FINAL REPORT | JANUARY 2026

Water Master Plan Update

PREPARED FOR

City of Lincoln

PREPARED BY

Water Master Plan Update

Prepared for

City of Lincoln

Project No. 206-60-24-56

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FINAL REPORT | JANUARY 2026

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LIST OF ACRONYMS AND ABBREVIATIONS

AACE	Association for the Advancement of Cost Engineering
ADD	Average Day Demand
af/ac/yr	Acre-Feet Per Acre Per Year
af/du/yr	Acre-Feet Per Dwelling Unit Per Year
AFY	Acre-Feet Per Year
AMI	Advanced Metering Infrastructure
ASR	Aquifer Storage and Recovery
AWMP	Agricultural Water Management Plan
AWWA	American Water Works Association
BPS	Booster Pump Station
CFC	2022 California Fire Code
CIP	Capital Improvement Program
City	City of Lincoln
CVFED	Central Valley Floodplain Evaluation and Delineation
CVP	Central Valley Project
DDW	Division of Drinking Water
DEM	Digital Elevation Model
DMP	Downtown Master Plan
DU	Dwelling Units
DWR	Department of Water Resources
EGWC	Emergency Groundwater Credit
EPA	Environmental Protection Agency
EPS	Extended Period Simulation
fps	Feet Per Second
ft	Feet
FY	Fiscal Year
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
GP	General Plan 2050
gpcd	Gallons Per Capita Per Day
gpm	Gallons per Minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HDPE	High-Density Polyethylene
HPRs	Hydrant Pressure Recorders
LiSWA	Lincoln-Sewer Maintenance District 1 Wastewater Authority
M	Million
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand

MFP	Middle Fork Project
MG	Million Gallons
mgd	Million Gallons per Day
msl	Mean Sea Level
NASb	North American Subbasin
NID	Nevada Irrigation District
NRW	Non-Revenue Water
ODDS	Objective Design and Development Standards
PCWA	Placer County Water Agency
PG&E	Pacific Gas & Electric
PHD	Peak Hour Demand
PRS	Pressure Regulating Station
PRV(s)	Pressure Regulating Valve(s)
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
R&R	Rehabilitation and Replacement
RUL	Remaining Useful Life
SACOG	Sacramento Area of Council of Governments
SCADA	Supervisory Control and Data Acquisition
SGMA	Sustainable Groundwater Management Act
SOI	Sphere of Influence
SUD	Special Use District
SWRCB	State Water Resources Control Board
TDS	Total Dissolved Solid
TM	Technical Memorandum
UWMP	Urban Water Management Plan
VFD	Variable Frequency Drive
WMP	Water Master Plan
WMPU	Water Master Plan Update
WPCGMP	Western Placer County Groundwater Management Plan
WPGSA	West Placer Groundwater Sustainability Agency
WWTRF	Wastewater Treatment and Reclamation Facility
Zone	Pressure Zone

Executive Summary

INTRODUCTION

The purpose of this 2025 Water Master Plan Update (WMPU) for the City of Lincoln (City) is to evaluate the existing water system infrastructure and address potential impacts of near-term and long-term planned growth to develop a comprehensive guide for the City's water system capital improvement program (CIP).

The City's last Water Master Plan (WMP) was completed in 2017, based on development plans described in the City's General Plan 2050 (GP). Since that time, the City has experienced growth and an increase in per capita water use, constructed a new storage tank (Verdera Tank No. 3), and identified proposed changes in land uses from the General Plan 2050. The City has also updated its water system model since the 2017 WMP to reflect existing system conditions. Since the completion of the 2017 WMP, the City became a member of the West Placer Groundwater Sustainability Agency (GSA). The West Placer GSA prepared and completed the North American Subbasin Groundwater Sustainability Plan (GSP) in 2021, which was then approved by the State in 2023.

These factors have led to a need to reassess the City's water needs, priorities and strategies and reevaluate the water system infrastructure improvements necessary to ensure a safe and reliable water supply for the City's existing and future residents and businesses.

The primary objectives of this WMPU, along with the chapters in which these topics are discussed, are as follows:

- Describe the City's existing water system and facilities (Chapter 2).
- Evaluate historical and existing water demands to understand recent water use patterns and water use by customer type (Chapter 3).
- Develop new unit use factors based on land use categories and recent water demand trends (Chapter 3).
- Develop future water demand projections for near-term and built out conditions based on future planned development in the City and updated unit water use factors (Chapter 3).
- Review the City's existing water supplies and the availability and reliability of each supply source (Chapter 4).
- Review City and industry water system standards and refine performance and operational criteria under which the City water system will be evaluated and recommendations for future facilities will be formulated (Chapter 5).
- Update and calibrate the City's water system hydraulic model to provide an updated, accurate tool for evaluating various water system demand and operational scenarios (Chapter 6).
- Evaluate the need for new water system facilities (including pipelines, supply facilities, storage facilities and pumping facilities) to meet existing, near-term, and built out water demands within the City (Chapters 7 and 8).

- Assess the remaining useful life of the City's water system assets and develop a recommended rehabilitation and replacement program (Chapter 9).
- Develop a CIP for implementation of recommended water system improvements and recommended rehabilitation and replacement program (Chapter 10).

It is important to note that this 2025 WMPU is a living document, and the details presented herein, such as assumptions, evaluations, and recommendations, are based on the data available at the time of preparation. This document will be updated every 5 to 8 years and will incorporate new information and updates that occur after its completion.

WATER SERVICE AREA

The City is located in Placer County, California and is part of the Sacramento metropolitan area. California State Route 65 runs north and south through the City while California State Route 193 runs east and west. The City's water service area covers approximately 29 square miles (18,454 acres) and is generally coterminous with the City limits. 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 proposals are approved.

This City operates a water storage and distribution system that contains seven pressure zones. The storage and distribution system consists of two Placer County Water Agency (PCWA) metering stations, five groundwater wells, three storage tanks, one booster pump station, ten pressure regulating stations, and approximately 279 miles of transmission and distribution pipelines. Refer to Chapter 2 for additional details on the existing water service area, supply sources, and existing water system.

EXISTING AND PROJECTED WATER DEMANDS

Existing baseline water production for this WMPU is 9.0 million gallons per day (mgd), based on the City's 2023 average annual water production. Production is primarily met through surface water supplies from the PCWA and Nevada Irrigation District (NID), supplemented by City-owned groundwater wells.

Updated water demands were projected for 5-Year, 10-Year, 15-Year, 20-Year, and Buildout Phases using the recommended unit water use factors applied to the City's planned future land uses. Future water production requirements were then estimated by adding the projected water demands to the existing baseline production, accounting for a non-revenue water factor of 10 percent. Table ES-1 summarizes the existing and projected water production for the 5-Year, 10-Year, 15-Year, 20-Year, and Buildout Phases.

By the 20-Year Phase, average day demands are projected to increase to 18.9 mgd, with a corresponding maximum day demand of 35.7 mgd. At full buildout, the system's average day demand is projected to reach 35.3 mgd and the maximum day demand is projected to reach 66.9 mgd.

Table ES-1. Projected Water Production Requirements[a]

Phase	Average Day Demand, mgd	Maximum Day Demand, mgd[b]
Existing[c]	9.0	16.9
5-Year	10.9	20.5
10-Year	14.0	26.4
15-Year	16.9	31.9
20-Year	18.9	35.7
Buildout	35.3	66.9

(a) Projected demands include non-revenue water of 10 percent.
(b) Average day to maximum day demand factor equals 1.9.
(c) Existing demands based on 2023 demands.
mgd = million gallons per day

Projected Future Land Use

Future growth and land uses within the City are based on the GP along with input from the City's Community Development Department. The GP summarizes anticipated development within the City's SOI. The SOI encompasses both incorporated and unincorporated areas and were defined in the GP as the probable ultimate boundary and service area of the City. Infill is expected to occur on vacant parcels within the City's existing City Limit boundary. Additionally, the GP categorized larger undeveloped areas into two designations: Village or Special Use District which are described in more detail in Chapter 3.

The future growth was classified in 5-year increments for a 20-year period based on input from the City's Community Development Department. All remaining areas in the GP SOI are assumed to occur at buildout. It is not expected that all areas in the SOI will be fully developed within the 20-year period based on the current pace of development.

Table ES-2 summarizes the future planned development within the City by land use designation. It is projected that approximately 16,947 new residential dwelling units will be added in the next 20 years and 42,916 new dwelling units will be added by buildout of the SOI. It is also projected that approximately 4,280 acres of non-residential land uses will be added in the next 20 years and 11,774 acres will be added by buildout of the SOI. Approximately 54 percent of the buildout non-residential area is composed of open space and right-of-way land use which is not planned to be irrigated. Refer to Chapter 3 for additional details and figures which show the future planned development areas.

Table ES-2. Summary of Future Cumulative Land Use Projections					
Future Land Use Designation	5-Year	10-Year	15-Year	20-Year	Buildout[(a)]
Residential, DU					
Country / Low Density Estates[(b)]	154	457	955	1,652	3,383
Low Density Residential	2,074	4,374	5,867	6,987	18,372
Medium Density Residential	1,044	3,306	5,543	5,608	13,701
High Density Residential	66	1,160	2,013	2,700	7,460
Total Residential	**3,338**	**9,297**	**14,378**	**16,947**	**42,916**
Non-Residential, Acres					
Mixed Use	5	57	83	87	528
Commercial	22	200	372	393	3,140
Business Professional	3	108	154	253	256
Industrial	100	237	337	436	536
Public	12	29	64	130	130
Parks	60	209	318	349	802
Open Space	350	913	1,446	2,162	5,255
ROW	22	118	240	470	1,127
Total Non-Residential	**574**	**1,871**	**3,014**	**4,280**	**11,774**

(a) Buildout includes planned developments within City Limits and SOI identified in General Plan 2050 (March 2008).
(b) Projected timing of developments based on discussions with the City's Community Development Department.
DU = Dwelling Units

WATER SUPPLY EVALUATION

The City's existing water supply portfolio consists of the following sources:

- **Surface water purchased from PCWA.** Surface water is diverted from the American, Yuba, and Bear Rivers, and various tributaries and creeks in West Placer County, and treated by PCWA at the Foothill Water Treatment Plant before delivery to the City via one PCWA transmission pipeline at two metering stations.
- **Surface water purchased from NID.** Surface water is diverted from the Yuba, Bear, and Deer Creek watershed and is conveyed through PCWA's facilities where it is treated by PCWA at the Foothill Water Treatment Plant before delivery to the City via one PCWA transmission pipeline at two metering stations.
- **Groundwater.** Groundwater is pumped from City owned and operated wells from the underlying North American Subbasin (NASb).

Currently, approximately 90 percent of the City's annual demand is met through surface water, with the remaining 10 percent supplied by groundwater. The City has responsibly managed its water supply by relying primarily on surface water, supplemented with groundwater as needed, to meet demand and operational requirements. In the future, the City may increase or decrease groundwater use (above or below 10 percent) through conjunctive-use strategies to optimize system performance while protecting the aquifer. The availability and reliability of these supply sources are described in Chapter 4 of this

WMPU. The available supplies were compared with the projected water demands in order to present an integrated supply plan, providing recommendations on how to meet projected future demands. The City's existing water supply is sufficient to meet existing demands, however, additional supply capacity will be required to meet projected demands prior to the 15-Year Phase.

Figure ES-1 compares historical and projected water demands with the City's surface water and firm groundwater production capacities. Future PCWA supply assumptions are based on the existing agreements in effect at the time of preparation of this WMPU. As the figure shows, when the City's annual average demand reaches approximately 32 mgd, the surface water supplies from PCWA's existing facilities may not be capable of supplying 90 percent of the demand and the City may require increased usage of groundwater to help support the average annual demands.

Also, based on the City's criteria of having redundant water supply capacity to meet 50 percent of maximum day demands, the City will need to explore all potential alternatives such as constructing new interconnections with adjacent water systems, new treatment plant capacity, new groundwater well capacity, and leverage reclaimed water supplies to offset and mitigate potable water demand. Without alternatives, the City will need to construction a new well approximately every 4-5 years assuming a capacity of 1.7 mgd (1,200 gpm) per well

The City will continue to pursue a conjunctive use strategy that maximizes available surface water supplies and supplements them with groundwater to meet future demands while concurrently exploring all available water supply alternatives. The City and PCWA will continue to coordinate as the City develops, ensuring that surface water supply infrastructure is funded, planned, and constructed to promote regional water supply affordability, sustainability, resilience, and reliability. The City will also evaluate opportunities for groundwater use, including recharge and aquifer storage and recovery (ASR), to ensure that impacts to the groundwater basin remain sustainable. These potential future supply sources for the City are described in more detail in Chapters 4 and 8 of this WMPU with recommendations on how to address the projected supply deficit.

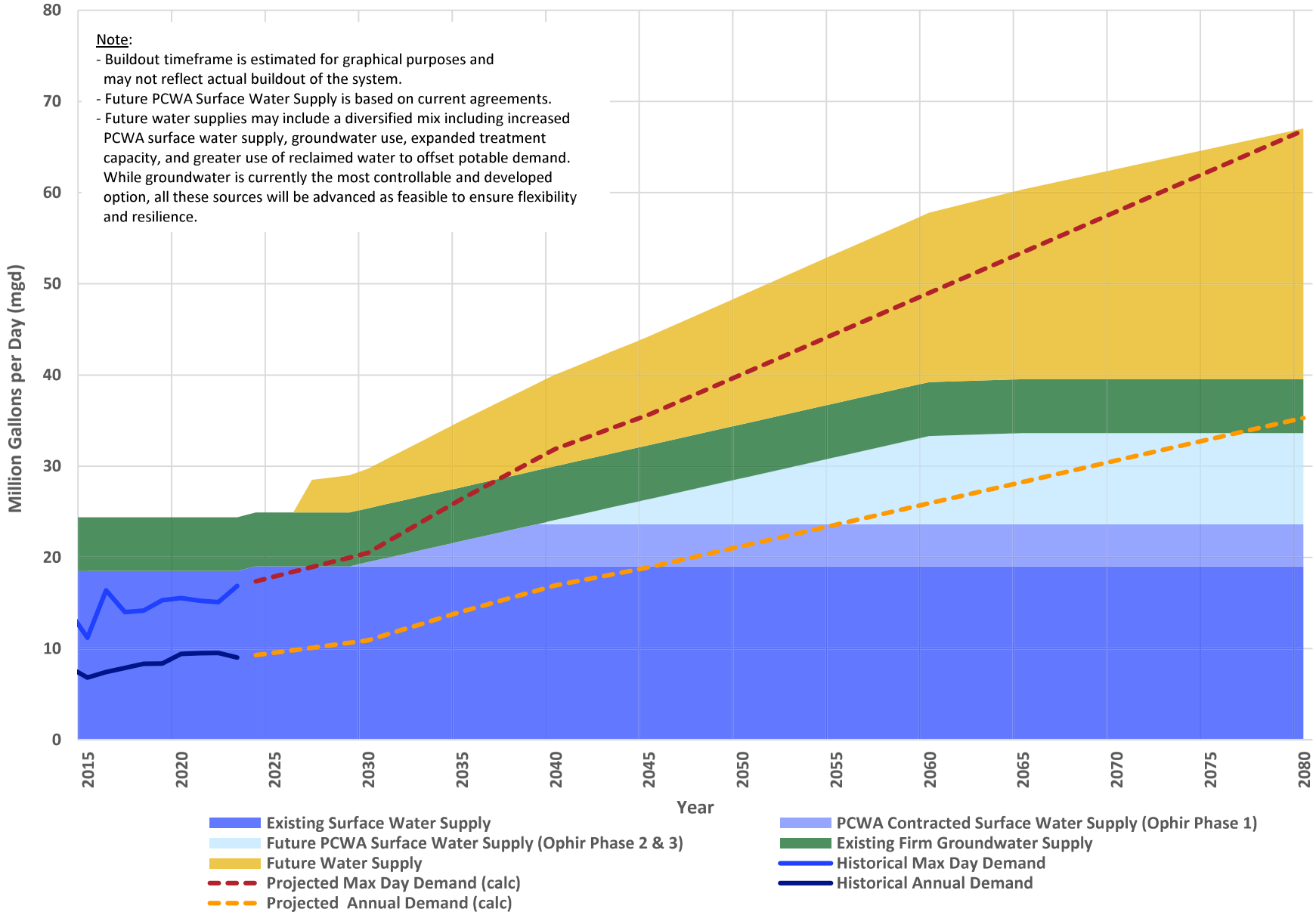
RECOMMENDED EXISTING AND FUTURE WATER SYSTEM IMPROVEMENTS

Chapter 10 presents the recommended CIP for the City's existing and future (5-Year, 10-Year, 15-Year, 20-Year, and Buildout) water system, based on the evaluations described in Chapters 7 and 8 and the recommended rehabilitation and replacement (R&R) program described in Chapter 9. This chapter provides a summary of the recommended improvement projects, along with estimates of probable construction and capital costs for each proposed project.

Improvements addressing existing and aging infrastructure are expected to be allocated to existing water customers, and improvements triggered by increased demands associated with future development should be allocated to future development and paid through connection fees.

The following sections summarize the recommended existing and future (5-Year, 10-Year, 15-Year, 20-Year, and Buildout) water system improvements. These improvements are presented on Figure ES-2.

Figure ES-1. Projected Supply and Demand Comparison



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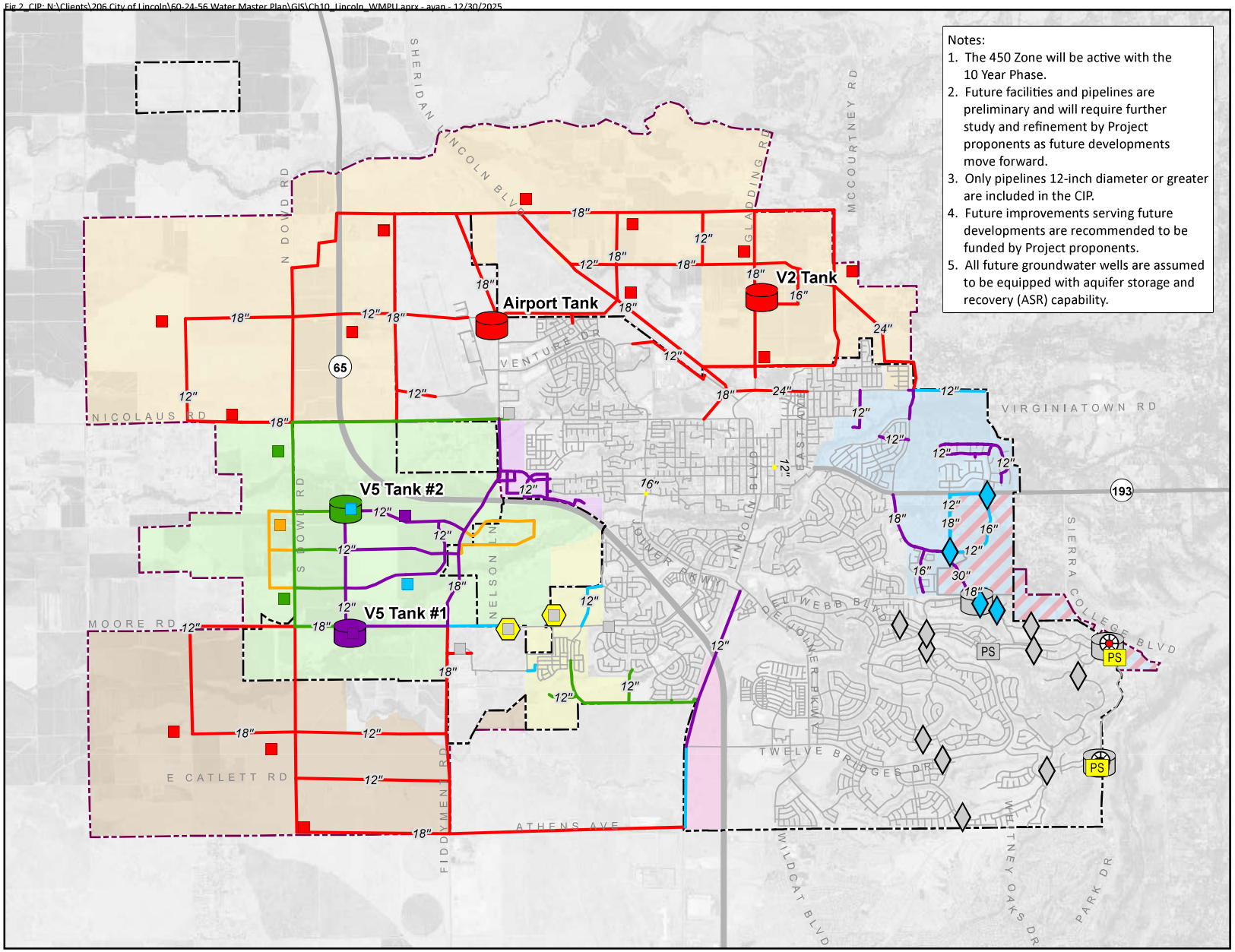


Phase Color Legend

- Existing (No Improvement)
- Existing (Improvement)
- 5 Year
- 10 Year
- 15 Year
- 20 Year
- Buildout

System Facilities

- Groundwater Well
- Placer County Water Agency Metering Station
- Backup Power
- PS Pump Station
- Pressure Reducing Station
- Storage Tank
- Pipeline

Future Development

- Lincoln 270
- Village 1
- Villages 2-4 and SUD-A
- Village 5
- Village 7
- SUD-B
- Village 6 and SUD-C

Boundaries

- New 450 Pressure Zone
- Existing City Limit
- City Sphere of Influence

Prepared by:

WEST YOST

N

0 3,750 7,500 Feet

Prepared for:

City of Lincoln
Water Master Plan Update

Lincoln Live. Life. Lincoln

Recommended Capital Improvement Projects

Figure 2

Recommended Existing System Improvements

Chapter 7 provided a summary of the evaluation of the City's existing water system and its ability to meet recommended water system planning and design criteria described in Chapter 5. In general, the analysis recommended the following:

- **Storage and Pumping:**
  - Address the existing storage deficit in the 375 Pressure Zone through installation of dedicated on-site backup power at the Nelson and Moore Wells to provide 1.76 million gallons (MG) of Emergency Groundwater Credit (EGWC) and improve system reliability.
  - Address the existing storage deficit in the 750 Pressure Zone through construction of a new booster pump station with back-up power at the Verdera Tank No. 3 site with a minimum capacity of 2 mgd.
  - Address the existing storage deficit in the 775 Pressure Zone through construction of a new booster pump station with back-up power at the Conspiracy Point Tank site with a minimum capacity of 4 mgd.
- **Pipelines:**
  - Replace 8-inch diameter pipeline at intersection of 1st Street and Joiner Parkway with a new 16-inch diameter pipeline to mitigate velocity exceedance.
  - Replace 8-inch diameter pipeline at intersection of E Street and McBean Park Drive with a new 12-inch diameter pipeline to mitigate velocity exceedance.
- **Rehabilitation and Replacement (R&R):**
  - Enhance the City's existing pipeline R&R program to accelerate the replacement of aging and undersized distribution pipelines on a proactive and programmatic basis before failure and require emergency repair and replacement. A recommended program is described in Chapter 9. Upsizing many of the smaller diameter pipelines would improve fire flow in the downtown area of the City.

Recommended Future System Improvements

Chapter 8 provided a summary of the evaluation of the City's water distribution system and its ability to support future (5-Year, 10-Year, 15-Year, 20-Year, and Buildout) demands while meeting recommended water system planning and design criteria described in Chapter 5. Table ES-3 summarizes recommended future system improvements resulting from the analysis.

In addition to the capacity-related improvements in Table ES-3, the following studies were recommended: Water Supply Options Study, Groundwater Recharge Study, ASR Wells Study, and Recycled Water Feasibility Study. These projects are included to improve system and/or water supply reliability and are described in detail in Chapter 8.

Table ES-3. Summary of Recommended Future System Improvements

Improvement Type	5-Year	10-Year	15-year	20-Year	Buildout
Supply	• Construct two new ASR wells with backup power to improve supply reliability.	• Construct additional two new ASR wells with backup power to improve supply reliability.	• Construct additional two new ASR wells with backup power to improve supply reliability.	• Construct an additional new ASR well with backup power to improve supply reliability.	• Construct additional 13 new ASR wells with backup power to improve supply reliability.
	Total (Previous and Current Phases): • 2 ASR wells	Total (Previous and Current Phases): • 4 ASR wells	Total (Previous and Current Phases): • 6 ASR wells	Total (Previous and Current Phases): • 7 ASR wells	Total (Previous and Current Phases): • 20 ASR wells
	• Alternative water supplies will be explored and/or advanced to offset the need for additional groundwater capacity. Refer to Chapter 4 for additional detail.				
Storage and Pumping	• Construct a 2 MG storage tank and pump station in Village 5 to mitigate the storage deficit in the 375 Zone.	• None	• Construct an additional 2 MG storage tank and pump station in Village 5 to mitigate the storage deficit in the 375 Zone.	None	• Construct a 5 MG storage tank and pump station in Village 2 to mitigate the storage deficit in the 375 Zone. • Construct a 3 MG storage tank and pump station in the Airport Area to mitigate the storage deficit in the 375 Zone.
	Total (Previous and Current Phases): • 1 new storage tank • 1 new associated pump station	Total (Previous and Current Phases): • 1 new storage tank • 1 new associated pump station	Total (Previous and Current Phases): • 2 new storage tanks • 2 new pump stations	Total (Previous and Current Phases): • 2 new storage tanks • 2 new pump stations	Total (Previous and Current Phases): • 4 new storage tanks • 4 new pump stations
Pressure Reducing Station	• None	• Construct four new pressure reducing stations for the proposed 450 Zone.	• None		
Pipelines	• Construct new transmission pipelines to support future development areas. • City should continue to rehabilitate and replace older and undersized (i.e., smaller than 8-inch diameter) pipelines, with the R&R previously discussed in Chapter 7 and described in detail in Chapter 9.				

Recommended Rehabilitation and Replacement Programs

Chapter 9 provided an overview of recommended enhancements to the City's existing R&R programs that will allow the City to replace aging infrastructure on a proactive and programmatic basis before system assets fail and require emergency repair and/or replacement.

As discussed in Chapter 9, the City's current Water CIP Replacement Plan, the remaining useful life estimates, and other projects identified by the City were used to develop a 10-Year Pipeline R&R Program that includes pipeline replacement lengths and associated replacement costs for each year. After Year 10 of the R&R Program, there are several years where no pipelines reach the end of their useful life. These assets will create a "replacement wave" where a significant number of assets reach the end of useful life around the same time, requiring simultaneous replacement or upgrades.

BASIS OF RECOMMENDATIONS

The evaluations described in this WMPU and the recommended CIP presented in this chapter are based on several key assumptions which are described throughout this report. These assumptions include the timing, type, and extent of future development projects within the City. The current assumptions for future planned development, used for this WMPU, are described in Chapter 3. Should these assumptions change (e.g., development timing is expedited or delayed, future planned land uses are changed, or the extent of development is changed or does not occur at all) the timing, need and sizing for water system improvements may be affected. Before the City proceeds with the design and construction of recommended water system improvements, future development plans and associated water system facility capacity needs should be reviewed and confirmed. As discussed in the Introduction, this 2025 WMPU is a living document and will be updated every 5 to 8 years to incorporate new information and updates that occur after its completion.

CHAPTER 1
Introduction

1.1 WATER MASTER PLAN UPDATE PURPOSE

The purpose of this 2025 Water Master Plan Update (WMPU) for the City of Lincoln (City) is to evaluate the existing water system infrastructure and address potential impacts of near-term and long-term planned growth to develop a comprehensive guide for the City's water system capital improvement program. The City's water system serves a mix of residential, commercial, industrial, and landscape customers.

The City's last Water Master Plan (WMP) was completed in 2017, based on development plans described in the City's General Plan 2050. Since that time, the City has experienced growth and changes in per capita water use, constructed a new storage tank (Verdera Tank No. 3), and identified proposed changes in land uses from the General Plan 2050. The City has also updated its water system model since the 2017 WMP to reflect existing system conditions.

As mentioned in the 2017 WMP, the State passed the Sustainable Groundwater Management Act of 2014 (SGMA) in September 2014 which required local agencies to form a Groundwater Sustainability Agency (GSA) and adopt and implement a Groundwater Sustainability Plan (GSP) to achieve the sustainable management of groundwater basins. Since the completion of the 2017 WMP, the City became a member of the West Placer GSA. The West Placer GSA prepared and completed the North American Subbasin GSP in 2021, which was then approved by the State in 2023.

These factors have led to a need to reassess the City's water needs, priorities and strategies and reevaluate the water system infrastructure improvements necessary to ensure a safe and reliable water supply for the City's existing and future residents and businesses.

It is important to note that this 2025 WMPU is a living document, and the details presented herein, such as assumptions, evaluations, and recommendations, are based on the data available at the time of preparation. This document will be updated every 5 to 8 years and will incorporate new information and updates that occur after its completion.

1.2 WATER MASTER PLAN OBJECTIVES

The primary objectives of this WMPU for the City of Lincoln are to:

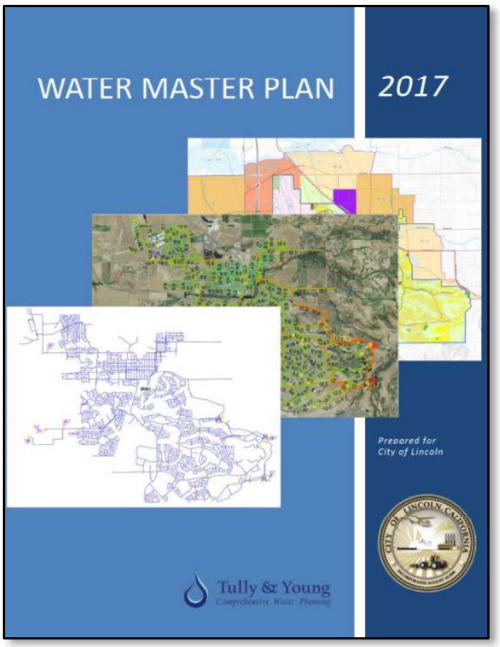
- Describe the City's existing water system and facilities.
- Evaluate historical and existing water demands to understand recent water use patterns and water use by customer type.
- Develop new unit use factors based on land use categories and recent water demand trends.
- Develop future water demand projections for near-term and built out conditions based on future planned development in the City and updated unit water use factors.
- Review the City's existing water supplies and the availability and reliability of each supply source.
- Review City and industry water system standards and refine performance and operational criteria under which the City water system will be evaluated and recommendations for future facilities will be formulated.

- Update and calibrate the City's water system hydraulic model to provide an updated, accurate tool for evaluating various water system demand and operational scenarios.
- Evaluate the need for new water system facilities (including pipelines, supply facilities, storage facilities and pumping facilities) to meet existing, near-term, and built out water demands within the City.
- Assess the remaining useful life of the City's water system assets and develop a recommended rehabilitation and replacement (R&R) program.
- Develop a CIP for implementation of recommended water system improvements and recommended R&R program.

1.3 PREVIOUS STUDIES

1.3.1 2017 Water Master Plan

The City's previous WMP was completed in 2017 and was developed to support future development in accordance with the City's General Plan 2050. The 2017 WMP addressed the following issues:



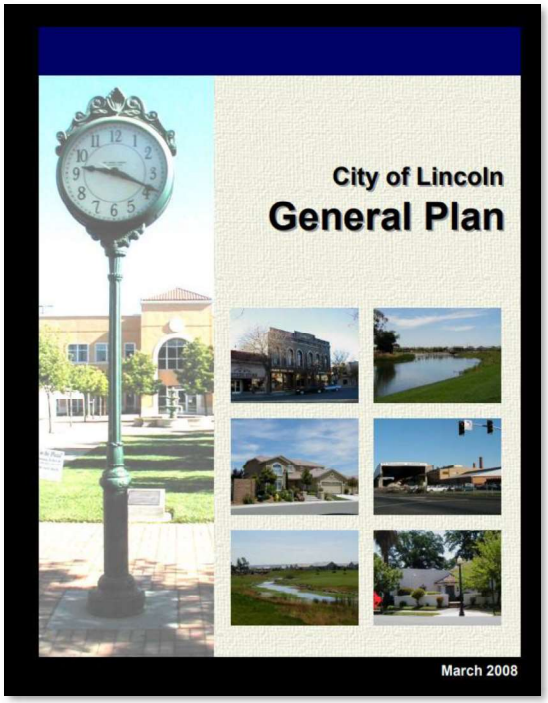
- The importance of maintaining water supply reliability to meet existing and future water demands;
- The importance of continued coordination and review of water supply contracts with Placer County Water Agency (PCWA) and the Nevada Irrigation District (NID);
- The continued use of surface water and groundwater as supply sources;
- The need for additional transmission mains, distribution pipelines, metering stations, pumping capacity, wells, and storage facilities to meet the needs of existing customers and future development;
- The importance of a facility replacement program to replace aging pipelines to maintain existing distribution capacity; and,
- The need to implement a planned CIP to meet the needs of the existing water system and to accommodate future growth.

Since the completion of the 2017 WMP, the City constructed Verdera Tank No. 3 to increase storage capacity and a new PCWA metering station to receive additional treated surface water deliveries. In 2018, West Yost re-built the City's water system hydraulic model using the City's updated water system Geographic Information System (GIS). West Yost updated and calibrated the model in 2023 using 2021 water consumption data. The City's hydraulic model will be updated, re-calibrated, and validated for this WMPU.

As noted above, this WMPU is a comprehensive update that refines unit water demand factors based on recent and projected water use trends and patterns to develop future demand projections, reflects the construction of the City's Verdera Tank No. 3, updates the City's water system hydraulic model to evaluate system capacity, and reflects updates to future development plans to provide an evaluation of future water system needs. As described in Chapter 3 of this WMPU, future water demands in the City are projected to be similar to the water demand projections included in the 2017 WMP.

1.3.2 2050 General Plan

The City's 2050 General Plan was adopted on March 25, 2008. The 2050 General Plan process included a comprehensive evaluation of the City's planning boundaries, including the City's Sphere of Influence (SOI). The General Plan 2050 serves as a long-term policy guidance document for the City's physical, economic, and environmental growth and reflects the community's vision for the City's ultimate growth.



The General Plan 2050 land use map depicts proposed land use for the City within the SOI to accommodate the growth projected by the Sacramento Area Council of Governments (SACOG). Between 2005 and 2050, SACOG projected that Lincoln's population will grow by 101,000 to a total of 132,000 (equating to an annualized growth rate of 7 percent). Since the adoption of the 2050 General Plan, population growth projections have been updated and additional development areas have been identified by the City to be incorporated in this WMPU, further detailed in Chapter 3.

The City's General Plan is built on several goals and policies that are related to the provision of safe and reliable water supplies. Table 1-1 summarizes the General Plan 2050 goals, policies, and actions related to water service within the City. The performance and operational criteria for the City's water distribution system listed in Table 1-1 have been updated as part of this WMPU, further detailed in Chapter 5.

1.3.3 2020 Urban Water Management Plan

The Urban Water Management Planning Act requires every urban water supplier in California that either provides over 3,000 acre-feet of water annually, or serves more than 3,000 urban connections, to prepare and adopt an Urban Water Management Plan (UWMP) that includes specified content, including an urban water shortage contingency analysis. The adopted UWMP must be submitted to the California Department of Water Resources (DWR) and other entities. Urban water suppliers are required to submit an UWMP every five years. The City's 2020 UWMP was adopted on July 1, 2021 and submitted to DWR.

Projected water demands based on land use are described in Chapter 3 of this WMPU and compared to the projections in the 2020 UWMP, which were also based on land use projections. The availability and reliability of the City's water supplies evaluated in 2020 UWMP were incorporated in the overview of water supplies in Chapter 4 of this WMPU.

Table 1-1. General Plan Goals, Policies, and Actions Related to Water Service

General Plan Goal	General Plan Policies and Actions
Land Use Element	
Goal LU-1:To grow in orderly pattern consistent with the economic, social, and environmental needs of Lincoln.	Policy LU-1.9 – Existing Assets: The City will promote the use of vacant infill parcels and the intensifying of land uses on parcels that are underutilized in order to better utilize existing public infrastructure.
Goal LU-15: To organize new development areas to create vibrant, mixed-use villages characterized by a mix of land uses, pedestrian and transit accessibility, and neighborhood identity.	Policy LU 15.1 – Village Specific Plans/General Plan Amendment: All specific plans prepared for a village designated area must meet the requirements of State law and be comprised of four planning frameworks. The Infrastructure/Public Facilities Framework will cover infrastructure requirements (water, sewer, storm drainage, electricity, natural gas, communications) as well as parkland, schools, and other public facilities. For infrastructure, the framework will address the proposed trunk infrastructure system improvements and system phasing necessary to support implementation of the land use plan.
	Policy LU-15.10 – Infrastructure Master Plans: New development will be required to comply with the City's adopted infrastructure master plans and provide fair share contributions towards existing and future improvements necessary to serve the development. If developments vary in intensity and distribution from that assumed in the existing infrastructure master plans, the City master plans will be updated and approved with that development.
	Policy LU-15.11 – Area Infrastructure Master Plans: Prior to the approval of any village specific plan, an Area Infrastructure Master Plan will be required. These master plans will lay out detailed plans for infrastructure improvements, phasing, and financing.
Goal LU-16: To organize new Special Use Districts (SUDs) to create dynamic community and regional serving commercial areas and locations for residential uses that are well integrated with future highway development and protection of the Lincoln Municipal Airport.	Policy LU-16.1 – Development Area Specific Plans: All specific plans prepared for a SUD must meet the requirements of State law and be comprised of four planning frameworks. The Infrastructure/Public Facilities Framework will cover infrastructure requirements (water, sewer, storm drainage, electricity, natural gas, communications) as well as parkland, schools, and other public facilities. For infrastructure, the framework will address the proposed trunk infrastructure system improvements and system phasing necessary to support implementation of the Land Use Framework.
Public Facilities and Services Element	
Goal PFS-1: To ensure that adequate public services and facilities are provided to meet the needs of residents of the city.	Policy PFS-1.3 – Conditions of Approval: During the development review process, the City shall not approve new development unless the following conditions are met: • The applicant can demonstrate that all necessary infrastructure will be installed or adequately financed; • Infrastructure improvements are consistent with City infrastructure plans; and • Infrastructure improvements incorporate a range of feasible measures that can be implemented to reduce public safety and/or environmental impacts associated with the construction, operation, or maintenance of any required improvement.
	Policy PFS-1.4 – Compliance with Federal and State Standards for Surface Water Protection: The City shall comply with the requirements of the Clean Water Act and other regulations with the intent of minimizing the discharge of pollutants to surface waters.
Goal PFS-2: Ensure provision of a water system with adequate supply transmission, distribution, and storage facilities to meet the needs of existing and future development.	Policy PFS-2.1 – Reliable Supply of Water: The City shall develop a long-term reliable supply of water that will permit the city to meet the existing and future demands of development.
	Policy PFS-2.2 – City-owned Water Storage and Distribution Systems: The City shall continue to operate the City-owned water storage and distribution systems.
	Policy PFS-2.3 – Adequate Water Supply for New Development: The City shall require the availability of an adequate water supply to be demonstrated before approving new development.
	Policy PFS-2.4 – Use of Reclaimed Water: The City shall require the use of reclaimed water by industrial, commercial, recreational users and roadway landscaping, whenever it is deemed feasible by the City. The City will also promote the use of reclaimed water by surrounding agricultural users as part of a water conservation program.
	Policy PFS-2.5 – Development in Annexation Areas: The City shall not allow development within newly annexed areas until a potable water supply is obtained through PCWA or NID or, where appropriate, other water districts.
	Policy PFS-2.6 – Coordinate with PCWA and NID: The City shall coordinate development activity with the PCWA and NID to ensure adequate provision of treated water supplied by either supplier.
	Policy PFS-2.7 – Groundwater Supplies: The City shall consider development of groundwater supplies in the western portions of the City's sphere of influence to provide emergency back up and to supplement the domestic supply provided by the PCWA and NID.
	Policy PFS-2.8 – Water Pressure Requirements: The City shall provide a water distribution system which, at a minimum, meets all pressure requirements outlined in the California Department of Health Services/Waterworks Standards.
	Policy PFS-2.9 – Water Storage Requirements: The City shall condition new development on availability of storage that meets the following parameters: • Equalizing Storage (for meeting peak flows) - 25 percent of maximum day demand. • Fire Reserve - Provide fire reserve as required by the Insurance Services Office (ISO) or as required by the City Fire Chief and City Engineer. • Emergency Reserve - 33 percent of the total of Equalizing Storage and Fire Reserve.
	Policy PFS-2.10 – Fire Flows: The City shall provide water supply, storage and adequately-sized pipelines to provide fire flows at any point within the City to meet recommendations of the ISO and/or the City Fire Chief and City Engineer and maintain minimum pressures in accordance with requirements outlined in the California Department of Health Services/Waterworks Standards.
	Policy PFS-2.11 – Groundwater Recharge: The City shall evaluate groundwater recharge capabilities as necessary, but at least every five years and ensure adequate long-term protection of groundwater resources.
	Policy PFS-2.12 – Capital Improvements Program: The City shall strive to maintain a five-year lead time in the planning of needed water system improvements and include identified improvements within the City's Capital Improvement Program.

Table 1-1. General Plan Goals, Policies, and Actions Related to Water Service

General Plan Goal	General Plan Policies and Actions
	Policy PFS-2.15 – Agricultural Uses: The City shall prohibit the use of treated, potable water supplies for commercial agricultural uses.
	Policy PFS-2.16 – Water Conservation Program: The City shall implement an active water conservation program to reduce future water demand to the extent allowed by law by establishing building requirements for new construction, providing educational information through local media sources, and establishing effective rate charges to encourage conservation.
	Policy PFS-2.17 – Water Conservation Measures for New Development: The City shall require new development to use the best available technologies (BAT) for water conservation, including, but not limited to water-conserving water closets, showerheads, faucets, and water conserving irrigation systems.
	Policy PFS-2.19 – Regional Sustainability of Groundwater Supplies: The City shall work in concert with the County of Placer, other cities and local water purveyors to share groundwater data, develop a mutually beneficial Integrated Regional Water Resources Management Program, define the long-term sustainability of the groundwater basin, and work to manage groundwater uses in ways that facilitate the basin's sustainability.
Open Space and Conservation Element	
Goal OSC-4: To preserve and enhance local streams, creeks, and aquifers.	Policy OSC-4.1 – Identify and Protect Aquifers: The City will protect local aquifers and water recharge areas.
	Policy OSC-4.2 – Develop Groundwater Management Plan: The City shall develop and periodically update a groundwater management plan to protect local aquifers.
	Policy OSC-4.3 – Protect Surface Water and Groundwater: The City shall ensure that new development projects do not degrade surface water and groundwater.
	Policy OSC-4.5 – Use of Reclaimed Water: The City shall encourage the use of reclaimed water, in place of treated potable water for landscaping and other suitable applications.
	Policy OSC-4.6 – Best Management Practices: The City shall continue to require the use of feasible and practical best management practices (BMPs) to protect surface water and groundwater from the adverse effects of construction activities and urban runoff.
	Policy OSC-4.7 – Landscape Irrigation: The City shall explore the possibility of using reclaimed water to irrigate new commercial developments and new areas with large landscape areas. In areas where reclaimed water can be provided in the future, the City shall require landscape irrigation to be installed so that the system could be used with reclaimed water. The City shall also explore the use of industrial process water for landscape irrigation provided that it meets City standards for irrigation.

1.4 REPORT ORGANIZATION

This WMPU is organized into the following chapters:

Chapter 1: Introduction

Describes the purpose and objectives for the WMPU, its relationship to other on-going studies, report organization and lists acknowledgments.

Chapter 2: Existing Water System

Provides background information on the existing City water service area, water supplies, and water system facilities.

Chapter 3: Water Demand Analysis

Presents historical, current, and projected future water demands based on planned future development in accordance with the City's General Plan 2050.

Chapter 4: Water Supply Analysis

Provides an overview of the City's existing water supply sources and plans to optimize available water supplies for the future.

Chapter 5: System Performance Criteria

Defines the recommended performance and operational criteria for the City's water system, including supply, storage and pumping capacity, fire flow requirements, minimum and maximum system pressures, and maximum pipeline velocity and head loss.

Chapter 6: Hydraulic Model Update and Calibration

Describes the update, refinement and calibration of the City's existing water distribution system hydraulic model used to analyze the City's distribution system performance.

Chapter 7: Existing System Evaluation

Describes the evaluation of the City's existing water system in comparison to the criteria developed in Chapter 5 and provides recommendations for existing system improvements.

Chapter 8: Future System Evaluation

Describes the evaluation of the City's water system and its ability to meet projected future water demands in comparison to the criteria developed in Chapter 5 and provides recommendations for future system improvements.

Chapter 9: Rehabilitation and Replacement Program

Presents the desktop study performed to assess the remaining useful life of the City's water system assets and a recommended R&R program to be incorporated into the overall CIP recommendations.

Chapter 10: Capital Improvement Program

Provides a detailed summary of recommended capital improvements for the City's water system to meet existing and projected future demands.

The following appendices to this WMPU contain additional technical information, assumptions, and calculations:

Appendix A: Water Supply Agreements

Contains water supply agreements between the City and PCWA and between NID, PCWA, and the City.

Appendix B: Water Use Factors Technical Memorandum (TM)

Contains the Water Use Factor TM detailing the update of the City's water use factors using 2023 water consumption data.

Appendix C: System Servicing Plan TM

Contains the System Servicing Plan TM establishing the strategy for providing service to growth areas within the City and General Plan areas that are not currently served by the City's water system.

Appendix D: Calibration Results

Contains graphs of the comparisons between model simulated results and Supervisory Control and Data Acquisition (SCADA) values at water system facilities for the calibration date of July 11, 2024.

Appendix E: HPR Results

Contains graphs of the comparisons between model simulated and SCADA pressures at hydrant pressure locations for the calibration date of July 11, 2024.

Appendix F: 10-Year Pipeline Rehabilitation and Replacement (R&R) Program Details

Contains the detailed 10-Year R&R Program.

Appendix G: Cost Estimating Assumptions

Contains the cost estimating assumptions used to estimate the probable construction costs used for the planning and design of recommended water system facilities for the City's water system.

1.5 ACKNOWLEDGMENTS

The development of this WMPU would not have been possible without the focused involvement and assistance of City staff. In particular, the following staff provided comprehensive information, significant input and important insights throughout development of this WMPU.

Araceli Cazarez, PE	Engineering Manager – Capital Projects
Matthew Medill, MPA, PE	Public Works Director
Sam Ford	Utilities Maintenance Supervisor – Water Quality
Chris Nelson	Environmental Services Manager
Kaylie Tavenner, PE	Associate Engineer – Development Engineering
Nigel Sanders	GIS Analyst

The following West Yost team members contributed to the project:

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Brenda Estrada, PE	Project Manager
Angie Yan, EIT	Project Engineer
Colton Short, EIT	Staff Engineer
Kelye McKinney, PE	QC Review
Elizabeth Drayer, PE	QC Review
Angélica Perea	Report Production
Cindy Houghton	Report Production
Christine Encelan	Report Production
Ali Clymer	Report Production
Dawn Lamb	Report Production

CHAPTER 2
Existing Water System

This chapter describes the City's existing water system. System information is based on a review of previous studies, design reports, maps, plans, operating records, and discussions with City staff. Key sections of this chapter include:

- Existing Water Service Area
- Existing Water Supply Sources
- Existing Water System and Facilities

2.1 EXISTING WATER SERVICE AREA

The City is located in Placer County, California and is part of the Sacramento metropolitan area. 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. Ground surface elevations generally range from about 113 feet above mean sea level (msl) on the west side of the City to approximately 595 feet above msl in the southeast corner of the City.

The City's water service area covers approximately 29 square miles (18,454 acres) and is generally coterminous with the City limits. 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; however, reclaimed water service may be considered in the future for groundwater recharge purposes further discussed in Chapter 4.

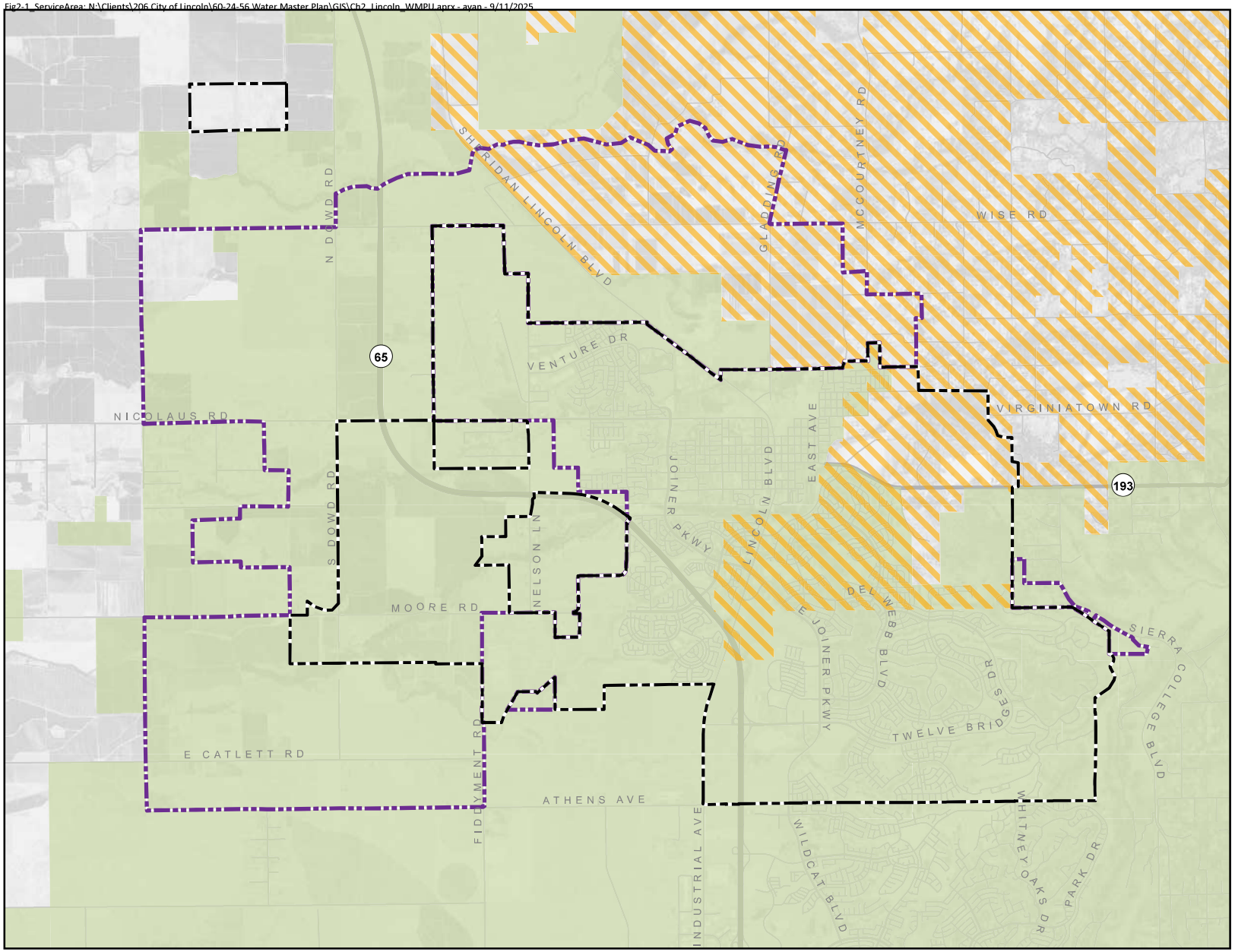
The City's water service area overlaps the service areas of the PCWA and NID. Figure 2-1 shows the relationship between City, PCWA, and NID service area boundaries, as well as the City's SOI. The City's SOI includes the area not currently within the City limits which the City plans to annex and extend water service to in the future as development proposals are approved. PCWA's Zone 6 service area includes the majority of the existing City limits and the City's SOI. 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.

2.2 EXISTING WATER SUPPLY SOURCES

The City is served by a conjunctive use water supply portfolio comprised of both surface water and groundwater sources. The City's existing water supply portfolio consists of the following sources:

- Surface water purchased from PCWA
- Surface water purchased from NID
- Pumped groundwater from City-owned wells

Fig2-1_ServiceArea: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch2_Lincoln_WMPU.aprx - ayan - 9/11/2025



City Limit

Sphere Of Influence

Nevada Irrigation District Service Area

Placer County Water Agency Zone 6 Service Area

Notes:
1. City boundaries shown based on GIS data provided by the City in May 2025.
2. Water agency boundaries shown based on GIS data last updated in 2021 from West Yost's existing mapping files for the City.

Prepared by:

WEST YOST

N

0 4,000 8,000 Feet

Prepared for:

City of Lincoln
Water Master Plan Update

City of Lincoln Live. Life. Lincoln

Service Area Boundaries

Figure 2-1

The City aims to meet approximately 90 percent of its water demands through surface water and the remaining 10 percent through groundwater.1 An overview of the City's water supply is described in the following subsections. Further details regarding the City's existing and planned water supply sources are provided in Chapter 4.

2.2.1 Surface Water Supply

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

2.2.1.1 Placer County Water Agency

In 2012, the City entered a water supply contract with PCWA for delivery of treated surface water.[2] The contract entitles the City to a maximum delivery entitlement of 18.5 million gallons per day (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. PCWA's surface water supplies are treated at PCWA's Foothill Water Treatment Plant. The treated surface water is then delivered to its customers through its Western Water System. The City receives treated water from PCWA at two metering station locations. Each metering station has one regulated and one unregulated connection. The regulated connections control the rate of flow into the City's main service area to minimize fluctuations in flow delivered. The unregulated connections provide water to the high elevation zones in the City's service area. Water supply agreements with PCWA are included in Appendix A.

Additionally, 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 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.

PCWA's surface water supplies include water from the American River supplied by the Middle Fork Project and Central Valley Project, water from the Yuba and Bear Rivers purchased from Pacific Gas & Electric (PG&E), and water from various tributaries and creeks in West Placer County diverted under pre-1914 appropriations. PCWA's water rights and contracts are described in Chapter 4.

2.2.1.2 Nevada Irrigation District

In 2004, the City entered a temporary raw water sales agreement (Temporary Agreement) between the City, PCWA, and NID[3] 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 all 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

[1] State Water Resources Control Board. October 2023. *2023 Compliance Inspection Report of City of Lincoln Public Water System.*

[2] 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 A.

[3] 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 A.

plan's preparation, the City, NID, and PCWA are engaged in negotiations to amend the Temporary Agreement. The water supply agreement with NID is included in Appendix A.

Additionally, NID delivers untreated surface water directly to the Turkey Creek Golf Course and Lincoln Crossing Homeowner's Association for irrigation purposes. 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 from watershed run-off from the Yuba, Bear, and Deer Creek watershed diverted under its pre-1914 and post 1914 appropriations. NID's water rights are described in Chapter 4.

2.2.2 Groundwater Supply

The City owns and operates five groundwater wells that pump from the underlying Sacramento Valley Groundwater Basin, North American Subbasin (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.

The various geologic formations that constitute the water-bearing deposits underlying the NASb 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.

The City uses its 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. The City employs a balanced rotation schedule for its wells to help preserve groundwater resources across all areas.

2.3 EXISTING WATER SYSTEM AND FACILITIES

The City's existing water distribution system contains seven (7) pressure zones. The distribution system consists of two (2) PCWA metering stations, five (5) groundwater wells, three (3) storage tanks, one (1) booster pump station (BPS), ten (10) pressure regulating stations (PRSs), and approximately 279 miles of distribution and transmission pipelines. The existing water system facilities are shown on Figure 2-2 and are discussed in more detail below.

2.3.1 System Configuration and Pressure Zones

The City's water distribution system is divided into seven (7) 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. Treated surface water from PCWA and NID enters the City's water system at two PCWA metering stations. The regulated connections, one at each PCWA metering station, fill the two tanks in the 575 Pressure Zone (Zone). Water in the 575 Zone is distributed to the 475 Zone via various PRSs and to the 375 Zone via a PRS and through the 3 MG tank via two transmission pipelines. Additional supply to the 375 Zone is provided by five (5) groundwater wells and from the 475 Zone via a PRS. The 750 Zone and 775 Zone are each supplied by unregulated

connections, one at each PCWA metering station. The 775 Zone can receive additional water supply from the 575 Zone via the Catta Verdera BPS as needed during peaking and/or emergency conditions. The 750 Zone supplies both the 610 Zone and 650 Zone via two PRSs, and the 775 Zone provides additional supply to the 650 Zone via a PRS.

Figure 2-3 provides a simplified schematic diagram of the City's water distribution system. The key characteristics of the City's pressure zones are summarized in Table 2-1.

Table 2-1. Summary of Existing Pressure Zones

Pressure Zone	Existing Service Elevations, ft msl[a]	Meter Connections[b]	Zones Providing Supply	Supply Facility	Storage Tank
375	114 - 282	17,552	375	• 3MG Tank[c] • Well No. 2 • Westwood Well • Moore Road Well • Fiddyment Well • Nelson Well	• 3MG Tank[c]
			475	• Wildomar PRS	
			575	• 3MG Tank[c] • Twelve Bridges PRS • Eastridge PRS	
475	227 - 338	1,444	575	• Spring Valley No. 1 PRS • Spring Valley No. 2 PRS • Stoneridge PRS	-
575	260 - 452	2,008	PCWA	• Conspiracy Point Tank Metering Station (Regulated Connection) • Verdera Tank No. 3 Metering Station (Regulated Connection)	• Conspiracy Point Tank • Verdera Tank No. 3
610	309 - 463	72	750	• Village 18 PRS • Village 19 PRS	-
650	380 - 474	304	750	• Village 13 PRS	-
			775	• Village 17 PRS	-
750	432 - 596	161	PCWA	• Verdera Tank No. 3 Metering Station (Unregulated Connection)	-
			575	• Catta Verdera BPS[d]	
775	524 - 597	55	PCWA	• Conspiracy Point Tank Metering Station (Unregulated Connection)	-

Source: City's hydraulic model last updated in May 2024 and City staff knowledge.

(a) Elevations are taken from the City's hydraulic model last updated in May 2024.

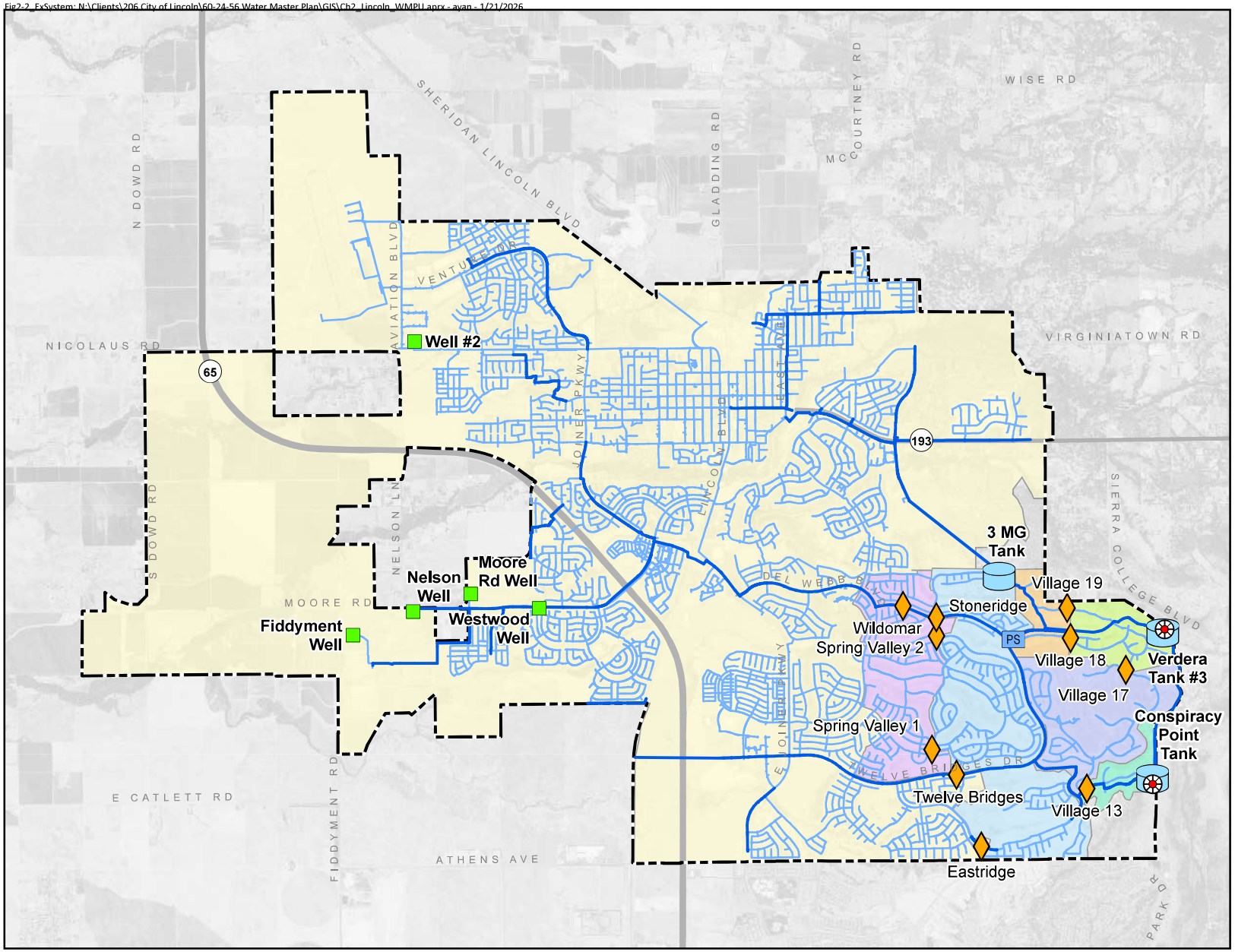
(b) Meter connections based on meter GIS shapefile provided by the City in April 2024.

(c) The 3MG Tank is the 375 Zone's main source of supply. Water gravity feeds from the 3MG into the zone via a 20-inch diameter transmission pipeline and the 16-inch diameter Del Webb transmission pipeline. The groundwater wells within the 375 Zone operate during peak demands to supplement water from the 3MG Tank. The 3MG Tank is filled from the 575 Zone via a 30-inch transmission pipeline and from the 375 Zone via the Del Webb pipeline during periods when the wells are operating, and the well supply exceeds zone demands.

(d) The Catta Verdera BPS currently operates during times of peak demand as supplemental supply.

ft msl = feet at mean sea level; PRS = pressure reducing station; BPS = booster pump station

Fig2-2_ExSystem; N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch2_Lincoln_WMPU.aprx - ayan - 1/21/2026



Existing System Facilities

- Placer County Water Agency Metering Station
- Groundwater Well
- Catta Verdera Pump Station (PS)
- Pressure Regulating Station
- Storage Tank
- Distribution Pipeline (<18-inch)
- Transmission Pipeline (≥18-inch)

Pressure Zones

- 375 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone

Boundary

- City Limit

Notes:
1. Facilities shown based on GIS data provided by the City in April 2024.

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Prepared for: City of Lincoln
Water Master Plan Update

Existing Water System
Figure 2-2

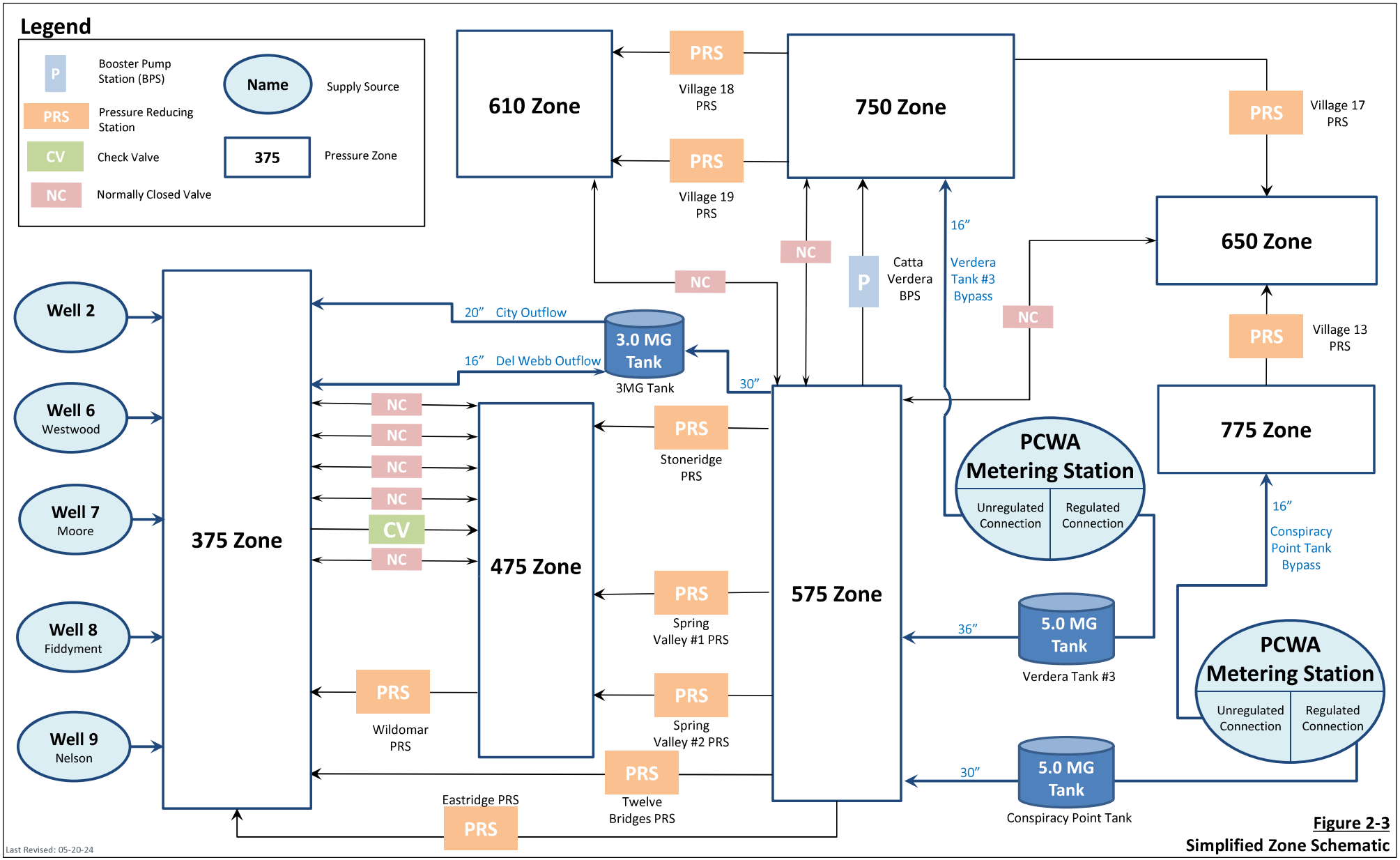


Figure 2-3
Simplified Zone Schematic

2.3.2 Placer County Water Agency Metering Stations

As described above, the City purchases water from PCWA and NID which is delivered at two PCWA metering stations. The metering stations are summarized in Table 2-2.

Table 2-2. Summary of Existing Placer County Water Agency Metering Stations to the City of Lincoln

Metering Station Location	Connection Name	Zone Supplied	Function	Type	Valve Diameter, inch	Elevation, ft	Pressure Setting, psi
Lincoln Metering Station at Conspiracy Point Tank Site	Tank 1	575	Fills Conspiracy Point Tank	Regulated	27	558	-
	Tank 1 Unregulated	775	Bypasses Conspiracy Point Tank to serve the 775 Zone	Unregulated	10	579	82
Verdera Tank No. 3 Tank Site	Tank 3	575	Fills Verdera Tank No. 3	Regulated	24	555	-
	Tank 3 Unregulated	750	Bypasses Verdera Tank No. 3 to serve the 750 Zone	Unregulated	8	548	87

Source: City's hydraulic model last updated in May 2024 and City staff knowledge.

psi = pounds per square inch

2.3.3 Groundwater Wells

The City currently operates five (5) active groundwater wells located in the western half of the City where the aquifer is the most productive. All of the groundwater wells supply the 375 Zone. The well pumping capacities of the active wells range from 800 gallons per minute (gpm) to 1,500 gpm with a combined total production capacity of 5,600 gpm (8.1 mgd). The City wells are primarily used for peak demand management, emergencies, and as a backup for PCWA and NID supplies. Table 2-3 summarizes the information on the City's groundwater wells.

Table 2-3. Summary of Existing Well Facilities

Well Number	Well Name	Pressure Zone	Install Year	Status	Backup Power Installed	Installed Horsepower	Depth to Water Level, ft	Well Pumping Capacity, gpm
2	Well No. 2	375	1984[a]	Active	Yes	125	40.5	900
6	Westwood	375	2000	Active	Yes	125	78.2	800
7	Moore Road	375	2002	Active	No	125	80.6	1,000
8	Fiddyment	375	2004	Active	Yes	200	63.2	1,400
9	Nelson	375	2005[b]	Active	Quick Connect Capability	300	73.3	1,500[c]
							Total Active Well Pumping Capacity (gpm)	**5,600**
							Total Active Well Pumping Capacity (mgd)	**8.1**

Source: City's 2017 Water Master Plan (April 2017), 2023 SWRCB State Water Resource Control Board Compliance Inspection Report (October 2023), and City staff knowledge.

(a) Well No. 2 was last upgraded in 2015.

(b) Nelson Well was last upgraded in 2014.

(c) The nominal pumping capacity for Nelson Well is 2,100 gpm, however, its pumping capacity is limited to 1,500 gpm by a variable frequency drive (VFD) to avoid excessive damage to the well pump motor.

ft = feet; gpm = gallons per minute; mgd = million gallons per day

2.3.4 Storage Tanks

The City has three storage tanks located at high elevations on the east side of the City. The Conspiracy Point Tank and the Verdera Tank No. 3 each have a 5 MG capacity and receive treated water directly from PCWA metering stations. The 3MG Tank is filled from the 375 Zone and 575 Zone via transmission pipelines. All three tanks are located at relatively high elevations and serve customers via gravity flow. The City's total nominal storage capacity is approximately 14 MG and the total usable storage capacity is approximately 11 MG assuming 5 feet of dead storage at the bottom of the tank and 2 feet of high water alarm levels below the overflow. Table 2-4 summarizes the information for each storage tank.

Table 2-4. Summary of Existing Water Storage Tanks

Storage Tank Name	Zone	Material	Install Year	Diameter, ft	Overflow Elevation, ft	Bottom Elevation, ft	Overflow Level, ft	Nominal Storage Capacity, MG[(a)]	Usable Storage Capacity, MG[(b)]
Conspiracy Point Tank	575	Reinforced Concrete	2000	159	587.8	554.0	33.7	5.0	4.0
3 MG Tank	375	Welded Steel	2002	134	397.1	366.1	31.0	3.3	2.5
Verdera Tank No. 3	575	Reinforced Concrete	2021	163	593.1	555.5	37.6	5.9	4.8
							Total Active Storage Capacity, MG	**14.2**	**11.3**

Source: Record drawings provided by the City in April 2024, 2023 State Water Resource Control Board Compliance Inspection Report (October 2023), and City staff knowledge.

(a) Nominal capacity is calculated based on diameter and overflow height. This does not take into consideration dead storage at the bottom of the tank nor high alarm levels typically located below the overflow.

(b) Usable capacity is calculated based on diameter and overflow height minus 5 feet of dead storage at the bottom of the tank and 2 feet of high-water alarm levels below the overflow.

MG = million gallons

2.3.5 Booster Pump Stations

The City's only booster pump station within the distribution system is the Catta Verdera BPS. Prior to the installation of the new PCWA metering station at the Verdera Tank No. 3 site in 2021, the Catta Verdera BPS was the sole source of supply for the 610 and 750 Zones. However, the unregulated connection at the new PCWA metering station currently provides adequate supply to the 610 and 750 Zones, and as a result, the Catta Verdera BPS only operates during times of peak demand to provide supplemental supply.

The total standby pumping capacity and the firm pumping capacity of the Catta Verdera BPS is 2,900 gpm (4.2 mgd) and 900 gpm (1.3 mgd), respectively. The firm pumping capacity is the total pumping capacity of the station with the largest pump offline. Table 2-5 summarizes information on the Catta Verdera BPS.

Table 2-5. Summary of Existing Booster Pump Stations

Pump Station Name	Function	Pump Number	Status	Nominal Capacity, gpm	Rated Horsepower	Total Capacity, gpm	Firm Capacity, gpm[a]
Catta Verdera Booster Pump Station[b]	Pumps supply from the 575 Zone to the 750 Zone	1	Standby	300	50	2,900	900
		2	Standby	300	50		
		3	Standby	300	50		
		4	Standby	2,000	250		
Total Standby Pumping Capacity (gpm)						**2,900**	**900**
Total Standby Pumping Capacity (mgd)						**4.2**	**1.3**

Source: City's water system hydraulic model updated in May 2024 and 2023 State Water Resource Control Board Compliance Inspection Report (October 2023).

(a) Firm capacity is the total installed capacity with the largest pump out of service.

(b) Also known as the 12 Bridges Booster Pump Station.

gpm = gallons per minute

2.3.6 Pressure Regulating Stations

The City's water distribution system includes ten (10) PRSs. Each PRS is equipped with two pressure reducing valves (PRVs) that regulate the flow of water from higher pressure zones to lower pressure zones. The PRSs prevent the pressure in lower pressure zones from exceeding City service standards. Table 2-6 presents a summary of the existing PRSs with their key characteristics.

Table 2-6. Summary of Existing Pressure Regulating Stations

Pressure Regulating Station Name	Function	Elevation, ft msl	Valve Diameter, inches	Pressure Setting, psi[(a)]	Hydraulic Grade Line, ft msl
Twelve Bridges	Reduces pressure from the 575 Zone to the 375 Zone	266	4 / 12	52.3 / 47.3	387 / 375
Eastridge	Reduces pressure from the 575 Zone to the 375 Zone	290	4 / 10	42.7 / 37.7	389 / 377
Spring Valley No. 1	Reduces pressure from the 575 Zone to the 475 Zone	323	3 / 8	61.5 / 56.5	465 / 454
Spring Valley No. 2	Reduces pressure from the 575 Zone to the 475 Zone	281	3 / 8	75.0 / 70.0	454 / 443
Stoneridge	Reduces pressure from the 575 Zone to the 475 Zone	267	6 / 14	69.8 / 64.8	428 / 417
Village 13	Reduces pressure from the 775 Zone to the 650 Zone	479	4 / 10	72.9 / 67.9	647 / 636
Village 17	Reduces pressure from the 750 Zone to the 650 Zone	456	4 / 10	80.0 / 75.0	641 / 629
Village 18	Reduces pressure from the 750 Zone to the 610 Zone	431	3 / 10	59.0 / 54.0	567 / 556
Village 19	Reduces pressure from the 750 Zone to the 610 Zone	463	6 / 10	52.0 / 47.0	583 / 572
Wildomar	Reduces pressure from the 475 Zone to the 375 Zone	273	6 / 16	49.5 / 44.5	387 / 376

Source: City's water system hydraulic model updated in May 2024 and City staff knowledge.

(a) The City does not change its PRV pressure settings seasonally.

ft msl = feet at mean sea level; psi = pressure per square inch

2.3.7 Transmission and Distribution Pipelines

The City maintains approximately 279 miles of transmission and distribution system pipelines. The transmission system consists of 18- to 42-inch diameter pipelines, while the distribution system consists of pipelines with diameters less than 18 inches. Table 2-7 provides a summary of the City's water system pipelines by pipeline diameter. As shown in Table 2-7, about 48 percent of the system is comprised of 8-inch diameter pipelines.

Table 2-7. Summary of Existing Distribution System Pipeline Diameter[a]

Pipeline Diameter, inches	Length of Pipeline		Percent in Water System
	feet	miles	
6 or less	135,980	25.8	9.0
8	703,850	133.3	47.7
10	18,750	3.5	1.3
12	409,760	77.6	27.8
14	9,310	1.8	0.6
16	44,590	8.4	3.0
18	78,050	14.8	5.3
20 or greater	74,430	14.1	5.0
Total	**1,474,720**	**279.3**	**100%**

Source: City's water system GIS database provided in April 2024.

(a) Only pipelines managed by the City are included.

Table 2-8 and Figure 2-4 summarize the City's water system pipelines by approximate decade of installation. Based on available GIS data, the majority of the water system pipelines were estimated to be installed in the 2000s. The City's downtown area contains the oldest pipelines that were installed prior to 1980. The City has an annual pipeline rehabilitation and replacement program that focuses on replacing older and deteriorating pipelines which are undersized for fire flow or have a history of leaking.

Table 2-8. Summary of Distribution System Pipeline Installation Decade[a]

Decade of Pipeline Installation	Length of Pipeline		Percent in Water System
	feet	miles	
1970s or earlier	70,820	13.4	4.8
1980s	72,350	13.7	4.9
1990s	222,680	42.2	15.1
2000s	806,960	152.8	54.7
2010s	102,810	19.5	7.0
2020s	199,100	37.7	13.5
Total	**1,474,720**	**279.3**	**100%**

Source: City's water system GIS database provided in April 2024.

(a) Only pipelines managed by the City are included.

Table 2-9 summarizes the City's water system pipelines by material. The majority of the City's water system pipelines, approximately 82 percent, are polyvinyl chloride (PVC).

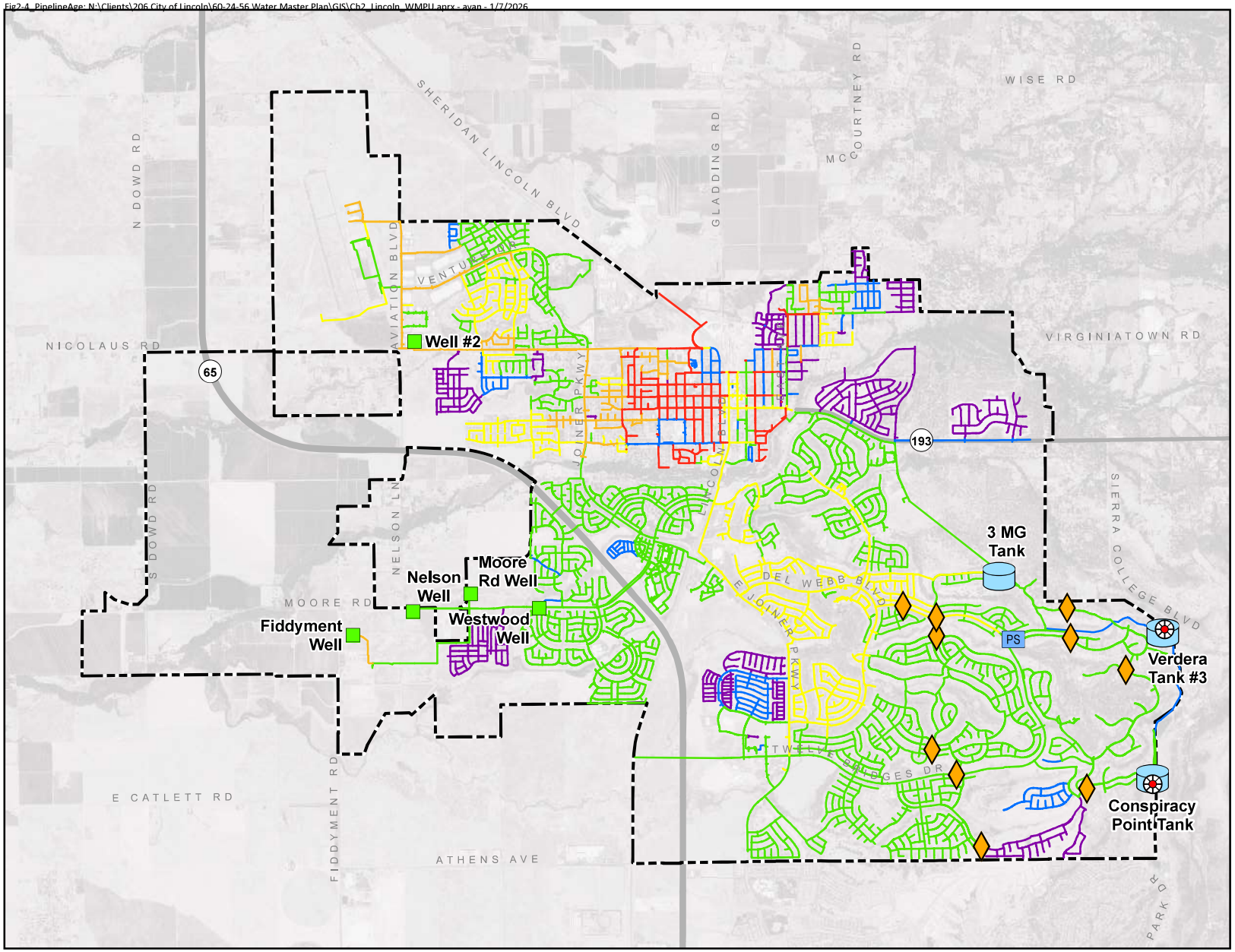
Table 2--9. Summary of Distribution System Pipeline Material[(a)]

Pipeline Material	Length of Pipeline		Percent in Water System
	feet	miles	
Asbestos Cement	77,960	14.7	5.3
Cast Iron	14,030	2.7	1.0
Copper	30	< 1.0	< 0.1
Ductile Iron	159,420	30.2	10.8
High-Density Polyethylene (HDPE)	90	< 1.0	< 0.1
Polyvinyl Chloride	1,207,800	228.8	81.9
Steel	12,220	2.3	0.8
Unknown	3,170	0.6	0.2
Total	**1,474,720**	**279.3**	**100%**

Source: City's water system GIS database provided in April 2024.

(a) Only pipelines managed by the City are included.

Fig2-4_PipelineAge: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch2_Lincoln_WMPU.aprx - ayan - 1/7/2026



Pipeline Decade of Installation

- 1970s or earlier
- 1980s
- 1990s
- 2000s
- 2010s
- 2020s

Existing System Facilities

- Placer County Water Agency Metering Station
- Groundwater Well
- Catta Verdera Pump Station
- Pressure Regulating Station
- Storage Tank

Boundary

- City Limit

Notes:

1. Facilities shown and pipeline decade of installation based on GIS data provided by the City in April 2024.

Prepared by:

WEST YOST

N

0 3,000 6,000 Feet

Prepared for:

City of Lincoln
Water Master Plan Update

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Existing Water System Pipeline Age

Figure 2-4