FINAL REPORT | JUNE 2021

City of Lincoln
2020 Urban Water Management Plan

PREPARED FOR

PREPARED BY

WEST YOST
Water. Engineered.

2020 Urban Water Management Plan

Prepared for

City of Lincoln

Project No. 206-60-20-20

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
AB	Assembly Bill
Act	Urban Water Management Planning Act
ADWF	Average Dry Weather Flow
AF	Acre-Feet
AFY	Acre-Feet Per Year
AMI	Advanced Metering Infrastructure
ARBS	American River Basin Study
AWIA	America's Water Infrastructure Act
AWMP	Agricultural Water Management Plan
AWWA	American Water Works Association
CCR	Consumer Confidence Report
cfs	Cubic Feet per Second
City	City of Lincoln
CVP	Central Valley Project
CWC	California Water Code
DMM	Demand Management Measures
DOF	Department of Finance
DRA	Drought Risk Assessment
DWR	Department of Water Resources
DWR Guidebook	2020 Urban Water Management Plans Guidebook for Urban Water Suppliers
DWR Methodologies	*DWR Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (2016)
ET_o	Reference Evapotranspiration
FEMA	Federal Emergency Management Authority
GPCD	Gallons Per Capita Per Day
gpm	Gallons per Minute
GSA	Groundwater Sustainability Agency

GSP	Groundwater Sustainability Plan
HGL	Hydraulic Grade Line
kWh	kilowatt hour
LHMP	Local Hazard Mitigation Plan
LMC	Lincoln Municipal Code
MFP	Middle Fork Project
MG	Million Gallons
MGD	Million Gallons Per Day
NABRDCP	North American Basin Regional Drought Contingency Plan
NASb	North American Subbasin
NID	Nevada Irrigation District
NPDES	National Pollutant Discharge Elimination System
PCWA	Placer County Water Agency
PG&E	Pacific Gas & Electric
PSAs	Public Service Announcements
RHNP	Regional Housing Needs Plan
RRA	Risk and Resilience Analysis
RUWMP	Regional Urban Water Management Plan
RWA	Regional Water Authority
RWQCB	Regional Water Quality Control Board
SACOG	Sacramento Area Council of Governments
SB	Senate Bill
SB X7-7	Senate Bill Seven of the Senate's Seventh Extraordinary Session of 2009
SGMA	Sustainable Groundwater Management Act of 2014
SMD1	Sewer Maintenance District No. 1
SOI	Sphere of Influence
Temporary Agreement	Temporary Water Sales Agreement Between the Nevada Irrigation District (NID), Placer County Water Agency (PCWA), and the City of Lincoln (Lincoln)
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WEP	Water Efficiency Program
WPCGMP	Western Placer County Groundwater Management Plan
WSA	Water Supply Assessment
WSCP	Water Shortage Contingency Plan
WSS	Watershed Sanitary Surveys
WUE	Water Use Efficiency
WWTRF	Wastewater Treatment and Reclamation Facility

INTRODUCTION

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

Since the City of Lincoln (City) provides water service directly to more than 3,000 connections, it is required to prepare an UWMP.

This Executive Summary serves as a Lay Description of the City's 2020 UWMP, as required by California Water Code §10630.5.

CALIFORNIA WATER CODE REQUIREMENTS

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

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

The 2012 to 2016 drought led to further revisions to the Act under the 2018 Water Conservation Legislation to improve water supply planning for long-term reliability and resilience to drought and climate change. Changes presented by the legislation include:

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

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

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

CITY OF LINCOLN WATER SERVICE AREA AND FACILITIES

The City's water system is responsible for delivering treated water to its customers. The City purchases treated water from Placer County Water Agency (PCWA) and pumps groundwater from local wells for its water supply. A portion of the water delivered to the City by PCWA is water supplied by the Nevada Irrigation District (NID) to PCWA for treatment and delivery to the City. The City also owns and operates the Lincoln Wastewater Treatment and Reclamation Facility (WWTRF), which produces recycled water for agricultural use at reclamation areas outside the existing City limits and for irrigation and industrial use within the City limits.

CITY WATER USE

The City currently serves a population of approximately 49,000. It anticipates population growth and future planned development in its water service area, which would increase their demand for water. Thorough and accurate accounting of current and future water demands is critical for City planning efforts. To continue delivering safe and reliable drinking water, the City must know how much water its customers currently use and how much they expect to use in the future.

Projected future water demands have been estimated based on the anticipated growth. Future planned development and study areas in the City's water service area were reviewed and confirmed with the City staff. Based on the anticipated growth, water demands in the City's water service area are expected to increase approximately 65 percent (from 2020 levels) by 2045.

CITY WATER SUPPLIES

The City has the following existing water supplies:

- Treated surface water purchased and delivered by PCWA
- Surface water from NID treated and delivered by PCWA
- Groundwater pumped by the City from City-owned and operated wells from the North American Groundwater Subbasin
- Recycled water produced by the City at the Lincoln WWTRF

To reliably meet current and future water demands, the City plans to implement several projects to optimize the use of its available water supplies. These projects include the installation of new groundwater production wells in developing areas and the expansion of the City's recycled water system to serve existing parks and new developments.

CONSERVATION TARGET COMPLIANCE

In accordance with SB X7-7, the City must meet a per capita water use target of 193 gallons per person per day by 2020 for its water service area. Based on the City's water service area population and water use in 2020, the City met and exceeded its water conservation target with a per capita water use of 191 gallons per person per day.

WATER SERVICE RELIABILITY

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

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

WATER SHORTAGE CONTINGENCY PLAN

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

UWMP PREPARATION, REVIEW, AND ADOPTION

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

The public hearing provided an opportunity for City water users and the general public to become familiar with the 2020 UWMP and ask questions about the City's water supply, its continuing plans for providing a reliable, safe, high-quality water supply, and its plans to address potential water shortages. Following the public hearing, the Lincoln City Council adopted the 2020 UWMP on June 8, 2021. A copy of the adopted Plan was provided to the Department of Water Resources and is available on the City's website: www.lincolnca.gov.

CHAPTER 1
UWMP Introduction

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

1.1 INTRODUCTION

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

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

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

Further, changes to the Act since 2015 require updates to the City's previously updated and adopted Water Shortage Contingency Plan (WSCP). The WSCP is included as an appendix of this UWMP and provides a plan for response to various water supply shortage conditions.

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

1.3 CHANGES FROM 2015 UWMP

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

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

- **Five Consecutive Dry-Year Water Reliability Assessment** [CWC §10635(a)]. The Legislature modified the dry-year water reliability planning from a "multiyear" time period to a "drought lasting five consecutive water years" designation. This statutory change requires the urban water supplier to analyze the reliability of its water supplies to meet its water use over an extended drought period. This requirement is addressed in the water use assessment presented in Chapter 4; the water supply analysis presented in Chapter 6; and the water reliability determinations in Chapter 7 of this plan.
- **Drought Risk Assessment** [CWC §10635(b)]. The California Legislature created a new UWMP requirement for drought planning because of the significant duration of recent California droughts and the predictions about hydrological variability attributable to climate change. The Drought Risk Assessment (DRA) requires the urban water supplier to assess water supply reliability over a five-year period from 2021 to 2025 that examines water supplies, water uses, and the resulting water supply reliability under a reasonable prediction for five consecutive dry years. The DRA is discussed in Chapter 7 based on the water use information in Chapter 4; the water supply analysis is presented in Chapter 6; and the water reliability determinations are discussed in Chapter 7 of this plan.
- **Seismic Risk** [CWC §10632.5]. The Water Code now requires urban water suppliers to specifically address seismic risk to various water system facilities and to have a mitigation plan. Water supply infrastructure planning is correlated with the regional hazard mitigation plan associated with the urban water supplier. The City's seismic risk is discussed in Chapter 8 of this plan.
- **Energy Use Information** [CWC §10631.2]. The Water Code now requires Suppliers to include readily obtainable information on estimated amounts of energy for their water supply extraction, treatment, distribution, storage, conveyance, and other water uses. The reporting of this information was voluntary in 2015. The City's energy use for water supply is discussed in Chapter 6 of this plan.
- **Water Loss Reporting for Five Years** [CWC §10608.34]. The Water Code added the requirement to include the past five years of water loss audit reports as part of this UWMP. This requirement is addressed in Chapter 4.
- **Water Shortage Contingency Plan** [CWC §10632]. In 2018, the Legislature modified the UWMP laws to require a WSCP with specific elements. The WSCP is a document that provides the urban water supplier with an action plan for a drought or catastrophic water supply shortage. Although the new requirements are more prescriptive than previous versions, many of these elements have long been included in WSCPs, other sections of UWMPs, or as part of the urban water supplier's standard procedures and response actions. Many of these actions were implemented by the urban water suppliers during the last drought to successfully meet changing local water supply challenges. The WSCP is used by DWR, the State Water Board, and the Legislature in addressing extreme drought conditions or statewide calamities that impact water supply availability. The City's WSCP is discussed in Chapter 8 and included as an appendix to this plan.

- **Groundwater Supplies Coordination** [CWC §10631(b)(4)]. In 2014, the Legislature enacted the Sustainable Groundwater Management Act to address groundwater conditions throughout California. Water Code now requires 2020 UWMPs to be consistent with Groundwater Sustainability Plans in areas where those plans have been completed by Groundwater Sustainability Agencies. This requirement is addressed in Chapter 6 of this plan.
- **Lay Description** [CWC §10630.5]. The Legislature included a new statutory requirement for the urban water supplier to include a lay description of the fundamental determinations of the UWMP, especially regarding water service reliability, challenges ahead, and strategies for managing reliability risks. This section of the UWMP could be viewed as a go-to synopsis for new staff, new governing members, customers, and the media, and it can ensure a consistent representation of the Supplier's detailed analysis. This requirement is addressed in the Executive Summary of this plan.
- **Water Loss Management** [CWC §10608.34(a) (1)]. The Legislature included a requirement for urban water suppliers to report on their plan to meet the water loss performance standards in their 2020 UWMPs. This requirement is addressed in the Demand Management Measures presented in Chapter 9 of this plan.

1.4 PLAN ORGANIZATION

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

This 2020 UWMP is organized into the following chapters:

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

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

- Appendix A: Legislative Requirements
- Appendix B: DWR 2020 Urban Water Management Plan Tables
- Appendix C: DWR 2020 Urban Water Management Plan Checklist
- Appendix D: Agency and Public Notices
- Appendix E: General Plan Land Use
- Appendix F: Land Use Projections
- Appendix G: Water Demand Factor Update Methodology
- Appendix H: Distribution System Water Loss Audit
- Appendix I: SB X7-7 Compliance Form
- Appendix J: Water Supply Agreements
- Appendix K: Water Shortage Contingency Plan
- Appendix L: Municipal Code Sections
- Appendix M: Water Rate Structure
- Appendix N: Adoption Resolutions

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

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

CHAPTER 2
Plan Preparation

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

2.1 BASIS FOR PREPARING A PLAN

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

The City manages Water System CA3110004. As shown in Table 2-1, the City provided water to 19,661 customer connections and supplied 10,567 acre-feet (AF) of water in 2020 to wholesale and retail customers. The City primarily supplies water to retail customers; therefore, the City is required to prepare an UWMP. The City's last UWMP, the 2015 UWMP, was adopted by the City Council on July 12, 2016.

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

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	Volume of Water Supplied 2020 *
Add additional rows as needed			
CA3110004	City of Lincoln	19,661	10,567
	TOTAL	19,661	10,567
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Volume of water supplied is in acre-feet (AF).			

2.2 REGIONAL PLANNING

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

2.3 INDIVIDUAL OR REGIONAL PLANNING AND COMPLIANCE

This 2020 UWMP has been prepared on an individual reporting basis covering only the City's service area, see Table 2-2. Although the City participates in regional water planning, The City is not part of a formal regional alliance, and it has not prepared a Regional Urban Water Management Plan (RUWMP). As described below in Section 2.5, the City has notified and coordinated planning and compliance with appropriate regional agencies and constituents.

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

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

2.4 FISCAL OR CALENDAR YEAR AND UNITS OF MEASURE

The City is a water retailer.

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

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

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

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

Submittal Table 2-3: Supplier Identification	
Type of Supplier (select one or both)	
☐	Supplier is a wholesaler
☑	Supplier is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables are in calendar years
☐	UWMP Tables are in fiscal years
If using fiscal years provide month and date that the fiscal year begins (mm/dd)	
Units of measure used in UWMP * (select from drop down)	
Unit	AF
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*	

2.5 COORDINATION AND OUTREACH

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

2.5.1 Wholesale and Retail Coordination

The City's retail water service area overlaps the service areas of two water supply wholesalers: (1) the Placer County Water Agency (PCWA), and (2) the Nevada Irrigation District (NID). PCWA's Zone 6 service area includes the majority of the existing City limits and the City's sphere of influence. The City plans to annex the area not currently in PCWA's Zone 6 service area into PCWA Zone 6 as the land is developed. The City relies upon PCWA for a large portion of its water supply.

The NID service area overlaps a portion of the existing City limits in the northeast quadrant of the City, as well as some of the City's sphere of influence north of the existing City limits. The City currently receives NID water supply, which is treated and delivered by PCWA via PCWA facilities. The City purchases the NID supply from PCWA.

In accordance with CWC Section 10631, the City provided water use projections to PCWA and NID, as shown in Table 2-4. As discussed further in Chapter 6, for the purposes of this UWMP, the City is conservatively assuming that it will not receive supply from NID in the future. However, pending the results of ongoing negotiations, NID may supply all or some of the portion of the City within its service area. Therefore, projected City water use within NID's service area was provided to NID for use in its planning efforts. The City provided water demand projections to PCWA and NID in five-year increments, from 2020 to 2045.

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

The retail Supplier has informed the following wholesale supplier(s) of projected water use in accordance with Water Code Section 10631.
Wholesale Water Supplier Name
Add additional rows as needed
Placer County Water Agency
Nevada Irrigation District
NOTES: Although the City is conservatively assuming that it will not utilize supply from the Nevada Irrigation District (NID) in the future, projected City water use within NID's service area was provided to NID for use in its planning efforts.

The City does not provide wholesale water service.

2.5.2 Coordination with Other Agencies and the Community

The City actively encourages community participation in water management activities and specific water-related projects. The City's public participation program includes both active and passive means of obtaining input from the community, such as mailings, public meetings, and web-based communication.

As part of the 2020 UWMP and WSCP update, the City facilitated a public review period. Public noticing, pursuant to Section 6066 of the Government Code, was conducted prior to commencement of a public comment period. Public hearing notices are included in Appendix D of this plan. During the public comment period, the Draft UWMP, which includes an updated WSCP, was made available on the City's website and at City offices, library, and City Hall.

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

- California American Water District
- City of Roseville
- Nevada Irrigation District

- Placer County Public Works
- Placer County Water Agency
- Sacramento Area Council of Governments
- South Sutter Water District

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

2.5.3 Notice to Cities and Counties

CWC Section 10621 (b) requires agencies to notify the cities and counties to which they serve water at least 60 days in advance of the public hearing that the plan is being updated and reviewed. In November 2020, a notice of preparation was sent to Placer County to inform them of the UWMP and WSCP update process and schedule. This notice is included in Appendix D of this plan. The City also coordinated internally with all relevant departments, including Public Works, Planning, Community Development, Utility Billing, and IT/GIS to solicit input and required data.

The notifications to various agencies, the public hearing notifications, and the public hearing and adoption are discussed in Chapter 10 of this report.

CHAPTER 3
System Description

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

3.1 GENERAL DESCRIPTION

The City is located in the Central Valley of California, which is surrounded by the Sierra Nevada Mountains to the east, costal ranges to the west, Klamath Mountains to the north, and is oriented in a north-south direction. The City is located in Placer County, California and is part of the Sacramento metropolitan area. Ground surface elevations generally range from about 113 feet above sea level on the west side of the City to approximately 595 feet above sea level in the southeast corner of the City.

The City's population is approximately 49,000[1]. The City's Public Works Department is responsible for providing and maintaining water, wastewater collection and treatment, solid waste, storm drainage and flood control services for residents and businesses within the City's water service area.

The City purchases treated water from Placer County Water Agency (PCWA) and pumps groundwater from local wells for its water supply, as described in further detail in Chapter 6. A portion of the water delivered to the City by PCWA is water supplied by NID to PCWA for treatment and delivery to the City.

3.2 SERVICE AREA BOUNDARY

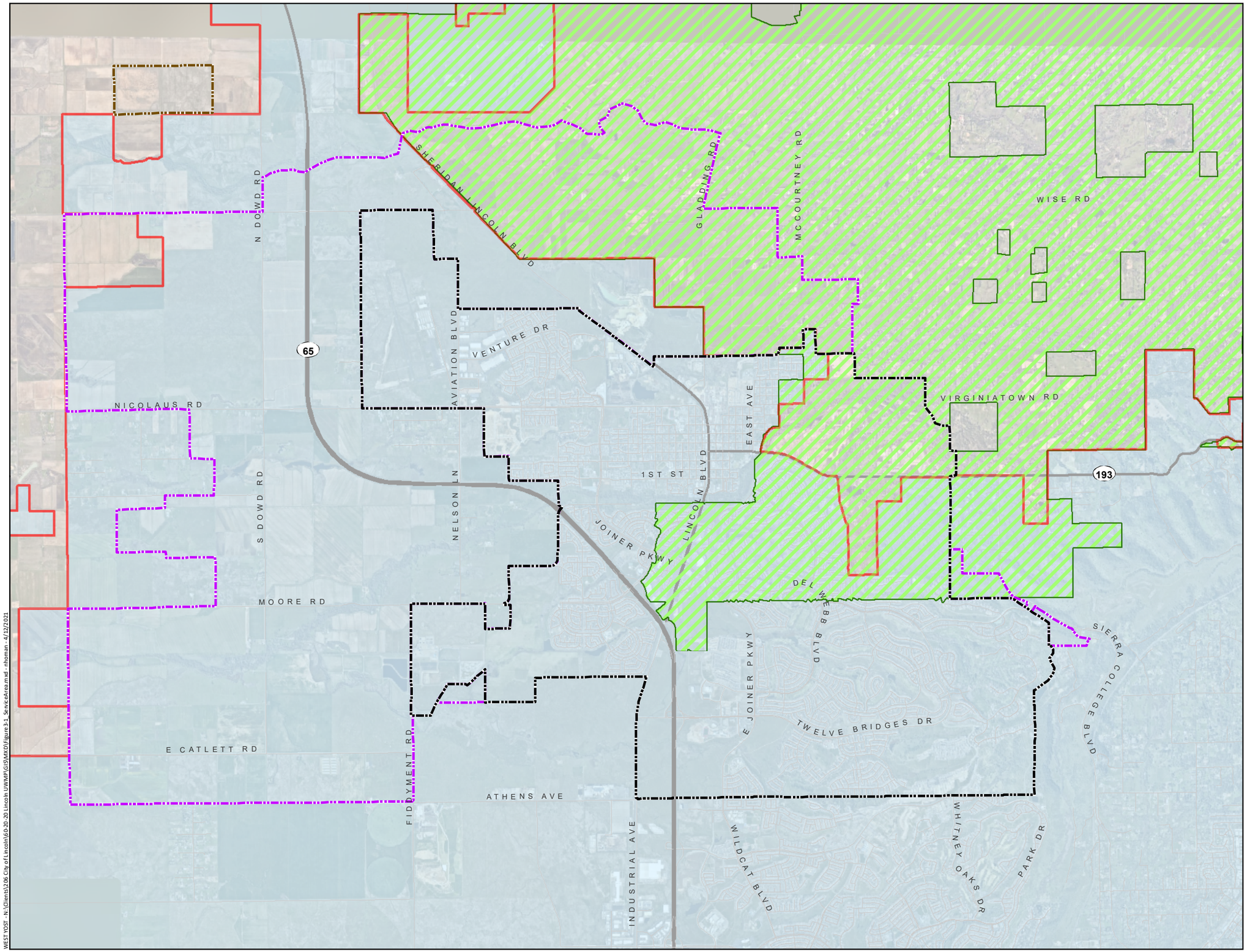
The City's retail water service area covers approximately 23 square miles (14,720 acres) and is generally coterminous with the City limits. California State Route 65 runs north and south through the City while California State Route 193 runs east and west. The City is bounded by the City of Rocklin to the south, Sierra College Boulevard and primarily undeveloped land to the east, and agricultural land to the north and west. The Auburn Ravine flows east to west through the City. The City limits also include a storm water retention basin north of Waltz Road which is not contiguous with the rest of the City limits. This property is outside of the City's water service area and is not expected to receive water service from the City in the future.

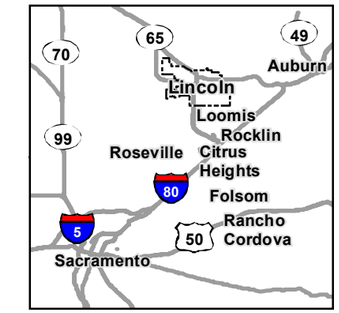
The City's Sphere of Influence (SOI) includes the area not currently within the City limits which the City plans to annex and extend water service to in the future as development proposal are approved. The City's SOI primarily consists of agricultural land to the north and west of the City.

The City's retail water service area overlaps the service areas of PCWA and NID. PCWA's Zone 6 service area includes the majority of the existing City limits and the City's SOI. The City plans to annex the area not currently in PCWA's Zone 6 service area into PCWA Zone 6 as the land is developed. The NID service area overlaps a portion of the existing City limits in the northeast quadrant of the City, as well as some of the City's SOI north of the existing City limits.

Figure 3-1 shows the relationship between City, PCWA, and NID service area boundaries, as well as the City's SOI.

[1] From California Department of Finance, E-4 Historical Population Estimates for Cities, Counties, and the State.





N

0 2,500 5,000

Scale in Feet

- City Water Service Area
- City's Sphere of Influence
- City Property outside of Water Service Area
- Nevada Irrigation District Service Area
- Placer County Water Agency Zone 6 Service Area

WEST YOST

Figure 3-1

Service Area Boundary Map

City of Lincoln
2020 Urban Water Management Plan

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3.3 SERVICE AREA CLIMATE

The climate of the City is best described as Mediterranean, characterized by cool, wet winters and hot, dry summers. The wet winter season usually begins in October and ends in April with an average low temperature of 44 degrees Fahrenheit (°F). Average annual precipitation is approximately 21 inches per year. The hot summer season has an average daily high temperature around 86°F with low humidity, and an average low temperature of 57°F.

Water use for the City is dependent on various climate factors such as temperature, precipitation, and reference evapotranspiration (ET_o). ET_o describes the combined water lost through evaporation from the soil and surface-water bodies and plant transpiration. In general, the ET_o is given for turf grass, and then corrected for a specific crop type. Local climate data was obtained from the California Irrigation Management Information System monitoring station in Fair Oaks, California (Station #131), which is located approximately 20 miles south of the City. The period of record was 1998 to 2020.

The historical climate characteristics affecting the City's water management are shown in Table 3-1.

Table 3-1. Monthly Average Climate Data Summary

Month	Standard Monthly Average ET_o, inches	Average Total Precipitation, inches	Average Temperature, degrees Fahrenheit	
			Max	Min
January	0.96	3.52	56.4	40.4
February	1.54	4.00	60.6	42.1
March	3.05	2.83	65.6	45.0
April	4.23	1.93	70.4	47.5
May	6.09	1.02	78.5	52.4
June	7.23	0.21	85.6	56.7
July	7.80	0.05	92.1	60.6
August	6.59	0.01	89.0	58.5
September	4.89	0.10	87.2	57.8
October	3.22	1.07	77.1	51.2
November	1.45	2.11	64.1	44.1
December	0.94	3.66	56.3	39.7
Total	**47.97**	**20.51**	**73.6**	**49.7**

Source: California Irrigation Management Information System data for Fair Oaks station 131 (downloaded January 13, 2021). The period of record is 1998 to 2020.

The American River Basin Study (ARBS) is a joint effort between the United States Bureau of Reclamation (USBR) and six local area non-federal cost partners including Placer County Water Agency (contracting lead), the Cities of Folsom, Roseville, and Sacramento, El Dorado County Water Agency, and the Regional Water Authority (of which the City is a member) to further refine the assessment of water supplies and demands in the American River Basin. The ARBS evaluates several potential climate change scenarios which may impact the region's water supplies and water demands. Key ARBS findings with respect to climate change impacts to temperature, precipitation/snowpack and runoff are as follows:

- Surface air **temperatures** are projected to increase steadily, with summer temperature increasing by approximately 7.2°F by the end of the 21st century, and winter temperature increasing by 4.9°F. Projections of daily maximum and minimum temperatures suggest similar seasonal trends. Maximum temperatures are projected to increase more than minimum temperatures during all seasons, with the largest increase of 7.3°F during the summer months.
- Annual **precipitation** projections show no change over the 21st century. Approximately half of the projections indicate an increase in annual precipitation and half indicate a decrease, highlighting the large uncertainty in future precipitation over this region. Although lacking a clear trend in projected annual precipitation, by the end of the 21st century, average fall and spring precipitation is expected to decrease, while winter and summer precipitation increase. Large variability is also expected in winter and fall precipitation. **Snowpack** will likely decline due to warming.
- **Runoff** is expected to increase during winter months. Projections indicate a pronounced shift in the distribution of runoff from May and June to earlier in the season (December to March), implying a shift in precipitation from snow to rainfall and/or earlier snowmelt. Peak runoff may shift by more than a month earlier by mid- to late century. Spring runoff will decrease due to reduced winter snowpack.

Additional discussion on potential climate change impacts to the City's water demands and water supplies is provided in Chapters 4, 6, and 7 of this plan.

3.4 WATER SYSTEM DESCRIPTION

The City's current water system served 19,661 water service connections (customer accounts) in 2020. The system is responsible for delivering treated water to residential, commercial, industrial, and irrigation customers. The distribution system consists of pressure zones, groundwater wells, storage tanks, a booster pump station, pressure reducing valves, and distribution/transmission pipelines. Each of these components is discussed in more detail below, and the locations of the major components are shown in Figure 3-2.

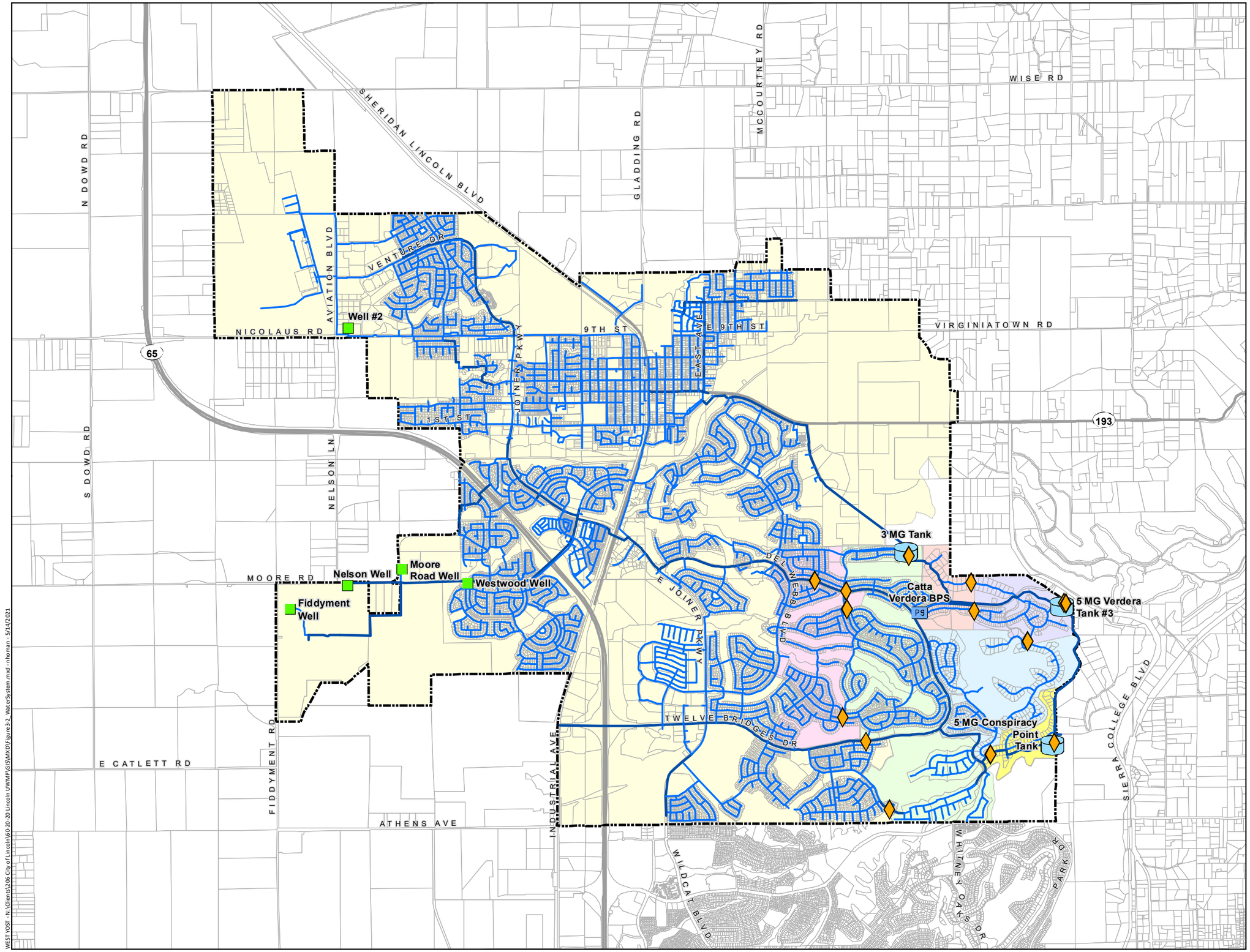

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Figure 3-2

Water Distribution System

City of Lincoln
2020 Urban Water Management Plan

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3.4.1 Pressure Zones

Water systems are typically divided into different hydraulic regions, known as pressure zones, to maintain adequate pressures throughout the distribution system in spite of varying topography. A hydraulic grade line (HGL) is established for each pressure zone. The City's water distribution system is divided into seven pressure zones to ensure that customers are provided water service that meet the City's service standards. Pressure zone boundaries are maintained by closed valves, pressure reducing valves, and pump stations. The City's pressure zones are shown on Figure 3-2.

3.4.2 Groundwater Wells

The City currently operates five active municipal groundwater supply wells, all of which are located in the western half of the City where the aquifer is the most productive. The current total pumping capacity of the City's municipal supply wells is approximately 5,800 gallons per minute (gpm), with a firm capacity (largest well out of service) of 4,300 gpm (6.2 million gallons per day (MGD))[2]. The City wells are primarily used for peak demand management, emergencies, and as a backup for PCWA and NID supplies. The locations of the City's municipal groundwater wells are shown on Figure 3-2. Additional information on the groundwater supply is presented in Chapter 6.

3.4.3 Storage Facilities

The City has three storage facilities located at high elevations on the east side of the City. The Conspiracy Point Tank and the new Verdera Tank #3 each have a 5 million-gallon (MG) capacity and receive treated water directly from PCWA turnouts. The 3 MG Tank is filled from the two 5 MG tanks via large-diameter transmission pipelines. All three tanks are located at relatively high elevations and serve customers via gravity flow. The City's cumulative distribution storage reservoir capacity is 13 MG. The locations of the City's storage reservoirs are shown on Figure 3-2.

3.4.4 Booster Pump Stations

The Catta Verdera Pump Station is the City's only booster pump station within the distribution system. Until recently, the Catta Verdera Pump Station was the only source of supply for the 610 Pressure Zone and 750 Pressure Zone. However, a new PCWA turnout installed as part of the Tank #3 construction project can now provide service at an adequate HGL to these areas. As a result, the Catta Verdera Pump Station is currently on standby, and will be decommissioned in the future. The location of the Catta Verdera Pump Station is shown on Figure 3-2.

3.4.5 Pressure Reducing Stations

The City has several pressure reducing stations which regulate the flow of water from higher HGL pressure zones to lower HGL pressure zones. These stations prevent the pressure in lower pressure zones from exceeding City service standards. The locations of these stations are shown on Figure 3-2.

[2] Well production capacity from Table 3-1 of the City's 2017 Water System Master Plan. It was assumed that wells can operate for 24 hours per day if necessary.

3.4.6 Distribution and Transmission Pipelines

The City maintains approximately 236 miles of water system pipelines[3]. Distribution pipelines sizes range from 6 to 16 inches in diameter, while larger transmission mains range from 18 to 36 inches in diameter. 93 percent (or 218 miles) of the City's pipelines are distribution mains consisting of pipelines 6 to 16 inches in diameter. The majority of the City's pipelines, 78 percent (or 185 miles), are polyvinyl chloride.

3.5 SERVICE AREA POPULATION AND DEMOGRAPHICS

The City's water service area population, employment, and other demographics that may affect water management and planning are described below.

3.5.1 Service Area Population

The City's current and historical population estimates were developed by the California Department of Finance (DOF), which uses analysis of US Census Bureau data to update City population estimates. Because the City's water service area boundary is the same as the City limits, DOF 2020 population estimates for the City are used as the current service area populations. Service area population is also used to determine per capita water use (discussed in Chapter 5). The DOF estimates the City's 2020 population to be 49,317 residents[4]. The City's population expanded rapidly between 2000 and 2010, experiencing a population increase of 282 percent. Since then, the City's growth has slowed, only increasing 15 percent between 2010 and 2020. Table 3-2 shows the historical population between 1995 and 2015.

The City's General Plan projects a 2050 population of 132,000, based on the Sacramento Area Council of Governments Blueprint Transportation and Land Use Study. However, based on the recent rate of development in the City and the projected timing of major projects, the City Community Development Department projects a much lower population of approximately 81,400 in 2045. For the purposes of this UWMP, the more recent projections from the City Community Development Department were used for future population estimates. Table 3-3 shows the City's 2020 population and the City Community Development Department's population projections through 2045.

Table 3-2. Historical Population

Population Served	1995	2000	2005	2010	2015
	8,303[(a)]	11,205[(b)]	28,083[(b)]	42,819[(c)]	46,224[(c)]

(a) California Department of Finance, August 2007. E-4 Historical Population Estimates for Cities, Counties, and the State, 1991-2000, with 1990 and 2000 Census Counts.

(b) California Department of Finance, November 2012. E-4 Historical Population Estimates for Cities, Counties, and the State, 2001-2010, with 2000 and 2010 Census Counts.

(c) California Department of Finance, May 2020. E-4 Historical Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Census Benchmark.

[3] Water system pipeline data is from the City's water system GIS database, updated February 2021.

[4] California Department of Finance, May 2020. E-4 Historical Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Census Benchmark.

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

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	49,317	57,100	61,300	68,000	74,700	81,400

NOTES: 2020 population from California Department of Finance, E-4 Historical Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Census Benchmark. Published May 2020.
Population projections for 2025 through 2045 are based on housing development projections provided by City Community Development staff and assume an average household size of 2.67 people.

3.5.2 Other Social, Economic, and Demographic Factors

The State now requires the inclusion of service area socioeconomic information as part of the system description in the UWMPs. However, differences in household water use across sociodemographic groups in the City has not been studied. Therefore, the following social, economic, and demographic information is being provided to comply with the new regulation. The information was derived from the US Census Bureau's profile of Lincoln for 2014-2018[5] and is assumed to sufficiently apply to the City's service area.

- The average number of people per household in the five-year period analyzed was 2.7.
- The median household income in Lincoln was $81,417, while 7.4 percent of all individuals and 10.3 percent of youth under the age of 18 lived in poverty.
- The average unemployment rate was 3.9 percent.
- The owner-occupied housing unit rate was 79.8 percent, with a median home value of $416,800.
- The median gross rent was $1,708 per month.
- The median age was 43.3 years.
- Of persons 25 years or older in Lincoln, 92.4 percent had earned at least a high school diploma or equivalent and 33.5 percent had earned a bachelor's degree or higher.
- Of persons under 65 years of age, 5 percent had a disability and 0.03 percent did not have health insurance.
- Almost 95 percent of households had a computer, and 88 percent had a broadband internet subscription.
- By race/ethnicity, 81.7 percent of people were White, 1.8 percent were Black, 0.2 percent were American Indian or Alaska Native, 6.3 percent were Asian, 0.4 percent were Hawaiian Native or Pacific Islander, 6.0 were some other single race, and 3.6 percent were two or more races. 20.5 percent of people identified as Hispanic or Latino.
- Of Lincoln's residents, 14 percent were foreign born, and 16.6 percent of people age five years and older spoke a language other than English at home.

[5] United States Census Bureau, American Community Survey, 2014-2018 ACS 5-Year Data Profile for Lincoln, California

3.6 LAND USES WITHIN SERVICE AREA

The City's existing land use and projected future land use development are described below.

3.6.1 Existing Land Uses within Service Area

Figure 3-3 shows the existing land use within the City's water service area. Existing zoning within the City limits consists of a variety of land uses, including Low Density Residential, Medium Density Residential, High Density Residential, Commercial, Business and Professional, Industrial, Parks, Open Space, and Public Facilities. Low Density Residential and Open Space occupy the vast majority of land within the City limits. Historically, most dwelling units within the City have been single-family residences, although some new residential developments are constructing apartments and other multi-family residential developments.

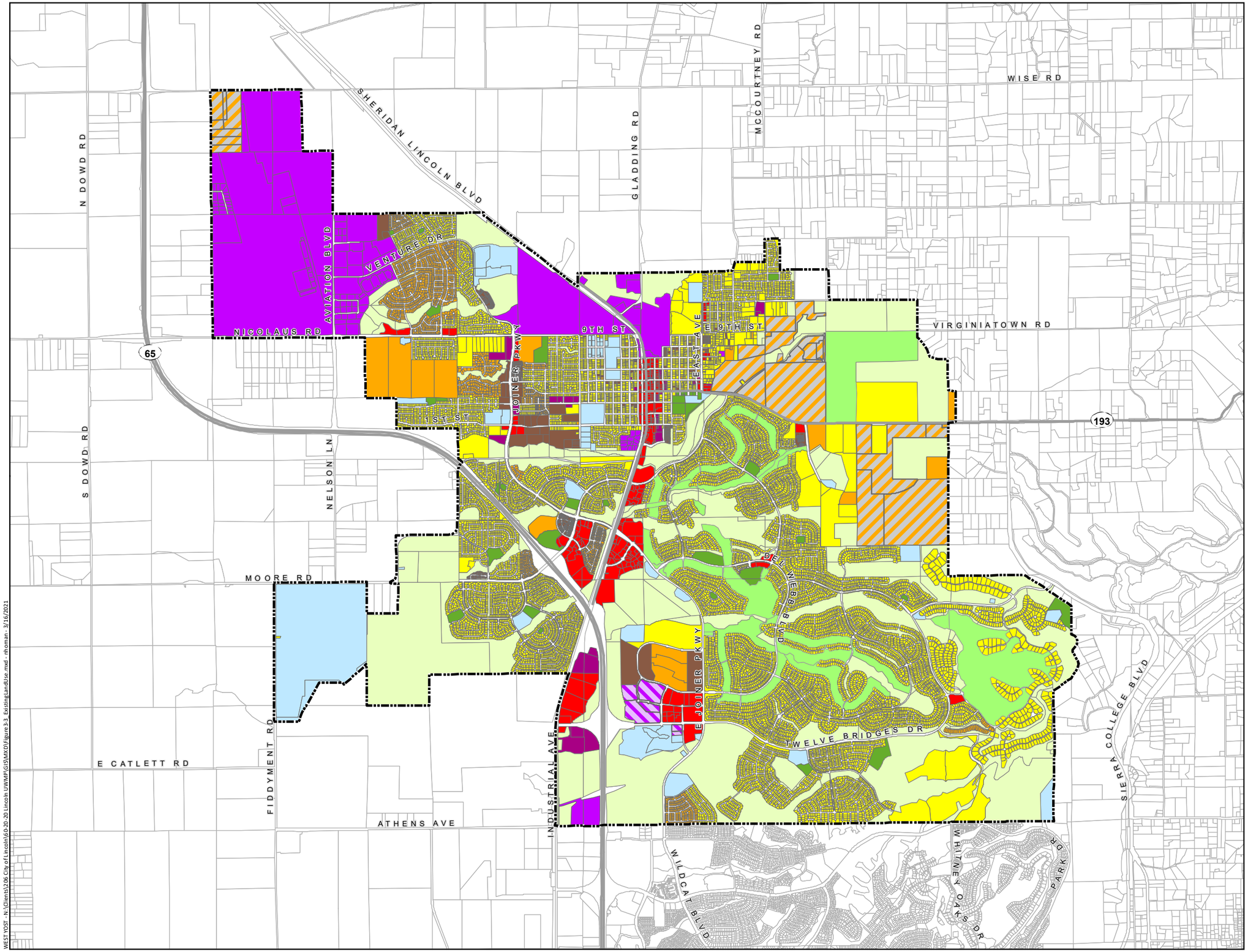
Significant concentrations of commercial land use include several large shopping centers at Joiner Parkway and Lincoln Boulevard, a grouping of smaller businesses in the City's downtown centered on Lincoln Boulevard, and a cluster of commercial buildings at Twelve Bridges Drive and Joiner Parkway which is still being developed. Notable industrial land use within the City include the Lincoln Regional Airport, a cluster of warehouses and other industrial buildings immediately east of the airport, light industrial businesses on Flocchini Circle, Sierra Pacific Industries Sawmill Plant, and the Gladding McBean Clay Plant.

3.6.2 Future Land Uses within Service Area

Future land use projections are presented in the City's General Plan. The City's Land Use Diagram from the General Plan, included in Appendix E, shows seven Villages, identified as V-1 through V-7, and three Special Use Districts, identified as SUD-A, SUD-B, and SUD-C, located outside of the City's limits but within the City's sphere of influence.

The Village designation promotes land uses oriented around creating neighborhoods for future residents. Each Village will include a mix of housing types and densities along with a village center which will be made up of a mix of neighborhood commercial, high density housing, schools, parks, recreational facilities, and other public facilities. Each village will also have extensive bicycle and pedestrian trails and open space with an emphasis on the interconnection to the other village areas and the developed parts of the City.

The Special Use District designation promotes land uses oriented around economic development while adhering to the Placer County Airport Land Use Compatibility Plan for the Lincoln Regional Airport. Development plans for these areas focus on commercial or industrial developments that require large areas for facilities or operations. It should be noted that SUD-B has been incorporated into the Village 5 Specific Plan and is now planned to develop into residential neighborhoods.



N

0 2,000 4,000

Scale in Feet

City Limits

Existing Zoning

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Additional Development
- Commercial (all types)
- Business and Professional
- Employment Center
- Industrial (all types)
- Open Space
- Park
- Golf Course
- Public

Notes:

1. Based on City shapefile of existing zoning provided February 2021. Zoning of parcels which are currently under development is based on anticipated final land use.

WEST YOST

Figure 3-3

Existing Land Use

City of Lincoln

2020 Urban Water Management Plan

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CHAPTER 4
Customer Water Use

This chapter describes and quantifies the City's historical, current and projected water uses to the extent that records are available. The terms "water use" and "water demand" are used interchangeably and refer to water conveyed by a distribution system and used by the City and its customers for any purpose.

4.1 NON-POTABLE VERSUS POTABLE WATER USE

Potable water is water that has had various levels of treatment and disinfection and is safe to drink. The City provides treated potable water to customers within its water service area.

Recycled water is municipal wastewater that has been treated to a specified quality for beneficial reuse. The City operates the Lincoln Wastewater Treatment and Reclamation Facility (WWTRF) and discharges its tertiary treated wastewater effluent into the Auburn Ravine Creek or sends the discharged effluent to on-site and off-site reclamation areas. The City produces and distributes recycled water throughout its service area for the irrigation of some landscaped medians and parks, for industrial use at Sierra Pacific Industries, and for dust control in construction activities. Additionally, recycled water produced by the City is used for agricultural irrigation outside of the City's existing potable water service area at the County Leased Reclamation Area and the Machado Farm. The City's recycled water system and recycled water system use is discussed in Chapter 6.

Raw water is untreated water that is used in its natural state or with minimal treatment. PCWA and NID deliver raw water directly to a few locations within the City's service area. Because the City is not involved in metering or payment obligations for these raw water deliveries, raw water use is not included in the City demand totals presented in this document.

4.2 WATER USE BY SECTOR

This section describes the City's retail water use by customer type, including historical, current, and the projected water uses through 2045. These classifications were used to analyze current consumption patterns among the City's various types of retail customers.

The City uses the following definitions for each sector, as outlined in the DWR Guidebook:

- **Single-family residential:** A single-family dwelling unit. A parcel with a free-standing building containing one dwelling unit that may include a detached secondary dwelling.
- **Multi-family residential:** Multiple dwelling units contained within one building or several buildings within one complex.
- **Commercial:** A water user that provides or distributes a product or service (CWC 10608.12(d)).
- **Industrial:** A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development (CWC 10608.12(h)).
- **Institutional (and Governmental):** A water user dedicated to public service. This type of user includes, among other users, higher-education institutions, schools, courts, churches, hospitals, governmental facilities, and nonprofit research institutions. (CWC 10608.12(i)).

- **Landscape:** Water connections supplying water solely for landscape irrigation. Such landscapes may be associated with multi-family, commercial, industrial, or institutional/governmental sites, but are considered a separate water use sector if the connection is solely for landscape irrigation.
- **Distribution System Losses:** Distribution system water losses are the physical water losses from the water distribution system and the supplier's storage facilities, up to the point of customer consumption.
- **Other:** Demand that is not covered in the above demand sectors which include such volume as parcels recently recoded as vacant, metered construction water, or metered water utilized for water main cleaning.

4.2.1 Historical Potable Water Use

The City's historical potable water production, metered consumption, and water losses for 2016 through 2019 are summarized in Table 4-1.

Table 4-1. Historical Potable Water Demand

Year	Annual Production	Annual Metered Consumption	Annual Water Losses
2016	8,311	7,323	989
2017	9,197	8,202	995
2018	9,365	8,558	807
2019	9,483	8,534	949

Source: City of Lincoln AWWA Water Loss Audits, 2016 – 2019.

Note: Units in AF

4.2.2 Current Water Use

The City's actual 2020 potable water demand by customer type is reported in Table 4-2. There is no existing use for saline barriers, groundwater recharge, or conjunctive use within the City's water service area. Table 4-2 does not include City use of recycled water, see Chapter 6 for a discussion of the City's recycled water use and demands.

Table 4-2. Demands for Potable and Non-Potable Water – Actual (DWR Table 4-1)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Single Family		Drinking Water	7,674
Multi-Family		Drinking Water	227
Commercial		Drinking Water	546
Industrial		Drinking Water	86
Landscape		Drinking Water	838
Other	Hydrant Water	Drinking Water	203
Other	Metered Use with Unknown Use Type	Drinking Water	174
Losses		Drinking Water	819
		TOTAL	10,567
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF). Does not include raw water delivered by NID or PCWA to customers within the City's potable water service area. Existing Institutional and Governmental use may be included under Commercial or Other (Metered Use with Unknown Use Type).			

4.2.3 Projected Water Use

The City's water demand projections from 2025 through 2045 are reported in Table 4-3. Projected future water demands are based on land use projections provided by the City Planning Department and updated City water demand factors developed using 2019 metered consumption data. Appendix F includes the updated land use projections. Appendix G provides a detailed discussion of the methodology used to develop the updated water demand factors. To be conservative and account for fluctuations in water use patterns from year-to-year, the updated water demand factors are five percent greater than the average unit water demands calculated from 2019 metered consumption data. The updated water demand factors were not adjusted to account for future water savings. This conservative approach to water demand factor development provides a buffer for potential increases in future unit water demands due to changes in customer water use behavior, the effects of climate change, or other unanticipated events.

The water demand projections in Table 4-3 are lower than those presented in the 2015 UWMP. The updated land use projections assume a slower growth rate than was previously assumed in the 2015 UWMP. This slower growth rate is more consistent with the actual rate of development within the City in

recent years. In addition, the water demand factors used in the 2015 UWMP were based on 2013 meter data. The 2015 UWMP factors do not take into account changes in water use patterns, conservation behavior, and water efficiency improvements which have been implemented in response to the drought conditions from 2012 through 2016.

Table 4-3. Demands for Potable and Raw Water – Projected (DWR Table 4-2)

Use Type	Additional Description (as needed)	Projected Water Use* *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family	See Note A	8,770	9,320	10,350	11,380	12,410
Multi-Family		230	310	410	510	610
Commercial	See Note B	580	720	950	1,180	1,420
Industrial		90	90	270	450	630
Institutional/Governmental	See Note C	0	20	50	70	100
Landscape	See Note D	830	1,000	1,140	1,270	1,120
Other	Hydrant Water	200	200	200	200	200
Other	Metered Use with Unknown Use Type	170	170	170	170	170
Losses	See Note E	950	1,060	1,250	1,450	1,640
	TOTAL	11,820	12,890	14,790	16,680	18,300

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

NOTES: Units are in acre-feet (AF). Projections rounded to nearest ten AF.
A) Includes Country Estates, Low Density Residential, and Medium Density Residential land use types.
B) Includes Commercial, Business Professional, and Mixed Use land use types.
C) Existing Institutional and Governmental use may be included under Commercial or Other (Metered Use with Unknown Use Type).
D) Includes existing landscape use plus projected future use for Parks and Recreation land use type. Projected future landscaping use for other land use types is included under the respective use type.
E) Equal to 2020 water loss plus assumed future development water loss rate of 10 percent.

4.2.3.1 Characteristic Five-Year Water Use

The estimated water use for the next five years, following 2020, is summarized in Table 4-4. Projected water demands for 2021 through 2025 were estimated as a linear interpolation between the 2020 consumption by use type, reported in Table 4-2, and the 2025 projected water use, reported in Table 4-3. The characteristic five-year water use does not assume drought conditions and will be incorporated into the Drought Risk Assessment, further discussed in Chapter 7.

Table 4-4. Five-Year Water Use					
Water Use Sector	2021	2022	2023	2024	2025
Single Family	7,890	8,110	8,330	8,550	8,770
Multi-Family	230	230	230	230	230
Commercial	550	560	560	570	580
Industrial	90	90	90	90	90
Institutional/Governmental[(a)]	0	0	0	0	0
Landscape	840	840	840	830	830
Other - Hydrant Water	200	200	200	200	200
Other - Metered with Unknown Use Type	170	170	170	170	170
Unaccounted for Water	850	870	900	920	950
Total	**10,820**	**11,070**	**11,320**	**11,570**	**11,820**

(a) No new Institutional and Governmental use projected by 2025. Existing Institutional and Governmental use may be included under Commercial or Other (Metered Use with Unknown Use Type).

Note: Units in AF

4.3 TOTAL WATER USE

Table 4-5 summarizes the actual and projected potable water demands reported in Tables 4-2 and 4-3, respectively. Table 4-5 also summarizes projected recycled water demands. Refer to Chapter 6 for a discussion of the City's recycled water system and recycled water demand projections.

Table 4-5. Total Water Demands (DWR Table 4-3)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	10,567	11,820	12,890	14,790	16,680	18,300
Recycled Water Demand[1] *From Table 6-4*	2,522	3,050	3,090	3,140	3,180	3,510
Optional Deduction of Recycled Water Put Into Long-Term Storage[2]						
TOTAL WATER USE	13,089	14,870	15,980	17,930	19,860	21,810

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

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

NOTES: Units are in acre-feet (AF). Projections rounded to nearest ten AF.

4.4 DISTRIBUTION SYSTEM WATER LOSSES

System losses is the difference between the actual volume of water treated and delivered into the distribution system and the actual metered consumption. Such apparent losses are always present in a water system due to pipe leaks; unauthorized connections or use; faulty meters; unmetered services such as fire protection and training, and system and street flushing.

The City's water distribution system consists of approximately 236 miles of distribution pipelines and transmissions mains. The City uses the American Water Works Association (AWWA) Water Audits and Loss Control Programs method to annually evaluate its distribution system losses. The water audit is an accounting exercise that tracks all sources and use of water within a water system over a calendar year. The City's 2020 water audit was not available at the time of this UWMP's preparation. Instead, a preliminary estimate of City water losses for the 2020 calendar year was calculated to be approximately 819 AF, or 8 percent, using the data presented in Table 4-2. AWWA Water Audits from 2016 to 2019 are included in Appendix H.

Table 4-6 summarized the monthly system losses as the difference between annual production and annual sales for the most recent 12-month period available. The most recent 12-month period began on January 1, 2020.

Table 4-6. 12 Month Water Loss Audit Reporting (DWR Table 4-4)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
01/2016	989
01/2017	995
01/2018	807
01/2019	949
01/2020	819
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units are in acre-feet (AF). The City's 2020 water audit has not yet been prepared. City water loss for 2020 is estimated using data presented in Table 4-2 (DWR Table 4-1).	

At the time of preparation of this UWMP, DWR and the State Water Board are in the process of adopting water loss standards. This is discussed further in Chapter 9.

4.5 ESTIMATING FUTURE WATER SAVINGS

Water savings from codes, standards, ordinances, or transportation and land use plans can decrease the water use for new and future customers. As indicated in Table , to be conservative, these "passive" water savings have not been included in the City's projected future water demands.

Table 4-7 indicates that lower income residential demands are included in the City's water demand projections, as is detailed in Section 4.2.

Table 4-7. Inclusion in Water Use Projections (DWR Table 4-5 Retail)

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

4.6 WATER USE FOR LOWER INCOME HOUSEHOLDS

SB 1087 (2006) requires that water providers develop written policies that give priority to development that included affordable housing to low-income households.

A lower income household has an income below 80 percent of an area median income, adjusted for family size. Projected water demands for low-income single-family and multi-family residential water uses are included in the total water demands described in Section 4.2.

The City is a member of the Sacramento Area Council of Governments (SACOG) and participated in the Regional Housing Needs Plan (RHNP) which allocated participating cities and counties their "fair share" of the region's projected housing needs. The RHNP is updated every five years and provides the housing units that a city or county must plan for within a 7.5-year time period. The SACOG 2021-2029 RHNP was adopted March 2020. This information is used by cities and counties to update their General Plan Housing Elements.

The SACOG 2021-2029 Housing Element includes the number of existing lower income households in the City. The Housing Element indicated approximately 33 percent of the City's households are Low Income (14 percent), Very-Low Income (9 percent), or Extremely Low Income (10 percent)[6]. The City assumes that gross per capita water demand is equal for all residential housing units regardless of income. Therefore, an estimated 2,532 AF (33 percent) of the City's residential water deliveries in 2020 (7,674 AF) were to lower income households. The City assumes that lower income households will continue to represent approximately 33 percent of the City's total residential customers through 2040. These projected low-income water demands projections are included in Table 4-3 and 4-4.

4.7 CLIMATE CHANGE CONSIDERATIONS

Climate change has the potential to alter local climatic patterns and meteorology. The City, along with the other Regional Water Authority (RWA) member agencies, participated in the North American Basin Regional Drought Contingency Plan (NABRDCP), adopted in October 2017, to work on coordinated planning to improve regional water supply reliability and to increase the resiliency of the region's water resources in the face of future climate and drought conditions.

Climate change is projected to increase evapotranspiration and lead to a longer growing season, which will increase demands from landscaping and other irrigated areas. The City's water demand projections are conservative and include a buffer to account for potential increases in demands caused by effects such as climate change. The NABRDCP highlighted water shortage response actions from individual agencies WSCP's and evaluated their effectiveness at reducing water demands. Additionally, the NABRDCP established four regional response actions RWA will implement as needed. RWA's response actions focus on public outreach messaging designed to develop consistent regional messaging to achieve large customer demand reductions to ensure available supplies would meet demands.

The potential impacts of climate change on the City's water supplies are described in *Chapter 6 System Supplies*.

[6] 2020 SACOG Housing Element Data, downloaded from https://www.sacog.org/sites/main/files/file-attachments/2020-sacog-housing-element-data-pkg2.xlsx?1589234902 on February 18, 2021.

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

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

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

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

5.1 OVERVIEW AND BACKGROUND

The City's compliance with SB X7-7 was first addressed in the City's 2010 UWMP. The City's baseline per capita water use was determined, and urban water use targets for 2015 and 2020 were established and adopted. Actual water use data and California DOF population estimates were used to calculate 2020 per capita water use. The 2020 Census results were not available for inclusion in this UWMP update; however, the potential difference between the DOF estimates and the eventual final 2020 Census results is not believed to impact the fundamental conclusions of meeting SB X7-7 requirements.

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

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

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

5.2 GENERAL REQUIREMENTS FOR BASELINE AND TARGETS

SB X7-7 required each urban water retailer to determine its baseline daily per capita water use over a 10-year or 15-year baseline period. The 10-year baseline period is defined as a continuous 10-year period ending no earlier than December 31, 2004 and no later than December 31, 2010. SB X7-7 also defined that for those urban water retailers that met at least 10 percent of their 2008 water demand using recycled water, the urban water retailers can extend the baseline GPCD calculation for a maximum of a continuous 15-year baseline period, ending no earlier than December 31, 2004 and no later than December 31, 2010. In 2008, the City delivered no recycled water within its service area; therefore, the City's baseline GPCD was calculated over a 10-year period. In its 2015 UWMP, the 10-year baseline period that the City selected was 2000 through 2009 (see Appendix I).

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

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

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

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

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

5.3 SERVICE AREA POPULATION

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

The method used to estimate the service area population is shown on Table 5-1. The DOF uses U.S. Census data, combined with changes to the housing stock, estimated occupancy of housing units, and the number of persons per household to estimate annual population within jurisdictional boundaries. Because the City's current water service area is substantially the same as the City limits, DOF population data for the City of Lincoln is valid for use as the service area population. The DOF estimate for the City of Lincoln 2020 population is 49,317, as shown in Table 5-2.

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

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

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

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	49,317

5.4 GROSS WATER USE

Annual gross water use, as defined in CWC §10608.12 (h), is the water that enters the City's distribution system over a 12-month period (calendar year) with certain exclusions. Annual gross water use for the baseline periods and 2020 is summarized in Appendix I, in accordance with DWR's Methodologies document. The baseline values reported in Appendix I are the same as documented in the City's 2010 and 2015 UWMP. The City's 2020 actual gross water use for Calendar Year 2020 is 10,567 AF, as presented in Chapter 4 of this plan.

5.5 BASELINES AND TARGETS SUMMARY

Daily per capita water use is reported in GPCD. Annual gross water use is divided by annual service area population to calculate the annual per capita water use for each year in the baseline periods. As discussed in Section 5.1, the City updated its population data, adjusted its baseline, and confirmed its 2020 target in its 2015 UWMP. The City's 10-year base daily per capita water use is 241 GPCD. Using Method 1 for 2020 water use target calculation as described in Section 5.2, the City's confirmed 2020 compliance target is 193 GPCD. The City's baseline and target are summarized in Table 5 3.

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

Baseline Period	Start Year *	End Year *	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*2000*	*2009*	*241*	*193*
5 Year	*2005*	*2009*	*239*	
**All cells in this table should be populated manually from the supplier's SBX7-7 Verification Form and reported in Gallons per Capita per Day (GPCD)*				

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

5.6 2020 COMPLIANCE DAILY PER CAPITA WATER USE

In Sections 5.3 and 5.4, the City's 2020 population and gross water use are presented, respectively. The City calculated its actual 2020 water use for the 2020 calendar year in accordance with DWR's Methodologies document. As shown in Table 5-4, urban per capita water use in 2020 was 191 GPCD, which is below the City's 2020 water use target of 193 GPCD. Therefore, the City has met its 2020 final water use target. The complete set of SB X7-7 tables used to document this compliance is included in Appendix I.

Table 5-4. 2020 Compliance (SB X7-7 Table 9)

Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD					2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*		
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
191	-	-	-	-	191	193	**YES**

[1] *All values are reported in GPCD*
[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

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

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

5.7 REGIONAL ALLIANCE

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

CHAPTER 6
Water Supply Characterization

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

The City obtains its retail water supply from a combination of groundwater, surface water, and recycled water sources. These sources, along with other projected future supplies are described in this chapter. Water supply information from the City's and other agencies 2020 UWMPs have been incorporated into this chapter; however, some sections have been revised to incorporate more recent information.

6.1 WATER SUPPLY ANALYSIS OVERVIEW

The City of Lincoln utilizes a portfolio approach to its water supplies. Water sources used to serve City customers include treated surface water, groundwater, and recycled water. Table 6-1 summarizes the City's available water supplies.

Table 6-1. Water Supplies

Water Supply Type	Water Supply Source
Treated Surface Water	• PCWA wholesale supply • NID wholesale supply conveyed through PCWA
Groundwater	• City retail supply from City owned wells overlying the North American Groundwater Subbasin
Recycled Water	• City retail recycled water delivered from Lincoln's WWTRF

In addition to water supplied by the City to its customers, PCWA and NID deliver untreated surface water directly to several customers within the City's service area. This water is delivered under contracts between the supplier (PCWA or NID) and the end user. This water does not enter the City's distribution system and the City does not bill these customers for untreated surface water use.

In this section, the management of each supply in correlation with other supplies are discussed, along with the measures the City has taken to acquire and develop planned sources of water. Anticipated availability of the City's water supplies under a normal water year is provided in this chapter. The availability of the City's water supplied under a single dry year and a drought lasting five years, as well as more frequent and severe periods of drought are discussed in detail in Chapter 7 of this UWMP, along with the basis of those estimates.

6.1.1.1 Regional Water Authority

The City of Lincoln is a member of the RWA. The RWA is a joint powers authority that serves and represents the interests of 24 water providers in the greater Sacramento, Placer, El Dorado and Yolo County regions. Two other RWA members from Placer County are PCWA and the City of Roseville. Both of those members are also members of the Western Placer County Groundwater Plan partnership.

RWA's primary mission is to help its members protect and enhance the reliability, availability, affordability and quality of water resources. RWA has launched significant programs and services on a regional scale, including: (1) A water efficiency program designed to help local purveyors implement best management practices on a regional basis; (2) implementation of the American River Basin Regional Conjunctive Use Program to build and upgrade water facilities throughout the region to better manage surface and groundwater resources; and (3) development of an Integrated Regional Water Management Planning Program to continually identify the regional projects and partnerships that will help the region best meet its future water needs. RWA has provided grant funding to the City for various water related improvements including development of its wastewater treatment plant and installation and repair of two groundwater wells.

6.2 WATER SUPPLY CHARACTERIZATION

This section characterizes the City's water supply sources, including discussion of available supply, supply reliability, and projected future use.

6.2.1 Purchased or Imported Water

The City receives treated potable water from PCWA and NID as described in this section.

6.2.1.1 Placer County Water Agency

PCWA was created in 1957 by a special act of the California Legislature and is the primary water resource agency for Placer County. The boundaries of PCWA are coterminous with the boundaries of Placer County. PCWA serves more than 41,000 retail treated water connections, provides wholesale water (treated and/or untreated) to Cal-Am, the Cities of Lincoln and Roseville, San Juan Water District, and several smaller historical community systems. It also provides raw water supply to private customers for irrigation and other non-potable uses. PCWA's water supplies are primarily delivered to customers within its Western Water System. Irrigation water (raw water) comprises about two-thirds of PCWA's Western Water System deliveries. Irrigation water is delivered to PCWA raw water customers via a complex network of canals, approximately 170 miles in total length. Approximately 50 miles of the canal length are unlined. The PCWA Natural Resources Management Plan dated April 2009 provides a more detailed description of PCWA's raw water distribution facilities.

The areas served by PCWA's Western Water System extend from the community of Alta in the east, westward down the Interstate 80 corridor to the Sutter, Sacramento, and Nevada county lines in the west, south and north; respectively. The Western Water System is comprised of four distinct administrative zones, named Zones 1, 2, 3 and 5. Each of these zones was formed as PCWA's service area grew at distinct times. However, a new Zone 6 was formed in 2017 to include these other zones and to consolidate administrative rules across all pre-existing zones in the Western Water System. PCWA's Zone 6, which covers its entire Western Water System service area, is shown on Figure 6-1.

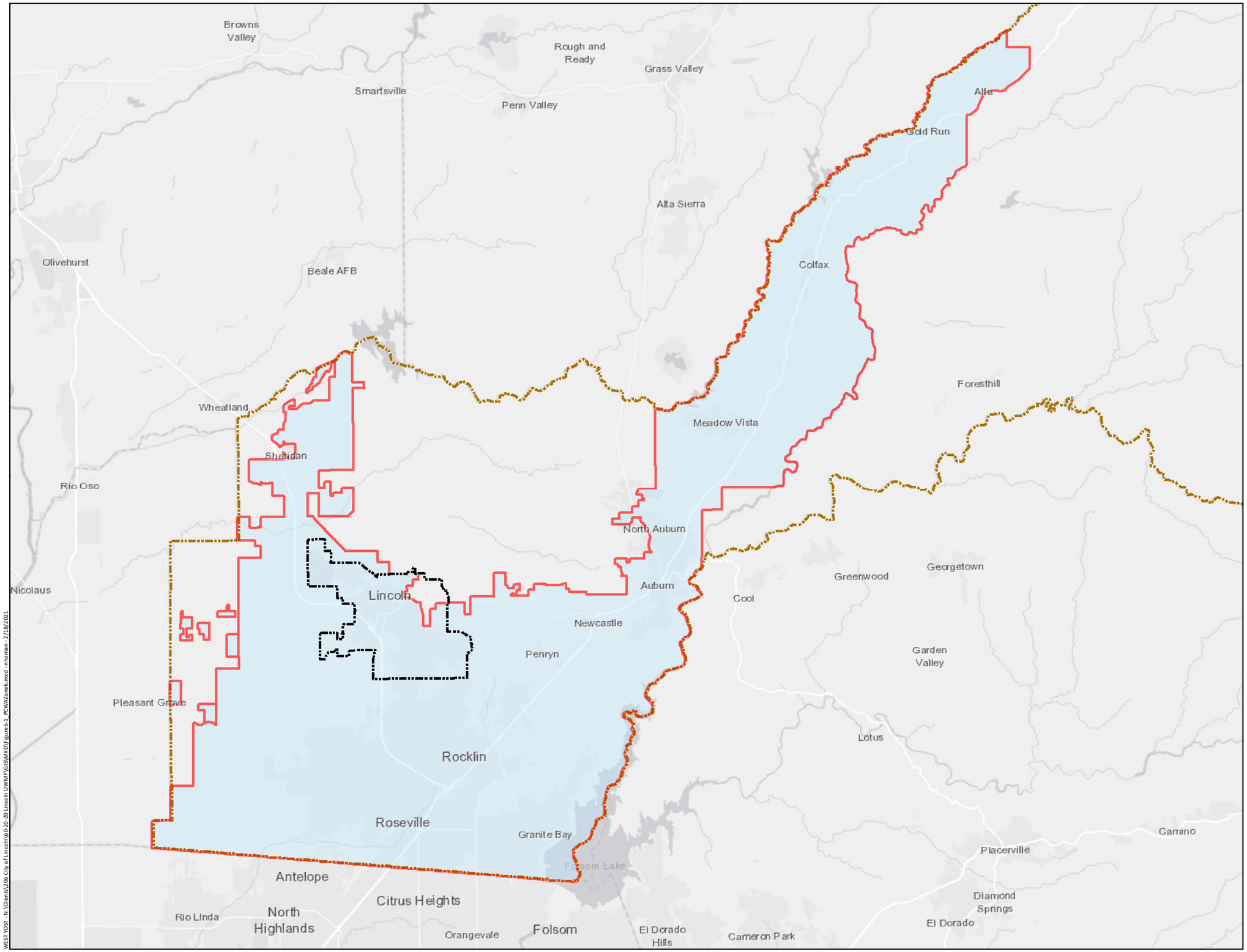

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Figure 6-1

PCWA Zone 6 Service Area

City of Lincoln
2020 Urban Water Management Plan

In 2012, the City entered a water supply contract with PCWA for delivery of treated surface water[7]. The contract entitles the City to a maximum delivery entitlement of 18.5 MGD of treated water supply. Completion of the City's Phase 3 Pipeline and Metering Station project in March 2021 increased the City's PCWA maximum delivery entitlement to 18.9 MGD per Facilities Agreement No. 2521 with PCWA. Water supply agreements with PCWA are included in Appendix J.

In addition to the treated surface water deliveries discussed above, PCWA delivers untreated surface water to some customers within the City's service area via the Caperton Canal and the Auburn Ravine Creek. This raw water is used for irrigation resulting in an offset of potable water use within the City. The City receives 2 miner's inches (equivalent to 36.2 AFY) of retail raw water from PCWA, which it uses to irrigate public landscaping on Twelve Bridges Drive. Other customers, such as the Catta Verdera Golf Course, receive raw water deliveries directly from PCWA. The City is not involved in metering or payment obligations for these raw water deliveries within its service area. Therefore, raw PCWA water use is not included in the City demand or supply totals presented in this document.

The reliability of the water supply delivery to the City is grounded in the underlying water rights and contracts held by PCWA. These water rights and contracts for PCWA's surface water supplies include the following:

- Middle Fork Project (MFP) Water - Water stored in the Middle Fork Project along the North Fork American River under water rights permits 13856 and 13858;
- Central Valley Project (CVP) Water - CVP water supply from the American River under CVP Contract 14-060200-5082A with the United States Bureau of Reclamation;
- Pacific Gas & Electric (PG&E) Water - Water purchased from PG&E from the Yuba River and Bear River under the 1982 Zone 3 Contract Purchase Agreement and the Water Supply Agreement, signed in February 2015; and
- Pre-1914 Appropriations - Water diverted from various small creeks and their tributaries in western Placer County, for the purpose of irrigation, under appropriative water rights S000959, S000967, S010397, and S010398.

Terms associated with water supply permits and contracts dictate the volume of supplies and applicable place of use. Table 6-2 below serves to outline the allotted maximum supply from each surface water source. These supplies are more fully described in PCWA's 2020 UWMP.

[7] Placer County Water Agency. November 2012. *Contract between Placer County Water Agency and the City of Lincoln for a Treated Water Supply*. Included in Appendix J.

Table 6-2. PCWA Surface Water Supply Summary[a]		
Supply	Source	Water Right or Contracted Volume
Middle Fork Project	American River	120,000 AFY
Central Valley Project Contract	American River	35,000 AFY
PG&E Agreements	Yuba and Bear Rivers	125,400 AFY
Pre-1914 Appropriative Rights	Various tributaries and creeks in West Placer County	S000959 – 40 cubic feet per second (cfs). All other pre-1914 rights not currently exercised. (total estimated yield of 3,400 AFY)

(a) As documented in PCWA's 2015 Urban Water Management Plan, PCWA has occasionally purchased surplus water from the South Sutter Water District (purchased from NID in excess of its needs) for service to PCWA Zone 5 irrigation customers. PCWA does not anticipate receiving these supplies in the future and therefore, this supply is excluded from Table 6-2.

6.2.1.1.1 Average Year Surface Water Supplies

As shown in Table 6-2, PCWA's surface water rights and contract supplies total 283,800 AFY. This total does not include recycled water supply or supply from groundwater wells in dry years. PCWA has indicated they are able to use the entirety of its surface water rights without restriction in an average year.

6.2.1.1.2 Single Dry Year Surface Water Supplies

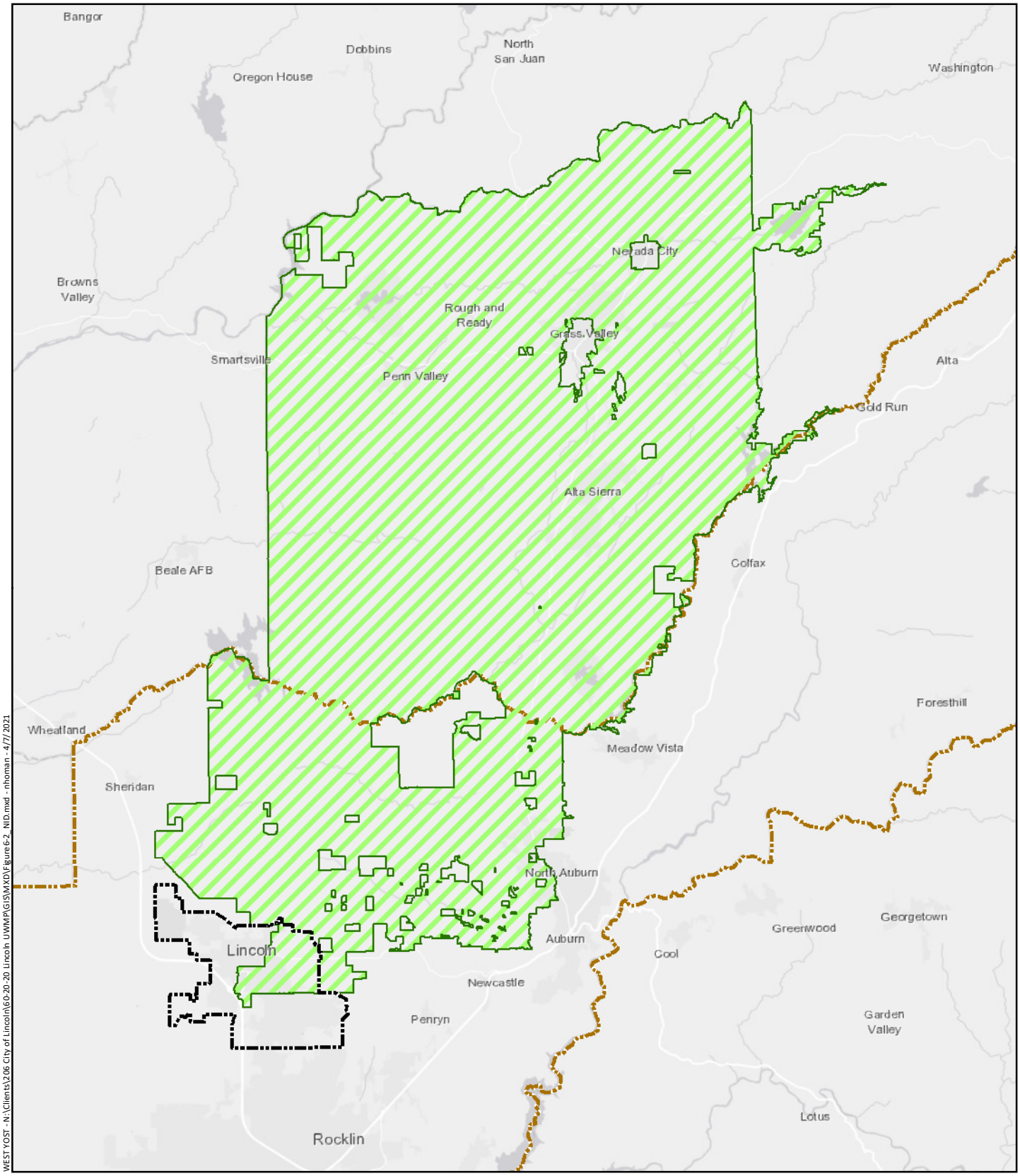
PCWA's 2020 UWMP evaluates potential water supply reductions during a single dry year condition. A single dry year is assumed to represent the worst-case scenario if hydrologic conditions were like those experienced during 1977. As documented in PCWA's 2020 UWMP, PCWA's MFP project water is anticipated to be fully available in this single dry year scenario. PCWA's CVP and PG&E supplies are projected to be reduced by 50 percent each and its Pre-1914 Appropriative supplies reduced by 75 percent. During a dry year, PCWA will rely on groundwater wells to supply up to 5,000 AFY to offset the reduction in available surface water supplies. Table 7-2 of PCWA's 2020 UWMP estimates single dry year surface water supplies at 206,050 AFY, not including recycled water supplies

6.2.1.1.3 Multiple Dry Year Surface Water Supplies

PCWA's 2020 UWMP evaluates potential water supply reductions during a multiple dry year condition. A multiple dry year condition simulates hydrologic conditions similar to those experienced during the period from 1988 through 1992. As documented in PCWA's 2020 UWMP, PCWA's CVP supplies are anticipated to be reduced by 25 percent and its Pre-1914 Appropriative supplies reduced by 50 percent. All other supplies (MFP and PG&E) are projected to be unaffected by a multiple dry year condition. Table 7-3 of PCWA's 2020 UWMP estimates multiple dry year surface water supplies at 271,100 AFY, not including recycled water supplies.

6.2.1.2 Nevada Irrigation District

The NID is a California special district providing treated water and raw/irrigation water to its nearly 25,000 customers within portions of Nevada, Placer and Yuba counties. NID was created in 1921 by authorization of the Nevada County Board of Supervisors under the California Irrigation District Act of 1897, covering a 202,000-acre area within the county. In 1926 a select group of residents in Placer County chose to join NID, adding another 66,500 acres to the district service area. NID's service area is shown on Figure 6-2.



City Water Service Area

Nevada Irrigation District Service Area

Placer County

N

0 2.5 5

Miles

WEST YOST

Figure 6-2

NID Service Area

City of Lincoln
2020 Urban Water Management Plan

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NID treated water service areas are located in and around Grass Valley, Nevada City, Banner Mountain, Glenbrook Basin, Loma Rica, Alta Sierra, Lake of the Pines, Penn Valley, Lake Wildwood, Smartsville and North Auburn. According to NID's 2015 Agricultural Water Management Plan (AWMP), NID currently serves approximately 5,200 agricultural customers (raw water customers) representing a reported area of 32,323 acres located primarily at the lower end (lower elevation) of the NID system. Agricultural water use accounts for more than 90 percent of the total demand on NID's water supply.

NID surface water is also supplied to some Placer County residential customers; primarily delivered indirectly through PCWA's treatment and distribution system. In 2004, the City entered a temporary raw water sales agreement (Temporary Agreement) between the City, PCWA, and NID[8] for treatment and delivery of NID water to City customers within NID's service area. The Temporary Agreement entitles the City to receive NID raw water supply which has been treated and delivered to the City via PCWA facilities. The City purchases any NID supply from PCWA. The Temporary Agreement does not specify an amount of water to be supplied by NID to the City. At the time of this plan's preparation, the City, NID, and PCWA are engaged in negotiations to amend the Temporary Agreement.

In addition to the treated surface water deliveries discussed above, NID delivers untreated surface water directly to the Turkey Creek Golf Course and Lincoln Crossing Home Owner's Association for irrigation purposes, resulting in an offset of potable water use within the City. The City does not have a contract with NID for raw water deliveries, and the City is not involved in metering or payment obligations for these deliveries. Therefore, raw NID water use is not included in the City demand or supply totals presented in this document.

NID water supplies are primarily surface water supplies derived from watershed run-off from the Yuba, Bear, and Deer Creek watershed and consists of two primary supply sources as follows:

- Pre-1914 Appropriations – NID holds 25 pre-1914 water rights for direct diversion and storage of water, including three riparian rights
- Post-1914 Appropriations – NID holds 28 post-1914 appropriative water rights for direct diversion and storage of water

Terms contained within NID water right permits and contracts dictate the volume of supplies and applicable place of use. In addition to annual water shed runoff, NID's surface water supplies also may include water purchased from PG&E and carryover storage left within its reservoirs from year to year. Table 6-3 provides a summary of NID surface water supplies as documented in NID's 2020 UWMP.

[8] October 26, 2004. Temporary Water Sales Agreement Between the Nevada Irrigation District (NID), Placer County Water Agency (PCWA), and the City of Lincoln (Lincoln). Included in Appendix J.

Table 6-3. NID Surface Water Supply Summary		
Supply	Source	Average Year Volume
Watershed Runoff	Yuba, Bear and Deer Creek Watersheds	233,000 AFY
PG&E Agreement	Yuba, Bear and Deer Creek Watersheds	7,500 AFY
Carryover Storage	NID Reservoirs	144,000AFY
	Total	**384,500 AF**

As discussed below, it is conservatively assumed that the City will not receive NID supply after 2020. Therefore, NID water supply reliability is not discussed in this plan.

6.2.1.3 Actual and Projected Water Supplies from Purchased or Imported Water Supplies

Actual water supplies from PCWA and NID in 2020 are provided in Table 6-4. The City's projected normal year water supplies from these sources are shown in Table 6-5 in 5-year increments from 2025 to 2045. The City anticipates that PCWA's supplies will be sufficient to meet its surface water supply needs in the future. Because the Temporary Agreement does not specify the amount of NID supply the City is entitled to, and because negotiations to amend the agreement are ongoing, for the purposes of this UWMP it is conservatively assumed that the City will not receive NID supply after 2020. Therefore, NID supply is not included in the evaluation of the City's water service reliability and drought risk assessment presented in Chapter 7.

Table 6-4. Purchased or Imported Water Supplies Actual	
Water District	Existing (2020) Water Supply Volume, AF[(a)]
PCWA[(b)]	8,430
NID[(c)]	1,509

(a) Does not include retail raw water supplies delivered by PCWA or NID to customers within City water service area.
(b) PCWA supply is equal to total potable supply delivered via PCWA facilities to the City less NID supply.
(c) NID supply data provided by PCWA staff.

Table 6-5. Purchased or Imported Water Supplies Projected[(a,b)]					
	Projected Water Supply Volume, AF				
Water District	2025	2030	2035	2040	2045
PCWA	10,640	11,600	13,310	15,020	16,480
NID	0	0	0	0	0

(a) The City plans to meet 90 percent of projected potable water demands with purchased surface water supplies.
(b) Projections rounded to nearest ten AF.

6.2.2 Groundwater

The City has five groundwater wells located in the western portion of the City. The City uses these wells in conjunction with its surface water supplies during normal and wet years to meet peak summer demands. Use of the groundwater wells may increase during dry years when available surface water supplies may be limited. This section describes the history and management strategies of the groundwater subbasin underlying the City as well as the volume of groundwater pumped by the City.

6.2.2.1 Groundwater Basin Description

The groundwater basin underlying the City is the Sacramento Valley Groundwater Basin, North American Subbasin (5-21.64, NASb). The NASb is defined by the unconsolidated sedimentary deposits that are bounded by the Bear River on the north; the Feather and Sacramento Rivers on the west; the American River on the south; and the edge of the alluvial basin, where little or no groundwater flows into or out of the groundwater basin from the rock of the Sierra Nevada, on the east. Figure 6-3 shows the extent of the NASb.

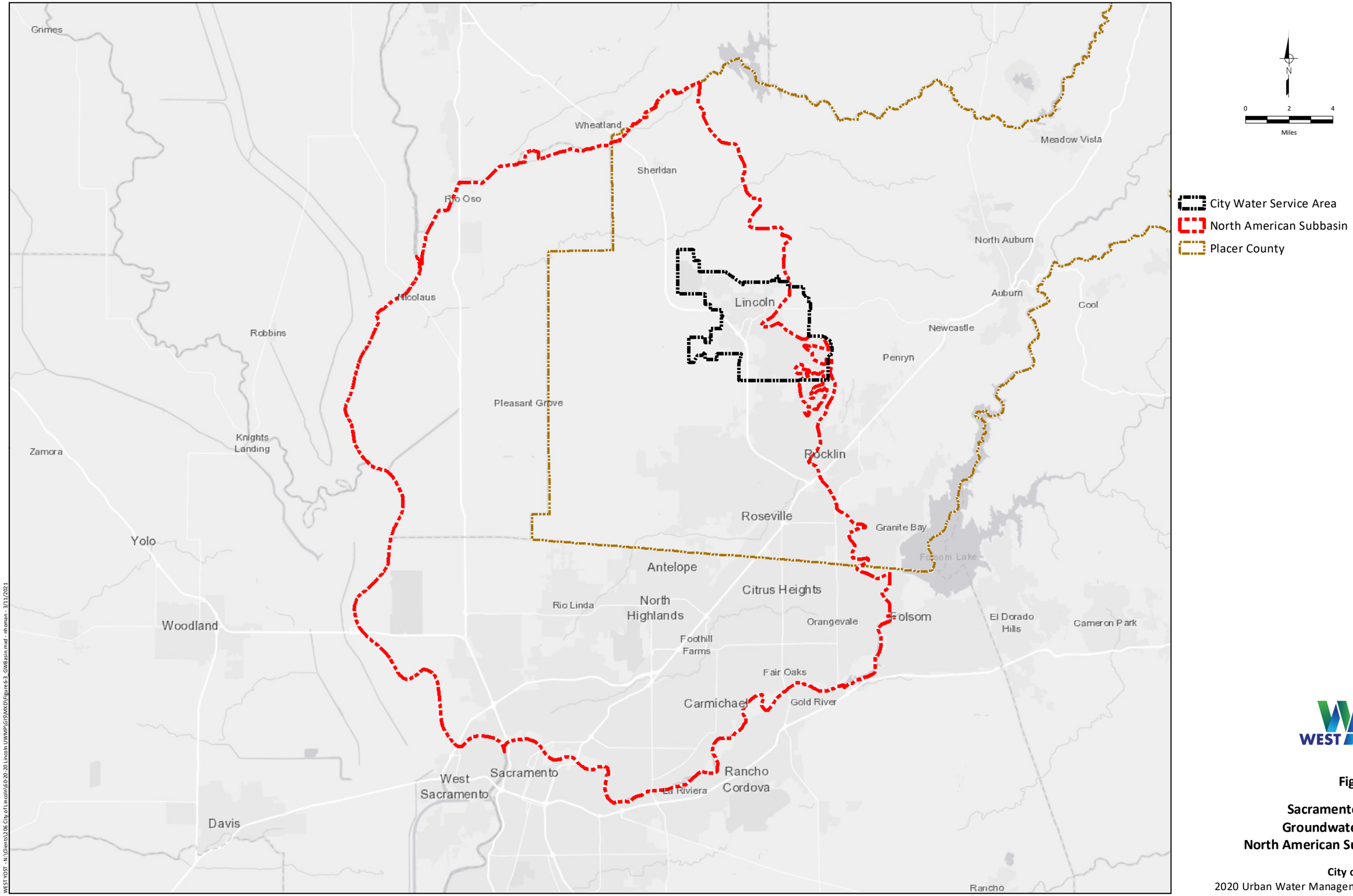
The various geologic formations that constitute the water-bearing deposits underlying the NASb are described in the 2003 Update to the DWR Bulletin 118. These formations include an unconfined aquifer system consisting of alluvial material occupying the upper 200 to 300 feet below ground surface, and a semi-confined aquifer system consisting of fragmented volcanic rocks below the alluvium. The upper aquifer system consists of the Modesto, Riverbank, Turlock Lake, Victor, Fair Oaks, and Laguna Formations, along with Arroyo Seco and South Fork Gravels; the lower aquifer consists primarily of the Mehrten Formation.

6.2.2.2 Groundwater Management

The management of NASb groundwater resources is discussed below. The NASb is not an adjudicated basin.

6.2.2.2.1 Western Placer County Groundwater Management Plan

In 2007, the City adopted the Western Placer County Groundwater Management Plan (WPCGMP). The WPCGMP was developed to assist the City of Roseville, the City of Lincoln, PCWA, and the California American Water Company in maintaining a safe, sustainable, and high-quality groundwater resource within a portion of the NASb. The WPCGMP provided a framework to coordinate groundwater management activities through a set of basin management objectives and specific implementation actions. The recommended sustainable yield for the entire NASb is 400,000 AFY, 95,000 AFY of which was assigned to Placer County in the WPCGMP.



WEST YOST

Figure 6-3

Sacramento Valley Groundwater Basin North American Subbasin

City of Lincoln
2020 Urban Water Management Plan

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6.2.2.2.2 Sustainable Groundwater Management Act

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

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

Table 6-6. Sustainable Groundwater Management Act Implementation Steps and Deadlines

Implementation Step	Implementation Measure	Deadlines
Step One	• Local agencies must form local GSAs within two years	• June 30, 2017
Step Two	• Agencies in basins deemed high- or medium-priority must adopt GSPs within five to seven years, depending on whether a basin is in critical overdraft	• January 31, 2020 for critically overdrafted basins • January 31, 2022 for high- and medium-priority basins not currently in overdraft
Step Three	• Once plans are in place, local agencies have 20 years to fully implement them and achieve the sustainability goal	• January 31, 2040 for critically overdrafted basins • January 31, 2042 for high- and medium-priority basins not currently in overdraft

SGMA applies to basins or subbasins designated by the DWR as high or medium priority basins, based on a statewide ranking that uses criteria including population and extent of irrigated agriculture dependent on groundwater. The most recent basin prioritization findings indicate that 94 of California's 515 groundwater basins and subbasins are high and medium priority basins. These high and medium priority basins account for 98 percent of California's annual groundwater pumping and supply 83 percent of California's population[9]. The ranking for the North American Subbasin of the Sacramento Valley groundwater basin is shown in Table 6-7. As shown, the NASb has been ranked as a high priority basin.

[9] Information obtained from DWR Basin Prioritization webpage, accessed at https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization on December 3rd 2020.

Table 6-7. Groundwater Basin Prioritization for Sustainable Groundwater Management Act[(a)]			
Basin Number	Basin Name	Overall Basin Ranking Score	Overall Basin Priority
5-21.64	Sacramento Valley – North American Subbasin	25.5	High
(a) Department of Water Resources, May 2020, Sustainable Groundwater Management Act 2019 Basin Prioritization.			

6.2.2.2.3 West Placer Groundwater Sustainability Agency

The NASb underlies portions of three counties (Placer, Sacramento and Sutter). Management of the basin is a collaborative effort of the following five GSAs:

- Reclamation District 1001 GSA
- Sacramento Groundwater Authority GSA
- South Sutter Water District GSA
- Sutter County GSA
- West Placer GSA

The City is a member of the West Placer GSA which also includes the City of Roseville, Placer County, PCWA, NID, and the California American Water Company.

The five GSAs are partnering to prepare a single GSP for the NASb per the requirements of SGMA. The NASb GSP is due to be completed by January 31, 2022. The focus of the NASb GSP is to identify required actions to maintain a safe, sustainable and high-quality groundwater resource that can meet backup, emergency, and peak water demands without adversely affecting other groundwater uses within the NASb area or within adjacent groundwater basins. Additional information on the NASb can be accessed at http://nasbgroundwater.org.

6.2.2.3 Overdraft Conditions

The NASb is not listed as critically overdrafted by DWR in the 2019 Groundwater Management Act 2019 Basin Prioritization. Furthermore, the subbasin has not been described in overdraft in DWR Bulletin 118, nor has Bulletin 118 projected the basin to become overdrafted with the current management of the subbasin.

6.2.2.4 Groundwater Use – Past Five Years

Historically, the City relied upon significant quantities of groundwater to meet demands but has since transitioned to acquiring surface water from PCWA and NID. The City uses groundwater during periods where treated surface water through PCWA's system is less available, and to manage summer maximum day and peak hour water demands. Availability of surface water supplies from PCWA will continue to reduce the City's reliance on its groundwater supplies.

Currently, City groundwater use accounts for less than 10 percent of its potable water supplies. As shown in Table 6-8, average groundwater use over the last 5 years was approximately 580 AFY, or 6.2 percent of City potable water supplies. In normal and wet years, the City primarily uses groundwater to supplement PCWA surface water supply during peak demand periods. In dry years, City groundwater use may increase to offset reductions in available surface water supply. The City's groundwater production wells are all located within the City limits, on the western side of the City's potable water service area.

Table 6-8. Groundwater Pumped in Last Five Years (DWR Table 6-1 Retail)

☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2016*	2017*	2018*	2019*	2020*
Add additional rows as needed						
Alluvial Basin	Sacramento Valley – North American Subbasin	543	734	344	660	628
	TOTAL	543	734	344	660	628
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units are in acre-feet (AF).						

6.2.2.5 Groundwater Use – Projected

The City's projected normal year water supplies from groundwater are shown in Table 6-9 in 5-year increments from 2025 to 2045. The City anticipates meeting ten percent of projected potable water demands with local groundwater supplies. If needed, the City will construct new groundwater wells and increase its groundwater supply capacity to meet this target. The exact location of future groundwater wells is unknown, but they will likely be located within the City's sphere of influence to the west or to the north of the existing City limits.

Table 6-9. Groundwater Supplies – Projected[(a,b)]

Project Groundwater Supply Volume, AF				
2025	2030	2035	2040	2045
1,180	1,290	1,480	1,660	1,820

(a) The City plans to meet 10 percent of projected potable water demands with groundwater supplies.
(b) Projections rounded to nearest ten AF.

6.2.3 Surface Water

The City does not use any self-supplied surface water. All surface water used by the City is imported from PCWA and NID.

6.2.4 Stormwater

The City does not currently divert stormwater for beneficial use.

6.2.5 Wastewater and Recycled Water

The City is responsible for the collection, treatment and disposal of wastewater within the City limits and portions of western Placer County. The City owns and operates the Lincoln WWTRF, which produces Title

22 treated tertiary wastewater (recycled water) suitable for unrestricted use and reclamation. The recycled water is permitted for discharge to surface water into the Auburn Ravine Creek or land application to on-site reclamation areas surrounding the WWTRF and off-site reclamation areas. Information within this section is largely from the City's Wastewater Collection System Master Plan [10] and the City's Reclamation Master Plan[11].

6.2.5.1 Wastewater Collection, Treatment, and Disposal

The City's collection system, treatment, and disposal services are described in the sections below.

6.2.5.1.1 Wastewater Collected Within Service Area

The City collects and treats wastewater within the City limits, as well as regional wastewater flow from Placer County's Sewer Maintenance District No. 1 (SMD1), which the City receives via the Mid-Western Placer Regional Sewer Pipeline under a Joint Exercise of Powers Agreement. The City's wastewater collection system consists of approximately 200 miles of sanitary sewers, including local sewers, trunk sewers, and force mains, and seven sewage pump stations. Regional wastewater flow from SMD1 is pumped through a 13.5-mile force main from western Placer County before discharging into the City's collection system near the intersection of Highway 193 and Sierra College Boulevard. The City began collecting and treating sanitary sewer flow from SMD1 in 2016. In the future, the City may also receive and treat wastewater from the City of Auburn and Bickford Ranch via the Mid-Western Placer Regional Sewer Pipeline.

Collected wastewater consists of base sanitary flow, groundwater infiltration, and rainfall inflow and infiltration. In 2020, the City collected 4,950 AF of wastewater, 3,380 AF of which was collected from within the City's potable water service area.

A summary of the wastewater collected in the City's service area is provided in Table 6-10.

[10] Stantec, May 2018. City of Lincoln Wastewater Collection System Master Plan.

[11] Stantec, December 2019. City of Lincoln – Reclamation Master Plan.

Table 6-10. Wastewater Collected Within Water Service Area in 2020 (DWR Table 6-2)

☐	There is no wastewater collection system. The supplier will not complete the table below.
	Percentage of 2015 service area covered by wastewater collection system *(optional)*
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*

Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2020 *	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
City of Lincoln	Metered	3,380	City of Lincoln	Wastewater Treatment and Reclamation Facility	Yes	No
Total Wastewater Collected from Service Area in 2020:		3,380				

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

NOTES: Units are in acre-feet (AF).
Wastewater Collected within UWMP Service Area is equal to total wastewater influent to WWTRF less wastewater flow from Placer County's Sewer Maintenance District No. 1.

6.2.5.1.2 Wastewater Treatment and Discharge Within Service Area

The WWTRF, located in the southwest part of the City off Fiddyment Road, treats collected wastewater using conventional secondary and tertiary wastewater treatment processes, including biological treatment in oxidation ditches with nitrification and denitrification, secondary clarification, granular media filtration, and UV disinfection. The current design daily average dry weather flow (ADWF) capacity of the WWTRF is 5.9 MGD. The City is in the process of expanding the WWTRF ADWF capacity by 1.2 MGD to accommodate future growth, for a future planned ADWF capacity of 7.1 MGD. A second planned expansion will further increase ADWF capacity by an additional 0.9 MGD, for a total future planned ADWF capacity of 8.0 MGD. The City's surface discharge permit allows for increases in the permitted ADWF up to 8.4 MGD, upon meeting certain conditions, to accommodate growth within the City's service area and additional regionalization projects.

Final tertiary effluent is either used to supply the City's recycled water distribution system, sent to tertiary storage facilities for later use, or discharged to the Auburn Ravine Creek. Effluent discharged to Auburn Ravine Creek is subject to Order No. R5-2018-0081 (NPDES No. CA0084476) adopted by the Central Valley Regional Water Quality Control Board (RWQCB). In addition to the ADWF limit, the City's National Pollutant Discharge Elimination System (NPDES) permit requires the effluent discharge to Auburn Ravine Creek to comply with various effluent and receiving water quality limitations, including receiving water limits for temperature, pH, and dissolved oxygen concentration. Historically, the receiving water limits on temperature have been the most limiting constraint for effluent management. The WWTRF's tertiary storage facilities can be used to store treated effluent until it meets the temperature requirements or until there is sufficient recycled water demand for its beneficial use.

Before entering the recycled water distribution system, effluent sent to storage can be re-treated using a dissolved air flotation tank system, which removes algae and other contaminants that may have been introduced during storage, and through the filtration and disinfection processes described above. Additionally, inline filtration will be located at City parks equipped to receive recycled water to improve water quality and reduce operation activities and maintenance. The City also has plans to install large-scale inline filters and disinfection along the primary recycled water transmission main serving the City as part of the WWTRF Expansion Project.

A summary of the treated and surface discharged effluent or recycled water in 2020 is provided in Table 6-11.

6.2.5.2 Existing Recycled Water System

The City's WWTRF is capable of producing tertiary treated recycled water that meets DDW Title 22 requirements for unrestricted reuse. Treated effluent not discharged to Auburn Ravine Creek can be applied for beneficial use at on-site or off-site reclamation areas. Recycled water is delivered to off-site reclamation areas via the City's recycled water distribution system, which consists of a 7.9 MGD Reclamation Booster Pump Station, located on-site at the WWTRF, and 12 miles of transmission pipelines.

The City's on-site reclamation area consists of approximately 180 acres of land at the WWTRF used for agriculture. The City also delivers recycled water for agricultural use to two off-site reclamation areas outside the existing City limits: (1) 192 acres of County Leased Reclamation Area and (2) 590 acres of the Machado Farm. Within the City limits, recycled water is used for the irrigation of Foskett Regional Park, some landscaped medians, industrial use at Sierra Pacific Industries, and in construction activities for dust control.

Table 6-12 summarizes the current beneficial uses within the City's recycled water service area and projections for future recycled water use through 2045. As shown in Table 6-11, agricultural irrigation accounts for the majority of existing recycled water use. Future recycled water use is discussed in the next section.

Table 6-11. Wastewater Treatment and Discharge Within Service Area in 2020 (DWR Table 6-3)

☐	**No wastewater is treated or disposed of within the UWMP service area.** The supplier will not complete the table below.										
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional) 2*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area? *Drop down list*	Treatment Level *Drop down list*	**2020 volumes [1]**				
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area [3]	Recycled Outside of Service Area	Instream Flow Permit Requirement
WWTRF	001	Auburn Ravine Creek		River or creek outfall	Yes	Tertiary	4,950	1,970	172	2,350	0
						Total	4,950	1,970	172	2,350	0

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

NOTES: Units are in acre-feet (AF).
Volume of wastewater treated includes wastewater collected from Placer County's Sewer Maintenance District No. 1.

Table 6-12. Current and Projected Recycled Water Direct Beneficial Uses Within Service Area (DWR Table 6-4 Retail)

☐	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.
Name of Supplier Producing (Treating) the Recycled Water:	City of Lincoln
Name of Supplier Operating the Recycled Water Distribution System:	City of Lincoln
Supplemental Water Added in 2020 (volume) *Include units*	
Source of 2020 Supplemental Water	

Beneficial Use Type *Insert additional rows if needed.*	**Potential** Beneficial Uses of Recycled Water (Describe)	Amount of **Potential** Uses of Recycled Water (Quantity) *Include volume units* [1]	General Description of 2020 Uses	Level of Treatment *Drop down list*	2020 [1]	2025 [1]	2030[1]	2035[1]	2040[1]	2045[1] (opt)
Agricultural irrigation	Irrigation of farmland near WWTRF		Rice and Fodder crops (not within current City limits)	Tertiary	2,350	2,840	2,840	2,840	2,840	2,840
Landscape irrigation (exc golf courses)	Irrigation of City parks and landscaping within western portion of City		Landscape medians, Foskett Regional Park	Tertiary	105	150	190	240	280	610
Golf course irrigation										
Commercial use										
Industrial use	Cooling and process water for industrial processes		Sierra Pacific Industries	Tertiary	65	60	60	60	60	60
Geothermal and other energy production										
Seawater intrusion barrier										
Recreational impoundment										
Wetlands or wildlife habitat										
Groundwater recharge (IPR)										
Reservoir water augmentation (IPR)										
Direct potable reuse										
Other (Description Required)	Construction dust control		Construction dust control	Tertiary	2	0	0	0	0	0
				Total:	2,522	3,050	3,090	3,140	3,180	3,510
				2020 Internal Reuse						

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

NOTES: Units are in acre-feet (AF). Projections are rounded to the nearest ten AF.
Projected recycled water use for 2040 is based on the projections for the Near-Term Development scenario presented in Table 6-10 of the City's Reclamation Master Plan. Landscape Irrigation projections for 2030 and 2035 are a linear progression between the 2020 and 2040 development scenarios. Landscape Irrigation projection for 2045 is based on a linear progression between the 2040 projection and the Long-Term Development scenario presented in Table 6-10 of the City's Reclamation Master Plan, assuming that the Long-Term Development scenario represents 2065 conditions.

Table 6-13 compares the projection of 2020 recycled water use included in the 2020 UWMP with actual 2020 recycled water use. Agricultural use of recycled water in 2020 was 30 percent greater than projected use. Other use of recycled water in 2020, including industrial use, landscape irrigation, and construction dust control, was significantly less than projected use. Total projected use is approximately 31 percent less than anticipated.

Table 6-13. 2015 Recycled Water Use Projection Compared to 2020 Actual (DWR Table 6-5 Retail)

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

Beneficial Use Type	2015 Projection for 2020 [1]	2020 Actual Use [1]
Insert additional rows as needed.		
Agricultural irrigation	1,800	2,350
Landscape irrigation (exc 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)		
Reservoir water augmentation (IPR)		
Direct potable reuse		
Other (Description Required)	1,500	172
Total	3,300	2,522

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

NOTE: Units are in acre-feet (AF).
Projected 2020 recycled water use other than for agricultural irrigation was not broken out by use type in the City's 2015 UWMP.

6.2.5.3 Projected Recycled Water System

The City plans to supply recycled water to all areas within the City's SOI at an elevation of approximately 160 feet above sea level or lower. Supplying recycled water to areas at higher elevations would require additional pump stations and may not be cost effective. The planned future recycled water service area is generally bounded by Lincoln Boulevard on the east and the City's SOI boundary to the west. Irrigation demands outside of the City's recycled water service area will be supplied by the City's potable water distribution system or by other non-potable supply sources from PCWA or NID. The City may expand its recycled water service area to the east in the future if there is a significant demand for recycled water. Refer to the City's Reclamation Master Plan for additional details on the feasibility of future recycled water use.

Table 6-14 presents the City's methods to expand future recycled water use. The City's Reclamation Master Plan indicates significant infrastructure will need to be constructed to expand the delivery of treated wastewater to City end-users. Since 2000, the City has been requiring the installation of recycled water distribution mains within the new developments to allow for the use of recycled water. As part of the City's Phase II Reclamation Project, recycled water service will be extended to Joiner Park, Machado Park, and Peter Singer Park. Other existing irrigation customers that may convert to use recycled water in the future include cemeteries, schools, parks, public facilities, streetscapes, and other City owned or operated facilities with a non-potable water demand. Recycled water use will also be extended to planned

development areas such as the Villages and SUDs within the recycled water service area. As the City develops, the current off-site agricultural use for WWTRF effluent is assumed to eventually be phased out in favor of other users. To be conservative, of these planned future recycled water connections, only Aitken Park and the Phase II Parks are assumed to be connected to the recycled water system by 2045[12]. Table 6-12 shows the City's projected recycled water use through 2045.

Table 6-14. Methods to Expand Future Recycled Water Use (DWR Table 6-6 Retail)

☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
See Section 6.2.5.3	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use *
Add additional rows as needed			
		Total	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Refer to Section 6.2.5.3 for expansion efforts explanation in narrative format.			

6.2.6 Desalinated Water Opportunities

Desalination is the process of removing dissolved minerals from brackish or saltwater to produce freshwater that can be used for municipal needs such as drinking water and industrial uses. It is one of several elements that may be included in a community's water supply portfolio.

The City has no sources of ocean water, brackish water, or groundwater that provide viable opportunities for development of desalinated water as a long-term supply. Thus, the City has not included desalinated water in planning for its future water supply sources.

6.2.7 Water Exchanges and Transfers

Water exchanges or transfers between willing sellers and willing buyers supplement water supplies in dry times and move water to places of critical need. The City has opportunities to acquire water through water transfers and make water available for water transfers.

Acquiring water through water transfers would require the City to obtain permission from PCWA in order to use their conveyance facilities to recover the water. Although PCWA may be willing to grant permission, PCWA has adequate supplies to meet the City's needs long-term.

Utilizing the City's groundwater assets, the City is able to make water available for water transfers. The City may be able to forgo PCWA or NID derived surface water supplies, under certain conditions, in order to make surface water supplies available to other users. PCWA may ask the City to use its groundwater assets in times of shortage. Under such conditions, the City may be able to direct the water supplies, to

[12] Consistent with the Near-Term Development scenario presented in Table 6-10 of the City's Reclamation Master Plan.

other regional water users. Any transfer of surface water assets would require regional cooperation among wholesale water agencies.

The City currently transfers recycled water supplies to regional agricultural users for irrigation purposes in accordance with the City's water discharge requirements. As more recycled water supplies become available, the City plans to expand its recycled water deliveries to offset surface water and groundwater supply needs. Excess recycled water supplies discharged to Auburn Ravine could be used for beneficial purposes or sold to third party interests.

6.2.8 Future Water Projects

The City does not have plans to develop new sources of water. Table 6-15 shows the future water supply projects planned by the City to expand supply from existing water sources. Further discussion of these projects is provided below.

Table 6-15. Expected Future Water Supply Projects or Programs (DWR Table 6-7 Retail)

☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☑	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.2.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other suppliers?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Supplier* *This may be a range*
	Drop Down List (y/n)	*If Yes, Supplier Name*				
Add additional rows as needed						
Recycled Water System Expansion	No			Ongoing	All Year Types	500
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units are in acre-feet (AF). See text for narrative description of the Future Groundwater Wells project.						

6.2.8.1 Future Groundwater Wells

As the City expands and develops the western and northern portions of its SOI, new groundwater production wells will be constructed in the developing areas. These groundwater wells will increase the City's total groundwater production capacity, and improve its ability to rely on groundwater supplies in the event that PCWA supplies are curtailed due to drought or unavailable due to an emergency. Construction of these groundwater wells will not increase the City's groundwater production in normal or wet years. These groundwater wells will primarily be used to supply peak demands, increase reliability, and offset unforeseen shortfalls in surface water supply.

6.2.8.2 Recycled Water System Expansion

The City plans to continue expanding its recycled water system and increase recycled water deliveries within its water service area. The City's Phase II Reclamation Project will extend recycled water service to Joiner Park, Machado Park, and Peter Singer Park. The City will extend service to other existing customers

and continue to require the construction of recycled water pipelines in new developments. Use of recycled water by these existing and new customers will offset potable water use and increase the City's potable water system reliability. The City projects that approximately 670 AFY of potable water demand will be offset by recycled water use in 2045. The City currently offsets approximately 170 AFY of potable water demand within the City limits through use of recycled water. Therefore, the recycled water system expansion will reduce potable water demand by an additional 500 AFY by 2045. This reduction has been included in the potable water demand projections presented in this plan.

6.2.9 Summary of Existing and Planned Sources of Water

The City's existing water supplies and future projected normal year water supplies are summarized in Table 6-16 and Table 6-17, respectively.

Table 6-16. Water Supplies – Existing (DWR Table 6-8 Retail)

Water Supply	Additional Detail on Water Supply	2020		
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		Actual Volume*	Water Quality Drop Down List	Total Right or Safe Yield* (optional)
Add additional rows as needed				
Purchased or Imported Water	PCWA	8,430	Drinking Water	
Purchased or Imported Water	NID	1,509	Drinking Water	
Groundwater (not desalinated)	City-owned Wells	628	Drinking Water	
Recycled Water	Produced at City's WWTRF	2,522	Recycled Water	
	Total	13,089		0
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*				
NOTES: Units are in acre-feet (AF). Does not include raw water delivered by NID or PCWA to customers within the City's potable water service area.				

Table 6-17. Water Supplies – Projected (DWR Table 6-9 Retail)

Water Supply	Additional Detail on Water Supply	Projected Water Supply * Report To the Extent Practicable									
Drop down list May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool		2025		2030		2035		2040		2045 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water	PCWA	10,640		11,600		13,310		15,020		16,480	
Purchased or Imported Water	NID	0		0		0		0		0	
Groundwater (not desalinated)	City-owned Wells	1,180		1,290		1,480		1,660		1,820	
Recycled Water	Produced at City's WWTRF	3,050		3,090		3,140		3,180		3,510	
	Total	14,870	0	15,980	0	17,930	0	19,860	0	21,810	0
***Units of measure (AF, CCF, MG)** *must remain consistent throughout the UWMP as reported in Table 2-3.*											

NOTES: Units are in acre-feet (AF). Projections rounded to nearest ten AF.
The City plans to meet 90 percent of potable demands with purchased surface water and 10 percent of potable demands with local groundwater. It is conservatively assumed that the City will not receive supply from NID in the future.
Recycled water demand projections are based on the City's Reclamation Master Plan.

6.2.10 Climate Change Impacts

The State of California is taking proactive steps to understand and address climate change. According to information contained within the State of California's climate change website portal (calepa climate), the world's climate is warming as supported by observations of increasing air and ocean temperatures.

As a proactive planning step, the State is inserting climate change considerations into documents and reports where the State has oversight. For example, per State Water Board Resolution 2017-0012, dated March 7, 2017, water system inspections are required to address climate change impacts and concerns. Future Urban Water Management Plans may be required to recognize climate change and potential impacts to water supplies.

The NABRDCP discusses the impacts of climate change on the City's supplies. Effects of climate change, including increased average temperature, decreased snowpack, increased evapotranspiration, and rising sea level make regional long-term water supply reliability uncertain. As a result of climate change impacts, Folsom Reservoir may need to be relied upon more heavily to regulate flow in the American River and to contribute high-quality water to the Sacramento-San Joaquin Delta to satisfy Delta flow requirements and protect endangered fish species. Changes in Folsom Reservoir operations may impact City supplies because of PCWA's reliance on the American River for a significant portion of its supply portfolio. The NABRDCP projects that low storage in Folsom Reservoir will have a moderate impact on PCWA and City supplies. The City has taken steps to increase the resilience of its water supply portfolio and decrease its potable water demands, including expansion of its recycled water system, participation in regional groundwater management, and participation in local and regional water conservation programs. Together, these actions will reduce the impacts of climate change on the City's surface water supplies.

6.3 ENERGY INTENSITY

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

potable water, and that NID requires to deliver raw water to PCWA's treatment facilities, is excluded from this Plan.

Energy intensity is the total amount of energy in kilowatt hour (kWh) expended on a per acre-foot basis to take water from the City's sources to its point of delivery. Understanding the whole-system energy intensity will allow the City to:

- Identify energy and cost saving opportunities. Energy consumption is often a large portion of the cost of delivering water;
- Calculate energy savings and greenhouse gas emissions reductions associated with water conservation programs;
- Identify opportunities for receiving energy efficiency funding for water conservation programs;
- Inform climate change mitigation strategies; and
- Benchmark energy use at each water acquisition and delivery step and compare energy use with those of other similar agencies.

The calculated energy intensity of the City's potable water service in 2020 is provided in Table 6-18. The City uses energy to extract groundwater from its wells and to operate its distribution system. The City does not store water in an energy intensive manner, nor does it convey or treat surface water. Energy required to treat groundwater is reported as extract and divert consumption. Energy consumption from the City's single booster pump station is reported as distribution consumption. The total energy intensity for the City's potable water service is 135 kWh/MG (44 kWh/AF).

Table 6-18. Energy Intensity (DWR Table O-1A or B or C)

Enter Start Date for Reporting Period	1/1/2020		Urban Water Supplier Operational Control							
End Date	12/31/2020		Water Management Process						Non-Consequential Hydropower (if applicable	
☐s upstream embedded in the values reported?										
		Water Volume Units Used	Extract and Divert	Place into Storage	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process		AF	*628*	*0*	*0*	*0*	*10567*	*10567*		*10567*
Energy Consumed (kWh)		*N/A*	*444322*	*0*	*0*	*0*	*21207*	*465529*		*465529*
Energy Intensity (kWh/vol. converted to MG)		*N/A*	*2171.3*	*0.0*	*0.0*	*0.0*	*6.2*	*135.2*	*0.0*	*135.2*

Quantity of Self-Generated Renewable Energy
kWh

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

Data Quality Narrative:
Energy consumption data provided by PG&E bills.

Narrative:
Extract and Divert includes City groundwater wells.
Distribution includes the City's single booster pump station and other misc. instrumentation.

As discussed in Section 6.2.5.1, the City provides wastewater collection, treatment, and disposal services within its potable water service area and from a portion of Placer County. As discussed in Section 6.2.5.2, the City distributes recycled water to areas both within and outside of its potable water service area. The

energy intensity for the City's wastewater and recycled water systems could not be fully separated because wastewater treatment and some recycled water distribution pumping both take place at the WWTRF, which has a single electricity service meter for all use. Therefore, some energy use for the recycled water distribution system is reported as wastewater treatment. The energy intensity associated with the City's wastewater and recycled water services in 2020 is provided in Table 6-19. The total energy intensity for the City's wastewater services is 5,054 kWh/MG (1,647 kWh/AF). The total energy intensity for the City's recycled water services is 243 kWh/MG (79 kWh/AF).

Table 6-19. Energy Intensity – Wastewater (DWR Table O-2)

Enter Start Date for Reporting Period	1/1/2020	**Urban Water Supplier Operational Control**			
End Date	12/31/2020	**Water Management Process**			
☐ Is upstream embedded in the values reported?		Collection / Conveyance	Treatment	Discharge / Distribution	Total
Volume of Water Units Used	AF				
Volume of Wastewater Entering Process (volume units selected above)		*4950*	*4950*	*1970*	*4950*
Wastewater Energy Consumed (kWh)		*168477*	*7980430*	*2442*	*8151349*
Wastewater Energy Intensity (kWh/volume)		*104.5*	*4947.7*	*3.8*	*5053.7*
Volume of Recycled Water Entering Process (volume units selected above)		*0*	*0*	*2522*	*2522*
Recycled Water Energy Consumed (kWh)		*0*	*0*	*199922*	*199922*
Recycled Water Energy Intensity (kWh/volume converted to MG)		*0.0*	*0.0*	*243.3*	*243.3*

Quantity of Self-Generated Renewable Energy related to recycled water and wastewater operations

kWh

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

Metered Data

Data Quality Narrative:

Energy consumption data provided by PG&E bills.

Narrative:

Collection system process includes energy consumption for lift stations.
Wastewater treatment process includes treatment of all collected wastewater to meet the standards for unrestricted recycled water use under DDW Title 22. Some of this reclaimed water is discharged to Auburn Ravine, the remainder is distributed through the recycled water system. Also includes some energy consumption from pump stations which distribute recycled water.
Discharge and Distribution includes energy consumption for discharge and recycled water distribution pump stations.

CHAPTER 7
Water Service Reliability and Drought Risk Assessment

This chapter describes the City's water system reliability through a twenty-five-year planning horizon during various year types. This chapter also includes a drought risk assessment (DRA) for the next consecutive five years. The water system reliability differs from the DRA by allowing a different basis for characterizing the five consecutive dry years. Shorter term reliability planning, such as catastrophic supply interruption, is addressed in Chapter 8.

7.1 WATER SERVICE RELIABILITY ASSESSMENT

This section describes the long-term reliability and vulnerability of the City's water supplies. The City's implemented, or planned to be implemented, water management tools for increasing the reliability of water supplies are also addressed.

7.1.1 Constraints on Water Sources

There are a variety of constraints that can impact water supply reliability. This section includes a description of potential physical, legal, environmental, water quality, and climatic constraints on the reliability of water supply sources as identified by the City. Descriptions of the City's water supply sources are included in Chapter 6.

7.1.1.1 Physical

Water supply reliability is dependent on the hydraulic capacity of supply and distribution system facilities. In general, the City's existing water distribution system has sufficient capacity to deliver existing average and peak demands. As the City continues to expand and new developments are connected to the City's distribution system, new facilities will need to be constructed to increase the system hydraulic capacity. The City proactively evaluates the impacts of new developments by using a hydraulic model of the distribution system to identify necessary system improvements.

Physical constraints on PCWA's water transmission and treatment infrastructure are discussed in PCWA's 2020 UWMP. The City and PCWA meet regularly to discuss the City's water supply and any improvements to PCWA infrastructure needed to supply the City. The City recently completed the Phase 3 Pipeline and Metering Station project, which increased the hydraulic supply capacity available from PCWA.

7.1.1.2 Legal

As discussed in Section 6.2.3, the City has a contract with PCWA for a maximum delivery entitlement of 18.9 MGD of treated water supply. As needed, the City and PCWA will coordinate amendments to this contract to increase the maximum delivery entitlement and enable PCWA supply to meet future increases in City demands. New City developments will be annexed into PCWA Zone 6 as they are connected to the City's distribution system.

Existing regulations do not directly limit the City's use of groundwater resources underlying the City.

The City does not anticipate future legal constraints on the recycled water system.

Per California Senate Bill 610, the City will prepare a Water Supply Assessment (WSA) for any development which is governed by the requirements set forth in CWC sections 10910 through 10915 (inclusive). Per California Senate Bill 221, the City will obtain an affirmative written verification of sufficient water supply for new residential subdivisions as required by the legislation.

7.1.1.3 Water Quality

Water quality for groundwater and surface water supplies are published annually in the City's Consumer Confidence Report (CCR). The most recent CCR is available on the City's website at http://www.lincolnca.gov/city-hall/departments-divisions/public-services/water/water-quality-report. As shown in the CCR, the City's water supply meets or exceeds all federal and state drinking water standards.

PCWA participates in regular updates to the Watershed Sanitary Surveys (WSS) for the American River Watershed and the Yuba/Bear River Watershed. PCWA diverts most of its water supplies from these two watersheds. The most recent WSS updates[13,14] show that PCWA's water treatment facilities are able to treat the source water to meet all regulatory requirements. As a result, water quality is not expected to impact supply reliability. Refer to PCWA's 2020 UWMP for additional information on the quality of PCWA's supplies.

Groundwater underlying the City's service area meets all primary and secondary drinking water standards for municipal water use. As discussed in Chapter 6, the City participates in regional groundwater management through the Western Placer GSA. The City will continue to regularly monitor groundwater quality and proactively address future regulations to minimize future water quality impacts to its groundwater supply reliability.

The City's recycled water produced at the WWTRF meets all standards for unrestricted use under DDW Title 22. The City has installed in-line filters at select locations within the recycled water distribution system to protect irrigation system emitters from being clogged by small particulates. Future expansion of the recycled water system may include installation of additional in-line filters and satellite disinfection facilities. The City does not anticipate any water quality constraints in the recycled water system.

7.1.1.4 Climate

The NABRDCP discusses the impacts of climate change on the PCWA water supplies. Effects of climate change are expected to include increased average temperature, decreased snowpack, increased evapotranspiration, and rising sea level. As a result of climate change impacts, Folsom Reservoir may need to be relied upon more heavily to regulate flow in the American River and to contribute high-quality water to the Sacramento-San Joaquin Delta to satisfy Delta flow requirements and protect endangered fish species. Because PCWA takes its water supplies upstream of Folsom Reservoir, the NABRDCP (Table 3-2) projects that low storage in Folsom Reservoir will have only a moderate impact on PCWA and City supplies.

The City's groundwater and recycled water supplies are not expected to be impacted by climate factors, and the City does not anticipate future disruption of these supplies as a result of climate factors.

7.1.2 Reliability by Hydrologic Year Type

The quantity of supply available from different water supply sources can vary from one year to the next depending on hydrologic conditions. Historical data, where available, were therefore used to develop a projected yield for each water supply source under three conditions: (1) normal water year, (2) single dry

[13] Starr Consulting, Palencia Consulting Engineers, Rincoln Consultants, Inc. 2018. *American River Watershed Sanitary Survey 2018 Update*.

[14] Starr Consulting, Palencia Consulting Engineers. January 2017. *Yuba/Bear River Watershed Sanitary Survey 2017 Update*.

year, and (3) multiple dry years. In accordance with the DWR Guidebook, each condition is defined as follows:

- **Normal Water Year:** The year, or an averaged range of years, that most closely represents the average water supply available to the City. The terms "normal" and "average" are used interchangeably. Available supplies in a normal year are based on modeling of the long-term hydrologic record rather than a single year.
- **Single Dry Year:** The year that represents the lowest water supply available to the City. The year 1977 represents the Single Dry Year for the City.
- **Multiple-Dry Year:** The lowest average supply for a consecutive 5-year period in the historical sequence. The years 1988 through 1992 represent the five consecutive Multiple-Dry Years for the City.

Years that the City identifies as the historical average, single driest year, and driest multi-year period are shown in Table 7-1. These years are also known as the "base years" and represent the availability of all of the City's water supplies. The hydrologic years selected as the base years for the City were provided by PCWA and are documented in PCWA's 2020 UWMP. The City's base years are identical to PCWA's base years because PCWA is the primary water supplier for the City, and because the City's supplementary supply sources, groundwater and recycled water, are generally unaffected by hydrologic year type. To be conservative, NID water supply is not included in as a projected water supply.

Table 7-1. Basis of Water Year Data[(a)]

Water Year Type	Base Year(s)
Normal Water Year	NA[(b)]
Single Dry Water Year	1977
Five Consecutive Dry Years	1988 - 1992

(a) Based on PCWA's base hydrologic years as documented in PCWA's 2020 UWMP.
(b) PCWA determines available supply in a normal water year based on modeling of the hydrologic record.

7.1.2.1 PCWA Supply

PCWA is the City's primary wholesale water supplier, as described in Section 6.2.1.1. PCWA supply reliability was determined by consultation with PCWA staff. The City's PCWA supply is anticipated to be 100 percent reliable in all year types (normal, single dry, and multiple-dry). Although some of PCWA's supply sources may have reduced availability in single dry and multiple-dry years, the total supply available to PCWA during these year types is projected to be sufficient to meet the City's full supply entitlement. However, should PCWA determine a water shortage or implement a given stage of PCWA's WSCP, the City would be required to implement its WSCP as necessary to achieve the required level of water conservation. The availability of PCWA supply during base years is summarized in Table 7-2.

Table 7-2. Retail: Basis of Water Year Data for PCWA Water Supply (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	**% of Average Supply**
Average Year	See Notes		100%
Single-Dry Year	1977		100%
Consecutive Dry Years 1st Year	1988		100%
Consecutive Dry Years 2nd Year	1989		100%
Consecutive Dry Years 3rd Year	1990		100%
Consecutive Dry Years 4th Year	1991		100%
Consecutive Dry Years 5th Year	1992		100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG**) must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF). Multiple versions of Table 7-1 are being used, this table reports the reliability of PCWA supplies. PCWA uses modeling of the long-term hydrologic record to determine available supplies in an average year.			

7.1.2.2 Groundwater Supply

The City's groundwater supplies are described in Section 6.2.2. The North American Subbasin (NASb) is not in overdraft and is not projected to become overdrafted with the current management of the subbasin. Therefore, the City's groundwater supplies are anticipated to be 100 percent reliable in all year types (normal, single dry, and multiple-dry). The availability of groundwater supply during base years is summarized in Table 7-3.

Table 7-3. Retail: Basis of Water Year Data for Groundwater Supply (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	% of Average Supply
Average Year	See Notes		100%
Single-Dry Year	1977		100%
Consecutive Dry Years 1st Year	1988		100%
Consecutive Dry Years 2nd Year	1989		100%
Consecutive Dry Years 3rd Year	1990		100%
Consecutive Dry Years 4th Year	1991		100%
Consecutive Dry Years 5th Year	1992		100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF). Multiple versions of Table 7-1 are being used, this table reports the reliability of supplies from the City operated groundwater wells. PCWA uses modeling of the long-term hydrologic record to determine available supplies in an average year.			

7.1.2.3 Recycled Water Supply

The City's recycled water supplies are described in Section 6.2.5. In general, recycled water supply reliability is not dependent on hydrologic year type. Available recycled water supply may decrease slightly in dry years if potable water conservation decreases wastewater inflows to the WWTRF. However, because the volume of recycled water produced at the WWTRF is significantly greater than recycled water demands, the City's recycled water supplies are assumed to be 100 percent reliable in all year types. The availability of recycled water supply during base years is summarized in Table 7-4.

Table 7-4. Retail: Basis of Water Year Data for Recycled Water Supply (Reliability Assessment) (DWR Table 7-1)

Year Type	Base Year If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 2019-2020, use 2020	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available *	% of Average Supply
Average Year	See Notes		100%
Single-Dry Year	1977		100%
Consecutive Dry Years 1st Year	1988		100%
Consecutive Dry Years 2nd Year	1989		100%
Consecutive Dry Years 3rd Year	1990		100%
Consecutive Dry Years 4th Year	1991		100%
Consecutive Dry Years 5th Year	1992		100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If a Supplier uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF). Multiple versions of Table 7-1 are being used, this table reports the reliability of the City's recycled water supplies. PCWA uses modeling of the long-term hydrologic record to determine available supplies in an average year.			

7.1.3 Water Service Reliability

In this section, the City's normal, single dry, and multiple-dry years projected supplies and demands are integrated and compared. Projected water demands are detailed in Chapter 4 and projected water supplies are detailed in Chapter 6. Under the various water year types, the total annual water supply sources available are compared to the total annual projected water use for the City's water service area from 2025 to 2045 in five-year increments.

7.1.3.1 Water Service Reliability – Normal Year

In normal water years, the City anticipates full availability of its water supply portfolio. Because PCWA supply projections and groundwater supply projections are based on the City's projected potable water demands, available supplies are equal to available demands. Table 7-5 compares the City's projected normal year supplies and demands. As shown in Table 7-5, the City's water supplies are adequate to meet demands during a normal year.

Table 7-5. Normal Year Supply and Demand Comparison (DWR Table 7-2)

	2025	2030	2035	2040	2045 *(Opt)*
Supply totals *(autofill from Table 6-9)*	14,870	15,980	17,930	19,860	21,810
Demand totals *(autofill from Table 4-3)*	14,870	15,980	17,930	19,860	21,810
Difference	0	0	0	0	0
NOTES: Units are in acre-feet (AF). Table references refer to DWR table numbers.					

7.1.3.2 Water Service Reliability – Single Dry Year

No reduction in City supplies is anticipated during a single dry year. PCWA's supplies are sufficient to meet the City's full entitlement in a single dry year. The City's groundwater and recycled water supplies will not be impacted by drought conditions.

No demand reductions are assumed during a single dry year because the City has sufficient supplies to meet normal year demands. However, the City will implement water conservation measures, including possible activation of its WSCP, as necessary to comply with State executive orders.

Table 7-6 compares the City's projected single dry year supplies and demands. As shown in Table 7-6, the City's water supplies are adequate to meet demands during a single dry year.

Table 7-6. Single Dry Year Supply and Demand Comparison (DWR Table 7-3)

	2025	2030	2035	2040	2045 (Opt)
Supply totals*	14,870	15,980	17,930	19,860	21,810
Demand totals*	14,870	15,980	17,930	19,860	21,810
Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*					
NOTES: Units are in acre-feet (AF).					

7.1.3.3 Water Service Reliability – Five Consecutive Dry Years

No reduction in City supplies is anticipated during multiple-dry years. PCWA's supplies are sufficient to meet the City's full entitlement during five consecutive dry years. The City's groundwater and recycled water supplies will not be impacted by drought conditions.

No demand reductions are assumed during multiple-dry years because the City has sufficient supplies to meet normal year demands. However, the City will implement water conservation measures, including possible activation of its WSCP, as necessary to comply with State executive orders.

Table 7-7 compares the City's projected multiple-dry years supplies and demands. As shown in Table 7-7, the City's water supplies are adequate to meet demands during multiple-dry years.

Table 7-7. Multiple Dry Years Supply and Demand Comparison (DWR Table 7-4)

		2025*	2030*	2035*	2040*	2045* (Opt)
First year	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
Second year	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
Third year	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
Fourth year	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
Fifth year	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals	14,870	15,980	17,930	19,860	21,810
	Demand totals	14,870	15,980	17,930	19,860	21,810
	Difference	0	0	0	0	0
***Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units are in acre-feet (AF).						

7.1.4 Water Management Tools and Options

The City uses a variety of management tools to maintain the reliability of its water supplies.

Table 6-15 (DWR Table 6-7R) shows expected future water supply projects that the City anticipates completing. As described in Chapter 6, the City plans to expand its recycled water system and install new groundwater production wells to increase its water supply reliability. Expanding the recycled water system will reduce the City's potable water demands. Installing new groundwater production wells will provide the City with additional operational flexibility and increase supply reliability in dry years if available surface water supplies were curtailed.

The City's water supply projections conservatively assume the City will not receive NID supply after 2020. However, the City is currently negotiating with PCWA and NID to amend the Temporary Agreement. Pending the results of these negotiations, NID may supply all or some of the portion of the City within its service area. Continuing to receive supply from NID in the future would further diversify the City's water supply portfolio and increase supply reliability.

The City also participates in regional water management through the West Placer GSA and RWA. The West Placer GSA is participating in the development of the NASb GSP, which will provide a plan to ensure that the City's groundwater supplies are managed sustainably. RWA coordinates the American River Basin Regional Conjunctive Use Program and the Integrated Regional Water Management Planning Program, which construct and fund regional water supply projects. RWA also supports the City through regional water conservation programs and public outreach. In addition to RWA programs, the City sponsors local programs to promote water conservation. RWA and City water conservation efforts are discussed in Chapter 9.

7.2 DROUGHT RISK ASSESSMENT

CWC §10635(b) requires that the City prepare a DRA based on the supply condition associated with the five driest consecutive years on record. This supply condition is to be assumed to occur over the next five years, from 2021 through 2025.

This section reviews the data and methods used to define the DRA water shortage condition and evaluates each water source's reliability under the proposed drought condition. Total water supplies during the five-year drought is compared to projected demands, and accounts for any applicable supply augmentation or demand reduction measures available to the City. As discussed in Sections 6.2.1.3 and 4.2.3, the projected supply and demand are purposely conservative to account for potential supply reductions and demand increase presented by climate change or regulatory change.

This DRA would allow the City to prepare for a potential water shortage and for implementation of its Water Shortage Contingency Plan, if necessary. Findings show that, should the region experience a period of five-consecutive dry years starting in 2021, adequate water supplies are available to meet projected City demands.

7.2.1 Data, Methods, and Basis for Water Shortage Condition

The DRA was performed assuming estimated demand levels for 2021 through 2025 using the same five-consecutive-dry period conditions presented in Section 7.1.3.3. The characteristic five-year potable water

use during the DRA for City water demands is summarized in Section 4.2.3.1. The 2025 projected water demand is based on water demand projections developed for this urban plan, and is estimated based on the most recent future development estimates provided by the City Planning Department (see Appendix F) and updated unit water use factors (see Appendix G). Future water demands for 2021 through 2024 were linearly interpolated between the 2020 actual water demand and the 2025 projected water demand. Water supplies for the five-consecutive dry years, summarized in Section 7.2.3, were compared to the projected demands to determine potential water shortages from 2021 through 2025.

7.2.2 DRA Water Source Reliability

The City's projected available water supply for each year of the DRA is presented in Table 7-8. Chapter 6 provides an in-depth discussion on the reliability of each water supply source. As documented in PCWA's 2020 UWMP, PCWA can meet the City's full surface water supply entitlement during a five-year drought beginning in 2021. The City's groundwater and recycled water supplies will not be impacted by a drought. Therefore, available supply shown in Table 7-8 is equal to the City's normal year demands for the evaluated period.

Table 7-8. Projected Water Supplies Available for Drought Risk Assessment

Supply Source	2021	2022	2023	2024	2025
PCWA Surface Water	9,740	9,960	10,190	10,410	10,640
Groundwater	1,080	1,110	1,130	1,160	1,180
Recycled Water	2,630	2,730	2,840	2,940	3,050
Total	**13,450**	**13,800**	**14,160**	**14,510**	**14,870**

Note: Units in Acre-Feet (AF)

7.2.3 Total Water Supply and Use Comparison

As shown in Table 7-9, during a five-year drought beginning in 2021, the City's supplies are projected to be adequate to meet projected demands through 2025, even without water conservation. However, as described previously, the City is prepared to enact water conservation requirements as maybe required by State executive orders during multi-year drought conditions.

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

2021	Total
Total Water Use	13,450
Total Supplies	13,450
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	13,800
Total Supplies	13,800
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	14,160
Total Supplies	14,160
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	14,510
Total Supplies	14,510
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	14,870
Total Supplies	14,870
Surplus/Shortfall w/o WSCP Action	0
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP - supply augmentation benefit	
WSCP - use reduction savings benefit	
Revised Surplus/(shortfall)	0
Resulting % Use Reduction from WSCP action	0%
NOTES: Units are in acre-feet (AF).	

CHAPTER 8
Water Shortage Contingency Plan

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

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

8.1 CITY WATER SHORTAGE CONTINGENCY PLAN

The City's WSCP is included in this UWMP as Appendix K. The WSCP describes the City's strategic plan in preparation for and responses to water shortages. The WSCP includes water shortage levels and associated actions that will be implemented in the event of a water supply shortage. As part of the WSCP, the City's legal authorities, communication protocols, compliance and enforcement, and monitoring and reporting are included. The Lincoln Municipal Code (LMC) Chapter 13.04 Article VI Conservation and LMC Chapter 13.04 Article IX Water Conservation Penalties support the City's WSCP actions, and are included in Appendix L.

The City's WSCP has been updated so that it is consistent with the 2018 Water Conservation Legislation requirements. The City plans to modify LMC Chapter 13.04 Articles VI and IX to be consistent with these updates.

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

When an update to the WSCP is proposed, the revised WSCP will undergo the process descripted in Section 8.3 for adoption by the City Council and distribution to Placer County, City customers, and the general public.

8.2 SEISMIC RISK ASSESSMENT AND MITIGATION PLAN

CWC §10632.5(a) requires that the UWMP include a seismic risk assessment and mitigation plan to assess the City's water system vulnerabilities and mitigate those vulnerabilities. A Local Hazard Mitigation Plan (LHMP) may be incorporated in this UWMP to address this requirement if it addresses seismic risk. The City participated in the *Placer County 2016 Local Hazard Mitigation Plan Update* (2016 LHMP), which included an analysis of seismic risk. Per Annex C of the 2016 LHMP, the City's vulnerability to an earthquake is rated as medium. There are no historical records of major earthquakes within the City. The most severe ground shaking caused by an earthquake on record resulted in only minor structural damage within the City. The 2016 LHMP includes mitigation actions for Placer County and the City, some of which address seismic risk. The 2016 LHMP was submitted to the Federal Emergency Management Authority (FEMA), which found it in conformance with Title 44 Code of Federal Regulations Part 201.6 Local

Mitigation Plans. The 2016 LHMP can be accessed at https://www.placer.ca.gov/1381/Local-Hazard-Mitigation-Plan and is incorporated in this UWMP by reference.

In accordance with America's Water Infrastructure Act (AWIA), the City is in the process of conducting a Risk and Resilience Analysis (RRA) of its water system. The RRA will systematically evaluate the City's assets, threats, and risks, and evaluate countermeasures that might be implemented to minimize overall risk to the system. Vulnerability to natural hazards, including earthquakes, will be assessed based on the City's level of preparation/resilience, active response capability, and ability to recover. Pending the results of the RRA, the City may develop new mitigation actions to address seismic vulnerability.

8.3 WATER SHORTAGE CONTINGENCY PLAN ADOPTION, SUBMITTAL, AND AVAILABILITY

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

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

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

CHAPTER 9
Demand Management Measures

This chapter describes the City's historical and existing water conservation program, status of implementation of Demand Management Measures (DMMs), and projected future implementation of water conservation measures. For retail agencies, the number of DMMs required to report is six (plus an "other" category). A narrative description of the status of the DMMs and how DMMs help the water supplier achieve its water efficiency goals are required. Detailed data are not required.

9.1 DEMAND MANAGEMENT MEASURES FOR WHOLESALE SUPPLIERS

The City is not a wholesale water supplier.

9.2 EXISTING DEMAND MANAGEMENT MEASURES FOR RETAIL AGENCIES

Retail water agencies are required to provide a description of the DMM's associated with the following:

- Water waste prevention ordinances
- Metering
- Conservation pricing
- Public education and outreach
- Programs to assess and manage distribution system real loss
- Water conservation program coordination and staffing support
- Other DMMs

This section provides a description of the water conservation programs that are currently implemented and those planned to be implemented in the future. For each DMM, the current program is described, followed by a description of how the DMM was implemented over the previous five years and any future implementation plans.

9.2.1 Water Waste Prevention Ordinances

9.2.1.1 DMM Description

Water waste is prohibited by the City. The City's Municipal Code (Title 13 Public Services, Chapter 13.04 Water, Articles VI, VIII, and IX) defines water waste runoff and associated penalties for violations. Additional prohibited actions, water use violations, and enforcement of these prohibitions are discussed in greater detail in the WSCP in Appendix K.

9.2.1.2 Implementation over the Past Five Years to Achieve Water Use Targets

The City implemented this DMM over the past five years. The City encourages reporting of water misuse. Customers may contact the City directly at the Public Works main line (916-434-2450) to report misuse.

9.2.1.3 Plans for Continued Implementation

The City will continue to implement this DMM. Although water savings from this program cannot be directly quantified, this DMM is expected to help the City achieve its future water use objectives by

minimizing the nonessential uses of water. The City will update its water waste prohibitions in accordance with the revised WSCP presented in Appendix K.

9.2.2 Metering

9.2.2.1 DMM Description

In 2004, the California Legislature passed AB 2572, requiring all water suppliers to install water meters on all customer connections by January 1, 2025.

The City is fully metered throughout its entire service area. This allows the City to closely monitor water usage, identify customers with leaks or excessive water usage, and identify long-term trends in water demand. All new development in the City is required to have meters installed.

9.2.2.2 Implementation over the Past Five Years to Achieve Water Use Targets

The City implemented this DMM over the past five years by continuing to install meters on new service connections. In addition, City water operations staff repair and replace broken water meters identified by the Finance department on a monthly basis. The average replacement rate is approximately 35 meters per month.

9.2.2.3 Plans for Continued Implementation

The City will continue to implement this DMM. The City plans to implement an Advanced Metering Infrastructure (AMI) project to save water, increase efficiencies in daily operations, and enhance customer service. This project will replace approximately 1,200 old water meters with new advanced meters and install three antennas throughout the City to allow wireless communication between the meters and City offices. AMI will allow residents to view real-time and historical water use data using an online portal. It will also provide leak alerts for City staff, allowing for faster response time, especially in irrigated areas that may not be frequented often. This will help prevent the flooding of recreational fields and associated significant water losses.

9.2.3 Conservation Pricing

9.2.3.1 DMM Description

The City's current water rate structure consists of two components, (1) a fixed monthly service charge based on the size of the water meter, and (2) a flat volumetric charge based on the quantity of water used by each customer. The volumetric charge incentivizes customers to reduce their water bill by reducing water use.

9.2.3.2 Implementation over the Past Five Years to Achieve Water Use Targets

In 2013, the City adopted a tiered water rate structure with five tiers of residential water rates to encourage water conservation. In April 2017, the City suspended Tiers 4 and 5 of the rate structure in response to a court ruling that rate structures similar to the City's violated California Proposition 218. The City subsequently conducted a rate study and developed a revised water rate structure which is in compliance with Proposition 218. The current water rate structure went into effect in October 2018, and is shown in Appendix M.

9.2.3.3 Plans for Continued Implementation

The City will continue to implement this DMM. The City plans to conduct water rate studies every 5 to 10 years and update its water rates accordingly.

9.2.4 Public Education and Outreach

9.2.4.1 DMM Description

The City participates in both local and regional public education and outreach activities.

At the local level, the City has a booth at the City's Farmer's Market where water technicians hand out information pamphlets, shower timers, low-flow shower heads, low-flow sprayers for garden hoses, water buckets, moisture meters, leak detector kits, and water conservation and education kits for children. The City has also implemented rebate programs for high-efficiency washers and toilets, which has been advertised to the public through its outreach efforts. Other outreach methods used by the City include water use audits for customers to improve conservation measures, site surveys, water-wise house calls and pressure checks, and customer access to water use data.

At the regional level, the City participates in a public education and outreach program through the RWA. The RWA is a joint powers authority formed in 2001 to promote collaboration on water management and water supply reliability programs in the greater Sacramento, Placer, El Dorado, Yolo and Sutter counties. In collaboration with 19 water provider members and other wastewater, stormwater and energy partners, RWA formed the Water Efficiency Program (WEP) in 2001 to bring cost effectiveness through economies of scale to public education and outreach activities.

The WEP operates on an average annual budget of $530,000 and is supplemented by grant funding. Grants are an important funding resource for the WEP. Since 2003, the WEP has been awarded $13.2 million in grant funding for public outreach and education as well as a variety of rebate programs, fixture direct install programs, system water loss, individualized customer usage reports, large landscape budgets and more. Of those funds, $3.8 million was awarded between 2016 and 2020.

The main function of the WEP is to develop and distribute public outreach messages to customers in the region by collaborating with its water purveyor members. The WEP distributes these messages on a regional scale through regional media and advertising buys and was honored with the United States Environmental Protection Agency WaterSense Excellence in Education and Outreach Award in 2016. From 2016 through 2020, the WEP created a series of public outreach campaigns. Below is a summary of each campaign and highlighted achievements.

9.2.4.2 Implementation over the Past Five Years to Achieve Water Use Targets

From 2015 to 2017, the City published a monthly newsletter titled "Water Wisdom" to elaborate on conservation tips and to communicate changes in water use restrictions to the public. The City also created a mascot named "Drippy" in the shape of a water droplet, which was included on all City outreach materials and social media posts related to conservation during this period. The City ceased publishing "Water Wisdom" and use of "Drippy" after 2017. However, the City continued to perform other local outreach and education via a Farmers Market booth, rebate programs, site surveys, water-wise house calls and pressure checks, and water use audits.

Following the historic 2015 California drought year, the WEP launched the "Rethink Your Yard" Campaign in 2016 with a focus on prioritizing landscape watering, putting trees first, and transitioning thirsty lawn and landscaping to beautiful low water use landscapes. The WEP advertised the campaign through online ads, social media, commercial radio, Raley Field (local baseball stadium), and local billboards. The campaign featured local homeowners with their newly redesigned yards on billboards throughout the region.

The campaign launched in 2017 focused on encouraging customers to understand and deliver the amount of water their landscape really needs and to make permanent equipment changes to improve efficiency such as installing weather-based irrigation controllers, more efficient sprinklers and drip irrigation. The WEP partnered on this messaging with local nurseries through a "Get Growing this Fall" initiative to encourage residents to plant in the fall when days are cooler and plants don't need as much water to establish roots.

From 2018 through 2020, the regional campaign focused on tackling the landscape overwatering problem with a "Check and Save" message encouraging residents to check the soil moisture with a moisture meter before turning on sprinklers. To support this message, the WEP provided free moisture meters via an online request form and at events. In 2019, WEP distributed 3,000 moisture meters to customers throughout the region.

The campaigns referred to above were implemented through both paid advertising buys and earned media from public service announcements (PSAs). Campaign messages were disseminated via Capital Public Radio and online through Google, Facebook, and YouTube advertisements. Table 9-1 summarizes the WEP advertising activities from 2016 through 2020.

Table 9-1. Summary of Water Efficiency Program Advertising, 2016 - 2020

Outreach Activity	Impressions (millions)	Other Statistics
Radio Advertising	17.2	3,443 advertisements run (2016 – 2020)
Digital Advertising	24.3	1.8 million advertisements run (2016 – 2020). 262,900 clicks received
Other Advertising	51.6	Billboards purchased in 2016
PSAs	20.0	Equivalent value of $570,000 if purchased as advertising

The WEP also disseminated messages through its Facebook page. From 2016-2020, the WEP created about 60 Facebook posts a year featuring water saving tips and other relevant information.

The WEP continues to utilize its public outreach website bewatersmart.info to reach customers throughout the region. The website contains regional and local water provider information on rebates and services, top ways to conserve water, an interactive watering and water waste information map, a water-wise gardening database, recent press releases, the Sacramento Smart Irrigation Scheduler tool, and more. Educational information and customer services were modified to address the COVID pandemic in 2020 by including online water efficiency lessons for kids, a list of nurseries that offered curbside pick-up, virtual water wise house calls, and numerous virtual educational customer workshops. Between 2016 and 2020, the website averaged 96,000 unique visitors per year.

For more targeted outreach, the WEP distributed quarterly e-newsletters to participating residents in 6,300 households. The e-newsletters were filled with water savings tips, upcoming events, and other interesting articles. Newsletter releases were typically timed to coincide with changes in the weather to help signal the need for residents to adjust their irrigation systems, such as a message to dial back sprinkler systems during daylight savings time.

Every year the WEP selects three public events at which local water efficiency staff will communicate the WEP messaging to the public in-person. Previously selected events have included the Sacramento Home & Landscape Show at Cal Expo, Creek Week, Harvest Day, Farm-to-Fork Festival, and several Earth Day events. Additionally, RWA, in coordination with participating local water providers, hosts an annual Mulch Mayhem event in which customers can pick up a truck load of free mulch from selected locations throughout the region. All in-person regional events were canceled in 2020 due to the COVID-19 pandemic.

The WEP is also very active in communicating to local media outlets such as the Sacramento Bee. Between 2016 and 2020, RWA issued 50 press releases on WEP activities and regionally significant news and participated in nearly 30 radio public affairs interviews. The RWA and the WEP were mentioned in dozens of news articles published by local and regional media outlets both within and outside of the Sacramento region during the same timeframe.

Since 2012, the WEP has hosted the Water Spots Video Contest for high school and middle school students. The WEP provides a new contest theme each year and provides the region's teacher and students with relevant facts and images to help develop 30-second video PSAs. Students submit their videos to RWA who hosts a panel of local celebrities to decide on a first, second and third place winner. The winning videos are played at Raley Field, in regional movie theaters, and are incorporated into the WEP's media activities. Past themes include *WATER MYTHS BUSTED!, H2o Hero,* and *Show Off Your Water Smarts.* Between 2016 and 2019, 450 videos were submitted (average of 90 videos a year). The 2020 Water Spots Video Contest was canceled due to the COVID-19 pandemic.

As part of its outreach, the WEP advertised regional rebate programs. A full discussion of these rebate programs is provided in Section 9.2.7.

9.2.4.3 Plans for Continued Implementation

The City plans to continue implementing this DMM by participating in the City and RWA sponsored programs discussed above.

9.2.5 Programs to Assess and Manage Distribution System Real Loss

9.2.5.1 DMM Description

To manage distribution system losses, the City conducts annual water audits, repairs system leaks when found, and replaces old pipelines at high risk for failure.

The Annual Water Loss Audit is a process of accounting for water use throughout the water system in order to quantify the non-revenue water. Non-revenue water is the difference between metered production and metered consumption for the entire water distribution system. Per State requirements, the City performs an annual water loss audit that conforms to AWWA Method 36.

The City detects leaks by performing leak detection surveys, monitoring the SCADA system for abnormally high flows, and encouraging customers to report visible leaks. When a leak is identified, the City sends a crew from Public Works to investigate and repair the leak.

9.2.5.2 Implementation over the Past Five Years to Achieve Water Use Targets

The City's 2016 to 2019 AWWA Water Loss Audits are included in Appendix H and summarized in Chapter 4. The City will submit its 2020 AWWA Water Loss Audit in October 2021.

Between 2016 and 2020, the City identified and responded to 154 total breaks or leaks on service connections and water mains, equivalent to an average of 31 leaks per year. In addition to responding to leaks and breaks, the City proactively maintains its water system by replacing old pipelines which are most susceptible to failure. Between 2016 and 2020, the City replaced approximately 25,000 linear feet of aging 6-inch and 8-inch diameter water mains, 400 service laterals, and 44 fire hydrants.

9.2.5.3 Plans for Continued Implementation

The City will continue to perform water audits and identify and address water leaks. The AMI project discussed in Section 9.2.2.3 will enhance the City's ability to identify leaks quickly so repairs can be conducted, and losses can be minimized. The City will continue to proactively replace high-risk water mains and service laterals.

9.2.6 Water Conservation Program Coordination and Staffing Support

9.2.6.1 DMM Description

To ensure that adequate resources are available for water conservation efforts, a City staff member within Public Works is assigned the responsibility of acting as the City's Water Conservation Coordinator. This staff member is responsible for developing, implementing, and monitoring conservation efforts, in addition to their other duties. In addition to the Water Conservation Coordinator, the City Public Works staff perform leak detection and repair. During a drought or other periods where the City needs to bolster conservation efforts, the City will assign additional staff members to support the Water Conservation Coordinator.

9.2.6.2 Implementation over the Past Five Years to Achieve Water Use Targets

The City has staffed the position of Water Conservation Coordinator for the past five years. During the most recent drought (2012 through 2016), the City had additional staff to assist the Water Conservation Coordinator to implement and enforce conservation measures. Administrative staff were assigned to answer the City's water conservation hotline, and a water conservation patrol officer was assigned to investigate and enforce violations of conservation mandates.

9.2.6.3 Plans for Continued Implementation

The City will continue to staff the position of Water Conservation Coordinator and adjust conservation staffing as needed to enact and enforce conservation measures.

9.2.7 Other Demand Management Measures

In addition to the six DMMs described above, the City also participates in local and regional rebate programs.

Locally, the City has implemented rebate programs for high-efficiency washers and toilets. On a larger scale, the WEP coordinated several regional rebate programs, which were partially funded by state and federal grants. A variety of rebate options were provided, including rebates for toilets, clothes washers, and irrigation systems, and are summarized in Table 9-2. Collectively these rebates and installations will produce estimated savings of 6 billion gallons of water and 6.4 million kilowatt hours of energy over a ten-year period.

Table 9-2. Regional Rebates and Installations from 2016-2020

Rebate/Installation Type	2016	2017	2018	2019	2020	Lifetime Water Savings per Type 2016-2020 (MG)	Lifetime Energy Savings per Type 2016-2020 (kWh)**
High Efficiency Clothes Washers Rebates	491	480	453	366	518	111.2	118,094
High Efficiency Toilets Rebates	4,494	3,124	2,255	1,868	904	512.3	544,076
Smart Irrigation Controllers Rebates	245	358	801	556	1,298	667.9	709,299
Irrigation Efficiencies Rebates*	21,271	5,879	5,548	1,724	NA	3,786.4	4,021,178
Turf Replacement Rebates (square feet)	376,613	584,535	236,064	85,375	NA	474.6	503,980
Toilet Direct Installation	1,943	4,542	968	NA	NA	237.4	252,066
Showerhead Direct Installation	1,141	2,512	704	NA	NA	222.6	236,447
Faucet Aerators Direct Installation	1,162	4,314	317	NA	NA	18.5	19,648
Urinal Direct Installation	NA	403	73	NA	NA	10.2	10,878
Total Water Savings per year/Lifetime (MG)	285.9	138.2	104.4	42.9	32.8	6,041.1	
Total Energy Savings per year/Lifetime (kWh)**	303,626	146,717	110,915	45,509	34,799		6,415,665

* Includes: pressure regulator equipment, pipe and pipe fittings, drip or low volume equipment, and sprinkler heads or nozzles.
**Regional average of 1,062 kilowatt hours per MG
kWh = kilowatt hours
MG = million gallons
NA = no funding available
Lifetime = 10 years

9.3 WATER USE OBJECTIVES (FUTURE REQUIREMENTS)

In 2018, the State Legislature enacted two policy bills, (SB 606 (Hertzberg) and AB 1668 (Friedman)), to establish long-term water conservation and drought planning to adapt to climate change and the associated longer and more intense droughts in California. These two policy bills build on SB X7-7 and sets authorities and requirements for urban water use efficiency. The legislation sets standards for indoor residential use and requires the State Water Board, in coordination with DWR, to adopt efficiency standards for outdoor residential use, water losses, and CII outdoor landscape areas with dedicated irrigation meters. At the time of preparation of this UWMP, DWR and the State Water Board are in the process of developing new standards for indoor and outdoor residential water use and water losses. These standards will require urban water retailers to develop agency-wide water use objectives, provide annual reports and update their UWMP.

The State Legislature established indoor residential water use standards as 55 gpcd until January 2025, 52.5 gpcd from 2025 to 2029, and 50 gpcd in January 2030, or a greater standard recommended by DWR and the State Water Board. By June 30, 2022, the State Water Board is anticipated to adopt an outdoor

residential use standard, a standard for CII outdoor landscape area with dedicated irrigation meters, and performance measures for CII water uses. At that time, the State Water Board will adopt guidelines and methodologies for calculating the water use objectives. In accordance with CWC §10609.20(c), the water use objective for urban water retailers will be based on the estimated efficient indoor and outdoor residential water use, efficient outdoor irrigation of CII landscaped areas, estimated water losses, and estimated water use for variances approved by the State Water Board aggregated across the population in its water service area.

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

CHAPTER 10
Plan Adoption, Submittal, and Implementation

This chapter provides information regarding the notification, public hearing, adoption, and submittal of the City's 2020 UWMP. The WSCP (Appendix K) is a component of the 2020 UWMP that is adopted, and can be amended, separately from the UWMP. This chapter includes discussion of plan implementation and the process for amending the UWMP and the WSCP.

10.1 INCLUSION OF ALL 2020 DATA

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

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

10.2 NOTICE OF PUBLIC HEARING

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

10.2.1 Notices to Cities and Counties

The City provided notice regarding the preparation of its 2020 UWMP and WSCP to cities and counties in its service area as discussed in Section 2.5. Notices were sent in November 2020, more than 60 days before the public hearing. The City coordinated the preparation of its UWMP and WSCP internally within the City and with the following agencies:

- California American Water District
- City of Roseville
- Nevada Irrigation District
- Placer County Public Works
- Placer County Water Agency
- Sacramento Area Council of Governments
- South Sutter Water District

The notices of preparation are included as Appendix D. Upon substantial completion of this 2020 UWMP and WSCP, the City provided the same agencies notice of public hearing (Appendix D).

Notifications to cities and counties within which the City provides water, in accordance with the Act, are summarized in Table 10-1.

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

City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Lincoln	Yes	Yes
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Placer County	Yes	Yes
NOTES: Other agencies provided notice include California American Water District, City of Roseville, Nevada Irrigation District, Placer County Water Agency, Sacramento Area Council of Governments, and South Sutter Water District.		

10.2.2 Notice to the Public

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

A notice of public hearing was issued in accordance with Government Code Section 6066 and was published twice in the Lincoln News Messenger newspaper to notify all customers and local governments of the public hearing. In addition, the notice was posted on the City's website, www.lincolnca.gov. A copy of the published Notice of Public Hearing is included in Appendix D.

10.3 PUBLIC HEARING AND ADOPTION

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

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

10.3.1 Public Hearing

A public hearing was held on June 8, 2021. As part of the public hearing, the City provided a report on its compliance with the Water Conservation Act of 2009. The report included information on the City's baseline, water use targets, compliance, and implementation, as discussed previously in Chapter 5.

10.3.2 Adoption

Subsequent to the public hearing, this 2020 UWMP was adopted by the City Council on June 8, 2021. The City adopted the updated WSCP separately so that it may be updated as necessary. Copies of the adopted resolutions are included in Appendix N.

10.4 PLAN SUBMITTAL

A hard copy of this 2020 UWMP, along with the WSCP, will be submitted to DWR within 30 days of adoption and by July 1, 2021. The adopted 2020 UWMP will be submitted electronically to DWR using the Water User Efficiency (WUE) data submittal tool. A copy of the adopted 2020 UWMP will also be submitted to the California State Library.

No later than 30 days after adoption, a copy of the adopted 2020 UWMP, including the WSCP, will be provided to the cities and counties to which the City provides water.

10.5 PUBLIC AVAILABILITY

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

10.6 AMENDING AN ADOPTED UWMP OR WATER SHORTAGE CONTINGENCY PLAN

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