	•			•				•	•	•
Objective F: Promote and enhance water conservation, water use efficiency, and sustainable water use	•	•															•	•					•		•						•
Objective G: Promote and enhance water recycling							•				•			•					•				•								•
Objective H: Maximize utility of Regional aquifers while improving sustainability	•	•					•	•				•	•	•				•	•	•					•	•			•	•	•
Objective I: Minimize risk of loss of life, infrastructure, and resources caused by significant storm events by utilizing uncontrolled flow beneficially							•					•				•					•			•	•	•			•	•	
Objective J: Capture stormwater for higher beneficial use whenever practicable							•		•			•			•	•	•	•		•			•	•	•	•	•	•	•	•	•

One of the most important IRWMP objectives pertaining to the City’s groundwater supply is Objective H: Maximizing utility of Regional aquifers while improving sustainability. The City is working with its regional partners to establish aquifer safe yield targets and manage regional aquifers to enable all users reliant on groundwater supplies to have the ability to use those resources during all year types. The City is in a sustainable position with its groundwater supplies currently using less than 40% of its safe yield capacity. As indicated in the City’s preferred water portfolio, additional management actions will be considered in the future as needed to meet this regional water planning objective. More information is contained in Appendix D on regional water management activities.

The City manages its groundwater resources within its safe yield as part of the recently adopted Delta-Mendota Subbasin Groundwater Sustainability Plan (GSP). The City coordinates with regional groundwater management efforts including data collection, analysis, and evaluation pertaining to groundwater sustainability and management actions to maintain reliance with safe yield targets agreed to in the adopted 2020 GSP approved by DWR. More information is contained in Appendix D on regional groundwater management activities.

CHAPTER 8

Water Shortage Contingency Plan

This chapter describes the expected plan elements DWR is requesting for updated Water Shortage Contingency Plans. The goal of having a standard plan template for all urban water supplier plans is to improve the readiness and response in addressing future water shortage conditions. DWR recommends that plans be updated on a regular basis (at least every UWMP cycle) to ensure effective implementation results in plan action is required.

Section 8-1: Water Supply Reliability Analysis

California Water Code (CWC) Section 10632(a)(1) requires an analysis of water supply reliability per CWC Section 10635. The City relies exclusively on groundwater to meet customer needs and has historically met customer demands through times of drought. Conditions could arise such as catastrophic events, prolonged periods of drought, unforeseen impacts to the groundwater supply, etc. that could require the activation of the WSCP.

The City maintains seven (7) potable well facilities and associated water storage tanks, and three (3) non-potable irrigation only well facilities to meet the maximum day demand and fire protection requirements of its water system with the largest well source offline, in accordance with State of California Code of Regulations, Title 22 California Waterworks Standards. All water is pumped from the Delta- Mendota Sub-basin within the safe yield.

The water supply assessment is based on operating six wells (with the largest capacity well offline) for up to 12 hours per day, 365 days per year, which the wells are capable of supplying. The total pumping capacity of the six wells is 2,028 million gallons per year. However, the wells will only be operated to the extent that it is required to meet the City's daily demands and thus will pump less than what is possible during the Winter and shoulder months of the calendar year.

The total potable water demand for the City was 3,894 ac-ft for the 2020 calendar year (from January 1, 2020 through December 31, 2020). Water demand projections from the City's 2020 Urban Water Management Plan project a total water demand of approximately 8,100 ac-ft per year by 2045. The existing water system has a firm well system capacity of 4,776 ac-ft per year (5,986 ac-ft per year with its largest well online) which can reliably meet current and future water demands till at least 2025 with new wells to be added as needed based on current growth projections to meet 2045 projected water demands. The additional well capacity added to meet future 2045 growth needs is within the safe yield of the City's groundwater sub-basin aquifer system (12,000 ac-ft per year). The City meets more than 10% of its annual water supplies in 2020 through the use of three (3) non-potable wells tapping into the shallow portion of the Corcoran Clay aquifer system considered highly reliable in all water year types.

Section 8-2: Annual Water Supply and Demand Assessment Procedures

CWC Section 10632 (a)(2) requires written procedures to be developed to conduct an annual water supply and demand assessment (annual assessment) to determine the water system's reliability. The annual assessment needs to be completed and submitted to the California Department of Water Resources (DWR) by July 1 of each year.

A report will be presented to the City Council each year following the completion of the annual assessment and prior to submittal to DWR. The City Council shall review and approve the findings of the annual assessment and if necessary, trigger implementation of any water shortage response actions resulting from the annual assessment findings through a resolution. Appendix C includes a sample resolution for Implementation of a given WSCP Water Supply Shortage Level.

The recommended steps to complete the annual assessment are described below.

Available Water Supply

Available water supplies for the City shall be quantified each year by summing the capacity of each operational groundwater well. A water supply availability analysis assuming one subsequent dry year shall also be completed. Since the City has not historically been impacted by drought, water shortage conditions, or had any impacts on the safe yield of the groundwater sub-basin, the available supply for the subsequent dry year shall be the same as the current year.

Unconstrained Customer Demand

Water use for the previous year shall be quantified by summing the metered water usage for all customers by user class for the previous year. Customer water demands for the City shall be projected for the upcoming year based on the previous year's water usage and anticipated new customer connections and per capita target assumptions.

The first step to calculate the anticipated demand is to calculate the future population changes. To calculate future population, multiply the number of anticipated new customer connections by the number of persons per household as indicated on updated Department of Finance (DOF) data tables shown on the DOF website for the City. That number shall be added to the current population to obtain the future population.

$$\text{Future Population} = \text{Current Population} + \text{No. of New Connections} \times \text{Persons per Household}$$

To calculate anticipated demands for the upcoming year, multiply each meter usage per customer class by the future population and divide it by the current population.

$$\text{Anticipated Demand} = \frac{\text{Meter Usage} \times \text{Future Population}}{\text{Current Population}}$$

Evaluation Criteria

If the available water supply is greater than the anticipated customer demand for the upcoming year, then the City would not need to take any further action. If the anticipated customer demands for the upcoming year are greater than the available water supplies, the City can initiate appropriate water conservation actions as detailed in this WSCP.

Planned Water Use for Current Year Considering Dry Subsequent Year

As mentioned above, the City has not historically been impacted by drought or water shortage conditions thus planned water use for the current year shall not be impacted by an anticipated subsequent dry year conditions unless they impact the safe yield of the subbasin.

Infrastructure Considerations

If infrastructure projects are anticipated for the upcoming year that could impact water supply production (e.g. repairs and/or replacement of existing wells, development of new groundwater well, etc.), these water supply impacts shall be evaluated for the timeframe (i.e. months) when the infrastructure projects will impact the available water system capacity. Thus, the available water supply shall be increased or reduced accordingly for each month based on expected months of well non-availability and/or when new or replacements supplies are developed and brought online providing additional system capacity.

Section 8-2: Annual Water Supply and Demand Assessment

CWC Section 10632 (a)(3)(A) requires standard water shortage levels including greater than a 50-percent reduction in water supply conditions. The City will implement six water shortage levels or stages in response to corresponding water supply shortages to comply with CWC requirements. The stages will be implemented during water supply shortages, due to City water system constraints or due to outside factors (e.g. State water use cutbacks or regional drought conditions that may not be directly influencing the City water supplies). The determination and declaration of a water supply shortage stage will be made by the City of Patterson City Council.

Stage 1 – This level would be initiated during a mild water shortage (up to 10%) and is part of an ongoing public information campaign encouraging voluntary water conservation. The City could achieve up to a 10% reduction voluntarily or could issue a resolution triggering Stage 1 voluntary water use reductions up to 10%. There are no mandatory measures implemented during a Stage 1 response. Although Stage 1 is very achievable, customers would be reminded of regional dry year concerns and any short interruptions in water service when the City may have a redundant back-up well offline for repairs, which makes the overall supply system more vulnerable to shortages.

Stage 2 – This level would be initiated during a moderate water shortage (11-20%) and

would be addressed through enhanced voluntary measures and public outreach with voluntary enforcement of the water waste ordinance. Failure of one groundwater supply wells could cause a moderate reduction in water supply resulting in implementation of Stage 2 measures. Stage 2 would also be implemented during an on-going regional drought condition where water conservation is voluntary with little to no actual impact on the City's groundwater supply capacity. During Stage 2 conditions, the City Council could declare certain water use prohibitions in accordance with the City's water waste ordinance.

Stage 3 – This level would be initiated during a more severe water shortage (21 to 30%), which could be caused by State mandated water use reductions or a catastrophic failure of up to two City groundwater supply wells. During a Stage 3 condition the City Council would implement a combination of voluntary and mandatory measures as needed to meet the specific water shortage cutback target. The City Manager would have the authority to implement City Council directed water shortage response measures including the implementation of additional prohibitions and consumption reduction methods that could include cutbacks in irrigation water use by all customers, enhanced leak repair by utilities and customers, City establishment of water shortage pricing surcharges, and other consumption reduction methods as needed to effectively reduce water demands to match available supplies.

Stage 4 – This level would be initiated during a critical water shortage (31 to 40%), which could be caused by a catastrophic failure of up to three groundwater supply wells. All actions taken in the prior stages would be intensified and production would be monitored on a daily for compliance with necessary water use reductions. Customers would be under strict enforcement of no waste policies and water rationing would be considered. The City may declare a water shortage emergency to immediately repair and bring well capacity back online in a timely manner.

Stage 5 – This level would be initiated during a critical water shortage (41-50%), which could be caused by a natural disaster, prolonged severe drought event, or catastrophic failure of water system facilities that greatly reduces water supply capacity by more than 40% from normal operation capacities. Severe limitations would be placed on irrigation use by all customers, leaks would be required to be repaired within five days and all non-essential City operations (e.g. flushing) would be curtailed until further notice.

Stage 6 – This level would be initiated during a catastrophic water shortage (>50%), which could be caused by a natural disaster or catastrophic failure requiring severe and immediate cutbacks in customer water demands. Rationing and mandatory restrictions would be enhanced as needed to effectively reduce water demands to match available supplies. Indoor use would be capped at the State mandated

minimal service level on a gpcd basis.

Table 8-1 summarizes the standard six (6) water shortage levels included in a compliant WSCP.

Table 8-1 Water Shortage Contingency Plan Levels		
Shortage Level	Complete Both	
	Percent Shortage Range ¹ <i>Numerical value as a percent</i>	Water Shortage Condition <i>(Narrative description)</i>
<i>Add additional rows as needed</i>		
1	Up to 10%	Mild Water Shortage - drought or loss of redundant well supply.
2	Up to 20%	Moderate Water Shortage - drought or temporary loss of one (1) well.
3	Up to 30%	Severe Water Shortage - drought, State cutbacks, or permanent loss of one (1) well.
4	Up to 40%	Critical Water Shortage - extended drought, State cutbacks, loss of two (2) wells.
5	Up to 50%	Critical Water Shortage - extended drought, State cutbacks, loss of three (3) wells.
6	>50%	Catastrophic Water Shortage - natural disaster, major system failures, energy supply disruptions.
¹ One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: Cutbacks in water use will be based on triggered shortage level and percent reduction target based on normal year per capita water use levels.		

Section 8-4: Shortage Response Actions

The City would migrate from voluntary water use reduction methods utilized in stages 1 and 2, to more mandatory actions during a stage 3 and 4 level water use reduction target. The City has very few emergency water supply options especially for potable water supplies. The City might consider emergency exchanges, transfers or purchases on an interim basis of non-potable water sources from neighboring water agencies as feasible. The following list of shortage response actions indicate that as water shortage severity increases corresponding response measures become more mandatory and severe to ensure percent shortage cutback targets are met during a given water shortage event. Response actions can be added or modified as needed to achieve percent reduction targets with least impact on customers and the economy.

Consumption Reduction Action	Level When Action Takes Affect	Projected Reduction (%)
Demand Reduction Program	All levels	0-50%+
Voluntary Water Use Reductions	1-3	0-30%
Voluntary Restrictions – no waste, not enforced	1-2	0-20%
Public Outreach Measures - General	1-2	0-20%
Public Outreach Measures – General and Specific	3-6	30-50%+
Expedite Conversion of Water Efficient Fixtures	1-3	10-30%
Irrigation Reduction – limit 3 watering days/week	1-2	0-20%
Irrigation Reduction – limit 2 watering days/week	1-4	0-40%
Irrigation Reduction – parks/open spaces	2-6	20-50%+
Irrigation Reduction – no lawn watering	5-6	40-50%+
Customer Leak Repair – within five days of detection	1-6	10-50%+
Utility Leak Repair – expedite larger leak repairs	3-6	20-50%+
Mandatory restrictions – no waste enforced [patrols, tickets, fines, etc.] – who/how/how much	3-6	20-50%+
Apply flow restrictions to customers	5-6	40-50%+
Water shortage pricing - surcharge	3-6	20-50%+
Apply penalties for excessive water use	3-6	20-50%+
Restrict water use for only priority uses	4-6	30-50%+
Mandatory water rationing, per capita allotment	5-6	40-50%+

The City has few water supply augmentation options available. Developing additional non-potable wells supplies or adding new recycled water options would take years to develop and would not be available during the short-term shortage condition at hand. The City could attempt to increase pumping capacity from operational wells or attempt to purchase emergency supplies from neighboring agencies which would be very expensive to the City and likely be non-potable water sources with limited uses in the City service area. Table 8-3 indicates some of the options available to the City to stretch existing supplies or augment under emergency conditions.

Operational Changes

During a triggered water supply shortage condition the City can implement operational changes such as reduce water system flushing, increase hydrant security, upgrade meters for accurate measurement of water use and enhanced reading capabilities (e.g. hourly reads), and change water CIP priorities to focus on water reducing projects and programs.

Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUedata online submittal tool</i>	How much is this going to reduce the shortage gap? <i>Include volume units used.</i>	Additional Explanation or Reference <i>(optional)</i>
<i>Add additional rows as needed</i>			
1 and 2	Improve Customer Billing	Up to 5% or 200 AF	Provide more real-time water use data as available through AMI project
	Offer Water Use Surveys	Up to 5% or 200 AF	Especially to large water users
3 and 4	Provide Rebates on Plumbing Fixtures and Devices	Up to 5% or 200 AF	Enhance plumbing fixture rebates
	Provide Rebates for Landscape Irrigation Efficiency	Up to 5% or 200 AF	Provide or enhance landscape rebates (e.g. sprinkler rebates)
	Decrease Line Flushing	Up to 5% or 200 AF	Avoid THM MCL violations.
	Provide Rebates for Turf Replacement	Up to 10% or 400 AF	Enhance turf replacement rebates
	Expand Public Information Campaign	Up to 5% or 200 AF	Use social media, apps, other means
	Implement or Modify Drought Rate Structure or Surcharge	Up to 5% or 200 AF	Cover additional costs associated with water shortage response actions.
	5 and 6	Increase Water Waste Patrols	Up to 10% or 400 AF
	Moratorium or Net Zero Demand Increase on New Connections	Up to 10% or 400 AF	Discuss phasing permitted development
	Other actions (describe)	Up to 5% or 200 AF	Enhance mandatory leak repair policies
	Other actions (describe)	Up to 10% or 400 AF	Significant irrigation prohibitions
	Exchanges	Up to 10% or 400 AF	Bring in temporary non-potable supplies

NOTES: Partial list of potential measures the City would consider as additional WSCP stages are triggered from real shortage conditions. The City has very few supply augmentation measures other than to increase pumping capacity from existing wells and attempt to secure short term supplies from neighboring agencies which would be very expensive to the City and likely only benefit non-potable uses.

Additional Mandatory Restrictions

The City could implement additional mandatory restrictions against specific water use practices that may be considered excessive during given water shortage conditions. If drought or water shortages warrant mandatory restrictions (consider for Stage 3), the City could implement further restrictions if warranted based on Stage 3 or Stage 4 conditions. Table 8-3 identifies mandatory restrictions that would be enforced during a water shortage emergency.

DWR Table 8-4 depicts the City’s minimum water supply capacity is expected to be stable over the next three years regardless of water year type based on conservative calculation of its firm water supply capacity which is adequate to meet water demand projections through 2025.

Table 8-4 Retail: Minimum Supply Next Three Years			
	2021	2022	2023
Available Water Supply	4,776	4,776	4,776
Notes: The City expects a reliable stable supply over the next three years in part because the City conservatively calculated its firm water supply capacity assuming its largest well is offline.			

Seismic Risk Assessment and Mitigation Plan

The CWC requires the City’s WSCP to include a seismic risk assessment and mitigation plan to assess the vulnerability of each water facility. Per CWC Section 10632.5 (c), this requirement is met by the Stanislaus County Hazard Mitigation plan with addresses hazard vulnerability assessments and mitigation plans (including for earthquakes). The City closely monitors its water facilities and is prepared to rehabilitate infrastructure should an earthquake hazard impact its water system. There are two major faults in the region that could generate a seismic event that could impact City water facilities.

Section 8-5: Communication Protocols

The CWC Section 10632 (a)(5)(A) requires the City to notify all customers and stakeholders of any anticipated water shortages as result of the annual water supply and demand assessment process. Per, the CWC Section 10632 (a)(5)(B), the City will also notify all customers and stakeholders if any shortage response actions are triggered pursuant to the annual water supply and demand assessment results. In the event of an anticipated water shortage, the City will inform customers through newsletters and messages on the City website, water bill inserts, direct mail (e.g. post cards), newspapers, press releases, advertising, social media (Nextdoor App), mobile electronic street signs, community workshops and meetings, and other communications as needed to meet water shortage reduction targets. Communications are summarized below in DWR Table 8-5.

Table 8-5 Retail: City WSCP Communication Protocol for Each Level/Stage		
Stage No.	Water Supply Conditions	Communication Method
1 - Voluntary	0-10% shortage	Website
2 – Enhanced Voluntary	10-20% shortage	Bill Insert, Newsletter, Website
3 – Voluntary/Mandatory	20-30%	Same as 1 & 2 plus: direct mail, newspaper, press release, advertising, social media, mobile electronic sign
4 – Voluntary/Mandatory	30-40%	Same as 1-3 plus: community workshop and meetings
5 - Restrictions/Allocations	40-50%	Same as 1-4 plus: targeted restriction and allocation communications
6 - Restrictions/Allocations	Catastrophic (> 50%)	Same as 1-5 plus: enhanced targeted restriction and allocation communications

Section 8-6: Compliance and Enforcement

CWC Section 10632 (a)(6) requires an urban water supplier to penalize or charge for excessive use, where applicable. In accordance with the City Code (through adoption of the 2020 WSCP), when a water shortage emergency is declared, the City Manager may issue a Notice of Violation to any customer that fails to comply with the conditions of the ordinance. After one notice has been issued further violations shall be punishable by a fine of: \$25 for a first violation; \$50 for a second violation; and \$100 for a third violation; and thereafter the City may exercise the option of terminating water service for flagrant water waste compliance and enforcement situations. Furthermore, each day upon which any condition of the ordinance is violated constitutes a separate violation. The City will ensure compliance and enforce provisions through the use water use field patrols, calls received at City offices, and/or communications received through social media supported by the City. The City will maintain records of all enforcement actions. The City Municipal Code will maintain updated policies and procedures related to implementation of the City's updated WSCP.

During severe and critical water shortages (Stages 3-6), there may be additional penalties or charges applied for excessive water use. During these triggered water shortage conditions, the City Manager may take further actions if violations continue after the initial written warning, such as installing a flow-restricting device on the service line or termination of service for repeated violations of unauthorized water use. A summary of when penalties and charges may take effect is summarized below by stage in DWR Table 8-6.

Table 8-6 Retail: City WSCP Penalties and Charges Summary	
Penalties or Charges	Stage When Penalty or Charge Takes Effect
Penalty for excess use	3-6
Charge for excess use	3-6
Flow Restriction	5-6
Termination of Service	5-6

In accordance with the City's Code (Section 13.24.240), violations or fines may be appealed for reconsideration. Appeals for reconsideration shall be processed as indicated in the City Code provisions.

Section 8-7: Legal Authorities

The City is a general law city with authorities to govern City business and services and enter into agreements or arrangements beneficial to the City in accordance with State laws and regulations. Per the City Code, the City has the authority to implement the water response actions presented herein and as necessary to meet the public health and safety needs of the community. The City has water code provisions in place to address water supply shortage and water waste conditions.

The City shall approve a DWR compliant WSCP by July 1, 2021 and may declare a water shortage emergency as required depending on the severity of the water shortage level/stage in accordance with CWC Chapter 3, Sections 350 through 359. This includes provisions related to penalties and charges associated with WSCP implementation actions. Existing provisions of City Code (e.g. Section 13.24.240) related to WSCP actions will be updated and incorporated into the City's updated WSCP.

The City shall coordinate with Stanislaus County for the possible proclamation of a local water supply emergency per California Government Code, California Emergency Services Act, Article 2, Section 8558.

Section 8-8: Financial Consequences of WSCP

CWC Section 10632 (a)(8) requires a description of the impacts of consumption reduction on the revenues and expenditures of the urban water supplier. The City has established an accounting system for tracking expenses and revenue shortfalls associated with voluntary and mandatory water use reductions implemented through WSCP implementation actions. The City maintains reserve funds that can be used to offset expenditure impacts during times of emergency. Further the City would implement a water surcharge upon triggering of a Stage 3 WSCP declaration to recover unmitigated revenue shortfalls resulting from the costs of additional water shortage response measures and actions. The water surcharge would only be in effect during the declared water shortage condition. Any water related surcharges would be approved by the City Council, validating the need for the surcharges and identifying appropriate costs to be covered through any approved surcharges to support WSCP implementation.

Section 8-9: Monitoring and Reporting

Per CWC Section 10632 (a)(9), the City will monitor and report on the implementation of its WSCP. Monthly metered water production and consumption data will be collected, tracked and analyzed to monitor compliance and meet SWRCB water conservation reporting requirements. The SWRCB is in the process of approving regulations for regular monthly water use reporting by urban water suppliers. Monthly water use data will be submitted with the 2013 baseline period starting point. This water use reporting process will assist the State to determine compliance with per capita water use targets, established end use targets, and future cutback policy response during prolonged drought conditions.

The City is working toward deployment of an AMI metering system which will collect hourly read data and provide real-time leak detection information for customers. The additional AMI meter data will also provide the City with a real-time tracking tool to monitor customer water use and reductions levels during a triggered water shortage condition. The City will also make real-time water use information available to customers when available through the City's website.

Section 8-10: WSCP Refinement Procedure

Per CWC Section 10632 (a) (10), the City may choose to refine the WSCP based on monitoring and reporting of data collected. The City's WSCP can be refined or updated at any time, independent of when UWMPs are updated every five years. Based on analysis of the data collected, the City may choose to modify or add consumption reduction methods to more accurately meet water level targets. Any updates to the WSCP will be approved by the City Council as needed to maintain an effective water shortage response plan for the community. Any WSCP updates will allow for stakeholder review, and be publicly noticed before any City Council action is considered at a planned City Council meeting. The WSCP documents and any updated information will be available on the City's website.

Section 8-11: Special Water Feature Distinction

The City does not have any special water features of distinction that would be involved in a WSCP response effort.

Section 8-12: Plan Adoption, Submittal, and Availability

The City conducted a public hearing and adopted its 2020 UWMP at the June 1, 2021 City Council Meeting. Public notices were posted 7 and 14 days prior and the City's 2020 UWMP document was available for review prior to the City Council meeting on the City's website. The City's updated Water Shortage Contingency Plan was approved at the same City Council Meeting prior to adoption of the 2020 UWMP with elements updated to reflect DWR 2020 Guidebook criteria. The City's adopted 2020 UWMP was submitted to DWR after adoption through the online data portal and provided to the State Library. The City's 2020 UWMP was also made available to stakeholders involved in the plan development process including the

County and agencies included in Table 10.1. The City's adopted Final 2020 UWMP is available for viewing or download from the City's website.

Per the CWC, the following steps shall be performed prior to adoption of the WSCP.

- Prior to adoption, the City will issue a notification of a public hearing to customers, the county, and other stakeholders.
- The City will publish a public notice in a local newspaper for two consecutive weeks prior to the public hearing.
- The City shall hold a public hearing to obtain public input.
- Following the public hearing or at a subsequent City Council meeting, the City Council shall formally adopt the WSCP.
- Per CWC Section 10632 (a)(c), the City will make the WSCP available on the City's website, <https://www.ci.patterson.ca.us/669/Urban-Water-Management-Plan>, within 30 days of adoption by the City Council.

The City may choose to amend its 2020 WSCP at any time which will follow the steps listed above independent of future City UWMP updates.

Section 8-13: Resources and References

The City will have its adopted 2020 UWMP and Water Shortage Contingency Plan available on its website for easy access by the community and interested stakeholders. The City considered appropriate AWWA publications and the DWR 2020 UWMP Guidebook provisions to assist in the development of these documents to prepare DWR compliant plans and policies. The City also reviewed WSCPs from other agencies to ensure that its 2020 WSCP update met all new DWR requirements and fit into the implementation approaches that would be most effective for the Patterson community. The City also referenced regional planning processes that it is engaged in to sustainably manage its water resources including the Westside-San Joaquin IRWMP and Delta-Mendota Subbasin Groundwater Sustainability Plan.

CHAPTER 9

Demand Management Measures

This chapter presents an analysis of the Demand Management Measures (DMMs) utilized by the City. A DMM is a program or action designed to maximize the efficient use of water and minimize water waste. The City's water use efficiency program will be in the context of reliably meeting 2020 per capita water use targets and including water use efficiency as part of its long-term water supply portfolio. Past, current and future measures will be addressed. Historically the City was a CUWCC member in good standing and has shown a commitment to using its water resources wisely.

Section 9-1: Demand Management Measures For Wholesale Agencies

The City is a retail urban water supplier and will address demand management measures for retail agencies in Section 9-2 of this chapter.

Section 9-2: DMM Implementation Over The Past Five Years

The City is a retail urban water supplier and in accordance with CWC Section 10631 must address demand management measures that they have implemented over the past five years including the following:

1. Water Waste Prevention Ordinances
2. Metering
3. Conservation Pricing
4. Public Education and Outreach
5. Programs to Assess and Manage Distribution System Real Loss
6. Water Conservation Program Coordination and Staffing Support
7. Other DMMs that reduce long term per capita water demands and help the City meets its 2020 water use target

The following table summarizes the City's DMMs implemented over the past five years. Many of the DMMs have been in place since the City's 2015 UWMP was prepared and submitted to DWR in 2016. The City has also focused on expanding non-potable water sources to offset future potable water demands.

City of Patterson Summary of DMMs Implemented Over The Past Five Years		
DMM	City Action	In Place Last 5 Years
Water Waste Ordinance	Water Waste Ordinance adopted as part of the City Municipal Code and enforced as needed.	YES
Metering	All City water services are metered, and all new water services are required to install meters.	YES
Conservation-Oriented Rates	Two-tier inclining rate structure in place for residential accounts.	YES
Public Education/Outreach	Local and regional public education and outreach efforts to support the City’s water use efficiency and resource management programs.	YES
Water Loss Control Program	Complying With SB 555 provisions and developing programs to reduce City total real water losses. Annual Validated Water Audits: 2015-2019.	YES
Water Conservation Staffing	The City has a water conservation coordinator with team support from utility billing for rates and water distribution staff for field services.	YES
Other DMMs that reduce per capita water use	Planning for AMI Metering System Upgrade Project for real-time leak detection and water loss control benefits. Customer plumbing fixture/appliance retrofit to current Green Code Standards. City offers turfgrass and HET replacement rebate programs. Conversion to non-potable irrigation uses where feasible.	YES

The City’s per capita water use ranged between 126 to 146 gpcd from 2016 to 2020, below its 2020 water use target of 164 gpcd. Calculations account for non-potable water use.

A summary of other DMMs the City implemented over the past five years are included below including type of program, number of units converted, rebate amounts, and water savings on an annual and cumulative basis over the 2016-2020 period.

The City’s toilet replacement program intends to expedite the conversion of older housing stock plumbing fixtures to new California Green Code Standards. The figures below do not include free riders or those that replaced older fixtures without using available rebate funds.

City of Patterson - HET Rebate Program						
HET Replacement Prog. ↓↑	2016 ↓	2017 ↓	2018 ↓	2019 ↓	2020 ↓	2016-2020 ↓
# of Toilets Converted	45	15	26	12	2	100
Rebate Amount (\$)	\$4,289	\$1,386	\$2,600	\$1,178	\$296	9,749
Estimated Water Savings (in gallons)	164,250	54,750	94,900	43,800	7,300	365,000
CUMULATIVE Water Savings						1,419,850

Note: Water savings calculation assumes 3.5 gpf to 1.28 gpf, two toilets per home, 20 flushes per day per home.

The City turf replacement program intends to encourage the conversion of landscaped turf areas, especially those with passive uses, with low water using landscaping with low volume irrigation systems and water efficient practices such as mulching. The figures below assumes that customers maintain eligible irrigated turf areas until the rebate application is approved, and replacement landscape is lower water using resulting in more than 50% water savings per square foot.

City of Patterson - Turf Rebate Program						
Turf Replacement Prog. ↓↑	2016 ↓	2017 ↓	2018 ↓	2019 ↓	2020 ↓	2016-2020 ↓
Square Feet Converted	2,774	1,152	5,353	12,782	4,758	26,819
Rebate Amount (\$)	\$2,774	\$1,260	\$5,353	\$12,306	\$4,758	\$26,451
Estimate Water Savings (in gallons)	83,220	34,560	160,590	383,460	142,740	804,570
CUMULATIVE Water Savings						1,945,770

Average water savings = 30 gallons per square foot of turfgrass converted landscape.

Section 9-3: Planned Implementation To Achieve Water Use Targets

The City of Patterson has already met its 2020 water use target, however; the City is wary of any post-drought water use bounces or any increases in per capita water use. While the City has drastically reduced its per capita water use since 2013, additional DMMs must be implemented over the next five years (2021-2025) to ensure the City can reliably meets its 2020 water use target of 164 gpcd. A summary of the DMMs the City will be focusing on over the next five years to achieve its water use target are listed below.

City of Patterson Summary of DMMs To Implement To Achieve Water Use Targets		
DMM	City Action	In Place Next 5 Years
Water Waste Ordinance	Continue City Water Waste Ordinance and enforce as needed.	YES
Metering	AMI Metering System Upgrade Project with 2025 delivery target.	YES
Conservation-Oriented Rates	Update City water rates and maintain conservation-oriented rate structure for residential and irrigation accounts.	YES
Public Education/Outreach	Continue local and regional public education and outreach efforts to support the City's water use efficiency and resource management programs.	YES
Water Loss Control Program	Reduce non-revenue water to < 8% and maintain ILI index between 1-3 by 2025. Continue annual validated water audits.	YES
Water Conservation Staffing	Continue City conservation coordinator with team support from utility billing for rates and water distribution staff for field services.	YES
Other DMMs that reduce per capita water use	Consider conservation-oriented rates and water budgets for irrigation accounts. Continue plumbing fixture/appliance retrofit and turfgrass replacement rebate programs. Fix leaky pipes and other leak sources. Continue conservation-oriented rate structure for 2022-26 rate plan.	YES

The City has been successful in meeting its 2020 water use target for the past five years (from 2016 to 2020) and will need to implement additional DMMs to ensure that it can reliably meet its 2020 water use target over the next five years (through 2025) by continuing to implement effective DMMs as described above. The City is confident that the effects of recently implemented DMMs plus the planning implementation of DMMs over the next five years will lead to sustained reduction in per capita water use in the City service area as indicated in Appendix J. In addition, the City will continue to benefit from water regulations that have already been approved by the State that encourage customers to install water efficient devices, use lower demand landscaping designs, or achieve additional water use reductions the City will

continue to support through its public outreach and educational campaign. A recap of recent regulations that effect water use are outlined below.

1. **The Water Conservation in Landscaping Act** (AB 1881, approved September 28, 2006, updated last in 2015) – This legislation mandates the adoption of a model water conserving landscaping ordinance with specific provisions for landscape design, construction, and maintenance of public and private developments (with landscapes greater than 2,500 sq. ft.) for the purpose of conserving water with an allowable landscape water budget parameter of 0.55 ETo (translates to inches of water applied). The City has adopted this ordinance which is implemented through the Public Works Department.
2. **2008 California Green Building Standards Code** (California Building Standards Code, Title 24, adopted July, 2008, last updated in 2016) – These changes to the California Building Code include adoption of mandatory water conservation measures for residential and non-residential development, requiring the use of water conserving building practices, including but not limited to, low-flow rate plumbing fixtures (to achieve a 20% reduction of indoor water use), and moisture sensing irrigation controllers.
3. **Property Transfers: Replacement of Plumbing Fixtures** (SB 407, adopted October 12, 2009) – This legislation requires that all existing commercial, residential and multi-family buildings in California built before 1994 be retrofitted to meet high efficiency water use standards by January 1, 2017 or 2019, depending on the type of structure. Encourages plumbing fixture conversion through time-of-sale regulation.
4. **Water Loss Control: Annual Validated Audits/Performance Standards** (SB 555, adopted in 2015) – This legislation requires that all existing urban water suppliers conduct annual distribution system water audits, validate annual audits, and develop performance standards to reduce water losses as a result of providing water to customers. The City has identified real losses in the utility system and intends to repair and replace infrastructure to reduce real losses and corresponding non-revenue water % to industry standard.
5. **Urban Water Use Targets: Residential, CII, Water Loss Control and Additional Per Capita Water Use Targets beyond 2020** (Water Conservation Legislation, AB 1668/SB 606, adopted in 2018) – This legislation requires the development of new water use standards for indoor and outdoor residential water uses, CII irrigation water use, and water loss for existing urban water suppliers. Once these new standards are adopted urban water suppliers will need to plan their DMMs carefully to ensure compliance in a timely manner.

Section 9-4: Water Use Objectives (Future Requirements)

The California Water Code requires that urban water suppliers (UWS) develop new water use objectives that are based on specific standards for certain water use sectors. These water use objectives will not be developed until 2023, and the first report will require information on what DMMs water agencies will implement to meet their water management objectives. The City will consider aligning its conservation management actions with the changing urban water use trends observed since 2005 in order to consider these potential future requirements.

Below are the water use objectives the City is tracking and evaluating for incorporation into its long term water use efficiency program. Some of these activities will be implemented when State actions and policy updates are adopted by DWR and/or the SWRCB. Until then the City will prepare for future requirements and stay updated on new water use objectives for UWS to address in their long-term water use efficiency programs.

Overview of Future Water Use Objectives Subject To Review and Approval By DWR/SWRCB		
Water Use Objective	Objective Criteria	City Action
Water Loss Control	Performance Standards for UWS by SWRCB	Complying With SB 555 provisions and developing programs to reduce City total water losses
Residential Indoor Water Use	Consider reducing indoor standard from 55 to 50 gpcd by 2030	City working to encourage customer plumbing fixture and appliance conversions to current Green Code Standards
Residential Outdoor Water Use	Consider reducing outdoor use based on water budget approach	City converting irrigation uses to non-potable sources and implemented conservation-oriented rate structure
CII Water Uses	Consider standards for CII users	City evaluating CII uses and possible measures pending updated State policy
GPCD Water Use Targets	Consider additional targets beyond 20x2020 criteria	City planning to meet current water use target reliably and will re-assess pending updated State policy
Implement Smart Metering System	AMI or equivalent metering system deployment	City is working on the implementation of its AMI Metering System Upgrade Project with 2025 delivery

The City will be prepared to address additional water use objectives based on State policy updates and resource management objectives. Appendix J contains additional information.

CHAPTER 10

Plan Adoption, Submittal and Implementation

The chapter provides information on the City's actions to adopt its Final 2020 UWMP and submit the final adopted documents to DWR and other agencies as required in the Guidebook. Information on planned implementation is also included to achieve plan objectives prior to the 2025 UWMP update process.

Section 10-1: Inclusion of 2020 Data

The City's 2020 UWMP updates the City's 2015 UWMP and includes all information necessary to meet the requirements of California Water Code, Division 6, Part 2.6. The City acts as an urban, retail public water system with over 6,600 water service connections and providing more than 3,800 AF of water supplied annually (Table 2-1). Data collected and used for this plan update included City water production, water consumption, water audit, and wastewater flow data for calendar year 2020. Energy intensity data is for the calendar year 2019 period to facilitate timely completion of its 2020 UWMP by July 1, 2021 deadline.

Section 10-2: Notice of Public Hearing

The City held a public hearing prior to adopting its Final 2020 UWMP and approving its updated Water Shortage Contingency Plan. The City published public notices 14 and 7-days prior to the scheduled public hearing for adoption of the City's 2020 UWMP. The City also notified the County and local stakeholders at least 60-days prior to when the public hearing was held to adopt the 2020 UWMP. Copies of all public notices are available in Appendix C and on the City's website with other 2020 UWMP update documentation.

The following parties were notified of the City's intent to prepare its 2020 UWMP and when the City Council would be conducting a public hearing prior to adoption of its 2020 UWMP. DWR Table 10-1 contains a list of stakeholders the City notified of the public hearing with 60-day advance notice.

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
West Stanislaus Irrigation District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Del Puerto Water District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Patterson Irrigation District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Twin Oaks Irrigation District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Grayson CSD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Crows Landing CSD	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Eastin Water District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Oak Flat Water District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Centinella Water District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Western Hills Water District	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Ceres	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Hughson	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Modesto	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Newman	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Oakdale	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Riverbank	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Turlock	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
City of Waterford	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
SLDMWA	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
County Name <i>Drop Down List</i>	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Stanislaus County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Merced County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
NOTE: Stanislaus County is the only City or County the City of Patterson is required to notify related to the 2020 UWMP; sent to County Environmental Resources, Public Works and the Housing Authority. Merced County was also notified.		

Section 10-3: Public Hearing and Adoption

The City prepared its Draft 2020 UWMP and made the associated documents available for a 30-day public review period (from March 29 through April 30, 2021). The Draft plan was made available to the community and interested stakeholders on its website at the following link: <http://www.ci.patterson.ca.us/669/Urban-Water-Management-Plan>. Comments were encouraged by interested stakeholders during the 30-day public review period, and amendments made to the Draft plan based on comments received during the 30-day public review period. An informational item was included on the City Council's April 20, 2021 Meeting Agenda highlighting the status of the City's 2020 UWMP update process and schedule for adoption at the City Council meeting on June 1, 2021. After the public review period and incorporation of any necessary changes, a Final 2020 UWMP was prepared for presentation to the City Council at their June 1, 2021 meeting where a public hearing was held and plan adopted via resolution per DWR 2020 UWMP Guidebook requirements. A copy of the adopted resolution can be found in Appendix C. The City's 2020 UWMP will be submitted to DWR electronically through DWR's online submittal tool (WUE data portal) prior to the July 1, 2021 submittal deadline. Once submitted to DWR, a copy of the City's adopted 2020 UWMP (including the updated Water Shortage Contingency Plan) will be provided to Stanislaus County and the California State Library within 30 days of adoption as required by California Water Code Section 10644(a). Additionally, notice will be given to parties included in DWR Table 10-1 above that the City's 2020 UWMP has been adopted and is available to view on the City's website at the link cited above.

If the City makes any modifications or amendments to the adopted 2020 UWMP, it will go through the process of notification, public hearing, adoption, and submittal to DWR as described in Section 10-6 below for the amended plan.

Section 10-4: Plan Submittal

The City prepared and adopted its 2020 UWMP on June 1, 2021 and submitted the Final 2020 UWMP documents to DWR through the DWR online portal submittal process prior to July 1, 2021. The City submitted the ten (10) chapters comprising its plan, Appendices A-P, and all DWR required data tables. All 2020 UWMP documents submitted to DWR were available for interested parties on its website at the link cited above. A receipt verification of the City's 2020 UWMP submittal to DWR in accordance with the DWR 2020 UWMP Guidebook is available upon request. The City does not provide water to any major water user outside of its service area and prepared this UWMP individually (Table 2-4) including its stakeholders in the process as discussed in Section 2-6.

Section 10-5: Public Availability

The City's Final 2020 UWMP was prepared, adopted and submitted to DWR and made available to the County, community and other stakeholders on the City's website at the link cited above. All parties were notified of the public availability of the City's adopted 2020 UWMP within 30-

days of plan adoption. The City's Final 2020 UWMP Chapters and Appendices are available to the public for review and downloading on an as needed basis. Any 2020 UWMP updates would be made available to the public on the City's designated website location for easy reference and access.

Section 10-6: Amending An Adopted UWMP or WSCP

The City encouraged public participation in the development of its 2020 UWMP and provided opportunities for public review and comment on the Draft and Final 2020 UWMP documents. In February 2021, the City sent out 60-day notification letters to its local and regional stakeholders to inform them of the City's intent to prepare its 2020 UWMP and welcome any comments or questions they might have in the plan development process. The stakeholders notified included Stanislaus County and all potential members of the local Groundwater Sustainability Agency (Ag and Urban entities). The City did not notify any wholesale supplier (Table 2-4) as it is a retail water provider that serves as its own water supplier. The City made copies of all draft and final documents available for stakeholder review during the 2020 UWMP development process on its City website in the designated location for the preparation of its 2020 UWMP as cited above. If the City needs to amend its 2020 UWMP (or WSCP), the City will follow the same procedures as listed below.

1. City staff prepares updated documents as required;
2. City makes updated documents available for public and stakeholder review on the City's website;
3. City provide a 30-day public review period pertaining to updated documents;
4. City publishes two (2) public notices (14 and 7 days prior to City Council consideration of approving updated document changes);
5. City conducts a public hearing prior to adopting prepared updated documents;
6. Upon City Council adoption of updated documents, City submits approved updates to DWR through the DWR online portal submittal process; and
7. City makes updated documents available to parties notified of the City's intent to prepare its 2020 UWMPs within 30-days after City Council approval of plan amendments on the City's website at the link cited above.

The City will amend its 2020 UWMP and WSCP documents as needed to comply with State requirements, improve program or measure effectiveness, or update information based on changing conditions. Additional information regarding future amendments will follow the process outlined above.

Section 10-7: 2020 UWMP Implementation

The City of Patterson is committed to the implementation of its 2020 UWMP concurrent with the scheduled activities identified herein as required by Section 10643 of the Act. The City's water supplies are managed through its Public Works Department with trained staff responsible to properly plan and implement responses identified in this document and other key planning efforts to proactively address water supply reliability challenges. Furthermore, the City has a conservation coordinator that oversees the implementation of Demand Management Measures

(DMMs) through its on-going water conservation program. The City is committed to implementation of the projects, plans, and discussions provided within this document. However, it is important to note that execution of the plan is contingent upon the ability to secure necessary approvals by state agencies and effectively collaborate with local and regional stakeholders to garner support for proposed actions. The City's 2020 UWMP document merely presents the water supply, reliability, and conservation programs known and in effect at the time of adoption of this plan. The City understands the limited nature of water supply in California and is committed to optimizing its available water resources. This commitment is demonstrated through the City's use of water management tools to promote the efficient use of water supplies from local sources, wherever feasible. The City takes steps to procure local reliable water supplies wherever feasible and cost effective to minimize and avoid dependence on importations from other regions. The City is a regular participant in regional water resources planning efforts (IRWMP and SGMA GSP related), and has developed internal water resource and master plans, as well as cost effective DMM programs that enable the City to meet future water use targets.