FINAL REPORT | JANUARY 2026

Water Master Plan Update

PREPARED FOR

City of Lincoln

PREPARED BY

WEST YOST
Water. Engineered.

Water Master Plan Update

Prepared for

City of Lincoln

Project No. 206-60-24-56

Prepared by: Brenda Estrada, PE, RCE #67062	January 21, 2026 Date
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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.

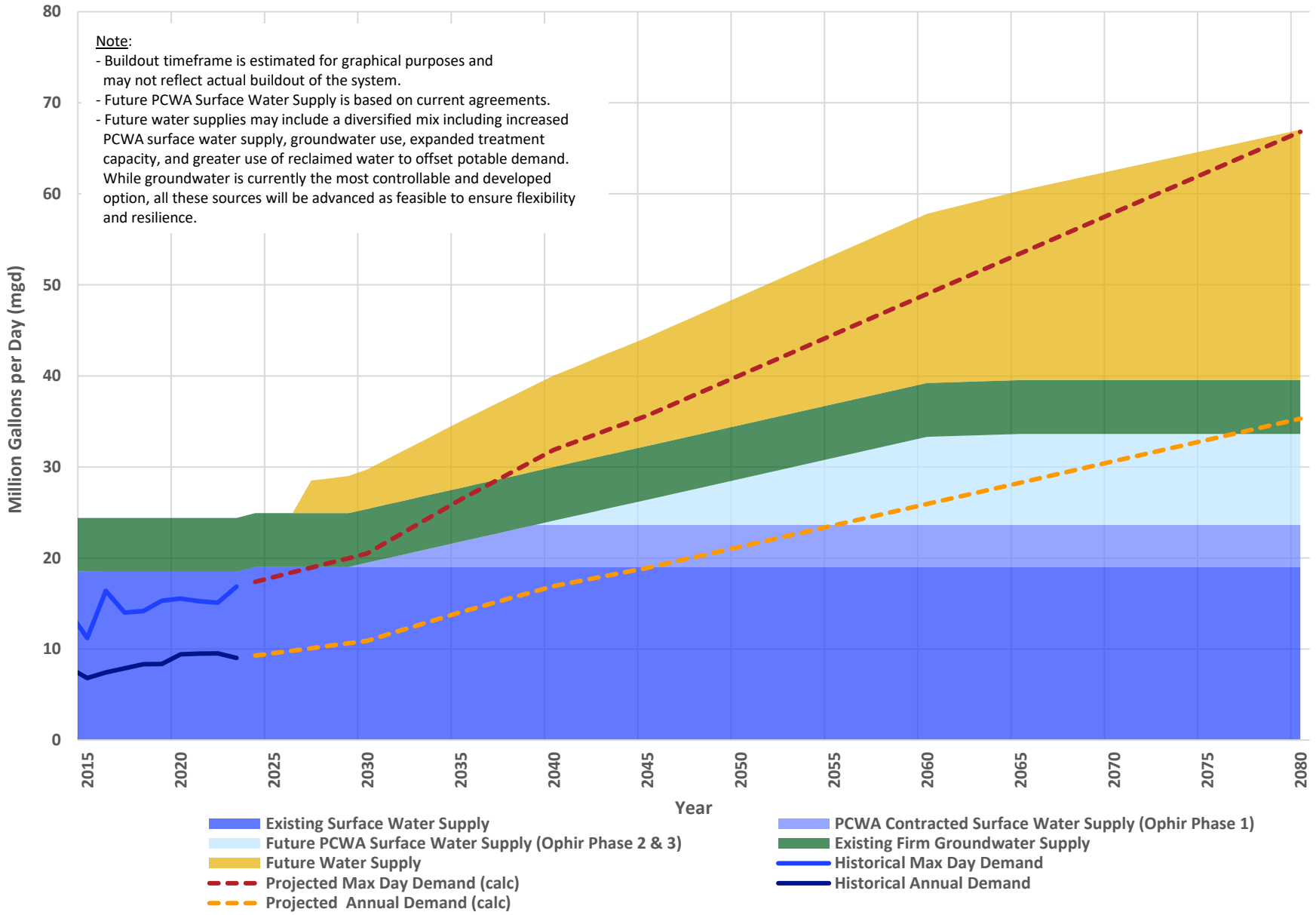
RECOMMENDED EXISTING AND FUTURE WATER SYSTEM IMPROVEMENTS

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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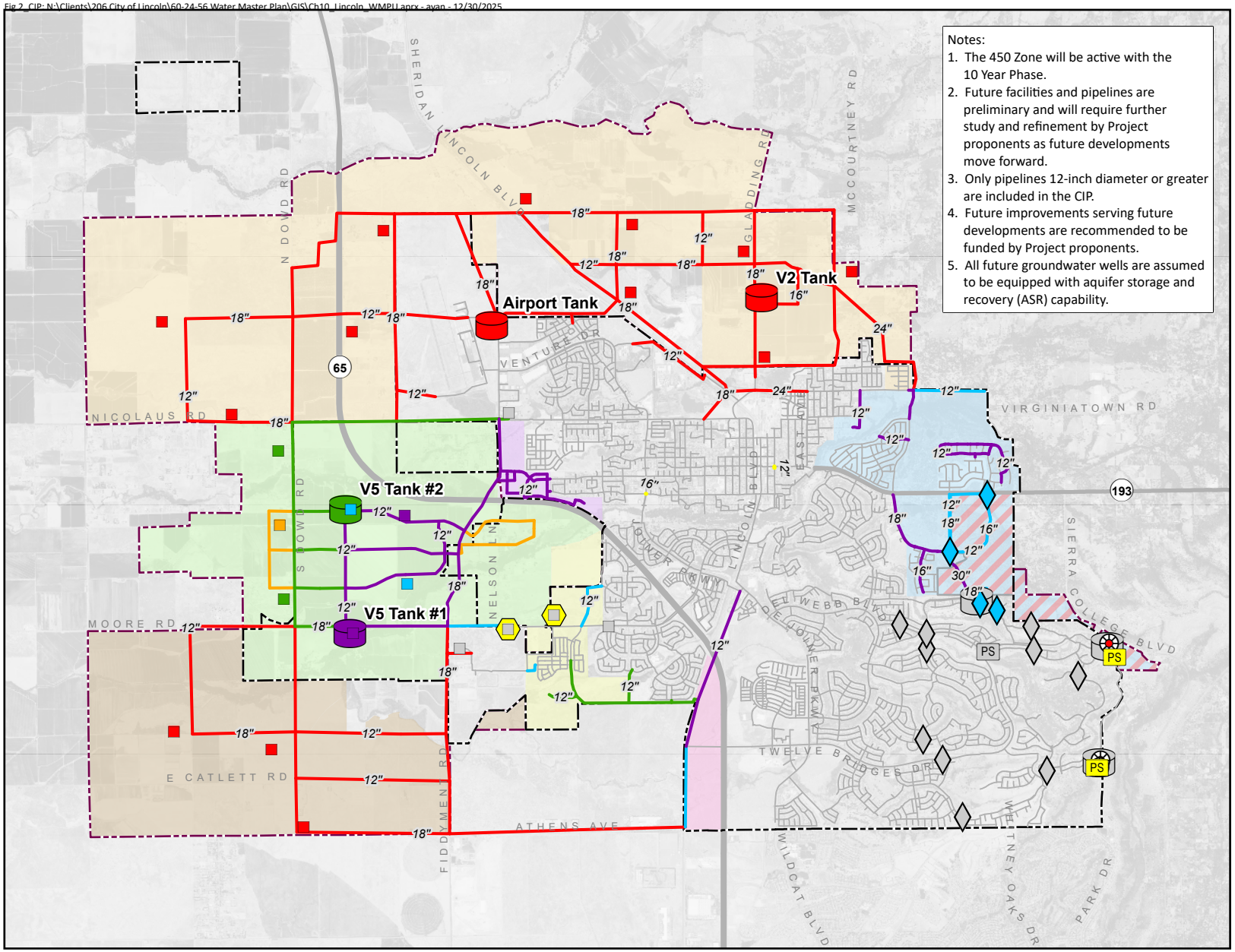

Phase Color Legend

- 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

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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:

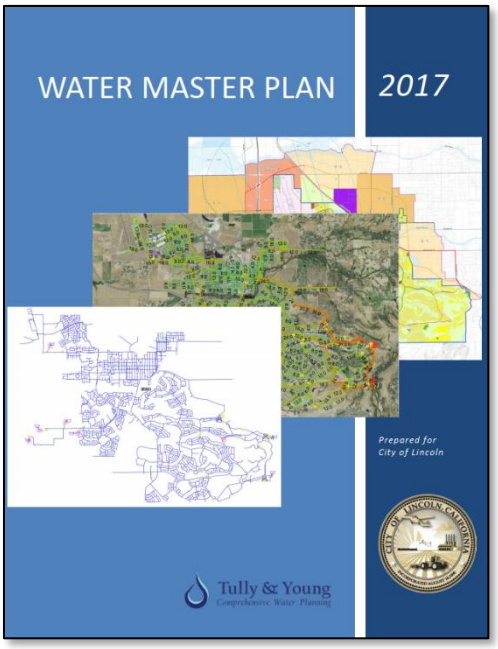
- Describe the City's existing water system and facilities.
- Evaluate historical and existing water demands to understand recent water use patterns and water use by customer type.
- Develop new unit use factors based on land use categories and recent water demand trends.
- Develop future water demand 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:



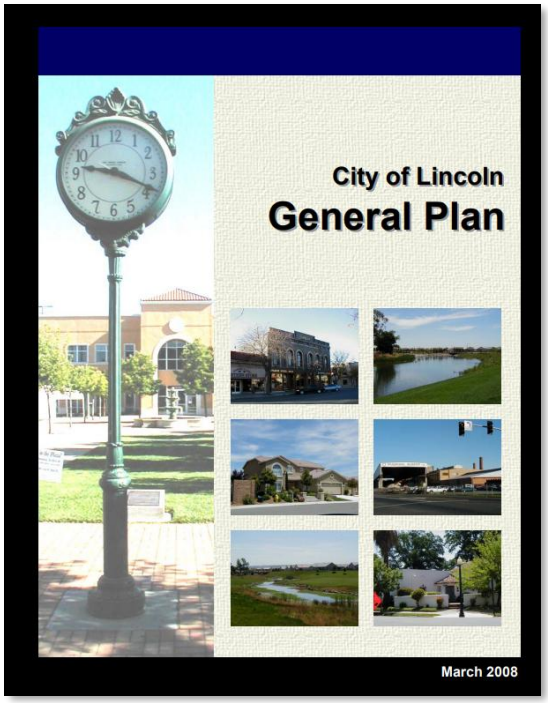
- The importance of maintaining water supply reliability to meet existing and future water demands;
- The importance of continued coordination and review of water supply contracts with Placer County Water Agency (PCWA) and the Nevada Irrigation District (NID);
- The continued use of surface water and 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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Angie Yan, EIT	Project Engineer
Colton Short, EIT	Staff Engineer
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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.

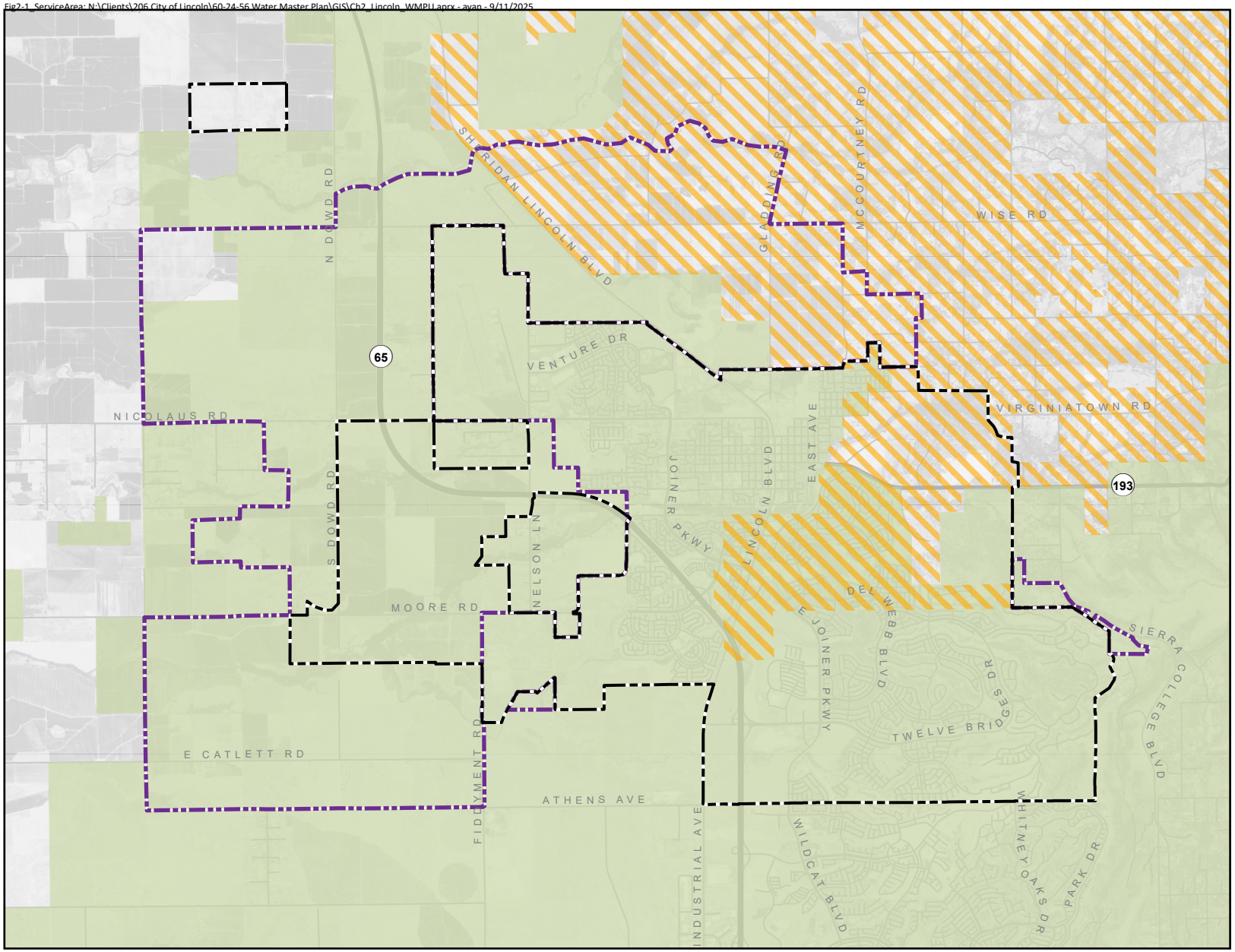
The City's water service area overlaps the service areas of the PCWA and NID. Figure 2-1 shows the relationship between City, PCWA, and NID service area boundaries, as well as the City's SOI. The City's SOI includes the area not currently within the City limits which the City plans to annex and extend 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.

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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.

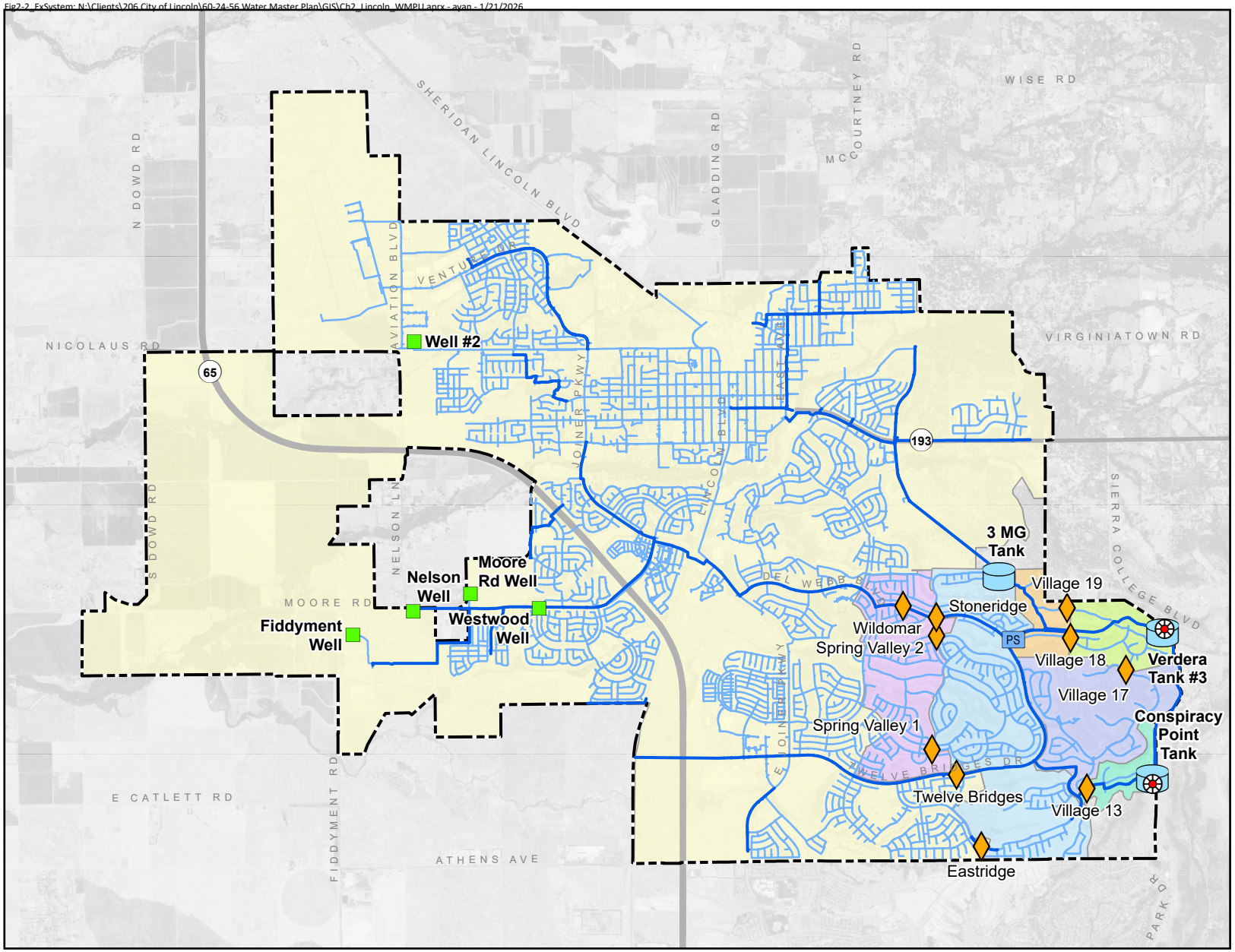
(b) Meter connections based on meter GIS shapefile provided by the City in April 2024.

(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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Existing Water System
Figure 2-2

Legend

- P — Booster Pump Station (BPS)
- Name — Supply Source
- PRS — Pressure Reducing Station
- CV — Check Valve
- 375 — Pressure Zone
- NC — Normally Closed Valve

610 Zone

PRS — Village 18 PRS

PRS — Village 19 PRS

750 Zone

PRS — Village 17 PRS

650 Zone

PRS — Village 13 PRS

775 Zone

NC

NC

P — Catta Verdera BPS

16" Verdera Tank #3 Bypass

NC

Well 2

Well 6 Westwood

Well 7 Moore

Well 8 Fiddyment

Well 9 Nelson

20" City Outflow

16" Del Webb Outflow

3.0 MG Tank

3MG Tank

30"

NC

NC

NC

CV

NC

375 Zone

475 Zone

575 Zone

PRS — Stoneridge PRS

PRS — Spring Valley #1 PRS

PRS — Spring Valley #2 PRS

PRS — Wildomar PRS

PRS — Twelve Bridges PRS

PRS — Eastridge PRS

PCWA Metering Station

Unregulated Connection | Regulated Connection

16" Conspiracy Point Tank Bypass

PCWA Metering Station

Unregulated Connection | Regulated Connection

36"

5.0 MG Tank

Verdera Tank #3

30"

5.0 MG Tank

Conspiracy Point Tank

Last Revised: 05-20-24

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).

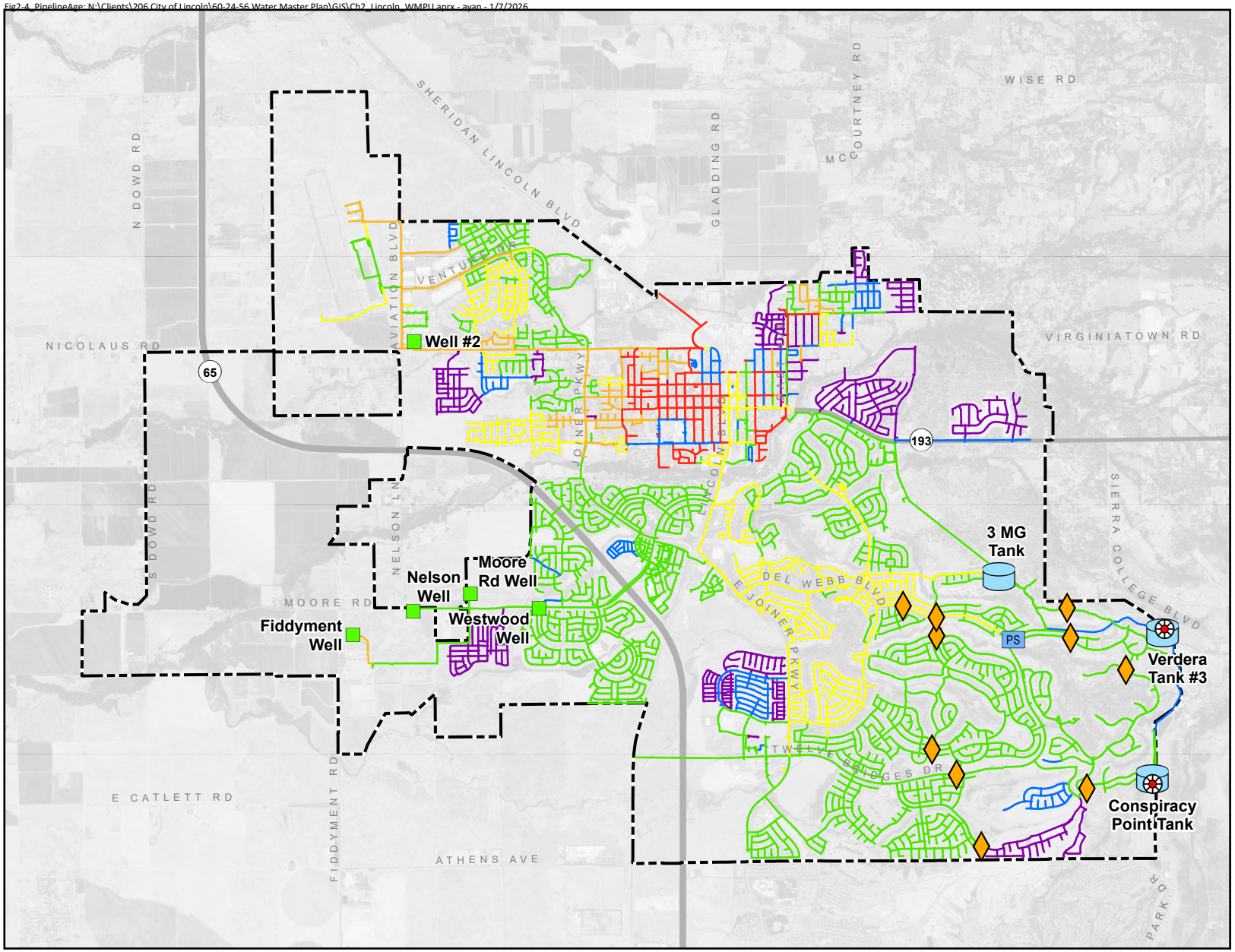
Table 2--9. Summary of Distribution System Pipeline Material[(a)]

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

Lincoln Live. Life. Lincoln

Existing Water System Pipeline Age

Figure 2-4

CHAPTER 3
Water Demand Analysis

This chapter describes the City's historical and current water use, as well as the City's future water demands. The future water demands are based on water use factors and planned future development discussed with the City's planning department. Future water demands will be used to evaluate the future water production required, the adequacy of the City's available water supplies, and the capacity of the City's water system to reliably deliver water to its customers.

The following sections of this chapter present the City's historical and current water demands and future water demands:

- Historical Water Production and Use
- Historical Peak Water Use
- Existing and General Plan Land Use and Growth Projections
- Water Use Factors
- Future Water Demands and Required Water Production

3.1 HISTORICAL WATER PRODUCTION AND USE

The following sections summarize the historical water production for the City's water service area.

3.1.1 Historical Annual Water Production

As described in Chapter 2, the City's water supplies come from a combination of surface water and groundwater sources consisting of water purchased from PCWA, water purchased from NID, and pumped groundwater from City-owned wells. Table 3-1 summarizes historical annual water production for the City between 2012 and 2023. The 10-year average surface water percentage of total production is 95 percent, and the 10-year average groundwater percentage of total production is 5 percent. These ratios align with the City's existing conjunctive use goal of relying on groundwater for 10 percent of its water demands and surface water for the remaining 90 percent, as stated in Chapter 2.

Figure 3-1 displays the annual water production, in mgd from 2012 to 2023. The highest annual water production occurred in 2022, with a total of approximately 9.5 mgd. The lowest annual water production occurred in 2015, with a total of approximately 6.8 mgd, which was during the height of a severe drought. Since 2015, production data shows a steady increase in production through 2020 which can be contributed to a post drought rebound in water use as well as new customers being added to the system. Figure 3-1 also shows that water production between 2020 and 2023 has remained fairly constant despite the City's continued growth. The fairly steady water production could be contributed to the City's continued emphasis on water conservation, expanded use of recycled water where possible, and improvements to infrastructure to reduce non-revenue water losses.

Table 3-1. Historical Annual Water Production

Year	Surface Water, MG	Groundwater, MG	Total, MG	Surface Water Percent of Total	Groundwater Percent of Total
2012	2,434	854	3,288	74	26
2013	3,175	363	3,538	90	10
2014	2,691	225	2,916	92	8
2015	2,256	230	2,486	91	9
2016	2,531	177	2,708	93	7
2017	2,758	120	2,878	96	4
2018	2,924	112	3,036	96	4
2019	2,837	215	3,052	93	7
2020	3,238	209	3,447	94	6
2021	3,379	83	3,462	98	2
2022	3,410	65	3,475	98	2
2023	3,244	45	3,289	99	1
5-Year Average (2019-2023)	**3,222**	**123**	**3,345**	**96%**	**4%**
10-Year Average (2014-2023)	**2,927**	**148**	**3,075**	**95%**	**5%**

Source: Surface water and groundwater production spreadsheets provided by the City, April 2024.

MG = Million Gallons per Year

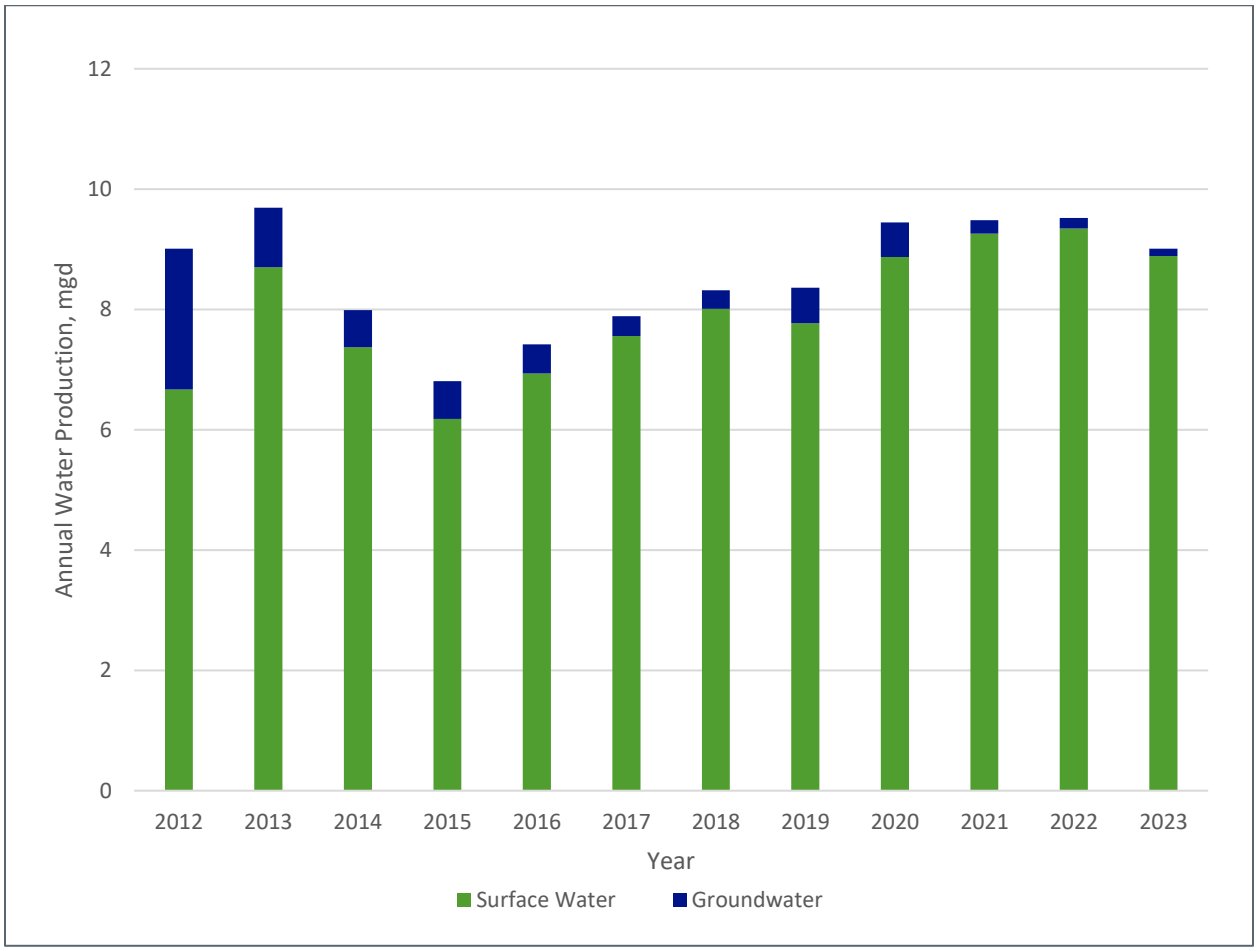


Figure 3-1. Historical Annual Water Production

3.1.2 Per Capita Water Use

Historical per capita water use for the City's water service area from 2012 to 2023 is presented in Table 3-2 and on Figure 3-2. The per capita water use is based on total water production for the City's water service area (representing all water uses including all residential and non-residential uses) divided by the City's water service area population. Since 2020, the City's per capita water use has continued to decrease as the population has increased.

Table 3-2. Historical Production, Population, and Per Capita Water Use

Year	Average Daily Production, mgd[a]	Population[b]	Per Capita Use, gpcd
2012	9.0	44,286	203
2013	9.7	44,954	216
2014	8.0	45,899	174
2015	6.8	46,627	146
2016	7.4	47,427	156
2017	7.9	48,268	163
2018	8.3	48,860	170
2019	8.4	49,348	169
2020	9.4	49,573	190
2021	9.5	50,165	189
2022	9.5	50,977	187
2023	9.0	52,296	172

(a) Production based on surface and groundwater spreadsheets provided by the City, April 2024.
(b) Source: Population estimates from State of California Department of Finance Tables E-4 Historical Population Estimates for Cities, Counties, and the State, September 2024.
mgd = million gallons per day: gpcd = gallons per capita per day

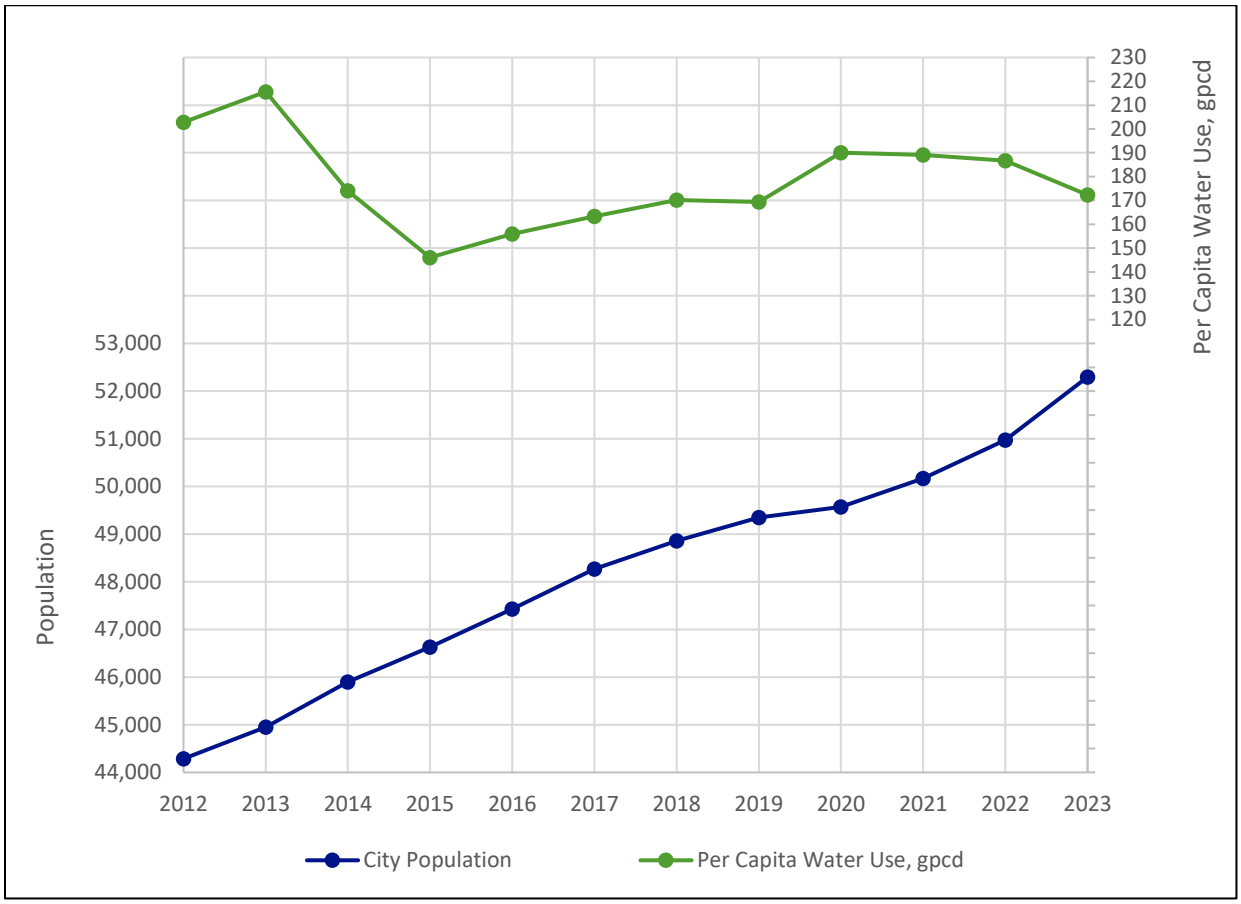


Figure 3-2. Comparison of Historical Per Capita Demand and Population

3.1.3 Historical Water Consumption

Water production is a measure of water produced at various supply facilities. Water consumption is a measure of water delivered to customers. The City tracks water consumption through customer meter records. As of 2023, the City had approximately 23,454 metered water use connections that serve various customer types. Table 3-3 summarizes the number of accounts by customer type. As shown in Table 3-3, the predominant customer type in the City's water service area is residential, which accounts for approximately 97 percent of the total number of water meters.

Table 3-3. City Customer Types as of December 2023[a]

Customer Type	Number of Accounts	Percent of Total Accounts
Residential		
Single Family	22,685	96.7
Multi Family	94	0.4
Residential Subtotal	**22,779**	**97.1%**
Non-Residential		
Non-residential[b]	415	1.8
Industrial	5	0.02
Landscape/Irrigation	255	1.0
Non-Residential Subtotal	**675**	**2.9%**
Total	**23,454**	**100%**

(a) Source: Data are from *2023 Water Consumption by Class.xls*, provided by the City in May 2024.
(b) Non-residential accounts include commercial, office, institutional, and public/quasi-public land use types.

Table 3-4 summarizes the City's water consumption by customer type in 2023. Although residential customers account for approximately 97 percent of the total accounts, they only account for 83 percent of the total consumption. Dedicated irrigation accounts (e.g., landscape median, parks, etc.) make up approximately 10 percent of the total consumption but only 3 percent of total accounts.

Table 3-4. Consumption by Customer Types as of December 2023[a]		
Customer Type	Total Annual Consumption, MG	Percent of Total Annual Consumption
Residential		
Single Family	2,481	80.7
Multi Family	70	2.3
Residential Subtotal	**2,551**	**82.9%**
Non-Residential		
Non-residential[b]	198	6.4
Industrial	22	0.7
Landscape/Irrigation	305	9.9
Non-Residential Subtotal	**578**	**17.1%**
Total	**3,076**	**100%**

(a) Source: Data are from *2023 Water Consumption by Class.xls*, provided by the City in May 2024.
(b) Non-residential accounts include commercial, office, institutional, and public/quasi-public land use type.

3.1.4 Non-Revenue Water

Non-revenue water (NRW) is the difference between the quantity of water produced and the quantity of water consumed and/or metered. Consumption (i.e., customer water use) typically does not equal the total production because of unmeasured system losses. Water utilities strive to minimize the amount of NRW; however, it is difficult to eliminate entirely. The most common reasons for NRW are due to system losses such as leakage, errors in measurement, unmetered usage, and errors in systematic data as discussed in detail below:

- **Leaks:** Leaks are frequently the largest component of NRW and includes losses from distribution and transmission mains and customer service laterals up to the meter. The amount of leakage varies from system to system, but there is a general correlation between the age of a system and the amount of NRW. Other factors affecting leaks include system pressure (i.e., the higher the pressure, the higher the leakage), frequency of main and service pipe breaks, and the extent of leak detection and control policies.
- **Errors in Measurement:** Flow measurements are not always exact, and thus metered customer usage may contain inaccuracies. For example, some flow meters under register actual usage at low flow rates, especially as they age.
- **Unmetered Usage:** The City may have unauthorized and unmetered connections or other types of unmetered water use. Not all unmetered usage is due to water theft; fire hydrants, blow-offs, and other maintenance appurtenances that are exercised are typically not metered.
- **Errors in Systematic Data:** Systematic data errors can contribute to NRW when inaccuracies occur in how water data is collected, recorded, or interpreted. These errors may include misread flow meter data, incorrect recording of meter readings, and/or incorrect meter locations.

An estimate of NRW is required for water system planning to project future water production needs, as a system will always have some amount of water loss. NRW ranging from 5 to 10 percent is typical for many water utilities.

California Water Code Section 10608.34 required the State Water Resources Control Board (SWRCB) to develop water loss performance standards for urban retail water suppliers. Executive Orders B-37-16 and B-40-17 directed the SWRCB and DWR to minimize water waste through system leaks. Water loss performance standards were developed through a rulemaking process that became effective in 2023.[1] The Water Loss Control regulation requires urban retail water suppliers, like the City, to complete questionnaires administered by the SWRCB and to meet water loss standards by 2028 (or by 2031 in some cases), using water audit data submitted for 2025, 2026, or 2027.

Table 3-5 summarizes the non-revenue water for the City's system from 2019 through 2023 by comparing water production to water consumption. Based on the average water consumption versus water production, the average NRW is approximately 9.8 percent. The NRW has consistently decreased over the five-year period which reflects the City's proactive approach to system rehabilitation of maintenance or replacement of aging infrastructure. As described in subsequent sections, NRW will be accounted for when projecting the future water production required for future conditions and will be assumed to be 10 percent.

Table 3-5. Non-Revenue Water

Year	Production, MG[(a)]	Consumption, MG[(b)]	NRW, MG[(c)]	NRW as a Percent of Production
2019	3,052	2,679	373	12.2
2020	3,447	3,049	398	11.5
2021	3,462	3,107	355	10.3
2022	3,475	3,176	299	8.6
2023	3,289	3,076	213	6.5
5-Year Average Percent of Production that is Non-Revenue Water				**9.8%**

(a) Production based on surface and groundwater production spreadsheets provided by the City, April 2024.
(b) Consumption based on *Water ConsumByClass.xls* spreadsheets provided by the City, May 2024.
(c) NRW is equal to production minus authorized consumption.

3.2 HISTORICAL PEAK WATER USE

Water system facilities are generally sized to meet peak demand conditions. For facility sizing (e.g., supply, pumping and storage), the peaking conditions of most concern are typically maximum day plus fire flow demand or peak hour demand. This section reviews historical peak water use for the City's water service area and includes discussion of the maximum day demand, peak hour demand, and hourly variations of demand during the maximum demand day.

[1] Source: Water Loss Control | California State Water Resources Control Board

3.2.1 Maximum Day and Peak Hour Demand

Table 3-6 summarizes the historical maximum day peaking factors for the City from 2014 through 2023, which are most representative of recent water use trends. As shown in Table 3-6, the maximum day demand has varied between 1.6 to 1.9 times the average day demand and the average historical maximum day peaking factor is 1.8 times average day demand.

Table 3-6. Summary of Historical Maximum Day Peaking Factors

Year	Average Day Demand (ADD), mgd	Maximum Day Demand (MDD), mgd	Maximum Day Peaking Factor (MDD/ADD)
2014	8.0	14.2	1.8
2015	6.8	11.2	1.6
2016	7.4	16.4	2.2
2017	8.2	14.0	1.7
2018	8.4	14.2	1.7
2019	8.4	15.3	1.8
2020	9.4	15.5	1.7
2021	9.5	15.3	1.6
2022	9.5	15.1	1.6
2023	9.0	16.9	1.9
Average	**8.5**	**14.8**	**1.8**

To develop a peak hour peaking factor, West Yost reviewed peak days of City provided SCADA data from 2023 to identify historical peak hour demands. This data was provided to West Yost as part of the hydraulic model calibration, the peak hour peaking factor was calculated based on the diurnal development for the City's pressure zone groups. While each of the pressure zone groups have a specific peak hour peaking factor, it was determined that a single peaking factor for the maximum day would be used for facilities sizing. The recommended peaking factors are summarized in the following section.

3.2.2 Recommended Demand Peaking Factors

Table 3-7 summarizes the recommended peaking factors for this WMPU. These peaking factors will be subsequently used to evaluate and size storage and pumping facilities, as well as define water supply needs and capacity requirements. For planning purposes, the maximum day peaking factor for the City is recommended to be 1.9 which is slightly higher than the 10-year average to be conservative. The factor also represents a decrease from the average day to maximum day factor developed in the City's 2017 WMP of 2.0. The reduction in the maximum day peaking factor reflects recent trends in water use, with increased water conservation and reductions in NRW loss.

The peak hour factor developed in the City's 2017 WMP was 2.0 times MDD (4.0 times ADD) for the City's entire system. Although the peak hour factor varies across each of the City's pressure zone groups, a single peak hour factor is recommended for the City's entire system. The recommended peak hour factor developed for this WMPU is 2.2 times MDD (3.8 times ADD), as shown in Table 3-7.

Table 3-7. Summary of Recommended Main Zone Maximum Day and Peak Hour Peaking Factors	
Maximum Day Demand Peaking Factor (MDD/ADD)	Peak Hour Demand Peaking Factor (PHD/MDD)
1.9	2.2
MDD = maximum day demand; ADD = average day demand; PHD = peak hour demand.	

3.2.3 Diurnal Curve Development

The MDD (including the peak hour) and minimum day demand diurnal curves were developed by reviewing SCADA data for summer and winter 2023 conditions. The minimum day demand diurnal curves represent seasonal winter demands (typically December through February), and MDD diurnal curves represent seasonal summer demands (typically June through August).

The City has SCADA coverage in the system that allows the development of multiple diurnal curves that group connected zones. Hourly patterns were developed for three zone groups for both winter and summer demands. The results of the 2023 diurnal curves were compared to the curves developed using 2021 data and found to be very similar in patterns.

Figure 3-3 shows the diurnal patterns developed for summer demand conditions. These diurnal patterns differ from the diurnal patterns developed for the model calibration (see Chapter 6), as patterns used for that effort are specific to the day the model was calibrated to. Diurnal patterns shown on Figure 3-3 are based on the hourly averages during the peak week of 2023 which occurred during the week of July 16 to 22. Diurnal patterns shown on Figure 3-3 were used for the existing and future distribution system evaluations, described in Chapters 7 and 8.

Figure 3-4 shows the diurnal patterns developed for winter demand conditions. Diurnal patterns shown on Figure 3-4 are based on the hourly averages during the minimum week of 2023 which occurred during the week of February 22 to 28. As expected, the minimum day demand diurnals have a flatter curve than the MDD diurnals as outdoor water irrigation use is typically minimal in the winter months.

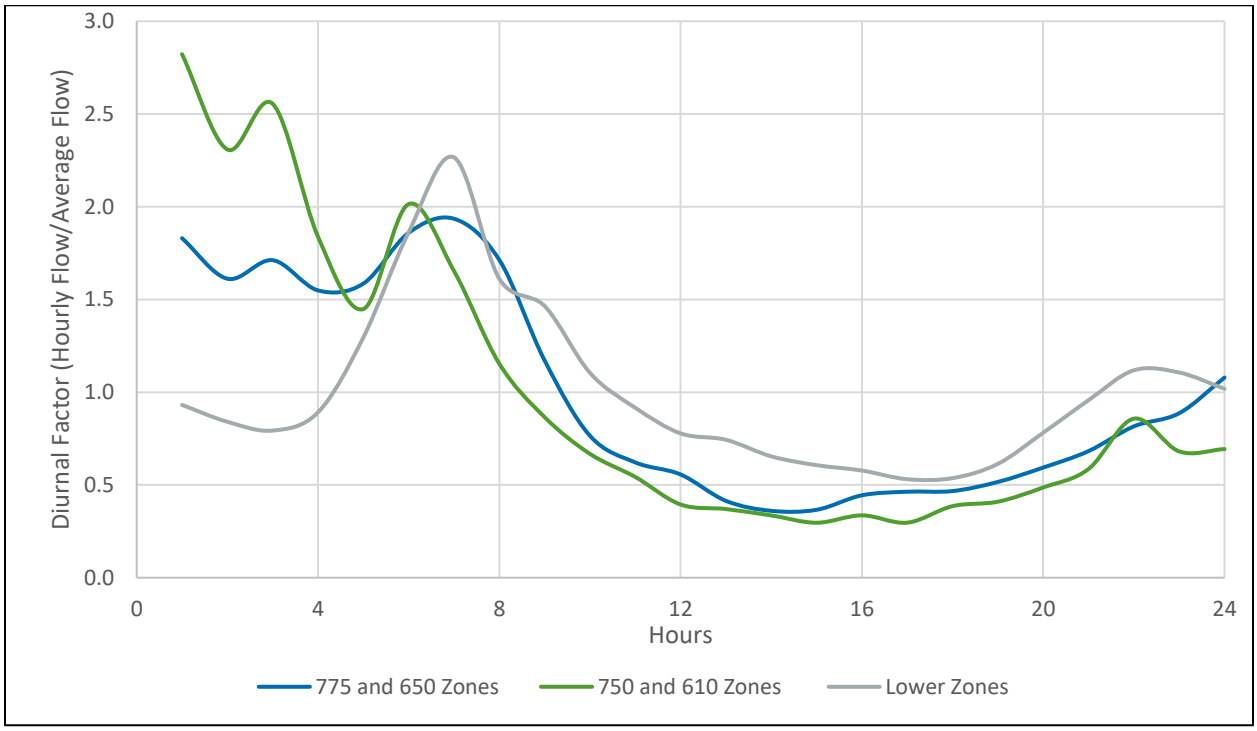


Figure 3-3. Grouped Zones Maximum Day Demand Diurnal Curves

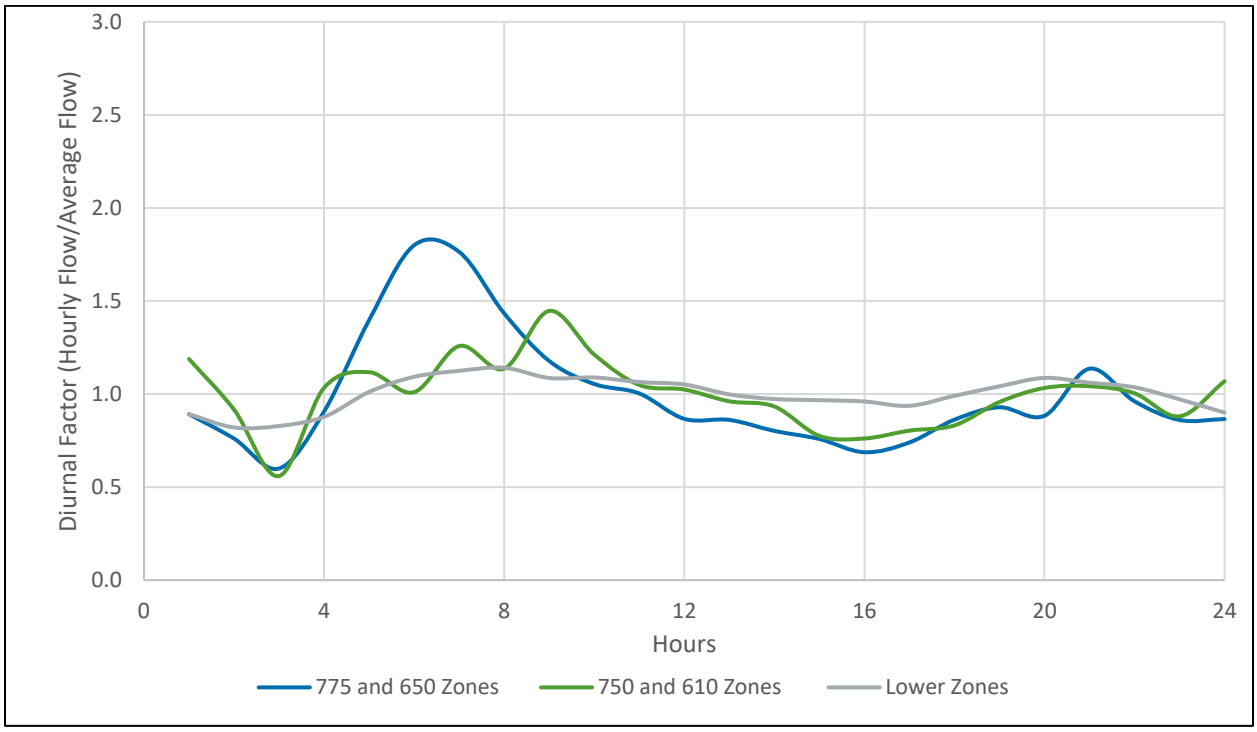


Figure 3-4. Grouped Zones Minimum Day Demand Diurnal Curves

The City provided hourly consumption data for its 17 largest water users collected through Advanced Metering Infrastructure (AMI) which allowed diurnals to be created for these accounts. The diurnals developed for these large water users show very different patterns from the diurnals developed for the zone groups discussed above.

Of the data provided, 12 of the 17 meters represent irrigation meters. The diurnal curves developed for each of these meters are shown on Figure 3-5 for a maximum summertime demand period during 2023. As expected, most of the consumption occurs overnight between the hours of 9 PM to 7 AM, which is consistent with when irrigation often occurs. An average of the irrigation diurnals was developed to provide a general irrigation diurnal to use for the future system evaluations.

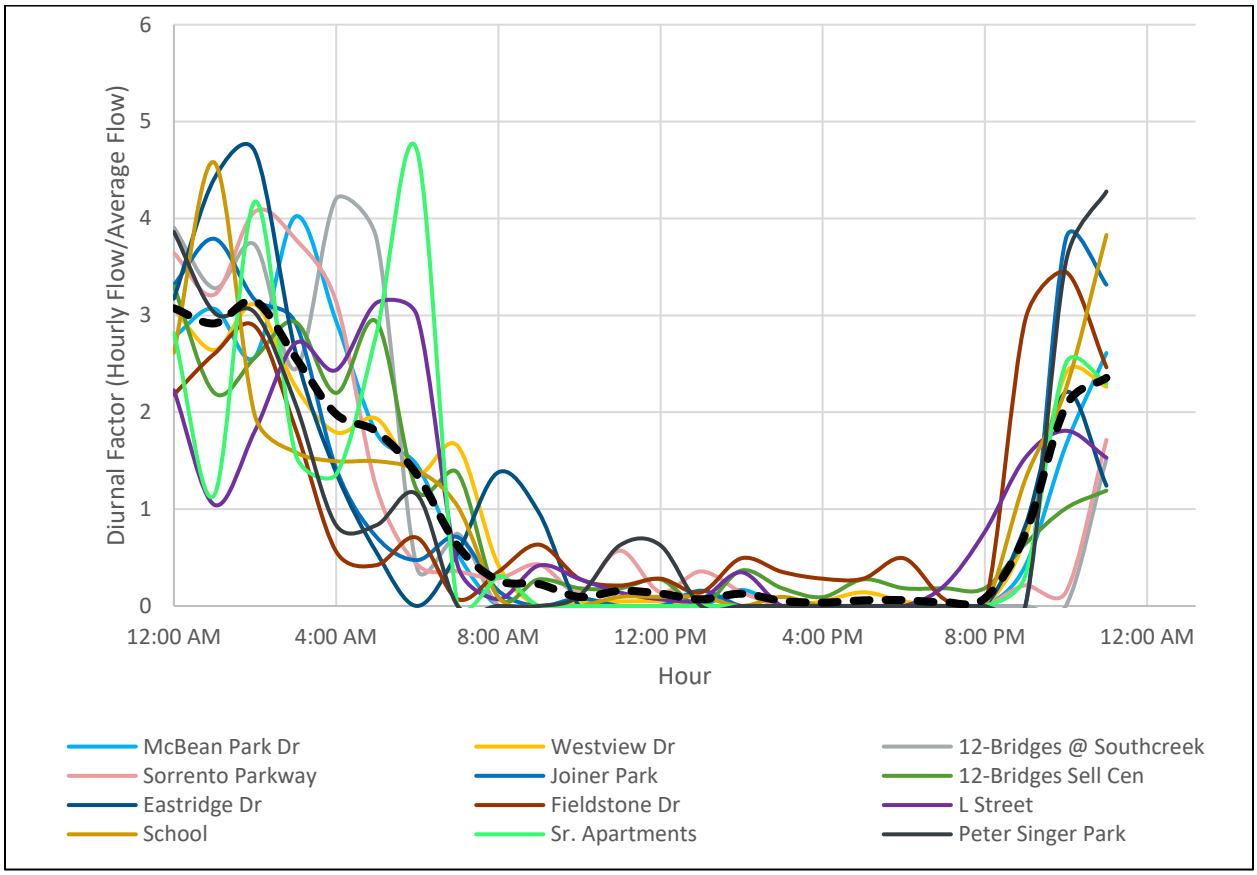


Figure 3-5. Irrigation Meters Maximum Day Demand Diurnal Curves

The five other large consumption meter data provided represents a mix of uses: industrial, recreational, commercial car wash, senior apartments, and a public pool. As shown on Figure 3-6, the industrial, recreational, and pool all show fairly constant demands occurring throughout the day with a morning peak for the industrial account. The senior apartment account shows high demands prior to about 10 AM which may be in part due to irrigation occurring during the evening hours. The commercial car wash account shows consumption occurs during business hours as expected. Due to the variety of how water is consumed by these individual large water users, the developed diurnals are only applied to these specific users.

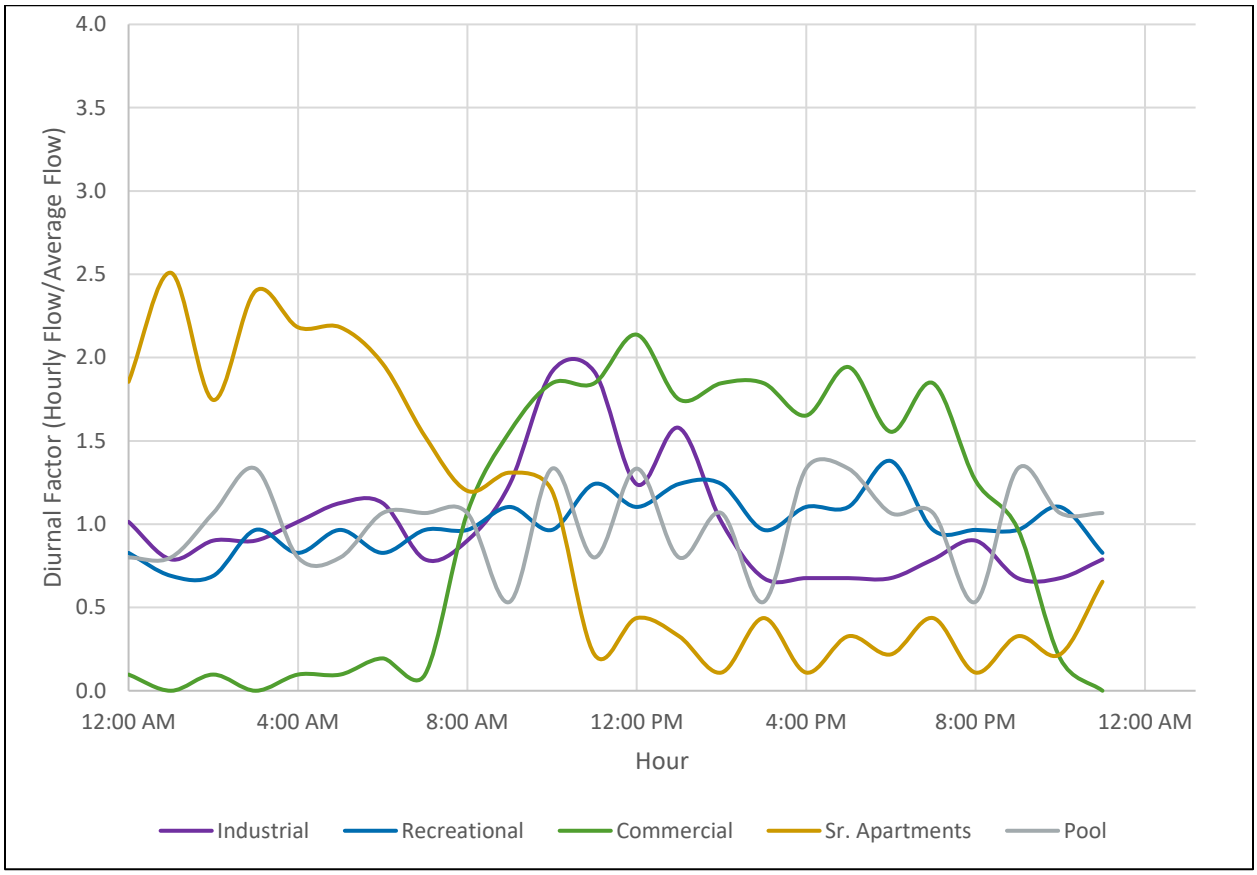


Figure 3-6. Large Users Maximum Day Demand Diurnal Curves

3.3 EXISTING AND FUTURE LAND USE AND GROWTH PROJECTIONS

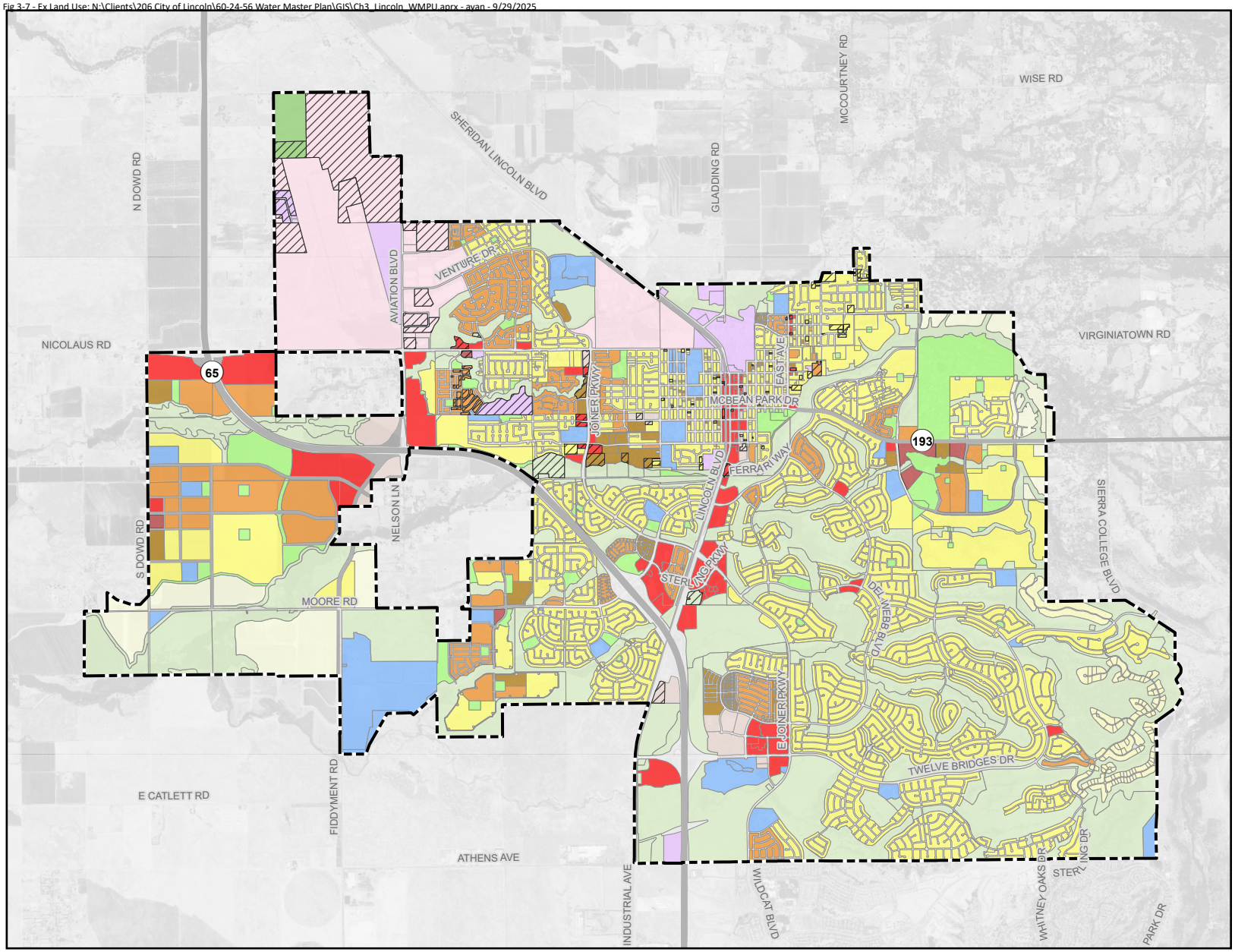
The following sections discuss the existing and projected future land use for the City's water service area.

3.3.1 Existing Land Use

The City's existing land use consists mostly of low density single family residential developments in addition to commercial, office, industrial, parks, and schools as shown on Figure 3-7. Residential uses are located throughout the City's service area. Generally, the eastern portion of the existing city has several traditional single family residential communities along Twelve Bridges Drive and Del Webb Boulevard. Along the most eastern edge of City Limits, the developments are low density/country estates which tend to include large multi-story homes on large lots with extensive landscaping.

The City's commercial and mixed uses are found throughout the City with a concentrated commercial corridor along Lincoln Boulevard which includes the historic downtown part of the City. The City also includes a significant industrial land use in the northern and northwestern part of the City. The industrial users include Sierra Pacific Industries, Gladding McBean Manufacturer, and the Lincoln Regional Airport.

Fig 3-7 - Ex Land Use: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch3_Lincoln_WMPU.aprx - ayan - 9/29/2025



City Limit

Zoning

- Country Estates
- Low Density Estates
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Mixed Use
- Commercial
- Business and Professional
- Industrial
- Industrial Planned Development
- Public Facilities
- Parks and Recreation
- Open Space
- Agricultural
- Right-of-Way
- Vacant Activity

Notes:

1. GIS zoning and land use shapefiles provided by the City of Lincoln in 2025.
2. Parcels with land use activity of Vacant are shown for locations within the City Limits which are not part of a Specific Plan.
3. Future land uses within Villages and Special Use Districts are planned and not shown as Vacant.

Prepared by:

WEST YOST

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Prepared for:

City of Lincoln

Water Master Plan Update

Lincoln Live. Life. Lincoln

Existing and Planned Land Use

Figure 3-7

3.3.2 Projected Future Land Use

This section includes a discussion of the City's future land use and the estimated timing on when development will occur. The General Plan 2050 (GP) serves as a long-term policy guide for the City's growth and is the basis for the future growth projections used for facility planning along with input from the City's Community Development Department. The development of the future growth areas were classified in 5-year increments through a 20-year period with any remaining area assumed to be developed at buildout.

3.3.2.1 Overview of the City's General Plan 2050

Future growth and land uses are defined in the City's GP, which 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 (SUD) which are described below and shown on Figure 3-8.

3.3.2.1.1 Infill

The GP identified the need to develop the vacant infill parcels within the existing City Limits. Implementation measures to encourage the development of vacant and underutilized parcels, including parcels in the downtown area of the City, were included as part of the GP. One measure to help achieve the infill development was the addition of a mixed use category to encourage combining a residential use with a business or commercial use (either horizontally or vertically). In 2024, the City has started a Downtown Master Plan (DMP) + Objective Design and Development Standards (ODDS) project to improve the downtown area of the City, which will include facilitating mixed use and housing options in the downtown area.

3.3.2.1.2 Villages

The GP designated seven areas as a Village (identified as V-1 through V-7). The village concept encompasses major new development areas which include a mix of housing types and a village center. In addition, each village will be characterized by extensive bicycle and pedestrian trails and open space to interconnect the village areas along with the developed portions of the City.

Village 1 is located in the eastern part of the City and is actively being developed. The City anticipates substantial completion of Village 1 within a 10-year timeframe.

Village 5 and Village 7 are located in the western part of the City Limits and SOI. Both villages have active development plans being processed with the City for portions that have recently been annexed within the City Limit boundary. Construction for both villages are anticipated to begin within a 5-year timeframe. Village 7 covers a smaller area and is expected to be substantially complete within a 15-year timeframe while Village 5 is anticipated to be completed within a 20-year timeframe.

Villages 2, 3, and 4 are located in the northern part of the SOI outside of the existing City Limits and Village 6 is located in the southwest part of the SOI. These areas are anticipated to start development beyond the 20-year timeframe and are therefore included as part of buildout.

3.3.2.1.3 Special Use Districts

The GP designated three areas as SUDs (identified as SUD-A, SUD-B, and SUD-C). Land uses within the SUDs are limited by restrictions established by the County of Placer's Airport Land Use Compatibility Plan and the proximity of the State Route 65 Bypass. At this time, only SUD-B is actively proceeding with development plans and is anticipated to begin construction within a 5-year timeframe and be completed within a 15-year timeframe. Both SUD-A and SUD-C are within the SOI but outside the existing City Limits and are not anticipated to have development occur over the next 20 years and are considered part of the buildout.

3.3.2.2 Projected Future Land Use

The exact amount of development that will occur through GP buildout is based on many factors, including changes in the regional real estate and labor markets, and individual property owners' decisions. For the purposes of this WMPU, the future land use projections defined are assumed based on the City's current pace of development.

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.

Based on discussions with City staff, additional assumptions used to estimate development in this WMPU include:

- Infill is assumed to be parcels within the existing City Limits with a land use activity code of "Vacant" in the City's GIS land use file, but do not include parcels in a Specific Plan or General Development Plan.
- Infill is assumed to be completed at a constant rate through buildout.
- Village 1 has active construction occurring and is anticipated to be substantially completed within 10 years.
- SUD-B is anticipated to begin development in the next 5 years and be substantially completed within 15 years.
- Villages 5 and 7 are anticipated to begin development in the next 5 to 10 years and be substantially completed within 15 to 20 years.
- Villages 2, 3, 4, and 6 and SUD-A and -C are assumed to develop in buildout (beyond 20 years).
- Available Specific Plans and/or General Development Plans were referenced to capture the most recent land use assumptions.
- Residential dwelling unit densities (i.e., dwelling units per acre) are assumed to be the average of the dwelling unit density ranges provided in the GP[2] unless other specific densities were provided.
- No development occurs outside of the SOI.

[2] Mintier & Associates. March 2008. City of Lincoln General Plan, Table 4-1

Table 3-8. Future Incremental Land Use Projections By Development Areas

Development/ Land Use	5-Year		10-Year		15-Year		20-Year		Buildout		Total	
	Acres	DU	Acres	DU	Acres	DU	Acres	DU	Acres	DU	Acres	DU
Vacant Infill Parcels												
Low Density Residential	6.3	28	6.3	28	6.3	28	6.3	28	6.3	28	31.3	139
Medium Density Residential	5.0	48	5.0	48	5.0	48	5.0	48	5.0	48	25.2	238
High Density Residential	4.0	66	4.0	66	4.0	66	4.0	66	4.0	66	19.9	328
Mixed Use	0.5	-	0.5	-	0.5	-	0.5	-	0.5	-	2.7	-
Commercial	6.5	-	6.5	-	6.5	-	6.5	-	6.5	-	32.5	-
Business Professional	3.2	-	3.2	-	3.2	-	3.2	-	3.2	-	16.0	-
Industrial	99.6	-	99.6	-	99.6	-	99.6	-	99.6	-	498.2	-
Open Space	9.6	-	9.6	-	9.6	-	9.6	-	9.6	-	47.9	-
Subtotal	**134.7**	**141**	**134.7**	**141**	**134.7**	**141**	**134.7**	**141**	**134.7**	**141**	**673.7**	**705**
Deer Crossing												
Commercial	3.6	-	-	-	-	-	-	-	-	-	3.6	-
Ferrari Pavillion												
Commercial	12.0	-	-	-	-	-	-	-	-	-	12.0	-
Joiner Ranch East												
Medium Density Residential	25.5	198	-	-	-	-	-	-	-	-	25.5	198
Bella Breeze												
Commercial	-	-	13.4	-	-	-	13.4	-	-	-	26.7	-
Lincoln 270												
Business Professional	-	-	79.9	-	-	-	-	-	-	-	79.9	-
Commercial	-	-	58.1	-	-	-	-	-	-	-	58.1	-
Industrial	-	-	37.8	-	-	-	-	-	-	-	37.8	-
Open Space	-	-	102.1	-	-	-	-	-	-	-	102.1	-
ROW	-	-	1.4	-	-	-	-	-	-	-	1.4	-
Subtotal	**-**	**-**	**279.3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**279.3**	**-**
Lincoln Place												
Low Density Residential	5.3	21	-	-	-	-	-	-	-	-	5.3	21
Medium Density Residential	7.6	80	-	-	-	-	-	-	-	-	7.6	80
Open Space	3.7	-	-	-	-	-	-	-	-	-	3.7	-
Subtotal	**16.6**	**101**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**16.6**	**101**
Village 1[(a)]												
Country Estates	72.2	154	51.9	119	58.0	129	10.2	23	-	-	192.3	425
Low Density Residential	354.4	1,542	239.8	1,184	-	-	-	-	-	-	594.2	2,726
Medium Density Residential	28.0	179	72.1	682	-	-	-	-	-	-	100.1	861
High Density Residential	-	-	17.9	421	-	-	-	-	-	-	17.9	421
Mixed Use	-	-	39.0	-	-	-	-	-	-	-	39.0	-
Parks	22.1	-	75.6	-	1.0	-	-	-	-	-	98.7	-
Open Space	210.1	-	138.9	-	61.3	-	9.3	-	-	-	419.7	-
ROW	15.1	-	15.1	-	15.1	-	15.1	-	-	-	60.4	-
Subtotal	**701.9**	**1,875**	**650.3**	**2,407**	**135.4**	**129**	**34.6**	**23**	**-**	**-**	**1,522.3**	**4,434**
Village 2												
Country Estates	-	-	-	-	-	-	-	-	164.4	321	164.4	321
Low Density Residential	-	-	-	-	-	-	-	-	575.5	2,561	575.5	2,561
Medium Density Residential	-	-	-	-	-	-	-	-	57.5	544	57.5	544
High Density Residential	-	-	-	-	-	-	-	-	24.7	469	24.7	469
Mixed Use	-	-	-	-	-	-	-	-	80.6	-	80.6	-
Parks	-	-	-	-	-	-	-	-	80.6	-	80.6	-
Open Space	-	-	-	-	-	-	-	-	564.2	-	564.2	-
ROW	-	-	-	-	-	-	-	-	64.5	-	64.5	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1,612.0**	**3,895**	**1,612.0**	**3,895**
Village 3												
Country Estates	-	-	-	-	-	-	-	-	263.2	513	263.2	513
Low Density Residential	-	-	-	-	-	-	-	-	579.0	2,576	579.0	2,576
Medium Density Residential	-	-	-	-	-	-	-	-	157.9	1,492	157.9	1,492
High Density Residential	-	-	-	-	-	-	-	-	52.6	1,000	52.6	1,000
Mixed Use	-	-	-	-	-	-	-	-	103.2	-	103.2	-
Parks	-	-	-	-	-	-	-	-	103.2	-	103.2	-
Open Space	-	-	-	-	-	-	-	-	722.4	-	722.4	-
ROW	-	-	-	-	-	-	-	-	82.6	-	82.6	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,064.0**	**5,581**	**2,064.0**	**5,581**
Village 4												
Country Estates	-	-	-	-	-	-	-	-	330.1	644	330.1	644
Low Density Residential	-	-	-	-	-	-	-	-	660.2	2,938	660.2	2,938
Medium Density Residential	-	-	-	-	-	-	-	-	264.1	2,496	264.1	2,496
High Density Residential	-	-	-	-	-	-	-	-	66.0	1,254	66.0	1,254
Mixed Use	-	-	-	-	-	-	-	-	129.5	-	129.5	-
Parks	-	-	-	-	-	-	-	-	129.5	-	129.5	-
Open Space	-	-	-	-	-	-	-	-	906.2	-	906.2	-
ROW	-	-	-	-	-	-	-	-	103.6	-	103.6	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,589.0**	**7,332**	**2,589.0**	**7,332**

Table 3-8. Future Incremental Land Use Projections By Development Areas

Development/ Land Use	5-Year		10-Year		15-Year		20-Year		Buildout		Total	
	Acres	DU	Acres	DU	Acres	DU	Acres	DU	Acres	DU	Acres	DU
Village 5												
Country Estates	-	-	149.2	184	298.4	368	261.6	674.3	-	-	709.2	1,227
Low Density Residential	-	153.0	113.1	380	226.3	1,065	230.7	1,091.9	-	-	570.1	2,690
Medium Density Residential	-	269.0	141.8	669	283.5	1,875	16.3	16.8	-	-	441.6	2,830
High Density Residential	-	78.0	13.0	195	26.0	547	29.7	621.1	-	-	68.7	1,441
Mixed Use	-	-	12.3	-	24.7	-	4.4	-	-	-	41.4	-
Commercial	-	-	65.1	-	130.3	-	0.9	-	-	-	196.3	-
Business Professional	-	-	21.7	-	43.3	-	94.9	-	-	-	159.9	-
Parks	-	-	45.7	-	91.4	-	31.6	-	-	-	168.7	-
Open Space	-	-	231.0	-	462.0	-	697.2	-	-	-	1,390.2	-
Public	-	-	17.4	-	34.8	-	66.0	-	-	-	118.2	-
ROW	-	-	50.1	-	100.2	-	214.3	-	-	-	364.6	-
Subtotal	**-**	**500**	**860.4**	**1,428**	**1,720.9**	**3,856**	**1,647.6**	**2,404**	**-**	**-**	**4,228.9**	**8,188**
Village 6												
Country Estates	-	-	-	-	-	-	-	-	129.7	253	129.7	253
Low Density Residential	-	-	-	-	-	-	-	-	700.6	3,118	700.6	3,118
Medium Density Residential	-	-	-	-	-	-	-	-	363.3	3,433	363.3	3,433
High Density Residential	-	-	-	-	-	-	-	-	103.8	1,972	103.8	1,972
Mixed Use	-	-	-	-	-	-	-	-	127.2	-	127.2	-
Parks	-	-	-	-	-	-	-	-	127.2	-	127.2	-
Open Space	-	-	-	-	-	-	-	-	890.4	-	890.4	-
ROW	-	-	-	-	-	-	-	-	101.8	-	101.8	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,544.0**	**8,776**	**2,544.0**	**8,776**
Village 7												
Low Density Residential	25.1	147	84.0	470	68.1	399	-	-	19.9	164	197.1	1,181
Medium Density Residential	57.6	539	60.9	595	33.6	314	-	-	6.3	81	158.4	1,529
High Density Residential	-	-	17.2	334	12.4	241	-	-	-	-	29.6	575
Mixed Use	4.9	-	-	-	-	-	-	-	-	-	4.9	-
Parks	34.1	-	27.3	-	15.8	-	-	-	12.5	-	89.7	-
Public	11.6	-	-	-	-	-	-	-	-	-	11.6	-
Open Space	120.2	-	64.8	-	-	-	-	-	-	-	185.0	-
ROW	7.1	-	11.9	-	7.1	-	-	-	1.1	-	27.1	-
Subtotal	**260.6**	**686**	**266.1**	**1,399**	**137.0**	**955**	**-**	**-**	**39.8**	**245**	**703.4**	**3,285**
SUD-A												
Commercial	-	-	-	-	-	-	-	-	1,814.4	-	1,814.4	-
ROW	-	-	-	-	-	-	-	-	201.6	-	201.6	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2,016.0**	**-**	**2,016.0**	**-**
SUD-B												
Commercial	-	-	35.1	-	34.7	-	-	-	-	-	69.8	-
Low Density Residential	64.2	336	20.1	85	-	-	-	-	-	-	84.3	421
Parks	4.0	-	0.6	-	-	-	-	-	-	-	4.6	-
Open Space	6.7	-	16.1	-	-	-	-	-	-	-	22.8	-
ROW	-	-	16.9	-	-	-	-	-	-	-	16.9	-
Subtotal	**74.9**	**336**	**88.8**	**85**	**34.7**	**-**	**-**	**-**	**-**	**-**	**198.4**	**421**
SUD-C												
Commercial	-	-	-	-	-	-	-	-	926.1	-	926.1	-
ROW	-	-	-	-	-	-	-	-	102.9	-	102.9	-
Subtotal	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1,029.0**	**-**	**1,029.0**	**-**
Total	**1,229.8**	**3,838**	**2,293.1**	**5,460**	**2,162.7**	**5,081**	**1,830.3**	**2,568**	**12,028.5**	**25,970**	**19,544.4**	**42,916**

(a) Buildout includes planned development within City Limits and SOI identified in General Plan 2050.

(b) Projected timing of development based on discussions with the City's Community Development Department.

DU = Dwelling Units

Table 3-8 summarizes the future incremental land use by planned development and infill based on the timing provided by the City. The table identifies the land use type, projected dwelling units and/or acreage, and development timing (i.e., 5-year, 10-year, 15-year, 20-year, or buildout). It should be noted that the Village 1 area is actively under construction for the Esplanade at Turkey Creek and Turkey Creek Estates Developments. Approximately 40 percent of Esplanade and 15 percent of the Turkey Creek Estates residential homes have been constructed. The dwelling units for Village 1 shown in Table 3-8 have been reduced to reflect the remaining units for Esplanade and Turkey Creek Estates.

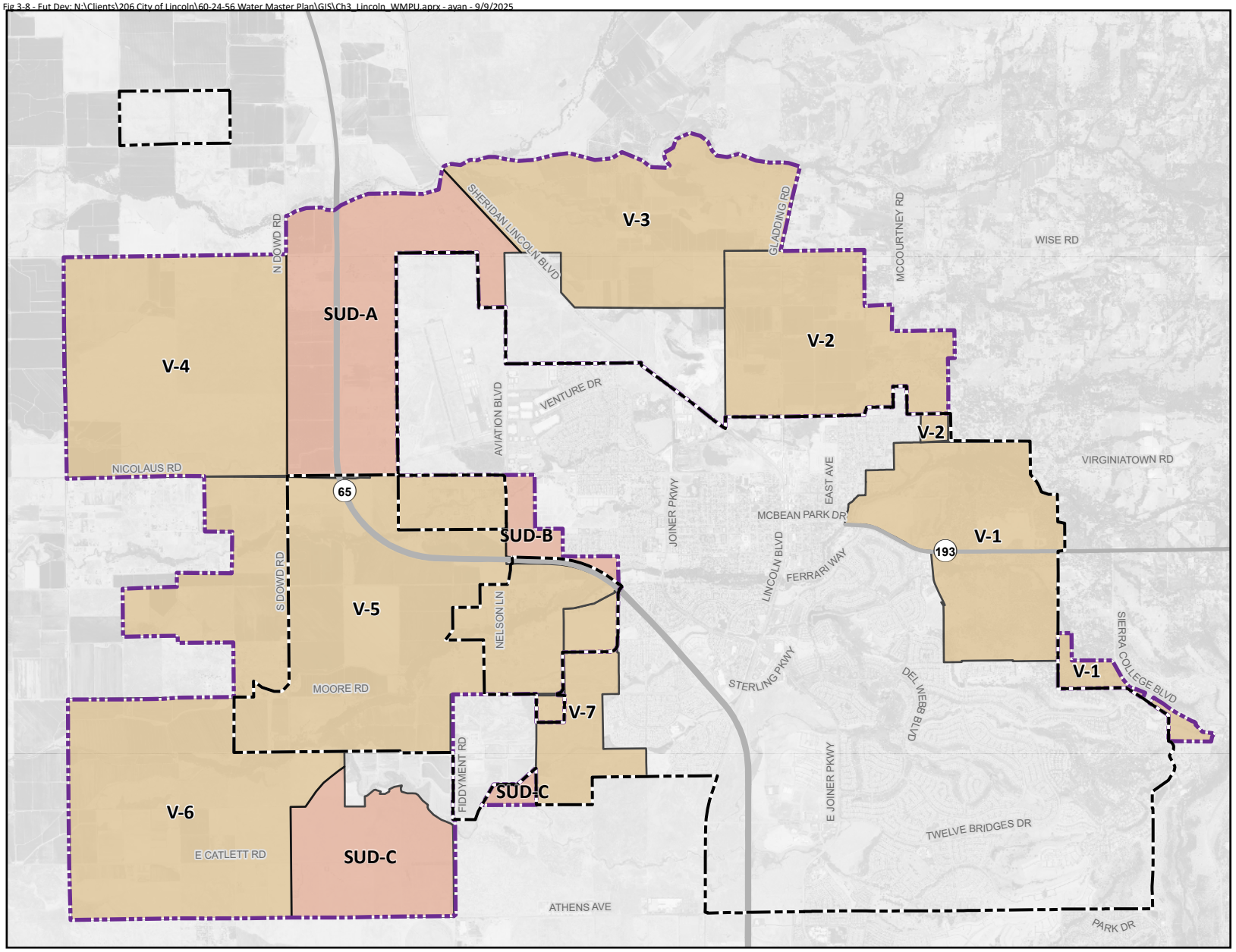
Table 3-9 summarizes the future cumulative planned development by land use designation. It is projected that approximately 16,947 new residential dwelling units will be added in the next 20 years and 42,916 new dwelling units will be added by buildout of the SOI. It is also projected that approximately 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.

Table 3-9. 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

Fig 3-8 - Fut Dev: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch3_Lincoln_WMPU.aprx - ayan - 9/9/2025



City Limit
Sphere Of Influence
Village Boundary
Special Use District

Notes:
1. GIS zoning and land use shapefiles provided by the City of Lincoln in 2025.

Prepared by:

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Prepared for:

City of Lincoln
Water Master Plan Update

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Future Development Areas

Figure 3-8

3.4 WATER USE FACTORS

Since 2019, the COVID pandemic occurred which altered how people work, with many continuing to work remotely from home at least part of the time. In addition, customers have continued to conserve water. These changes have had an impact on water consumption trends within the City's service area.

The City's meter consumption data from 2023 was used to develop the updated water use factors which are documented in a technical memorandum included as Appendix B.

3.4.1 Water Use Factor Development Methodology

Unit water demand factors were developed using 2023 meter data and existing land use information in GIS format. The meter information was filtered to exclude meters which did not represent potable water consumption (i.e., reclaim water, hydrant water, and null). In addition, accounts without a full year's worth of meter reads were excluded from the analysis. The City's meter consumption data was spatially joined to the GIS parcels and land use. Some records were manually linked if the meter was located outside of its respective parcel. The unit water demand factor for each land use designation was calculated by dividing the total metered water consumption by the associated dwelling units or the parcel area per land use for residential and non-residential land uses respectively.

The parcel area calculation did not include streets, and therefore, resulted in "net" unit water use factors. The "net" unit water use factors were adjusted to account for streets so they could be applied to the gross acreage information provided by City staff for future development.[3] The following sections describe the updated unit water use factors by land use designation.

3.4.2 Residential Land Uses

Unit water use factor categories were determined by comparing the existing land use to the General Plan land use designations. Land use with similar usage characteristics were grouped into a single water use factor category (i.e., low density estates and country estates). Residential water use factors were developed in units of acre-feet per dwelling unit per year (af/du/yr).

3.4.3 Non-Residential Land Uses

Non-residential land uses were grouped together based on the similarity of their characteristics (i.e., neighborhood commercial and community commercial). The non-residential water use factors are in units of acre-feet per acre per year (af/ac/yr).

During the development of the non-residential water use factors, existing large industrial users, such as Sierra Pacific Industries, were excluded from the industrial water use factor since they are not representative of future industrial developments planned in the City's General Plan.

[3] The gross acreage within the existing City limits is 15,425 acres, and the net acreage within the City limits assigned to an existing or planned land use is 13,798 acres. Therefore, a factor of 1.12 was used to convert from net acreage to gross acreage.

3.4.4 Recommended Water Use Factors

Table 3-10 summarizes the recommended unit water use factors for the City to use for future water system planning.

Table 3-10. Recommended Unit Water Demand Factors

Water Use Factor	General Plan Land Use Designation(s)	Unit Water Use Factor	
		af/du/yr	af/ac/yr
Residential			
Low Density Estates	Low Density Estates	1.46	--
	Country Estates		
Low Density Residential	Low Density Residential	0.39	--
Medium Density Residential	Medium Density Residential	0.30	--
High Density Residential	High Density Residential	0.18	--
Non-Residential			
Commercial	Neighborhood Commercial	--	1.45
	Community Commercial	--	
Business and Professional	Business and Professional	--	1.15
	Employment Center	--	
Mixed Use[a]	Mixed Use	--	2.00
Industrial	Industrial	--	0.47
	Light Industrial	--	
	Industrial Planned Development	--	
Public Facilities[b]	Public Facilities	--	1.80
Parks and Recreation[b]	Parks and Recreation	--	3.55

(a) The City did not have any Mixed Use consumption during the 2023 year, therefore, it is recommended for the City to continue using the Mixed Use unit water use factor of 2.00 af/ac/yr developed in 2021 as provided in Table 3-10.

(b) The calculated Public Facilities and Parks and Recreation water use factors were significantly lower than the 2021 unit water use factors of 1.80 af/ac/yr and 3.55 af/ac/yr, respectively. To be conservative, it is recommended for the City to continue using the Public Facilities and Parks and Recreation unit use factors developed in 2021 as provided in Table 3-10.

3.5 FUTURE WATER DEMANDS AND REQUIRED WATER PRODUCTION

Water demands were projected for the GP SOI using the recommended water use factors applied to the future proposed developments. Future water production requirements were then estimated by adding the future water demand projections, which include NRW of 10 percent, to the existing baseline production.

3.5.1 Existing Baseline Demand

The average annual water production for the City's water service area in 2023 was used to establish the existing baseline production. The average annual water production in 2023 was 9.0 mgd.

3.5.2 Projected Future Water Demands

Water demands in 5-year increments over the next 20-years and the buildout water system were developed by applying the water use factors to the proposed land uses shown in Table 3-8. Table 3-11 summarizes the projected incremental average daily water demand for each development that represent new demands in the system.

Table 3-11. Projected Average Day Water Demand by Development, mgd[a,b,c]

Development Name	5-Year	10-Year	15-Year	20-Year	Buildout
Vacant – Infill	0.1	0.1	0.1	0.1	0.1
Deer Crossing	0.01	-	-	-	-
Ferrari Pavilion	0.02	-	-	-	-
Joiner Ranch East	0.1	-	-	-	-
Bella Breeze (Commercial)	-	0.1	-	0.1	-
Lincoln Place and Lincoln 14	0.03	-	-	-	-
Lincoln 270	-	0.2	-	-	-
Village 1	0.9	1.2	0.2	0.03	-
Village 2	-	-	-	-	2.0
Village 3	-	-	-	-	2.9
Village 4	-	-	-	-	3.7
Village 5	0.2	1.0	2.2	1.8	-
Village 6	-	-	-	-	3.6
Village 7	0.4	0.5	0.3	-	0.1
SUD-A	-	-	-	-	2.6
SUD-B	0.1	0.1	0.05	-	-
SUD-C	-	-	-	-	1.3
Total	**1.9**	**3.1**	**2.9**	**2.0**	**16.4**

(a) Village 1, Village 5, Village 7, Lincoln 270, and SUD-B have active specific plans. The remaining villages do not have active specific plans but are anticipated to include a mix of land uses described in the General Plan 2050 (March 2008).

(b) SUD-A and SUD-C do not have active specific plans but are anticipated to be Commercial land use described in the General Plan 2050 (March 2008).

(c) Projected ADD includes non-revenue water of 10 percent.

mgd = million gallons per day

3.5.3 Projected Water Production Requirements

Table 3-12 summarizes the total projected water production requirements by the 5-year increments used to develop demands. Based on the projected land use development timing, the ADD will approximately be 18.9 mgd and a total MDD of 35.7 mgd by the 20-year timeframe. The buildout water system will have a total ADD of 35.3 mgd and a total MDD of 66.9 mgd.

Table 3-12. Projected Water Production Requirements[a]

Phase	ADD, mgd	MDD, 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 MDD factor equals 1.9.
(c) Existing demands based on 2023 demands in Table 3-2.
mgd = million gallons per day

CHAPTER 4
Water Supply Analysis

This chapter provides an overview of the City's water supplies which include both surface water supplies and groundwater supplies. The availability and reliability of the City's water supplies are evaluated in the City's 2020 UWMP, which was incorporated into this WMPU. In addition, this chapter includes an integrated supply plan, which is intended to provide recommendations on how to meet the projected future demands (refer to Chapter 3) through a combination of groundwater and surface water supplies.

Key sections of this chapter include:

- Water Supply Overview
- Surface Water Supply
- Groundwater Supply
- Water Supply Plan

4.1 WATER SUPPLY OVERVIEW

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 is 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 NASb.

In future years, the City will continue to rely on these sources to meet the projected demands. Additional production capacity from all sources will be required and is discussed in more detail in the subsequent sections.

4.2 SURFACE WATER SUPPLY

The City does not use any self-supplied surface water. All surface water used by the City is purchased from PCWA and NID as described in this section. The surface water supply is conveyed through PCWA facilities. The PCWA conveyance infrastructure includes the 42-inch diameter Penryn-Lincoln-Sunset pipeline which conveys supply to the points of delivery for the City. The surface water supply enters the City's system at two metering stations. Each metering station has one regulated and one unregulated connection. The regulated connections provide metered flow into the City's distribution system via the City's two 5 MG tanks (the Conspiracy Point Tank No. 1 and the Verdera Tank No. 3). The regulated connections control the rate of flow into the City's main service area to limit flow fluctuations. The unregulated connections provide metered flow into the City's higher elevation pressure zones. Since there are no storage tanks located in the higher elevation pressure zones, the flow is unregulated and based on customer demand patterns.

It is important to note 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. Therefore, raw PCWA or NID water use is not included in this WMPU.

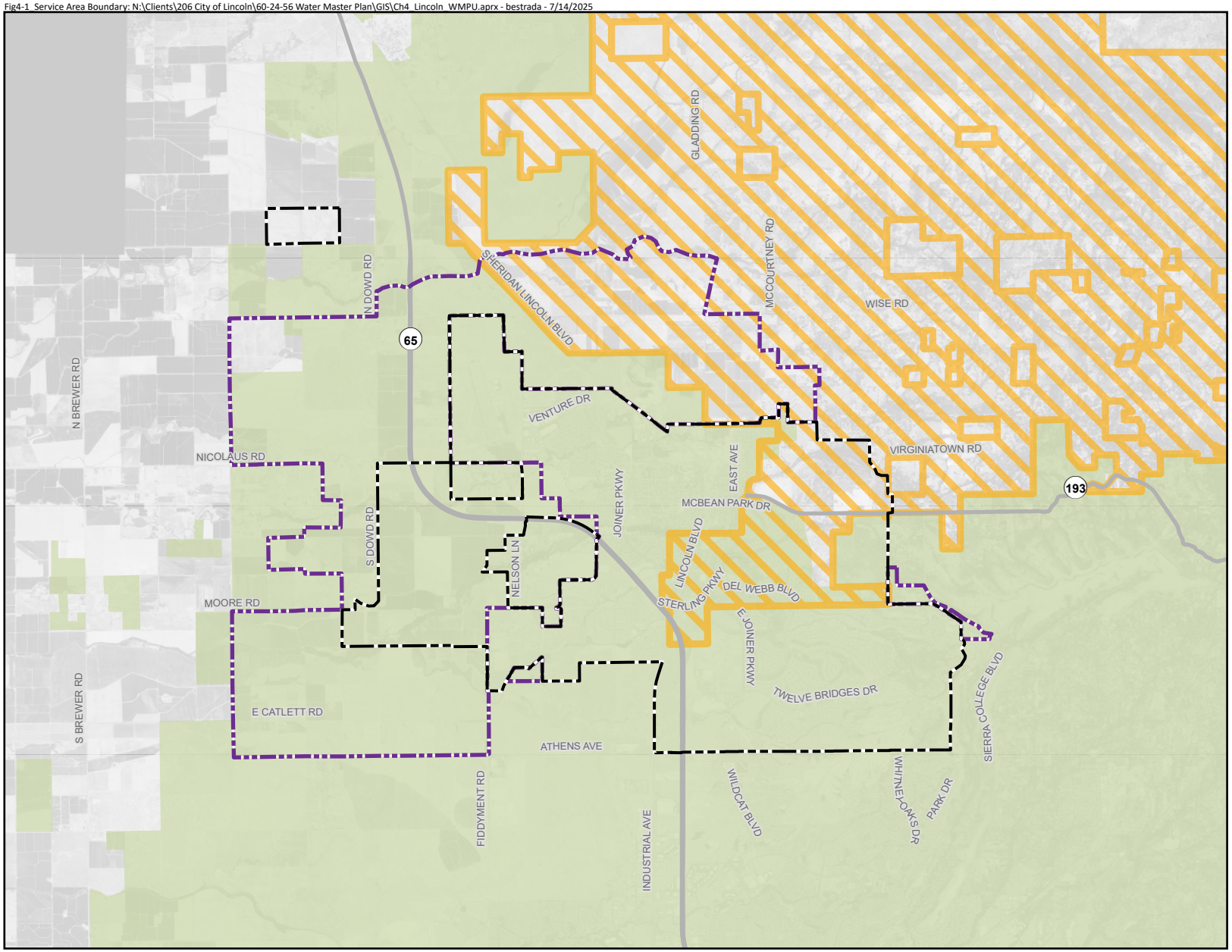
4.2.1 Placer County Water Agency

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 California American Water, 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.

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 covers its entire Western Water System service area and includes the majority of the City's existing limits and SOI (see Figure 4-1).

As discussed in Chapter 2, the City entered a water supply contract with PCWA for delivery of treated surface water in 2012 with a maximum delivery entitlement of 18.5 mgd. In 2021, the City's PCWA maximum delivery entitlement was increased to 18.9 mgd per Facilities Agreement No. 2521. In 2023, the City adopted Resolution 2023-109 which approves a funding agreement between the City and PCWA for the construction of Ophir Water Treatment Plant and additional treated water capacity. PCWA has been planning construction of Ophir Water Treatment Plant for more than a decade to meet the growing needs of treated water in the western side of Placer County. To serve the needs of PCWA and the City, PCWA must construct the first phase of Ophir Water Treatment creating an additional capacity of 10 mgd. The additional treated water capacity is expected to be available to the City starting in Quarter 3 2030. Per the agreement, the City's Partner Capacity cannot exceed 5 mgd and was planned to initiate in 2030 with 0.46 mgd and increase at an estimated 0.46 mgd each year, reaching full capacity in approximately 10 years. Any additional capacity would be made available upon the completion of Phase 2 of the Ophir Water Treatment Plant which is estimated for another 10 mgd. Water supply agreements with PCWA are included in Appendix A.

Fig4-1_Service Area Boundary: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch4_Lincoln_WMPU.aprx - bestrada - 7/14/2025



Nevada Irrigation District Service Area

Placer County Water Agency Zone 6 Service Area

City Limit

Sphere Of Influence

Notes:
1. City boundaries shown based on GIS data provided by the City in 2025.

Prepared by:

WEST YOST

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Prepared for:

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Service Area Boundary

Figure 4-1

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 – 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 4-1 outlines the allotted maximum supply from each surface water source. These supplies are more fully described in PCWA's 2020 UWMP.

Table 4-1. PCWA Surface Water Supply Summary

Supply	Source	Water Right or Contracted Volume
Middle Fork Project	American River	120,000 AFY
CVP 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 All other pre-1914 rights not currently exercised Total estimated yield of 3,400 AFY

Source: Table 6-2 from City's 2020 Urban Water Management Plan.

AFY = Acre Feet Per Year

It should be noted that during the preparation of PCWA's 2020 UWMP, PCWA coordinated with the City for the City's water demand projections. As discussed in Chapter 4 of the PCWA 2020 UWMP, the City provided a 20-year demand forecast but did not provide a buildout forecast; therefore, PCWA used the City's 2017 WMP, which anticipates the City's total potential buildout water use to be around 35,986 AFY (32 mgd).[1] The PCWA 2020 UWMP further states that "while some of this demand may be met with other Lincoln water assets under some circumstances, Lincoln primarily plans for this demand to be served by PCWA supplies" (PCWA 2020 UWMP).

However, at the time of this WMPU, no agreements are in place between the City and PCWA to increase the City's maximum delivery entitlement to the approximate 32 mgd identified in the PCWA 2020 UWMP.

[1] Water Systems Consulting, Inc. June 2021. *Placer County Water Agency 2020 Urban Water Management Plan*. Section 4.2.1.3 Western Area Treated Wholesale Water Use.

Additional agreements between the City and PCWA, as well as potential modifications and/or expansions to PCWA metering stations, would be required to provide this additional supply capacity. Therefore, for planning purposes of this WMPU, future PCWA supply assumptions are based on the existing agreements in effect at the time of preparation, as described above in this section.

As demonstrated in Chapter 4 of the PCWA 2020 UWMP, 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.

4.2.2 Nevada Irrigation District

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 (see Figure 4-1).

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. Additionally, per 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. The City entered the Temporary Agreement between the City, PCWA, and NID in 2004. The Temporary Agreement entitles the City to receive NID raw water supply to serve City customers within NID's service area in 2004, but it does not specify an amount of water to be supplied by NID to the City. The water supply agreement with NID is included in Appendix A.

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 watershed 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 4-2 provides a summary of NID surface water supplies as documented in NID's 2020 UWMP.

Table 4-2. 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	144,000 AFY
	Total	**384,500 AFY**
Source: Table 6-3 from City's 2020 Urban Water Management Plan.		

Per the Temporary Agreement, NID agreed to sell PCWA raw water that would be delivered to PCWA's treatment plants. PCWA would treat and deliver equivalent quantities of water to the City, less losses, for distribution for the City's customers that are within the boundaries of NID. Although the water supply agreement between NID and the City is still active, the City is currently not using any NID supply. NID raw supply cost has exceeded the cost of PCWA's alternative water supplies, thus PCWA has not been purchasing raw water from NID. However, the City recognizes the value of the Pre-1914 water rights and endeavors to retain access to the water supply whether directly or indirectly through PCWA. The City, PCWA, and NID plan to revisit the Temporary Agreement for an update within the next five years.

4.3 GROUNDWATER SUPPLY

As discussed in Chapter 2, 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 and provide water supply resiliency when PCWA supplies are limited. Use of the groundwater wells may increase during dry years when available surface water supplies may be limited.

The City's current annual demands are met by approximately 90 percent surface water and the remaining 10 percent through groundwater.[2] 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. 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.

4.3.1 Groundwater Basin Description

The groundwater basin underlying the City is the NASb of the Sacramento Valley Groundwater Basin (5-21.64). 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 4-2 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 California DWR Bulletin 118. These formations include an unconfined aquifer system consisting of alluvial material occupying the upper 200 to 300 feet below ground surface,

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

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 NASb is not an adjudicated basin and 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.

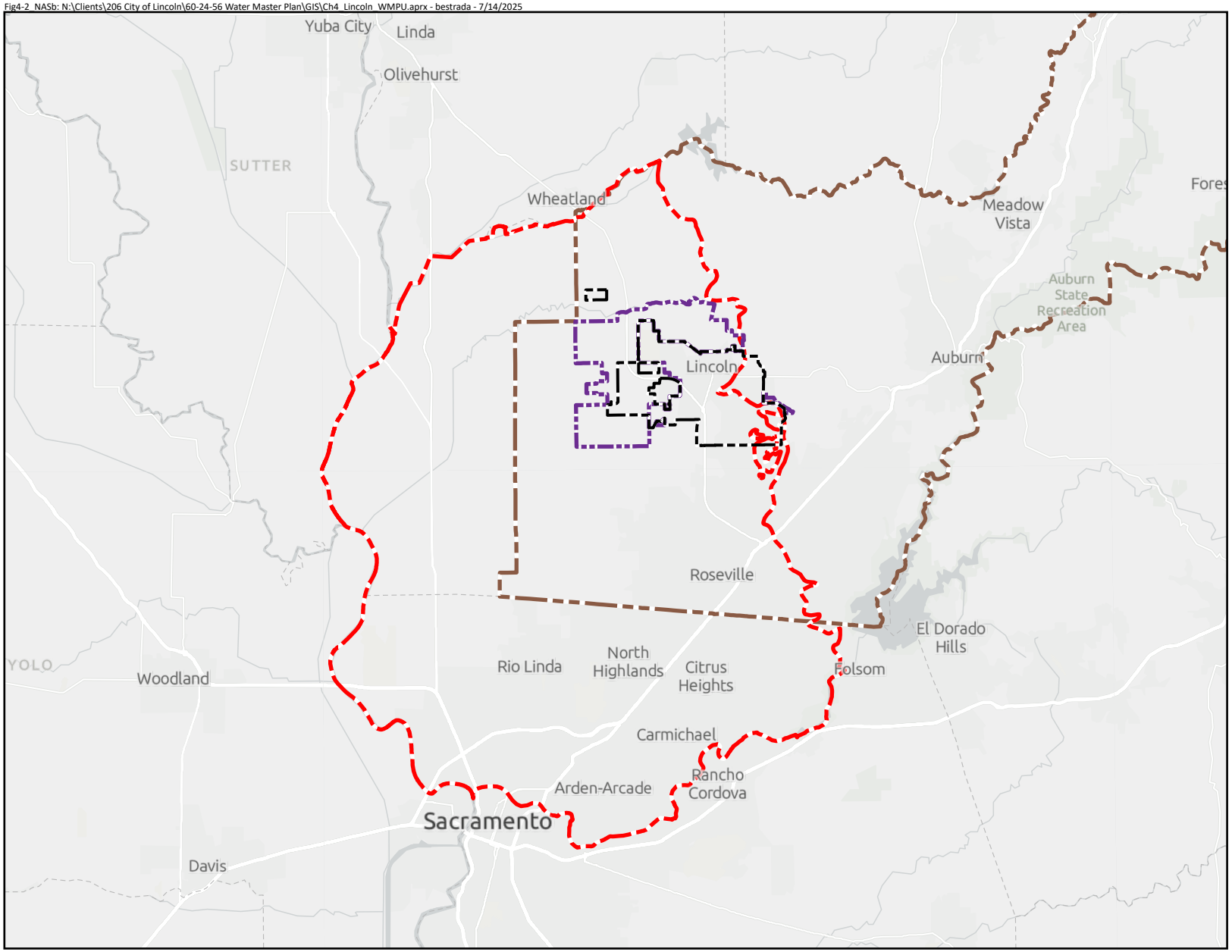
4.3.1.1 Groundwater Basin Conditions

The NASb can be divided into three areas (Eastern, Central, and Western) based on differences in groundwater conditions.[3] The City is located within Eastern Area which extends from the Placer County limits in the north to the City of Citrus Heights in the south. Due to the availability of surface water as a supply source for urban areas in the Eastern Area, groundwater levels are generally stable. In 2012, an aquifer water level depression was identified near the City which currently still exists. The depression varies in depth seasonally by about 5 to 10 feet.[4] Land subsidence is negligible and sea water intrusion is unlikely to occur in all areas of the NASb. The City, as a member of the Western Placer Groundwater Sustainability Agency, is closely monitoring groundwater levels to maintain sustainable conjunctive-use practices and protect aquifer health as described in more detail in the following section.

[3] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 5: Groundwater Conditions.

[4] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 5.2.3 Eastern Area.

Fig4-2_NASb: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch4_Lincoln_WMPU.aprx - bestrada - 7/14/2025



North American Subbasin
Placer County
City Limit
Sphere Of Influence

Notes:
1. City boundaries shown based on GIS data provided by the City in 2025.

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Sacramento Valley Groundwater Basin
North American Subbasin
Figure 4-2

Generally, the quality of groundwater in the NASb is suitable for nearly all uses, with the exception of contamination plumes and localized quality issues.[5] In the Eastern Area, boron and total dissolved solids (TDS) levels were elevated in some locations near Sheridan, the City, and the City of Roseville.[6] However, the TDS levels in the Eastern Area are generally stable or decreasing. Nitrate concentrations are trending upward in many areas of the NASb but remain below the maximum contaminant level (MCL) for drinking water standards.

4.3.1.2 Groundwater Management

The management of NASb groundwater resources is discussed below.

4.3.1.2.1 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 California American Water 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 acre-feet per year (AFY), 95,000 AFY of which was assigned to Placer County water users in the WPCGMP.

4.3.1.2.2 Sustainable Groundwater Management Act

In September 2014, the California Legislature passed the SGMA, which required local agencies to form a GSA and adopt and implement a GSP to achieve the sustainable management of groundwater basins over a 20-year time frame. The SGMA also required any agencies within medium and high priority basins to prepare GSPs by January 2022. The NASb was ranked as a high priority basin, and therefore, required the preparation of the NASb GSP, further discussed in the section below.

4.3.1.2.3 North American Subbasin Groundwater Sustainability Plan

Since 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 California American Water. In compliance with the SGMA, the five GSAs collaborated to develop the NASb GSP which was completed in December 2021 and approved by the State in July 2023. The focus of the NASb GSP is to identify required actions to maintain a safe, sustainable and high-quality

[5] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 5.8: Groundwater Quality.

[6] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 5.8.1 Occurrence of Commonly Evaluated Constituents in Groundwater.

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.

Section 6 of the NASb discusses the development of water budgets for historical, current, and future (including and excluding climate change) conditions of the NASb. Table 4-3 summarizes the average annual estimated change in groundwater storage under each of these conditions. As shown in Table 4-3, the NASb has a surplus of groundwater storage for all conditions except for the future condition with climate change. With climate change, the NASb is estimated to have a future storage deficit of about 3,500 AFY. The total sustainable yield of the NASb was estimated to be 336,000 AFY and the NASb is currently under its estimated sustainable yield by more than 10 percent.[7]

Table 4-3. Estimated Groundwater Change in Storage

Groundwater Model Baseline Condition	Average Annual Groundwater Storage Change, acre-feet
Historical (Water Years 2009 through 2018)	31,000
Current (Water Years 1970 through 2019)	14,900
Projected Future Demands over 50 years (using 1970 - 2019 hydrology)	5,400
Projected Future Demands over 50 years with Climate Change (using 1970 - 2019 hydrology)	(3,500)

Source: From Table ES-1 of the 2021 North American Subbasin Groundwater Sustainability Plan.

Section 9 of the NASb GSP identifies two projects and five management actions to help reach the NASb sustainability goal.[8] The only project that directly involves the City is the Regional Conjunctive Use Expansion Project. As summarized from Section 9.2 of the NASb GSP, the Regional Conjunctive Use Expansion Project will provide additional surface water during wet years to reduce existing demand on groundwater through the reoperation of existing water treatment and distribution facilities. Agencies expected to participate by altering their groundwater extraction patterns to increase conjunctive use include California American Water, Citrus Heights Water District, City of Lincoln, City of Sacramento, Golden State Water Company, Rio Linda/Elverta Community Water District, Sacramento County Water Agency, and Sacramento Suburban Water District.

The following descriptions of the five management actions are taken directly from Section ES 9 of the NASb GSP.[9]

1. Continue development of the Sacramento Regional Water Bank, which will expand conjunctive use to further ensure basin sustainability.

[7] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 6 Water Budgets.

[8] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section 9 Projects and Management Programs.

[9] GEI Consultants. December 2021. *North American Subbasin Groundwater Sustainability Plan.* Section ES 9 Projects and Management Actions.

2. Explore potential revisions to Placer, Sacramento, and Sutter counties' and the City of Roseville's well permitting programs to assess whether the permitting ordinances can be improved to be more protective of domestic wells, groundwater dependent ecosystems (GDEs) and interconnected surface water, along with reducing potential impacts to designated representative wells.
3. Proactively coordinate with land use agencies on their development of plans and approvals of new developments, to improve communications with the agencies and inform them of findings of the NASb GSP, annual report findings, and whether groundwater can be relied upon for future growth without causing undesirable results.
4. Improve data collection and communication with domestic and other shallow well owners to protect these beneficial users of groundwater in the NASb.
5. Continue monitoring and assessment of the NASb's GDEs to better understand these ecosystems to help protect them.

4.3.2 Historical Groundwater Use

Historically, the City relied upon significant quantities of groundwater to meet demands but has since transitioned to proactive conjunctive use practices including 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. For the foreseeable future, availability of surface water supplies from PCWA will continue to be utilized as the City's primary water supply, and the City will continue to invest in its groundwater supplies to increase water supply resiliency and meet peak demands including fire protection while continuing to explore water supply alternatives.

As discussed in Chapter 3, average annual groundwater use over the last 5 years was approximately 123 MG, or 4 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 and/or limitations of available surface water supply. Therefore, the City's future supply criteria include development of adequate groundwater capacity to meet up to 50 percent of a maximum day demand to improve supply redundancy and reliability. As the City continues to grow, the City will endeavor to explore feasible opportunities to increase surface water supplies from PCWA and/or perfect the NID raw water supply for beneficial use and additional water supply resiliency potentially providing further diversification of its water supply portfolio.

4.4 WATER SUPPLY PLAN

This section compares available supplies with projected water demands (summarizing supply capacity and demand assumptions used for the analysis) and presents a recommended supply plan, so that the City can reliably meet the projected future demands. Appendix C provides a system servicing plan with a more detailed comparison of projected demands and supply recommendations based on the phased planned growth.

4.4.1 Existing Supply Production Capacity

The City's water supplies are introduced into the City's water distribution system via two metering stations from PCWA and five groundwater wells. Table 4-4 summarizes the existing capacity available through water rights agreements with PCWA and groundwater.

Table 4-4. Existing Supply Capacity for the City of Lincoln	
Supply Source	Capacity, mgd
Surface Water	19.0
Groundwater Total (Firm)[(a)]	8.1 (5.9)
Total (Firm)	**27.1 (24.9)**
(a) Firm groundwater capacity assumes the largest well is out of service.	

Based on the existing capacity of supply sources, the City has adequate supplies to meet the existing maximum day demand of 16.9 mgd.

4.4.2 Potential Future Supply Sources

As discussed in Chapter 3, the City is experiencing rapid growth, and the planned developments result in increased demands which will require new water resources be developed. The City's ultimate plan is to continue to rely on surface water for 90 percent of the annual demand but also develop enough groundwater supply to meet 50 percent of maximum day demand for planning purposes. However, it should be noted the City does recognize alternative additional surface water supplies, to the extent feasible, would complement and potentially offset the magnitude of future reliance on groundwater.

To meet future demands and improve supply reliability, the City is exploring other supply sources, including:

- Aquifer Storage and Recovery Wells
- Groundwater Recharge
- Recycled Water

4.4.2.1 Aquifer Storage and Recovery Wells

To meet future demands, the construction of new groundwater wells is necessary. To mitigate potential impacts on the groundwater basin, the City intends to equip a strategic subset of future wells with aquifer storage and recovery (ASR) capability.

ASR is a water management strategy that involves the injection of treated surface water into a suitable aquifer during times when surplus water is available, typically winter months when demands are low. The stored water can then be recovered and used for potable supply during periods of high demand, such as the summer or for emergency conditions.

4.4.2.2 Groundwater Recharge

In addition to ASR, the City is working with other agencies that rely on NASb to develop potential groundwater recharge to help ensure a sustainable groundwater basin for all users. The West Placer Groundwater Sustainability Agency (WPGSA) has been leading the effort to regionally determine recharge projects that will benefit groundwater users of the basin which includes the City.

WPGSA completed a groundwater recharge site feasibility study in 2023[10]. The study helped to identify multiple sites throughout western Placer County that would be suitable for groundwater recharge and develop criteria to rank the priority of potential projects. Locations identified include potential sites within the City's existing city limits as well as the sphere of influence. Since potential sites have now been identified, the next step is to perform field investigation and testing to further evaluate whether implementation of recharge is viable.

4.4.2.3 Recycled Water

Wastewater flows from the City are treated at the Lincoln-Sewer Maintenance District 1 Wastewater Authority (LiSWA) wastewater treatment and reclamation facility (WWTRF). The WWTRF produces Title 22 recycled water that is used for agricultural use at reclamation areas outside the existing City limits and for irrigation and industrial use within the City's limits.

The City is interested in expanding the municipal use of recycled water. As part of the on-going Village 5 planning, a reclaimed water system is being considered to serve irrigation demands. Backbone recycled water pipeline infrastructure is included in Village 5 master planning and needs to be reconciled with the City's Reclaimed Water Master Plan completed in 2019.[11]

For this WMPU, it is assumed that future parks and landscape corridors will be irrigated with potable water and not recycled water. Therefore, if the City does develop recycled water for irrigation in new developments, the future potable water demands could potentially be partially offset by the recycled water.

4.4.3 Projected Water Demands

Chapter 3 summarizes demand projections for the City's system (refer to Table 3-11). Unit water use factors, developed from historical water use data, were used to estimate the future water use. Maximum day demands were calculated as 1.9 times the average daily demand, using the peaking factor adopted for this update. Maximum day demand is estimated at 35.7 mgd in the 20-year planning timeframe and 66.9 mgd by buildout of the entire sphere of influence.

[10] GEI Consultants. March 2023. *Groundwater Recharge Site Feasibility Evaluations West Placer County, California*

[11] Stantec. December 2019. *City of Lincoln - Reclamation Master Plan*

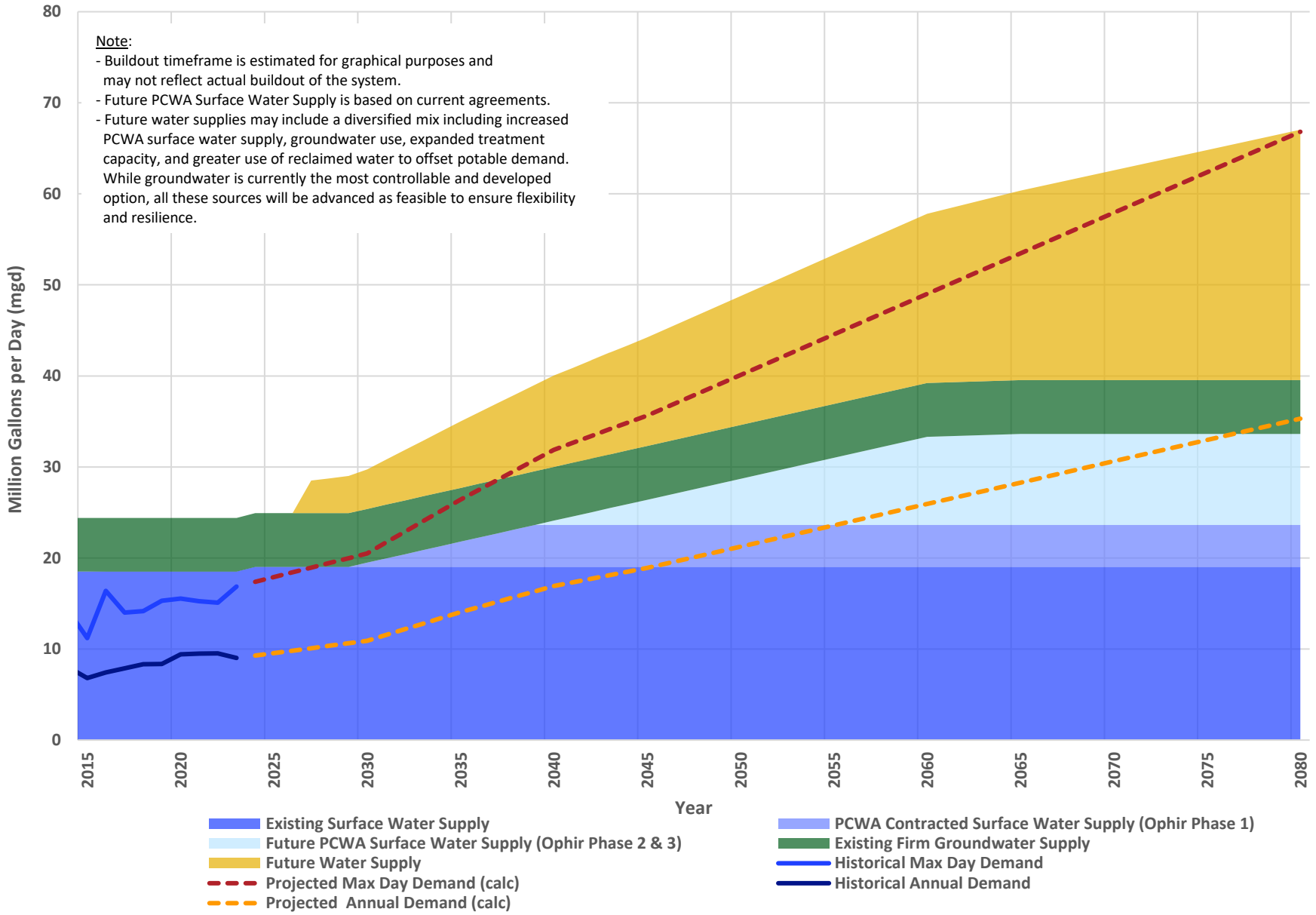
4.4.4 Comparison of Supply Production Capacity and Demands

Figure 4-3 compares historical and projected water demands with the City's surface water and firm groundwater production capacities. As discussed in Section 4.2.1, 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 developing adequate groundwater 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 construct a new well approximately every 4 to 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 will also evaluate opportunities for groundwater use, including recharge and ASR, to ensure that impacts to the groundwater basin remain sustainable.

Figure 4-3. Projected Supply and Demand Comparison



CHAPTER 5
System Performance Criteria

The purpose of this chapter is to define the recommended performance and operational criteria for the City's water distribution system. These criteria include required fire flow, pump station capacity, system storage capacity (including operational, fire flow, and emergency storage components), minimum and maximum system pressures, and maximum pipeline velocity and head loss.

Table 5-1 summarizes the recommended criteria, and the following sections of this chapter present the recommended performance and operational criteria for sizing the City's water system:

- General Water System Guidelines
- Water System Performance
- Facility Sizing Criteria

5.1 GENERAL WATER SYSTEM GUIDELINES

Before discussing specific water system evaluation criteria, it is helpful to provide some general guidelines that a water system should follow. This section identifies requirements for a reliable water system that delivers high quality water.

5.1.1 Water System Reliability

Attention to enhancing the reliability of the system under all conditions is an important part of maintaining high quality water service. Water system reliability is achieved through a number of system features including: (1) appropriately sized storage facilities; (2) redundant or "firm" pumping capacity, transmission/distribution, and supply facilities where required; and (3) alternative power supplies. Reliability and water quality are also improved by designing looped water distribution pipelines and avoiding dead-end distribution pipelines whenever possible. Looping pipeline configurations reduces the potential for stagnant water and the associated problems of poor taste and low chlorine residuals. In addition, proper valve placement is also necessary to maintain reliable and flexible system operation under both normal and emergency operating conditions.

5.1.2 Water Quality Standards

Water quality standards largely pertain to protecting public health and consistently delivering a satisfactory product to the customer. The United States Environmental Protection Agency (EPA) and the SWRCB Division of Drinking Water (DDW) are the agencies responsible for establishing water quality standards. The EPA and the DDW prescribe regulations that limit the amount of certain contaminants in the water provided by a public water system. The City, as a water purveyor, is responsible for ensuring that the applicable water quality standards and regulations are met at all times.

Table 5-1. Summary of Recommended Water System Performance and Operational Criteria

Component	Criteria	Remarks / Issues
Fire Flow Requirements		
Country Estates	1,500 gpm	Fire flows are for planning purposes and are based on the 2022 California Fire Code (CFC) and the City of Lincoln Design Standards. Actual requirements are established by the City of Lincoln Fire Department. The Fire Department will conform to the 2022 CFC's recommendations for fire flow durations.
Low-Density Residential	1,500 gpm	
Medium Density Residential	3,000 gpm	
High Density/Multi-Family Residential	3,000 gpm	
Commercial	3,000 gpm	
Schools	4,000 gpm	
Other[(a)]	4,000 gpm	
Firm Capacity		
Firm Placer County Water Agency (PCWA) Capacity	Defined as City's maximum delivery entitlement of 18.9 mgd as identified in the City's agreement with PCWA.	
Firm Booster Pump Station Capacity	Defined as total booster pump station capacity with the largest pump offline at each station.	The City's future water system is expected to include installation of new at-grade pump stations at future storage tanks.
Firm Groundwater Well Capacity	Defined as 50 percent of maximum day demand for buildout system.	The City will require new wells to have aquifer storage and recovery (ASR) capability.
Supply Capacity		
Water Supply Capacity	Provide firm supply capacity equal to maximum day demand.	Met through a combination of purchased water and groundwater with wells operating at firm capacity.
Pumping Capacity Sizing		
Pumping Capacity	- **Zones with Gravity Storage** must provide firm pumping capacity or gravity supply capacity that is sufficient to meet maximum day demand. Fire flows should be provided from storage. - **Zones without Gravity Storage** must provide firm pumping capacity equal to the larger of either (1) the maximum day demand plus fire flow, or (2) the peak hour demand.	
Backup Power	Equal to the firm capacity of the pumping facility.	Plug-in adaptor at pumping location with available portable generator.
Storage Capacity Sizing		
Operational	Equal to 25 percent of maximum day demand	
Fire	Equal to the largest fire flow requirement in pressure zone multiplied by the CFC's recommended duration.	Varies depending on land use and associated fire flow requirement in a given pressure zone.
Emergency	Equal to 60 percent of maximum day demand.	
Emergency Groundwater Credit (EGWC)	Equal to the 80 percent of maximum day demand.	The 375 Pressure Zone is the only pressure zone that receives groundwater supply. The emergency storage for the 375 Pressure Zone is assumed to be met by EGWC, and its associated tanks will provide emergency storage to the upper pressure zones.
Storage Facility Capacity	Operational + Fire + Emergency - EGWC	Storage capacity should be evaluated by pressure zone.
Distribution and Transmission Pipeline Sizing		
Normal Operating Conditions		Criteria based on requirements for new development. Existing distribution mains will be evaluated on a case-by-case basis.
Maximum Pressure [psi]	120[(b)]	
Minimum Pressure (Maximum Day Demand) [psi]	50	
Minimum Pressure (Peak Hour Demand) [psi]	40	
Maximum Velocity [ft/sec]	7	
Maximum Head loss (Maximum Day and Peak Hour Demand) [ft/1000 ft]	3	
Fire Flow Conditions		
Minimum Pressure [psi]	20	
Maximum Velocity [ft/sec]	10	

(a) Other includes industrial areas and other individual high value buildings.
(b) Per California Plumbing Code, an individual PRV must be installed on the service line if service pressure is greater than 80 psi.

5.2 WATER SYSTEM PERFORMANCE CRITERIA

This section describes the recommended water system performance criteria for system supply capacity, fire flows, and distribution system pressures.

5.2.1 Water System Supply Capacity

Under normal (i.e., non-emergency) demand conditions, the City must have a firm supply capacity capable of meeting maximum day demand under existing and future conditions. Adopted peaking factors for maximum day and peak hour demands are discussed in Chapter 3.

The following definitions of firm capacity will be used when considering the City's water supply:

- **Firm PCWA Capacity:** Firm water supply from PCWA will be assumed to be the City's maximum delivery entitlement of 18.9 mgd as identified in the City's agreement with PCWA (Appendix A).
- **Firm Groundwater Capacity:** Firm groundwater supply will be assumed to be the City's ultimate plan of developing enough groundwater to meet 50 percent of maximum day demand. The City will require new wells to have ASR capability.

It should be noted that storage facilities are intended to help balance supplies and demands during peak use and emergency conditions but are not considered a supply source to meet maximum day demand requirements.

5.2.2 Fire Flow Requirements

The City of Lincoln Fire Department (Fire Department) is focused on the availability of adequate water supply during fire activity within its service area. The City is responsible for water supply and distribution, while the Fire Department establishes minimum water flows required for firefighting purposes.

The Fire Department conforms to the 2025 California Fire Code (CFC) to establish the minimum fire flows and durations for specific buildings. The CFC also establishes the minimum residual pressure of 20 pounds per square inch (psi) required within a water system during a fire flow condition.

The City's water system should concurrently meet maximum day demands during a fire flow event and maintain at least 20 psi residual pressure for all customer service locations in the distribution system. Fire flows and the expected duration are also used to establish storage requirements.

The Fire Department is responsible for setting and enforcing fire flow requirements as future developments are approved. However, for planning purposes, the minimum recommended fire flow requirements are generalized based on land use type, as shown in Table 5-2, since actual future building types and/or design details are not yet known. The Lincoln Municipal Code (Title 15 – Buildings and Construction, Section 15.04.170) specifies additional requirements for automatic sprinkler systems to be installed for all new construction including residential structures and buildings that undergo a substantial improvement and/or change of occupancy classification. Therefore, the minimum recommended fire flow criteria that have been established assume new buildings are equipped with automatic sprinkler systems; buildings without sprinklers will require higher fire flow requirements.

Table 5-2. City of Lincoln Recommended Fire Flow Planning Criteria[a,b]	
Land Use Category	Fire Flow, gpm
Country Estates (1-2.9 du/ac)	1,500
Low-Density Residential (3-5.9 du/ac)	1,500
Medium Density Residential (6-12.9 du/ac)	3,000
High Density/Multi-Family Residential (13-20 du/ac)	3,000
Commercial	3,000
Schools	4,000
Other[c]	4,000

(a) Fire flow requirements assume new buildings are fully equipped with automatic sprinkler systems per the Lincoln Municipal Code (Title 15 – Buildings and Construction, Section 15.04.170).
(b) The City of Lincoln Fire Department will conform to the 2022 CFC's recommendations for fire flow durations.
(c) Other includes industrial areas and other individual high value buildings.
gpm = gallons per minute

5.2.3 Distribution System Pressure

Adequate system pressure is a basic indicator of acceptable water distribution system performance. The recommended performance standards for system pressures are summarized in Table 5-1.

These performance standards are applied to all areas that fall within the normal customer service elevation ranges for each pressure zone. Customers outside of the normal service elevation ranges may require an individual pressure regulator or pump.

5.3 FACILITY SIZING CRITERIA

This section describes the recommended criteria governing the size of water facilities within the City's service area, including pump stations, backup power, storage facilities, and pipelines.

5.3.1 Pump Station Capacity and Backup Power

The City's only BPS is the Catta Verdera BPS which only operates during times of peak demand to provide supplemental supply. The City may potentially install new at-grade pump stations at new storage tanks to meet future demands. Sufficient water system pumping capacity should be provided to meet demands of the pressure zone under the conditions listed below. Pump stations in a pressure zone must be sized to serve other pressure zone(s) dependent upon them for supply.

- **Pressure Zones with Storage** must provide firm pumping capacity or gravity supply capacity equal to the maximum day demand. Fire flows should be provided from storage.
- **Pressure Zones without Storage** must provide firm pumping capacity equal to the larger of either (1) the maximum day demand plus fire flow, or (2) the peak hour demand.

Firm pump station capacity assumes total pump station capacity with the largest pump out of service at each pump station. These conservative assumptions ensure the reliability and flexibility of the system to provide sufficient pumping capacity during peak demand conditions.

5.3.1.1 Critical Supply and Pumping Facilities

Critical pumping facilities are defined as those facilities that provide service to a pressure zone(s) without sufficient emergency storage (see Section 5.3.2.3) and that meet one of the following criteria:

- The largest pumping facility that provides water to a particular pressure zone and/or water service area
- A pumping facility that provides the sole source of water to single or multiple water pressure zones
- A pumping facility that provides water from key groundwater supply wells (determined based on capacity, water quality and location)
- All tank pump stations

All critical pumping facilities should be equipped with an on-site, back-up power generator. At less critical facilities, a plug-in adapter and transfer switch can be used to allow interconnection to a generator appropriately permitted (i.e., mobile or stationary) with the State, which will be brought to the site by City staff during a prolonged power outage. In addition, sites without permanent generators should be configured to have hook ups for portable generators.

5.3.2 Storage Facility Capacity Criteria

The total water storage capacity required for each pressure zone is based on the following three major components:

- Operational Storage
- Fire Flow Storage
- Emergency Storage

A discussion of these three storage components, along with a discussion of "credits" for groundwater supply available within each zone is discussed below. Also described are potential operational strategies for the City's storage facilities based on seasonal water demand patterns (i.e., winter vs. summer) to help optimize system operations by facilitating tank turnover to minimize water quality issues (e.g., stale water, loss of disinfectant residual).

5.3.2.1 Operational Storage

Operational storage is defined as the amount of stored water needed to meet peak demands in excess of normal supply delivery. Since water supplies are generally designed to meet maximum day demands, operational storage is typically used to supply peak demands (e.g., the difference between peak hour and maximum day demand). Supplies replenish operational storage during periods of lower demand.

In accordance with American Water Works Association (AWWA) guidelines,[1] it is recommended the City plans for an operational storage volume equivalent to 25 percent of the maximum day demand.[2]

5.3.2.2 Fire Flow Storage

Fire storage is the volume of water reserved for fire suppression. As discussed in Section 5.2.1, fire flow requirements are based on generalized land uses. Required fire flow for each pressure zone is calculated using the land uses within the zone and the largest associated fire flow requirement shown in Table 5-2. The fire storage volume requirement for each zone is determined by multiplying the required fire flow rate by the 2022 CFC's required duration time.

5.3.2.3 Emergency Storage

Emergency storage helps meet demands during an unforeseen or unplanned event that may degrade the quality or quantity of potable water supplies available to serve customers. There are three types of emergency events that a water utility typically prepares for:

- **Minor emergency.** A fairly routine, normal, or localized event that affects a few customers, such as a pipeline break, malfunctioning valve, hydrant break, or a brief power loss. Utilities plan for minor emergencies and typically have staff and materials available to address them.
- **Major emergency.** A disaster that affects an entire, or large, portion of a water system, lowers the quantity and quality of the water, or places the health and safety of the community at risk. Examples include water treatment plant failures, raw water contamination, and/or major power grid outages. Water utilities infrequently experience major emergencies.[3]
- **Natural disaster**. A disaster caused by natural forces or events that create water utility emergencies. Examples include earthquakes, forest or brush fires, hurricanes, tornados or high winds, floods, and other severe weather conditions such as freezing or drought that damage or cause water system facilities to not be able to operate.

Determination of the required volume of emergency storage is a system-specific policy decision based on the assessment of the risk of failures and the desired degree of system reliability. The amount of required emergency storage is a function of several factors including the diversity of the supply sources, redundancy and reliability of the production facilities, and the anticipated length of the emergency outage. In developing an emergency storage requirement for the City, typical industry standards were used.

[1] AWWA Manual M32, Distribution Network Analysis for Water Utilities (AWWA, 2012) states that for large systems, the equalizing storage requirement is typically 15 to 20 percent of the total maximum day demand over a 24- hour period, but equalizing storage could exceed 30 percent for small service areas or arid climates (page 116). The AWWA Water Distribution Handbook (AWWA, 2000) (Section 3.2.2.2 Storage) states that the volume of operational storage required is a function of the diurnal demand fluctuation in a community and is commonly estimated at 25 percent of the total maximum day demand.

[2] Tully & Young. April 2017. *City of Lincoln 2017 Water Master Plan*. Section 9.5.2 Storage.

[3] In 2024 and 2025, supply from PCWA was impacted by damage to PG&E Spaulding Powerhouses No. 1 and No. 2. The impacts forced PCWA customers to reduce the supply they received. For the City, this meant they needed to rely on groundwater pumping to meet demands.

The AWWA states that no formula exists for determining the amount of emergency storage required, and that the decision will be made by the utility based on a judgement about the perceived vulnerability of the system. The City requires an emergency storage volume equivalent to 60 percent of maximum day demand.

5.3.2.4 Emergency Groundwater Storage Credit

Based on the available City groundwater wells, an emergency groundwater credit (EGWC) can account for a portion of the recommended emergency storage. The following must be true to use the groundwater supply to offset the need to provide surface storage:

- Groundwater supply is of potable water quality and can be reliably accessed (i.e., wells are equipped with an on-site emergency generator or a plug-in adapter and transfer switch).
- Groundwater supply is not already being relied upon to meet the City's average day demand requirements.
- Sufficient water distribution facilities are available to distribute this water to demand areas.

It will be assumed that only the firm groundwater supply will be available for an emergency groundwater storage credit to offset the City's emergency storage requirement (i.e., 80 percent of maximum day demand); however, the EGWC cannot exceed the emergency storage requirement. EGWC is only applicable to pressure zones with available groundwater supply (i.e., the 375 Zone).

5.3.2.5 Total Storage Capacity Recommended

The recommended City potable water storage capacity should be determined using the following formula, with each component defined below:

Total Recommended Storage Capacity = Operational + Fire Flow + Emergency – Emergency Groundwater Storage Credit

- **Operational**: Volume of water necessary to meet diurnal peaks observed throughout the day, assumed to be equivalent to 25 percent of the maximum day demand.
- **Fire Flow**: Volume of water necessary to supply a single large fire flow event in each pressure zone.
- **Emergency**: Volume of water necessary to provide 60 percent of a maximum day demand.
- **Emergency Groundwater Storage Credit**: Equal to the firm groundwater supply that can be reliably accessed, assumed to be 80 percent of maximum day demand.

The amount of total system storage and system peaking capacity required to meet these criteria will change over time as the City's potable water demands increase.

5.3.2.6 Storage Operational Strategies

The operations of the City's storage tanks can be varied seasonally to optimize tank operations and facilitate tank turnover to maintain water quality throughout the system. If water demands are evaluated seasonally (e.g., winter vs. summer), the required operational storage volumes for the winter months would be less than the required storage volumes for the summer months as the water demands are lower. Therefore, storage levels in the tanks could be maintained at lower levels in the winter months to facilitate better tank turnover or selected tanks could be removed from service during the low demand conditions, provided that fire-fighting ability is not compromised.

5.3.3 Valve Capacity Criteria (For Zones Supplied by Pressure Reducing Stations)

The 475 Zone, 610 Zone, and 650 Zone are currently the City's only pressure regulated areas. Since these pressure zones do not have a BPS or a storage tank, the total valve capacity of the PRS should be equal to the peak hour demand plus fire flow condition.

Future areas that are determined to have static pressures greater than 120 psi are recommended to be served via PRSs. For these future areas, the PRSs will also need to have sufficient total capacity to be able to meet the peak hour demand plus fire flow condition.

It is generally recommended that maximum pressures at customer service locations not exceed 80 psi. Should pressures exceed 80 psi at customer service locations, individual pressure regulating valves should be installed in accordance with California Plumbing Code requirements (Section 608.2 Excessive Water Pressure) to avoid potential damage to customer fixtures (e.g., water heaters, hoses, etc.).

5.3.4 Water Transmission and Distribution Pipeline Criteria

The following criteria will be used as guidelines for sizing new transmission and distribution pipelines. However, the existing water system will be primarily evaluated using system pressure as the criterion. Pipeline velocity and head loss are secondary criteria that help prioritize water system improvements, along with pipeline age, material type, and location in the system. If the pressure criterion is satisfied, an existing pipeline with high velocities is not necessarily problematic. The following list summarizes the general definitions and City standards for transmission and distribution pipelines:

- Transmission pipelines are defined as having a diameter greater than or equal to 18-inch.
- Distribution pipelines are defined as having a diameter less than 18-inch.
- All new pipelines are required to have a minimum diameter of 6-inch in residential areas and 8-inch in non-residential areas unless otherwise required or allowed by the City.
- New transmission and distribution pipelines to serve the future planning areas within the City's water service area should be located within designated utility corridors wherever possible. These designated utility corridors should be within public rights-of-way to minimize or eliminate the need for utility easements within private property.

Velocity and head loss criteria are used as indicators to locate and prioritize where water system improvement may be needed. The recommended criteria for water transmission and distribution system pipelines are summarized in Table 5-1.

CHAPTER 6
Hydraulic Model Update and Calibration

This chapter describes the update and calibration of the City's existing water distribution system hydraulic model to reflect existing conditions. The City's water system GIS was used to confirm the configuration of water system facilities in the existing model. The hydraulic model was calibrated to a high degree of accuracy, per general guidelines established by the American Water Works Association Manual of Practice 32 (AWWA M32), and to a level that is acceptable for use for planning purposes or detailed design/operational studies. The resulting updated hydraulic model was subsequently used to evaluate the adequacy of the City's existing and future water systems to meet existing and future needs (see Chapters 7 and 8, respectively).

The hydraulic model updates and calibration efforts are described in the following sections of this chapter:

- Hydraulic Model Background
- Hydraulic Model Update Methodology
- Hydraulic Model Update
- Hydraulic Model Extended Period Simulation (EPS) Calibration

6.1 HYDRAULIC MODEL BACKGROUND

The City's original hydraulic model was developed in the early 2000s using H_2ONET software. For the 2017 WMP, the hydraulic model was converted and updated using Innovyze InfoWater software. In 2018, the City requested West Yost to perform a peer review of the hydraulic model which resulted in West Yost re- building the City's water system hydraulic model using the City's updated GIS water system. In 2023, West Yost updated and calibrated the model using 2021 water consumption data and converted the InfoWater model to InfoWater Pro. As part of the on-going hydraulic modeling support West Yost provides to the City, the hydraulic model is consistently updated with new development projects. For this WMPU, West Yost converted the hydraulic model from InfoWater Pro to Aquanuity AquaTwin Water software.

6.2 HYDRAULIC MODEL UPDATE METHODOLOGY

West Yost completed the following tasks to update the City's hydraulic model:

- Converted the updated InfoWater Pro model to Aquanuity's AquaTwin Water software;
- Used the existing City water distribution GIS to verify that the existing hydraulic model system configuration (pipeline sizes, alignments, connections, and other facility sizes and locations) is representative of the current water system;
- Incorporated small diameter PRVs at all existing PRSs (refer to Table 2-6 for valve diameters and PRS locations) that were not originally in the InfoWater Pro hydraulic model;
- Allocated 2023 water consumption using spatially located meter data to assign demands where they occur in the system;
- Assigned elevations to new nodes using the Placer County's digital elevation model (DEM) and/or Central Valley Floodplain Evaluation and Delineation (CVFED)'s DEM; and
- Dynamically calibrated the City's water system hydraulic model to simulate pressures, levels and flows observed in the field and recorded by the City's SCADA system.

To accomplish these tasks, West Yost worked closely with City staff to obtain and review the following available data:

- As-built information, where needed, for storage tanks, control valves, wells, and pump stations;
- System operation plans;
- Metered account water consumption data;
- Historical SCADA system data; and
- Pressure data gathered using hydrant pressure recorders (HPRs).

The updated hydraulic model was calibrated under maximum day demand conditions using an updated diurnal demand pattern for a 24-hour EPS. The calibration utilized SCADA and field collected data from July 11, 2024, which was the peak demand day concurrent with the HPR data collection.

6.3 HYDRAULIC MODEL UPDATE

The following sections describe the findings of West Yost's model review, and the specific updates made to the water distribution system hydraulic model.

6.3.1 Model Pipeline Configuration Update

West Yost compared the latest hydraulic model with the GIS geodatabase file provided by City staff to verify and, if needed, update the pipeline diameters and configurations of the existing model to be consistent with the GIS geodatabase. Additionally, the City consistently has the hydraulic model updated with new development projects that are in construction or scheduled to be completed soon as part of on-going hydraulic modeling support. Therefore, no pipelines or major facilities were required to be added or updated.

6.3.2 Pipeline Roughness Characteristics

Hazen-Williams coefficients, C-factors, are used in the Hazen-Williams equation to calculate friction loss in ducts and pipes. C-factors indicate the roughness (or smoothness) of the interior of a pipeline. The lower the C-factor, the rougher the pipeline interior and the higher the friction loss in the pipeline. Typically, C-factors are assigned to pipelines based on the characteristics of the pipeline (e.g., age, material type, and size). The City's GIS geodatabase contains information on install year, material type, and pipe age. During West Yost's 2018 re-building of the City's hydraulic model, C-factors were assigned on the basis of material type and age and results verified through SCADA calibration. For the purposes of this update, C-factors were not reassigned.

6.3.3 Water Demand Allocation

The City's GIS geodatabase contains a feature class for spatially located water meters. City staff provided a spreadsheet containing meter IDs, register numbers, and water consumption for 2023 to use for the hydraulic model as it represents the latest complete year of water consumption. The water use data for 2023 was linked to the water meter feature class by register number. All of the 2023 metered water consumption was able to be linked to the spatially located water meters.

The 2023 consumption data was allocated by spatially assigning meters to the nearest pipeline. The demand allocation results were reviewed to confirm that the demands were allocated appropriately (i.e., demands not placed on large transmission pipelines or to the wrong pressure zone).

6.3.4 Elevation Extraction

The node features in the hydraulic model require that elevations be assigned to calculate pressures in the system. It is important to use the most accurate elevation data available when assigning elevations to the hydraulic model. All existing nodes in the hydraulic model already had an assigned elevation which were not updated. Elevations were manually assigned using either CVFED's DEM or Placer County's DEM. Elevations assigned in the hydraulic model range from a low of 116 feet above sea level in the furthest west of the distribution system, near the Lincoln Regional Airport, to a high of 584 feet above sea level along Bella Circle on the east side.

6.3.5 Water System Facilities

After the pipelines and nodes were confirmed in the hydraulic model, major system facilities (i.e., groundwater wells, storage tanks, Catta Verdera BPS, and PRSs) were reviewed in the model to confirm correct configuration. Tank elevations (i.e., base, inlet, and overflow) were verified based on available information. Existing pump curves for the Catta Verdera BPS and wells in the hydraulic model were not updated. The City's existing PRSs in the field include multiple PRVs, however, the hydraulic model only included a single PRV to represent each PRS. The associated PRVs for each PRS were updated in the hydraulic model and settings for each PRV were updated as needed.

6.3.6 Hourly Pattern Development

City staff provided SCADA system data in 30-minute intervals from July 8, 2024 to July 15, 2024, which corresponds with the HPR monitoring period. The SCADA information included flows, tank levels, and pressures for most of the City's water system facilities (i.e., tanks, wells, PRSs, and Catta Verdera BPS) that were in operation during the monitoring period. Since SCADA flow data for the PRSs are not monitored, the pressure zones were grouped into three zone groups (i.e., Lower Zones [375, 475, 575], 750 and 610 Zones, and 775 and 650 Zones) based on how the zones are connected and available SCADA data to develop the hourly diurnal patterns.

The Lower Zones are supplied predominantly by the two PCWA regulated connection points (one located at the metering station supplying Conspiracy Point Tank and one located at the metering station at Verdera Tank No. 3 supplying Verdera Tank No. 3) and are supplemented with water from existing groundwater wells. The 750 and 610 Zones are supplied by the PCWA unregulated connection at the metering station at Verdera Tank No. 3 (i.e., the Verdera Tank No. 3 bypass). The 775 and 650 Zones are supplied by the unregulated connection at the metering station at Conspiracy Point Tank (i.e., the Conspiracy Point Tank bypass). Refer to Chapter 2 for specific detail on supply facilities that supply each individual pressure zone.

To conduct the extended period calibration, West Yost compiled PCWA metering station flows, tank levels, well production, and pump flows to develop diurnals for each of the three zone groups. The diurnal pattern from July 11, 2024 was selected for calibration because the peak demand occurred on that day during the HPR monitoring period. Figure 6-1 shows the diurnals for each of the zone groups. These diurnals were similar in shape to the curves developed for the 2023 calibration.

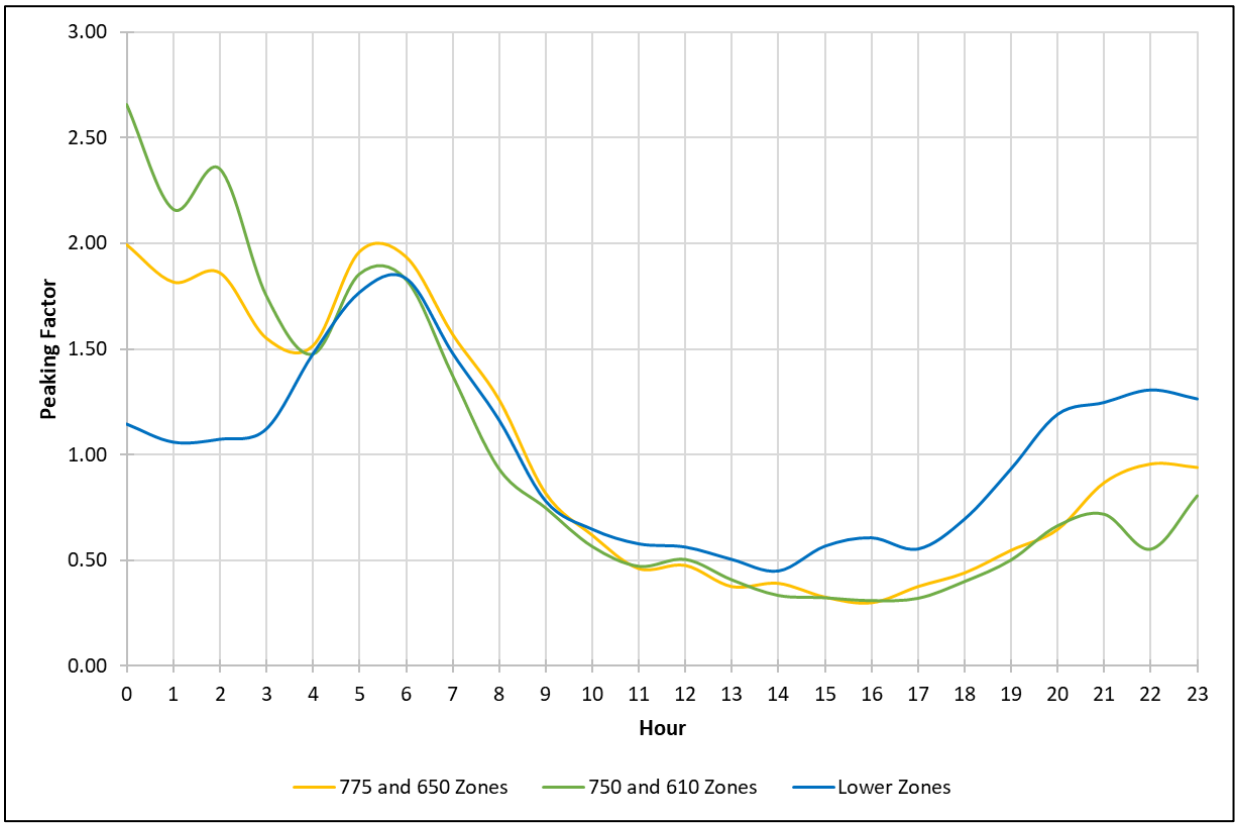


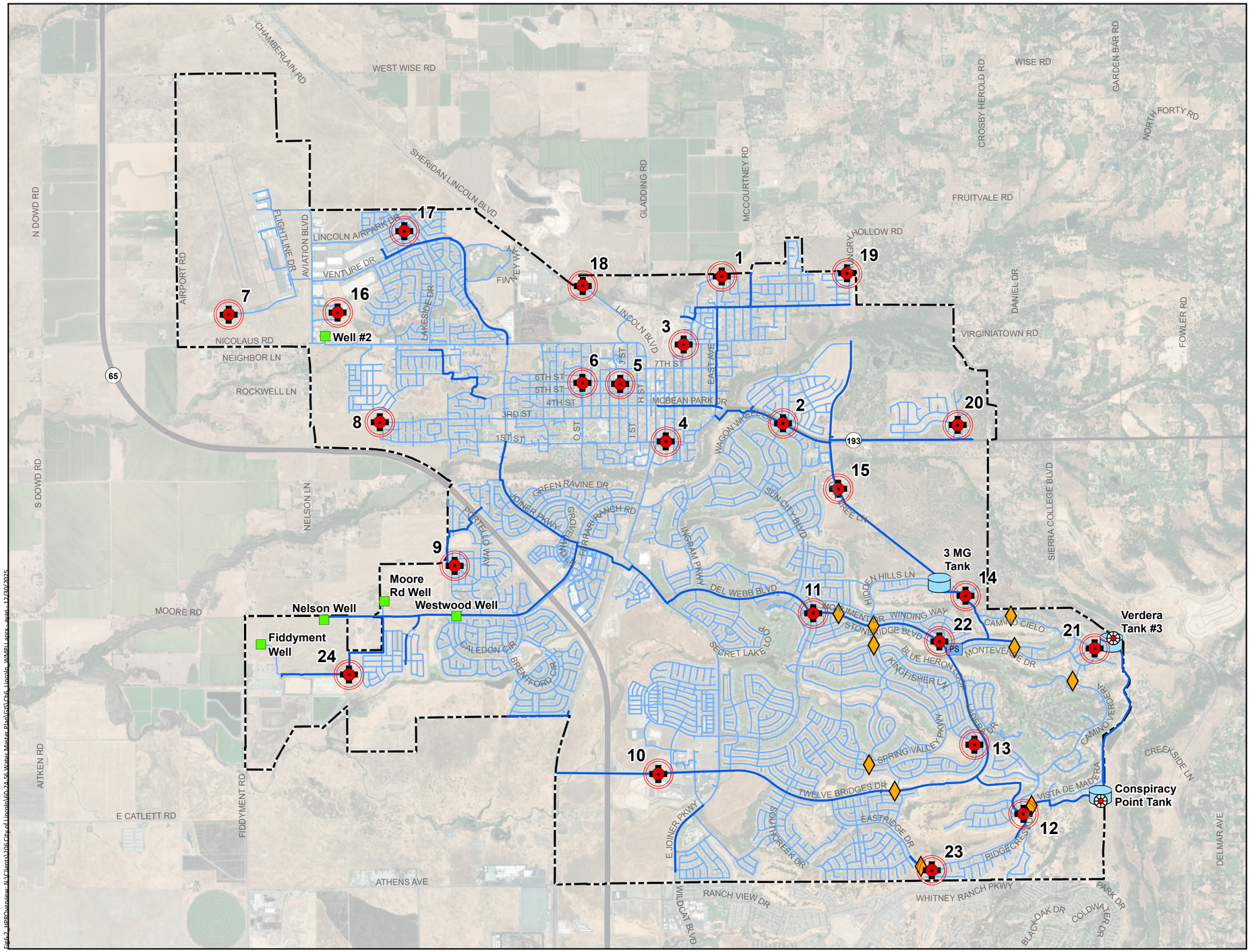
Figure 6-1. Calibration Day Diurnal Patterns (July 11, 2024)

6.4 HYDRAULIC MODEL EPS CALIBRATION

Calibrating a hydraulic model to replicate field operating conditions requires thorough knowledge of how the water system performs over a range of operating conditions. To ensure that the hydraulic model was correctly configured and capable of producing results that are consistent with those observed in the field, a detailed EPS calibration process for summer conditions was conducted.

The hydraulic model EPS calibration was developed using SCADA data for the maximum demand day of July 11, 2024 during the HPR monitoring period of July 8, 2024 to July 15, 2024. For the EPS calibration, 24 HPRs were deployed to collect supplemental pressure data that was subsequently used to compare model predicted results at various locations throughout the system, including high and low elevation locations, locations that are hydraulically distant from supply points, and locations chosen by the City. Twenty HPRs were provided by West Yost and four HPRs were provided by the City. The locations where the HPRs were set up in the system are shown on Figure 6-2.

The hourly diurnal patterns developed for each zone group were applied to the demand nodes in the model. The model was set up to replicate the system operations by applying controls to facilities based on specific conditions (i.e., well pumps on or off based on tank level). Model predicted results (i.e., facility flows and pressures, tank levels, and HPR pressures) were plotted and compared to the SCADA system and field collected HPR data for July 11, 2024 to verify whether the City's hydraulic model accurately predicts field conditions.



Notes:
1. Facilities and hydrants shown based on GIS data provided by the City in April 2024.
2. HPRs 1 to 10 and 12 to 15 are locations previously used for the 2019 model calibration.
3. HPR 11 is a new location added by West Yost and HPRs 16 to 24 are new locations added by the City

Prepared by: WEST YOST

Prepared for: City of Lincoln
Water Master Plan Update

HPR Locations Overview Map

Figure 6-2

Model predicted flows and levels were matched as closely as possible and aimed to be within 10 percent of field recorded data. Pressure trends were checked to see whether results were within ±5 psi of field trends. Minor adjustments to the model were made (i.e., pump settings and PRV pressure settings), if needed, to better match field data when results from the hydraulic model did not trend well with the field data. Results from the calibration are discussed in the following sections.

6.4.1 Hydraulic Model EPS Calibration Results

The 2023 demands allocated in the model discussed in Section 6.3.3 were scaled to match demands for the calibration day of July 11, 2024. The calibration diurnals were applied to the scaled demands for the associated zone group.

Graphs of the comparisons between model simulated results and SCADA values for the calibration date of July 11, 2024 are provided in Appendix D. For the model EPS calibration scenario, HPR results are also shown and are provided in Appendix E. Figures are grouped to show results for facilities in the Lower Zones, 750 and 610 Zones, and 775 and 650 Zones.

Hours where the field recorded data deviates slightly from the model predicted results may be due to the zone group diurnal not completely capturing the nuances of water use trends in each pressure zone within the zone group.

6.4.1.1 Lower Zones EPS Calibration Results

Figures D-1 through D-15 of Appendix D show results for the EPS calibration of the facilities in the Lower Zones with available SCADA data (i.e., PCWA regulated connections, three tanks, five groundwater wells, and three PRSs). It should be noted only the Westwood and Nelson Wells were operating on calibration day. Model simulated flows, tank levels, and system pressures trend very closely with field recorded data and are within 10 percent and 5 psi, respectively.

Figures E-1 to E-21 from Appendix E show the HPR pressure comparison between the model simulated results and the recorded field pressures in the Lower Zones. The pressure trends collected by the HPRs installed in the Lower Zones generally match similarly with the pressure results from the model simulation and are within approximately 5 psi. However, the model simulated pressures for HPR 7 (Figure E-7), HPR 16 (Figure E-14), and HPR 24 (Figure E-21) are off by more than 5 psi than the field recorded pressures. Since the majority of model results for the remaining HPRs fall within 5 psi, it is assumed that HPRs 7 and 16 may not have been properly calibrated and therefore collected data incorrectly. However, this does not affect the reliability of the overall model, as the majority of results remain within the acceptable range.

6.4.1.2 750 and 610 Zones EPS Calibration Results

Figures D-16 through D-18 of Appendix D show results for the EPS calibration of the facilities within the 750 and 610 Zones (i.e., Verdera Tank No.3 bypass, Catta Verdera BPS, and Village 18 PRS). The model simulated results trend very closely with the field recorded flows and pressures and are within 10 percent and 5 psi, respectively.

Figures E-22 and E-23 from Appendix E show the HPR pressure comparison between the model simulated results and the recorded field pressures in the 750 and 610 Zones. As shown on Figure E-22, unfortunately, HPR 21 in the 750 Zone did not record pressures. The pressure trends collected by HPR 14 in the 610 Zone shown on Figure E-23 trend similarly with the pressure results from the model simulation and are within 5 psi.

6.4.1.3 775 and 650 Zones EPS Calibration Results

Figures D-19 through D-21 of Appendix D show results for the EPS calibration of the facilities within the 775 and 650 Zones (i.e., Conspiracy Point Tank bypass, Village 13 PRS, and Village 17 PRS). The model simulated results trend very closely with the field recorded flows and pressures and are within 10 percent and 5 psi, respectively.

Figures E-24 from Appendix E shows the HPR pressure comparison between the model simulated results and the recorded field pressures for HPR 12 in the 775 Zone. The pressures collected by the HPR trends very similarly with the pressure results from the model simulation and are within 5 psi.

6.4.2 Hydraulic Model EPS Calibration Findings and Conclusions

Majority of the hydraulic model EPS calibration results were within the acceptable ranges (i.e., within 10 percent for flows and tank levels and within 5 psi for pressures). Therefore, it can be concluded that the hydraulic model provides a reasonable representation of the City's water distribution system and can be used for planning evaluations and design/operational analysis for a variety of flow conditions.

Additionally, City staff should continue to update and verify facilities data and pipeline system configurations in the hydraulic model as facilities are constructed or replaced to maintain a hydraulic model that will continue to accurately represent the City's water distribution system.

CHAPTER 7
Existing System Evaluation

This chapter presents the evaluation of the City's existing water system, as described in Chapter 2, and its ability to meet the recommended performance and operational criteria described in Chapter 5 under various existing water demand conditions. This evaluation includes an analysis of water supply capacity, storage capacity, and pumping capacity, as well as the existing water distribution system's ability to meet recommended operational and design criteria under normal and emergency scenarios.

West Yost conducted this evaluation using the calibrated hydraulic model described in Chapter 6. Recommendations from this evaluation are used to develop a recommended capital improvement program, which is detailed in Chapter 10.

The following sections present the evaluation methodology and results from the existing water system evaluation:

- Existing Water Demands
- Existing Water Supply and Water System Facility Capacity Evaluation
- Existing Water Distribution System Performance Evaluation
- Summary of Findings and Recommendations for the Existing Water System

7.1 EXISTING WATER DEMANDS

The City's existing baseline water demands are summarized by pressure zone in Table 7-1. As described in Chapter 3, the system-wide baseline average day demand for the purposes of this WMP is approximately 9.0 mgd and represents the average annual water production from 2023. Approximately 78 percent of the City's overall demand is located within the 375 Pressure Zone.

Chapter 3 describes development of the diurnal patterns for each pressure zone group using consumption and production data from summer of 2023. Maximum day demands were calculated using the maximum day peaking factor developed from the average day and maximum day demands from 2023. Peak hour demands were calculated using the peak hour factor for the City's entire system based on the summer demand diurnal curves developed using the peak week in summer of 2023.

Table 7-1. Existing Baseline Demands

Pressure Zone	Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
	gpm	mgd	gpm	mgd	gpm	mgd
375	4,895	7.0	9,301	13.4	20,462	29.4
475	398	0.6	756	1.0	1,663	2.0
575	559	0.8	1,062	1.5	2,336	3.3
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.1
750	115	0.2	219	0.3	482	0.6
775	44	0.1	84	0.1	185	0.2
Total Demand	**6,264**	**9.0**	**11,903**	**16.9**	**26,187**	**36.9**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6).
(b) Maximum day demand is based on the 2023 maximum day demand data (refer to Table 3-6).
(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).
gpm = gallons per minute; mgd = million gallons per day

7.2 EXISTING WATER SUPPLY AND WATER SYSTEM FACILITY CAPACITY EVALUATION

The following capacity evaluations were conducted for the existing water system and are discussed in more detail in subsequent sections:

- Supply Capacity Evaluation
- Pumping Capacity Evaluation
- Storage Capacity Evaluation
- Pressure Regulating Station Capacity Evaluation

7.2.1 Supply Capacity Evaluation

As described in Chapter 5, the recommended supply capacity criterion requires the City to provide firm supply capacity equal to the maximum day demand. For the existing water system, firm groundwater well capacity is defined as the City's active well capacity with the largest groundwater well offline. Table 7-2 summarizes the results of the supply capacity evaluation and shows that the City has a surplus of existing supply capacity.

Table 7-2. Comparison of Required versus Available Existing Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Existing Maximum Day Demand	16.9	System-wide maximum day demand (refer to Table 7-1)
Supply		
[B] Surface Water from PCWA	18.9	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	5.9	Existing firm capacity at groundwater wells[(b)]
[D] Total Supply	***24.8***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	**7.9**	**[E] = [D] - [A]**

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 18.9 mgd (refer to Table 5-1).

(b) Firm groundwater well capacity for the existing system is defined as the City's active well capacity with the largest groundwater well offline.

mgd = million gallons per day

7.2.2 Pumping Capacity Evaluation

Existing pumping capacity in the City's water system was evaluated to assess its ability to deliver a reliable firm capacity to meet demand conditions outlined in Chapter 5, dependent on whether the pressure zone has gravity storage. The City's only existing booster pump station is the Catta Verdera BPS serving the 750 Zone which supplies the 610 Zone through pressure regulating stations. Since the 750 Zone does not have gravity storage, pumps at the Catta Verdera BPS need to have sufficient pumping capacity to deliver the greater of either the maximum day demand plus fire flow or the peak hour demand.

Table 7-3 compares the existing firm pumping capacity with required firm pumping capacity for the 750 Zone for existing water demand conditions. As shown in Table 7-3, the 750 Zone has a firm pumping capacity deficit. However, since the unregulated connection at the new PCWA metering station at the Verdera Tank No. 3 site provides adequate supply to the 750 and 610 Zones, the Catta Verdera BPS currently only operates during times of peak demand to provide supplemental supply. The City is also considering upgrading the pump motors with a variable frequency drive. Therefore, no recommendations are made to address the existing pumping capacity deficit.

Table 7-3. Comparison of Required versus Available Existing Pumping Capacity

Pressure Zone	Supported Zone	Pump Station Name	Required Pumping Capacity, gpm[(a)] [A]	Booster Pump Station Firm Capacity[(c)] [B]	Existing Pump Capacity Surplus (Deficit), gpm [C] = [B] - [A]
750	610	Catta Verdera Pump Station	1,822	900	(922)[(c)]

(a) Required pumping capacity shown is the MDD plus fire flow for the pressure zone itself and all supported zones. The 750 Zone supplies the 610 Zone; therefore, the required pumping capacity includes the MDD for the 750 Zone and the 610 Zone (refer to Table 7-1). The largest fire flow requirement in the two zones is 1,500 gpm for low density residential land use.

(b) Includes the firm capacity of all booster pump stations supplying the pressure zone. Firm pump capacity at booster pump stations is defined as total booster pump station capacity with the largest pump out of service (refer to Table 2-5).

(c) The unregulated connection at the PCWA metering station at the Verdera Tank No. 3 site installed in 2021 provides adequate supply to the 750 and 610 Zones. The Catta Verdera BPS currently operates during times of peak demand as supplemental supply. Therefore, no recommendations are made to address the existing pumping capacity deficit.

gpm = gallons per minute

7.2.3 Storage Capacity Evaluation

Water storage provides operational storage to balance differences in demands and supplies, emergency storage in case of a supply failure, and water to fight fires. The City's water system has two sources of available storage: above-ground storage (i.e., storage tanks) and storage available in the groundwater basin. Together, these two sources of storage must be sufficient to meet the City's operational, emergency, and fire flow storage criteria. The City's water storage capacity requirements are further described in Chapter 5.

The existing water storage facilities, along with the available EGWC, were evaluated to determine whether the City's existing storage is sufficient to meet recommended operational, emergency, and fire flow storage for existing conditions. Table 7-4 summarizes results from the storage capacity evaluation. As shown in Table 7-4, there is a storage capacity surplus in the 575 Zone and storage capacity deficits in the 375, 750, and 775 Zones.

As discussed in Chapter 2, the 375 Zone receives its main source of supply through three pressure regulating stations, two from the 575 Zone (Twelve Bridges and Eastridge) and one from the 475 Zone (Wildomar), and is supplemented with supply from its own groundwater wells. Therefore, the required operational storage for the 375 Zone is assigned to the 575 Zone, while the required storage capacity for the 375 Zone is composed of the remaining fire and emergency storage components. The 475, 610, and 650 Zones are pressure regulated zones (i.e., pressure zones served solely by pressure regulating stations without a booster pump station or storage tank) and are grouped with the pressure zone they receive supply from.

Additionally, the 375 Zone is the only pressure zone that can use EGWC since it is the only pressure zone with groundwater wells. The EGWC equals the firm capacity of the active groundwater wells that can be reliably accessed (i.e., well facilities equipped with auxiliary power). The EGWC cannot exceed the emergency storage requirement and wells included for the EGWC also cannot already be relied upon to meet the City's average day demand. Three out of five of the City's active groundwater wells (Well 2, Westwood Well, and Fiddyment Well) have backup power and are not needed to meet average day demands. To obtain the firm capacity of the active groundwater wells that can be reliably accessed, the well capacity of the Fiddyment Well is excluded since it has the largest well capacity out of the three wells.

The storage capacity deficit in the 375 Zone is due to the emergency storage component. It is assumed the 575 Zone can transfer its surplus storage capacity to the 375 Zone via gravity transfer through the existing pressure regulating stations. Therefore, no additional storage tanks are recommended for the 375 Zone. However, it is recommended that the City consider acquiring dedicated backup power sources for the Moore and Nelson Wells, which would improve well reliability and allow these wells to be counted as part of the EGWC. With backup power at the Moore and Nelson Wells, the EGWC would increase by 1.76 MG for a total EGWC of 4.2 MG[1] resulting in a storage capacity surplus of 1.57 MG for the 375 Zone.

The 750 and 775 Zones do not have any existing storage tanks. If the unregulated PCWA connections supplying these zones go offline, the 775 Zone has no alternative water supply source. Although the 750 Zone can be supplied by the Catta Verdera BPS, and subsequently the 650 and 610 Zones through pressure regulating stations, there is a pumping capacity deficit as shown in Table 7-3. To alleviate the storage capacity deficits and provide redundancy, it is recommended that the City construct a two (2) mgd emergency booster pump station at the Verdera Tank No. 3 site for the 750 Zone and a four (4) mgd emergency booster pump station at the Conspiracy Point Tank site for the 775 Zone. A hydraulic evaluation showing the results of a loss of the unregulated PCWA connections with and without these improvements is discussed in Section 7.3.2.

[1] With backup power at the Moore and Nelson Wells, the firm capacity of the active groundwater wells that can be reliably accessed would increase to 5.9 MG. However, since EGWC cannot exceed the emergency storage amount, the EGWC would be equal to the emergency storage amount of 4.2 MG.

Table 7-4. Comparison of Required versus Available Storage Capacity

Pressure Zone	Supported Pressure Zones	Storage Available	Required Storage Capacity, MG				Available Storage Capacity, MG			Existing Storage Capacity Surplus (Deficit), MG [H] = [G] - [D]
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Existing Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [F]	Storage Capacity Available [G] = [E] + [F]	
375	-	3 MG Tank	-	0.96	4.20	5.16	2.53	2.44	4.97	(0.19)
575	475 375	Verdera Tank No. 3 Conspiracy Point Tank	3.98	0.96	0.82	5.76	8.75	0.00	8.75	2.99
750	610	-	0.10	0.18	0.15	0.43	0.00	0.00	0.00	(0.43)
775	650	-	0.15	0.54	0.21	0.90	0.00	0.00	0.00	(0.90)

(a) Operational storage is 25 percent of 2023 maximum day demand (MDD) data of each pressure zone (refer to Table 7-1).

(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).

(c) Emergency storage is 60 percent of 2023 average day demand (ADD) data of each pressure zone (refer to Table 7-1).

(d) Available tank storage capacity was calculated taking into account 5 feet of dead storage and 2 feet of high alarm level in each storage tank (refer to Section 2.3.4).

(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. In order for groundwater supply to count toward the EGWC it must: (1) be equipped with backup power, (2) not already be relied upon to meet City average day demand (ADD) requirements, and (3) have sufficient distribution facilities available to distribute to demand areas. The EGWC includes the firm capacity of wells with backup power. The EGWC cannot exceed the emergency storage requirement.

7.2.4 Pressure Regulating Station Capacity Evaluation

The existing pressure regulating stations in the City's water system were evaluated to assess their ability to reliably supply the existing water service area. As described in Chapter 5, the criterion for pressure zones served solely by pressure regulating stations without a booster pump station or storage tank requires the City's pressure regulating stations to have sufficient capacity to meet the peak hour demand plus fire flow condition.

Table 7-5 compares existing available pressure regulating station capacity with required capacity for pressure zones that are completely dependent on pressure regulating stations for supply. As shown in Table 7-5, the pressure regulating stations for the pressure regulated zones have sufficient capacity to meet the requirements.

Table 7-5. Comparison of Available versus Required Existing Pressure Regulating Station Capacity

Pressure Zone	Pressure Regulating Station	Supplied By	Valve Diameter, inches	Available PRS Capacity, gpm[a] [A]	Required PRS Capacity, gpm			Existing PRS Capacity Surplus (Deficit), gpm [E] = [A] - [D]
					Peak Hour Demand[b] [B]	Fire Flow Demand[c] [C]	PRS Capacity Requirement [D] = [B] + [C]	
475	Spring Valley #1	575	3	580	1,663	1,500	3,163	18,587
			8	3,900				
	Spring Valley #2	575	3	580				
			8	3,900				
	Stoneridge	575	6	2,250				
			14	10,540				
	475 Zone Total			**21,750**				
650	Village 13	775	4	990	832	3,000	3,832	10,448
			10	6,150				
	Village 17	750	4	990				
			10	6,150				
	650 Zone Total			**14,280**				
610	Village 18	750	3	580	227	1,500	1,727	13,403
			10	6,150				
	Village 19	750	6	2,250				
			10	6,150				
	610 Zone Total			**15,130**				

(a) Valve capacity is estimated based on intermittent maximum flow capacity for ClaVal Model 90-01 pressure reducing valves. However, actual flow capacity will vary depending on system conditions.

(b) Refer to Table 7-1 for peak hour demand.

(c) Largest fire flow event that could occur in each pressure zone (refer to Table 5-1).

7.3 EXISTING WATER DISTRIBUTION SYSTEM PERFORMANCE EVALUATION

The water distribution system performance evaluation identifies necessary improvements to support existing water demands while meeting the City's recommended water system planning and design criteria, presented in Chapter 5. The updated model and calibrated model described in Chapter 6 was used to evaluate the City's existing water distribution system. The following evaluations were performed to assess system performance under existing demand conditions:

- **Normal Operations:**
  - Average Day Demand Scenario: This scenario evaluated service pressures during an average day demand condition.
  - Maximum Day Demand Scenario: This scenario evaluated service pressures during a maximum day demand condition.
  - Water Age Scenario: This scenario evaluated system water age during a winter demand condition.
- **Emergency Operations:**
  - Maximum Day Demand plus Fire Flow Scenario: This scenario evaluated system fire flow availability under a maximum day demand condition.
  - Additional Emergency Scenarios: These scenarios evaluated system performance under emergency conditions during a maximum day demand condition.

The results presented are based on the maximum and minimum day diurnal demand patterns (i.e., pressure zone groups, irrigation meters, and large users) derived from 2023 SCADA data and previously presented in Chapter 3. These diurnal patterns were incorporated into the hydraulic model for their associated demand conditions as discussed in the following sections. Results are also based on model controls from the calibrated hydraulic model, which were adjusted as needed for each evaluation. For normal (i.e., non-emergency) operations, model controls were adjusted to reflect typical normal operating conditions observed in the 2023 SCADA data provided in Chapter 3.

7.3.1 Normal Operations

7.3.1.1 Average Day Demand

The normal operations of the City's water distribution system were evaluated under average day demand conditions (i.e., non-fire). An overview of the evaluation and a discussion of the results are presented in the following sections.

7.3.1.1.1 Evaluation Overview

A 72-hour EPS was conducted using the hydraulic model to evaluate system performance under an average day demand condition with the maximum day diurnal patterns incorporated. As shown in Table 7-1, the average day demand is 6,264 gpm (9.0 mgd) for the existing system. The operational criteria applicable during average day demand conditions are detailed in Chapter 5. The existing system analysis assumes the water system demand will be met by a combination of the PCWA metering stations and existing storage tanks. Groundwater wells and the Catta Verdera BPS were assumed to be offline since these are typically only used during maximum day with peak hour demands and/or emergencies.

7.3.1.1.2 Evaluation Results

Approximate tank level ranges under average day demand conditions are as follows: the 3 MG Tank ranges from 11 to 17 feet, the Conspiracy Point Tank ranges from 16 to 19 feet, and Verdera Tank No. 3 ranges from 14 to 17 feet.

Results from the average day demand condition indicate the existing water system generally meets the City's minimum and maximum pressure criterion at most customer service locations. Figure 7-1 presents the minimum instantaneous pressures during the EPS. In general, most areas of the City's distribution system meet the minimum pressure requirement of 40 psi under peak hour demand. The majority of the City's distribution system experiences pressures ranging between 80 to 100 psi. Pockets of pressures ranging from 40 to 60 psi typically occur around areas that are on the high end of a pressure zone's service elevation range and/or are served by a dead-end pipeline. Locations with pressures below 40 psi occur adjacent to major system facilities where the associated pipelines do not have service connections.

Velocities in the majority of the water distribution system do not exceed 7 feet per second (fps), except for 25 linear feet of 8-inch diameter pipeline at the intersection of 1st Street and Joiner Parkway, which experiences a maximum velocity of 10.5 fps. One 24-inch diameter pipeline and three 12-inch diameter pipelines tie into this 8-inch diameter pipeline, which create a bottleneck resulting in high velocities. It is recommended that this 8-inch diameter pipeline be replaced with a new 16-inch diameter pipeline to mitigate high velocities.

7.3.1.2 Maximum Day Demand with Peak Hour

The normal operations of the City's water distribution system were evaluated under maximum day with peak hour demand conditions (i.e., non-fire). An overview of the evaluation and a discussion of the results are presented in the following sections.

7.3.1.2.1 Evaluation Overview

A 72-hour EPS was conducted using the hydraulic model to evaluate system performance under a maximum day with peak hour demand condition with the maximum day diurnal patterns incorporated. As shown in Table 7-1, for the existing system, the maximum day demand is 11,903 gpm (16.9 mgd) and the total system peak hour demand is 26,187 gpm (36.9 mgd). The operational criteria applicable during maximum day with peak hour demand conditions are detailed in Chapter 5. The existing system analysis assumes the water system demand will be met by a combination of the PCWA metering stations, existing storage tanks, two groundwater wells, and if needed, the Catta Verdera BPS.

7.3.1.2.2 Evaluation Results

Approximate tank level ranges under average day demand conditions are as follows: the 3 MG Tank ranges from 13 to 23 feet, the Conspiracy Point Tank ranges from 17 to 21 feet, and Verdera Tank No. 3 ranges from 14 to 18 feet.

Results from the maximum day with peak hour demand condition indicate the existing water system generally meets the City's minimum and maximum pressure criterion at most customer service locations. Figure 7-2 presents the minimum instantaneous pressures during the EPS. In general, pressures slightly decrease compared to the average day demand results; however, most areas of the City's distribution system meet the minimum pressure requirement of 40 psi under peak hour demand. The majority of the City's distribution system experiences pressures ranging between 60 to 80 psi and between 80 to 100 psi.

Pockets of pressures ranging from 40 to 60 psi typically occur around areas that are on the high end of a pressure zone's service elevation range and/or are served by a dead-end pipeline. Locations with pressures below 40 psi occur adjacent to major system facilities where the associated pipelines do not have service connections.

Velocities in the majority of the water distribution system do not exceed 7 fps, except for 69 linear feet of 8-inch diameter pipeline at the intersection of E Street and McBean Park Drive, which experiences a maximum velocity of 7.7 fps, and the previously identified 8-inch diameter pipeline at 1st Street and Joiner Parkway, which experiences an increased maximum velocity of 21 fps.

The 8-inch diameter pipeline at E Street and McBean Park Drive ties into 18-inch, 12-inch, and 10-inch diameter pipelines which create a bottleneck resulting in high velocities. It is recommended that this 8-inch diameter pipeline be replaced with a new 12-inch diameter pipeline to mitigate high velocities.

7.3.1.3 Water Age

A water age evaluation was performed on the City's existing water distribution system to determine areas in the distribution system that may be vulnerable to potential water quality issues. When water stays stagnant in the distribution system for extended periods due to lack of turnover, water age can increase which can lead to taste and odor concerns, increased potential for disinfection byproduct formation, and potential water quality and/or public health risks. Areas identified with older water age may be used to inform development of water management strategies (e.g., targeted flushing programs and operational changes) to improve water quality within the distribution system.

The water age of the City's existing water distribution system during normal operations was evaluated under a typical winter demand condition. An overview of the evaluation and a discussion of the results are presented in the following sections.

7.3.1.3.1 Evaluation Overview

For purposes of this evaluation, water age is assumed to begin upon entry into the City's distribution system at the PCWA metering stations. A 30-day EPS was conducted using the hydraulic model to evaluate water age under a typical minimum day demand condition; however, only results from the last 24 days of the simulation are presented, as these results are not affected by initial conditions. The minimum day demand diurnal patterns were incorporated into the hydraulic model for the water age evaluation. Water age was evaluated under a minimum week demand condition of 3,230 gpm (4.7 mgd), previously used to develop the minimum day demand diurnal in Chapter 3. The existing system analysis assumes the winter demand would be met by a combination of the PCWA metering stations and existing storage tanks. Groundwater wells and the Catta Verdera BPS were assumed to be offline since these are typically only used during maximum day with peak hour demands and/or emergencies.

It is important to note that locations of the oldest water are typically found on dead-end pipelines (i.e., service laterals) with little or no demand assigned in the hydraulic model and are not representative of the overall water age of the distribution system water served to the City's customers.

7.3.1.3.2 Evaluation Results

Water age in storage tanks has an important influence on the water age in the distribution system. The water age in tanks depends on different factors such as inlet/outlet configuration, total volume in the tank, and system demands supplied from the tank. Table 7-6 summarizes the average water age and average tank level of the three tanks during the water age evaluation. Since the three storage tanks in the

City's water system have a turnover rate of less than 1 foot over a 24-hour (1 day) period, the resulting water age in the three tanks remains constant. The water age in the Conspiracy Point Tank and Verdera Tank No. 3 are both around 1.5 days old since both tanks receive fresh supply directly from the regulated PCWA connections, while the water age in the 3 MG Tank is slightly older at approximately 2.4 days old due to being fed by older water from the distribution system.

Table 7-6. Summary of Water Age Results in Existing Storage Tanks[(a)]

Storage Tank Name	Average Water Age, hours	Average Tank Level, feet
Conspiracy Point Tank	34 (1.4 days)	20.7
Verdera Tank No.3	39 (1.6 days)	19.5
3 MG Tank	58 (2.4 days)	9.4

(a) Results are based on the last 24 days of a 30-day EPS.

Figure 7-3 shows the maximum water age results for City's water system. Model results indicate the majority of the 375 Zone has a maximum water age ranging from 4 to 7 days. Areas in the 375 Zone with younger water age ranging from 2 to 3 days occur closest to the supply sources into the zone (i.e., near a PRS and/or the 3 MG Tank). The remaining zones (475, 575, 610, 750, and 775 Zones) generally have a maximum water age of less than 3 days. Areas in the remaining zones with older water age of 3 to 4 days occur at dead-end pipelines and/or at areas far from the supply sources into the zone.

The oldest water in the overall system (greater than 7 days) is located in the far north and west furthest from the supply sources and/or at dead-end pipelines with minimal demand. Notable locations with the oldest water include the Turkey Creek Estates development in the far east, the developments in the far northeast, and the Airport area in the far northwest. It should be noted the Liberty development shows water age greater than 7 days, however, this development is new and no associated demands have been added to the existing condition model scenario. Only the pipelines for the Liberty development have been constructed and no units have been constructed at the time of this evaluation.

The Turkey Creek Estates development is a newer development with minimal demands and is supplied by a single dead-end 18-inch diameter transmission pipeline. As development continues in the area, a future connection to Village 1 to the south will provide looping and improve water age in the Turkey Creek Estates. The developments in the northeastern extent of City limits are located north of the Auburn Ravine which limits the ability to easily construct looping. This limitation contributes to its older water age. As development occurs in Village 1, a new transmission pipeline is planned to cross the Auburn Ravine and connect to the northeastern developments, which will add looping and improve water age.

The Airport area has minimal demands and is supplied by 12-inch diameter pipelines which were sized to meet large fire flows (i.e., 3,000 to 4,000 gpm). Due to the low demands, there is less water flowing through the larger diameter pipes which can lead to stagnant water and resulting in older water age.

The City may consider updating its flushing program to include parameters to include water quality. No recommendations are made for the turnover in the City's tanks since City operational staff are able to adjust operations daily to optimize turnover which the hydraulic model is unable to capture.

7.3.2 Emergency Operations

7.3.2.1 Maximum Day Demand Plus Fire Flow

The maximum day demand plus fire flow scenario evaluates the existing fire flow availability in the City's distribution system under a maximum day demand condition. An overview of the evaluation and a discussion of the results are presented in the sections below.

7.3.2.1.1 Evaluation Overview

To evaluate the existing water system fire flow availability, AquaTwin Water's fire flow module was used to determine the available fire flow at all junctions that represent hydrant locations throughout the system, while maintaining a minimum residual system pressure of 20 psi at all customer service locations. The fire flow evaluation assumed that the fire event would occur during the hour where the peaking factor on the maximum day diurnal is closest to 1. Hour 48 from the maximum day demand plus peak hour EPS was chosen to run the fire flow analysis on. The purpose of this assumption is to confirm that storage is sufficient to supply fire flows during a typical maximum day demand. Maximum velocity is not considered in this evaluation because it is a secondary design criterion.

7.3.2.1.2 Evaluation Results

Figure 7-4 summarizes the percent of available fire flow available at each tested location with respect to its fire flow requirement. Results presented on Figure 7-4 are representative of the system's capacity and do not represent available flow from a specific hydrant. Typically, fire flows exceeding 1,500 gpm are met by multiple hydrants.

As shown on Figure 7-4, there are several locations that do not meet the recommended fire flow criteria. The majority of the tested locations that do not meet the recommended fire flow criteria are along older and/or small diameter pipelines (especially in the downtown area), areas with larger fire flow requirements (i.e., 4,000 gpm), or areas with a lack of looping where high head losses limit the ability to provide recommended fire flows while maintaining pressures greater than 20 psi.

Existing pipelines are assumed to meet fire flow standards that were in place at the time of construction, which may have been lower than the current standards. Therefore, the evaluation of the City's water system under existing demand conditions does not recommend specific pipeline improvements to increase existing fire flow capacity. However, a rehabilitation and replacement (R&R) program, described in detail in Chapter 9, is recommended to replace older and smaller diameter pipelines.

7.3.2.2 Additional Emergency Scenarios

In coordination with the City, 11 emergency scenarios were developed to evaluate the performance of the existing water distribution system under emergency conditions. Each emergency scenario listed below was evaluated under maximum day demand with peak hour conditions using a 96-hour EPS, with the emergency event assumed to occur at hour 24. The operational criteria applicable during maximum day demand under peak hour demand conditions are detailed in Chapter 5 (i.e., minimum pressure of 40 psi under peak hour demand at customer service locations and maximum velocity of seven (7) fps in

distribution pipelines). Results are presented for the final 72 hours of each simulation, as these reflect system performance during the emergency and are not influenced by initial conditions. An overview of each evaluation and a discussion of the results are presented in the following sections:

- Emergency Scenario 1: Loss of all PCWA water sources
- Emergency Scenario 2: Unregulated PCWA Source and Catta Verdera BPS Failure
- Emergency Scenario 3: 775 Zone Unregulated PCWA Connection Failure
- Emergency Scenario 4: 750 Zone Unregulated PCWA Connection Failure
- Emergency Scenario 5: Conspiracy Point Tank 30-inch Diameter Pipeline Failure
- Emergency Scenario 6: Three Largest Groundwater Wells Offline
- Emergency Scenario 7: Stoneridge Blvd 24-inch Diameter Pipeline Failure
- Emergency Scenario 8: 3 MG Tank 20-inch Diameter Pipeline Failure
- Emergency Scenario 9: Verdera Tank No. 3 36-inch Diameter Pipeline Failure
- Emergency Scenario 10: Zone Control Valve in the Camino Cielo Walking Path Failure
- Emergency Scenario 11: Zone Control Valve at Anton Lane and Andover Lane Failure

All storage tanks are assumed to start at 60 percent full, as directed by the City, which correspond to initial tank levels of 20 feet in the Conspiracy Point Tank, 19 feet in Verdera Tank No. 3, and 17 feet in the 3 MG Tank. Results described in the following sections are based on this assumption and may vary if actual tank levels are lower or higher at the time of an emergency. No other operational changes are made from normal operating conditions unless otherwise stated.

It should be noted for most of the emergency scenarios the same distribution pipelines identified in the 375 Zone for the normal operations evaluation have a maximum velocity greater than 7 fps. For some emergency scenarios, additional distribution pipelines are greater than 7 fps but remain under 10 fps. No recommendations are made for these pipelines. Only new pipeline locations with velocities greater than 10 fps are identified in the results.

7.3.2.2.1 Emergency Scenario 1: Loss of All PCWA Water Sources

Emergency Scenario 1 assumes loss of all PCWA regulated and unregulated supply sources. The City's five groundwater wells and the Catta Verdera BPS are active for this scenario. As expected, pressures in the upper zones (i.e., 775, 650, 750, and 610 Zones) supplied by the unregulated connections immediately drop below 40 psi when the supply is lost as there are no other available supply facilities to these zones. Also as anticipated, approximately seven hours after loss of supply, the tank levels in both the Conspiracy Point Tank and Verdera Tank No. 3 reach their minimum levels which cause pressures to drop below 40 psi in the 475 and 575 Zones. Since the 375 Zone has groundwater wells as additional supply, the level in the 3 MG Tank reaches its minimum level after 12 hours of supply loss and pressures within the zone drop below 40 psi after 20 hours of supply loss.

The scenario was re-evaluated with the recommended emergency BPSs from the storage capacity evaluation for the 750 and 775 Zones. Pressures in the upper zones drop below 40 psi after seven hours of loss of supply, while values for the rest of the zones remain the same.

To mitigate loss of PCWA supply, the City is recommended to evaluate additional supply sources discussed in Chapter 4 (i.e., ASR wells, groundwater recharge, recycled water) and consider expanding groundwater well capacity. These recommendations are further discussed and evaluated in Chapter 8. Customers would also be required to significantly reduce water use to extend the available supply. Per the City's Water Shortage Contingency Plan, the loss of PCWA supply would result in a shortage stage of level 6 being declared which requires water be used for health and safety purposes only. Additionally, the 750 Zone and 775 Zone emergency BPSs are recommended to be constructed to ensure continued service to the upper zones.

7.3.2.2.2 Emergency Scenario 2: Unregulated PCWA Source and Catta Verdera BPS Failure

Emergency Scenario 2 assumes the loss of unregulated PCWA supply and the failure of the Catta Verdera BPS. As discussed in the previous scenario, the 775 Zone has no alternative supply source besides supply from PCWA. Without the Catta Verdera BPS, the 750, 650, and 610 Zones would also have no supply.

The scenario was re-evaluated with the inclusion of the 750 Zone and 775 Zone BPSs, which allowed the upper zones to be supplied from the 575 Zone tanks. Inflow from the regulated PCWA connections were slightly increased, but remained within the contracted amount, to account for the demands in the upper zones. Without this adjustment, after three days of supply loss, the levels in the Conspiracy Point Tank and Verdera Tank No. 3 would drop to approximately 13 feet and 9 feet, respectively. This drop in the 575 Zone tank levels would cause minimum pressures in the 475 and 575 Zones to decrease but remain above 40 psi during peak hour.

Although the Catta Verdera BPS is currently equipped with a portable generator, installation of a permanent generator is recommended. Construction of the 775 Zone emergency BPS is also recommended, as the zone lacks backup supply. While complete failure of the Catta Verdera BPS is considered unlikely, construction of the 750 Zone emergency BPS is recommended to further enhance system redundancy and reliability.

7.3.2.2.3 Emergency Scenario 3: 775 Zone Unregulated PCWA Connection Failure

Emergency Scenario 3 assumes the failure of the unregulated PCWA connection supplying the 775 and 650 Zones with Catta Verdera BPS online. As previously discussed, the 775 Zone has no alternative supply source. However, the 650 Zone can receive supply from the 750 Zone via the Village 17 PRS. The Catta Verdera BPS operates and provides additional supply into the 750 Zone to support the 650 Zone demands.

The scenario was re-evaluated assuming construction of the 775 Zone emergency BPS. In this case, the Catta Verdera BPS did not operate, as the 775 Zone BPS also supplied the 650 Zone. Similar to Emergency Scenario 2, inflow from the regulated PCWA connections were slightly increased; if not adjusted, after three days of supply loss, the levels in the Conspiracy Point Tank and Verdera Tank No. 3 drop to approximately 15 feet and 12 feet, respectively. This drop in the 575 Zone tank levels would cause minimum pressures in the 475 and 575 Zones to decrease but remain above 40 psi during peak hour. As with Emergency Scenario 2, it is recommended the emergency 775 Zone emergency BPS be constructed.

7.3.2.2.4 Emergency Scenario 4: 750 Zone Unregulated PCWA Connection Failure

Emergency Scenario 4 assumes the failure of the unregulated PCWA connection supplying the 750 and 610 Zones with the Catta Verdera BPS online. As discussed in Chapter 2, prior to the installation of the unregulated PCWA connection, the Catta Verdera BPS historically provided supply to these zones. In the

event of an unregulated PCWA connection failure, the Catta Verdera BPS is capable of meeting zone demands which was confirmed when this scenario was evaluated in the model.

In the event of the 750 Zone unregulated connection failure, the Catta Verdera BPS becomes a critical pumping facility as defined by the criteria in Chapter 5. Therefore, it is recommended to install a permanent generator at the facility to ensure reliable operation. The construction of the 750 Zone emergency BPS is not required for this emergency scenario as the Catta Verdera BPS can provide adequate supply to the 750 and 610 Zones.

7.3.2.2.5 Emergency Scenario 5: Conspiracy Point Tank 30-inch Diameter Pipeline Failure

Emergency Scenario 5 assumes a break in the 30-inch diameter transmission pipeline downstream of the Conspiracy Point Tank into the distribution system. Assuming the outflow from the Conspiracy Point Tank is shut off after the pipeline break, the Conspiracy Point Tank levels would continuously increase. However, City operations staff continuously monitor tank levels through SCADA and would make an immediate adjustment to the inflow into the Conspiracy Point Tank to prevent the tank from overflowing. The 3 MG Tank reaches its minimum level after six hours, and Verdera Tank No. 3 reaches its minimum level after 10 hours. Minimum pressures in the majority of the system drop below 40 psi five hours after the pipeline break.

Adjustments to model controls were made to identify operational recommendations. Within four hours after the pipeline break (i.e., before pressures drop below 40 psi and the Conspiracy Point Tank overflows), it is recommended City operations staff make the following adjustments to maintain adequate service during repairs:

- Shut off valve for the 30-inch diameter transmission pipeline downstream of the Conspiracy Point Tank
- Shut off supply into the Conspiracy Point Tank
- Increase supply through the regulated PCWA connection at the metering station at the Verdera Tank No. 3 site
- Turn on all groundwater wells
- Reduce inflow significantly into the 3 MG Tank

With these adjustments, the levels in the active tanks are generally lower than levels during normal operations; Verdera Tank No. 3 ranges from approximately 7 to 14 feet, while the 3 MG Tank ranges from approximately 9 to 20 feet. Figure 7-5 shows the change in minimum pressures compared to normal operations under maximum day demand (Figure 7-2). Pressures in the western portion of the 375 Zone increase by 5 to 10 psi, while pressures in the 575 Zone decrease by 5 to 10 psi north of Stonebridge Boulevard and by more than 10 psi south of Stonebridge Boulevard. However, almost all customer service locations remain above 40 psi under peak hour demand, with the exception of three locations near Rossi Lane, where minimum pressures are approximately 35 to 36 psi, as shown on Figure 7-5.

7.3.2.2.6 Emergency Scenario 6: Three Largest Groundwater Wells Offline

Emergency Scenario 6 assumes the City's three largest capacity groundwater wells (i.e., Nelson, Fiddyment, and Moore Road Wells) are offline. Operations remain the same as the normal operations under maximum day demand evaluation except the two wells that are operating are the two smallest capacity wells: Well 2 (800 gpm) and Westwood Well (900 gpm). Results of the evaluation indicate that

there are minimal effects on the system if the three largest capacity wells are offline. Pressures drop minimally (0 to 1.5 psi) compared to the pressures from the normal operations under maximum day demand. There are no customer service locations that experience pressures below 40 psi during peak hour. No recommendations are made for this scenario.

7.3.2.2.7 Emergency Scenario 7: Stoneridge Blvd 24-inch Diameter Pipeline Failure

Emergency Scenario 7 assumes a break in the 24-inch diameter transmission pipeline in Stonebridge Boulevard west of the Catta Verdera BPS. Figure 7-6 shows the change in minimum pressures compared to normal operations under maximum day demand (Figure 7-2). As shown on Figure 7-6, minimum pressures in the 575 Zone north of Twelve Bridges Drive decrease by five (5) to more than 15 psi, with the greatest impacts occurring in neighborhoods north and south of Stonebridge Boulevard (i.e., along Hidden Hills Lane, Monument Drive, Winding Way, Blue Heron Loop, Kingfisher Lane, and Spring Valley Parkway). Minimum pressures in the 575 Zone south of Twelve Bridges Drive increase slightly by 0 to 5 psi, while pressures in the rest of the system decrease minimally by 0 to 5 psi. However, no customer service locations in the entire system drop below 40 psi under peak hour demand. No recommendations are made for this scenario.

7.3.2.2.8 Emergency Scenario 8: 3 MG Tank 20-inch Diameter Pipeline Failure

Emergency Scenario 8 assumes a break in the 20-inch diameter transmission pipeline downstream of the 3 MG Tank into the distribution system. Assuming the outflow from the 3 MG Tank is shut off after the pipeline break, the 3 MG Tank levels would continuously increase. However, City operations staff continuously monitor tank levels through SCADA and would make an immediate adjustment to the inflow into the 3 MG Tank to prevent the tank from overflowing. The Conspiracy Point Tank reaches its minimum level after 33 hours, and Verdera Tank No.3 reaches its minimum level after 32 hours. Minimum pressures in the Turkey Creek Estates and Lincoln Meadows developments drop below 40 psi five hours after the pipeline break.

Similar to Emergency Scenario 5, adjustments to model controls were made to identify operational recommendations. Within four hours after the pipeline break (i.e., before pressures drop below 40 psi), it is recommended City operations staff make the following adjustments to maintain adequate service to customers while the pipeline is being repaired:

- Shut off valve for the 20-inch diameter transmission pipeline downstream of the 3 MG Tank
- Reduce inflow into the 3 MG Tank
- Turn on two groundwater wells
- Decrease supply through the regulated PCWA connection at the metering station at the Conspiracy Point Tank site
- Decrease supply through the regulated PCWA connection at the metering station at the Verdera Tank No. 3 site

With these adjustments, tank levels are generally lower than levels during normal operations; the 3 MG Tank ranges from approximately 11 to 16 feet, the Conspiracy Point Tank ranges from approximately 11 to 19 feet, while Verdera Tank No. 3 ranges from approximately 8 to 16 feet. Figure 7-7 shows the change in minimum pressures compared to normal operations under maximum day demand (Figure 7-2). As shown on Figure 7-7, the Esplanade and Turkey Creek Estates developments in the 375 Zone experience the largest minimum pressure decrease by more than 10 psi and pressures southwest of Esplanade decrease

by 10 to 15 psi. Majority of pressures in the remaining 375 Zone decrease by 5 to 10 psi, while pressures in the remainder of the system decrease minimally by 0 to 5 psi. However, most customer service locations remain above 40 psi under peak hour demand, with the exception of Turkey Creek Estates, where minimum pressures are approximately 35 to 39 psi, as shown on Figure 7-7.

The City may consider installing a temporary emergency BPS to help boost pressures in Turkey Creek Estates in the event of emergency. However, it should be noted, within the next five years, the 20-inch diameter transmission pipeline is planned to be replaced by a 30-inch diameter transmission pipeline and a new pressure zone (450 Zone) will be created to serve Village 1 developments located in high elevations. This transmission pipeline replacement and new 450 Zone are planned to be completed as part of the Leavell Ranch Project in Village 1 and West Yost is currently conducting a water system hydraulic evaluation to assess the impacts of this development on the City's water system. The proposed 450 Zone will be supplied through a PRS from the 575 Zone with a secondary PRS from the 610 Zone. Additionally, as part of the Leavell Ranch development, an emergency PRS from the 450 to 375 Zone near Turkey Creek Estates is recommended to be constructed which will provide a secondary supply avenue for the 375 Zone. This emergency PRS would help alleviate low pressures in the event of the 20-inch diameter pipeline (or new 30-inch diameter pipeline) failure. Recommendations associated with the Leavell Ranch Project are further evaluated and discussed in Chapter 8.

7.3.2.2.9 Emergency Scenario 9: Verdera Tank No. 3 36-inch Diameter Pipeline Failure

Emergency Scenario 9 assumes a break in the 36-inch diameter transmission pipeline downstream of Verdera Tank No. 3 into the distribution system. Assuming the outflow from Verdera Tank No. 3 is shut off after the pipeline break, Verdera Tank No. 3 tank levels would continuously increase. However, City operations staff continuously monitor tank levels through SCADA and would make an immediate adjustment to the inflow into Verdera Tank No. 3 to prevent the tank from overflowing. The Conspiracy Point Tank reaches its minimum level after seven hours, and the 3 MG Tank reaches its minimum level after 11 hours. Minimum pressures at several locations in the system drop below 40 psi five hours after the pipeline break.

Similar to Emergency Scenario 5, adjustments to model controls were made to identify operational recommendations. Within four hours after the pipeline break (i.e., before pressures drop below 40 psi), it is recommended City operations staff make the following adjustments to maintain adequate service to customers while the pipeline is being repaired:

- Shut off valve for the 36-inch diameter transmission pipeline downstream of Verdera Tank No. 3
- Shut off supply into Verdera Tank No. 3
- Increase supply through the regulated PCWA connection at the metering station at the Conspiracy Point Tank site
- Turn on all groundwater wells
- Reduce inflow significantly into the 3 MG Tank

With these adjustments, the levels in the active tanks are generally lower than levels during normal operations; Conspiracy Point Tank ranges from approximately 7 to 15 feet, while the 3 MG Tank ranges from approximately 9 to 20 feet. Figure 7-8 shows the change in minimum pressures compared to normal operations under maximum day demand (Figure 7-2). Pressures in the western portion of the 375 Zone

increase by 5 to 10 psi, while pressures in the 575 Zone decrease by more than 10 psi north of Twelve Bridges Drive and by 5 to 10 psi south of Twelve Bridges Drive. However, almost all customer service locations remain above 40 psi under peak hour demand, with the exception of three locations near Rossi Lane, where minimum pressures are approximately 36 to 38 psi, as shown on Figure 7-8.

7.3.2.2.10 Emergency Scenario 10: Zone Control Valve in the Camino Cielo Walking Path Failure

Emergency Scenario 10 assumes failure of the normally closed 12-inch diameter zone control valve located in the Camino Cielo walking path, which separates the 610 and 575 Zones. For this scenario, the valve is assumed to fail fully open, resulting in an average flow of 1,050 gpm and a maximum flow of 1,400 gpm from the 610 Zone to the 575 Zone.

With the 610 Zone supplying the 575 Zone, flow from the unregulated PCWA connection in the 750 Zone increases substantially to meet the additional 575 Zone demands and significantly exceeds the contracted maximum deliverable amount by 226 percent. The Catta Verdera BPS also operates continuously to support demands in the 750 and 610 Zones, but because it draws from the 575 Zone it is effectively pumping in a loop. Additionally, the 575 Zone tanks continuously fill and reach overflow levels about three days after the valve failure, while the level in the 3 MG Tank is approximately 23 feet.

The main concern with a sudden failure of a zone control valve is the resulting pressure changes and high velocities. In the 610 Zone, minimum pressures decrease on average by six (6) psi; however, no customer service locations drop below 40 psi. In the 575 Zone, maximum pressures increase by four (4) to five (5) psi, with most locations remaining below 120 psi. Figure 7-9 shows the maximum pressures under maximum day demand in the 575 Zone. As shown on Figure 7-9, a few customer service locations north and south of Stonebridge Boulevard (i.e., along Winding Way, Blue Heron Loop, and Monument Drive) and at the southeastern border of the 575 Zone exceed the maximum pressure criterion, however, pressures remain at or below 125 psi. Areas with known maximum pressures near 135 psi along Hidden Hills Lane increase to approximately 136 to 139 psi. Pressures in the remainder of the system remain similar to normal conditions.

It is recommended City consider the following to maintain adequate service to customers while the zone control valve is being repaired:

- Shut off the Catta Verdera BPS to prevent pumping in a circle
- Close valves feeding the 12-inch diameter pipeline connected to the zone control valve to isolate the valve for repair
- Install motor-operated valves upstream and downstream of the 12-inch diameter pipelines to be able to quickly isolate the valve for repair

7.3.2.2.11 Emergency Scenario 11: Zone Control Valve at Anton Lane and Andover Lane Failure

Emergency Scenario 11 assumes the failure of the normally closed 8-inch diameter zone control valve located at the intersection of Anton Lane and Andover Lane, which separates the 475 and 375 Zones. For this scenario, the valve is assumed to fail fully open, resulting in an average flow of 2,224 gpm and a maximum flow of 2,400 gpm from the 475 Zone to the 375 Zone. Due to the increase in supply from the 475 Zone, supply from the 3 MG Tank would decrease and tank levels would continuously increase. However, City operations staff continuously monitor tank levels through SCADA and would make an

immediate adjustment to the inflow into the 3 MG Tank to prevent the tank from overflowing. Tank levels in the Conspiracy Point Tank and Verdera Tank No. 3 are at 10 feet and 4 feet, respectively.

As previously discussed, the main concern with a sudden failure of a zone control valve is the resulting pressure changes and high velocities. Figure 7-10 shows the change in minimum pressures compared to normal operations under maximum day demand (Figure 7-2) and locations of maximum velocity exceedances. In the 475 Zone, minimum pressures near the valve decrease by five (5) to more than 15 psi, while the remainder of the zone experiences minimal decreases of 0 to 1 psi; no customer service locations drop below 40 psi during peak hour. In the 375 Zone, maximum pressures closest to the valve increase by 2 to 3 psi, with no locations exceeding 120 psi.

As shown on Figure 7-10, the largest pressure decreases and highest velocities occur upstream of the valve along the 8-inch diameter pipelines in Anton Lane and in Beckwith Lane between Anton Lane and Monument Drive. This segment experiences extremely high velocities, with an average of 14.3 fps and maximum values ranging from 10 to 15 fps. These high velocities for long-sustained periods can lead to pipeline breaks. Pressures and velocities in the remainder of the system remain similar to normal conditions. No recommendations are made for this scenario, however, the City should be aware of the pipelines in this location if the valve failure were to occur.

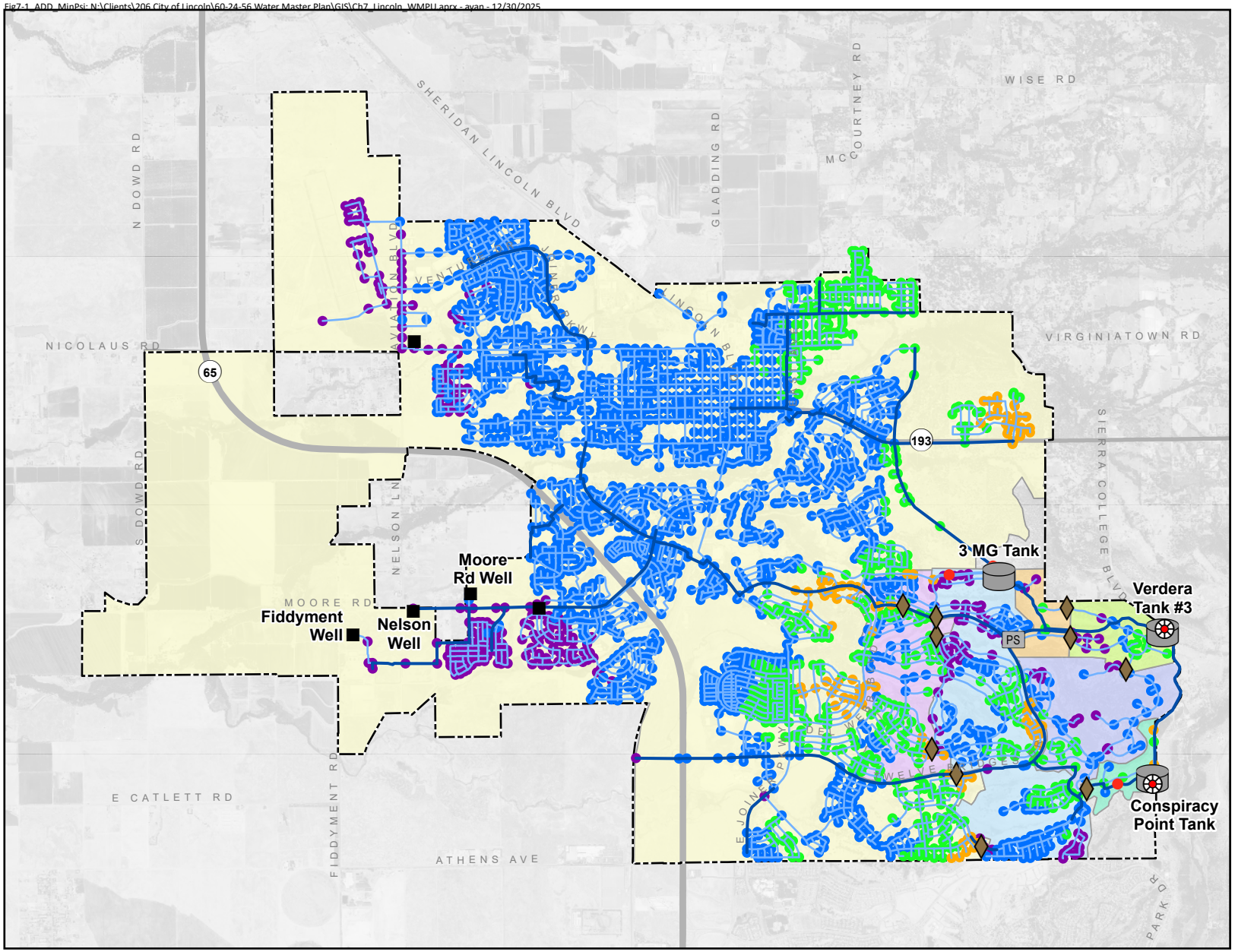
7.4 SUMMARY OF FINDINGS AND RECOMMENDATIONS FOR THE EXISTING WATER SYSTEM

Findings and recommended improvements for the existing water system are summarized below. Figure 7-11 summarizes all recommended improvements for the existing water system. These recommendations are used to develop a recommended capital improvement program, which is further described in Chapter 10.

- Supply
  - No supply-related improvements are recommended.
- 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 MG of EGWC and improve system reliability.
  - Address the existing storage deficit in the 750 Pressure Zone through construction of a new emergency booster pump station at the Verdera Tank No. 3 tank site with a minimum capacity of two (2) mgd.
  - Address the existing storage deficit in the 775 Pressure Zone through construction of a new emergency booster pump station at the Conspiracy Point Tank site with a minimum capacity of four (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
  - 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 they fail 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.
- Other Recommendations
  - Update flushing program to include water quality parameters to improve water quality in the developments in northeastern extent of City limits, the Turkey Creek Estates development, and the Airport Area.

Fig7-1_ADD_MinPsi: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU.aprx - ayan - 12/30/2025



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

Existing System Facilites

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

Existing Boundaries

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

Notes:

1. Total system average day demand is 9.0 million gallons per day (refer to Table 7-1).
2. Velocities in the entire system are less than 7 feet per second.

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0 3,000 6,000 Feet

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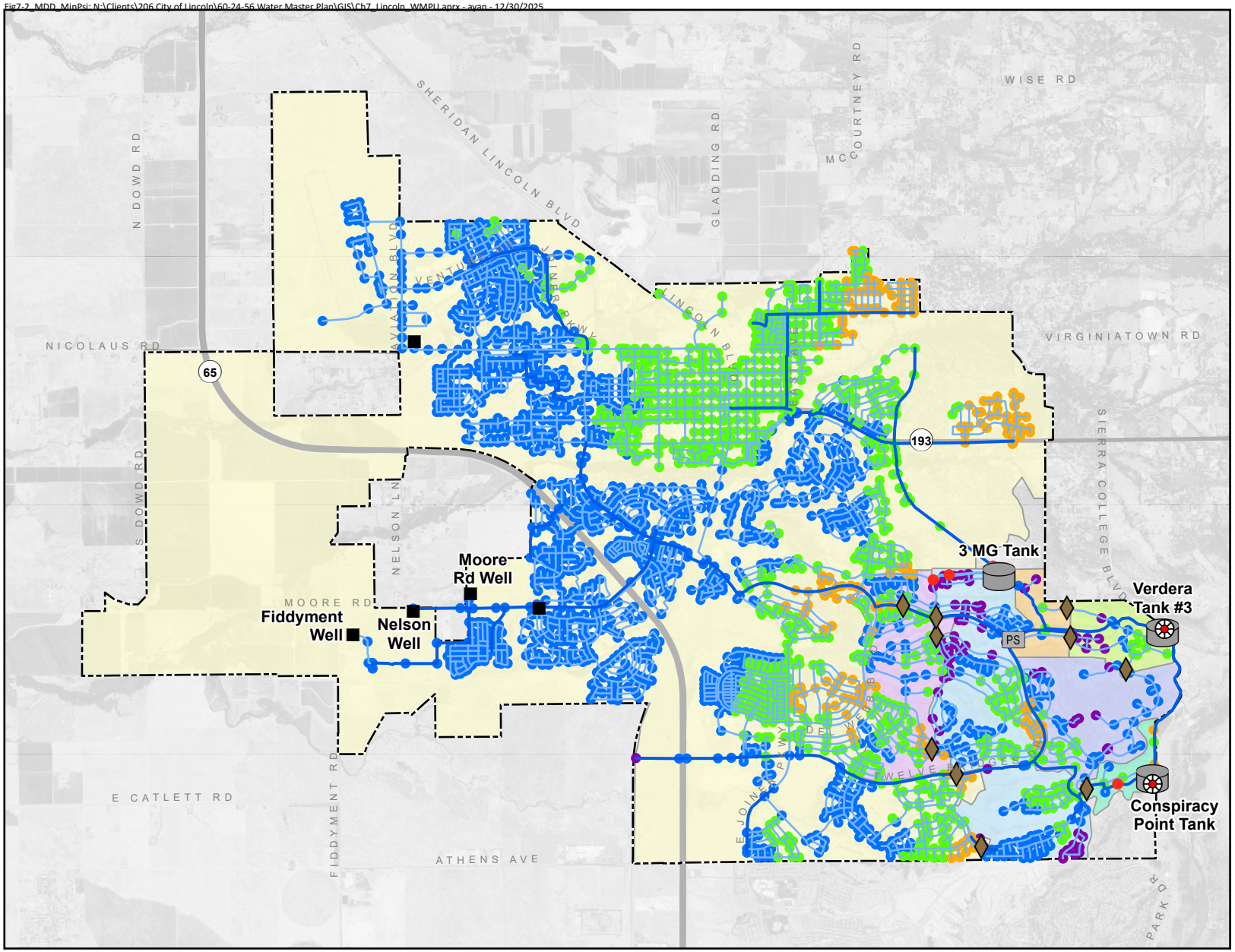
Minimum Pressure at Average Day Demand

Existing Water System

Figure 7-1

Fig7-2_MDD_MinPsi: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU.aprx - ayan - 12/30/2025



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

Existing System Facilites

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

Existing Boundaries

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

Notes:

1. Total system maximum day demand is 16.9 mgd and peak hour demand is 36.9 mgd (refer to Table 7-1).
3. Velocities in the entire system are less than 7 fps.

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0 3,000 6,000 Feet

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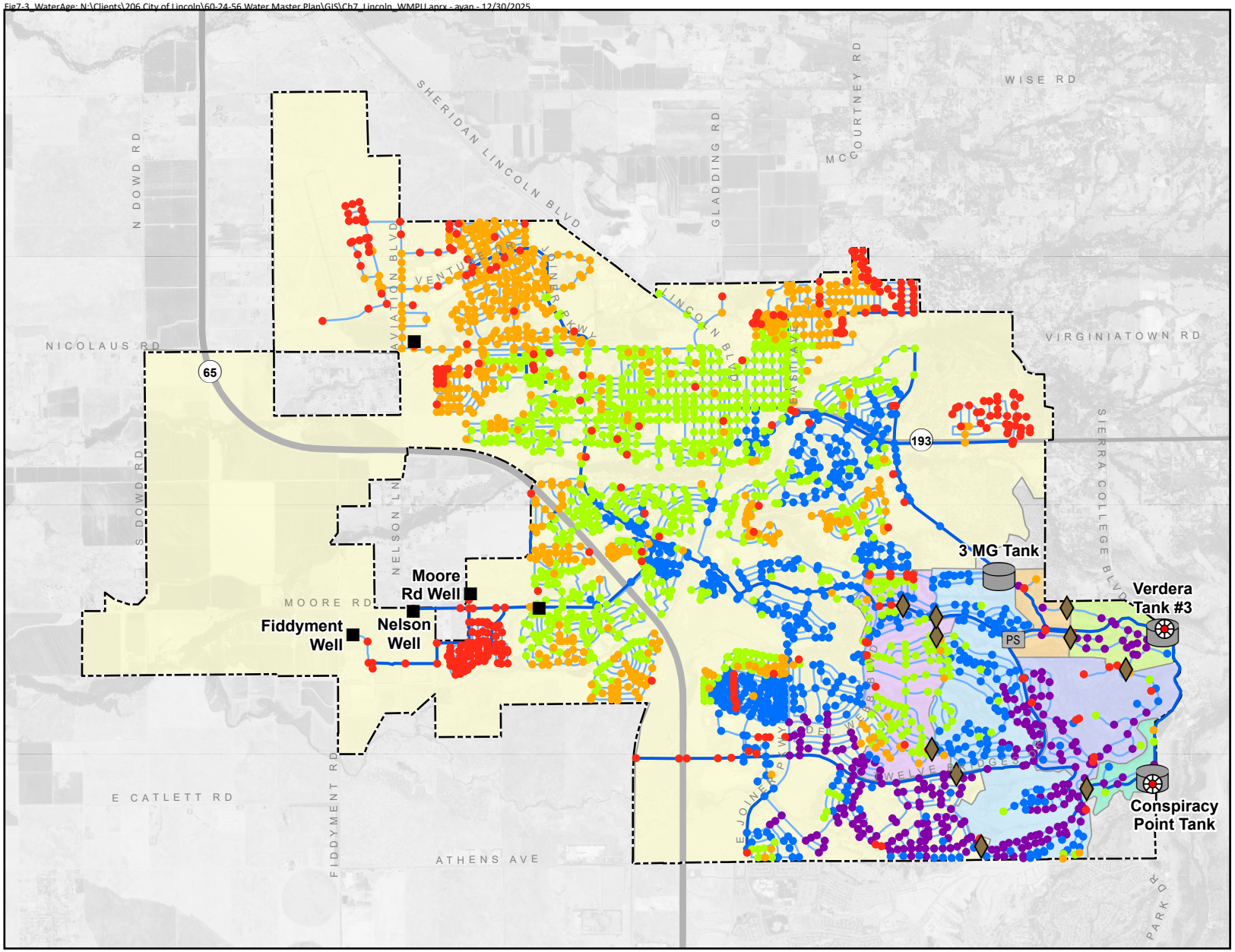
Minimum Pressure at Maximum Day Demand
Existing Water System
Figure 7-2

Fig7-3_WaterAge: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU.aprx - ayan - 12/30/2025



Maximum Water Age

- Less than 2 days
- 2 - 3 days
- 3 - 4 days
- 4 - 7 days
- Greater than 7 days

Existing System Facilites

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

Existing Boundaries

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

Notes:

1. Total system minimum day demand is 4.7 mgd which was used to develop the minimum day diurnal in Chapter 3.
2. Water age was evaluated over a 30-day period.

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0 3,000 6,000 Feet

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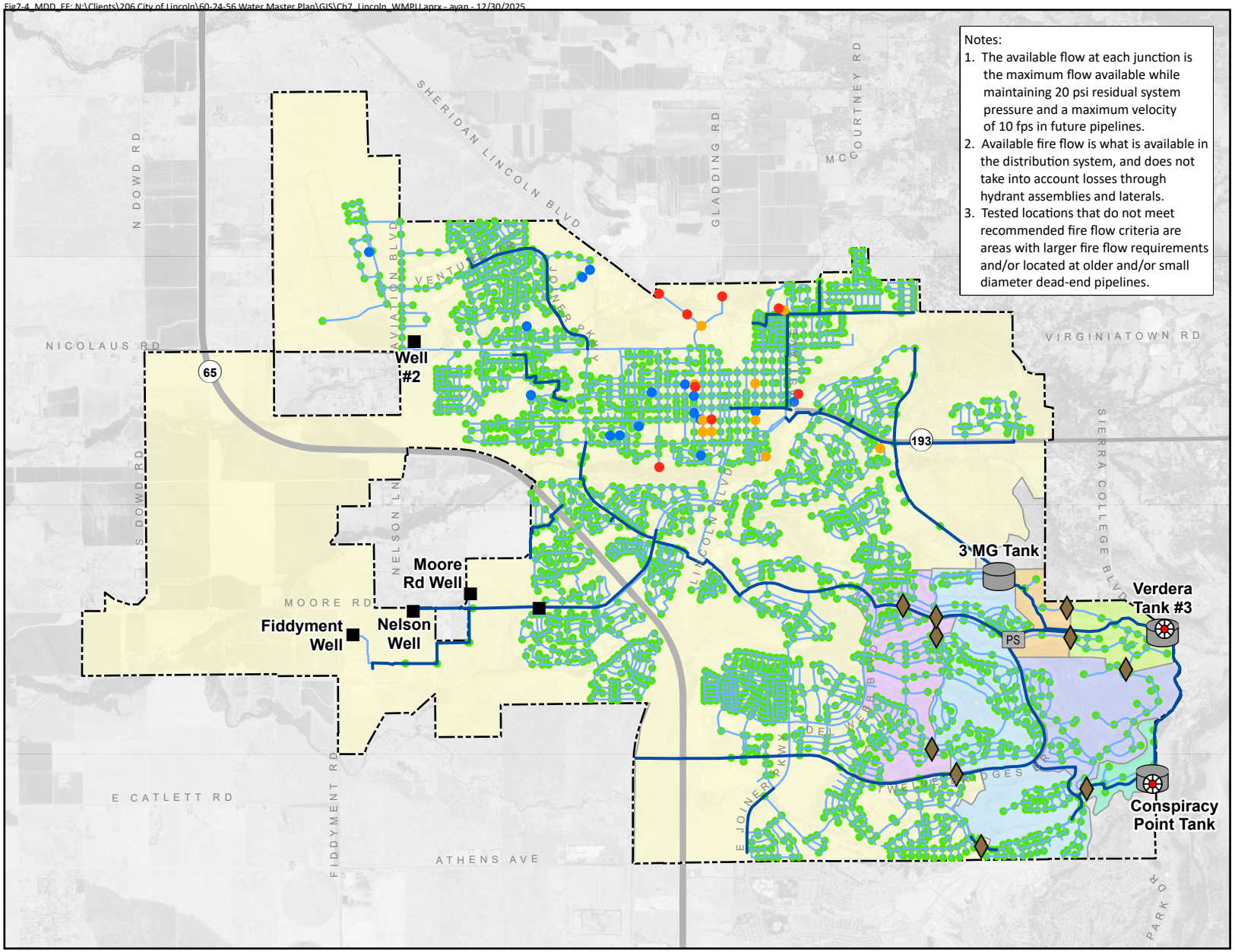
Maximum Water Age at Minimum Day Demand

Existing Water System

Figure 7-3

Fig7-4_MDD_FF: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU.aprx - ayan - 12/30/2025



Percent of Available Fire Flow

- ≥ 100% of Criteria
- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

Existing System Facilites

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

Existing Boundaries

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

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0 3,000 6,000 Feet

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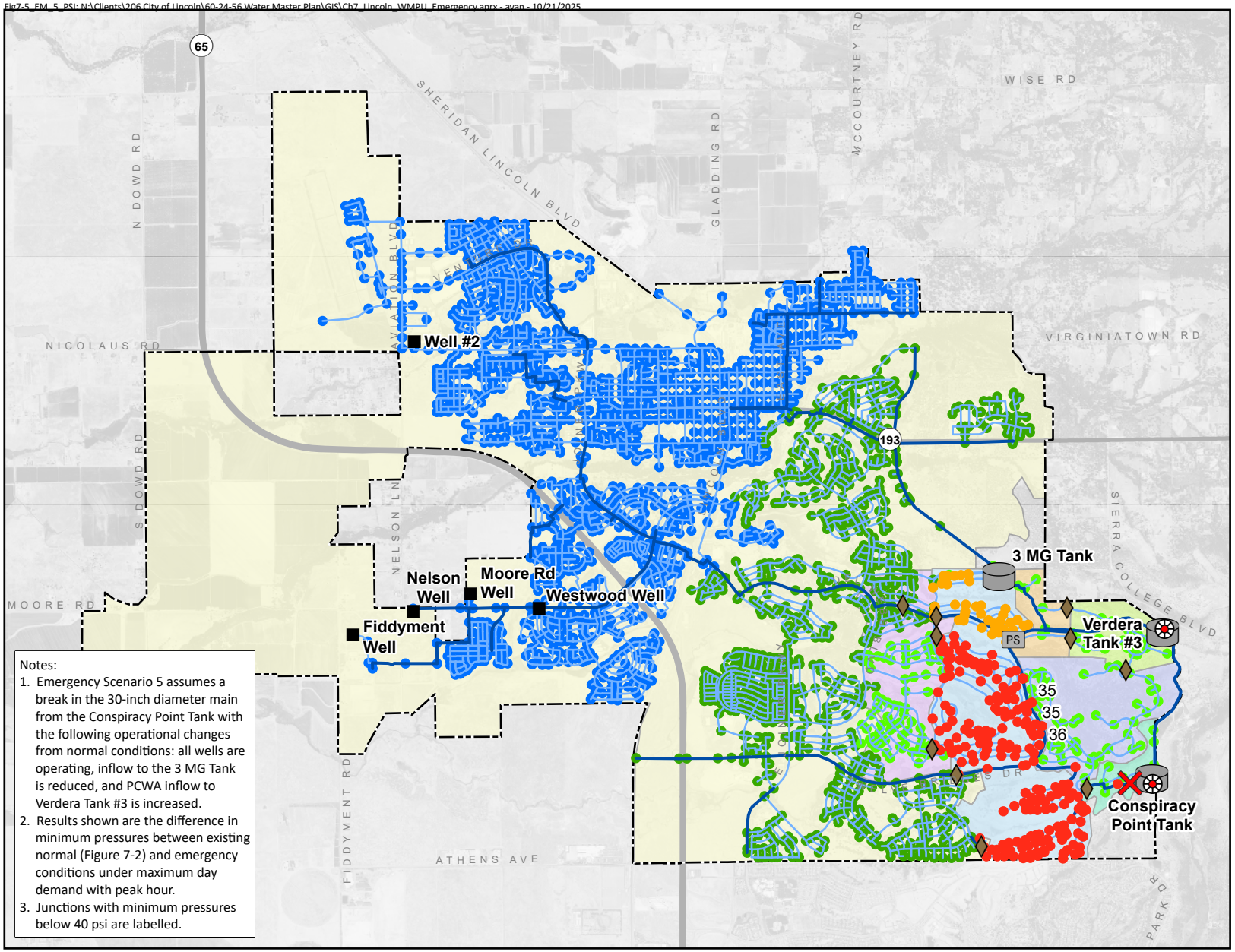
Percent of Fire Flow Requirement Available

Existing Water System

Figure 7-4

Fig7-5_EM_5_PSI: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU_Emergency.aprx - ayan - 10/21/2025



Notes:
1. Emergency Scenario 5 assumes a break in the 30-inch diameter main from the Conspiracy Point Tank with the following operational changes from normal conditions: all wells are operating, inflow to the 3 MG Tank is reduced, and PCWA inflow to Verdera Tank #3 is increased.
2. Results shown are the difference in minimum pressures between existing normal (Figure 7-2) and emergency conditions under maximum day demand with peak hour.
3. Junctions with minimum pressures below 40 psi are labelled.

Transmission Main Break

Change in Pressure
- Greater than -10 psi
- -10 to -5 psi
- -5 to 0 psi
- 0 to 5 psi
- 5 to 10 psi
- Greater than 10 psi

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

Boundaries
- 375 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit

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N

0 3,000 6,000 Feet

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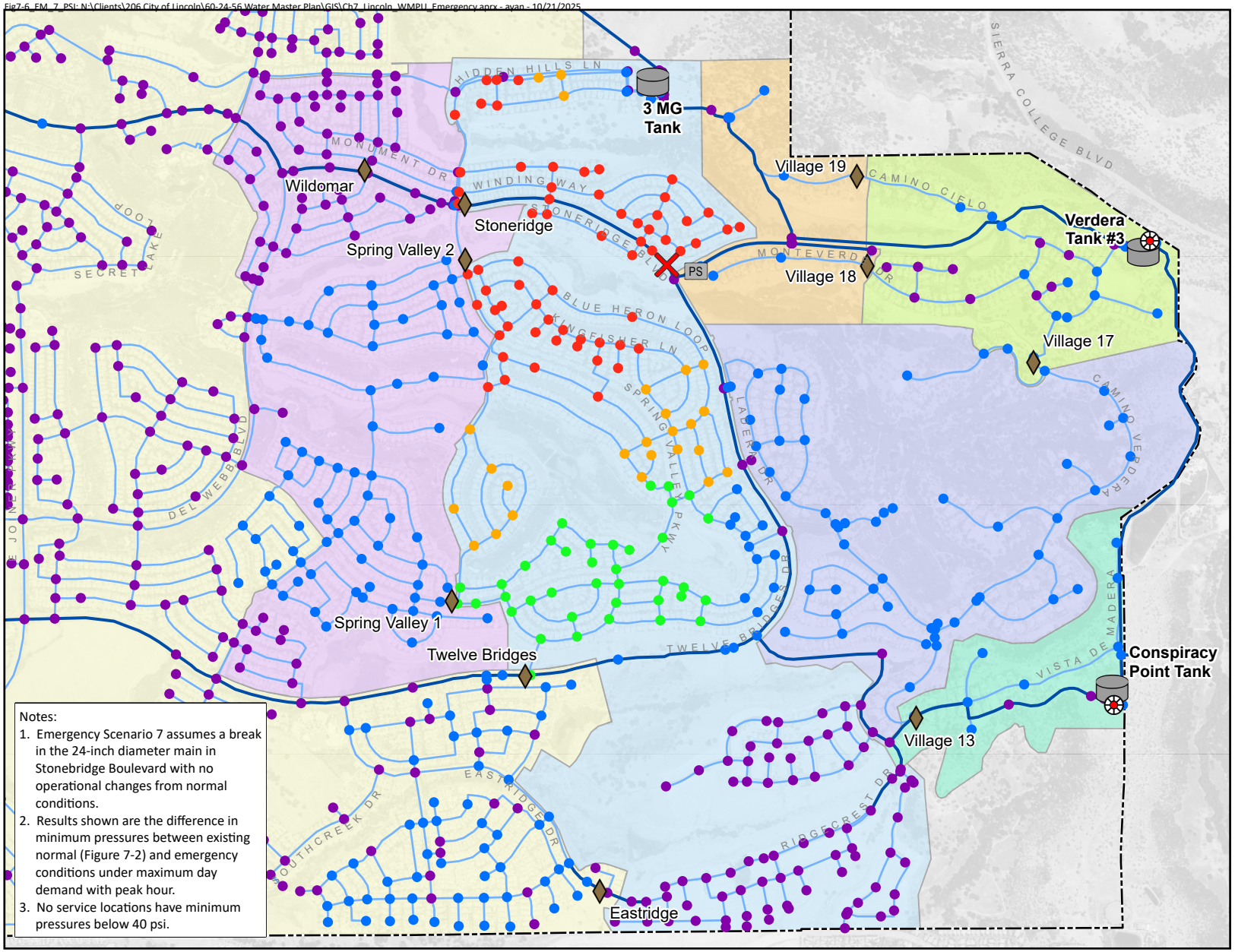
Change in Minimum Pressures
Emergency Scenario 5
Figure 7-5



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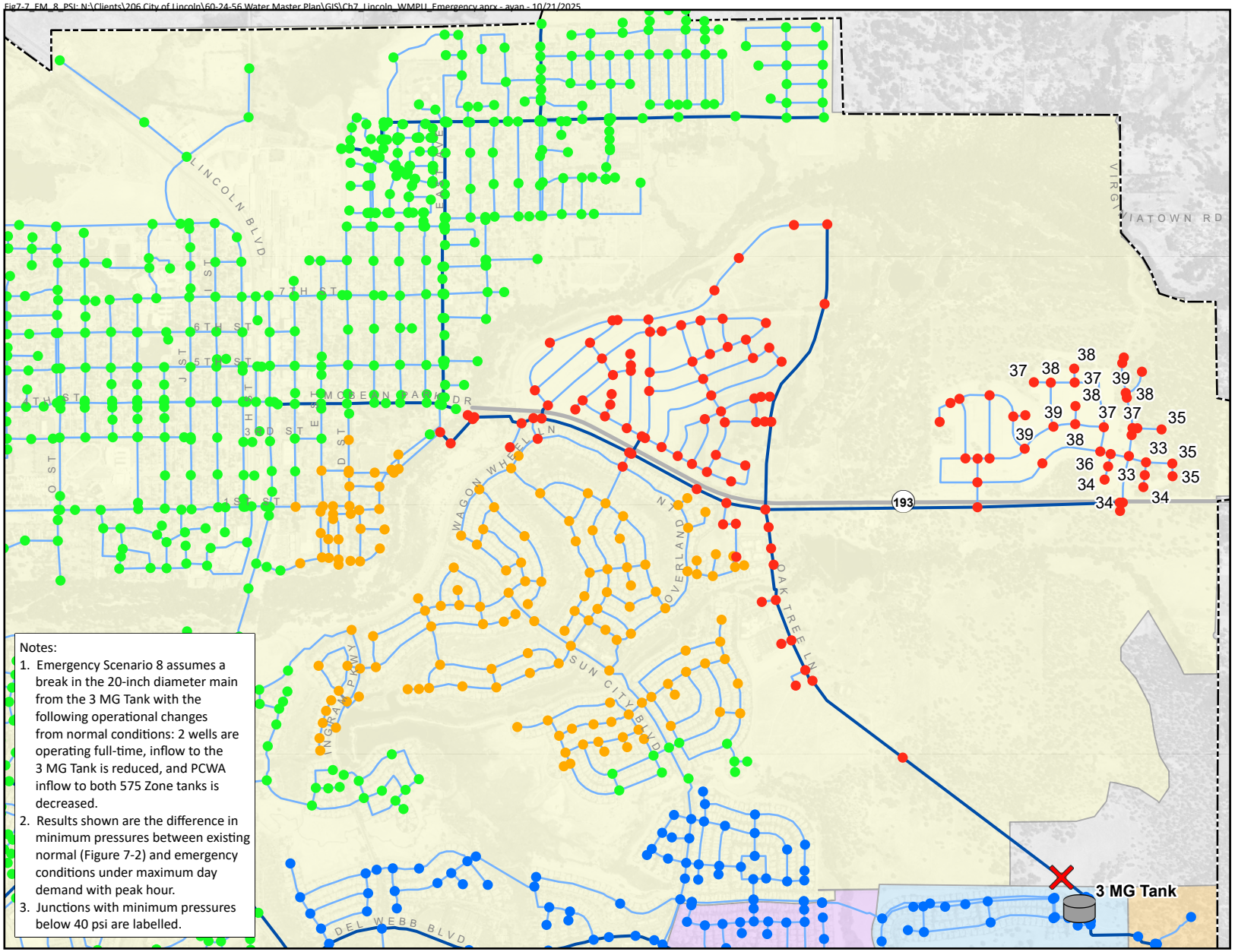
Change in Minimum Pressures

Emergency Scenario 7

Figure 7-6

Fig7-7_EM_8_PSI: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU_Emergency.aprx - ayan - 10/21/2025



Notes:
1. Emergency Scenario 8 assumes a break in the 20-inch diameter main from the 3 MG Tank with the following operational changes from normal conditions: 2 wells are operating full-time, inflow to the 3 MG Tank is reduced, and PCWA inflow to both 575 Zone tanks is decreased.
2. Results shown are the difference in minimum pressures between existing normal (Figure 7-2) and emergency conditions under maximum day demand with peak hour.
3. Junctions with minimum pressures below 40 psi are labelled.

Transmission Main Break

Change in Pressure
- Greater than -15 psi
- -15 to -10 psi
- -10 to -5 psi
- -5 to 0 psi
- 0 to 5 psi

System Facilities
- Storage Tank
- Distribution Pipeline (<18-inch)
- Transmission Pipeline (≥18-inch)

Boundaries
- 375 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- Existing City Limit

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WEST YOST

N

0 1,000 2,000 Feet

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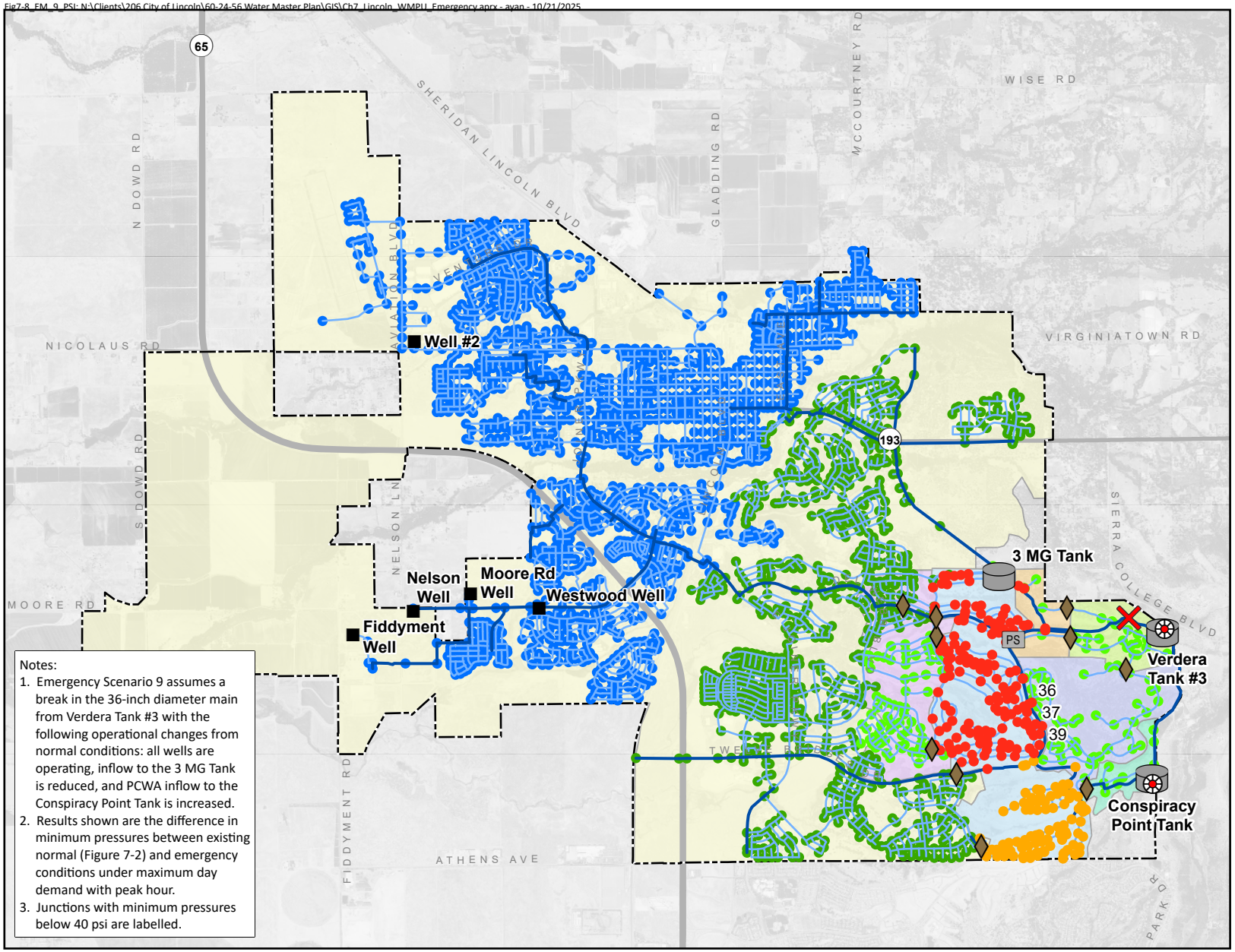
Change in Minimum Pressures
Emergency Scenario 8
Figure 7-7

Fig7-8_EM_9_PSI: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU_Emergency.aprx - ayan - 10/21/2025



Notes:
1. Emergency Scenario 9 assumes a break in the 36-inch diameter main from Verdera Tank #3 with the following operational changes from normal conditions: all wells are operating, inflow to the 3 MG Tank is reduced, and PCWA inflow to the Conspiracy Point Tank is increased.
2. Results shown are the difference in minimum pressures between existing normal (Figure 7-2) and emergency conditions under maximum day demand with peak hour.
3. Junctions with minimum pressures below 40 psi are labelled.

Transmission Main Break

Change in Pressure
- Greater than -10 psi
- -10 to -5 psi
- -5 to 0 psi
- 0 to 5 psi
- 5 to 10 psi
- Greater than 10 psi

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

Boundaries
- 375 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit

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0 3,000 6,000 Feet

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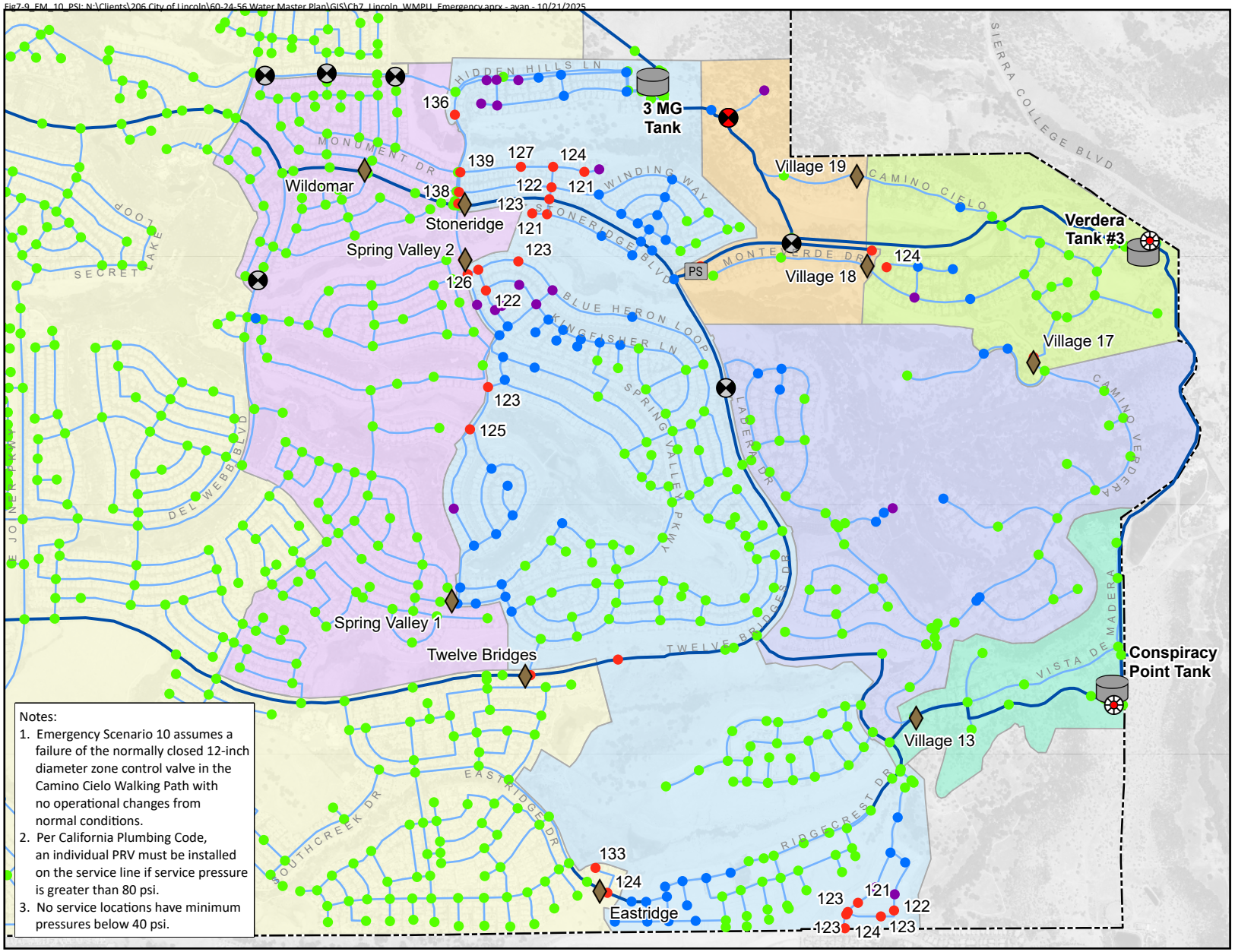
Change in Minimum Pressures
Emergency Scenario 9
Figure 7-8



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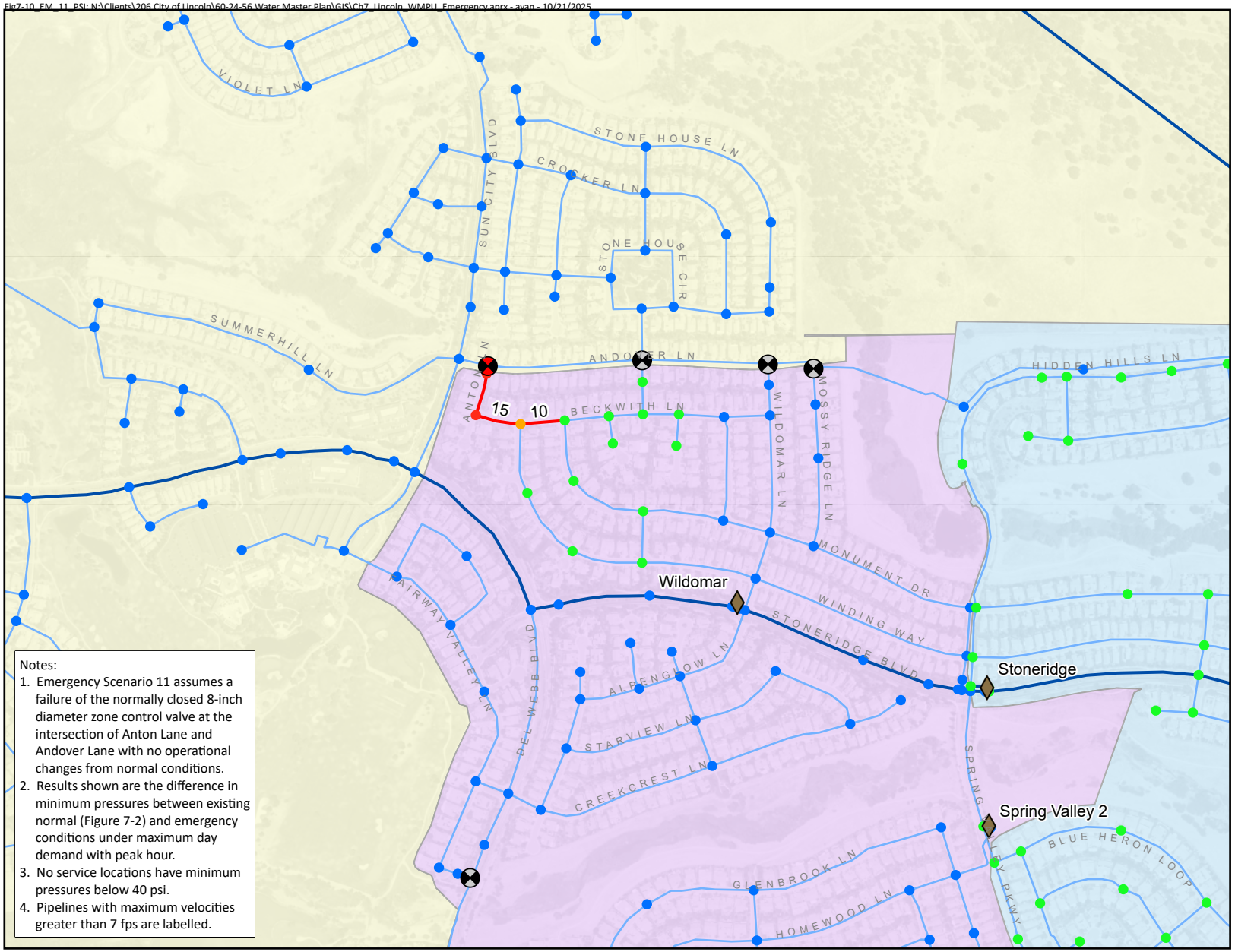
Maximum Pressures at Maximum Day Demand
Emergency Scenario 10
Figure 7-9

Fig7-10_EM_11_PSI: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch7_Lincoln_WMPU_Emergency.aprx - ayan - 10/21/2025



Notes:
1. Emergency Scenario 11 assumes a failure of the normally closed 8-inch diameter zone control valve at the intersection of Anton Lane and Andover Lane with no operational changes from normal conditions.
2. Results shown are the difference in minimum pressures between existing normal (Figure 7-2) and emergency conditions under maximum day demand with peak hour.
3. No service locations have minimum pressures below 40 psi.
4. Pipelines with maximum velocities greater than 7 fps are labelled.

Zone Break Valve Failure (Open)

Pipeline Velocity Greater Than 7 fps

Change in Pressure

- Greater than -15 psi
- -15 to -10 psi
- -10 to -5 psi
- -5 to 0 psi
- 0 to 5 psi

System Facilites

Zone Break Valve (Normally Closed)

Pressure Regulating Station

Distribution Pipeline (<18-inch)

Transmission Pipeline (≥18-inch)

Boundaries

- 375 Zone
- 475 Zone
- 575 Zone

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0 400 800 Feet

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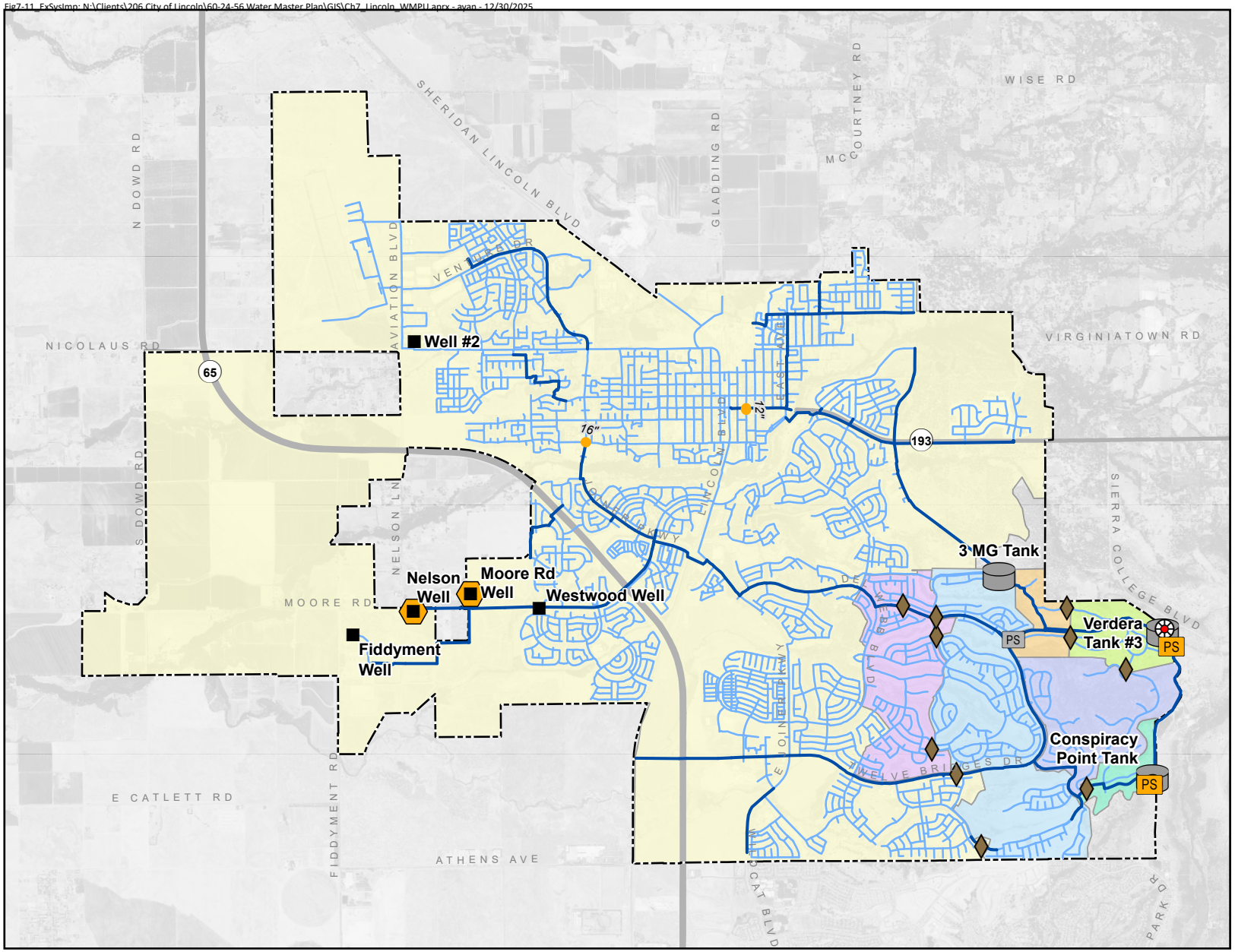
Change in Minimum Pressures

Emergency Scenario 11

Figure 7-10



Prepared by:

WEST YOST

N

0 3,000 6,000 Feet

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Recommended Improvements
Existing Water System
Figure 7-11

CHAPTER 8
Future System Evaluation

This chapter presents the evaluation of the City's future water system, and its ability to support projected phasing and buildout demands (described in Chapter 3) while meeting the recommended performance and operational criteria (described in Chapter 5).

This evaluation includes an analysis of water supply capacity, storage capacity, and pumping capacity, as well as the distribution system's ability to meet recommended operational and design criteria under 5-Year, 10-Year, 15-Year, and Buildout average day demand, maximum day demand (including peak hour), and maximum day demand plus fire flow scenarios. West Yost conducted this evaluation using the calibrated hydraulic model described in Chapter 6. The hydraulic model was subsequently updated to include recommended improvements developed as part of the existing water system evaluation (see Chapter 7) and assumes the recommended existing system improvements are completed for the phasing and buildout scenarios. Recommendations from this evaluation are used to develop a recommended Capital Improvement Program (CIP), which is detailed in Chapter 10.

The following sections present the evaluation methodology and results from the future water system analysis:

- Future Water System Description
- Future Water Demand
- Future Water Supply and Water System Facility Capacity Evaluation
- Future Water Distribution System Performance Evaluation
- Summary of Findings and Recommendations for the Future Water System

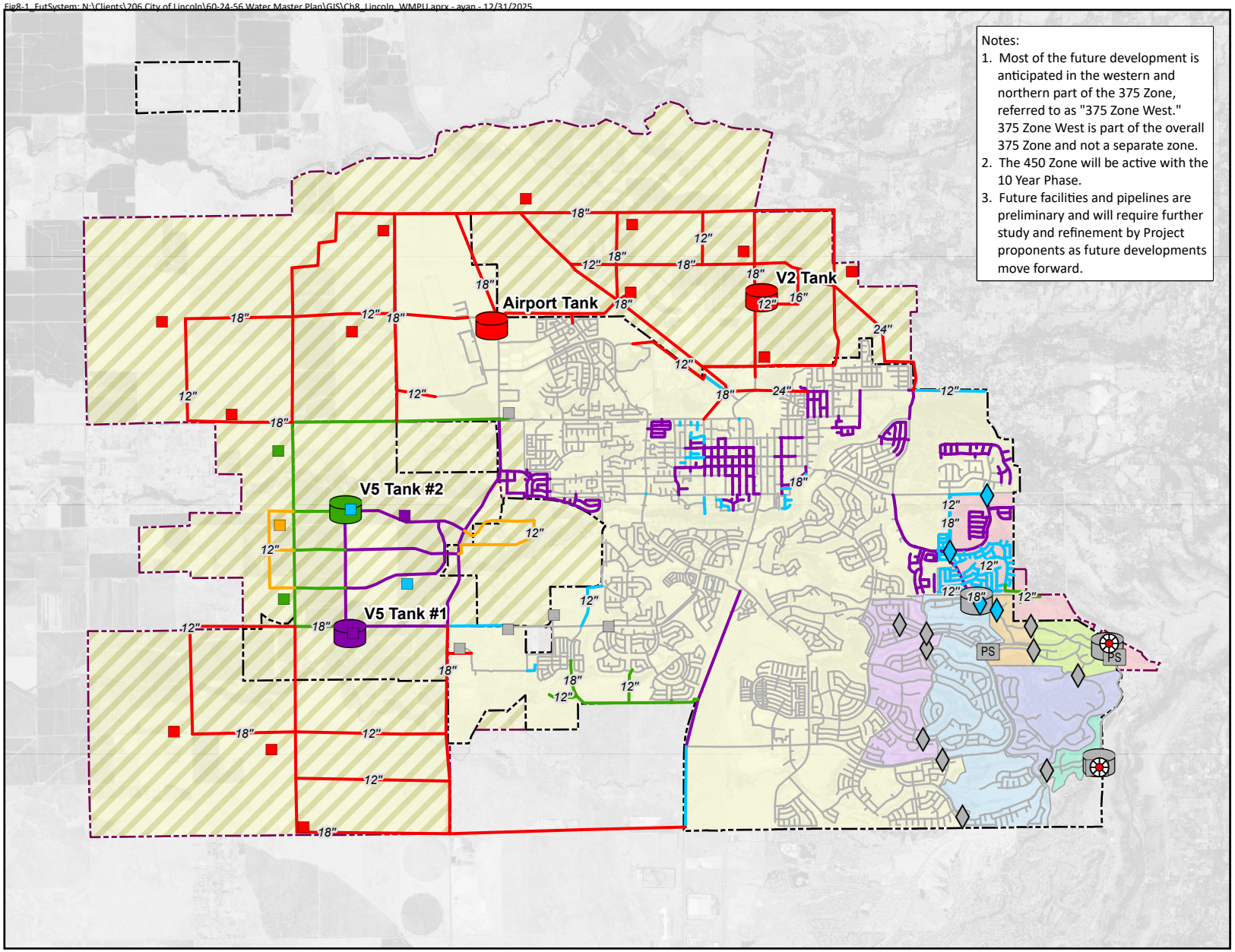
8.1 FUTURE WATER SYSTEM DESCRIPTION

Figure 8-1 shows the backbone water distribution system network recommended for the future system. The backbone pipelines shown on Figure 8-1 serve as a basis for supplying future development in the Villages and Special Use Districts (SUDs) described in Chapter 3. Pipelines are color coded to indicate the anticipated timing they are needed to support future demands. Recommended future groundwater wells and storage tanks are also shown on Figure 8-1. As discussed in Chapter 4, future groundwater wells are recommended to be equipped with ASR capability. Sizing and layout of future wells and storage tanks are preliminary and based on the data used for the WMPU. As future development plans are refined, infrastructure needs may change, and the City should require Project proponents to confirm the proposed infrastructure meets all design criteria presented in Chapter 5.

In addition, the recommended existing system improvements (i.e., emergency booster pump stations at the Conspiracy Point Tank and Verdera Tank No. 3 tank sites) detailed in Chapter 7 are included on Figure 8-1. These existing system improvements were assumed to be constructed but inactive for the normal operation of the future system.

Currently, West Yost is conducting a water system hydraulic evaluation to assess the impacts of the Leavell Ranch Project within Village 1. Due to high elevations in parts of the development, a new 450 Zone is recommended to be created to be able to meet the City's minimum system criteria. The 450 Zone is shown on Figure 8-1 in the southeast area of the City. The 450 Zone will be supplied through a PRS from the 575 Zone with a secondary PRS from the 610 Zone to provide required system supply redundancy. In addition, emergency PRSs from the 450 Zone will be added to support the 375 Zone.

Fig8-1_FutSystem: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 12/31/2025



Phasing Color Legend

- Existing
- 5 Year
- 10 Year
- 15 Year
- 20 Year
- Buildout

System Facilities

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

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N

0 3,750 7,500 Feet

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Future Water System

Figure 8-1

Most of the future development within the City's service area is anticipated to occur in the western and northern part of the 375 Zone. These future developments are referred to as "375 Zone West" in the tables for the future demand projections and facility capacity evaluations in the subsequent sections. However, it should be noted that 375 Zone West is part of the overall 375 Zone and not a separate zone.

8.2 FUTURE WATER DEMAND

Future demand conditions used in the water system evaluation are based on projected land uses and water use factors discussed in Chapter 3. Projected future demands were added to the existing baseline demands (described in Chapter 3 and Chapter 7) to develop projected 5-Year, 10-Year, 15-Year, 20-Year, and Buildout baseline water demands. The future water demands were spatially located in the hydraulic model based on the future development land use areas. Tables 8-1 to 8-5 summarize the City's future water demands for each of the pressure zones over the five phases. As discussed in Section 8.1, the majority of the future development occurs in the western and northern 375 Zone, which is separated out as 375 Zone West for identification purposes.

The City's 5-Year water demands are summarized in Table 8-1. Maximum day demands were calculated based on the recommended peaking factor of 1.9 times the average day demand. Peak hour demands were calculated based on the recommended peaking factor of 2.2 times the maximum day demand. The 5-Year baseline average day demands are expected to be 10.9 mgd, or a 20 percent increase over existing baseline demands (previously presented in Table 7-1). As shown in Table 8-1, approximately 82 percent of the City's overall 5-Year demand is located within the 375 and 375 West Zones. The proposed 450 Zone is assumed to not be active in the 5-Year Phase, and therefore, no demands are projected.

Table 8-1. 5-Year Future Baseline Demands

Pressure Zone	Average Day Demand[a]		Maximum Day Demand[b]		Peak Hour Demand[c]	
	gpm	mgd	gpm	mgd	gpm	mgd
375 Zone[d]						
Existing 375	5,692	8.2	10,815	15.6	23,793	34.3
375 West	462	0.7	877	1.3	1,929	2.8
375 Zone Subtotal	*6,154*	*8.9*	*11,692*	*16.9*	*25,722*	*37.1*
Remaining Zones						
450	0	0.0	0	0.0	0	0.0
475	398	0.6	756	1.1	1,663	2.4
575	559	0.8	1,062	1.5	2,336	3.4
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.2
750	115	0.2	219	0.3	482	0.7
775	44	0.1	84	0.1	185	0.3
Remaining Zone Subtotal	*1,369*	*2.0*	*2,602*	*3.6*	*5,725*	*8.3*
Total Demand	**7,523**	**10.9**	**14,294**	**20.5**	**31,447**	**45.4**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6) plus projected 5-Year demands (refer to Table 3-11).

(b) Maximum day demand is calculated using a peaking factor of 1.9 times the average day demand (refer to Table 3-7).

(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).

(d) Most of the future development within the City is anticipated to occur in the western and northern part of the 375 Zone, referred to as 375 Zone West. It should be noted 375 Zone West is part of the overall 375 Zone and not a separate zone.

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

The City's 10-Year baseline demands are summarized in Table 8-2. The 10-Year baseline average day demands are expected to be 14.0 mgd, or a 54 percent increase over existing baseline demands (previously presented in Table 7-1). Approximately 81 percent of the City's 10-Year baseline demand is located within the 375 and 375 West Zones.

Table 8-2. 10-Year Future Baseline Demands

Pressure Zone	Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
	gpm	mgd	gpm	mgd	gpm	mgd
375 Zone[(d)]						
Existing 375	6,348	9.2	12,061	17.4	26,534	38.2
375 West	1,550	2.2	2,945	4.2	6,479	9.3
375 Zone Subtotal	*7,898*	*11.4*	*15,006*	*21.6*	*33,013*	*47.5*
Remaining Zones						
450	444	0.6	844	1.2	1,857	2.7
475	398	0.6	756	1.1	1,663	2.4
575	559	0.8	1,062	1.5	2,336	3.4
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.2
750	115	0.2	219	0.3	482	0.7
775	44	0.1	84	0.1	185	0.3
Remaining Zone Subtotal	*1,813*	*2.6*	*3,446*	*4.8*	*7,582*	*11.0*
Total Demand	**9,711**	**14.0**	**18,452**	**26.4**	**40,595**	**58.5**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6) plus projected 10-Year demands (refer to Table 3-11).
(b) Maximum day demand is calculated using a peaking factor of 1.9 times the average day demand (refer to Table 3-7).
(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).
(d) Most of the future development within the City is anticipated to occur in the western and northern part of the 375 Zone, referred to as 375 Zone West. It should be noted 375 Zone West is part of the overall 375 Zone and not a separate zone.

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

The City's 15-year baseline demands are summarized in Table 8-3. The 15-Year baseline average day demands are expected to be 16.9 mgd, or an 86 percent increase over existing baseline demands (previously presented in Table 7-1). Approximately 85 percent of the City's 15-year baseline demand is located within the 375 and 375 West Zones.

Table 8-3. 15-Year Future Baseline Demands

Pressure Zone	Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
	gpm	mgd	gpm	mgd	gpm	mgd
375 Zone[(d)]						
Existing 375	6,540	9.4	12,426	17.9	27,337	39.4
375 West	3,345	4.8	6,355	9.2	13,981	20.1
375 Zone Subtotal	*9,885*	*14.2*	*18,781*	*27.1*	*41,318*	*59.5*
Remaining Zones						
450	444	0.6	844	1.2	1,857	2.7
475	398	0.6	756	1.1	1,663	2.4
575	559	0.8	1,062	1.5	2,336	3.4
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.2
750	115	0.2	219	0.3	482	0.7
775	44	0.1	84	0.1	185	0.3
Remaining Zone Subtotal	*1,813*	*2.7*	*3,446*	*4.8*	*7,582*	*11.0*
Total Demand	**11,698**	**16.9**	**22,227**	**31.9**	**48,900**	**70.5**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6) plus projected 15-Year demands (refer to Table 3-11).

(b) Maximum day demand is based on the 2023 maximum day demand data (refer to Table 3-6).

(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).

(d) Most of the future development within the City is anticipated to occur in the western and northern part of the 375 Zone, referred to as 375 Zone West. It should be noted 375 Zone West is part of the overall 375 Zone and not a separate zone.

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

The City's 20-year baseline demands are summarized in Table 8-4. The 20-Year baseline average day demands are expected to be 18.9 mgd, or a 109 percent increase over existing baseline demands (previously presented in Table 7-1). Approximately 86 percent of the City's 20-year baseline demand is located within the 375 and 375 West Zones.

Table 8-4. 20-Year Future Baseline Demands

Pressure Zone	Average Day Demand[a]		Maximum Day Demand[b]		Peak Hour Demand[c]	
	gpm	mgd	gpm	mgd	gpm	mgd
375 Zone[d]						
Existing 375	6,666	9.6	12,665	18.3	27,863	40.1
375 West	4,596	6.6	8,732	12.6	19,210	27.7
375 Zone Subtotal	*11,262*	*16.2*	*21,397*	*30.9*	*47,073*	*67.8*
Remaining Zones						
450	444	0.6	844	1.2	1,857	2.7
475	398	0.6	756	1.1	1,663	2.4
575	559	0.8	1,062	1.5	2,336	3.4
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.2
750	115	0.2	219	0.3	482	0.7
775	44	0.1	84	0.1	185	0.3
Remaining Zone Subtotal	*1,813*	*2.7*	*3,446*	*4.8*	*7,582*	*11.0*
Total Demand	**13,075**	**18.9**	**24,843**	**35.7**	**54,655**	**78.8**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6) plus projected 20-Year demands (refer to Table 3-11).

(b) Maximum day demand is based on the 2023 maximum day demand data (refer to Table 3-6).

(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).

(d) Most of the future development within the City is anticipated to occur in the western and northern part of the 375 Zone, referred to as 375 Zone West. It should be noted 375 Zone West is part of the overall 375 Zone and not a separate zone.

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

The City's buildout baseline demands are summarized in Table 8-5. The Buildout baseline average day demands are expected to be 35.3 mgd, or a 292 percent increase over existing baseline demands (previously presented in Table 7-1). Approximately 93 percent of the City's buildout baseline demand is located within the 375 and 375 West Zones.

Table 8-5. Buildout Future Baseline Demands

Pressure Zone	Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
	gpm	mgd	gpm	mgd	gpm	mgd
375 Zone[(d)]						
Existing 375	6,733	9.7	12,793	18.4	28,145	40.5
375 West	15,976	23.0	30,354	43.8	66,779	96.2
375 Zone Subtotal	*22,709*	*32.7*	*43,147*	*62.2*	*94,924*	*136.7*
Remaining Zones						
450	444	0.6	844	1.2	1,857	2.7
475	398	0.6	756	1.0	1,663	2.4
575	559	0.8	1,062	1.5	2,336	3.4
610	54	0.1	103	0.1	227	0.3
650	199	0.3	378	0.5	832	1.2
750	115	0.2	219	0.3	482	0.7
775	44	0.1	84	0.1	185	0.3
Remaining Zone Subtotal	*1,813*	*2.6*	*3,446*	*4.7*	*7,582*	*11.0*
Total Demand	**24,522**	**35.3**	**46,593**	**66.9**	**102,506**	**147.7**

(a) Average day demand is based on 2023 average day demand data (refer to Table 3-6) plus projected buildout demands (refer to Table 3-11).

(b) Maximum day demand is based on the 2023 maximum day demand data (refer to Table 3-6).

(c) Peak hour demand is calculated using a peaking factor of 2.2 times the maximum day demand (refer to Table 3-7).

(d) Most of the future development within the City is anticipated to occur in the western and northern part of the 375 Zone, referred to as 375 Zone West. It should be noted 375 Zone West is part of the overall 375 Zone and not a separate zone.

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

8.3 FUTURE WATER SUPPLY AND WATER SYSTEM FACILITY CAPACITY EVALUATION

The following capacity evaluations were conducted for the existing water system and are discussed in more detail in subsequent sections:

- Supply Capacity Evaluation
- Pumping Capacity Evaluation
- Storage Capacity Evaluation
- Pressure Regulating Station Capacity Evaluation

8.3.1 Supply Capacity Evaluation

As described in Chapter 5, the recommended supply capacity criterion requires the City to provide firm supply capacity equal to the maximum day demand. For the future water system, firm groundwater well capacity is defined as 50 percent of the City's maximum day demand with the largest well pump out of service. As discussed in Chapter 4, future PCWA supply assumptions are based on the existing agreements in effect at the time of preparation of this WMPU and the City will need to construct new groundwater ASR wells to achieve the firm groundwater well capacity criterion. Each new well is assumed to have a capacity of 1.7 mgd (1,200 gpm) and will be equipped with backup power or plug-in adaptors to provide additional credit toward the EGWC discussed in Section 8.3.3. Tables 8-6 to 8-10 summarize the results of the five phases. The tables show the comparison of projected maximum day demands to the recommended firm supply.

Table 8-6 summarizes the results of the 5-Year supply capacity evaluation and shows that the City has a supply surplus of 10.1 mgd. Two new wells are assumed to be added to the system by the end of the 5-Year Phase.

Table 8-6. Comparison of Projected Demand versus 5-Year Future Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Maximum Day Demand	20.5	System-wide maximum day demand (refer to Table 8-1)
Firm Supply		
[B] Surface Water from PCWA	20.4	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	10.2	Firm capacity at groundwater wells[(b)]
[D] Total Supply	***30.6***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	***10.1***	***[E] = [D] - [A]***

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 20.4 mgd and based on existing agreements at the time of preparation of this WMPU (refer to Figure 4-3).

(b) Firm groundwater well capacity is assumed to be 50 percent of MDD with the largest well out of service.

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

Table 8-7 summarizes the results of the 10-Year supply capacity evaluation and shows that the City has a supply surplus of 9.4 mgd. Two new wells are assumed to be added to the system by the end of the 10-Year Phase in addition to the two new wells previously added in the 5-Year Phase.

Table 8-7. Comparison of Projected Demand versus 10-Year Future Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Maximum Day Demand	26.4	System-wide maximum day demand (refer to Table 8-2)
Firm Supply		
[B] Surface Water from PCWA	22.7	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	13.1	Firm capacity at groundwater wells[(b)]
[D] Total Supply	***35.8***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	***9.4***	***[E] = [D] - [A]***

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 22.7 mgd and based on existing agreements at the time of preparation of this WMPU (refer to Figure 4-3).
(b) Firm groundwater well capacity is assumed to be 50 percent of MDD with the largest well out of service.
mgd = million gallons per day; gpm = gallons per minute

Table 8-8 summarizes the results of the 15-year supply capacity evaluation and shows that the City has a supply surplus of 9.0 mgd. Two new wells are assumed to be added to the system by the end of the 15-Year Phase in addition to the four new wells added in the previous phases.

Table 8-8. Comparison of Projected Demand versus 15-Year Future Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Maximum Day Demand	31.9	System-wide maximum day demand (refer to Table 8-3)
Firm Supply		
[B] Surface Water from PCWA	25.0	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	15.9	Firm capacity at groundwater wells[(b)]
[D] Total Supply	***40.9***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	***9.0***	***[E] = [D] - [A]***

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 25.0 mgd and based on existing agreements at the time of preparation of this WMPU (refer to Figure 4-3).
(b) Firm groundwater well capacity is assumed to be 50 percent of MDD with the largest well out of service.
mgd = million gallons per day; gpm = gallons per minute

Table 8-9 summarizes the results of the 20-Year supply capacity evaluation and shows that the City has a supply surplus of 9.3 mgd. One new well is assumed to be added to the system by the end of the 20-Year Phase in addition to the six new wells added in the previous phases.

Table 8-9. Comparison of Projected Demand versus 20-Year Future Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Maximum Day Demand	35.7	System-wide maximum day demand (refer to Table 8-4)
Firm Supply		
[B] Surface Water from PCWA	27.3	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	17.7	Firm capacity at groundwater wells[(b)]
[D] Total Supply	***45.0***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	***9.3***	***[E] = [D] - [A]***

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 27.3 mgd and based on existing agreements at the time of preparation of this WMPU (refer to Figure 4-3).

(b) Firm groundwater well capacity is assumed to be 50 percent of MDD with the largest well out of service.

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

Table 8-10 summarizes the results of the buildout supply capacity evaluation and shows that the City has a supply deficit of 4.5 mgd based on the assumptions for firm supply. Nine new wells are assumed to be added to the system by buildout in addition to the seven new wells added in the previous phases to achieve 50 percent of maximum day demands. A total of 16 new groundwater wells would be added to the City's future water system by Buildout.

Additional water supply sources would be required by buildout. Evaluation of future supply alternatives to meet buildout demands should be conducted. It is recommended the City perform the following:

- Conduct a study to evaluate obtaining additional capacity from PCWA facilities, such as potential modifications and/or expansions to metering stations, and additional PCWA water supply sources in western Placer County (e.g., RiverArc Project).[1]
- Conduct an evaluation on groundwater replenishment, including ASR and basin recharge.
- Conduct a study within the next five years to explore buildout supply options which would be used as a framework for developers to provide supply solutions since the increase in water demands are driven by development.
- Conduct a feasibility and reliability study to evaluate how the City can utilize the water supply from NID.
- Conduct an evaluation on the impacts of increased use of recycled water on potable water demand offsets.
- Monitor system demands to verify water conservation impacts on future consumption.

[1] As discussed in Chapter 4, additional agreements between the City and PCWA would be required to obtain additional supply capacity.

Table 8-10. Comparison of Projected Demand versus Buildout Future Supply Capacity

Component	Capacity, mgd	Notes
Demand		
[A] Maximum Day Demand	66.9	System-wide maximum day demand (refer to Table 8-5)
Firm Supply		
[B] Surface Water from PCWA	29.0	Entitlement under Contract for Treated Water Supply with PCWA[(a)]
[C] Groundwater	33.4	Firm capacity at groundwater wells[(b)]
[D] Total Supply	***62.4***	***[D] = [B] + [C]***
[E] Supply Capacity Surplus (Deficit)	***(4.5)***	***[E] = [D] - [A]***

(a) The firm water supply from PCWA is assumed to be the City's maximum delivery entitlement of 29.0 mgd and based on existing agreements at the time of preparation of this WMPU (refer to Figure 4-3).

(b) Firm groundwater well capacity is assumed to be 50 percent of MDD with the largest well out of service.

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

8.3.2 Pumping Capacity Evaluation

Future pumping capacity in the City's water system was evaluated to assess its ability to deliver a reliable firm capacity to meet demand conditions outlined in Chapter 5, dependent on whether the pressure zone has gravity storage.

The City's future system will incorporate at grade storage tanks with pump stations in the 375 Zone West area of the City to support the proposed developments as well as new ASR wells to provide additional supply to the area. The pump stations for the at grade storage tanks are intended to support the system during peak demands and emergency conditions. The maximum day demands are anticipated to be met through the supply capacity. Therefore, the pumping capacity evaluation for the 375 Zone West area of the City assumes the required pumping capacity is the difference between maximum day demands and peak hour demands plus the maximum fire flow requirement. The existing area in the 375 Zone is expected to continue to be supported through gravity storage from the 3 MG Tank and from the PRSs feeding the zone.

Table 8-11 shows the results for the pumping capacity evaluation of the 375 Zone West area for the five phases. For the Buildout phase, there is a slight pumping capacity deficit. This deficit is a result of the projected supply capacity deficit discussed in Section 8.3.1 and shown in Table 8-10.

Existing water storage facilities, in conjunction with the available EGWC[2], were evaluated to determine whether the City's existing storage capacity is sufficient to meet future demands. Tables 8-12 to 8-16 summarize the results of the storage capacity evaluations on the five phases of the City's future water system. Recommended storage improvements for each phase are incorporated into the storage capacity evaluation for the subsequent phase.

2 Available EGWC includes the firm capacity of groundwater supply that can be reliably accessed, which includes the existing wells and new future wells from the supply capacity evaluation.

The 750 and 775 Zones were previously identified in the existing system storage capacity evaluation as having a deficit. These zones are supplied through the unregulated connections from PCWA which accounts for the operational storage serving these zones. As the unregulated supply currently does not include local distribution system storage for the 750 and 775 Zones, it was identified that the construction of emergency pump stations could provide redundant backup fire flow and a more resilient emergency supply to the zones from the Verdera Tank No.3 and Conspiracy Point Tank, in the unlikely scenario that the PCWA unregulated water supply becomes temporarily unavailable. Since there is no growth projected for these zones, they are not included in the storage tables for the future system.

Table 8-12 summarizes results from the 5-Year storage capacity evaluation. As shown in Table 8-12, there is a storage capacity surplus in the 375 and 575 Zones and deficit in the 375 West Zone. The deficit in the 375 West Zone can be alleviated through the construction of the planned 2 MG storage tank in Village 5.

Table 8-13 summarizes results from the 10-Year storage capacity evaluation. As shown in Table 8-13, there is a storage capacity surplus in the 375 and 575 Zones and minor deficit in the 375 West Zone. No recommendations are made for the 375 West Zone since the deficit is minor (0.01 mgd) and will be resolved by the recommended 15-Year storage improvement.

Table 8-14 summarizes results from the 15-year storage capacity evaluation. As shown in Table 8-14, there is a storage capacity surplus in the 375 and 575 Zones and deficit in the 375 West. The deficit in the 375 West Zone can be alleviated through the construction of an additional 2 MG storage tank in Village 5.

Table 8-15 summarizes results from the 20-Year storage capacity evaluation. As shown in Table 8-15, there is a storage capacity surplus in the 375 and 575 Zones and deficit in the 375 West. No recommendations are made for the 375 West Zone since the deficit is minor (0.11 mgd) and will be resolved by the recommended Buildout storage improvement.

Table 8-16 summarizes results from the buildout storage capacity evaluation. As shown in Table 8-16, there is a storage capacity surplus in the 375 and 575 Zones and deficit in the 375 West. The deficit in the 375 West Zone can be alleviated through the construction of a 5 MG storage Tank in Village 2 and a 3 MG storage tank in the Airport area.

8.3.3 Storage Capacity Evaluation

Water storage provides operational storage to balance differences in demands and supplies, emergency storage in case of a supply failure, and water to fight fires. The City's water system has two sources of available storage: above-ground storage (i.e., storage tanks) and storage available in the groundwater basin. Together, these two sources must be sufficient to meet the City's operational, emergency, and fire flow storage criteria. The City's water storage capacity requirements are further described in Chapter 5.

Table 8-11. Comparison of Required versus Available Pumping Capacity for 375 Zone West

Pumping Station/Well Name[a]	Required Pumping Capacity, gpm[b] [A]	Booster Pump Stations Firm Capacity[c] [B]	Groundwater Wells Firm Capacity[d] [C]	Total Available Pumping Capacity [D] = [B] + [C]	Pump Capacity Surplus (Deficit), gpm [E] = [D] - [A]
5-Year					
Village 5 Tank #1 Pump Station 2 Future Wells 5 Existing Wells	5,052	2,250	6,500	8,750	3,698
10-Year					
Village 5 Tank #1 Pump Station 4 Future Wells 5 Existing Wells	7,534	2,250	8,900	11,150	3,616
15-Year					
Village 5 Tank #1 Pump Station Village 5 Tank #2 Pump Station 6 Future Wells 5 Existing Wells	11,626	4,500	11,300	15,800	4,174
20-Year					
Village 5 Tank #1 Pump Station Village 5 Tank #2 Pump Station 7 Future Wells 5 Existing Wells	14,478	4,500	12,500	17,000	2,522
Buildout					
Village 5 Tank #1 Pump Station Village 5 Tank #2 Pump Station Village 2 Tank Pump Station Airport Tank Pump Station 16 Future Wells 5 Existing Wells	40,425	13,000	23,300	36,300	(4,125)

(a) All future wells are assumed to be equipped with ASR capability.

(b) Required pumping capacity for the 375 Zone West assumes the required pumping capacity is the difference between maximum day demands and peak hour demands (refer to Tables 8-1 to 8-5) plus the maximum fire flow requirement which is 4,000 gpm for schools.

(c) Includes the firm capacity of all booster pump stations supplying the pressure zone. Firm pump capacity at booster pump stations is defined as total booster pump station capacity with the largest pump out of service.

(d) Groundwater wells firm capacity is total groundwater well capacity with the largest well out of service.

gpm = gallons per minute

Table 8-12. Comparison of Required versus 5-Year Future Storage Capacity

Pressure Zone	Supported Pressure Zone	Storage Available	Required Storage Capacity, mg				Available Storage Capacity, mg			Storage Capacity Surplus (Deficit), mg [I] = [H] - [D]	Recommended Improvements		
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [G]	Storage Capacity Available [H] = [E] + [F] + [G]		Recommended Storage	Recommended Storage Capacity, mg [J]	New Storage Capacity Surplus (Deficit), mg [K] = [I] + [J]
375[f]	-	- 3 MG Tank (3 MG)	-	0.96	4.92	5.88	2.53	4.92	7.45	1.57	-	-	-
375 West[g]	-	-	0.33	0.96	0.42	1.71	0.00	0.42	0.42	(1.29)	Village 5 Tank #2 (2 MG)	2.00	0.71
575	475 and 375	- Verdera Tank No.3 (5 MG) - Conspiracy Point Tank (5 MG)	4.55	0.96	1.18	6.69	8.75	0.00	8.75	2.06	-	-	-

(a) Operational storage is 25 percent of maximum day demand (MDD) (refer to Table 8-1).
(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).
(c) Emergency storage is 60 percent of average day demand (ADD) of each pressure zone (refer to Table 8-1).
(d) Available tank storage capacity was calculated as useable storage which assumes 5 feet of dead storage and 2 feet below high alarm level in each storage tank (refer to Section 2.3.4).
(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. The EGWC cannot exceed the emergency amount.
(f) Operational storage for the 375 Zone is assigned to the 575 Zone which supplies normal operation to the 375 Zone through multiple pressure reducing stations.
(g) 375 Zone West represents new development on the west side of the City, including Village 5.

Table 8-13. Comparison of Required versus 10-Year Future Storage Capacity

Pressure Zone	Supported Pressure Zone	Storage Available	Required Storage Capacity, mg				Available Storage Capacity, mg			Storage Capacity Surplus (Deficit), mg [I] = [H] - [D]	Recommended Improvements		
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [G]	Storage Capacity Available [H] = [E] + [F] + [G]		Recommended Storage	Recommended Storage Capacity, mg [J]	New Storage Capacity Surplus (Deficit), mg [K] = [I] + [J]
375[f]	-	- 3 MG Tank (3 MG)	-	0.96	5.46	6.42	2.53	5.46	7.99	1.57	-	-	-
375 West[g]	-	- Village 5 Tank #1 (2 MG)	1.05	0.96	0.42	2.43	2.00	0.42	2.42	(0.01)	-	-	-
575	475 and 375	- Verdera Tank No.3 (5 MG) - Conspiracy Point Tank (5 MG)	5.30	0.96	1.18	7.44	8.75	0.00	8.75	1.31	-	-	-

(a) Operational storage is 25 percent of maximum day demand (MDD) (refer to Table 8-2).
(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).
(c) Emergency storage is 60 percent of average day demand (ADD) of each pressure zone (refer to Table 8-2).
(d) Available tank storage capacity was calculated as useable storage which assumes 5 feet of dead storage and 2 feet below high alarm level in each storage tank (refer to Section 2.3.4).
(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. The EGWC cannot exceed the emergency amount.
(f) Operational storage for the 375 Zone is assigned to the 575 Zone which supplies normal operation to the 375 Zone through multiple pressure reducing stations.
(g) 375 Zone West represents new development on the west side of the City, including Village 5.

Table 8-14. Comparison of Required versus 15-Year Future Storage Capacity

Pressure Zone	Supported Pressure Zone	Storage Available	Required Storage Capacity, mg				Available Storage Capacity, mg			Storage Capacity Surplus (Deficit), mg [I] = [H] - [D]	Recommended Improvements		
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [G]	Storage Capacity Available [H] = [E] + [F] + [G]		Recommended Storage	Recommended Storage Capacity, mg [J]	New Storage Capacity Surplus (Deficit), mg [K] = [I] + [J]
375[f]	-	- 3 MG Tank (3 MG)	0.00	0.96	5.64	6.60	2.53	5.64	8.17	1.57		-	-
375 West[g]	-	- Village 5 Tank #1 (2 MG)	2.30	0.96	2.88	6.14	2.00	2.88	4.88	(1.26)	- Village 5 Tank #2 (2 MG)	2.00	0.74
575	475 and 375	- Verdera Tank No.3 (5 MG) - Conspiracy Point Tank (5 MG)	5.45	0.96	1.54	7.95	8.75	0.00	8.75	0.80		-	-

(a) Operational storage is 25 percent of maximum day demand (MDD) (refer to Table 8-3).
(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).
(c) Emergency storage is 60 percent of average day demand (ADD) of each pressure zone (refer to Table 8-3).
(d) Available tank storage capacity was calculated as useable storage which assumes 5 feet of dead storage and 2 feet below high alarm level in each storage tank (refer to Section 2.3.4).
(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. The EGWC cannot exceed the emergency amount.
(f) Operational storage for the 375 Zone is assigned to the 575 Zone which supplies normal operation to the 375 Zone through multiple pressure reducing stations.
(g) 375 Zone West represents new development on the west side of the City, including Village 5.

Table 8-15. Comparison of Required versus 20-Year Future Storage Capacity

Pressure Zone	Supported Pressure Zone	Storage Available	Required Storage Capacity, mg				Available Storage Capacity, mg			Storage Capacity Surplus (Deficit), mg [I] = [H] - [D]	Recommended Improvements		
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [G]	Storage Capacity Available [H] = [E] + [F] + [G]		Recommended Storage	Recommended Storage Capacity, mg [J]	New Storage Capacity Surplus (Deficit), mg [K] = [I] + [J]
375[f]	-	- 3 MG Tank (3 MG)	-	0.96	5.76	6.72	2.53	5.76	8.29	1.57	-	-	-
375 West[g]	-	- Village 5 Tank #1 (2 MG) - Village 5 Tank #2 (2 MG)	3.15	0.96	3.96	8.07	4.00	3.96	7.96	(0.11)	-	-	-
575	475 and 375	- Verdera Tank No.3 (5 MG) - Conspiracy Point Tank (5 MG)	5.53	0.96	1.54	8.03	8.75	0.00	8.75	0.72	-	-	-

(a) Operational storage is 25 percent of maximum day demand (MDD) (refer to Table 8-4).
(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).
(c) Emergency storage is 60 percent of average day demand (ADD) of each pressure zone (refer to Table 8-4).
(d) Available tank storage capacity was calculated as useable storage which assumes 5 feet of dead storage and 2 feet below high alarm level in each storage tank (refer to Section 2.3.4).
(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. The EGWC cannot exceed the emergency amount.
(f) Operational storage for the 375 Zone is assigned to the 575 Zone which supplies normal operation to the 375 Zone through multiple pressure reducing stations.
(g) 375 Zone West represents new development on the west side of the City, including Village 5.

Table 8-16. Comparison of Required versus Buildout Future Storage Capacity

Pressure Zone	Supported Pressure Zone	Storage Available	Required Storage Capacity, mg				Available Storage Capacity, mg			Storage Capacity Surplus (Deficit), mg [I] = [G] - [D]	Recommended Improvements		
			Operational[a] [A]	Fire Flow[b] [B]	Emergency[c] [C]	Storage Capacity Requirement [D] = [A] + [B] + [C]	Available Storage[d] [E]	Emergency Groundwater Storage Credit[e] [G]	Storage Capacity Available [H] = [E] + [F] + [G]		Recommended Storage	Recommended Storage Capacity, mg [J]	New Storage Capacity Surplus (Deficit), mg [K] = [I] + [J]
375[f]	-	- 3 MG Tank (3 MG)	-	0.96	5.82	6.78	2.53	5.82	8.35	1.57	-	-	-
375 West[g]	-	- Village 5 Tank #1 (2 MG) - Village 5 Tank #2 (2 MG)	10.95	0.96	13.80	25.71	4.00	13.80	17.80	(7.91)	- Village 2 Tank (5 MG) - Airport Tank (3 MG)	8.00	0.09
575	475 and 375	- Verdera Tank No.3 (5 MG) - Conspiracy Point Tank (5 MG)	5.58	0.96	1.54	8.08	8.75	0.00	8.75	0.67	-	-	-

(a) Operational storage is 25 percent of maximum day demand (MDD) (refer to Table 8-5).
(b) Fire storage is equal to the volume of the largest fire flow event that could occur in each pressure zone (refer to Table 5-1).
(c) Emergency storage is 60 percent of average day demand (ADD) of each pressure zone (refer to Table 8-5).
(d) Available tank storage capacity was calculated as useable storage which assumes 5 feet of dead storage and 2 feet below high alarm level in each storage tank (refer to Section 2.3.4).
(e) The Emergency Groundwater Storage Credit (EGWC) includes the firm capacity of groundwater supply that can be reliably accessed. The EGWC cannot exceed the emergency amount.
(f) Operational storage for the 375 Zone is assigned to the 575 Zone which supplies normal operation to the 375 Zone through multiple pressure reducing stations.
(g) 375 Zone West represents new development on the west side of the City, including Village 5.

8.3.4 Pressure Regulating Station Capacity Evaluation

The future pressure regulating stations in the City's water system were evaluated to assess their ability to reliably supply the future water service area. As described in Chapter 5, the criterion for pressure zones served solely by pressure regulating stations without a booster pump station or storage tank requires the City's pressure regulating stations to have sufficient capacity to meet the peak hour demand plus fire flow conditions.

The 475, 610, and 650 Zones were evaluated in Chapter 7 (see Table 7-5 for results) and no new demands are projected for these zones. The required pressure regulating station capacity to serve the new 450 Zone described in Section 8-1 was evaluated. Table 8-17 compares future available pressure regulating station capacity with required capacity for the 450 Zone.

Table 8-17. Comparison of Available versus Required 450 Zone Pressure Regulating Station Capacity for 10-Year, 15-Year, 20-Year, and Buildout[(a)]

Pressure Regulating Station	Supplied By	Valve Diameter, inches	Available PRS Capacity, gpm[(b)] [A]	Required PRS Capacity, gpm			PRS Capacity Surplus (Deficit), gpm [E] = [D] - [A]
				Peak Hour Demand[(c)] [B]	Fire Flow Demand[(d)] [C]	PRS Capacity Requirement [D] = [B] + [C]	
450 Main	575	3	580	1,857	4,000	5,857	3,103
	575	8	3,900				
450 Emergency	610	3	580				
	610	8	3,900				
450 Zone Total			**8,960**				

(a) The 450 Zone will be active starting in the 10-Year Phase. No new demands will be added in the subsequent phases, therefore, the required PRS capacity is assumed to be the same for 10-Year, 15-year, 20-Year, and Buildout.

(b) Valve capacity is estimated based on intermittent maximum flow capacity for ClaVal model 90-01PRV valves. However, actual flow capacity will vary depending on system conditions.

(c) Refer to Table 8-1 for peak hour demand.

(d) The largest fire flow requirement for the 450 Zone is 4,000 gpm for schools.

gpm = gallons per minute

8.4 FUTURE WATER DISTRIBUTION SYSTEM PERFORMANCE EVALUATION

The water distribution system performance evaluation identifies necessary improvements to the City's water distribution system to support the City's future water demands while meeting the City's recommended water system planning and design criteria presented in Chapter 5 under normal and emergency conditions. A hydraulic performance evaluation was carried out for each of the five phases: 5-Year, 10-Year, 15-Year, 20-Year, and Buildout. The following scenarios were evaluated as part of the future water distribution system performance evaluation:

- **Normal Operations:**
  - Average Day Demand Scenario: This scenario evaluated service pressures during an average day demand condition
  - Maximum Day Demand Scenario: This scenario evaluated service pressures during a maximum day demand condition
- **Emergency Operations:**
  - Maximum Day Demand plus Fire Flow Scenario: This scenario evaluated system fire flow availability under a maximum day demand condition

The water system hydraulic model, updated with the proposed improvements to the existing system from Chapter 7, was used to evaluate the water system performance for each of the five phases. Additional facilities (i.e., pipes, new PRSs, new tanks, and new wells) to provide service to projected future development areas were also included in the hydraulic model, as shown on Figure 8-1. In addition, recommended improvements identified in the facility capacity evaluation above were incorporated into the hydraulic model and are also shown on Figure 8-1. As previously mentioned, sizing and locations of future pipelines and facilities are preliminary and will require further study and refinement by Project proponents as future developments move forward.

As discussed in Section 8.3.1, the City will have insufficient supply by the Buildout Phase. For purposes of the hydraulic evaluation, it is assumed that four additional groundwater ASR wells are added into the system to mitigate the supply deficit and to support maximum day plus peak hour demand conditions. However, the City is recommended to conduct the supply studies recommended in Section 8.3.1 to determine the most viable additional water supply source.

Table 8-18 summarizes the assumptions for each modeling scenario before incorporating recommended improvements from the performance evaluation. Sections 8.4.1 and 8.4.2 provide an overview and general discussion of results of the evaluated scenarios. Table 8-19 in Section 8.4.3 summarizes the specific results for each phase.

Table 8-18. Summary of Phasing Assumptions[a,b]

Phase	Capacity Evaluation Improvements	Additional Assumptions
5-Year	5-Year: • 1 storage tank: Village 5 Tank #1 (2 MG) • 2 wells	• Includes recommendations from the existing system evaluation in Chapter 7 (i.e., pipeline improvements and emergency BPSs for the 750 and 775 Zones). • Planned replacement of 20-inch transmission main from the 3 MG Tank with a 30-inch transmission main is active. • Planned extension of 24-inch transmission main in Oak Tree Lane crossing the Auburn Ravine to existing 18-inch transmission main in Virginiatown Road is active. • Pipelines within the 5-Year timeline identified in the 10-Year Pipeline R&R from Chapter 9 are replaced.
10-Year	10-Year: • 2 wells Total (Previous and Current Phases): • 1 storage tank • 4 wells	• Includes recommendations from previous phases • All pipelines identified in the 10-Year Pipeline R&R from Chapter 9 are replaced. • New Pressure Zone (450 Zone) is created with associated PRSs.
15-Year	15-Year: • 1 storage tank: Village 5 Tank #2 (2 MG) • 2 wells Total (Previous and Current Phases): • 2 storage tanks • 6 wells	• Includes recommendations from previous phases.
20-Year	20-Year: • 1 well Total (Previous and Current Phases): • 2 storage tanks • 7 wells	• Includes recommendations from previous phases.
Buildout	Buildout: • 2 storage tanks: Village 2 Tank (5 MG) Airport Tank (3 MG) • 9 wells • 4 wells to address supply deficit for purposes of the performance evaluation[c] Total (Previous and Current Phases): • 4 storage tanks • 20 wells	• Includes recommendations from previous phases.

(a) Sizing and locations of future pipelines and facilities are preliminary and will require further study and refinement by Project proponents as future developments move forward.

(b) All future wells are assumed to be equipped with ASR capability.

(c) As discussed in Section 8.3.1, the City will have insufficient supply by the Buildout Phase. For purposes of the hydraulic evaluation, it is assumed four additional groundwater wells are added into the system to mitigate the supply deficit. However, the City is recommended to conduct the supply studies recommended in Section 8.3.1 to determine the most feasible additional water supply source.

8.4.1 Normal Operations Overview

The normal operations of the City's water distribution system were evaluated under average day and maximum day with peak hour demand conditions (i.e., non-fire). For each phase, a 72-hour extended period simulation (EPS) was conducted using the hydraulic model to evaluate system performance under average day and maximum day with peak hour demand conditions. However, only results from the last two days of the simulation were used, as these results are not affected by initial conditions.

Tables 8-1 to 8-5 summarize the average day and maximum day system demands for each phase. The maximum day diurnal patterns (i.e., pressure zone groups, irrigation meters, and large users) previously presented in Chapter 3 and previously incorporated into the hydraulic model in Chapter 7, were used. The operational criteria applicable during normal operating conditions are detailed in Chapter 5.

The normal operations evaluation assumes the water system demand will be met by a combination of the PCWA metering stations, storage tanks, and groundwater wells as needed. Firm groundwater capacity is assumed (i.e., the largest existing well is offline). Catta Verdera BPS was assumed to be offline for the future water system.

8.4.1.1 Normal Operations Results: 5-Year, 10-Year, 15-Year, and 20-Year Phases

For the 5-Year, 10-Year, 15-Year, and 20-Year Phases, no wells operate during average day demand, however, during maximum day demand, various wells operate either full-time or during peak hour only (refer to Table 8-19 for the number of wells operating per phase).

Table 8-19 summarizes the specific results for each phase and subsequent recommendations. Figures 8-2 to 8-5 present the minimum instantaneous pressures during the EPS for average day demand for each phase. Figures 8-7 to 8-10 present the minimum instantaneous pressures during the EPS for maximum day demand for each phase. The following discussion is a general summary of results for the 5-Year, 10--Year, 15-Year, and 20-Year Phases. These results assume the recommended improvements from Table 8-18 have been constructed in the system.

Results from the normal operations evaluation (i.e., average day and maximum day demand with peak hour conditions) indicate the 5-Year, 10-Year, 15-Year, and 20-Year phasing of the future water system generally meets the City's minimum and maximum pressure criterion at most customer service locations.

In general, most areas of the City's distribution system meet the minimum pressure requirement of 40 psi for each phase. For the average day demand condition for each phase, the majority of the City's distribution system experiences pressures ranging between 80 to 100 psi or greater than 100 psi. For the maximum day demand condition for each phase, the majority of the City's distribution system experiences pressures ranging between 60 to 100 psi. Lower pockets of pressures (refer to Table 8-19 for specific pressure ranges for each phase) typically occur around areas that are on the high end of a pressure zone's service elevation range and/or are served by a dead-end pipeline. Locations with pressures below 40 psi occur adjacent to major system facilities where the associated pipelines do not have service connections, and therefore, no recommended improvements are made. Velocities in the water distribution system for both average day and maximum day demand conditions do not exceed 7 feet per second (fps).

8.4.1.2 Normal Operations Results: Buildout Phase

For Buildout Phase, six wells (three full-time and three during peak hour) operate during average day demand. During maximum day demand, 24 wells (20 full-time and four during peak hour) operate while one well does not operate. To mitigate the potential for high use of groundwater supply to meet peaking demands, the City endeavors to leverage use of reclaimed water supply and partner with PCWA and/or NID to provide additional surface water supplies.

Table 8-19 summarizes the specific results for the Buildout Phase and subsequent recommendations. Figure 8-6 presents the minimum instantaneous pressures during the EPS for average day demand. Figure 8-11 presents the minimum instantaneous pressures during the EPS for maximum day demand. The following discussion is a general summary of results for the Buildout Phase.

Results from the normal operations evaluation (i.e., average day and maximum day demand with peak hour conditions) indicate the buildout phase of the water system generally meets the City's minimum and maximum pressure criterion at most customer service locations.

In general, most areas of the City's buildout distribution system meet the minimum pressure requirement of 40 psi. For the average day demand condition, the majority of the City's distribution system experiences pressures ranging between 80 to 100 psi. For the maximum day demand condition, the majority of the City's distribution system experiences pressures ranging between 60 to 80 psi. Lower pockets of pressures (refer to Table 8-19 for ranges) and locations with pressures below 40 psi typically occur around areas that are on the high end of a pressure zone's service elevation range and/or are served by a dead-end pipeline. No recommendations are made to mitigate these areas of low pressure since velocity criterion in pipelines are met in these areas. Additionally, there are locations with pressures below 40 psi that occur adjacent to major system facilities where the associated pipelines do not have service connections, and therefore, no recommended improvements are made.

For the average day demand condition, maximum velocities in the buildout water distribution system pipelines do not exceed 7 fps. Figure 8-12 shows the maximum velocities in the buildout water system for the maximum day demand condition. As shown on Figure 8-11, maximum velocities range from 7 to 8 fps in the following transmission mains near storage tanks and pressure reducing stations:

- 24-inch diameter main in Twelve Bridges from Verdera Tank No.3
- 30-inch diameter main from the 3 MG Tank to Oak Tree Lane
- 30-inch diameter main from the Conspiracy Point Tank
- Portions of the 24-inch diameter main in Stonebridge Boulevard (near the Stoneridge pressure reducing station), Del Webb Boulevard (near the Wildomar pressure reducing station), and East Joiner Parkway
- 8-inch diameter pipeline in Chesapeake Way near the Eastridge pressure reducing station

While these velocities exceed maximum recommended velocities, improvements are not recommended at these locations as they do not impact the primary criterion, customer service pressure.

8.4.2 Emergency Operations Overview

To evaluate the existing water system fire flow availability, AquaTwin Water's fire flow module was used to determine the available fire flow at junctions that represent hydrant locations throughout the system, while maintaining a minimum residual system pressure of 20 psi at all customer service locations and new development areas. In addition, a maximum velocity of 10 fps should be maintained in new development pipelines. Pipelines in existing areas are evaluated without a maximum velocity constraint because these pipelines were sized to meet standards at the time of their construction.

The fire flow evaluation assumed that the fire event would occur during the hour where the peaking factor on the maximum day diurnal is closest to 1. Hour 48 from the maximum day demand plus peak hour EPS was chosen to run the fire flow analysis on. The purpose of this assumption is to confirm that storage is sufficient to supply fire flows during a typical maximum day demand.

As discussed in Chapter 7, recommended fire flow criteria presented in Table 5-1 are established for future development land use types. The fire flow evaluation presents the system-wide available fire flow compared to recommended fire flow criteria for future water service areas for comparison purposes only. As previously mentioned in Chapter 7, because much of the City's system is older, a R&R Program detailed in Chapter 9 is recommended to replace smaller diameter (i.e., less than 8-inch diameter) distribution pipelines (which are typically older). As the City proceeds with the program, fire flow availability in these areas will improve. Therefore, the evaluation of the City's future water system does not recommend specific pipeline improvements to existing pipelines to increase existing fire flow capacity as it is assumed they will be included in the City's R&R program.

For new development areas, fire flow availability is evaluated to confirm sizing of recommended future system improvements for new developments. As development plans in future areas are refined, infrastructure is expected to change, and the City should require Project proponents to size infrastructure to meet all design criteria presented in Chapter 5, unless criteria are superseded by a future standard adopted by the City.

8.4.2.1 Emergency Operation Results

Figures 8-13 to 8-17 summarizes the percent of available fire flow available for each phase at each tested location with respect to its fire flow requirement. Results presented in these figures are representative of the system's capacity and do not represent available flow from a specific hydrant.

As shown on Figures 8-13 to 8-17, most tested locations in the model for each phase meet or exceed the City's fire flow requirements, and a few locations meet at least 75 percent of the criteria. Most locations that do not meet the recommended fire flow criteria are existing known deficiencies in the model as identified in Chapter 7. These are locations with larger fire flow requirements (i.e., 3,000 and 4,000 gpm) and/or located at small diameter (i.e., 6-inch) dead-end distribution pipelines. Typically, fire flow requirements exceeding 1,500 gpm are expected to be met by multiple hydrants and as described in Chapter 7, existing pipelines are assumed to meet fire flow standards that were in place at the time of construction. All tested locations within future development areas meet the required fire flow. Therefore, no specific pipeline improvements to increase fire flow capacity are recommended.

8.4.3 Future Water Distribution System Performance Evaluation Results Summary

Table 8-19 details the specific performance evaluation results for each of the five phases.

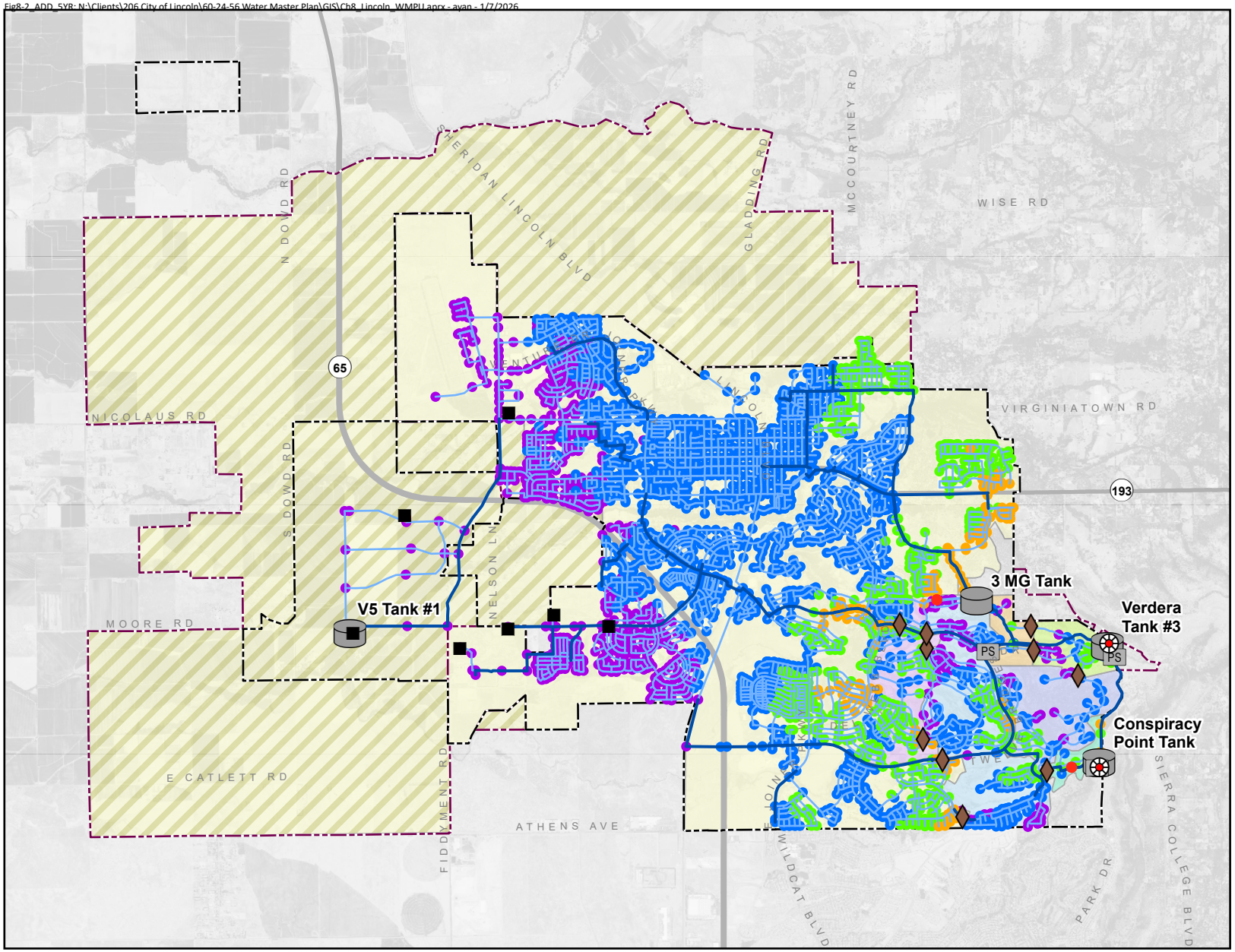
Table 8-19. Future System Evaluation Results Summary

Phase	Average Day Demand Results	Maximum Day Demand Results	Maximum Day Demand Plus Fire Flow Results	Recommended Performance Evaluation Improvements
5-Year	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 80 - greater than 100 psi. • Some locations in the east, northeast, and Village 1 (i.e., Turkey Creek and Stardust) range from 40 – 80 psi due to high elevations. • Pressures below 40 psi occur adjacent to major system facilities where the associated pipelines do not have service connections. • Velocity exceedance (8 fps) in existing 8-inch diameter pipe at intersection of 1st Street and Joiner Ranch. • No wells operating.	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 60 to 100 psi. • Some locations in the east and Village 1 (i.e., Turkey Creek and Stardust) range from 40 - 60 psi due to high elevations. • Pressures below 40 psi occur adjacent to major system facilities where the associated pipelines do not have service connections. • Velocity exceedance (20 fps) in existing 8-inch diameter pipe at intersection of 1st Street and Joiner Ranch. • 3 wells operating (1 well operating full-time and 2 wells during peak hour).	• Most existing tested locations meet the required fire flow. • Existing tested locations in the model that do not meet the required fire flow are existing known deficiencies (i.e., areas with larger fire flow requirements which require multiple hydrants [i.e., 3,000 and 4,000 gpm] and/or located at small diameter [(i.e., 6-inch)] dead-end distribution pipelines). • All tested future development locations meet the required fire flow.	• No recommended improvements for normal operations. • Known existing fire flow deficiencies not located on dead-end pipelines will be addressed with the R&R Program described in Chapter 9. • No recommended improvements for other existing fire flow deficiencies.
10-Year	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 80 to greater than 100 psi similar to 5-Year Phase. • Some locations in the east, northeast, and Village 1 range from 40 - 80 psi due to high elevations. • -Pressures improve and range from 80 - 100 psi in Stardust of Village 1 due to being served by the new 450 Zone. • Pressures below 40 psi occur at the same locations as the 5-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • No wells operating.	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 60 to 100 psi with an increase in areas with 80 to 100 psi to the north compared to the 5-Year Phase. • Some locations served in the east and Village 1 range from 40 - 60 psi due to high elevations. • Pressures improve and range from 80 - 100 psi in Stardust of Village 1 due to being served by the new 450 Zone. • Pressures below 40 psi occur at the same locations as the 5-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • 3 wells operating (1 well operating full-time and 2 wells during peak hour).	• Most existing tested locations meet the required fire flow. • One existing deficient fire flow location is alleviated by the R&R Program. • Existing tested locations in the model that do not meet the required fire flow are existing known deficiencies (i.e., areas with larger fire flow requirements which require multiple hydrants [i.e., 3,000 and 4,000 gpm] and/or located at small diameter [(i.e., 6-inch)] dead-end distribution pipelines). • All tested future development locations meet the required fire flow.	• No recommended improvements for normal operations. • No recommended improvements for existing fire flow deficiencies.
15-Year	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 80 to greater than 100 psi with a slight decrease in pressures to the west compared to the 10-Year Phase. • Pressures ranging from 40 to 80 psi are at the same locations as the 10-Year Phase due to high elevations. • Pressures below 40 psi occur at the same locations as the 10-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • No wells operating.	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 60 to 100 psi with a slight decrease in pressures to the north compared to the 10-Year Phase. • Pressures ranging from 40 to 80 psi are at the same locations as the 10-Year Phase due to high elevations. • Pressures below 40 psi occur at the same locations as the 10-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • 6 wells operating (3 wells operating full-time and 3 wells during peak hour).	• Most existing tested locations meet the required fire flow. • Existing tested locations in the model that do not meet the required fire flow are existing known deficiencies (i.e., areas with larger fire flow requirements which require multiple hydrants [i.e., 3,000 and 4,000 gpm] and/or located at small diameter [(i.e., 6-inch)] dead-end distribution pipelines). • All tested future development locations meet the required fire flow.	• No recommended improvements for normal operations. • No recommended improvements for existing fire flow deficiencies.
20-Year	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 80 to 100 psi with a slight decrease in pressures to the west compared to the 15-Year Phase.	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 60 to 100 psi with a slight decrease in pressures to the north compared to the 15-Year Phase.	• Most existing tested locations meet the required fire flow. • Existing tested locations in the model that do not meet the required fire flow are existing known deficiencies (i.e., areas with larger fire flow requirements which	• No recommended improvements for normal operations. • No recommended improvements for existing fire flow deficiencies.

Table 8-19. Future System Evaluation Results Summary

Phase	Average Day Demand Results	Maximum Day Demand Results	Maximum Day Demand Plus Fire Flow Results	Recommended Performance Evaluation Improvements
	• Pressures ranging from 40 to 80 psi are at the same locations as the 15-Year Phase due to high elevations. • Pressures below 40 psi occur at the same locations as the 15-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • No wells operating.	• Pressures ranging from 40 to 80 psi are at the same locations as the 15-Year Phase due to high elevations. • Pressures below 40 psi occur at the same locations as the 15-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • 8 wells operating (3 wells operating full-time and 5 wells during peak hour).	require multiple hydrants [i.e., 3,000 and 4,000 gpm] and/or located at small diameter [(i.e., 6-inch)] dead-end distribution pipelines). • All tested future development locations meet the required fire flow.	
Buildout	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 80 to 100 psi with a slight decrease in pressures to the west compared to the 20-Year Phase. • Pressures ranging from 40 to 80 psi are at the same locations as the 20-Year Phase due to high elevations. • Pressures below 40 psi occur at the same locations as the 20-Year Phase, adjacent to major system facilities where the associated pipelines do not have service connections. • No velocity exceedances in distribution system pipelines. • No wells operating.	• Meets pressure criteria at most customer service locations. • Majority of system ranges from 60 to 80 psi which is an overall decrease in pressures compared to the 20-Year Phase. • Pressures ranging from 40 to 80 psi are at the same locations as the 20-Year Phase with additional locations in the east and northeast due to high elevations. • Pressures below 40 psi occur at the same locations as the 20-Year Phase, with additional locations located at high elevations and/or end of dead-end pipes. • Borderline velocity exceedances in transmission mains near storage tanks and pressure reducing stations (7 to 8 fps). • 24 wells operating (20 wells operating full-time and 4 wells during peak hour).	• Most existing tested locations meet the required fire flow. • Existing deficiencies in the north by Village 2 are resolved. • Existing tested locations in the model that do not meet the required fire flow are existing known deficiencies (i.e., areas with larger fire flow requirements which require multiple hydrants [i.e., 3,000 and 4,000 gpm] and/or located at small diameter [(i.e., 6-inch)] dead-end distribution pipelines). • All tested future development locations meet the required fire flow.	• No recommended improvements for normal operations since velocity exceedances are borderline. • Four new wells to meet peak demands during maximum day. • No recommended improvements for existing fire flow deficiencies.

Fig8-2_ADD_5YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in majority of the distribution system are less than 7 feet per second.

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N

0 3,750 7,500 Feet

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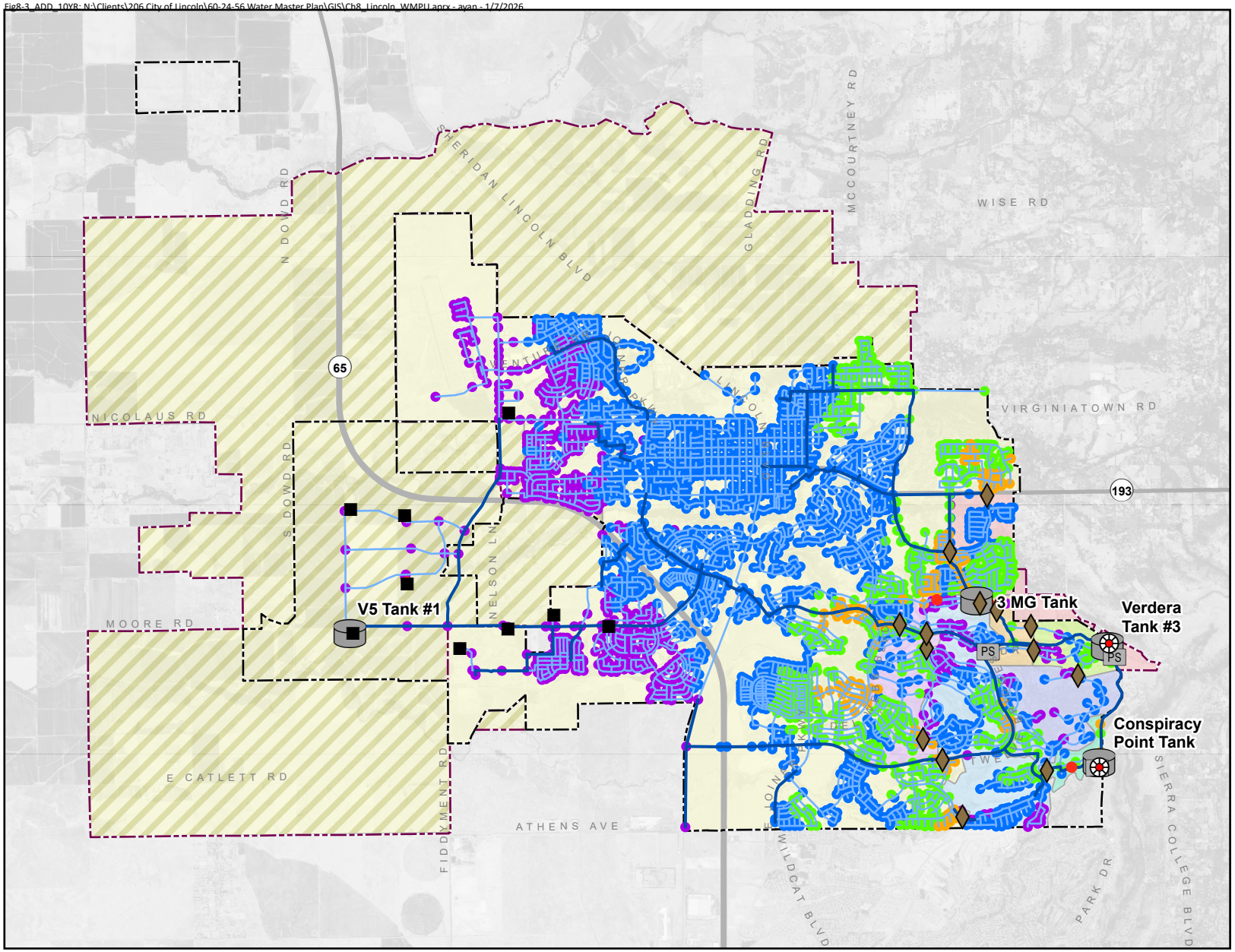
Minimum Pressure at Average Day Demand

5-Year Water System

Figure 8-2

Fig8-3_ADD_10YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in the distribution system are less than 7 feet per second.

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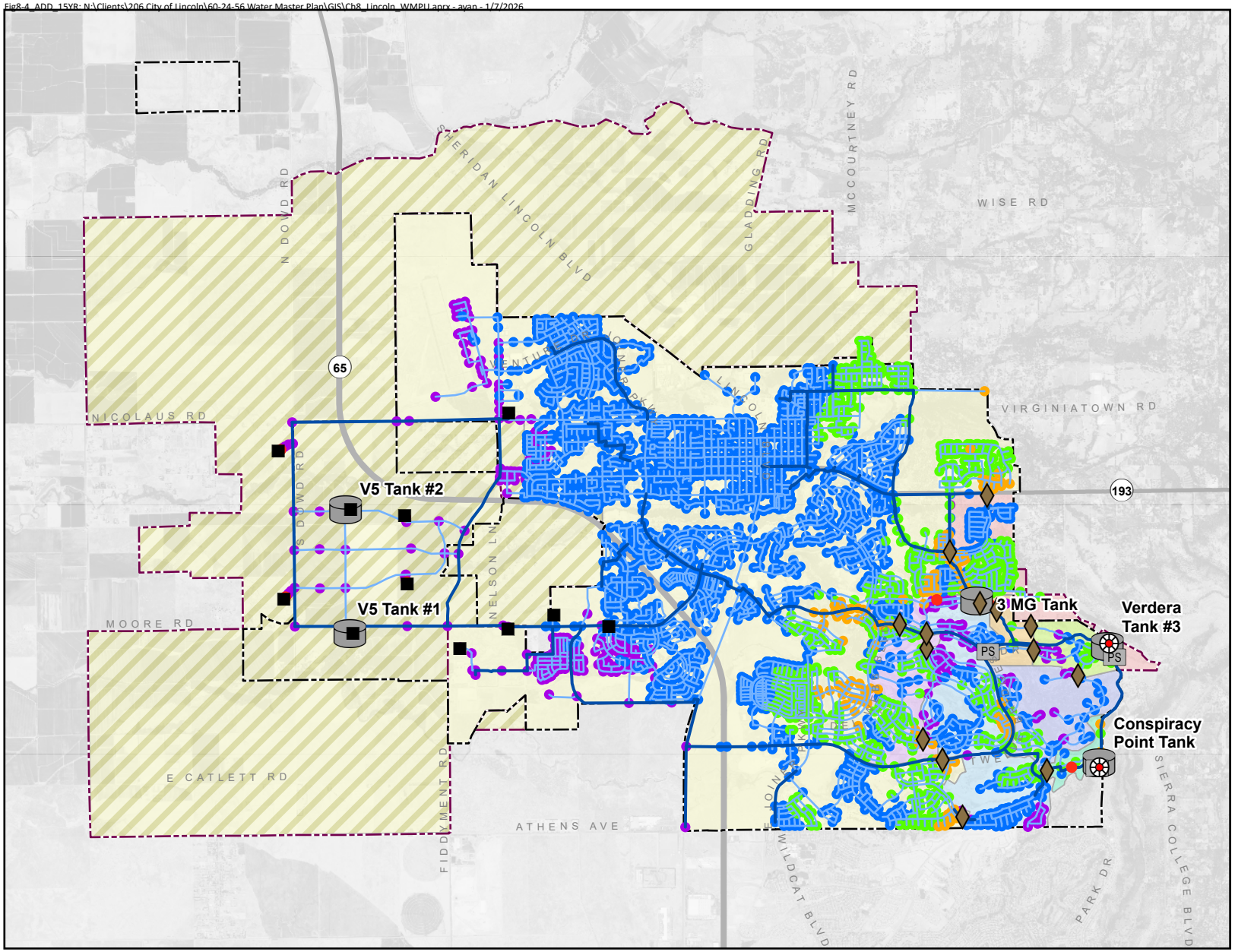
Minimum Pressure at Average Day Demand
10-Year Water System
Figure 8-3

Fig8-4_ADD_15YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
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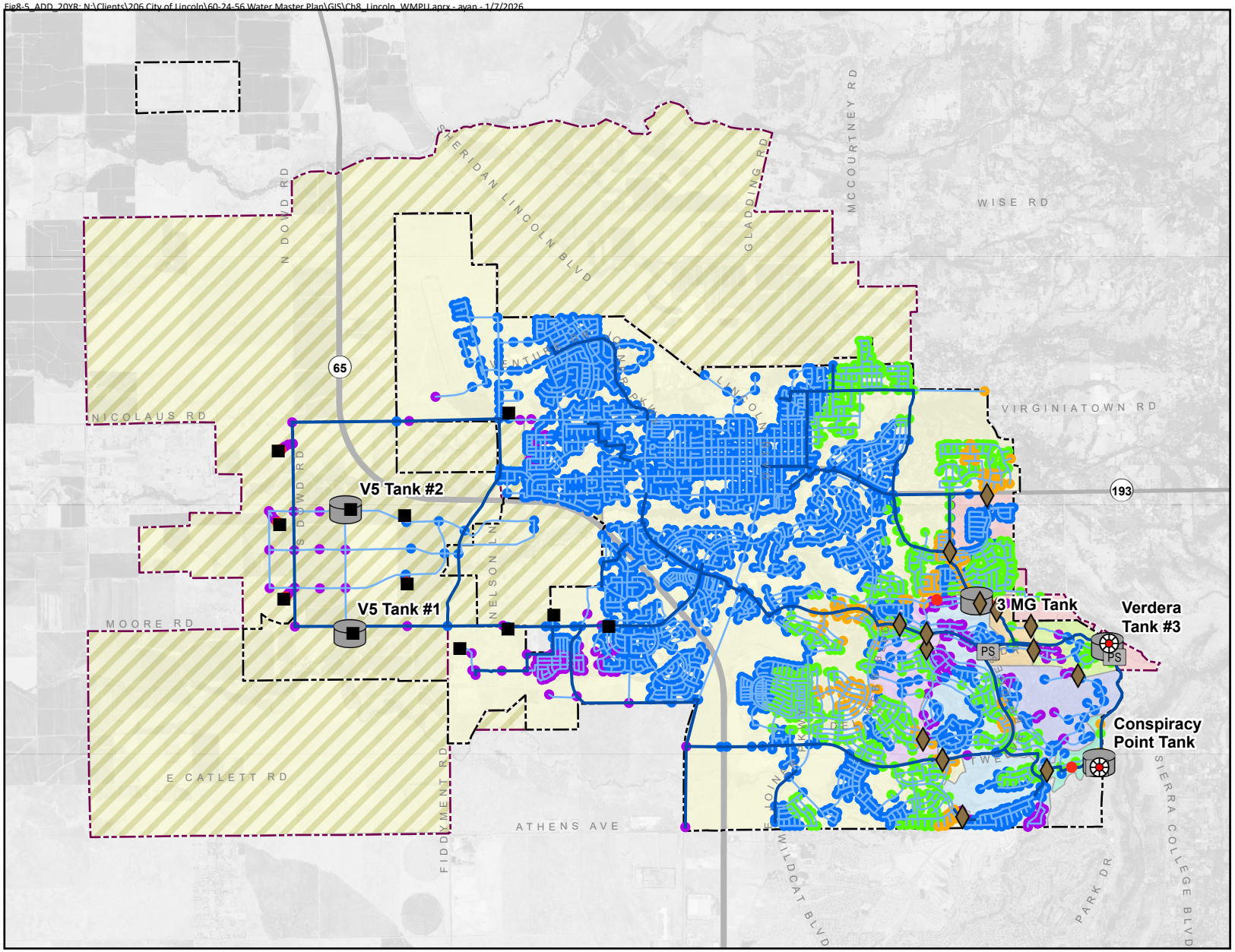
Minimum Pressure at Average Day Demand
15-Year Water System
Figure 8-4

Fig8-5_ADD_20YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
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0 3,750 7,500 Feet

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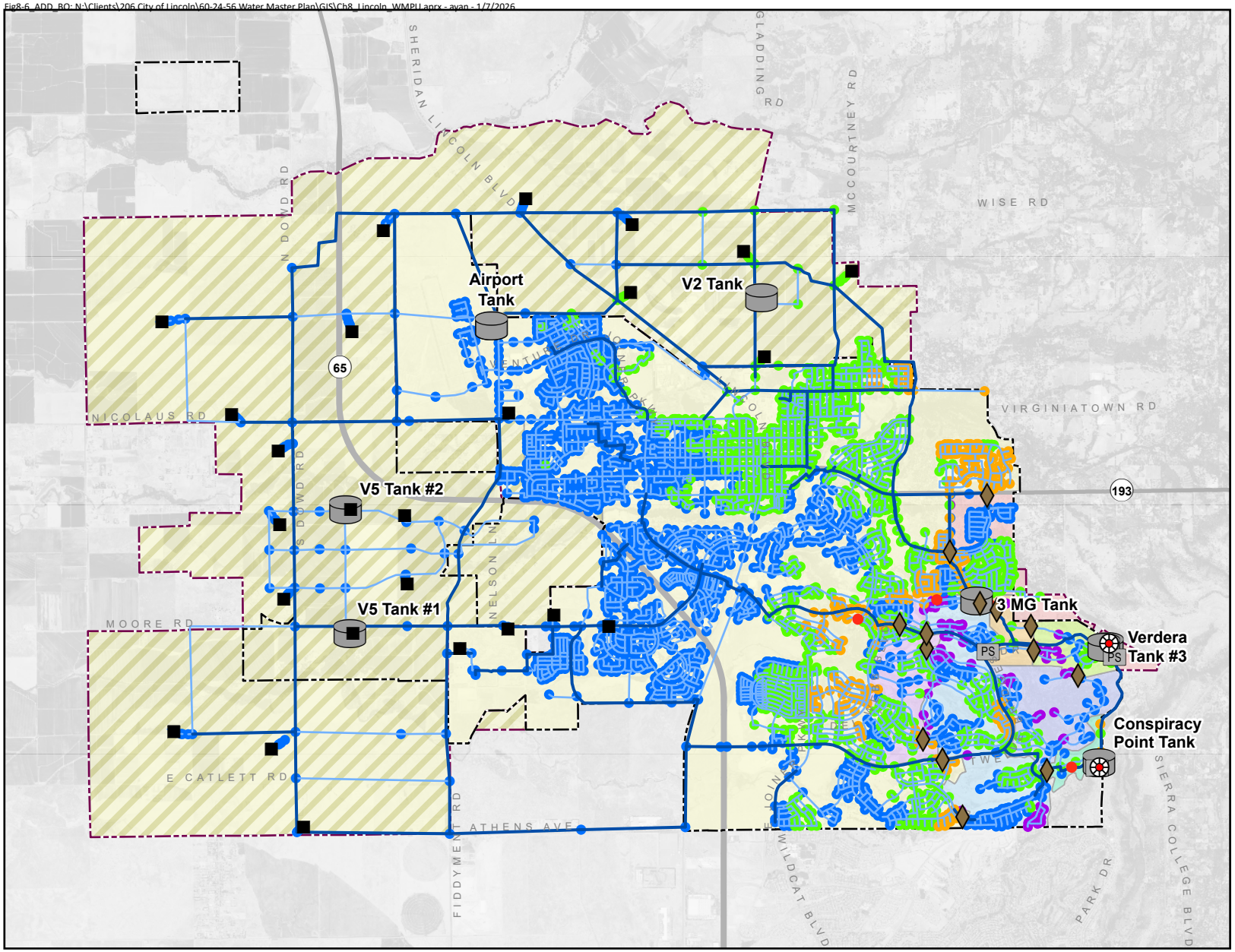
Minimum Pressure at Average Day Demand
20-Year Water System
Figure 8-5

Fig8-6_ADD_BO: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in the distribution system are less than 7 feet per second.

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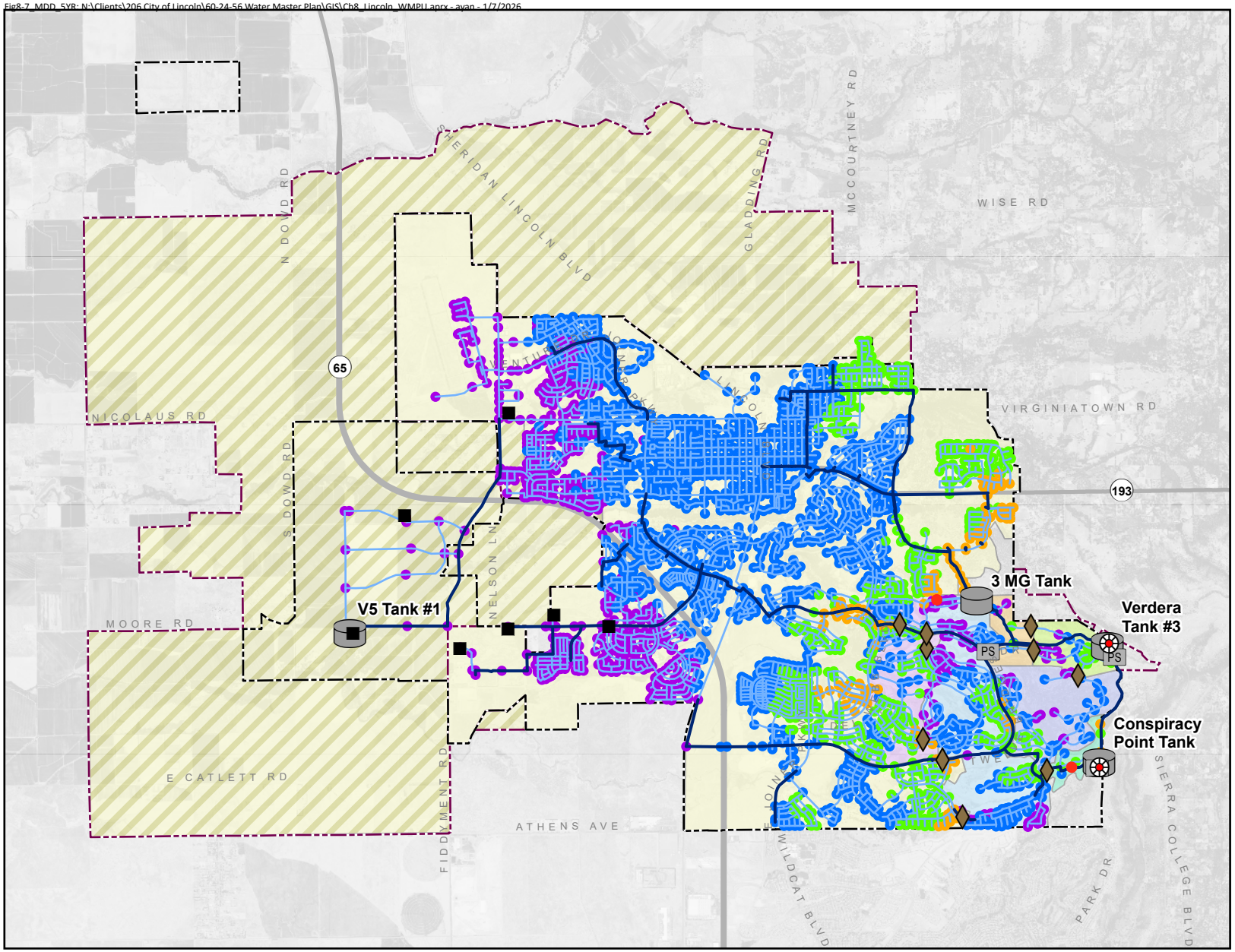
Minimum Pressure at Average Day Demand
Buildout Water System
Figure 8-6

Fig8-7_MDD_5YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

- Placer County Water Agency Metering Station
- Groundwater Well
- Pump Station
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- Distribution Pipeline (<18-inch)
- Transmission Pipeline (≥18-inch)

Boundaries

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- 375 Zone West
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- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in majority of the distribution system are less than 7 feet per second.

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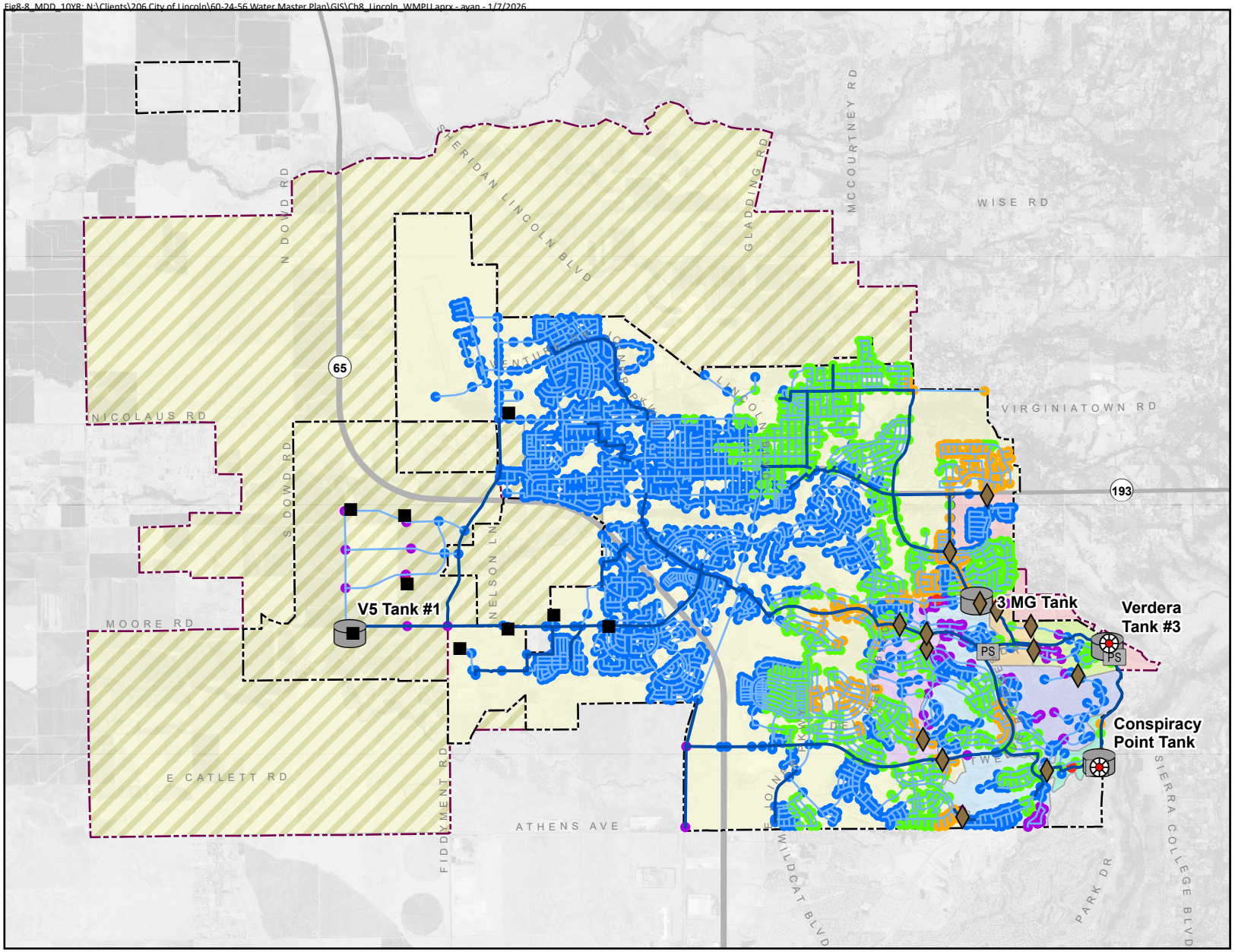
Minimum Pressure at Maximum Day Demand
5-Year Water System
Figure 8-7

Fig8-8_MDD_10YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in the distribution system are less than 7 feet per second.

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N

0 3,750 7,500 Feet

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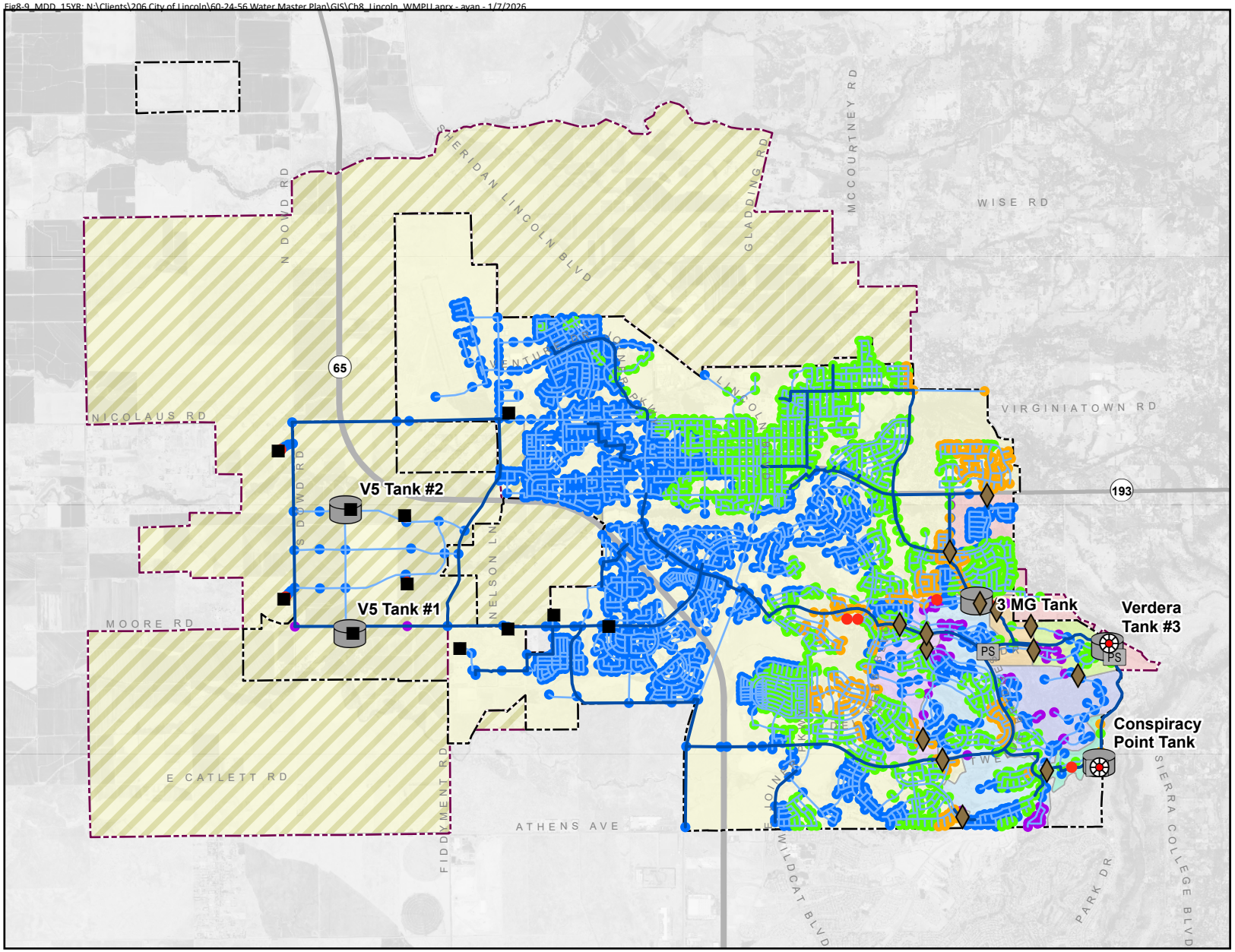
Minimum Pressure at Maximum Day Demand
10-Year Water System
Figure 8-8

Fig8-9_MDD_15YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in the distribution system are less than 7 feet per second.

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0 3,750 7,500 Feet

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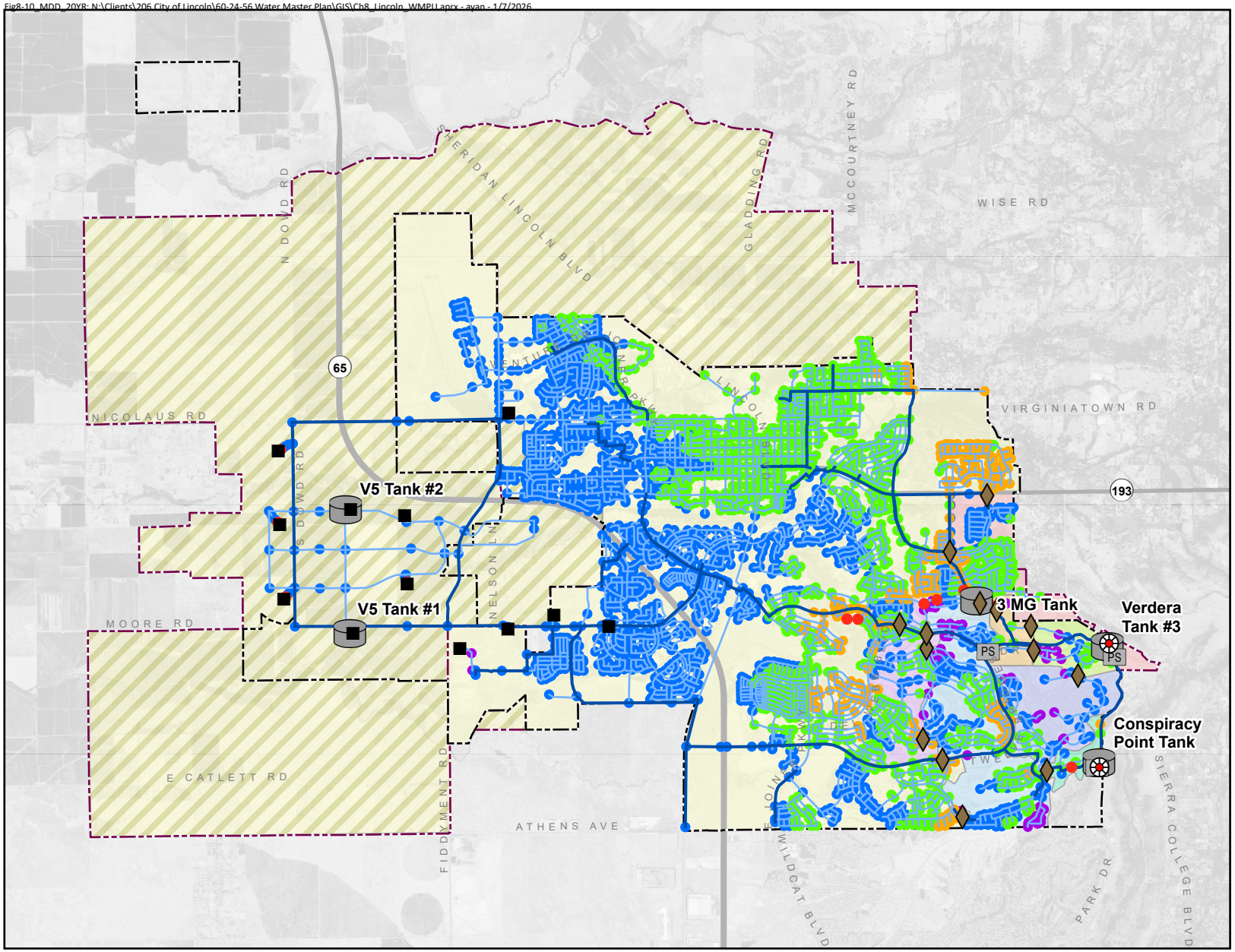
Minimum Pressure at Maximum Day Demand
15-Year Water System
Figure 8-9

Fig8-10_MDD_20YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Velocities in the distribution system are less than 7 feet per second.

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0 3,750 7,500 Feet

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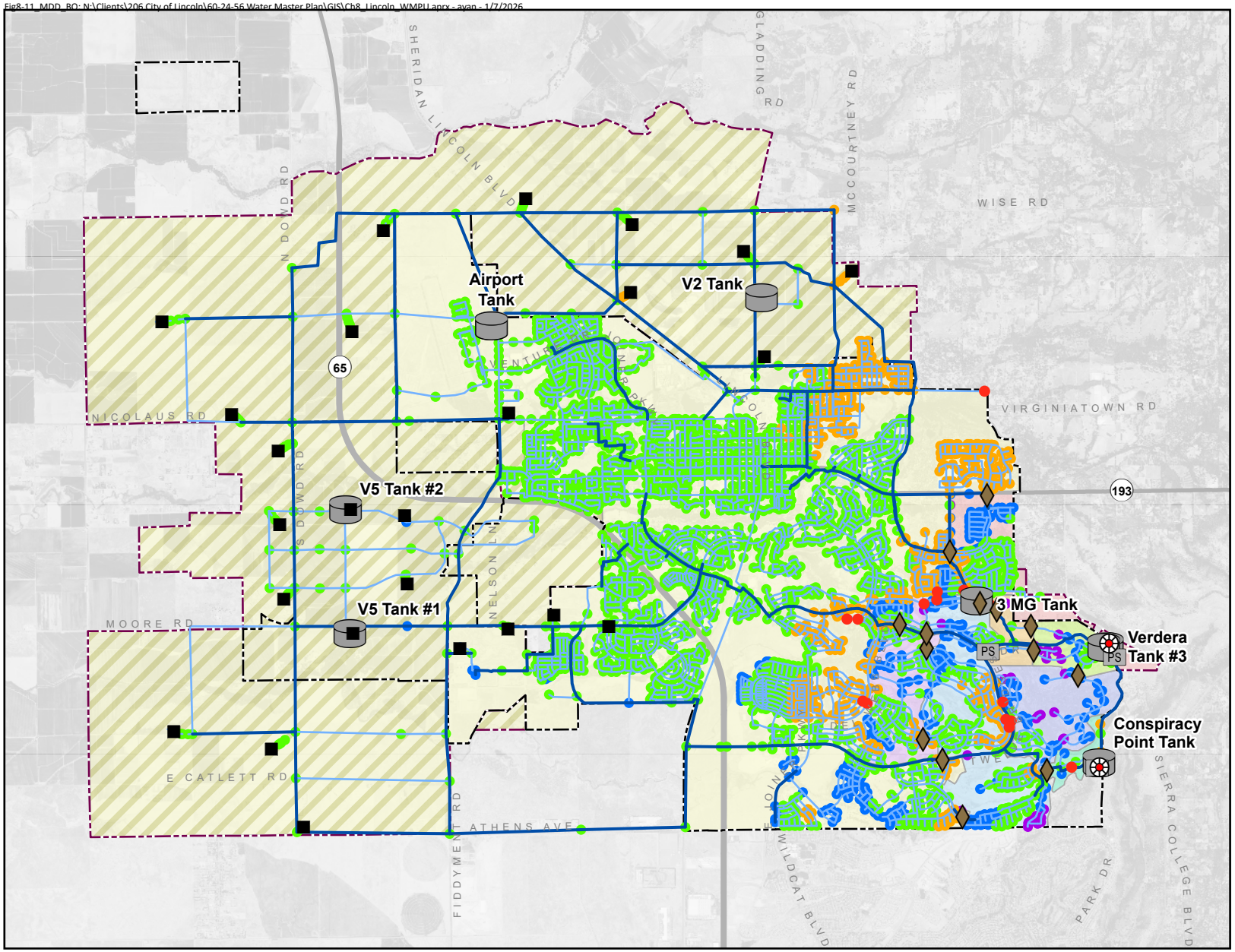
Minimum Pressure at Maximum Day Demand
20-Year Water System
Figure 8-10

Fig8-11_MDD_BO: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Minimum System Pressure

- Less than 40 psi
- 40 - 60 psi
- 60 - 80 psi
- 80 - 100 psi
- Greater than 100 psi

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:

1. Velocities in the most of the system are less than 7 feet per second.

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N

0 3,750 7,500 Feet

Prepared for:

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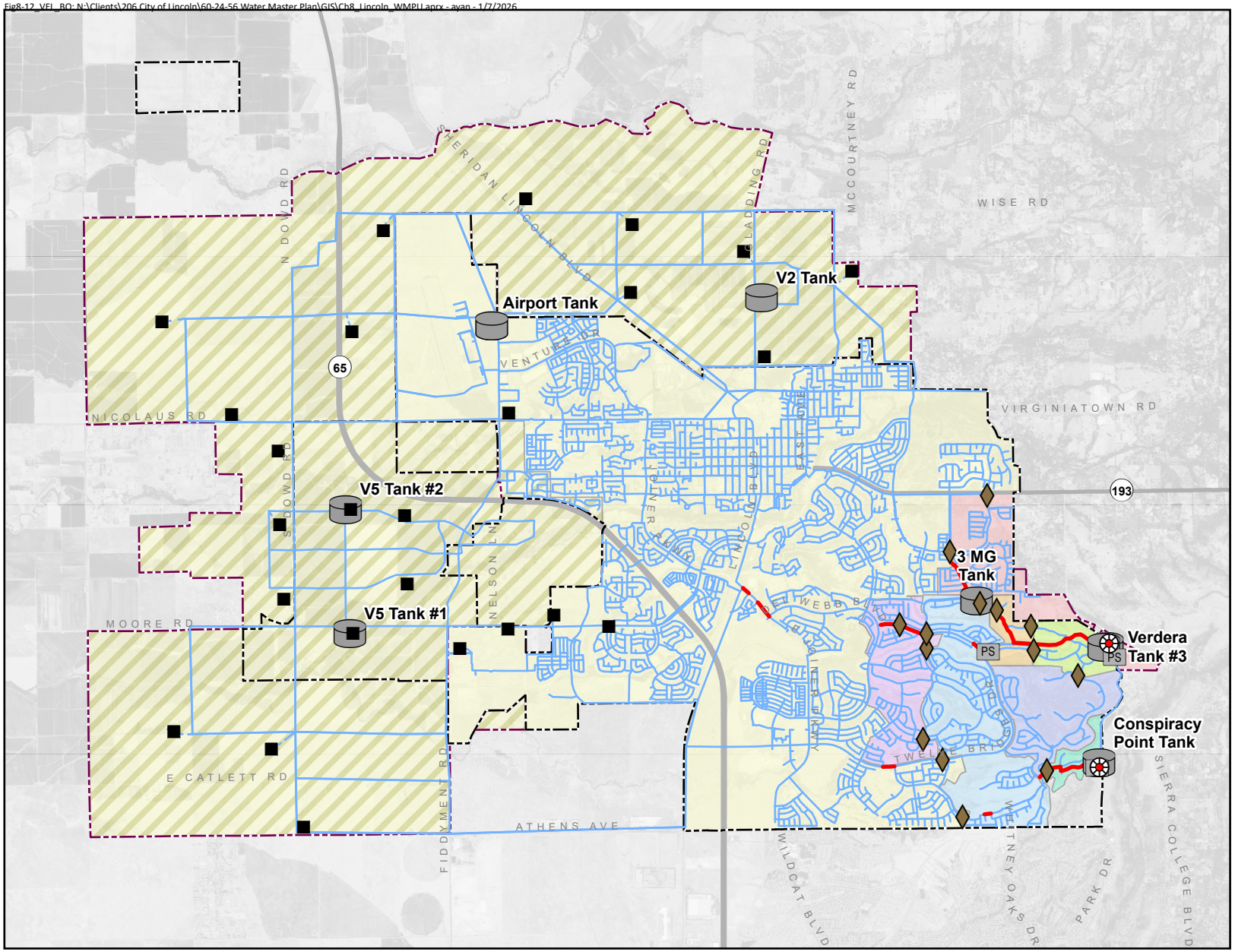
Minimum Pressure at Maximum Day Demand

Buildout Water System

Figure 8-11



Maximum Velocity

- Less than or equal to 7 fps
- Greater than 7 fps

System Facilites

- Placer County Water Agency Metering Station
- Groundwater Well
- PS — Pump Station
- Pressure Regulating Station
- Storage Tank

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

Notes:
1. Maximum velocities exceeding the velocity criterion range from 7 to 8 feet per second.

Prepared by:

WEST YOST

N

0 3,750 7,500 Feet

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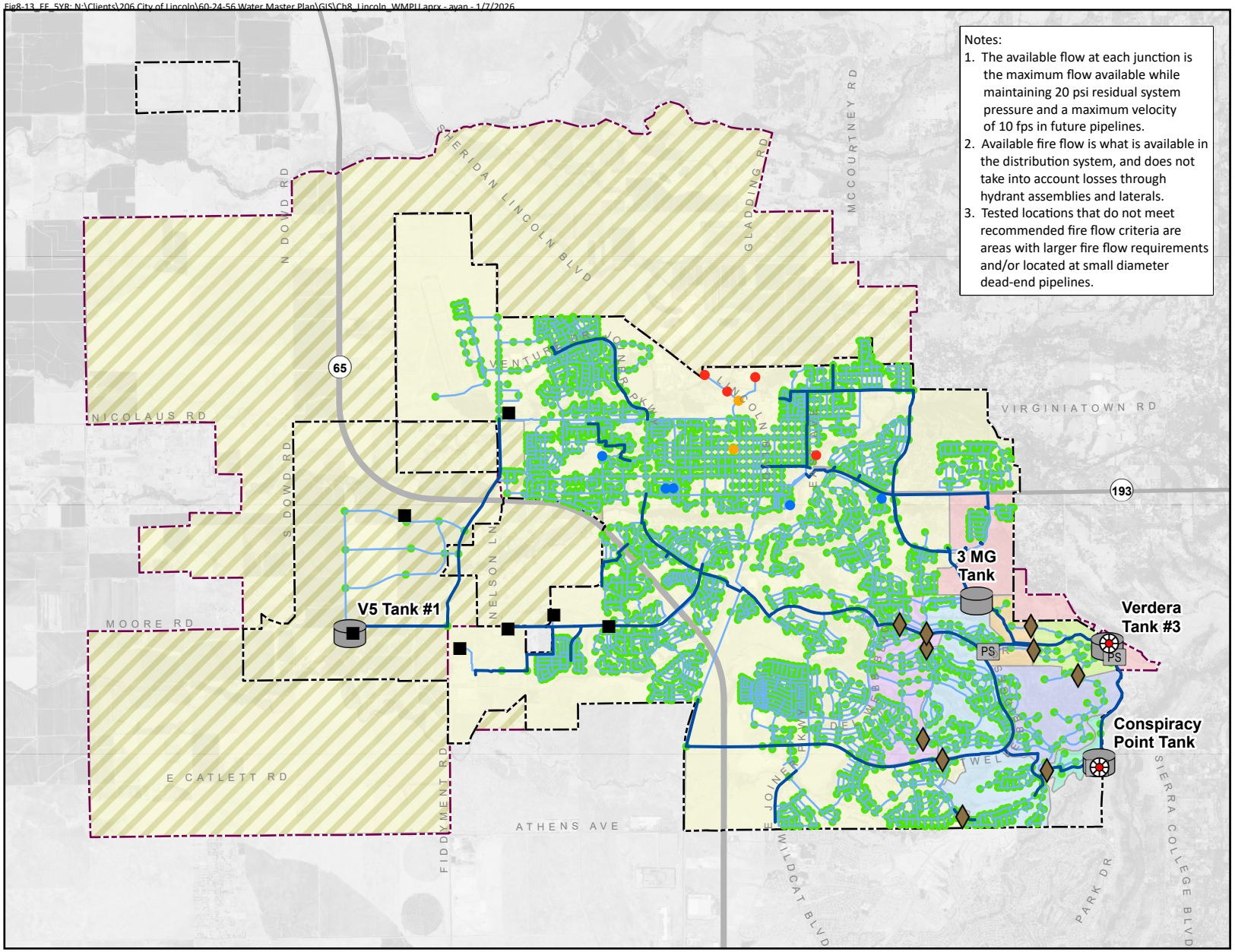
Maximum Velocities at Maximum Day Demand
Buildout Water System
Figure 8-12

Fig8-13_FF_5YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Percent of Available Fire Flow

- ≥ 100% of Criteria
- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

System Facilites

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

Boundaries

- 375 Zone
- 375 Zone West
- 450 Zone
- 475 Zone
- 575 Zone
- 610 Zone
- 650 Zone
- 750 Zone
- 775 Zone
- Existing City Limit
- City Sphere of Influence

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0 3,750 7,500 Feet

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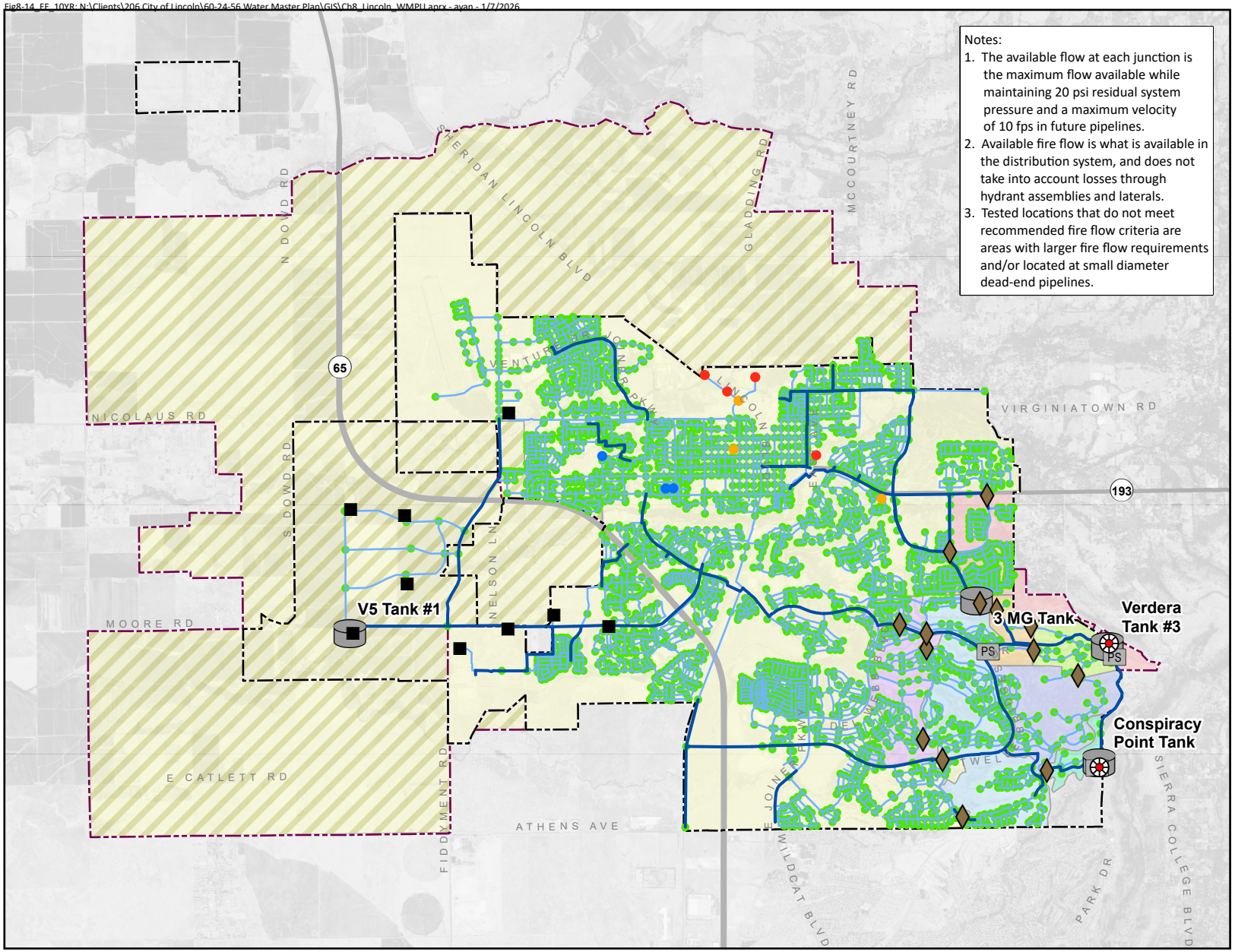
Percent of Fire Flow Requirement Available
5-Year Water System
Figure 8-13

Fig8-14_FF_10YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Percent of Available Fire Flow

- ≥ 100% of Criteria
- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

System Facilites

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Boundaries

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- 575 Zone
- 610 Zone
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- 775 Zone
- Existing City Limit
- City Sphere of Influence

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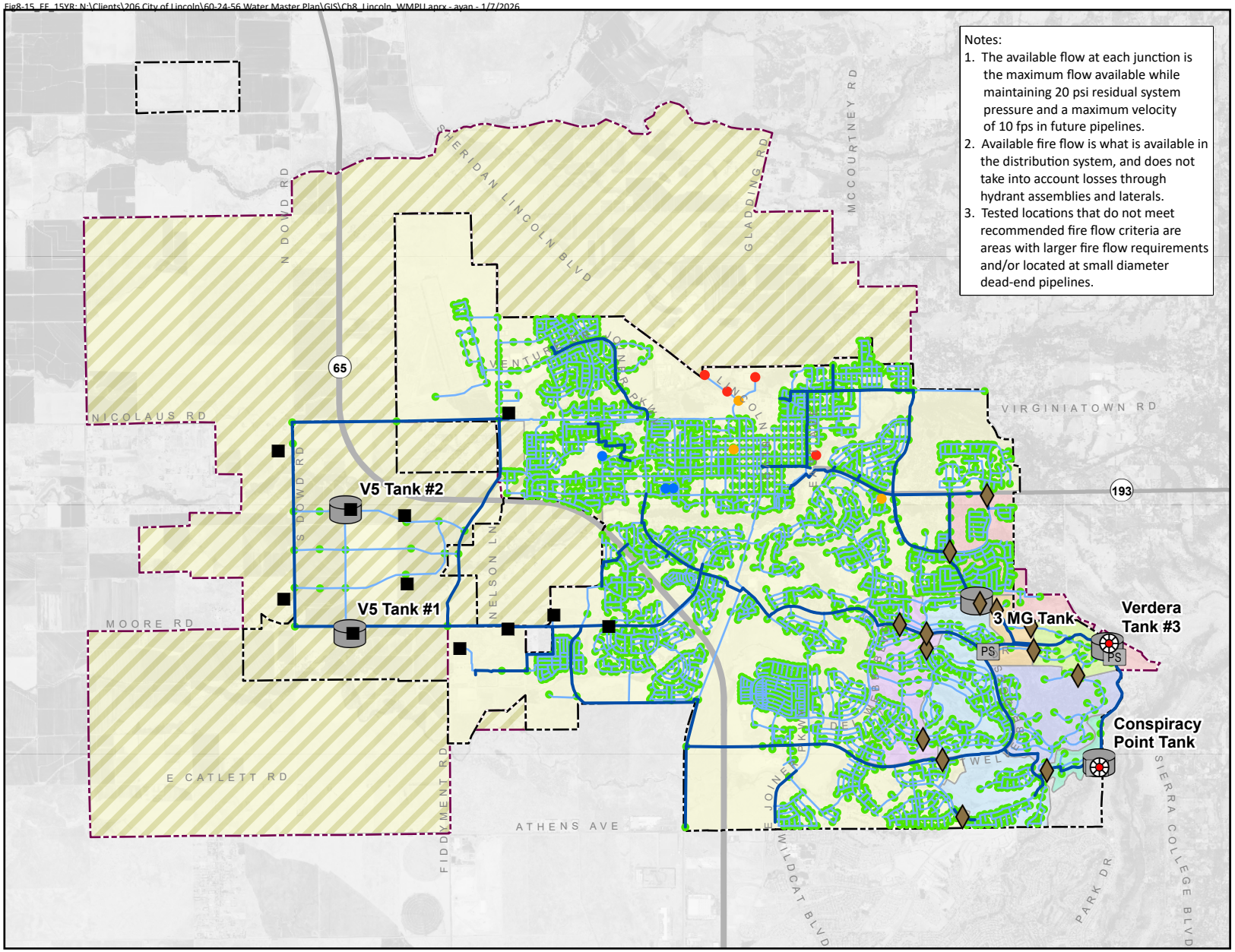
Percent of Fire Flow Requirement Available
10-Year Water System
Figure 8-14

Fig8-15_FF_15YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Percent of Available Fire Flow

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- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

System Facilites

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Boundaries

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- 575 Zone
- 610 Zone
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- 775 Zone
- Existing City Limit
- City Sphere of Influence

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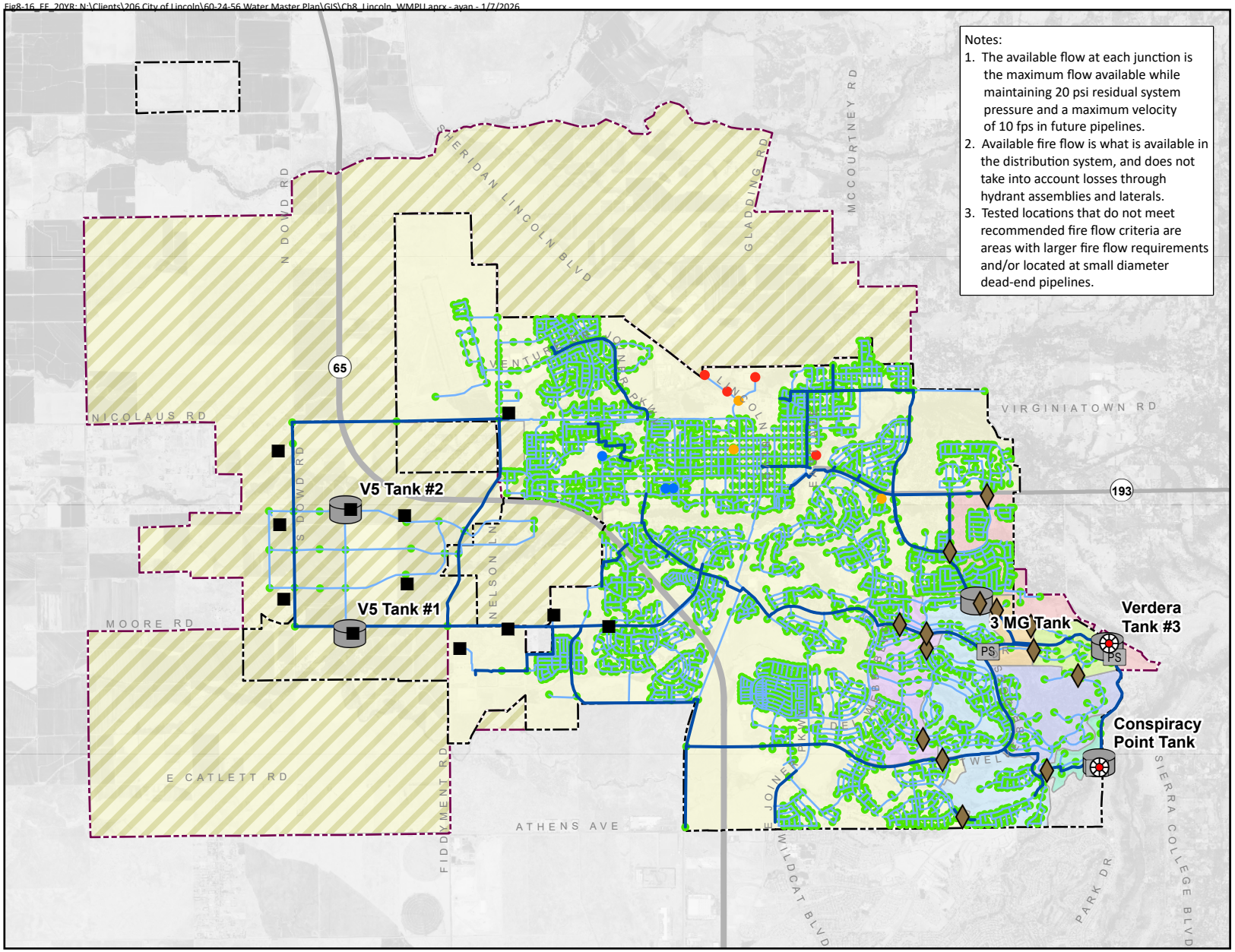
Percent of Fire Flow Requirement Available

15-Year Water System

Figure 8-15

Fig8-16_FF_20YR: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Percent of Available Fire Flow

- ≥ 100% of Criteria
- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

System Facilites

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- Groundwater Well
- Pump Station
- Pressure Regulating Station
- Storage Tank
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- Transmission Pipeline (≥18-inch)

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- Existing City Limit
- City Sphere of Influence

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0 3,750 7,500 Feet

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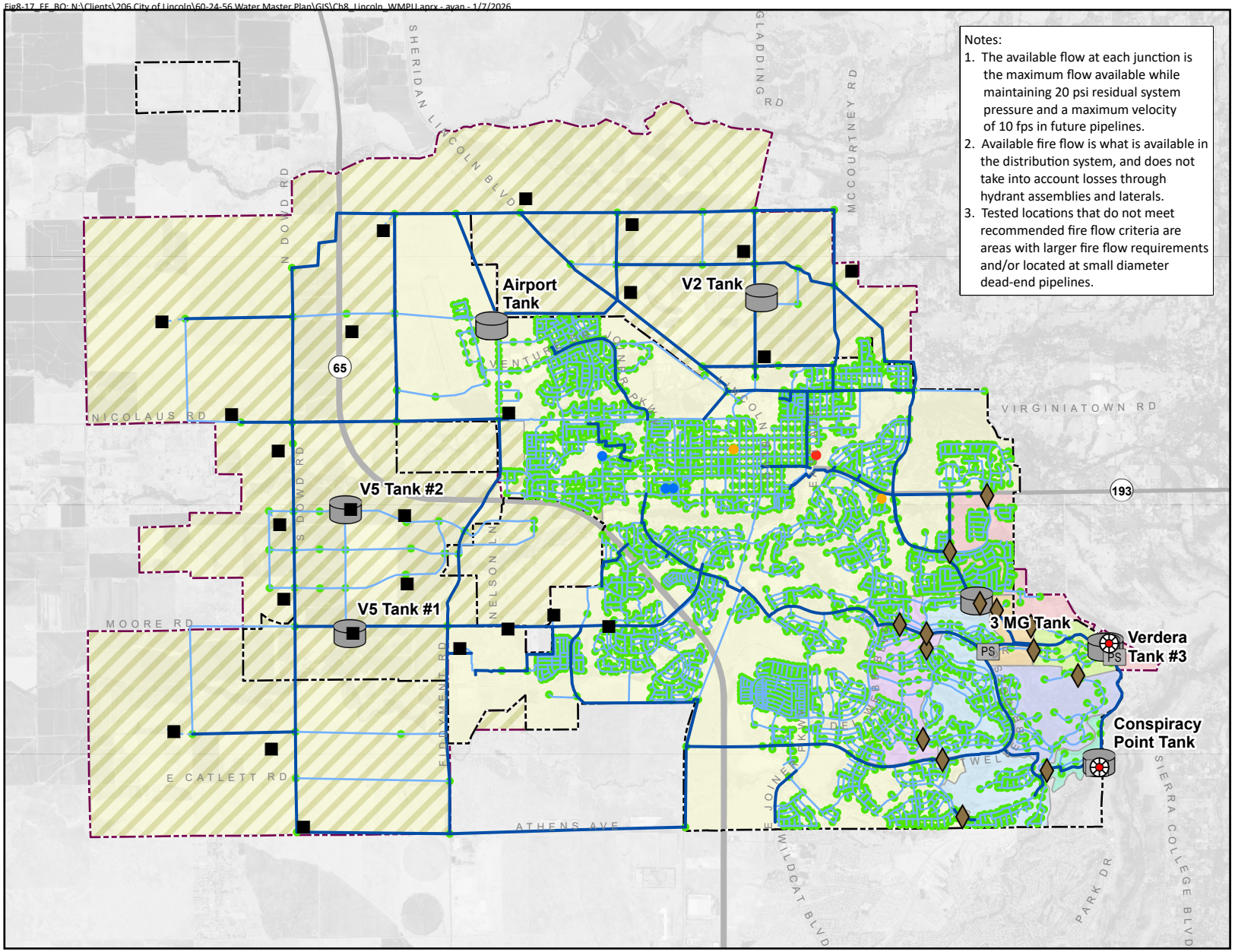
Percent of Fire Flow Requirement Available
20-Year Water System
Figure 8-16

Fig8-17_FF_RO: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch8_Lincoln_WMPU.aprx - ayan - 1/7/2026



Percent of Available Fire Flow

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- 75 - 100% of Criteria
- 50 - 75% of Criteria
- < 50% of Criteria

System Facilites

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- City Sphere of Influence

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Percent of Fire Flow Requirement Available
Buildout Water System
Figure 8-17

8.5 SUMMARY OF FINDINGS AND RECOMMENDATIONS FOR THE FUTURE WATER SYSTEM

Table 8-20 provides a summary of findings and recommended improvements identified by evaluating the 5-Year, 10-Year, 15-Year, 20-Year, and Buildout water systems and is organized by improvement type and phase. These recommendations are used to develop a recommended CIP, which is further described in Chapter 10. Figure 8-1 presents the recommended improvements for the five phases.

8.6 OTHER RECOMMENDATIONS

In addition to the improvements identified in the capacity and performance evaluations, other recommendations were identified through discussions with City staff. These projects are included to improve system and/or water supply reliability and are summarized below.

- **Water Supply Options Study.** A comprehensive water supply study is recommended to investigate feasible water supply sources for Buildout. This study will also explore the feasibility of obtaining additional PCWA and NID water supply. Potential PCWA options to consider include, but are not limited to, new PCWA water supply sources in west Placer County, such as the RiverArc Project, potential expansion and/or modification to metering stations, and the establishment of new agreements to access additional supply. The outcome of the study will be used as a framework for Project proponents to provide supply solutions to meet the increase in water demands for their developments. The supply solutions should be included in the development approval process with the City.
- **Groundwater Recharge Study.** A groundwater recharge study is recommended to perform field investigation and testing on the sites identified in the 2023 groundwater recharge site feasibility study completed by WPGSA. This study will also further evaluate whether implementation of recharge is viable in the City.
- **ASR Wells Study.** An ASR well study is recommended to investigate the feasibility of implementing ASR capabilities in future wells.
- **Recycled Water Feasibility Study.** The City should update the 2019 Reclamation Master Plan and continue to work with developers and Lincoln-Sewer Maintenance District 1 Wastewater Authority (LiSWA) to maximize the future use of recycled water.

Table 8-20. 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.				

CHAPTER 9
Rehabilitation and Replacement Program

Previous chapters of this WMPU have focused on the hydraulic capacity of the water system and evaluation of the ability to meet demands under existing and projected future conditions. This chapter presents the desktop study performed to assess the condition of water pipelines and the recommended pipeline R&R program. The results of a visual condition assessment of major water system facilities are also presented. Recommendations from the pipeline and major facilities assessments will be incorporated into the overall capital improvement program.

Major sections in this chapter include:

- Existing Pipeline R&R Approach
- Pipeline Asset Registry
- Pipeline Remaining Useful Life Assessment
- 10-Year Pipeline R&R Projections
- Condition Assessment of Major Facilities
- Next Steps

9.1 EXISTING PIPELINE REHABILITATION AND REPLACEMENT APPROACH

The City currently develops a pipeline replacement list every year which focuses on older pipelines and areas that have frequent leaks, breaks and/or maintenance calls. The water department meets with operations staff to identify the highest need pipelines and they are grouped into replacements for the following two fiscal years (FY). All appurtenances (valves, hydrants, sampling stations, etc.) are replaced when the adjacent pipeline is replaced. The City develops a GIS-based plan which identifies replacements through the next five to seven FY. At the time of the development of the recommended R&R program discussed in Section 9.4, the City's most recent Water CIP Replacement Plan was dated May 2024 and shown in Figure 9-1.

It should be noted that the City continuously updates its Water CIP Replacement Plan and versions more recent than the May 2024 plan are not included in this WMPU, as they were not used for the development of the recommended R&R program. The City's most recent publicly available CIP information, including a CIP Tracker report and a ArcGIS-based Active CIP web map public information on CIP including items like a CIP tracker report and ArcGIS CIP web-based map, can be accessed on the City's website at: https://www.lincolnca.gov/our-government/capital-improvement-projects/.

For the past few years, the quantity of pipelines to be replaced has largely been dictated based on available budget, which has been between $1.2M and $3M per year. The City's 2023 Water and Wastewater Rate Study (Raftelis) proposes a capital improvement plan which anticipates replacement of up to 1 mile per year of pipeline starting in FY 2026 and increasing up to 2 miles per year of pipeline by FY 2029, which is based on pipelines that have exceeded their service life.

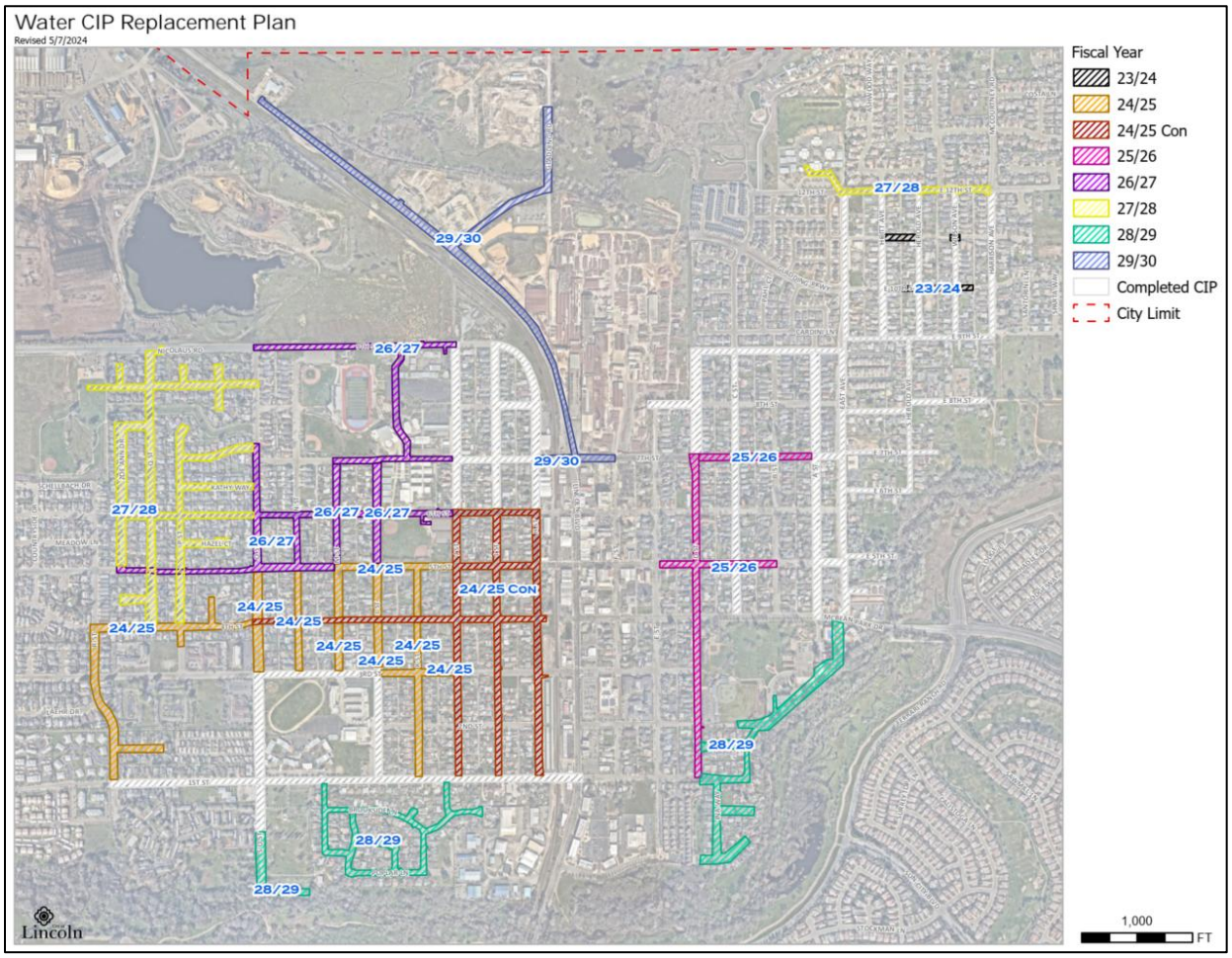


Figure 9-1. Water CIP Replacement Plan (May 2024)

9.2 PIPELINE ASSET REGISTRY

The City provided a GIS database that was used to create an inventory of existing pipelines within the City's potable water system (asset register). The asset register consists of 11,611 pipeline segments and associated asset data (e.g., pipeline age, size, material, etc.). Table 9-1 presents a summary of the City's water pipelines by diameter. Table 9-2 presents a summary of the City's water pipelines by material. In Chapter 2, Table 2-8 and Figure 2-4 present the water pipelines by decade of installation. The majority of pipelines (56-percent) were installed in the 2000s, with only five percent installed in the 1970s or earlier.

Table 9-1. Existing Pipeline Summary, by Diameter[a]

Pipeline Diameter, inches	Length of Pipeline, miles	Percent in Water System by Length	Count of Pipeline Segments
1-3	0.7	0.2	58
4	3.0	1.1	178
6	22.1	8.0	1,060
8	129.6	47.2	5,623
10	3.6	1.3	180
12	77.0	28.0	3,625
14	1.8	0.6	64
16	8.4	3.1	180
18	14.5	5.3	362
20	1.0	0.4	3
24	8.9	3.2	209
30	1.9	0.7	37
36	1.1	0.4	27
42	1.2	0.4	1
Unknown	0.01	<0.01	4
Total	**274.6**	**100%**	**11,611**

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

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

The majority of the City's water system pipelines, approximately 77 percent, have diameters between 8 inches and 12 inches.

Table 9-2. Existing Pipeline Summary, by Material[a]

Pipeline Material	Length of Pipeline		Percent in Water System, percent
	feet	miles	
Asbestos Cement	77,960	14.7	5.4
Cast Iron	14,030	2.7	1.0
Copper	30	< 1.0	< 0.1
Ductile Iron	159,420	30.2	11.0
High-Density Polyethylene (HDPE)	90	< 1.0	< 0.1
Polyvinyl Chloride (PVC)	1,183,130	224.1	81.6
Steel	12,220	2.3	0.8
Unknown	3,170	0.6	0.2
Total	**1,450,050**	**274.6**	**100%**

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

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

The majority of the City's water system pipelines, approximately 82 percent, are PVC.

As described in the following sections, the asset register was used to develop remaining useful life (RUL) estimates and develop a proposed pipeline rehabilitation and repair schedule.

9.3 PIPELINE REMAINING USEFUL LIFE ASSESSMENT

Asset *useful life* (UL) is the time that an asset provides valued service, after which it does not meet its intended service level. End of life is not necessarily indicative of catastrophic failure, and in most cases an asset can still hold functionality when it has reached the end of its useful life. Asset *RUL* can be estimated by comparing the actual age of assets to its useful life. In the absence of condition or performance data, this approach provides an initial determination of assumed condition and can be used to project estimated renewal needs. If available in the future, asset condition or performance data can be used to support or supersede RUL estimates.

The following section presents the method used to estimate RUL of City pipelines.

9.3.1 Remaining Useful Life

Each pipeline's RUL was estimated by subtracting the estimated useful life (UL) from its age (how long the asset has been installed):

$$RUL = UL - age$$

For example, an asset with a 50-year useful life that has been in service 35 years would have a RUL of 15 years.

9.3.1.1 Useful Life Expectancies

Municipal utility system assets vary by type, manufacturer, design, construction, and quality. They have different characteristics in how they operate and, consequently, will have different profiles of how they perform and ultimately fail. Standard UL expectancies are documented by the American Water Works Association, Water Environment Research Foundation, in addition to other industry associations. UL expectancies were developed for the City's pipelines using these industry standards.

Each pipe material and diameter within the City's water system was assigned a useful life. Considerations were made to account for variable environmental conditions. Based on discussions with City staff, the City has experienced brittle AC pipe of all diameters (in clay soils with high shrink-swell potential, asbestos cement pipes are prone to breaks due to the brittle nature of the material). The City has not experienced corrosive soils within the service area, which can impact the useful life of metallic pipelines. The standard useful life expectancies are presented in Table 9-3. Once each pipeline was assigned a standard useful life, the RUL of each of the City's water pipelines was calculated.

Table 9-3. Standard Useful Life of Buried Pipelines, by Material	
Material	Useful Life, years
Asbestos Cement[(a)]	50
Cast Iron	90
Copper	50
Ductile Iron	95
High Density Polyethylene (HDPE)	80
Polyvinyl Chloride (PVC)	80
Steel	75
Unknown	50

(a) Asbestos cement pipe typically has a useful life of 65-100 years. When exposed to clay soils with high shrink-swell potential, asbestos cement pipes are prone to breaks due to the brittle nature of the material.

9.3.1.2 RUL Classification

Based on the pipeline estimated RUL, each pipeline was assigned an assumed condition from *Like New* to *Poor*, as presented in Table 9-4. Newer assets with 50 percent or more of their useful life remaining are expected to be in Good to Like New condition. Older assets with less than 50 percent of their useful life remaining are expected to be in fair to poor condition.

Table 9-4. RUL to Condition Translation	
Percent RUL	Assumed Condition
100 to 80%	Like New
79 to 50%	Good
49 to 20%	Fair
19% to >0%	Poor

Table 9-5 summarizes the assumed condition of pipelines based on each pipeline's estimated RUL. Note that the Poor condition category was split between pipes with greater than zero percent RUL and less than or equal to zero RUL.

Table 9-5. Pipeline RUL-Based Condition Summary

Condition	Length of Pipelines		Percent of System, percent
	feet	miles	
Like New (100% to 80% RUL)	301,820	57.2	21
Good (79% to 50% RUL)	1,053,340	199.5	73
Fair (49% to 20% RUL)	21,380	4.0	1
Poor (greater than 0% to 19% RUL)	19,540	3.7	1.3
Beyond RUL (0% RUL)	53,970	10.2	4
Total	**1,450,050**	**274.6**	**100%**

This information provides a snapshot view of the condition of the City's potable water pipelines based on the estimated RUL and where future R&R may be required. Approximately 94-percent of the City's pipelines are in Good to Like New condition. Approximately fourteen miles of pipeline, or about five percent of the water system, are expected to be in Poor condition. The last row in Table 9-5 shows the pipelines that are already beyond useful life (10.2 miles or four percent of pipelines).

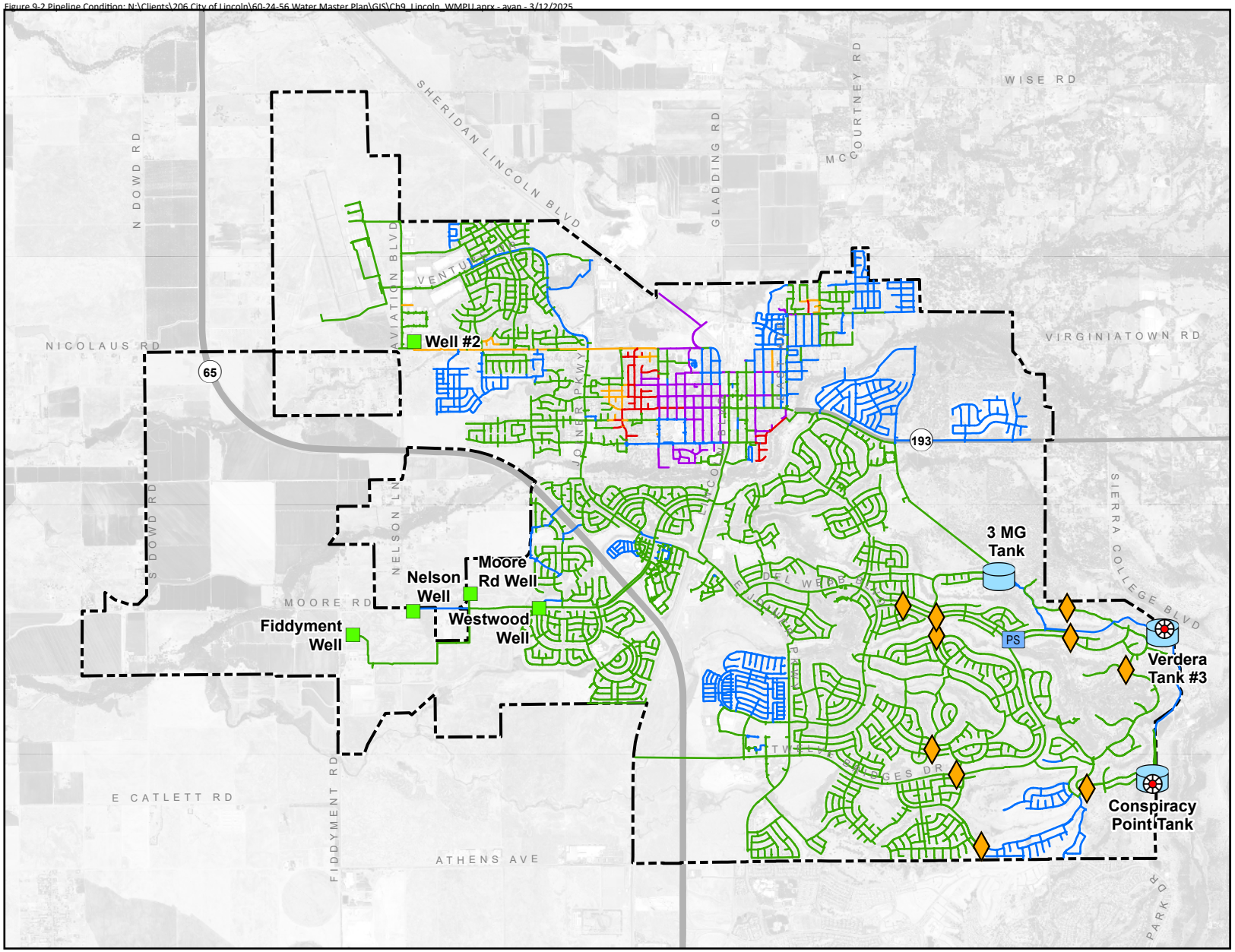
Figure 9-2 presents the RUL-based condition of pipelines.

9.4 PIPELINE R&R PROJECTIONS

The purpose of this effort is to improve the City's approach to pipeline R&R by identifying assets that are beyond their expected useful life, incorporate the City's institutional knowledge of chronic issues, and combine those assets into a prioritized program that can be implemented strategically by the City over the next 10 years.

Once the RUL analysis was complete, West Yost held a workshop with City staff to discuss the initial replacement projections and receive feedback on any issues in the system such as areas/neighborhoods, certain pipeline materials, or certain pipeline sizes with chronic leak/breaks, or maintenance calls. Existing and proposed projects were also discussed for potential inclusion in the program such as replacement of lead goosenecks (largely completed through CIP Plan), backflow preventer installation/replacements (agreed to require more study and more appropriate in the Downtown Specific Plan), and replacement of specific pipelines for access improvement. Most of these projects were agreed to be included in other planning efforts, except for the realignment of 14-inch pipelines at 1st Street/D Street that currently runs under a house.

Figure 9-2 Pipeline Condition: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch9_Lincoln_WMPU.aprx - ayan - 3/12/2025



Pipeline Condition by Percent of Remaining Useful Life

- Beyond Remaining Useful Life
- Poor (1-19%)
- Fair (20-49%)
- Good (50-79%)
- Like New (80-100%)

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 are based on GIS data provided by the City in April 2024.
2. Pipeline condition is determined based on the asset's age and expected useful life. Expected useful life is estimated based on pipeline material and industry standards.

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0 3,000 6,000 Feet

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Pipeline Condition

Figure 9-2

9.4.1 10-Year Pipeline R&R Program

The City's May 2024 Water CIP Replacement Plan[1], the RUL estimates, and other projects identified by the City were used to develop a 10-year pipeline R&R program.

The City's 2023 Water and Wastewater Rate Study specifies replacement of up to 1 mile of pipeline per year starting in FY 2026, increasing up to 2 miles per year by FY 2029. City Staff provided feedback to incrementally increase pipeline replacements per year, as follows: replacement of 1 mile per year though FY 2028, followed by 1.5 miles per year in FY 2029-2031, and 2 miles per year thereafter.

For each year of the plan, pipelines were included based on the following hierarchy:

1. Pipelines included in the City's current Water CIP Replacement Plan, by FY
2. Pipelines identified to have less than or equal to zero RUL
3. Other pipelines identified by the City (e.g., 1st Street/D Street realignment of 14-inch pipeline under house), which were matched with adjacent replacements

The 10-year pipeline R&R program is presented in Table 9-6 and Figure 9-3. The last two columns in Table 9-6 present the oldest pipeline remaining after replacements are performed for that year, and the count of pipelines beyond useful life after replacements are performed for that year. At Year 10 (2034), the program will "catch up" with overdue replacements and all pipelines beyond their useful life will have been replaced. At that point, is expected that unplanned and emergency pipeline repairs and replacements will decrease because the oldest and poorest condition pipelines will no longer be in the system.

Details on the 10-Year R&R program including pipelines by year are included in Appendix F.

[1] As discussed in Section 9.1, at the time of the development of the 10-year pipeline R&R program, the City's most current Water CUP Replacement Plan was dated May 2024.

Table 9-6. 10-Year Pipeline R&R Program					
Year	Length of Pipelines, miles	Unit Cost for Pipeline Replacement[a]	Capital Cost Estimate, dollars[b]	Remaining Oldest Pipe after Replacements	Count of Pipes Beyond UL after Replacements
Year 1 (2025)	1	$475 / linear foot	2,528,160	1929	430
Year 2 (2026)	1		2,607,757	1929	376
Year 3 (2027)	1		2,766,406	1929	323
Year 4 (2028)	1		2,792,331	1945	304
Year 5 (2029)	1.5		4,268,664	1945	269
Year 6 (2030)	1.5		4,367,729	1945	199
Year 7 (2031)	1.5		4,369,866	1960	131
Year 8 (2032)	2		6,121,991	1971	84
Year 9 (2033)	2		6,389,702	1971	23
Year 10 (2034)	2		6,522,755	1971	0

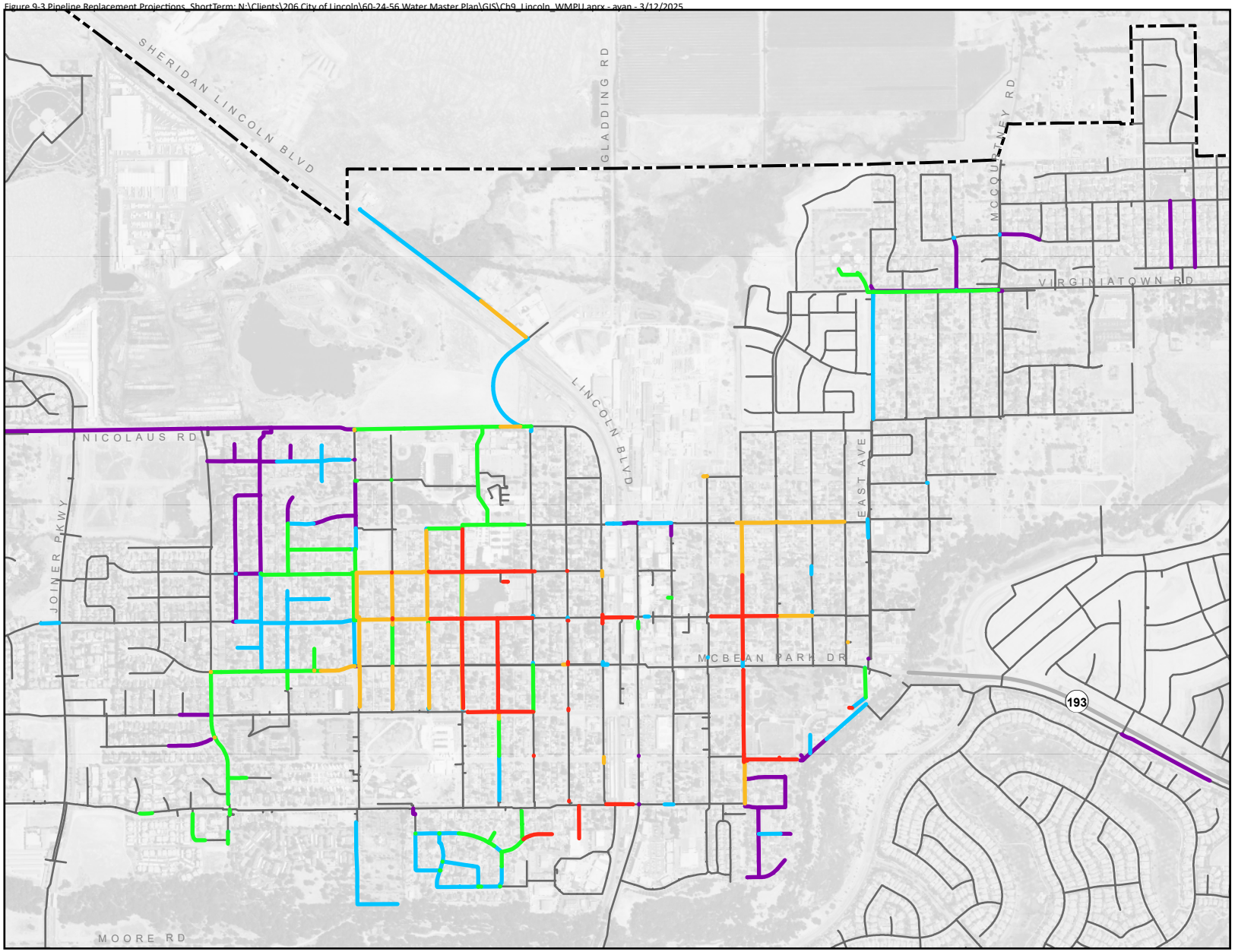
(a) Unit construction cost estimate is based on 8-inch diameter pipeline built in developed area.
(b) 3% inflation rate applied for years subsequent to 2025.

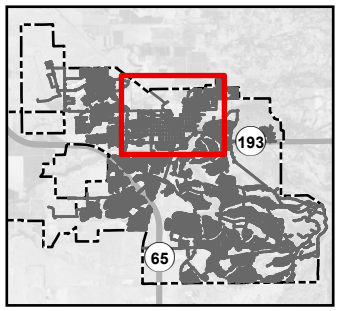
9.4.2 Future Pipeline Replacements

After Year 10 of the R&R program, there are several years where no pipelines reach the end of their useful life. Because the majority of the City's system was installed in the 1990s and 2000s, it is expected these assets will create a "replacement wave" where a significant number of assets reach the end of their useful lives around the same time, requiring simultaneous replacement or upgrades. To understand the longer-term outlook on pipeline replacements, the RUL projections were extended an additional 70-years beyond the 10-Year program (to year 2104). Table 9-7 presents the pipeline replacement projections based on RUL for 10-year increments, ending in year 2104.

Table 9-7. Long-Term Pipeline R&R Projections			
Year	Length of Pipelines, feet	Length of Pipelines, miles	Percent of System, percent
Year 11-20 (2035-2044)	13,274	2.5	2.5
Year 21-30 (2045-2054)	4,120	0.8	0.3
Year 31-40 (2055-2064)	16,710	3.2	1.2
Year 41-50 (2065-2074)	63,010	11.9	4.3
Year 51-60 (2075-2084)	686,760	130.1	47
Year 61-70 (2085-2094)	241,670	45.8	17
Year 71-80 (2095-2104)	322,790	61.1	22

Figure 9-3 Pipeline Replacement Projections_ShortTerm: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch9_Lincoln_WMPU.aprx - ayan - 3/12/2025





Pipeline Replacement Year

- 2025 - 2026
- 2027 - 2028
- 2029 - 2030
- 2031 - 2032
- 2033 - 2034
- Beyond 2034

Boundary

- City Limit

Notes:

1. Infrastructure shown are based on GIS data provided by the City in April 2024.
2. Projection of pipeline replacement is determined based on City CIP plans and the asset's age and expected useful life. Expected useful life is estimated based on pipeline material and industry standards.
3. Several standalone segments are located throughout the city and fall outside the figure boundaries, they are included in appendices.

Prepared by:

WEST YOST

N

0 750 1,500 Feet

Prepared for:

City of Lincoln
Water Master Plan Update

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Pipeline Replacement Projections - 10-Year CIP

Figure 9-3

As shown in Table 9-7, there are a small number of expected replacements (less than four percent of the system) until Years 51-60, when 47 percent of the system is expected to require replacement. The following decades also have significant replacements expected (17 percent and 22 percent, respectively).

To proactively plan for the wave of replacements, it is recommended the City:

1. **Implement a Staggered Replacement Strategy**
    - Spread replacements over time by prioritizing segments based on condition, risk, location, or strategic importance, instead of waiting for mass end-of-life events.
    - To support the replacement prioritization, consider conducting a condition assessment to identify pipelines that may require early replacement due to wear or operational conditions, which can help to out the replacement timeline.
    - Considering the challenges and costs associated with assessing the condition of water mains, the City should adopt a cost-benefit-driven approach to prioritize assessments strategically – this could include risk-based prioritization, a representative sampling-based approach, or other strategies.
2. **Establish a Long-Term Capital Reserve Fund**
    - The dedicated fund should be similar to what was developed as part of the 2023 Water and Wastewater Rate Study and should serve long-term needs.
3. **Continue and Enhance the Collaborative Approach**
    - The City currently utilizes a collaborate approach to develop the replacement plan. Continue this approach and support decisions with data (maintenance records, condition assessment, work order history, the program presented here).
    - Coordinate with other City departments (sewer, roads) to align replacement schedules and reduce costs.

9.5 BASIC CONDITION ASSESSMENT OF MAJOR FACILITIES

As discussed in Chapter 2, the City's major water system facilities include: three storage tanks, five groundwater wells, one booster pump station, and multiple pressure reducing stations.

On May 23, 2024, West Yost conducted a basic condition assessment of the City's major facilities to evaluate the condition, performance, and efficiency of each facility. Table 9-8 summarizes the condition of the evaluated facilities and any associated comments and/or recommendations. Generally, all evaluated facilities were in good condition with no major issues. West Yost recommends installing an exterior ladder with a safety cage on the Verdera Tank No. 3.

9.6 NEXT STEPS

Recommendations from the pipeline program and major facilities assessments will be incorporated into the overall capital improvement program.

Table 9-8. Summary of Basic Condition Assessment of Major Facilities		
Name	General Condition	Comments
Storage Tanks		
Conspiracy Point Tank	Good	• There is an unknown PRV vault on site, City is uncertain if this is a PCWA vault. • No standby power.
3 MG Tank	Good	• No issues.
Verdera Tank #3	Good	• New PRV is currently under construction. • Tank needs an exterior ladder with a safety cage. There is currently no access to the top of tank due to the lack of an exterior ladder. • No standby power.
Groundwater Wells		
Well 2	Good	• Currently, Well 2 is only operated periodically (pumped to waste) each month due to PFAS being detected in the well water. However, the PFAS level is not above the MCL. • The City uses Well 2 only as necessary during times of high demand. • At the time of the site visit (May 23,2024), the generator was unable to start in “Auto” mode due to issues with the automatic transfer switch and the only way to operate the generator was to start it in “Manual” mode when there was no PG&E power available onsite. • As of July 11, 2024, the generator was repaired and is fully functional.
Well 6 – Westwood	Good	• No issues.
Well 7 – Moore Rd	Good	• No standby power but has a connection for a portable generator.
Well 8 – Fiddyment	Good	• No issues.
Well 9 – Nelson	Good	• No standby power but has a connection for a portable generator.
Catta Verdera BPS		
Overall	Good	• BPS is only needed if the PCWA line is out of service. • City staff keeps the BPS operational by operating it weekly, however, this requires a lot of time and cost.
Pump 1	Good	• Frequent check valve replacement when the pump station is operational.
Pump 2	Good	• Frequent check valve replacement when the pump station is operational.
Pump 3	Good	• No VFD. • Frequent check valve replacement when the pump station is operational.
Pump 4	Good	• No VFD. • Pump has not been run in more than five years.

Table 9-8. Summary of Basic Condition Assessment of Major Facilities

Name	General Condition	Comments
Pressure Reducing Stations (PRS)		
Twelve Bridges PRS	Good	• 4-inch and 12-inch ClaVals were recently rebuilt. • Piping has minor coating issues. • No standby power. • There are traffic speeding issues at the PRS site, which causes an employee safety issue when working on the PRS. • No site lighting
Eastridge PRS	Good	• No standby power. • No site lighting.
Village 13 PRS	Good	• No standby power.
Village 19 PRS	Good	• No site power, SCADA, or standby power. • No alarms. • No site lighting. • No PG&E.

CHAPTER 10
Capital Improvement Program

This chapter presents the recommended Capital Improvement Program (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 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.

It should be noted that the recommended CIP only identifies improvements at a master plan level and does not necessarily include all required on-site infrastructure or provide design of improvements. Subsequent detailed design is required to determine the exact sizes and locations of these proposed improvements.

The following sections of this chapter summarize the cost estimating methodology and present the CIP of recommended upgrades to improve the existing system and support future demands:

- Cost Estimating Assumptions
- Recommended CIP
- Basis of Recommendations

10.1 COST ESTIMATING ASSUMPTIONS

Cost estimates prepared for this WMPU are in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International for a Class 5 Estimate. AACE International defines a Class 5 Estimate in the following manner:

> *Class 5 Estimate: This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known. Strategic planning purposes include, but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale-up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class estimate are -20 to -50 percent on the low side and +30 to +100 percent on the high side.*

Construction and Capital Cost estimates are presented in August 2025 dollars based on an Engineering News Record Construction Cost Index (ENR CCI) of 20-cities average (13,913.52). Construction costs were developed based on a combination of data supplied from manufacturers, bids on other water facilities projects, construction costs previously estimated by West Yost, and from standard cost estimating guides. Total CIP costs include contingencies equal to 49.5 percent of base construction costs, including construction contingency and other costs for engineering and implementation.

For this WMPU, it is assumed that recommended distribution system facilities will be developed in public rights-of-way or on public property; therefore, land acquisition costs have not been included. Construction cost estimates do not include costs for annual operations and maintenance. A complete description of the assumptions used in developing the estimates of probable construction cost is provided in Appendix G.

10.2 RECOMMENDED CAPITAL IMPROVEMENT PROGRAM

This section summarizes the overall recommended CIP, which is based on the evaluations described in Chapters 7 and 8 and recommendations in Chapter 9. A high-level summary of the overall program is provided below, and subsequent sections provide more detail for each of the evaluated time frames. Figure 10-1 shows overall recommendations for the City's existing, 5-Year, 10-Year, 15-Year, 20-Year, and Buildout water system. Pipelines intended to serve future development areas and their associated costs are included for reference in the CIP; only pipelines that are 12-inch diameter or greater are included. These pipelines, however, are recommended to be funded by Project proponents in the future, as part of connection fees, and alignments are expected to change as future development plans are refined.

10.2.1 Summary of Estimated Capital Costs

Table 10-1 summarizes the estimated total capital costs by time frame and responsible party for the costs (i.e., the City or future development). As shown in Table 10-1, the overall capital improvement costs are estimated to be approximately $539 million (M). Approximately 98 percent of the overall program ($529M), is recommended to be allocated to future development and paid for through connection fees, as the identified infrastructure is needed to support future demands. The top three contributors to the overall program costs are Villages 2 through 4 and SUD-A at approximately 45 percent ($240M), Village 5 at approximately 23 percent ($125M), and Village 6 and SUD-C at approximately 15 percent ($82M). The City is responsible for the remaining 2 percent ($10M) of overall program costs which is attributed to improving existing infrastructure and/or developing studies to improve water supply quality and/or reliability.

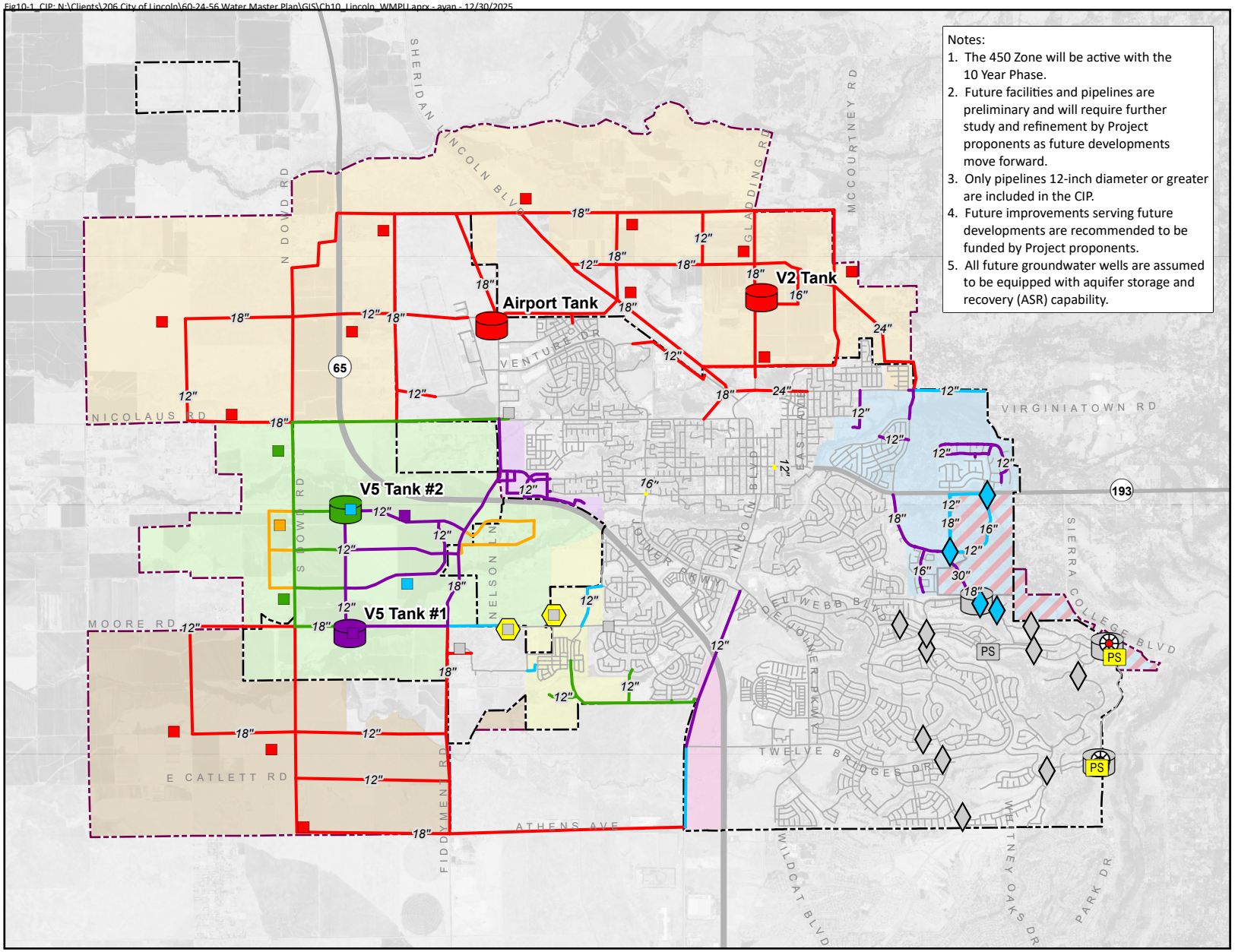
The improvement costs presented in Table 10-1 do not include improvements from the recommended R&R programs, which should be completed on an on-going basis and are not included in this WMPU. These programs and associated costs are summarized below and described in detail in Chapter 9.

Table 10-1. Summary of Improvement Costs by Time Frame and Responsible Party, dollars[(a)]

Improvement Type	Existing	5-Year	10-Year	15-Year	20-Year	Buildout	Total
City							
Storage and Pumping	7,073,000	0	0	0	0	0	7,073,000
Pipeline	113,000	1,884,000	0	0	0	0	1,997,000
Other Improvements	0	700,000	0	0	0	0	700,000
Subtotal	**7,186,000**	**2,584,000**	**0**	**0**	**0**	**0**	**9,770,000**
Lincoln 270							
Pipeline	0	6,898,000	4,281,000	207,000	0	0	11,386,000
Subtotal	**0**	**6,898,000**	**4,281,000**	**207,000**	**0**	**0**	**11,386,000**
SUD-B							
Pipeline	0	12,558,000	0	0	0	0	12,558,000
Subtotal	**0**	**12,558,000**	**0**	**0**	**0**	**0**	**12,558,000**
Village 1							
Pressure Reducing Station	0	0	1,935,000	0	0	0	1,935,000
Pipeline	0	23,699,000	15,304,000	0	0	0	39,003,000
Subtotal	**0**	**23,699,000**	**17,239,000**	**0**	**0**	**0**	**40,938,000**
Village 5							
Supply	0	8,615,000	8,615,000	8,615,000	4,308,000	0	30,153,000
Storage and Pumping	0	10,017,000	0	10,017,000	0	0	20,034,000
Pipeline	0	32,854,000	3,219,000	30,738,000	8,292,000	0	75,103,000
Subtotal	**0**	**51,486,000**	**11,834,000**	**49,370,000**	**12,600,000**	**0**	**125,290,000**
Village 7							
Pipeline	0	3,119,000	2,535,000	10,805,000	0	0	16,459,000
Jack & Bore	0	0	0	128,000	0	0	128,000
Subtotal	**0**	**3,119,000**	**2,535,000**	**10,933,000**	**0**	**0**	**16,587,000**
Village 2, Village 3, Village 4, and SUD-A							
Supply	0	0	0	0	0	43,073,000	43,073,000
Storage and Pumping	0	0	0	0	0	28,792,000	28,792,000
Pipeline	0	0	0	0	0	168,005,000	168,005,000
Jack & Bore	0	0	0	0	0	575,000	575,000
Subtotal	**0**	**0**	**0**	**0**	**0**	**240,445,000**	**240,445,000**
Village 6 and SUD-C							
Supply	0	0	0	0	0	12,922,000	12,922,000
Storage and Pumping	0	0	0	0	0	0	0
Pipeline	0	0	0	0	0	68,515,000	68,515,000
Jack & Bore	0	0	0	0	0	128,000	128,000
Subtotal	**0**	**0**	**0**	**0**	**0**	**81,565,000**	**81,565,000**
Total Costs	**$7,186,000**	**$100,344,000**	**$35,889,000**	**$60,510,000**	**$12,600,000**	**$322,010,000**	**$538,539,000**

(a) Costs shown are based on August 2025 CCI of 20-cities average (13913.52).

Fig10-1_CIP: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch10_Lincoln_WMPU.aprx - ayan - 12/30/2025



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:

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Recommended Capital Improvement Projects

Figure 10-1

10.2.2 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 MG of 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:**
  - 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.

No specific capital improvement projects besides the above listed capacity-related improvements were identified for the existing water system.

10.2.3 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 10-2 summarizes recommended future system improvements resulting from the analysis.

Recommended improvements and the associated costs are presented in Table 10-3, and locations are shown on Figure 10-1. Improvements addressing existing and aging infrastructure are expected 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.

Table 10-2. 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.				

Table 10-3. Recommended Capital Improvement Projects[a]

Responsible Party	Improvement Type	Justification	Improvement Description	Quantity and Unit	Construction Cost, dollars [b,c]	Capital Cost, dollars (includes markups)[b,d]
Existing System						
Storage and Pumping Improvements						
City	Backup Power	Addresses the existing storage capacity deficit in the 375 Pressure Zone by increasing the emergency groundwater credit (EGWC). Nelson and Moore Wells do not currently have backup power and do not contribute to EGWC.	Installation of dedicated on-site backup power at the Nelson and Moore Wells to provide 1.76 MG of EGWC.	2 each	$476,000	$1,186,000
City	Booster Pump Station	Addresses the existing storage deficit in the 750 Pressure Zone through construction of emergency booster pump station.	Installation of emergency booster pump station at the Verdera Tank #3 tank site with backup power.	2 mgd	$1,700,000	$2,542,000
City	Booster Pump Station	Addresses the existing storage deficit in the 775 Pressure Zone through construction of emergency booster pump station.	Installation of emergency booster pump station at the Conspiracy Point Tank site with backup power.	4 mgd	$2,238,000	$3,345,000
				Subtotal - Storage and Pumping Improvements	**$4,414,000**	**$7,073,000**
Pipeline Improvements						
City	Pipeline	Addresses high velocities observed in existing pipelines.	Replace existing 8-inch diameter pipeline at intersection of 1st Street and Joiner Parkway with new a 16-inch diameter pipeline.	25 LF	$21,000	$31,000
City	Pipeline	Addresses high velocities observed in existing pipelines.	Replace existing 8-inch diameter pipeline at intersection of E Street and McBean Park Drive with a new 12-inch diameter pipeline.	80 LF	$55,000	$82,000
				Subtotal - Pipeline Improvements	**$76,000**	**$113,000**
				Total Existing System Capital Improvements	**$4,490,000**	**$7,186,000**
5-Year System						
Supply Improvements						
Village 5	Supply (ASR Wells)	Improves supply reliability for increased demands in the 5-Year Phase.	Construction of 2 new ASR wells, equipped with backup power.	2 wells	$5,763,000	$8,615,000
				Subtotal - Supply Improvements	**$5,763,000**	**$8,615,000**
Storage and Pumping Improvements						
Village 5	Above-Ground Concrete Storage Tank	Addresses projected future storage deficit in the 375 West Zone as a result of increased demands in the 5-Year Phase. Sizing of facilities accounts for increased demands in the 10-Year Phase.	Construction of Village 5 Tank #1	2 MG	$4,700,000	$7,027,000
	Storage Tank Pump Station		Village 5 Tank #1 Pump Station, equipped with backup power	3 mgd	$2,000,000	$2,990,000
				Subtotal - Storage and Pumping Improvements	**$6,700,000**	**$10,017,000**
Pipeline Improvements						
City	Pipeline	Provides pipelines to support future development areas. *(It should be noted this pipeline is currently a developer obligation, however, an amendment is under review that may revise this to a City funded pipeline. For the purposes of the CIP, this pipeline is added to the City's responsibility to have a complete understanding of the City's potential financial needs*).	New 24-inch diameter pipeline crossing the Auburn Ravine	1,500 LF	$1,260,000	$1,884,000
Lincoln 270	Pipeline	Provides pipelines to support future development areas.	New 12-inch diameter pipelines	5,970 LF	$2,896,000	$4,329,000
	Pipeline		New 18-inch diameter pipelines	2,490 LF	$1,719,000	$2,569,000
SUD-B	Pipeline		New 12-inch diameter pipelines	13,050 LF	$6,330,000	$9,463,000
	Pipeline		New 18-inch diameter pipelines	3,000 LF	$2,070,000	$3,095,000
Village 1	Pipeline		New 12-inch diameter pipelines	12,600 LF	$6,111,000	$9,136,000
	Pipeline		New 16-inch diameter pipelines	2,270 LF	$1,453,000	$2,172,000
	Pipeline		New 18-inch diameter pipelines	2,730 LF	$1,884,000	$2,817,000
	Pipeline		Replace existing 20-inch diameter transmission main from the 3 MG Tank with new 30-inch diameter transmission main	5,875 LF	$6,404,000	$9,574,000
Village 5	Pipeline		New 12-inch diameter pipelines	25,890 LF	$12,557,000	$18,773,000
	Pipeline		New 18-inch diameter pipelines	13,650 LF	$9,419,000	$14,081,000
Village 7	Pipeline		New 12-inch diameter pipelines	1,540 LF	$747,000	$1,117,000
	Pipeline		New 18-inch diameter pipelines	1,940 LF	$1,339,000	$2,002,000
				Subtotal - Pipeline Improvements	**$54,189,000**	**$81,012,000**

Table 10-3. Recommended Capital Improvement Projects[a]

Responsible Party	Improvement Type	Justification	Improvement Description	Quantity and Unit	Construction Cost, dollars [b,c]	Capital Cost, dollars (includes markups)[b,d]
Other Improvements						
City	Study	A water supply study is recommended to investigate feasible water supply sources for Buildout. The outcome of the study will be used as a framework for Project proponents to provide supply solutions to meet the increase in water demands for their developments. The supply solutions should be included in the development approval process with the City.	Water Supply Options Study	1 lump sum	-	$100,000
	Study	A groundwater recharge study is recommended to perform field investigation and testing on the sites identified in the 2023 groundwater recharge site feasibility study completed by WPGSA. This study will also further evaluate whether implementation of recharge is viable in the City.	Groundwater Recharge Study	1 lump sum	-	$150,000
	Study	An ASR well study is recommended to investigate the feasibility of implementing ASR capabilities in future wells.	ASR Wells Study	1 lump sum	-	$100,000
	Study	The City should update the 2019 Reclamation Master Plan and continue to work with developers and Lincoln Sewer Maintenance District 1 Wastewater Authority (LiSWA) to maximize the future use of recycled water to offset potable demands.	Recycled Water Feasibility Study	1 lump sum	-	$350,000
			Subtotal - Other Improvements		**$0**	**$700,000**
			Total 5-Year System Capital Improvements		**$66,652,000**	**$100,344,000**
10-Year System						
Supply Improvements						
Village 5	Supply (ASR Wells)	Improves supply reliability for increased demands in the 10-Year Phase.	Construction of 2 new ASR wells, equipped with backup power.	2 wells	$5,763,000	$8,615,000
			Subtotal - Supply Improvements		**$5,763,000**	**$8,615,000**
Pressure Reducing Station Improvements						
Village 1	Pressure Reducing Station	Provides main supply from the 575 Pressure Zone to the new 450 Pressure Zone.	New PRS for the 450 Pressure Zone.	1 PRS	$324,000	$484,000
Village 1	Pressure Reducing Station	Provides emergency supply from the 610 Pressure Zone to the new 450 Pressure Zone.	New PRS for the 450 Pressure Zone.	1 PRS	$324,000	$484,000
Village 1	Pressure Reducing Station	Provides emergency supply from the new 450 Pressure Zone to the 375 Pressure Zone.	New PRS for the 450 Pressure Zone.	2 PRS	$647,000	$967,000
			Subtotal - Pressure Reducing Station Improvements		**$1,295,000**	**$1,935,000**
Pipeline Improvements						
Lincoln 270	Pipeline	Provides pipelines to support future development areas.	New 18-inch diameter pipelines	4,150 LF	$2,864,000	$4,281,000
Village 1	Pipeline		New 12-inch diameter pipelines	9,390 LF	$4,555,000	$6,809,000
	Pipeline		New 16-inch diameter pipelines	3,670 LF	$2,349,000	$3,512,000
	Pipeline		New 18-inch diameter pipelines	4,830 LF	$3,333,000	$4,983,000
Village 5	Pipeline		New 18-inch diameter pipelines	3,120 LF	$2,153,000	$3,219,000
Village 7	Pipeline		New 12-inch diameter pipelines	3,495 LF	$1,696,000	$2,535,000
			Subtotal - Pipeline Improvements		**$16,950,000**	**$25,339,000**
			Total 10-Year System Capital Improvements		**$24,008,000**	**$35,889,000**

Table 10-3. Recommended Capital Improvement Projects[a]

Responsible Party	Improvement Type	Justification	Improvement Description	Quantity and Unit	Construction Cost, dollars [b,c]	Capital Cost, dollars (includes markups)[b,d]
15-Year System						
Supply Improvements						
Village 5	Supply (ASR Wells)	Improves supply reliability for increased demands in the 15-Year Phase.	Construction of 2 new ASR wells, equipped with backup power.	2 wells	$5,763,000	$8,615,000
				Subtotal - Supply Improvements	**$5,763,000**	**$8,615,000**
Storage and Pumping Improvements						
Village 5	Above-Ground Concrete Storage Tank	Addresses projected future storage deficit in the 375 West Zone as a result of increased demands in the 15-Year Phase. Sizing of facilities accounts for increased demands in the 20-Year Phase.	Construction of Village 5 Tank #2	2 MG	$4,700,000	$7,027,000
	Storage Tank Pump Station		Village 5 Tank #2 Pump Station, equipped with backup power	3 mgd	$2,000,000	$2,990,000
				Subtotal - Storage and Pumping Improvements	**$6,700,000**	**$10,017,000**
Pipeline Improvements						
Lincoln 270	Pipeline	Provides pipelines to support future development areas.	New 18-inch diameter pipelines	200 LF	$138,000	$207,000
Village 5	Pipeline		New 12-inch diameter pipelines	7,870 LF	$3,817,000	$5,707,000
	Pipeline		New 18-inch diameter pipelines	24,265 LF	$16,743,000	$25,031,000
Village 7	Pipeline		New 12-inch diameter pipelines	3,370 LF	$1,635,000	$2,444,000
	Pipeline		New 18-inch diameter pipelines	8,105 LF	$5,593,000	$8,361,000
	Jack & Bore		Jack & Bore is needed for portions of 18-inch diameter pipeline crossing Southern Pacific Railroad	60 LF	$86,000	$128,000
				Subtotal - Pipeline Improvements	**$28,012,000**	**$41,878,000**
				Total 15-Year System Capital Improvements	**$40,475,000**	**$60,510,000**
20-Year System						
Supply Improvements						
Village 5	Supply (ASR Wells)	Improves supply reliability for increased demands in the 20-Year Phase.	Construction of 1 new ASR well, equipped with backup power.	1 wells	$2,882,000	$4,308,000
				Subtotal - Supply Improvements	*$2,882,000*	*$4,308,000*
Pipeline Improvements						
Village 5	Pipeline	Provides pipelines to support future development areas.	New 12-inch diameter pipelines	17,095 LF	$8,292,000	$8,292,000
				Subtotal - Pipeline Improvements	*$8,292,000*	*$8,292,000*
				Total 20-Year System Capital Improvements	**$11,174,000**	**$12,600,000**
Buildout System						
Supply Improvements						
Village 2, Village 3, Village 4, and SUD-A	Supply (ASR Wells)	Addresses supply deficit and Improves supply reliability for increased demands in Buildout.	Construction of 10 new ASR wells, equipped with backup power.	10 wells	$28,811,000	$43,073,000
Village 6 and SUD-C	Supply (ASR Wells)		Construction of 3 new ASR wells, equipped with backup power.	3 wells	$8,644,000	$12,922,000
				Subtotal - Supply Improvements	**$37,455,000**	**$55,995,000**
Storage and Pumping Improvements						
Village 2, Village 3, Village 4, and SUD-A	Above-Ground Concrete Storage Tank	Addresses projected future storage deficit in the 375 West Zone as a result of increased demands in Buildout.	Construction of Village 2 Tank	5 MG	$8,200,000	$12,259,000
	Storage Tank Pump Station		Village 2 Tank Pump Station, equipped with backup power	6.5 mgd	$2,822,000	$4,218,000
	Above-Ground Concrete Storage Tank	Addresses projected future storage deficit in the 375 West Zone as a result of increased demands in Buildout.	Construction of Airport Tank	3 MG	$6,000,000	$8,970,000
	Storage Tank Pump Station		Airport Tank Pump Station, equipped with backup power	4 mgd	$2,238,000	$3,345,000
				Subtotal - Storage and Pumping Improvements	**$19,260,000**	**$28,792,000**

Table 10-3. Recommended Capital Improvement Projects[a]

Responsible Party	Improvement Type	Justification	Improvement Description	Quantity and Unit	Construction Cost, dollars [b,c]	Capital Cost, dollars (includes markups)[b,d]
Pipeline Improvements						
Village 2, Village 3, Village 4, and SUD-A	Pipeline	Provides pipelines to support future development areas.	New 12-inch diameter pipelines	30,665 LF	$14,873,000	$22,235,000
	Pipeline		New 16-inch diameter pipelines	2,320 LF	$1,485,000	$2,220,000
	Pipeline		New 18-inch diameter pipelines	126,200 LF	$87,078,000	$130,182,000
	Pipeline		New 24-inch diameter pipelines	10,645 LF	$8,942,000	$13,368,000
	Jack & Bore		Jack & Bore is needed for portions of 12-inch diameter pipeline crossing Southern Pacific Railroad	120 LF	$129,000	$192,000
	Jack & Bore		Jack & Bore is needed for portions of 18-inch diameter pipeline crossing Southern Pacific Railroad	180 LF	$256,000	$383,000
Village 6 and SUD-C	Pipeline		New 12-inch diameter pipelines	26,595 LF	$12,899,000	$19,284,000
	Pipeline		New 18-inch diameter pipelines	47,725 LF	$32,931,000	$49,231,000
	Jack & Bore		Jack & Bore is needed for portions of 18-inch diameter pipeline crossing Southern Pacific Railroad	60 LF	$86,000	$128,000
			Subtotal - Pipeline Improvements		**$158,679,000**	**$237,223,000**
			Total Buildout System Capital Improvements		**$186,583,000**	**$322,010,000**
			Total Capital Improvements		**$333,382,000**	**$538,539,000**

(a) Costs shown are based on August 2025 CCI of 20-cities average (13913.52).

(b) Costs rounded to the nearest $1,000.

(c) Estimated construction costs reflect typical conditions and do not account for construction uncertainties or reflect economic bidding climate. Costs include construction contingency of 15 percent from base construction costs

(d) Costs include project contingencies equal to 30 percent (Engineering: 10 percent; Construction Management: 10 percent; Program Implementation, CEQA, Legal: 10 percent).

In addition to the capacity-related improvements in Table 10-2, 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. These recommendations are also summarized in Table 10-3, along with their associated timing and estimated costs which are assumed to be funded by the City.

10.2.4 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 Section 9.4.1, the City's current Water CIP Replacement Plan, the RUL 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. To proactively plan for the wave of replacements, it is recommended the City implement a staggered replacement strategy, establish a long-term capital reserve fund, and continue and enhance the collaborative approach. Details on each of these recommendations are discussed further in Section 9.4.2.

10.3 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 Chapter 1, 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.

Appendix A

Water Supply Agreements

RESOLUTION 2023 - 109

RESOLUTION OF THE CITY COUNCIL OF LINCOLN APPROVING A FUNDING AGREEMENT BETWEEN THE CITY OF LINCOLN AND PLACER COUNTY WATER AGENCY FOR CONSTRUCTION OF ADDITONAL TREATED WATER CAPACITY

WHEREAS, Placer County Water Agency (PCWA) has been planning construction of Ophir Water Treatment Plant (WTP) for more than a decade to meet the growing needs of treated water in the western side of the county; and

WHEREAS, the 2017 Water Master Plan prepared for the City of Lincoln included water management recommendations to support PCWA's decision to design and construct the Ophir Water Treatment Plant. Additionally, the Ophir WTP was identified as a capital program project outside of the city to be completed as necessary to maintain service; and

WHEREAS, current treated water needs, including that of the City of Lincoln, are mostly provided by Foothill WTP in Newcastle; and

WHEREAS, current estimates are that Ophir WTP is needed by 2030 to keep pace with growing demands in both Lincoln and PCWA retail service areas; and

WHEREAS, Lincoln and PCWA have an established history of cooperatively developing treated water infrastructure as the region has grown; and

WHEREAS, the 1998 treated water supply contract has been updated several times, most recently in 2012, which now includes a provision for joint financing of new infrastructure to increase capacity; and

WHEREAS, given the fact that Lincoln and PCWA need Ophir WTP at the same time, and that PCWA anticipates bidding the project in 2025, it is appropriate to take advantage of this contract provision; and

WHEREAS, staff of both parties have negotiated terms for joint financing with two primary objectives: 1) to defray borrowing costs for PCWA and 2) to maximize Lincoln's investment in future capacity; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LINCOLN AS FOLLOWS:

Section 1. The City Council hereby approves the attached agreement (Exhibit A) funding construction of additional treated water capacity; and

Section 2. The City Manager is hereby authorized to execute the attached agreement hereto and incorporated by this reference, including minor revisions that are in substantial conformance with the agreement on behalf of the City of Lincoln.

PASSED AND ADOPTED this 13th day of June, 2023:

AYES:	COUNCILMEMBERS:	Karleskint, Andreatta, Lauritsen, Joiner
NOES:	COUNCILMEMBERS:	
ABSENT:	COUNCILMEMBERS:	Brown

Paul Joiner, Mayor

ATTEST:

Gwen Scanlon, City Clerk

FUNDING AGREEMENT BETWEEN PLACER COUNTY WATER AGENCY AND THE CITY OF LINCOLN FOR CONSTRUCTION OF ADDITIONAL TREATED WATER CAPACITY

This Funding Agreement for Construction of Additional Treated Water Capacity is entered into by and between Placer County Water Agency, a public agency ("PCWA"), and the City of Lincoln, California, a municipal corporation ("Lincoln") (hereafter, the "Funding Agreement" or "Agreement"). PCWA and Lincoln may be collectively referred to as the "Parties," or each individually as a "Party."

Recitals

A. PCWA is a public agency and the primary water resource agency for Placer County, California, created under the Placer County Water Agency Act, that provides, among other things, retail and wholesale supplies of treated and untreated water to customers throughout the west slope of Placer County.

B. Lincoln is an incorporated city in Placer County that purchases wholesale treated water from PCWA and operates its own retail water system.

C. It is currently estimated that both PCWA and Lincoln will need additional treated water capacity by approximately 2030.

D. PCWA and Lincoln both collect capacity charges from new connections to their respective water systems to pay for the capacity needed when constructing new or expanded infrastructure.

E. To serve the needs of PCWA and Lincoln, PCWA must construct the first phase of its next major water treatment plant ("WTP"), named Ophir WTP. Phase 1 of the project will create an additional capacity of 10 million gallons per day ("MGD").

F. Lincoln wishes to use some of its current funds accrued by way of capacity charges to guarantee future capacity from PCWA's Ophir WTP and related infrastructure.

G. PCWA wishes to minimize the borrowing necessary to fund the construction of Ophir WTP.

H. Article 6(c) of the "Contract between Placer County Water Agency and City of Lincoln for a Treated Water Supply," dated December 10, 2012 (the "Contract") provides the option for joint financing of new infrastructure to increase capacity.

I. PCWA is willing to reduce the Water Connection Charge ("WCC") normally applicable to Lincoln based upon the defrayed borrowing costs for Ophir WTP if Lincoln pays for capacity in advance pursuant to the terms of this Agreement.

In consideration of the mutual covenants contained herein, the Parties agree as follows:

1. **Recitals Incorporated:** The foregoing recitals are true and are incorporated by reference.

2. **Purpose:** The purpose of this Agreement is to memorialize the agreement and understanding of the Parties with respect to a partnership that is intended to provide PCWA the funding for construction

of Ophir WTP, to enable PCWA to meet future water delivery obligations in both PCWA and Lincoln service areas, which is contemplated in the Contract.

3. **WCC Currently.** Pursuant to the Contract, Lincoln pays a WCC for "Regulated" Units of Capacity ("UOC"). The current WCC for a UOC of Regulated delivery in 2023 dollars is as follows:

Component	Amount
Treatment	$10,564
Transmission	$7,829
Planning	$95
Total	$18,488

4. **The Proposed WCC for Advanced Payment (the "Partner WCC").** In exchange for Lincoln's advance payment, PCWA shall reduce the treatment component by twenty-seven percent (27%), resulting in a revised total of $15,636 in 2023 dollars for the Partner WCC. This percent reduction is the estimated financing cost for Ophir WTP from PCWA's "Water Connection Charge Cost Study – 2017 Update," dated March 17, 2017.

5. **Purchased Capacity (the "Partner Capacity").** The parties agree that the volume of Partner Capacity purchased is variable based upon the amount of advanced payment(s) made by Lincoln and is expressed in UOC and MGD as follows:

Partner Funding	Partner Capacity	
	UOC	MGD
$35 million	2,239	2.58
$40 million	2,558	2.94
$45 million	2,878	3.31
$50 million	3,198	3.68
$55 million	3,518	4.05

Actual Partner Capacity may be interpolated or extrapolated from the incremental amounts listed.

6. **Terms of Payment.**

a. Lincoln shall submit an initial payment ("Partner Funding") by June 30, 2023.

b. PCWA shall place the Partner Funding in a designated account only used for construction of Ophir WTP.

c. Partner Funding shall be invested and maintained in accordance with PCWA's investment policy with the goal of investing at a market rate yield for the limited duration from the date received until the date the funds are needed for the construction contract for Ophir WTP.

i. Interest and/or dividends earned shall be accumulated in the fund.

ii. Expenses incurred for the management of the funds shall be offset first against interest and/or dividends earned and second against the funding amounts.

iii. PCWA shall report quarterly to Lincoln the type of investment, issuer, purchase date, par value, market value, stated rate and maturity date of the Partner Funding.

d. Lincoln may submit additional payments contributing to the Partner Funding up until such time as PCWA awards a construction contract for Ophir WTP; however, Lincoln's Partner Capacity may not exceed 5 MGD.

7. **Escalations.** Beginning January 1, 2024, the Partner WCC will increase each January 1st by the previous June-to-June annual increase as published in the Engineering News Record Construction Cost Index for the San Francisco region. The parties agree to meet and confer regarding this calculation.

8. **Conversion of Partner Funding to Partner Capacity.** Upon PCWA's award of a construction contract for Ophir WTP, the cash balance of the Partner Funding account shall be converted to Partner Capacity (i.e., UOC and MGD) using the Partner WCC at the time of conversion. The parties agree to meet and confer regarding this calculation.

9. **Construction Timeline.** PCWA's currently planned project timeline for Ophir WTP is as follows, along with provisions for adjustment:

a. Final design work and preparation of bid documents, through 2024;

b. Bidding for construction, award of contract, and mobilization, through 2025; and

c. Construction in 2026, 2027, and 2028.

d. This timeline assumes continuation of the current pace of housing and commercial development in both PCWA and Lincoln service areas. With this timeline, Partner Capacity would be available in 2029. Although both PCWA and Lincoln currently estimate needing the capacity gained by construction of Ophir WTP by 2030, the parties acknowledge this timeline could be delayed by up to several years, depending upon economic conditions and demand.

e. PCWA shall update Lincoln regarding changes to this timeline and the amount of the Partner Funding each year in its annual water supply letter, pursuant to Article 5(f) of the Contract.

f. If PCWA has delayed construction of Ophir WTP and Lincoln needs the additional capacity sooner than planned, Lincoln shall notify PCWA in writing of any requested changes to the timeline at least eighteen (18) months before the date Lincoln wishes for the project to be bid.

10. **Notification of Critical Path Events.** PCWA shall notify Lincoln in writing of the following critical path events for construction of the Ophir WTP:

a. Ninety (90) days in advance of its intent to advertise for construction bids and upon advertisement;

b. One (1) week prior to any recommendation for award of a construction contract to PCWA's board, and within one (1) week after a successful award; and

c. Within one (1) week after recordation of the Notice of Completion ("NOC") of construction.

11. **Partner Capacity Availability.** The Partner Capacity will be available upon recordation of the NOC.

12. **Rate Adjustment.**

    a. The Partner Capacity will be added incrementally to the basis for Lincoln's fixed monthly water rates (fixed charge and renewal and replacement charge) at a rate of 400 UOC per year, effective each January 1 following recordation of the NOC of Ophir WTP, and continue until all Partner Capacity has been added.

    b. If development conditions within the City of Lincoln are such that 400 UOC per year is significantly too high or too low, Lincoln and PCWA may mutually agree to revise this rate by written amendment to this Agreement, to be executed by the City Manager and General Manager.

    c. If Lincoln's actual usage exceeds this incremental increase in capacity, the basis for their fixed monthly water rates will be increased to their actual usage for the year of exceedance and Lincoln will retroactively pay the difference in fixed rates back to January 1.

13. **Separate Agreement:** Nothing in this Funding Agreement is intended to amend or modify the terms, conditions and obligations of the Contract.

14. **No Obligation:** The Parties acknowledge and agree nothing in this Agreement requires, or implies that this Agreement is intended to obligate, Lincoln to contribute to Partner Funding beyond its initial contribution.

15. **Notices:** Any notice to be given under this Agreement shall be provided to those representatives identified in **Exhibit A** and may be made by: (a) depositing in any United States Post Office, postage prepaid, and shall be deemed received at the expiration of 72 hours after its deposit; (b) transmission by a reputable overnight delivery service; (c) transmission by electronic mail; or (d) personal delivery. Receipt of any notice sent by transmission method (b), (c) or (d) shall be deemed effective upon delivery.

16. **Term and Termination:**

a. This Funding Agreement will take effect as of the last date on which both PCWA and Lincoln have executed same, or on such date as PCWA accepts Lincoln's Partner Funding,

whichever occurs first.

b. This Agreement may be mutually terminated by written agreement of both parties. If the Agreement is mutually terminated by the written agreement of both Parties or by operation of law, any balance of Partner Funding contributed by Lincoln, including interest earned thereon, shall be promptly returned to Lincoln.

c. If PCWA, due to no fault of its own, becomes unable to perform construction of the Ophir WTP due to, for example, protracted environmental litigation, passage of prohibitive laws or regulations, or the effects of extended "Acts of God" such as fire, flood, drought, earthquake, war, terrorism, riots, civil disorders, rebellions, revolutions or pandemic, either party may elect to provide sixty (60) days' written notice of termination of this Funding Agreement to the other party. In such case, PCWA shall promptly return any balance of Partner Funding contributed by Lincoln, including interest earned thereon.

17. **Amendments:** Amendments to this Agreement must be in writing and executed by both Parties.

18. **Assignment:** The rights and duties of the Parties may not be assigned or delegated without the written consent of the other Party and its respective governing body. Subject to the foregoing, this Agreement will inure to the benefit of, and be binding upon, the successors and assigns of the Parties hereto.

19. **No Agency:** Each Party understands and agrees that there is no agency or joint venture relationship between the Parties. It is further understood and agreed by the Parties that notwithstanding anything contained herein, the employees of each Party shall continue to be entirely and exclusively under the direction, supervision, and control of the employing Party.

20. **Responsibility for Costs:** Each Party understands and agrees that any internal, in-house or administrative costs, or expenses incurred by either Party related to that Party's obligations hereunder shall be the sole responsibility of the Party incurring said costs and expenses.

21. **No Third-Party Beneficiary:** The Parties understand and agree that this Agreement creates rights and obligations solely among the Parties and is not intended to benefit any other party. No provision of this Agreement shall in any way inure to the benefit of any third person so as to constitute any such third-person as a third-party beneficiary of this Agreement or any of its items or conditions, or otherwise give rise to any cause of action in any person not a Party hereto.

22. **Governing Law and Venue:** This Agreement shall be governed by the laws of the State of California. Any action brought on any claims founded on this Agreement shall be brought in the Superior Court of Placer County.

23. **No Conflict:** Nothing in this Agreement is intended to conflict with current law, regulations, or policy. Further, nothing in this Agreement is intended to restrict the authority of either Party to act as provided by law or regulation, or to restrict either Party from enforcing any laws or regulations within its authority or jurisdiction.

24. **Severability:** If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way, but only to the extent that the intent of the Parties can be effectuated without the provision or provisions held invalid, void, or unenforceable.

25. **No Waiver:** The waiver by any Party to this Agreement of any requirements, condition, or provision of this Agreement shall not be deemed a waiver of any subsequent breach of that or any other requirement, condition or provision.

26. **Signatories' Authority:** The Parties represent that the undersigned individuals executing this Agreement are fully authorized to do so by law or other appropriate instrument and to bind the Parties to the obligations set forth herein.

27. **Counterparts:** The Parties agree this Agreement may be executed and delivered in counterparts which, when taken together, shall constitute a fully-executed Agreement. In addition, this Agreement may be executed via electronic transmission and any such electronic signature shall be deemed to be an original signature.

28. **Entire Agreement:** This instrument and any attachments hereto constitute the entire Agreement between the Parties concerning the subject matter hereof.

29. **Interpretation.** The Parties agree and acknowledge they have each had the equal opportunity to review the terms and conditions of this Agreement, enter into the Agreement freely, and that no law governing interpretation of the provisions of the Agreement in favor or against the drafter or either Party is enforceable.

The foregoing is hereby agreed to by the Parties as of the date executed below.

PLACER COUNTY WATER AGENCY

By: _____ Date: _____
Name:
Title:

ATTEST

By: _____ Date: _____
Name:
Title:

CITY OF LINCOLN

By: _____ Date: 6/20/23

Name: Sean Scully
Title: City Manager

ATTEST

By: _____ Date: 6/20/2023

Name: Gwen Scanlon
Title: City Clerk

Approved as to form:

By: _____ Date: 6.15.23

Name: Kristine Mollenkopf
Title: City Attorney

Exhibit A

Placer County Water Agency and City of Lincoln Representatives for Notice

PCWA:

General Manager
Placer County Water Agency (PCWA)
P.O. Box 6570
Auburn, CA 95604
Office: (530) 823-4860

Lincoln:

City Manager
City of Lincoln
600 6th Street
Lincoln, CA 95648
Office: (916) 434-2490

MEMORANDUM OF AGREEMENT
BETWEEN PLACER COUNTY WATER AGENCY AND THE CITY OF LINCOLN
FOR METERING FACILITIES KNOWN AS
LINCOLN METERING STATIONS NO. 1 & 2 AND RELATED FACILITIES

This Memorandum of Agreement ("MOA") for shared use and mutual responsibilities with respect to Lincoln Metering Stations Number 1 and 2, and Lincoln Water Tanks Number 1 and 3, and facilities related or connected to these facilities (collectively referred to as "Facilities" or individually "Facility"), is entered into by and among the City of Lincoln ("LINCOLN") and the Placer County Water Agency, a public agency ("AGENCY") and will take effect as of the date on which both LINCOLN and the AGENCY have executed this MOA. LINCOLN and the AGENCY may be collectively referred to as the "Parties," or each individually as a "Party." Additional defined terms are set forth in Section 3 under "Agreement," below.

RECITALS

A. WHEREAS, LINCOLN and the AGENCY previously entered into a "Contract Between Placer County Water Agency and City of Lincoln for a Treated Water Supply," dated December 10, 2012 ("2012 Contract"), that describes delivery entitlements, operations and locations of purchased water from the AGENCY to LINCOLN.

B. WHEREAS, on October 17, 2013, the Parties entered into "Facilities Agreement No. 2521," subsequently amended September 16, 2016, and December 13, 2018 ("FA 2521"), which provides for the construction, funding and operation of the "Lincoln-Penryn Phase 3 Pipeline and Metering Station Project" (also known as "Lincoln Metering Station 2").

C. WHEREAS, each Party owns and operates certain facilities which are interdependent with or on the other Party's facilities.

D. WHEREAS, the Parties also require regular access between their facilities, across properties owned by or under the control of the other Party.

E. WHEREAS, the Parties now desire to delineate shared use and mutual responsibilities with respect to various facilities.

AGREEMENT

NOW, THEREFORE, IT IS AGREED as follows:

1. **INCORPORATION OF RECITALS**. The foregoing recitals are hereby incorporated by reference.

2. **PURPOSE**. The purpose of this MOA is to memorialize the Parties' responsibilities and obligations upon completion of construction contemplated in FA 2521 with respect to matters involving shared and interdependent use of facilities not previously addressed in the 2012 Contract. The focus includes identifying shared site access, maintenance of shared access, easements and shared fiber optic conduits.

3. **DEFINITIONS**. When used in this MOA, the following terms shall have the meanings set forth below:

a. Assessor's Parcel Number ("APN"): APN at the time of execution of this MOA. APNs are listed for reference to subject parcels of land in the attached exhibits but, as they are subject to change by the Placer County Assessor's Office, they should not be considered the primary reference information for purposes of this MOA.

b. Caperton Canal: Raw water conveyance canal owned, operated and maintained by the AGENCY under pre-existing rights. LINCOLN is providing a defined easement to the AGENCY concurrent with the execution of this MOA.

c. Lincoln Metering Station 1 ("LMS1"): Treated water metering facility owned and maintained by the AGENCY as granted in document 2000-0059693, a grant deed recorded August 16, 2000 in Placer County Official Records. The boundaries of the AGENCY and LINCOLN's treated water facilities for LMS1 are depicted on Attachment A, attached hereto and incorporated by reference.

d. Lincoln Metering Station 2 ("LMS2"): Also known as "Twelve Bridges Metering Station," this is a treated water metering facility owned and maintained by the AGENCY. Currently the metering station is located on a portion of LINCOLN's Lot 301. LINCOLN shall grant this portion of Lot 301 to the AGENCY via grant deed upon the execution of this MOA. The boundaries of the AGENCY and LINCOLN's treated water facilities for LMS2 are depicted on Attachment B, attached hereto and incorporated by reference.

e. Lot A: A public utility easement dedicated on Final Map No. 2003-156 Verdera Large Lot Subdivision, recorded in Book Z of Maps, Page 32, Placer County Official Records (attached hereto as Attachment C), and is described as being "...for the installation and maintenance of water, gas, sewer and drainage pipes, and for poles and overhead and underground wires and conduits for electric, television, and telephone services, traffic control appurtenances together with any and all appurtenances pertaining thereto on, over, under and across Lots "A" and "B". Lot A is commonly known as the Camino Verdera road right-of-way.

f. Lot 301: Site of LINCOLN's Tank #3 ("LT3") and future Tank #4, and shown in Book Z Maps at Page 32. This lot is owned and maintained by LINCOLN.

g. Lot 502: Shown in Book Z Maps at Page 32, this lot is owned and maintained by the Verdera Community Association, not a party to this MOA.

h. Lot 503: Shown in Book Z Maps at Page 32, this lot is owned and maintained by LINCOLN.

i. Lot 504: Shown in Book Z Maps at Page 32, this lot is owned and maintained by LINCOLN.

j. Lot 512: Shown in Book Z Maps at Page 32, this lot is owned and maintained by LINCOLN.

k. R-20: A 0.2-acre parcel of land granted to LINCOLN by Ridgeview Land Ventures, LLC in document 2017-0072626, Placer County Official Records, via a grant deed recorded September 20, 2017, being a portion of Lot R-20 Bickford Ranch Large Lot Subdivision, recorded in Book BB of Maps, at Page 77.

l. Joint Use Amenities: Facilities that are jointly used by the Parties or connect one Party's facility to the other Party's facility. Particular Joint Use Amenities and associated shared uses are described in Sections 4, 5, 6, and 7 of this MOA.

m. Lincoln Tank #1 ("LT1"): Lincoln Tank No. 1 is a five (5)-million-gallon tank, owned and maintained by LINCOLN, sited on a portion of Lot 512, APN 337-012-041, adjacent to LMS1.

n. Lincoln Tank Site #3 ("LT3"): Lincoln Tank No. 3 is a five (5)-million-gallon tank, owned and maintained by LINCOLN, sited on Lot 301 immediately adjacent to LMS2.

o. Twelve Bridges Drive Shared Access: An approximate twenty-foot (20')-wide gravel access road benefitting both LINCOLN and the AGENCY providing access to LT3 and LMS2, respectively, beginning near the intersection of Twelve Bridges Drive and Camino Verdera and traversing across Lots 502, 503 and 301, generally following LINCOLN's 36-inch pipeline as shown on Attachment D, attached hereto and incorporated by reference. Twelve Bridges Drive Shared Access road surface is a combination of gravel and paved road surfaces at the connections to Camino Verdera and at the entrances into the tank and metering station sites. Ownership of this access road varies by lot, as indicated in Attachment D.

p. Whitney Reservoir: Raw water reservoir owned and maintained by the AGENCY, depicted in Record of Survey Book 11 at Page 042, Placer County Official Records.

q. Whitney Reservoir Shared Access: FA 2521 included the construction of an access road that connects LMS1 and LMS2, as well as LT1 and LT3. This access road passes over four LINCOLN-owned parcels (Lots 301, R-20, 504, 512) and through the AGENCY's Whitney Reservoir site. Whitney Reservoir Shared Access road surface is primarily gravel with paving near the LMS2 site and traverses various LINCOLN-owned properties as well as the AGENCY-owned Whitney Reservoir site as depicted on Attachment E, attached hereto and incorporated by reference.

4. PROPERTIES AND RIGHTS-OF-WAY.

In addition to the ownership and access rights described under Section 3, Definitions, various easements exist which impact the properties referenced in this MOA. These easements are as follows:

a. Caperton Canal: A twenty-foot (20')-wide easement shall be granted by LINCOLN to benefit the AGENCY that traverses Lot 301 and Lot 504 as depicted on Attachment F. This easement is a requirement of FA 2521 and shall be granted concurrent with the execution of this MOA. Said easement is intended to serve the operation, maintenance and perpetuation of the use of the Caperton Canal. Associated access will generally follow the constructed gravel road alignment, which deviates from the canal easement and may change over time. Easement deeds with legal descriptions and plats maps for this easement, substantially in the form of those attached hereto as Attachment J, shall be recorded after this MOA is fully executed by the Parties.

b. Water Transmission Pipeline and Fiber Optics ("WTPFO easement"): This easement shall be granted by LINCOLN to benefit the AGENCY over portions of Lot 512, Lot 504, and Lot 301 for a water transmission pipeline and fiber optics conduit as depicted on Attachment G. This easement is a requirement of FA 2521 and shall be granted concurrent with the execution of this MOA. Easement deeds with legal descriptions and plats maps for this easement, substantially in the form of those attached hereto as Attachment J, shall be recorded after this MOA is fully executed by the Parties.

c. Camino Verdera Access and Waterline Easement: Lot A, also known as Camino Verdera, is a roadway that benefits LINCOLN and the AGENCY shall be granted by Verdera Community Association, and provides access through various parcels within the Verdera Large Lot Subdivision and was dedicated in Book Z Maps, Page 032. In addition, this reference includes a twenty foot (20')-wide waterline easement, traversing Lot 502, that benefits LINCOLN and was recorded in Book 511 Page 372, Placer County Official Records.

d. Telemetry Easement: This easement benefits the AGENCY and traverses the easterly portion of Lot 512 for telemetry systems. Recorded in Document 1997-0035561, Placer County Official Records.

5. **USAGE RIGHTS – ROADWAYS AND GATES.** Due to the interdependent nature of the water systems of the Parties, each Party acknowledges that it may, from time to time, need to enter, cross over, or pass through the other Party's facilities or property to access its own facilities or property for operations and maintenance purposes. Facilities requiring such operations and maintenance include: (i) communications and equipment controls-related facilities for the interactive operation of metering facilities, (ii) water storage tanks, and (iii) water transmission pipelines. Access to facilities shall be allowed by each Party as set forth in this section and with adequate notifications pursuant to Articles 8.g. and 13.b.

As a result of this need for access, the Parties agree that access shall be provided with respect to the below facilities and properties as follows:

a. General:

i. LINCOLN and the AGENCY shall maintain twenty-four (24)-hour access, three hundred sixty-five (365) days a year, to enter, cross over, or pass through all access routes covered by this MOA.

ii. Notwithstanding Section 5.a.i., access into the other Party's structures or within fences surrounding that Party's facilities must be requested and shall only be granted upon prior approval by the other Party.

iii. Where costs to resurface an access road is shared, surfacing material and limits shall be negotiated in good faith by the Parties.

b. Twelve Bridges Drive Shared Access:

i. The AGENCY and LINCOLN require continuous, daily use of the Twelve Bridges Drive access road, which traverses properties owned by LINCOLN and Verdera Community Association. See Attachment D.

ii. Recognizing that the route of the road crossing parcels owned by LINCOLN may be modified from time to time, LINCOLN hereby grants the AGENCY access rights along the road.

iii. Parties each anticipate receiving a dedicated easement over that portion of the road traversing Lot 502, owned by Verdera Community Association. Easement deeds with legal descriptions and plats maps for this easement, substantially in the form of those attached hereto as Attachment J, shall be recorded after this MOA is fully executed by the Parties.

iv. There are three (3) LINCOLN-owned, manual gates to enter various sections of the access road. Locks shall be installed on each gate and LINCOLN shall allow the AGENCY to also install its own locks, such that each lock will work independent of one another to open the gate. Users other than the AGENCY and LINCOLN that may be provided access by LINCOLN may include the Verdera Homeowners' Association ("Verdera HOA") and other AGENCY water customers with turnouts on the properties covered by this MOA.

c. Whitney Reservoir Shared Access:

i. The AGENCY and LINCOLN require continuous, daily use of the Whitney Reservoir Shared Access, which traverses properties owned by LINCOLN and the AGENCY.

ii. In general, this access follows the WTPFO easement; although, the access road may meander away from the pipeline easement as needed, and from time to time (*see* Attachment E, attached hereto and incorporated by reference). LINCOLN grants the AGENCY access rights along the road, to the extent such access is not covered by the WTPFO easement.

iii. There are two (2) LINCOLN-owned gates that control access at each end of this roadway, as well as two (2) intermediate gates located at the Whitney Reservoir site that are AGENCY-owned and maintained. Locks shall be installed on each LINCOLN-owned gate as described in Article 5(b)(iii) and shall be used so that each Party is able to independently open the gate. Gate access will be limited to the AGENCY and LINCOLN. See 5.c.vi below for access through the two AGENCY-owned gates.

iv. Due to the vulnerability of the Whitney Reservoir site, LINCOLN's access across Whitney Reservoir shall be limited to driving between LT1 and LT3 sites for routine operations and in-house maintenance activities. LINCOLN staff typically performs daily maintenance using a full-size, highway-legal pick-up truck not exceeding a one (1)-ton capacity. A Right-of-Entry Agreement, substantially in the

form of those attached hereto as Attachment K, shall be recorded after this MOA is fully executed by the Parties.

v. LINCOLN may use the site more or less often than described in the preceding paragraph, or with alternate vehicles as the AGENCY acknowledges that such equipment shall change from time to time over the term of this MOA; however, such modifications shall remain restricted to "routine operations and maintenance activities." More specifically, LINCOLN shall not use the access route for construction equipment without additional permission and insurance requirements as stipulated by AGENCY.

vi. Conditions and Restrictions:

1. While the AGENCY's intent is to provide LINCOLN with a permanent access route with respect to Whitney Reservoir, the AGENCY has an obligation to protect the water supply and therefore LINCOLN's failure to strictly follow any of the conditions and restrictions set forth herein may result in termination of LINCOLN's access to and across Whitney Reservoir.

2. LINCOLN shall use the primary shared access road across the northwesterly portion of the Whitney Reservoir site, as the road is currently established. If the northwesterly road is not passable, LINCOLN shall have the right to use the secondary shared access road southeasterly of the Whitney Reservoir until such time as the primary northwesterly access road becomes passable. These two roads are depicted in Attachment E, attached hereto and incorporated by reference.

3. LINCOLN's employee(s) shall close and lock all gates after passing through the gates. Under no circumstances shall any of the gates be left open or be "false-" or "dummy-locked."

4. The Whitney Reservoir site is protected by a security alarm system and such system is owned and maintained by the AGENCY. In the event that LINCOLN has obtained AGENCY approval to access the Whitney Reservoir site, the AGENCY will provide LINCOLN with an access code to disarm and re-alarm the system. This code shall not be shared with any person or persons not directly employed by LINCOLN, including any third-party vendor, contractor, or any other person or entity not employed by LINCOLN.

5. LINCOLN shall be responsible for setting any alarms upon leaving the Whitney Reservoir site and securing the site each time LINCOLN accesses it, using the safety and security measures then in use by the AGENCY. Safety and security systems may change from time-to-time and the

AGENCY shall promptly communicate such changes to LINCOLN when they occur.

6. LINCOLN shall not perform any work on AGENCY property without written authorization from the AGENCY.

7. LINCOLN shall immediately notify the AGENCY of any damage to AGENCY property or structures.

8. AGENCY maintains the road in a passable condition for its use only. If LINCOLN desires to make additional improvements to the road, such improvements shall be at LINCOLN's sole cost and expense and shall be made only after receiving written authorization from the AGENCY.

d. Metering Station Bypass Road:

i. Access for this paved road, which is used by LINCOLN and the AGENCY to bypass the LMS2 site for day-to-day operations by both LINCOLN and the AGENCY, is on LINCOLN property as depicted on Attachment D.

ii. There is one (1) LINCOLN-owned gate that controls said access. Locks shall be installed on this gate as described in Article 5(b)(iii) shall be used so that each Party is able to independently open the gate. Gate access will be limited to the AGENCY and LINCOLN. Users other than the AGENCY and LINCOLN that may be provided access by LINCOLN may include the Verdera HOA and other AGENCY water customers with turnouts on the properties covered by this MOA.

e. LMS1 Site:

i. The sliding gates that provide access to this property are AGENCY-owned and operated and LINCOLN is not anticipated to require independent, keyed access.

ii. In the event that LINCOLN requires access to the site, LINCOLN shall coordinate such access with the AGENCY and an AGENCY representative will accompany LINCOLN's representative to provide site access.

f. LMS2 Site:

i. The automatic gates that provide access to this property are AGENCY-owned and operated and LINCOLN is not anticipated to require independent, keyed access.

ii. In the event that LINCOLN requires access to the site, LINCOLN shall coordinate such access with the AGENCY and an AGENCY representative will accompany LINCOLN's representative to provide site access.

6. **USAGE RIGHTS – UTILITIES.** The Parties also acknowledge that they may, from time to time, need to utilize or pass through or upon the other Party's facilities or property for the operation and maintenance of its own facility-related utilities. Such operations and maintenance include: (i) raw water facilities for service, (ii) communications- and electrical-related facilities for the interactive

operation of metering facilities and tanks, and (iii) various drainage and sewer facilities for proper operation. Facility usage shall be allowed by each Party as set forth in this section and with adequate notifications pursuant to Articles 8.g. and 13.b.

As a result of this need for access, the Parties agree that usage rights shall be provided with respect to the below facilities and properties as follows:

a. Raw Water:

   i. Caperton Canal Turnouts/Raw Water Service Lines: Certain AGENCY raw water service pipelines from the Caperton Canal are known to traverse LINCOLN-owned parcels to serve adjacent properties and LINCOLN; however, the exact locations of services pipelines are not known by LINCOLN or the AGENCY. The AGENCY's responsibility for these raw water services terminates at the turnouts (see Attachment H for turnout locations) and the AGENCY bears no responsibility for the raw water services beyond the turnouts. Each raw water customer owns and is responsible for the operation and maintenance of its raw water service pipeline. There are currently ten (10) known raw water service customers with locations that require private pipelines to traverse LINCOLN-owned parcels.

      The AGENCY will direct impacted raw water customers to contact LINCOLN's Public Works Department at (916) 434-245 for maintenance and repair access. LINCOLN agrees that it will coordinate separately with said raw water customers if the customer locations and/or land rights need to be addressed in the future.

      LINCOLN acknowledges and agrees that the AGENCY may modify or add/remove customers and may modify diversions on canals such as the Caperton Canal. Any changes to privately-owned pipelines associated with customers and easements are the responsibility of the customer and LINCOLN agrees that, to the extent feasible, it shall not endeavor to restrict new easements, installation of new private lines, or maintenance of existing private lines.

   ii. Canal Spill Facilities: The AGENCY has existing spill facilities upon the Caperton Canal which have been used historically by the AGENCY to manage flows within the canal (see Attachment H, attached hereto and incorporated by reference).

      A spill easement is granted per document number 98-0070888 recorded on September 3, 1998, for a spill (a.k.a. North Spill) located at the northeast portion of the Whitney Reservoir site. An additional spill easement, memorializing prescribed rights, for a spill (a.k.a. Spill #10) at approximate PCWA Caperton Canal Station 505+26, substantially in the form of those attached hereto as Attachment J, shall be recorded after this MOA is fully executed by the Parties.

      This MOA is not intended to change or modify the AGENCY's right to perpetuate the use of those spill facilities, including the ability to spill water onto and across LINCOLN lands in a responsible and managed fashion as needed for canal operations.

b. Communication & Low Voltage:

i. Fiber Optic Communications: AGENCY-owned fiber optic conduits and pull boxes run along the transmission pipeline alignment extending from LMS1/LT1 to LMS2/LT3. The Parties agree to shared use of one (1) four-inch (4") diameter conduit containing three color-coordinated 1-1/4" innerducts. The AGENCY will have sole ownership of the orange and blue innerducts, and LINCOLN will have sole ownership of the red innerduct.

LINCOLN shall be responsible to pay one-third (1/3) of the installation costs and one-third (1/3) of the maintenance costs for those fiber-optic facilities described in this Section 6.b.i. and as depicted on Attachment G.

ii. Signal Wiring:

1. Communication wiring via shared conduits exists between the LMS1 and LT1 sites and between the LMS2 and LT3 sites. It is also anticipated that similar wiring will be installed between LT3 and a future adjoining fourth tank that will be owned and maintained by LINCOLN.

2. Level Transducers and Signal Wires (LMS2 to LT3): Redundant tank level transducers on LT3 and related signal wires exist between the AGENCY's LMS2 control panel and LINCOLN's LT3 control panels that allow for the sharing of operating data of the respective control systems between the Parties. Access to the separately owned control panels for both Parties is intended to be maintained and perpetuated. The Parties acknowledge that the data provided pursuant to this paragraph is for informational purposes only and its reliability is not guaranteed. Accordingly, the Parties agree that each Party will be held harmless for the data shared with the other Party.

3. Telephone: To the extent that the AGENCY determines that telephone communications facilities are required for the AGENCY's operation of LMS2, LINCOLN agrees that it will cooperate with the AGENCY and communications providers to allow for installation, maintenance and operation of telecommunication facilities over and upon Lots 301 and 503 as necessary to meet the AGENCY's needs.

iii. Low Voltage (Electricity):

1. Pacific Gas & Electric ("PG&E") electric service to LMS2: A PG&E electric meter and an individual 240v-400A sub-meter pedestal providing service to the AGENCY for LMS2 is located at on Parcel 337-012-001 as depicted on Attachment I. The AGENCY shall own and maintain the service for operation of LMS2. A dedicated four-inch (4") electrical conduit from the sub-meter pedestal traverses over sections of Lots 301, APN 337-070-033 and APN 337-012-001 to meet the electrical service needs of the

AGENCY's LMS2. LINCOLN agrees that it will cooperate with the AGENCY and PG&E to allow for the maintenance and operation of electrical service facilities over and upon Lots 301 and Parcels 337-070-033 and 337-012-001. Easement deeds with legal descriptions and plats maps for this easement, substantially in the form of those attached hereto as Attachment J, shall be recorded after this MOA is fully executed by the Parties.

2. Future 480v: See Section 7.b.ii.

c. Drainage (surface, subsurface): The LMS1 and LMS2 facilities generate storm water runoff that drains onto Lots 512 and 301. Storm drainage lines extend from the LMS2 building and site and flow to LINCOLN property. LINCOLN agrees that it shall allow and not impede the perpetuated use of surface and subsurface drainage from both sites.

d. Sewer: LINCOLN's sewer system provides service to both the LT3 drinking water sampling station and to LMS2 for sewage and "grey water". A LINCOLN-owned two-inch (2") force main conveys wastewater west from a LINCOLN-owned and operated pump station near LT3 to a gravity sanitary sewer manhole at Bella Circle. LMS2 has a sewage lateral connecting to a LINCOLN-owned sewer manhole immediately adjacent to LT3 as depicted on Attachment B. The AGENCY's LMS2 sewer connection constitutes a commercial sewer service and will be subject to on-going LINCOLN sewer services fees.

7. SPECIAL CONDITIONS.

a. Landscaping:

i. Landscape Plantings: The landscape plantings installed on portions of Lot 301 in the immediate vicinity of LMS2 for screening purposes, are owned by LINCOLN and will be monitored and maintained by LINCOLN for the initial five (5)-year plant establishment period. Thereafter, LINCOLN will maintain this area to a standard as determined by the City.

ii. Irrigation Systems (five [5]-year establishment): The irrigation systems installed with and in the immediate vicinity of LMS2, including the easterly slope area alongside the AGENCY parcel, shall be owned and maintained by LINCOLN and are intended to be necessary only for the initial five (5)-year plant establishment period for the landscape plantings. It is anticipated that irrigation will be terminated after the plant establishment period is complete, as determined by LINCOLN.

Irrigation water is provided from LINCOLN's unregulated water main (already metered by AGENCY).

iii. Slope Maintenance: LINCOLN will maintain fill or cut slopes and retaining structures along Twelve Bridges Drive Shared Access road and within the immediate vicinity of that portion of Lot 301 deeded to the AGENCY and where

LMS2 is located. No grading shall occur along fill or cut slopes without the written consent of both Parties.

iv. Fencing: Fencing and gate maintenance and repair is the sole responsibility of the Party that owns the fencing. For ease of reference, such ownership at the time of execution of this MOA is as follows:

1. LMS1 site: AGENCY
2. LMS2 site: AGENCY
3. Lot 502: Verdera Homeowners Association
4. Tank 1 Site: LINCOLN
5. Tanks 3 & 4 Site: LINCOLN
6. Twelve Bridges Access roads: LINCOLN
7. Whitney Reservoir: AGENCY

b. Future accommodations:

i. Future 60" treated water from Ophir: The AGENCY has plans for a future water pipeline from Ophir Road to LMS2. Some provisions have been made in the planning of these future facilities regarding LMS2, but specific accommodation, conditions, easements and design requirements of the pipeline are not yet defined or contemplated in this MOA.

ii. Hydroelectric Generation at LMS2: LINCOLN will cooperate with the AGENCY and any partnered electrical utilities to make reasonable accommodation for future installation, maintenance and operation of electrical transmission facilities over and upon the adjacent LINCOLN properties as needed for electrical transmission facilities necessary for the envisioned future hydroelectric generation plant at LMS2. Planning and implementation of such facilities will be subject to LINCOLN review and approval.

8. RESPONSIBILITIES OF THE PARTIES.

a. Unless otherwise noted, each Party shall be responsible for all maintenance, operation and replacement of facilities identified herein as solely owned by each Party.

b. Neither Party shall perform any construction or make any modifications that will impact the other Party's accessibility as described herein without prior written approval from the other Party.

c. Each Party is solely responsible to repair any damage caused by that Party to the other Party's facilities, outside of normal wear and tear. Such repairs shall restore the damaged facility to as good as or better than its condition prior to the damage and shall be to the satisfaction of the Party sustaining such damage.

i. In order to perform the repairs outlined herein, the Party that caused the damage may choose to either utilize its own internal staff to make such repairs or retain outside services when deemed necessary or appropriate.

ii. With the exception of damage by LINCOLN to the Whitney Reservoir site, the damaged Party shall allow the damaging Party sufficient and reasonable time to budget for such repairs (including obtaining bids and/or Board approval, if necessary) and then to perform same. Damage by LINCOLN to the Whitney Reservoir site shall be repaired immediately by LINCOLN.

iii. In the event that the damaging Party does not perform such repairs in a reasonable amount of time, then the damaged Party reserves the right to make the necessary repairs itself upon notice to the damaging Party, and the damaging Party shall reimburse the other Party for all time and materials required to make repairs and subject to submission of an invoice and receipts.

d. Each Party shall be responsible for the cost of operation and maintenance of the gates owned by that Party.

e. The cost of all access road maintenance shall be shared equally between the AGENCY and LINCOLN unless otherwise noted.

i. Cost-sharing maintenance activities shall generally consist of the width of the access road, and include preventative pavement maintenance, re-surfacing, regrading and conditioning of the gravel surfacing.

ii. Non-cost sharing items shall generally consist of managing vegetation that may be impeding the use of the access road on the respective Party's property.

iii. Each Party shall be responsible for performing the maintenance on that Party's respective property. Each Party may perform maintenance on the other Party's facility with written consent.

iv. Nothing in this section precludes a Party from requesting reimbursement of maintenance costs from third parties. Any such reimbursements shall be applied to the total cost of maintenance first, with the remaining cost thereafter divided between the Parties.

v. Prior to the commencement of any shared cost activity, Parties shall mutually agree upon scope and budget for cost sharing purposes.

vi. Parties shall allow sufficient and reasonable time to budget for such cost-share activities (including obtaining bids and/or Board approval, if necessary)

f. Where there will be an impact to use or access of the Joint Use Amenities, each Party shall provide either written or personal notice to the other Party as follows:

i. Emergency: Notice shall be provided as soon as practicable, but no later than forty-eight (48) hours to the other Party. Where emergency maintenance or

repairs need to be made immediately to avoid loss or damage, no advance notice is required.

ii. Use of LMS1 or LMS2: When LINCOLN requires use of LMS1 or LMS2, LINCOLN shall provide seventy-two (72) hours' notice to the AGENCY.

iii. Tank site access: When AGENCY requires access to a LINCOLN tank site, the AGENCY shall provide seventy-two (72) hours' notice to LINCOLN.

iv. Construction: The Party performing construction shall provide six (6) months' notice to the other Party prior to the commencement of construction having potential to impact access or operations of the other Party pursuant to this Agreement so that the other Party can plan accordingly and determine alternate access where necessary.

v. Maintenance: The maintaining Party shall provide thirty (30) days' notice to the other Party prior to performing maintenance work on or within the properties described in this Agreement.

vi. Invoicing: Each Party shall submit invoices for work as it is performed, but at a minimum of once a quarter (if any such statements exist). Such statements, if determined to be correct and approved by the receiving Party, shall be paid within forty-five (45) days of their receipt. The receiving Party will advise as soon as practicable in the event an invoice is disputed. The Parties agree to exercise good faith and diligence in the resolution of any disputed invoice amounts.

9. INDEMNIFICATION.

a. The AGENCY agrees to save harmless and indemnify LINCOLN from any liability, claim or demand which may be made by any person resulting from the negligence of the AGENCY in the performance of its responsibilities under this MOA, and further agrees, at its own cost and expense, to defend any action which may be brought against LINCOLN resulting from such negligence of the AGENCY upon request from LINCOLN, and further agrees to pay or satisfy any judgment which may result from such action. The foregoing provisions shall not be applicable to claims or actions that arise from the negligence of LINCOLN in its performance of the terms of this MOA.

b. LINCOLN agrees to save harmless and indemnify the AGENCY from any liability, claim or demand which may be made by any person resulting from the negligence of LINCOLN in the performance of its responsibilities under this MOA, and further agrees, at its own cost and expense, to defend any action which may be brought against the AGENCY resulting from such negligence of LINCOLN upon the request from the AGENCY, and further agrees to pay or satisfy any judgment which may result from such action. The foregoing provisions shall not be applicable to claims or actions that arise from the negligence of the AGENCY in its performance of the terms of this MOA.

10. **INSURANCE.** Each Party shall procure and maintain, at each Party's own expense and until all obligations under this MOA have been discharged, sufficient insurance coverage to ensure its liabilities under this MOA and provide coverage against claims for injury to persons or damages to property which may arise from or in connection with the performance of services or activities under this MOA by the insured Party, its agents, representatives, employees, or subcontractors. Such insurance shall include all coverage reasonable and customary to be procured and maintained for such work and/or required by applicable law, including but not limited to, workers' compensation, comprehensive general liability (including contractual liability and completed operations coverage), commercial automobile liability, errors and omissions, and excess umbrella liability. Self-insurance complies with the requirements of this section.

11. **ASSIGNMENT**. Except as otherwise provided in this MOA, the rights and duties of the Parties may not be assigned without the written consent of the Parties to this MOA and their respective governing bodies. Subject to the foregoing, this MOA will inure to the benefit of, and be binding on, the successors and assigns of the Parties hereto.

12. **TERM**. This MOA will remain in full force and effect until terminated in writing by both Parties upon thirty (30) days' prior written notice. In the event that this MOA is terminated, each Party shall fulfill access and ownership obligations, including the provision of any related easements (for example, allowing access to LMS2), incurred under this MOA prior to the effective date of termination. With the exception of the fulfillment of such outstanding obligations, upon termination the additional benefits of Joint Use Amenities afforded herein shall also terminate.

13. **MISCELLANEOUS TERMS.**

    a. Related Agreements. This MOA is wholly separate and is not intended to modify or supersede the conditions of FA 2521 or the 2012 Contract.

    b. Notices. All notices that are required either expressly or by implication to be given by any party to the other under this MOA shall only be signed by authorized representatives of the notifying party.

    All notices to Parties required by this MOA shall be hand-delivered, mailed U.S. first class postage prepaid, or over-night mailed to the following addresses:

City of Lincoln	**Placer County Water Agency**
City Manager	General Manager
600 6th Street	P.O. Box 6570
Lincoln, CA 95648	Auburn, CA 95604

    If agreed upon by both Parties in writing, notice via email, return receipt, for the notice types set forth in Section 8.g. will be considered sufficient notice for same.

    c. Rights and Responsibilities. The Parties hereby agree and acknowledge that, except as otherwise set forth in this MOA, the Parties retain full use and enjoyment of their respective facilities.

d. Amendment of MOA. This MOA may be amended only in writing upon approval by both Parties' respective governing bodies.

e. Addition of Parties. Upon written approval by all of the Parties respective governing bodies, the Parties may approve the addition of a new party to the MOA and any terms or conditions related to the new party's addition. The terms and conditions applicable to a joining party shall be set forth in an amendment to this MOA, executed by all Parties and the joining party.

f. Remedies. The use by either Party of any remedy specified for the enforcement of this MOA is not exclusive and shall not deprive the Party using such remedy of, or limit the application of, any other remedy provided by law.

g. Choice of Law. This MOA shall be governed by the laws of the State of California. Venue for any action to enforce the terms of this MOA shall be in Placer County, California. The Parties each waive any federal court removal and/or jurisdictional rights they may have.

h. Severability. If one or more clauses, sentences, paragraphs or provisions of this MOA is held by a court of competent jurisdiction to be unlawful, invalid or unenforceable, it is hereby agreed by the Parties that the remainder of the MOA shall not be affected thereby and will continue in full force and effect, but only to the extent that the intent of the Parties can be effectuated without the provision(s) held unlawful, invalid or unenforceable. Such clauses, sentences, paragraphs or provisions shall be deemed reformed so as to be lawful, valid and enforced to the maximum extent possible.

i. Good Faith Resolution. Without limiting any rights or remedies of either Party under this MOA, in the event that, at any time during the term of this MOA, a disagreement, dispute, controversy or claim should arise out of or relating to the interpretation of this MOA, or performance by a party under this MOA, or a breach of this MOA by a Party, or any claim by a Party that any provision of this MOA is invalid ("Dispute", or collectively "Disputes"), one Party shall give written notice to the other Party that a Dispute exists and the Parties will then attempt in good faith to resolve such Dispute through negotiation. If the Parties cannot resolve the disputed matter within thirty (30) days after such notice, then either Party shall be free to submit the Dispute to mediation as provided in the next paragraph.

In recognition of the negative consequences associated with disputes both in terms of lost time and expense to all Parties, the Parties agree to attempt to settle their disputes by good-faith, non-binding mediation as a condition precedent to the institution of legal proceedings by either Party. Request for mediation shall be filed in writing with the other Party to this MOA and with the American Arbitration Association. If mediation would jeopardize the substantive rights of either Party including, but not limited to, the application of any applicable statute of limitations or other timing requirement, then such Party may proceed to enforce such rights notwithstanding this mediation requirement and mediation will be required during the dispute resolution process to the extent it may be used without jeopardizing the substantive rights of either Party. The Parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in Placer County, California unless another location is mutually agreed upon.

j. Headings. The section headings used in this MOA are intended for convenience only and shall not be used in interpreting this MOA or in determining any of the rights or obligations of the Parties to this MOA.

k. No Third-Party Beneficiaries. The Parties understand and agree that this MOA creates rights and obligations solely between the Parties and is not intended to benefit any other party. No provision of this MOA shall in any way inure to the benefit of any third person so as to constitute any such third person as a third-party beneficiary of this MOA or any of its items of conditions, or otherwise give rise to any cause of action in any person not a party hereto.

l. Reasonable Cooperation; No AGENCY Relationship. The Parties will reasonably cooperate with each other, including the execution of all necessary documents required to perform the obligations under this MOA, and to carry out the purpose and intent of this MOA; provided that each Party understands and agrees that there is no AGENCY or joint venture relationship between the Parties, and no Party is authorized to act for or on behalf of any other Party except as expressly authorized under this MOA.

m. Construction and Interpretation. This MOA is entered into freely and voluntarily. This MOA has been arrived at through negotiation, and each Party has had a full and fair opportunity to revise the terms of this MOA. Consequently, the normal rule of construction that any ambiguities are to be resolved against the drafting party will not apply in construing or interpreting this MOA.

n. Waiver. The waiver at any time by a Party of its rights with respect to a default or other matter arising in connection with this MOA will not be deemed a waiver with respect to any other default or matter.

o. Allocation of Liabilities. The Parties expressly agree that the debts, liabilities and obligations of each Party shall remain the debts, liabilities and obligations of that Party and shall not be the debts, liabilities and obligations of the other Party.

p. Counterparts. The Parties hereto agree that this MOA may be executed and delivered in counterparts which, when taken together, shall constitute a fully executed MOA. In addition, this MOA may be executed via electronic pdf transmission and any such pdf signature shall be deemed to be an original signature.

The foregoing is hereby agreed to by the Parties.

IN WITNESS THEREOF, the Parties have executed this MOA as of the dates written below.

ATTEST:

Clerk, Board of Directors
Placer County Water AGENCY
P.O. Box 6570
Auburn, California 95604

PLACER COUNTY WATER AGENCY

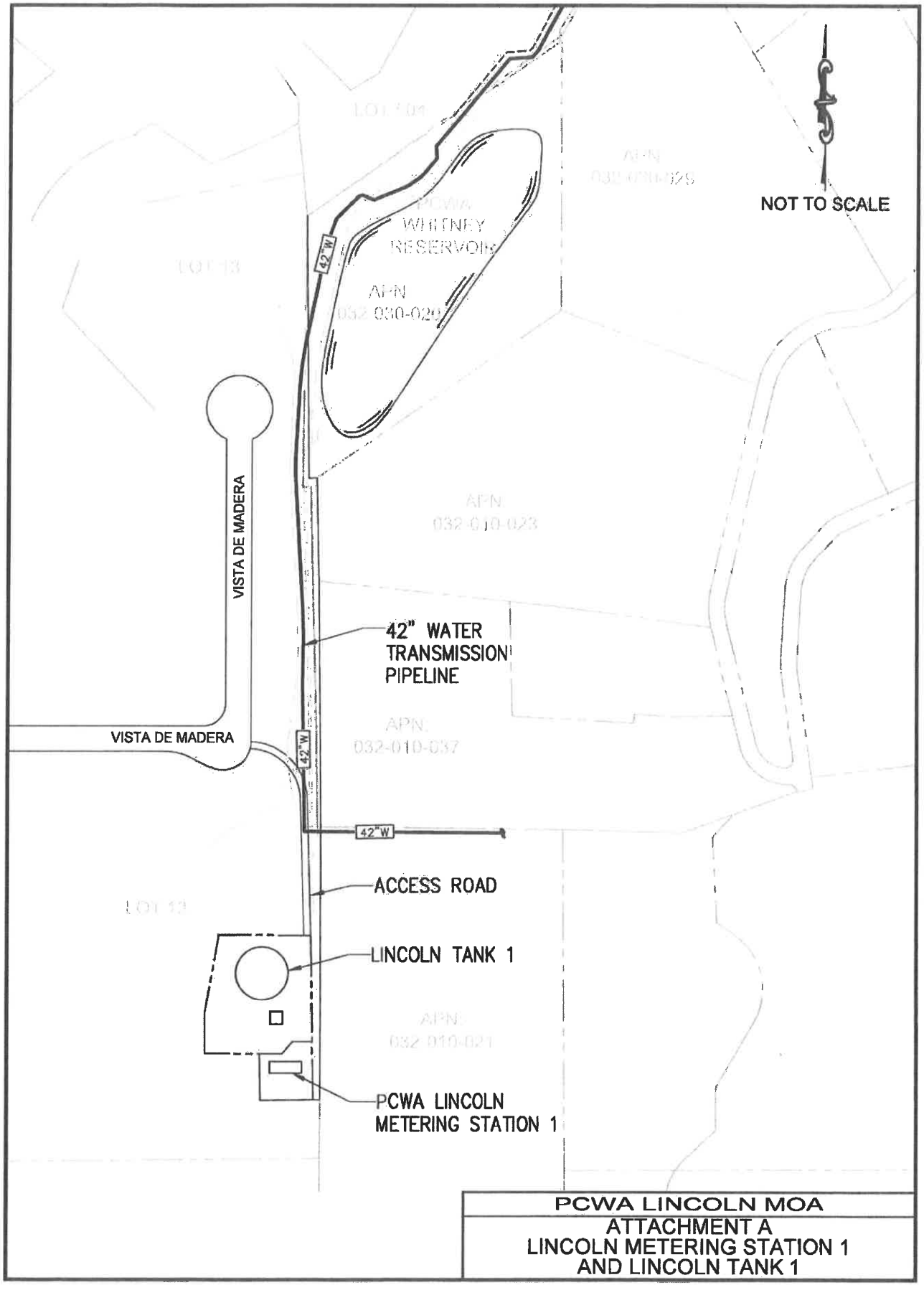
Chairman of the Board

ATTEST:

City Clerk
City of Lincoln
600 Sixth Street
Lincoln, California 95648

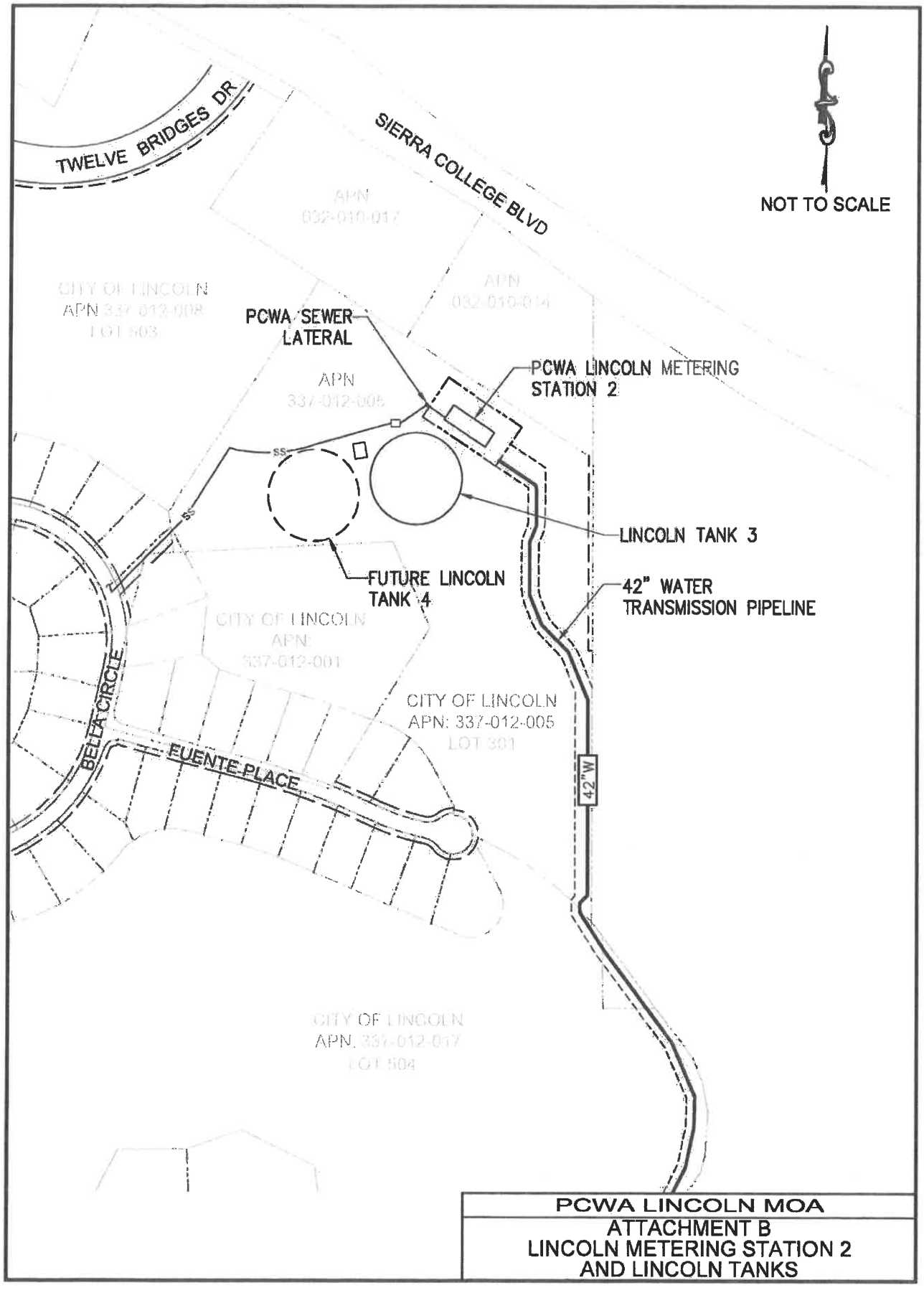
CITY OF LINCOLN

Sean Scully, City Manager



PCWA LINCOLN MOA

ATTACHMENT A
LINCOLN METERING STATION 1
AND LINCOLN TANK 1


TWELVE BRIDGES DR
SIERRA COLLEGE BLVD
NOT TO SCALE
APN
032-010-017
CITY OF LINCOLN
APN 337-012-008
LOT 503
APN
032-010-014
PCWA SEWER
LATERAL
PCWA LINCOLN METERING
STATION 2
APN
337-012-005
SS
SS
LINCOLN TANK 3
FUTURE LINCOLN
TANK 4
42" WATER
TRANSMISSION PIPELINE
CITY OF LINCOLN
APN:
337-012-001
CITY OF LINCOLN
APN: 337-012-005
LOT 301
BELLA CIRCLE
FUENTE PLACE
42"W
CITY OF LINCOLN
APN: 337-012-017
LOT 504
PCWA LINCOLN MOA
ATTACHMENT B
LINCOLN METERING STATION 2
AND LINCOLN TANKS

BOOK 7 OF MAPS, PAGE 32

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

CITY OF LINCOLN • PLACER COUNTY • CALIFORNIA

MACKAY & SOMPS (CIVIL ENGINEERING AND PLANNING/LAND SURVEYING, ROSEVILLE, CA 95661, (916) 773-1189)

AUGUST 2003

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OWNER'S STATEMENT

THE UNDERSIGNED HEREBY CERTIFY THAT THEY ARE THE ONLY PERSONS HAVING ANY RECORD TITLE INTEREST IN THE REAL PROPERTY INCLUDED WITHIN THIS SUBDIVISION; THAT THEY HEREBY CONSENT TO THE PREPARATION AND RECORDING OF THIS SUBDIVISION MAP; THAT THEY HEREBY RELINQUISH AND WAIVE THEIR PRIORITY TO ANY AND ALL GROUNDWATER ASSOCIATED WITH THE REAL PROPERTY INCLUDED WITHIN THE SUBDIVISION AS AGAINST ANY RIGHTS TO THIS GROUNDWATER THAT MAY NOW OR HEREINAFTER BE ASSERTED BY THE CITY OF LINCOLN; THAT THEY IRREVOCABLY OFFER FOR DEDICATION AND DO HEREBY DEDICATE TO ANY AND ALL PUBLIC USES TWELVE BRIDGES DRIVE AS SHOWN HEREON; AND THAT THEY OFFER FOR DEDICATION AND DO HEREBY DEDICATE TO THE PUBLIC FOR SPECIFIC PURPOSES THE FOLLOWING:

A. PUBLIC EASEMENTS FOR THE INSTALLATION AND MAINTENANCE OF WATER, GAS, SEWER AND DRAINAGE PIPES, AND FOR POLES AND OVERHEAD AND UNDERGROUND WIRES AND CONDUITS FOR ELECTRIC, TELEVISION, AND TELEPHONE SERVICES, TRAFFIC CONTROL APPURTENANCES TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, OVER, UNDER AND ACROSS LOTS "A" & "B" AND THOSE STRIPS OF LAND 12.5' IN WIDTH LYING CONTIGUOUS TO THE PRIVATE ROADWAY AND THE PRIVATE ACCESS EASEMENT AS SHOWN HEREON AND DESIGNATED "P.U.E." (PUBLIC UTILITY EASEMENT).

B. EMERGENCY VEHICLE ACCESS EASEMENTS FOR INGRESS/EGRESS AND USE BY PUBLIC, COUNTY OR STATE AGENCIES IN RESPONSE TO LAW ENFORCEMENT, FIRE, MEDICAL AND NATURAL DISASTER CAUSED EMERGENCIES ON, OVER AND ACROSS THOSE CERTAIN STRIPS OF LAND AND LOTS "A" AND "B" AS SHOWN HEREON AND DESIGNATED AS "E.V.A.E." (EMERGENCY VEHICLE ACCESS EASEMENT).

C. PUBLIC EASEMENT FOR THE INSTALLATION AND MAINTENANCE OF A WATER LINE TOGETHER WITH ANY AND ALL APPURTENANCES PERTAINING THERETO ON, UNDER AND ACROSS THOSE STRIPS OF LAND AS SHOWN HEREON AND DESIGNATED "W.L.E." (WATER LINE EASEMENT).

JTS COMMUNITIES, INC.,
A CALIFORNIA CORPORATION

BY: Vikki Holt
PRINT NAME: Vikki Holt
ITS: Treasurer

BY: _____
PRINT NAME: _____
ITS: _____

NOTARY STATEMENT

STATE OF CALIFORNIA } S.S.
COUNTY OF _____ }

ON SEPTEMBER 8, 2003 BEFORE ME, TIMOTHY J. O'CONNOR,
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
VIKKI HOLT AND _____

☒ PERSONALLY KNOWN TO ME OR ☐ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL:

Timothy J. O'Connor — Signature
TIMOTHY J. O'CONNOR — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: SACRAMENTO COUNTY, CALIFORNIA
MY COMMISSION NO. IS 1290839 AND EXPIRES: 1-14-05

CENTEX HOMES,
A NEVADA GENERAL PARTNERSHIP
BY: CENTEX REAL ESTATE CORPORATION,
A NEVADA CORPORATION, ITS MANAGING GENERAL PARTNER

BY: _____
PRINT NAME: STEVEN C PORTER
ITS: LAND DEVELOPMENT MANAGER

BY: _____
PRINT NAME: _____
ITS: _____

BENEFICIARY STATEMENT
BANK OF THE WEST, A NATIONAL BANKING ASSOCIATION, BENEFICIARY FOR DEED OF TRUST RECORDED JULY 5, 2002, PER DOCUMENT NO. 2002-77899 OFFICIAL RECORDS, PLACER COUNTY.

BY: _____ V.P.
PRINT NAME: RICHARD L. CARTER TITLE

BY: _____
PRINT NAME: _____ TITLE

NOTARY STATEMENT

STATE OF CALIFORNIA } S.S.
COUNTY OF Placer }

ON 9/10/03 BEFORE ME, Laura Wilder,
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
Richard L. Carter AND _____

☐ PERSONALLY KNOWN TO ME OR ☒ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL:

Laura Wilder — Signature
Laura Wilder — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: Placer COUNTY, CALIFORNIA
MY COMMISSION NO. IS 1327107 AND EXPIRES: Oct. 27, 2005

NOTARY STATEMENT

STATE OF CALIFORNIA } S.S.
COUNTY OF Placer }

ON Sept. 5, 2003 BEFORE ME, Jennifer A. Jurgens,
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
Steven C. Porter AND _____

☒ PERSONALLY KNOWN TO ME OR ☐ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL:

Jennifer A. Jurgens — Signature
Jennifer A. Jurgens — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: Placer COUNTY, CALIFORNIA
MY COMMISSION NO. IS 1425725 AND EXPIRES: June 21, 2007

SURVEYOR'S STATEMENT

THIS MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS BASED UPON A FIELD SURVEY IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCES AT THE REQUEST OF B & Z INVESTMENTS, LLC, DURING JULY 2002. I HEREBY STATE THAT THIS FINAL MAP SUBSTANTIALLY CONFORMS TO THE CONDITIONALLY APPROVED TENTATIVE MAP, AND THAT ALL THE MONUMENTS ARE OF THE CHARACTER AND OCCUPY THE POSITIONS INDICATED, OR THAT THEY WILL BE SET IN THOSE POSITIONS ON OR BEFORE JANUARY 1, 2005 AND THAT THE MONUMENTS ARE, OR WILL BE, SUFFICIENT TO ENABLE THE SURVEY TO BE RETRACED.

MACKAY & SOMPS CIVIL ENGINEERS, INC.

DAVID W. KOPP, P.L.S. 4533
EXPIRATION DATE: DECEMBER 31, 2005

DATE: 9/15/03

CITY ENGINEER'S STATEMENT

I, JOHN E. PEDRI, CITY ENGINEER FOR THE CITY OF LINCOLN, DO HEREBY STATE THAT I HAVE EXAMINED THIS FINAL MAP OF THE SUBDIVISION OF "VERDERA LARGE LOT SUBDIVISION" LINCOLN, CALIFORNIA, COMPRISING TEN (10) SHEETS; THAT THE SUBDIVISION SHOWN HEREON IS SUBSTANTIALLY THE SAME AS IT APPEARED ON THE TENTATIVE MAP AND ANY APPROVED ALTERATIONS THEREOF; AND THAT ALL PROVISIONS OF THE SUBDIVISION MAP ACT AND ANY LOCAL ORDINANCES APPLICABLE AT THE TIME OF APPROVAL OF THE TENTATIVE MAP HAVE BEEN COMPLIED WITH.

DATE: 9-15-03

JOHN E. PEDRI, CITY ENGINEER
CITY OF LINCOLN, R.C.E. 35,266, EXPIRES 9-30-03

CITY SURVEYOR'S STATEMENT

THIS FINAL MAP HAS BEEN EXAMINED BY ME AND I AM SATISFIED THAT IT IS TECHNICALLY CORRECT.

DATE: Sept. 15, 2003

CARY G. SHUART, LS 4645
LICENSE EXPIRES 09-30-06

CITY CLERK'S STATEMENT

I HEREBY STATE THAT THE CITY COUNCIL OF THE CITY OF LINCOLN, HAS APPROVED THIS FINAL MAP OF THE SUBDIVISION OF "VERDERA LARGE LOT SUBDIVISION", AND HAS ACCEPTED ON BEHALF OF THE PUBLIC ALL EASEMENTS HEREON OFFERED FOR DEDICATION INCLUDING RELINQUISHMENT OF GROUNDWATER RIGHTS IN ACCORDANCE WITH THE TERMS OF THAT OFFER.

AND TO THE ABANDONMENT OF A PORTION OF TWELVE BRIDGES DRIVE ROAD RIGHT OF WAY REFERENCED IN NOTE NO. 12 ON SHEET 3.

DATE: 9-16-03

CITY CLERK, CITY OF LINCOLN

RECORDER'S STATEMENT

FILED THIS 22nd DAY OF September 2003, AT 15:13 P.M.
IN BOOK 7 MAPS, AT PAGE 31 AT THE REQUEST OF B & Z TB, LLC; CATTA VERDERA-GOLF COURSE, LLC; CENTEX HOMES; CELO PARTNERS, LLC, AND JTS COMMUNITIES, INC.

DOCUMENT NO. 2003-0163211
FEE: $35.00

JIM McCAULEY
PLACER COUNTY RECORDER

BY: _____
DEPUTY

Lts 14-16 V-31
L-1 20 V-31

Attachment C
Page 1 of 10

BOOK Z OF MAPS, PAGE 32

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

CITY OF LINCOLN • PLACER COUNTY • CALIFORNIA

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ROSEVILLE, CA. 95661 (916) 773-1188

AUGUST 2003

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18208-LL

B & Z TB, LLC.
A CALIFORNIA LIMITED LIABILITY COMPANY
BY: B & Z INVESTMENTS, LLC.
A CALIFORNIA LIMITED LIABILITY COMPANY, MANAGING MEMBER

BY: _____
BRUCE W. BELL, MEMBER

BY: _____
JAMES M. ZURBUCHEN,
CO-TRUSTEE OF THE ZURBUCHEN FAMILY TRUST, UNDER TRUST AGREEMENT DATED OCTOBER 27, 1999, MEMBER

NOTARY STATEMENT

STATE OF CALIFORNIA)
COUNTY OF Sacramento) S.S.

ON September 4, 2003 BEFORE ME, Kimberly M. Robinson
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
Bruce Bell AND James M Zurbuchen

☒ PERSONALLY KNOWN TO ME OR ☐ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL:

Kimberly M. Robinson — Signature
Kimberly M. Robinson — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: Sacramento COUNTY, CALIFORNIA

MY COMMISSION NO. IS 1424471 AND EXPIRES: June 14, 2007

TRUSTEE'S STATEMENT

NORTH AMERICAN TITLE COMPANY, A CALIFORNIA CORPORATION, AS TRUSTEE UNDER A DEED OF TRUST RECORDED ON AUGUST 19, 2003, PER DOCUMENT NUMBER 2003-0140528, OFFICIAL RECORDS OF THE COUNTY OF PLACER, AND AS TRUSTEE UNDER A DEED OF TRUST RECORDED ON AUGUST 19, 2003, PER DOCUMENT NUMBER 2003-0140529, OFFICIAL RECORDS OF THE COUNTY OF PLACER, HEREBY CONSENTS TO THE PREPARATION AND FILING OF THIS MAP IN THE RECORDS OF THE COUNTY OF PLACER.

BY: Mark Gamba
PRINT: Marcy Gamba
TITLE: Vice President

BY: _____
PRINT: _____
TITLE: _____

CERTIFICATE FOR DEDICATION

A) SUBDIVIDER DEDICATING PROPERTY:

B & Z TB, LLC
2882 PROSPECT PARK DRIVE, SUITE 250
RANCHO CORDOVA, CALIFORNIA 95670

B) DESCRIPTION OF PROPERTY BEING DEDICATED:

TWELVE BRIDGES DRIVE
(ADDITIONAL RIGHT-OF-WAY ALONG NORTHERLY SIDE OF LOT 503)

C) PUBLIC AGENCY STATEMENT:

PURSUANT TO SECTION 66477.5 OF THE SUBDIVISION MAP ACT THE CITY OF LINCOLN DOES HEREBY CERTIFY THE FOLLOWING: THAT UPON DETERMINATION THAT THE SAME PUBLIC PURPOSE FOR WHICH THE PROPERTY, DESCRIBED IN (B) ABOVE IS DEDICATED, NO LONGER EXISTS, THE CITY OF LINCOLN WILL RECONVEY TO THE SUBDIVIDER, NAMED IN (A) ABOVE, ALL PROPERTY THAT IS REQUIRED FOR THE SAME PUBLIC PURPOSE.

TRUSTEE'S ACKNOWLEDGMENT

STATE OF CALIFORNIA)
COUNTY OF Placer) SS.

ON Sept. 10, 2003 BEFORE ME: Marcy Steele
PERSONALLY APPEARED: Mark Gamba

PERSONALLY KNOWN TO ME (OR PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND
SIGNATURE: Marcy Steele
PRINT: Marcy Steele

COUNTY OF: Placer
MY COMMISSION NO: 1329339
AND EXPIRES: Nov. 10, 2005

CATTA VERDERA-GOLF COURSE, LLC,
A CALIFORNIA LIMITED LIABILITY COMPANY

BY: Christopher R. Steele
CHRISTOPHER R. STEELE,
CO-TRUSTEE OF THE STEELE 1994 FAMILY TRUST, UNDER TRUST AGREEMENT DATED JUNE 22, 1994, MEMBER

NOTARY STATEMENT

STATE OF CALIFORNIA)
COUNTY OF Placer) S.S.

ON September 9, 2005 BEFORE ME, John W. Gibson
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
Christopher R. Steele AND _____

☒ PERSONALLY KNOWN TO ME OR ☐ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

WITNESS MY HAND AND OFFICIAL SEAL:

Signature — John W. Gibson — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: Placer COUNTY, CALIFORNIA

MY COMMISSION NO. IS 1234678 AND EXPIRES: September 16, 2003

CATTA VERDERA-VILLAGE 13, LLC.
A CALIFORNIA LIMITED LIABILITY COMPANY
BY: CRSTB PARTNERS, LLC.
A CALIFORNIA LIMITED LIABILITY COMPANY, MANAGING MEMBER

BY: Christopher R. Steele
CHRISTOPHER R. STEELE,
CO-TRUSTEE OF THE STEELE 1994 FAMILY TRUST, UNDER TRUST AGREEMENT DATED JUNE 22, 1994, MEMBER

NOTARY STATEMENT

STATE OF CALIFORNIA)
COUNTY OF Placer) S.S.

ON September 9, 2005 BEFORE ME, John W. Gibson
A NOTARY PUBLIC IN AND FOR SAID COUNTY AND STATE, PERSONALLY APPEARED
Christopher R. Steele AND _____

☒ PERSONALLY KNOWN TO ME OR ☐ PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE) TO BE THE PERSON(S) WHOSE NAME(S) IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME THAT HE/SHE/THEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAPACITY(IES), AND THAT BY HIS/HER/THEIR SIGNATURE(S) ON THE INSTRUMENT, THE PERSON(S), OR THE ENTITY UPON BEHALF OF WHICH THE PERSON(S) ACTED, EXECUTED THE INSTRUMENT.

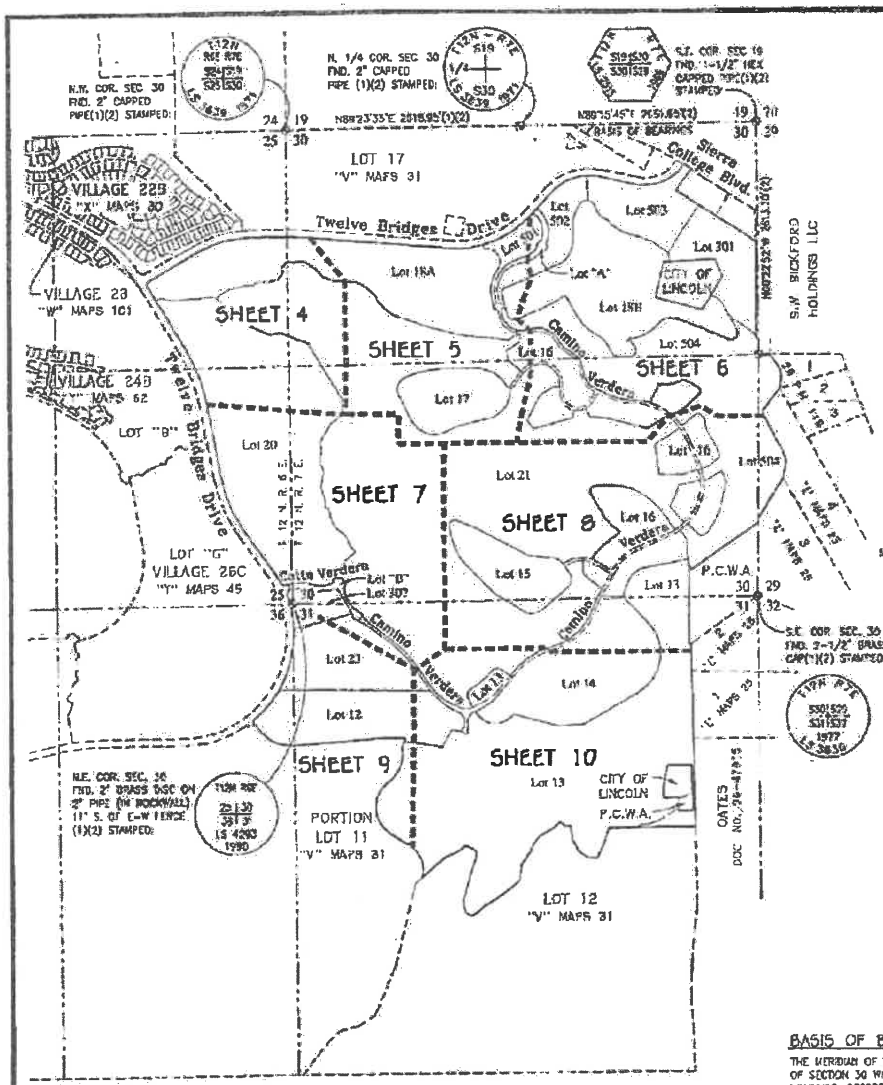
WITNESS MY HAND AND OFFICIAL SEAL:

Signature — John W. Gibson — Print Name

MY PRINCIPAL PLACE OF BUSINESS IS: Placer COUNTY, CALIFORNIA

MY COMMISSION NO. IS 1234678 AND EXPIRES: September 16, 2003

BOOK 2 OF MAPS, PAGE 32



LEGEND:

○	DIMENSION POINT
⊙	FOUND COPPERWELD MARKER WITH CENTER PUNCH IN MONUMENT WELL SET PER (1)
⊠	FOUND COPPERWELD MARKER WITH CENTER PUNCH IN MONUMENT WELL, STAMPED "L.S. 6046" SET PER "W" MAPS 55 (SUN CITY LINCOLN HILLS PHASE 4)
⌀	FOUND 3/4" GALVANIZED PIPE WITH PLASTIC CAP, STAMPED "L.S. 6046" SET PER "W" MAPS 55
⊕ ⊞	FOUND SECTION CORNER, QUARTER CORNER, AS NOTED
⊟	QUARTER SECTION CORNER AS NOTED. (NOT FOUND)
⊻	SET COPPERWELD MARKER WITH CENTER PUNCH IN MONUMENT WELL STAMPED "L.S. 4533"
⌀	SET 3/4" GALVANIZED PIPE, L.S. 4533
(R)	RADIAL BEARING
(1)	"V" MAPS 31 (TWELVE BRIDGES LARGE LOT SUBD.)
(2)	14 SURVEY 128 (TWELVE BRIDGES RDS.)
(3)	"X" MAPS 30 (VILLAGE 22B SUN CITY LINCOLN HILLS)
(4)	DOC. NO. 2000-002424 (CERTIFICATE OF CORRECTION)
(5)	DOC. NO. 2000-059893
(6)	DOC. NO. 2001-010055
(7)	DOC. NO. 2001-122933
(8)	DOC. NO. 2002-057628 (LOT LINE ADJUSTMENT)
(9)	31 P.M. 34
(O/A)	OVERALL
O.R.P.C.	OFFICIAL RECORDS OF PLACER COUNTY
P.M.	PARCEL MAP
P.U.E.	PUBLIC UTILITY EASEMENT
E.V.A.E.	EMERGENCY VEHICLE ACCESS EASEMENT
S.F.	SQUARE FEET
N.A.P.C.T.S.	NOT A PART OF THIS SURVEY
R.O.W.	RIGHT OF WAY

NOTES:

1. TOTAL GROSS ACREAGE OF VERDERA LARGE LOT SUBDIVISION IS: 845.014 ACRES. THIS SUBDIVISION CONTAINS 10 LARGE LOTS, 4 OPEN SPACE LOTS (501 – 504), 2 MISCELLANEOUS LOTS (301-FUTURE CITY PARK SITE AND PROPOSED CITY WATER STORAGE TANK SITE & 302) AND 2 PRIVATE ROAD LOTS ("A" & "B"). THERE ARE 5 PARCELS OF LAND (EXCEPTIONS) THAT LIE ENTIRELY WITHIN THE BOUNDARY OF THIS SUBDIVISION.
2. SOURCE OF METES AND BOUNDS: DOC. NO 2002-077898, JTS COMMUNITIES, INC.
3. THIS PROJECT MAY NOT USE THE NAME "HOFMAN RANCH" OR "HOFMAN", AS DESCRIBED IN BOOK 2509 AT PAGE 421 OFFICIAL RECORDS PLACER COUNTY.
4. ALL CURVE DIMENSIONS ARE IN RADIUS, DELTA AND ARC LENGTH.
5. ALL DISTANCES SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF.
6. THE SUM OF THE INDIVIDUAL PARTS OF A GIVEN LINE OR CURVE MAY NOT EQUAL THE OVERALL WHOLE DUE TO ROUNDING.
7. ALL ANGLE POINTS, REAR LOT CORNERS AND FRONT LOT CORNERS ARE MARKED BY A 5/8" REBAR WITH PLASTIC CAP STAMPED L.S. 4533. FRONT LOT CORNERS WILL BE RESET AS NEEDED WITH THE SMALL LOT VILLAGE FINAL MAPS.
8. THIS PROPERTY MAY BE AFFECTED BY THE FOLLOWING EASEMENTS THAT ARE UNDISCLOSED AS TO THEIR EXACT LOCATION:
   A) CONSTRUCTION/MAINTENANCE OF DAM, RESERVOIR, PIPELINE TO THE CITY OF LINCOLN RECORDED IN BOOK 3 OF CONTRACTS, PAGE 9 O.R.P.C.;
   B) DITCH FOR WATER TO CITRUS FRUIT COMPANY RECORDED IN BOOK 69 DEEDS, PAGE 570, O.R.P.C.
9. THE CITY OF LINCOLN MAY REQUIRE THE DEVELOPER OF ANY LARGE LOT TO CONSTRUCT SIGNIFICANT ON AND OFF SITE IMPROVEMENTS AS SET FORTH IN THE "PLACER HOLDINGS, INC. DEVELOPMENT AGREEMENT" WITH THE CITY OF LINCOLN, COVERING THE "TWELVE BRIDGES PROJECT" PER DOCUMENT NO. 98-053215, AMENDED PER DOC. NOS. 99-084205, 2001-008137, 2001-046026 AND 2002-136067, O.R.P.C. THE COSTS OF THE IMPROVEMENTS SHALL BE BORNE BY THE DEVELOPER OF THE LARGE LOTS.
10. CONDITIONS AND APPROVALS SET FORTH PER THE TENTATIVE MAP (LARGE LOT) AND SPECIFIC DEVELOPMENT PLAN APPROVED BY THE CITY OF LINCOLN JANUARY 13, 1998 PER CITY COUNCIL RES. NO. 98-06.
11. THE WATERLINE EASEMENT PER BK. 511, PG. 372, O.R.P.C., TO THE CITY OF LINCOLN WAS INCORRECTLY SHOWN ON THE MAP OF "TWELVE BRIDGES LARGE LOT SUBD." PER BOOK "V" OF MAPS, PG 31, P.C.R. DUE TO A LACK OF DEED ROTATION TO THE SAID BASIS OF BEARINGS.
12. PORTIONS OF TWELVE BRIDGES DRIVE AS SHOWN ON THE OFFER OF DEDICATION PER DOCUMENT NO. 2001-053055, O.R.P.C., (PORTIONS OF THE RETURNS ALONG THE EASTERN RIGHT-OF-WAY OF TWELVE BRIDGES AS SHOWN ON SHEET 7) AND PORTIONS ALONG THE NORTHERLY LINE OF LOT 503 PER "V" MAPS 31 ARE HEREBY ABANDONED BY THE FILING OF THIS FINAL MAP PURSUANT TO SECTION 66434(g) AND 66499.20 1/2 OF THE SUBDIVISION MAP ACT (2002).
13. THE 25-FOOT WIDE WATERLINE, ELECTRIC LINE AND INGRESS/EGRESS EASEMENT TO P.G.&E. PER BOOK 1048, PAGE 473, O.R.P.C. AND THE 15-FOOT WIDE WATERLINE, ELECTRIC LINE AND INGRESS/EGRESS EASEMENT TO PLACER COUNTY WATER WORKS DISTRICT NO. 1 PER BOOK 1486, PAGE 476, O.R.P.C. LIE ENTIRELY WITHIN THE EASEMENT AREAS OF DOC. NOS. 97-35851 & 97-38582, O.R.P.C. AS SHOWN ON THIS MAP.

0 400 800 1500
SCALE: 1"=800'

BASIS OF BEARINGS:

THE MERIDIAN OF THIS SURVEY IS THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 30 WHICH IS N88°18'45"E AS SHOWN ON THE "12 BRIDGES PLACER HOLDINGS, RECORD OF SURVEY NO. 1921" RECORDED IN BOOK 14 OF SURVEYS AT PAGE 128, OFFICIAL RECORDS OF PLACER COUNTY, AND WAS DETERMINED FROM THE MONUMENTS SHOWN HEREON AS FOUND.

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 21 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS "A" AND "C" AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 30, TOWNSHIP 12 NORTH, RANGE 5 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 5 EAST, MOUNT DIABLO MERIDIAN.

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MACKAY & SOMPS
CIVIL ENGINEERING AND PLANNING • LAND SURVEYING
ROSEVILLE, CA. 95661 (916) 772-1100

AUGUST 2003

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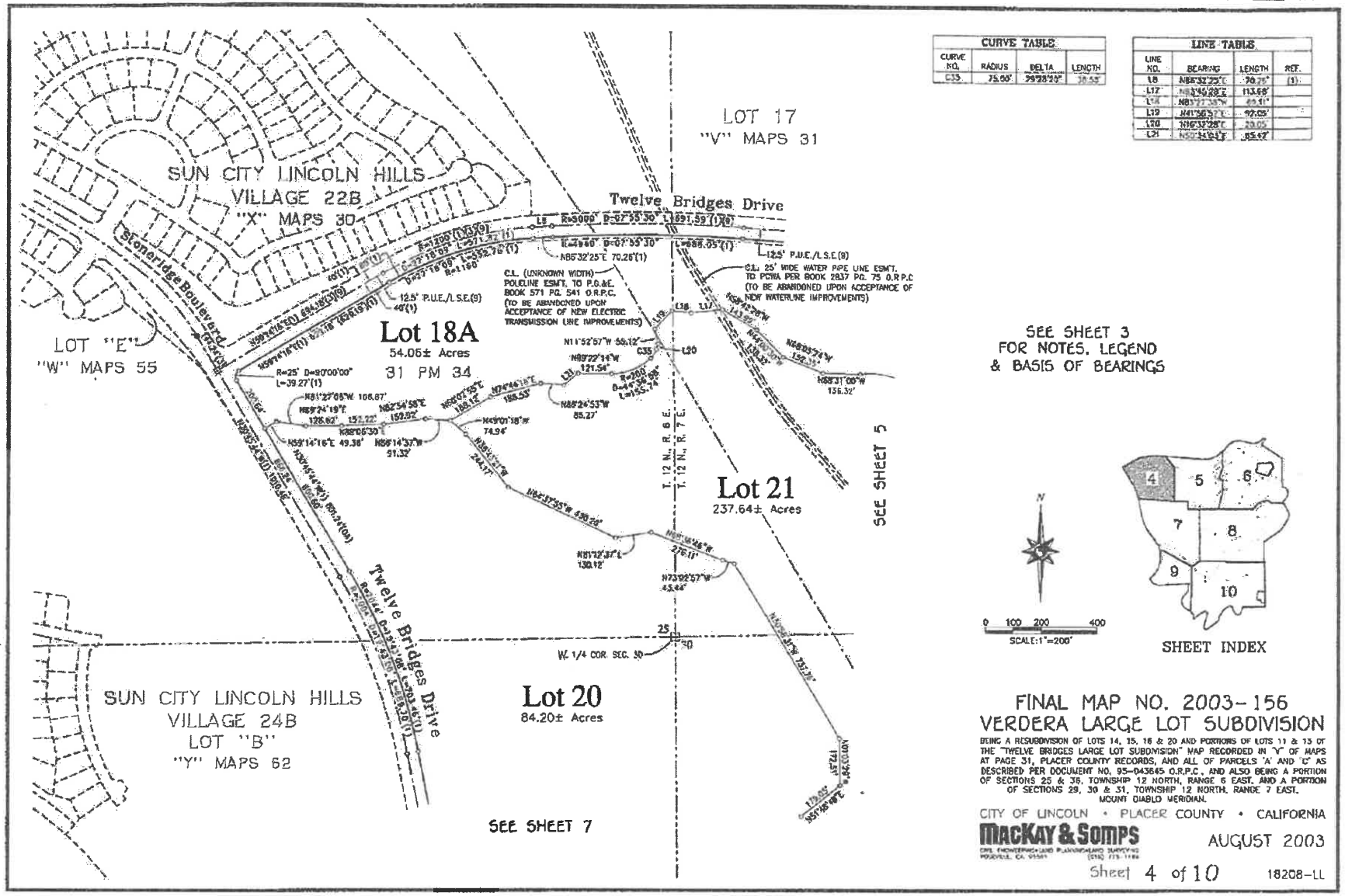
BOOK 2 OF MAPS, PAGE 32



CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C35	75.00'	39°28'29"	38.58'

LINE TABLE			
LINE NO.	BEARING	LENGTH	REF.
L18	N85°32'25"E	70.26'	(1)
L17	N81°40'28"E	113.68'	
L16	N81°27'05"W	49.41'	
L19	N41°26'57"E	97.05'	
L20	N16°33'28"E	23.05'	
L21	N50°34'04"E	85.67'	

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 18 & 20 AND PORTIONS OF LOTS 13 & 19 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

CITY OF LINCOLN • PLACER COUNTY • CALIFORNIA

MACKAY & SOMPS

AUGUST 2003

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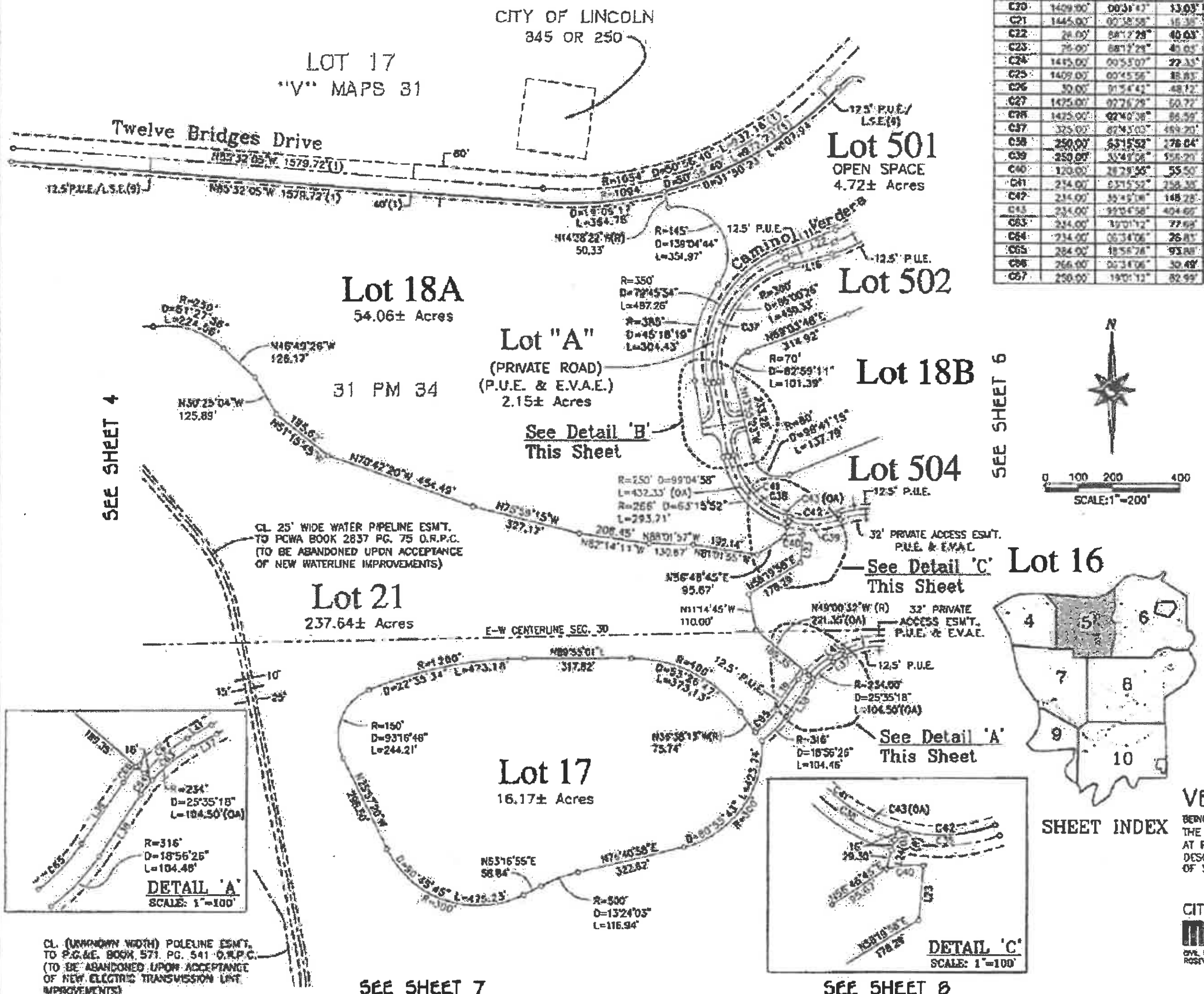
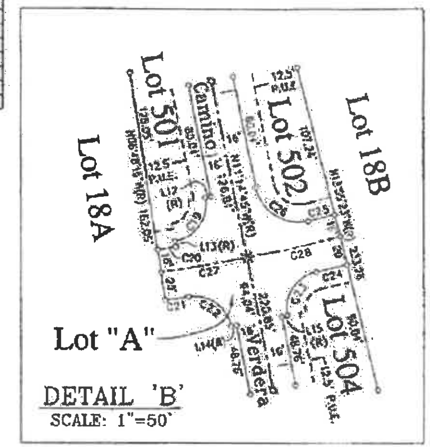
Attachment C
Page 4 of 10

BOOK Z OF MAPS, PAGE 32

CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C19	26.00'	91°54'42"	41.71'
C20	1409.00'	00°31'47"	13.03'
C21	1445.00'	00°38'58"	16.38'
C22	26.00'	88°12'29"	40.03'
C23	26.00'	88°12'29"	40.03'
C24	1445.00'	00°53'07"	22.33'
C25	1409.00'	00°45'56"	18.83'
C26	30.00'	91°54'42"	48.12'
C27	1425.00'	02°26'29"	60.72'
C28	1425.00'	02°40'38"	66.59'
C37	325.00'	87°43'03"	459.20'
C38	250.00'	63°15'52"	276.04'
C39	250.00'	35°49'08"	156.20'
C40	120.00'	26°29'55"	55.50'
C41	234.00'	63°15'52"	258.35'
C42	234.00'	35°45'08"	146.28'
C43	234.00'	99°04'58"	404.65'
C63	234.00'	19°01'12"	77.68'
C64	234.00'	06°34'06"	26.83'
C65	284.00'	18°56'28"	93.88'
C66	266.00'	06°34'06"	30.49'
C67	250.00'	19°01'12"	82.99'

LINE TABLE		
LINE NO.	BEARING	LENGTH
L11	N68°31'09"E	173.95'
L12	N78°45'15"E	4.00'
L13	N09°20'03"W	4.00'
L14	N78°45'15"E	4.00'
L15	N78°45'15"E	4.00'
L16	N74°45'41"E	123.75'
L22	N71°28'16"E	150.85'
L23	N04°56'19"E	81.85'
L24	N15°29'23"E	61.30'
L37	N60°00'40"E	40.74'
L38	N34°25'22"E	109.90'
L39	N34°25'22"E	109.20'
L41	N60°00'40"E	40.74'





SEE SHEET 3
FOR NOTES, LEGEND
& BASIS OF BEARINGS

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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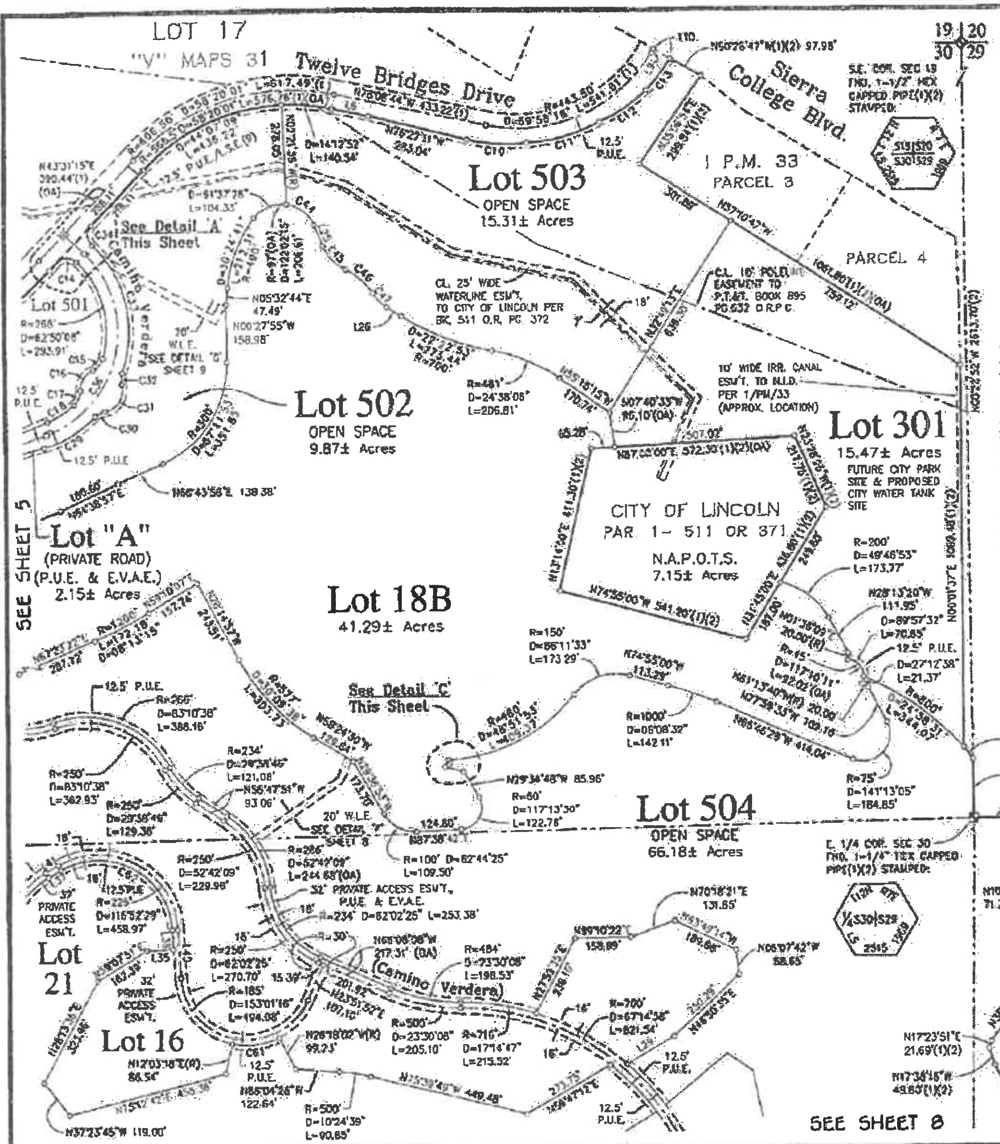
Sheet 5 of 10 18208-LL

Attachment C
Page 5 of 10

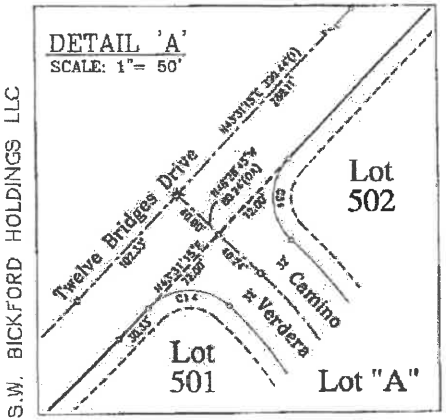
BOOK Z OF MAPS, PAGE 32

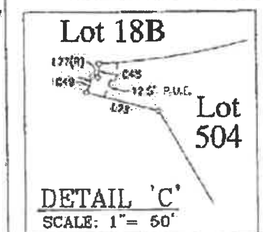


CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C10	480.00'	20°09'56"	168.94'
C11	483.50'	25°43'26"	217.07'
C12	475.00'	19°05'57"	158.34'
C13	485.00'	[illegible]	111.91'
C14	40.00'	89°35'21"	62.79'
C15	50.00'	50°57'05"	44.25'
C16	60.00'	68°25'05"	71.65'
C17	50.00'	50°42'05"	44.25'
C18	266.00'	19°15'20"	90.07'
C29	332.00'	29°32'52"	171.21'
C30	50.00'	35°57'37"	31.38'
C31	60.00'	96°47'19"	101.36'

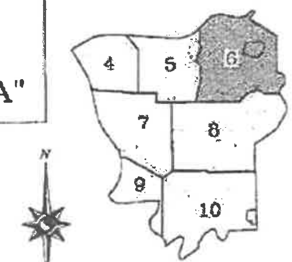
CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C32	50.00'	35°57'37"	31.38'
C33	332.00'	66°51'43"	387.43'
C34	40.00'	90°02'14"	62.86'
C38	300.00'	117°57'03"	617.58'
C44	97.00'	60°24'47"	102.28'
C45	125.00'	43°10'50"	94.20'
C46	180.00'	32°33'49"	102.28'
C47	130.00'	24°52'37"	56.44'
C48	44.00'	12°45'44"	9.80'
C49	40.00'	17°14'52"	12.03'
C61	201.00'	38°21'19"	134.55'
C62	207.00'	116°52'23"	422.55'

LINE TABLE		
LINE NO.	BEARING	LENGTH
L6	N78°08'44"W(1)	105.49'
L7	N31°53'09"E	14.88'
L9	N31°53'09"E	12.73'(2)
L10	N50°26'47"W(1)(2)	53.54'
L25	N22°00'20"W	64.26'
L26	N57°30'28"W	66.89'
L27	N78°02'00"W	4.80'
L28	N75°16'25"W	51.67'
L29	N59°47'12"E	152.80'
L35	N86°53'09"E	75.00'
L36	N03°06'51"W	54.89'
L37	N60°00'40"E	40.74'
L40	N03°06'51"W	135.86'
L41	N60°00'40"E	40.74'





SEE SHEET 3 FOR NOTES, LEGEND & BASIS OF BEARINGS



FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS "A" AND "C" AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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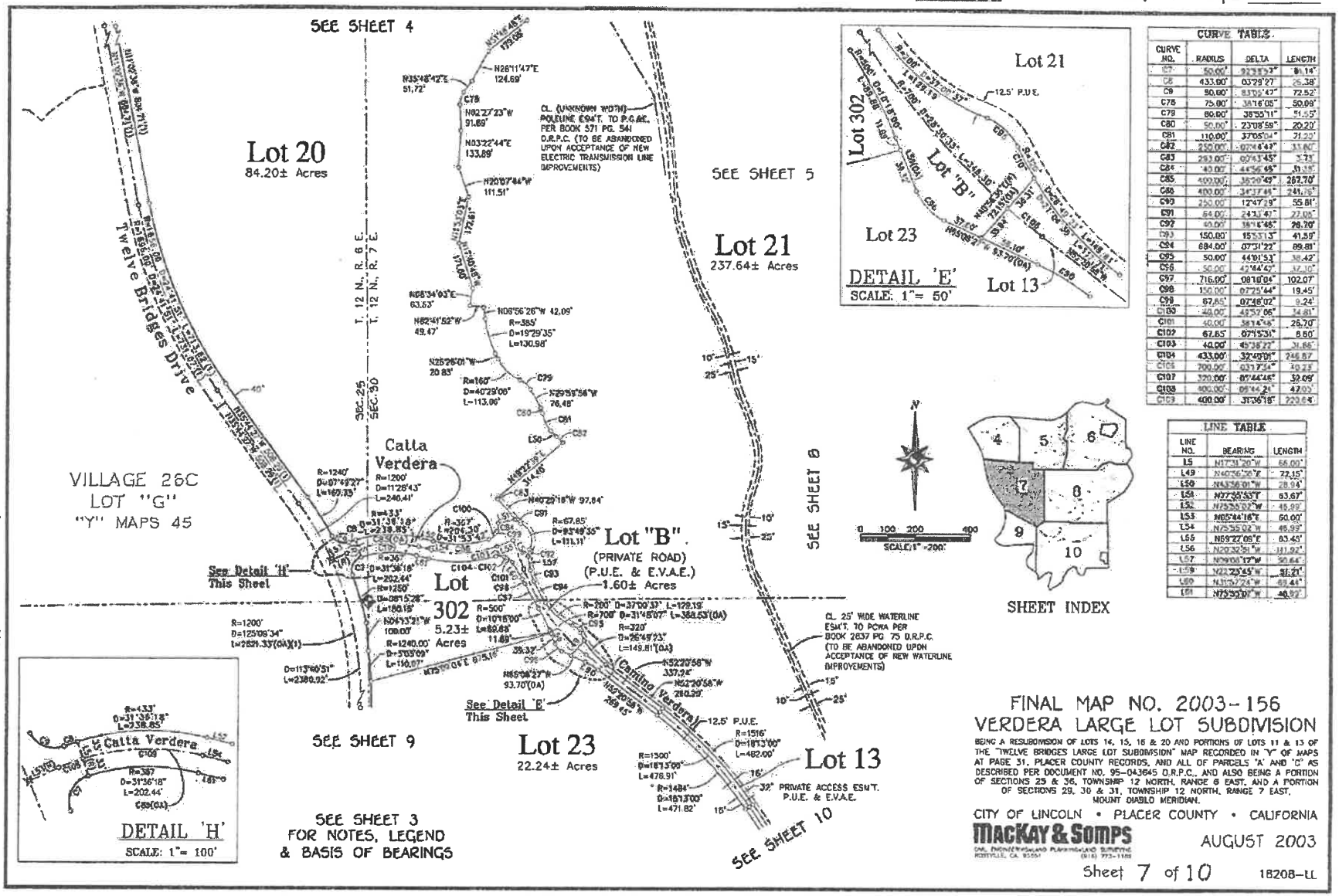
Sheet 6 of 10 18208-LL

BOOK 2 OF MAPS, PAGE 32



CURVE TABLE

CURVE NO.	RADIUS	DELTA	LENGTH
C5	50.00'	93°33'33"	81.64'
C6	433.00'	03°29'27"	26.38'
C9	50.00'	83°00'47"	72.52'
C75	75.00'	38°16'05"	50.09'
C79	80.00'	38°35'11"	51.55'
C80	50.00'	23°08'59"	20.20'
C81	110.00'	37°05'04"	71.22'
C82	250.00'	07°46'49"	33.90'
C83	293.00'	07°43'45"	3.71'
C84	40.00'	44°56'46"	31.38'
C85	400.00'	38°20'49"	267.70'
C86	400.00'	34°37'46"	241.78'
C90	250.00'	12°47'19"	55.81'
C91	64.00'	24°33'47"	27.05'
C92	40.00'	38°16'46"	26.70'
C93	150.00'	15°53'13"	41.59'
C94	684.00'	07°31'22"	89.81'
C95	50.00'	44°01'53"	38.42'
C96	50.00'	42°44'42"	37.30'
C97	716.00'	08°10'04"	102.07'
C98	150.00'	07°25'44"	19.45'
C99	67.65'	07°46'02"	9.24'
C100	40.00'	42°57'06"	34.81'
C101	40.00'	38°16'46"	26.70'
C102	67.65'	07°15'31"	8.60'
C103	40.00'	45°26'22"	31.86'
C104	433.00'	32°49'01"	248.87'
C105	700.00'	03°37'34"	44.28'
C107	320.00'	07°44'46"	32.09'
C108	400.00'	08°44'21"	42.00'
C109	400.00'	31°36'18"	220.64'

LINE TABLE

LINE NO.	BEARING	LENGTH
L5	N17°31'20"W	58.00'
L49	N40°36'26"E	22.15'
L50	N43°56'01"W	28.94'
L54	N72°25'55"E	63.67'
L52	N75°55'02"W	48.99'
L53	N05°44'16"E	50.00'
L54	N75°55'02"W	48.99'
L55	N69°27'05"E	63.45'
L56	N20°32'55"W	181.92'
L57	N79°01'17"W	50.64'
L58	N22°23'45"W	91.21'
L59	N15°27'24"W	69.41'
L61	N75°55'02"W	48.92'

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "Y" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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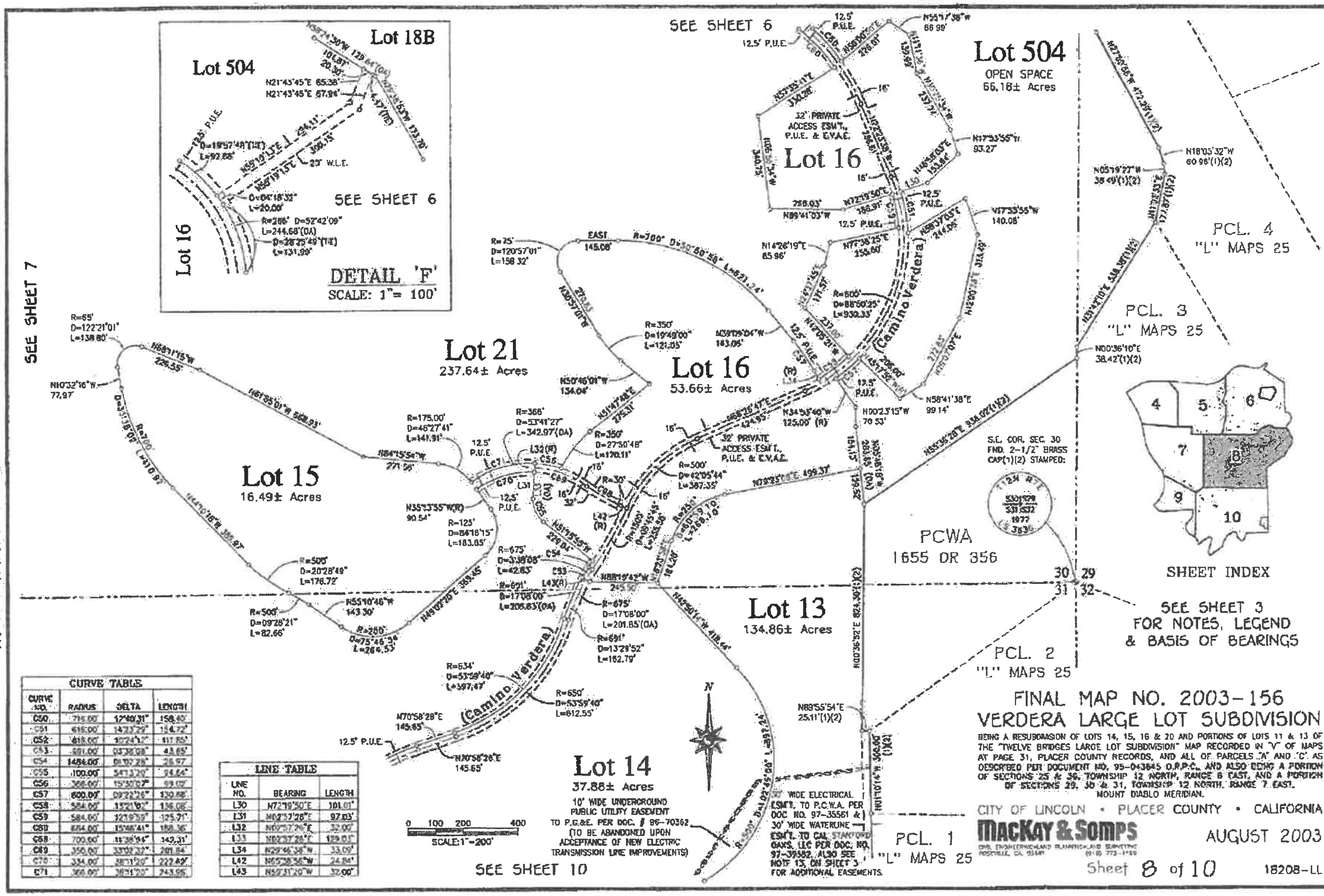
Sheet 7 of 10 18208-LL

Attachment C
Page 7 of 10

BOOK Z OF MAPS, PAGE 32



CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C50	716.00'	12°40'31"	158.40'
C51	616.00'	14°23'29"	154.72'
C52	616.00'	10°24'12"	111.85'
C53	491.00'	05°38'08"	48.65'
C54	1484.00'	01°07'28"	28.97'
C55	100.00'	54°13'20"	94.64'
C56	366.00'	15°30'07"	99.07'
C57	800.00'	09°22'26"	130.88'
C58	584.00'	13°21'02"	136.08'
C59	584.00'	12°19'59"	125.71'
C60	684.00'	15°46'41"	188.36'
C68	700.00'	11°38'54"	142.31'
C69	350.00'	33°02'37"	201.84'
C70	334.00'	38°11'20"	222.49'
C71	366.00'	38°11'20"	243.95'

LINE TABLE		
LINE NO.	BEARING	LENGTH
L30	N72°19'50"E	101.01'
L31	N02°57'26"E	97.03'
L32	N02°57'26"E	32.00'
L33	N02°57'26"E	129.01'
L34	N29°46'38"W	33.09'
L42	N65°38'56"W	24.84'
L43	N59°31'20"W	32.00'

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS "A" AND "C" AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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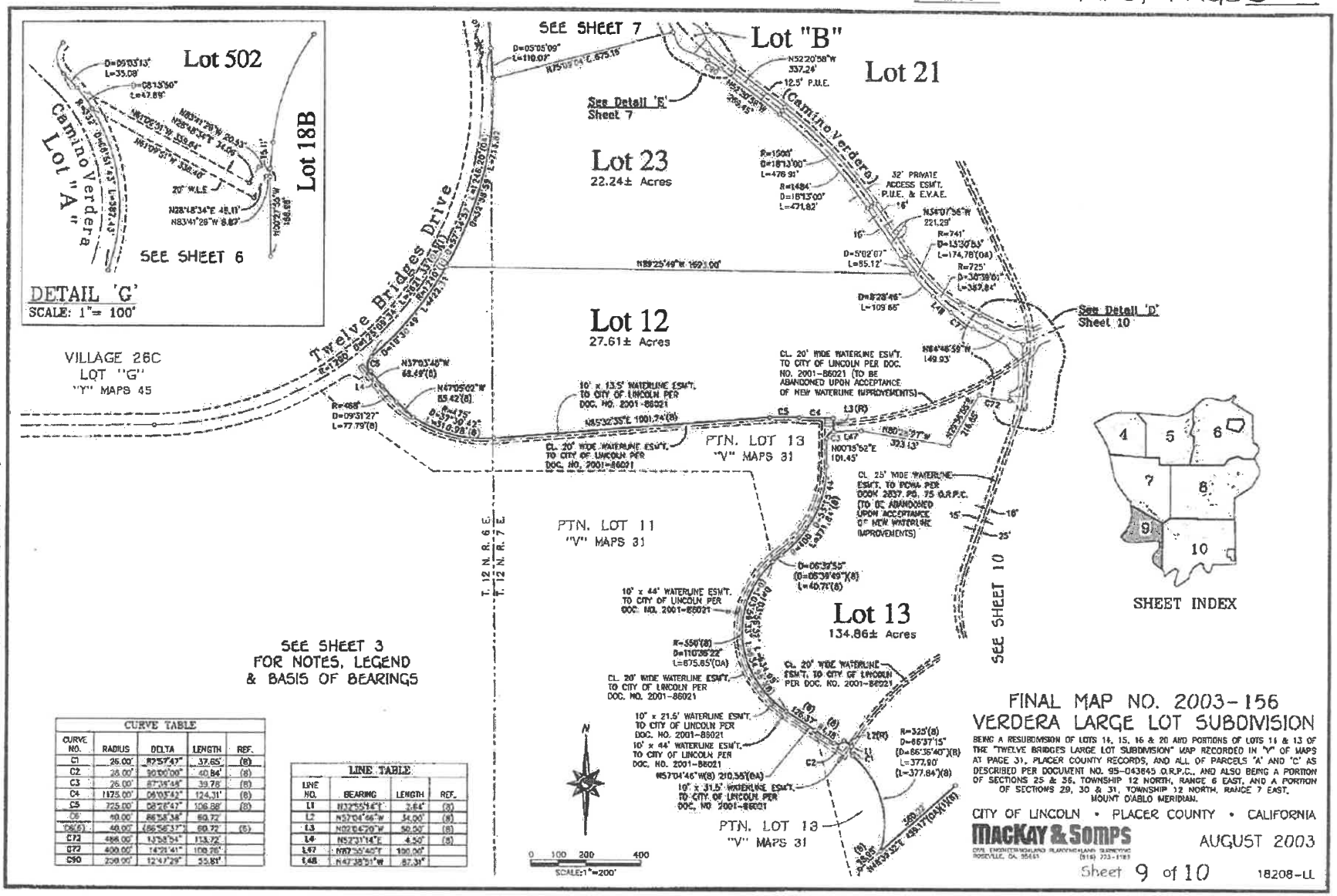
AUGUST 2003

Sheet 8 of 10 18208-LL



CURVE TABLE				
CURVE NO.	RADIUS	DELTA	LENGTH	REF.
C1	25.00'	87°57'47"	37.65'	(B)
C2	25.00'	90°00'00"	40.84'	(B)
C3	25.00'	87°35'55"	39.76'	(B)
C4	1175.00'	06°05'42"	124.31'	(B)
C5	725.00'	08°26'47"	106.88'	(B)
C6	60.00'	86°58'38"	89.72'	
C6(R)	60.00'	(86°58'37")	89.72'	(B)
C72	486.00'	13°58'54"	118.72'	
C72	600.00'	14°21'41"	150.28'	
C90	250.00'	12°47'29"	55.81'	

LINE TABLE			
LINE NO.	BEARING	LENGTH	REF.
L1	N32°55'14"E	2.64'	(B)
L2	N57°04'46"W	34.00'	(B)
L3	N02°04'29"W	50.00'	(B)
L4	N57°23'14"E	4.50'	(B)
L47	N87°55'40"E	100.00'	
L48	N47°38'21"W	87.31'	

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 11 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "Y" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS "A" AND "C" AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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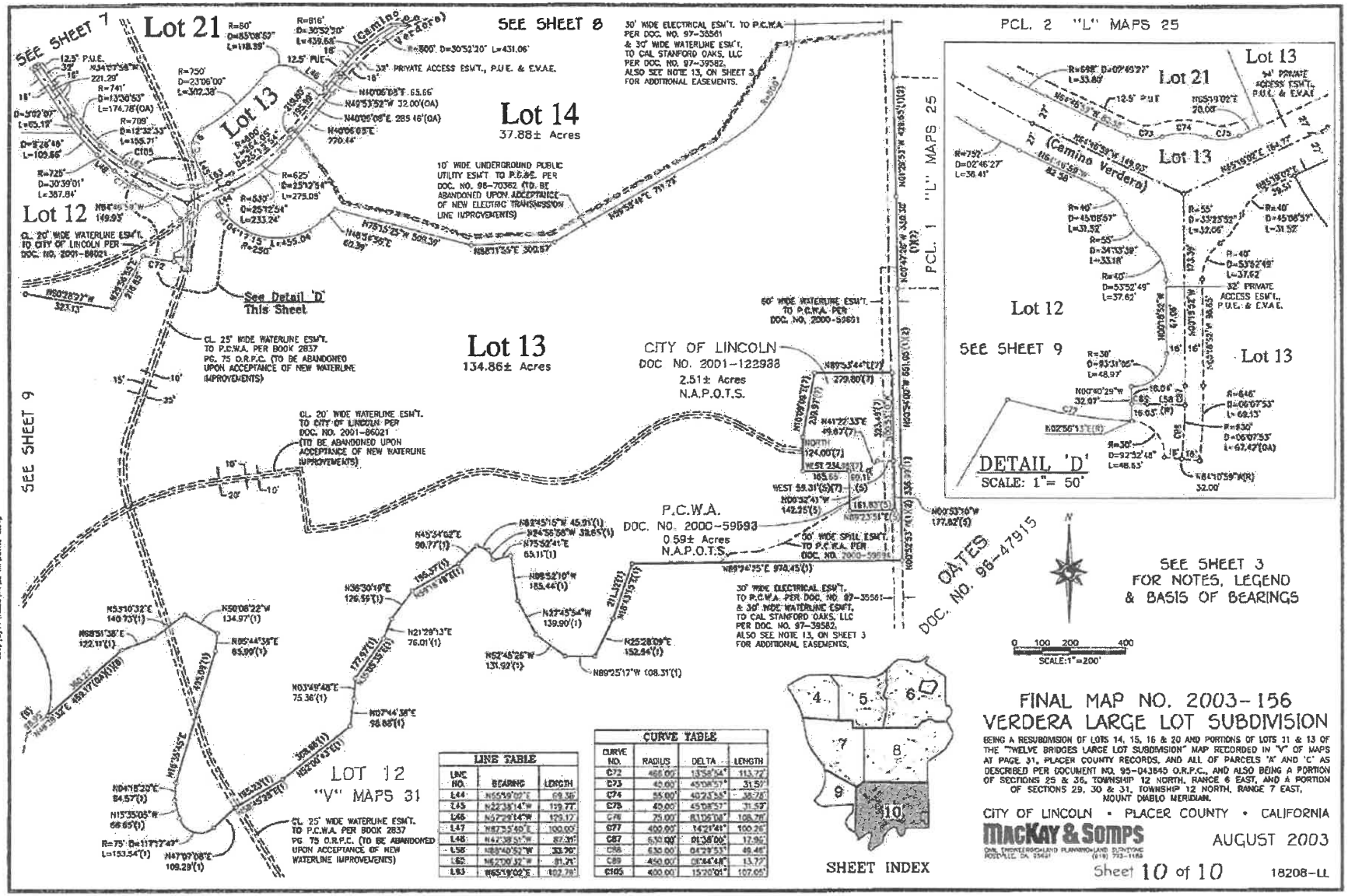
Sheet 9 of 10

18208-LL

BOOK 2 OF MAPS, PAGE 32



LINE TABLE		
LINE NO.	BEARING	LENGTH
L44	N65°59'02"E	69.36'
L45	N22°38'14"W	139.77'
L46	N67°29'14"W	129.12'
L47	N87°35'40"E	100.00'
L48	N47°38'30"W	87.31'
L56	N89°40'52"W	33.79'
L62	N62°00'32"W	91.71'
L93	N65°59'02"E	107.79'

CURVE TABLE			
CURVE NO.	RADIUS	DELTA	LENGTH
C72	468.00'	13°58'24"	113.72'
C73	40.00'	45°08'57"	31.52'
C74	55.00'	40°13'36"	38.78'
C75	40.00'	45°08'57"	31.52'
C76	75.00'	81°06'08"	106.16'
C77	400.00'	14°21'49"	100.26'
C87	530.00'	01°36'06"	17.96'
C96	530.00'	04°23'31"	40.46'
C89	450.00'	01°44'48"	13.72'
C105	400.00'	15°20'01"	107.05'

FINAL MAP NO. 2003-156
VERDERA LARGE LOT SUBDIVISION

BEING A RESUBDIVISION OF LOTS 14, 15, 16 & 20 AND PORTIONS OF LOTS 21 & 13 OF THE "TWELVE BRIDGES LARGE LOT SUBDIVISION" MAP RECORDED IN "V" OF MAPS AT PAGE 31, PLACER COUNTY RECORDS, AND ALL OF PARCELS 'A' AND 'C' AS DESCRIBED PER DOCUMENT NO. 95-043645 O.R.P.C., AND ALSO BEING A PORTION OF SECTIONS 25 & 36, TOWNSHIP 12 NORTH, RANGE 6 EAST, AND A PORTION OF SECTIONS 29, 30 & 31, TOWNSHIP 12 NORTH, RANGE 7 EAST, MOUNT DIABLO MERIDIAN.

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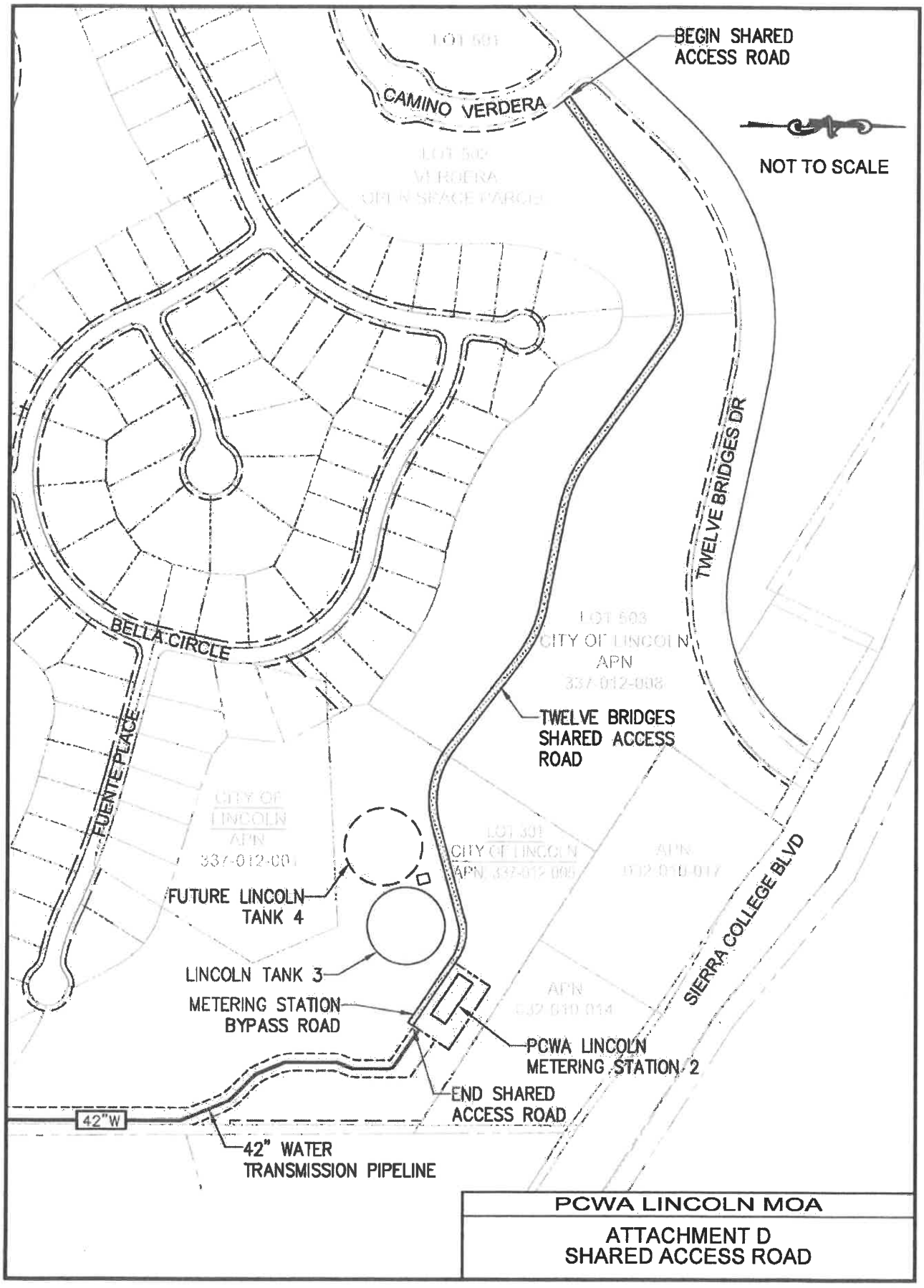
Sheet 10 of 10 18208-LL

Attachment C
Page 10 of 10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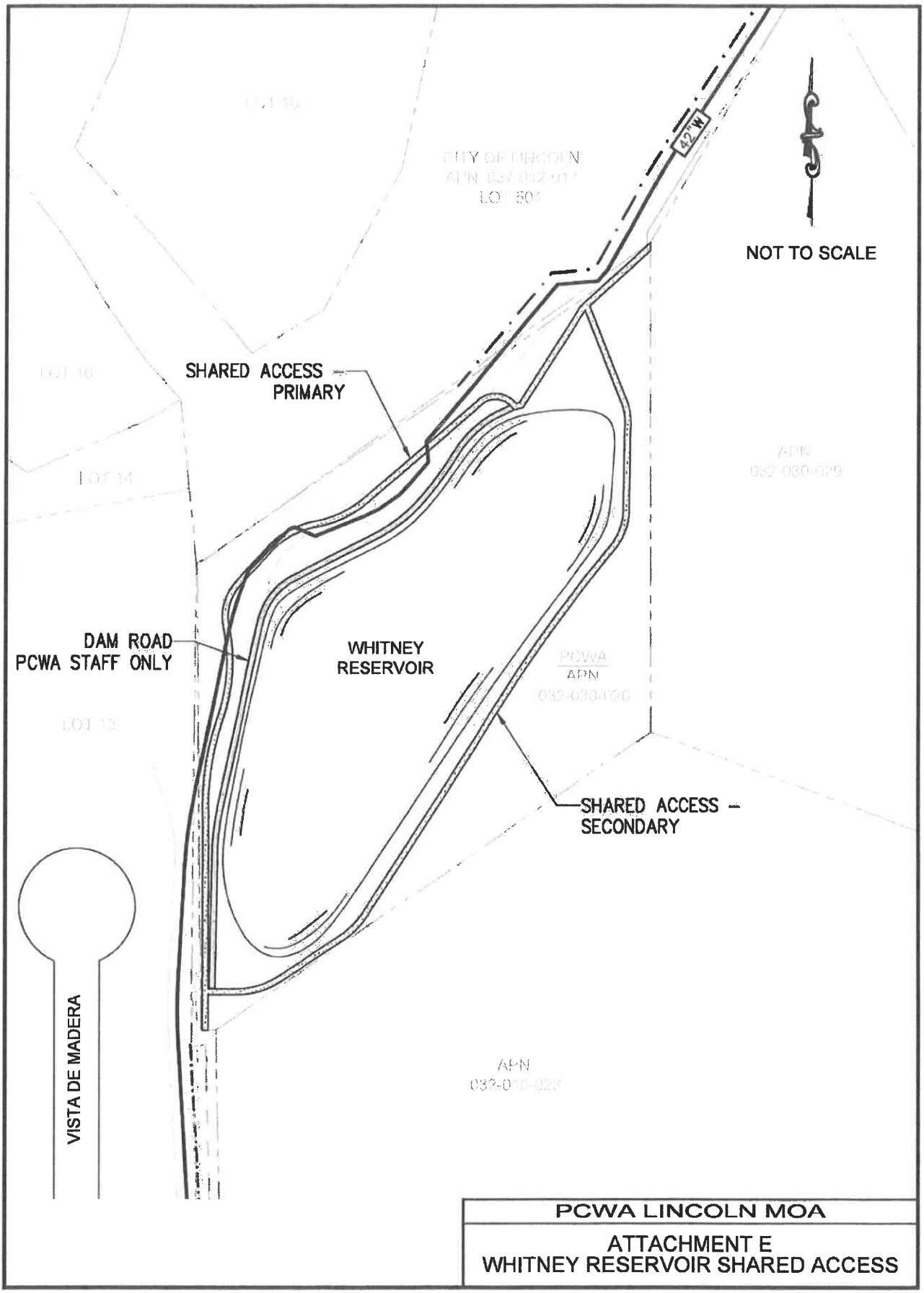
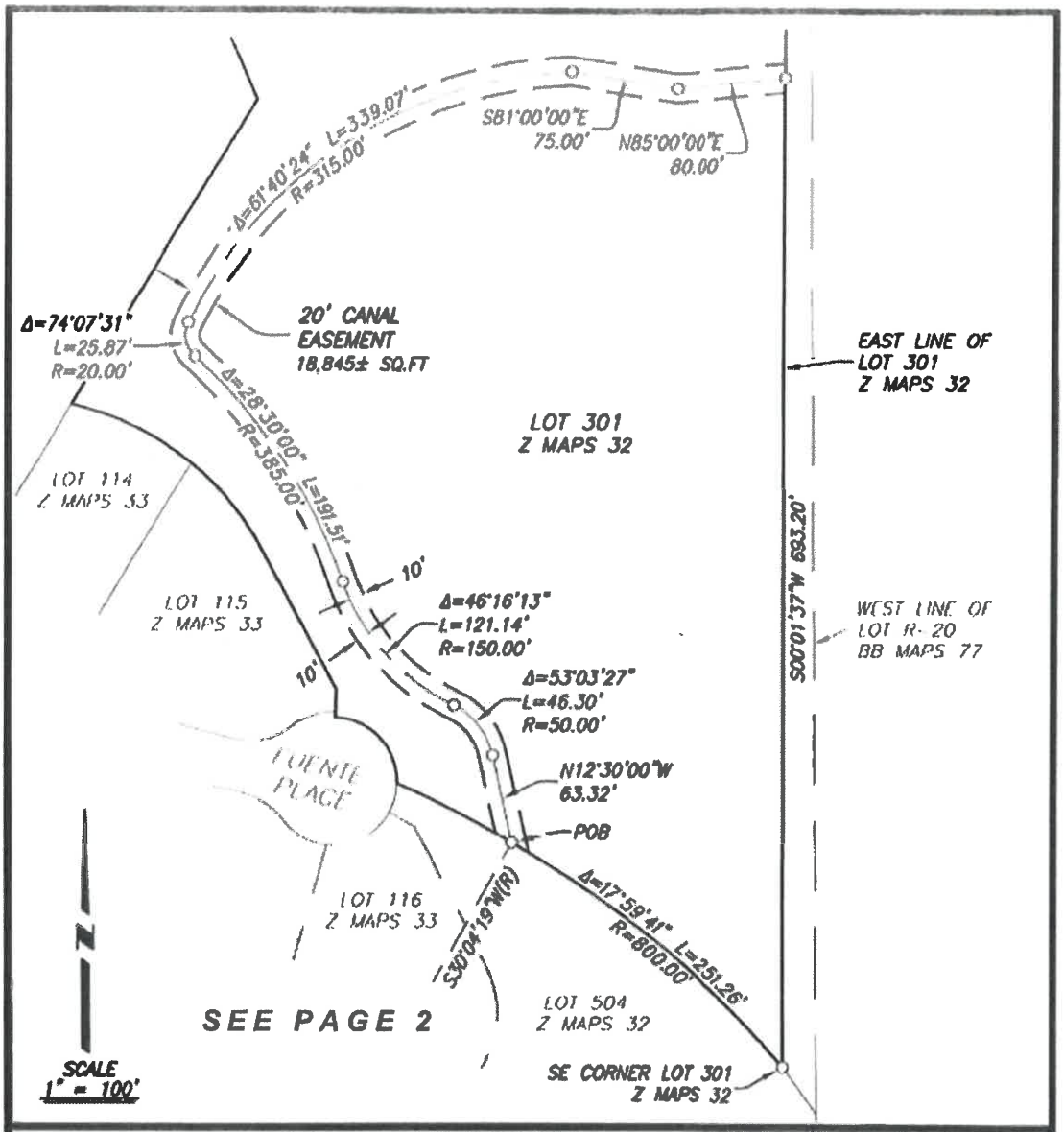
CAMINO VERDERA
NOT TO SCALE
TWELVE BRIDGES DR
BELLA CIRCLE
FUENTE PLACE
TWELVE BRIDGES SHARED ACCESS ROAD
FUTURE LINCOLN TANK 4
LINCOLN TANK 3
METERING STATION BYPASS ROAD
PCWA LINCOLN METERING STATION 2
END SHARED ACCESS ROAD
42"W
42" WATER TRANSMISSION PIPELINE
SIERRA COLLEGE BLVD
PCWA LINCOLN MOA
ATTACHMENT D
SHARED ACCESS ROAD



PCWA LINCOLN MOA

ATTACHMENT E
WHITNEY RESERVOIR SHARED ACCESS



20' CANAL EASEMENT
LOT 301, Z B.M. 32
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
DP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Tavern Grove Blvd, Suite 130 Roseville, CA 95678
Phone 916 773-4005 Fax 916 773-4106

DRAWN BY:	BB
CHECKED BY:	MH
SHEET:	1 OF 2
DATE:	07-13-20

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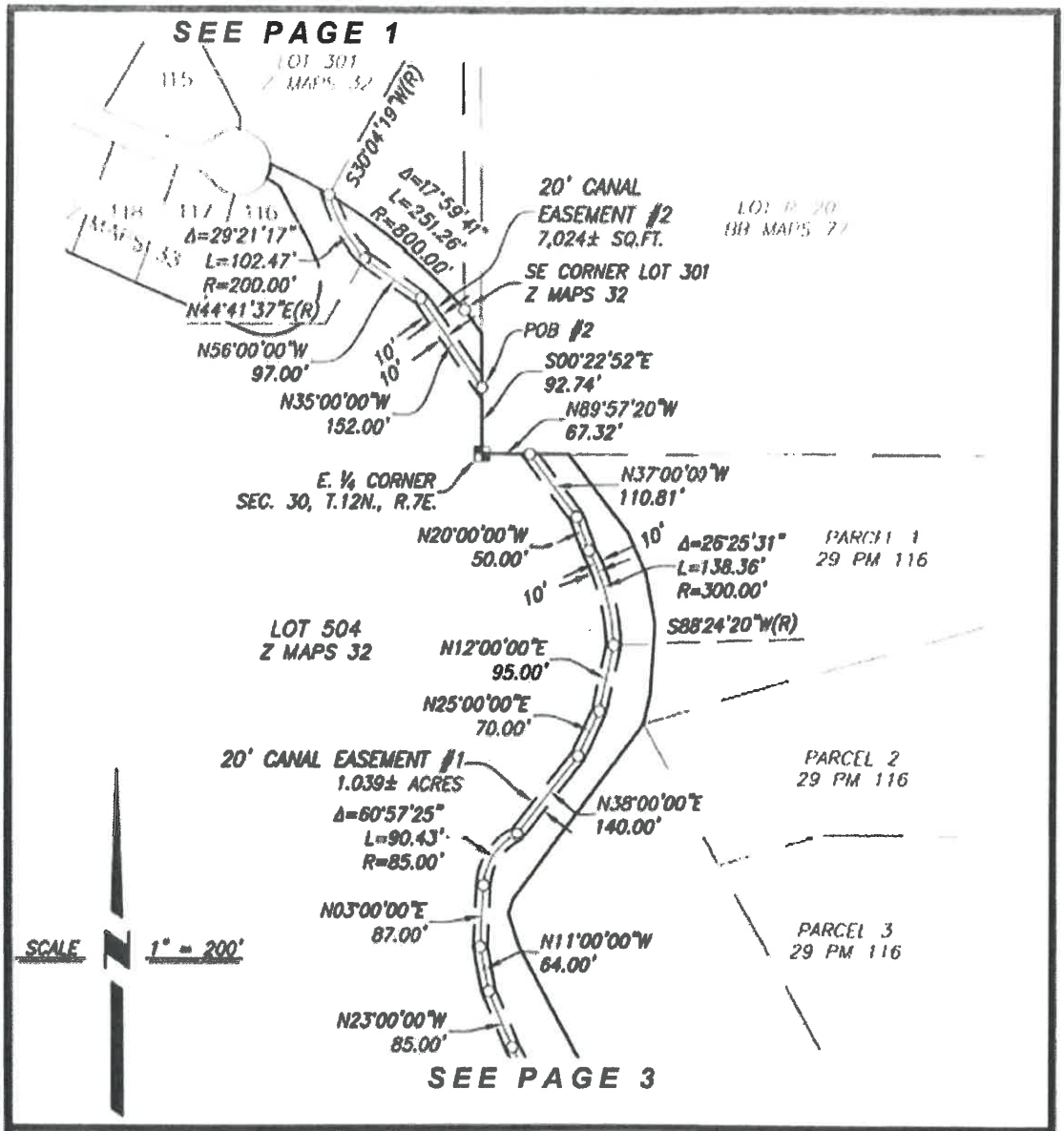
PCWA LINCOLN MOA

ATTACHMENT F
PCWA LINCOLN MOA
PAGE 1 OF 3



20' CANAL EASEMENT
LOT 504, Z B.M. 32
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
EXP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Pleasant Grove Blvd. Suite 130 · Roseville, CA 95678
Phone 916-773-4005 Fax 916-773-4406

DRAWN BY:	BB
CHECKED BY:	MH
SHEET:	2 OF 2
DATE:	07-13-19

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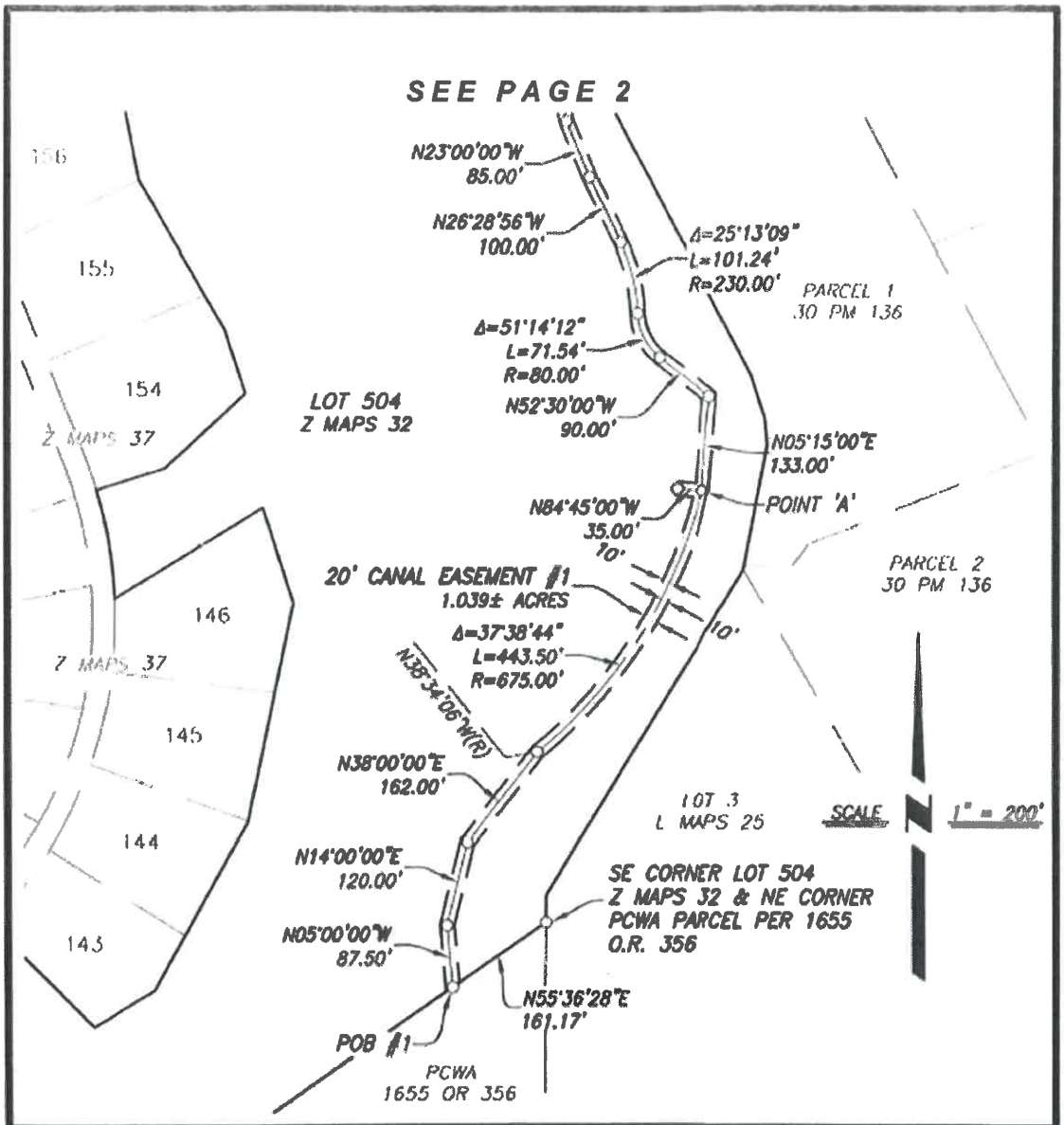
PCWA LINCOLN MOA
ATTACHMENT F
PCWA LINCOLN MOA
PAGE 2 OF 3



20' CANAL EASEMENT
LOT 504, Z B.M. 32
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
EXP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Pleasant Grove Blvd. Suite 130 Roseville CA 95678
Phone 916 773-4000 Fax 916-773-4498

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SHEET:	1 OF 2
DATE:	07-13-20

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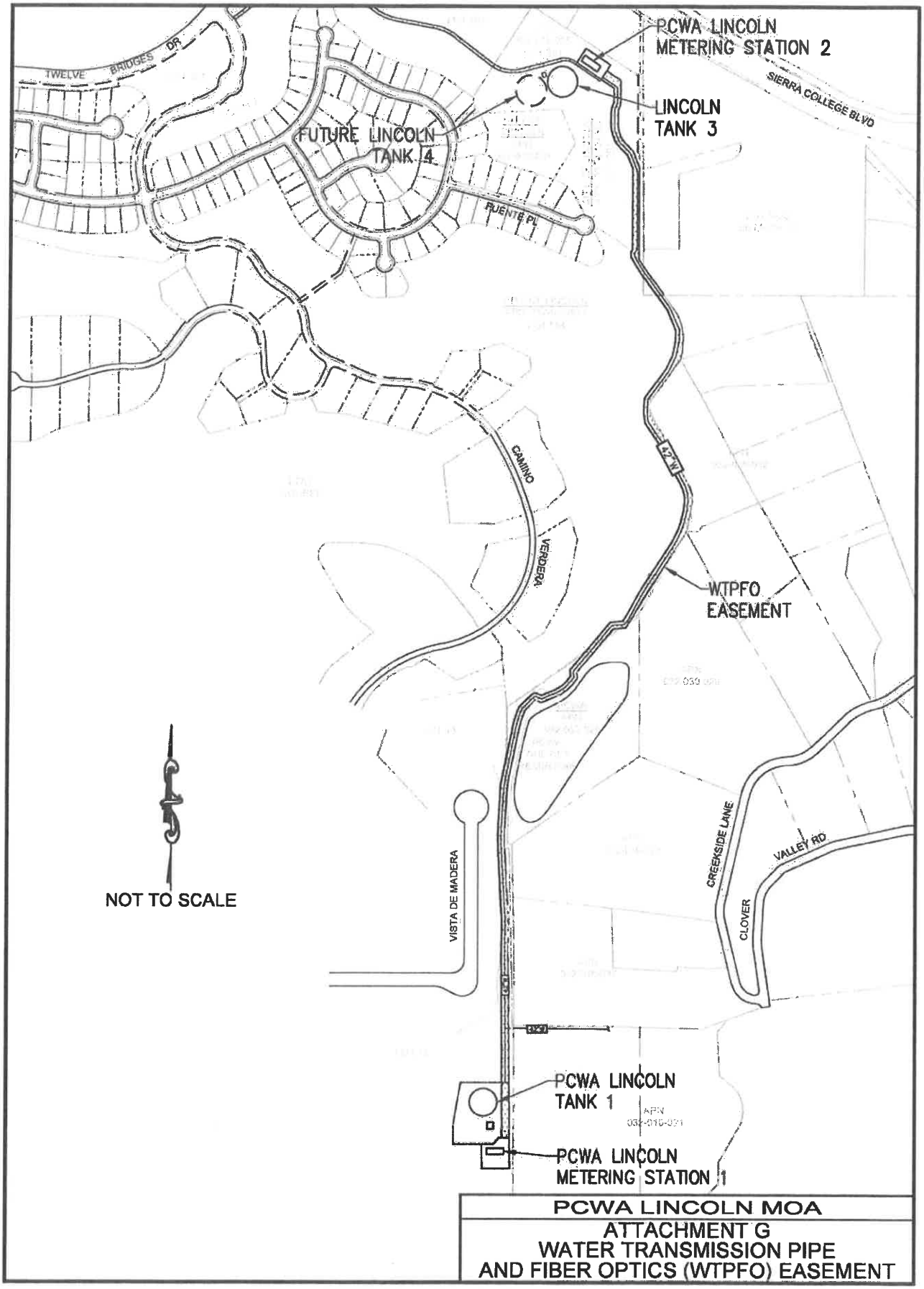
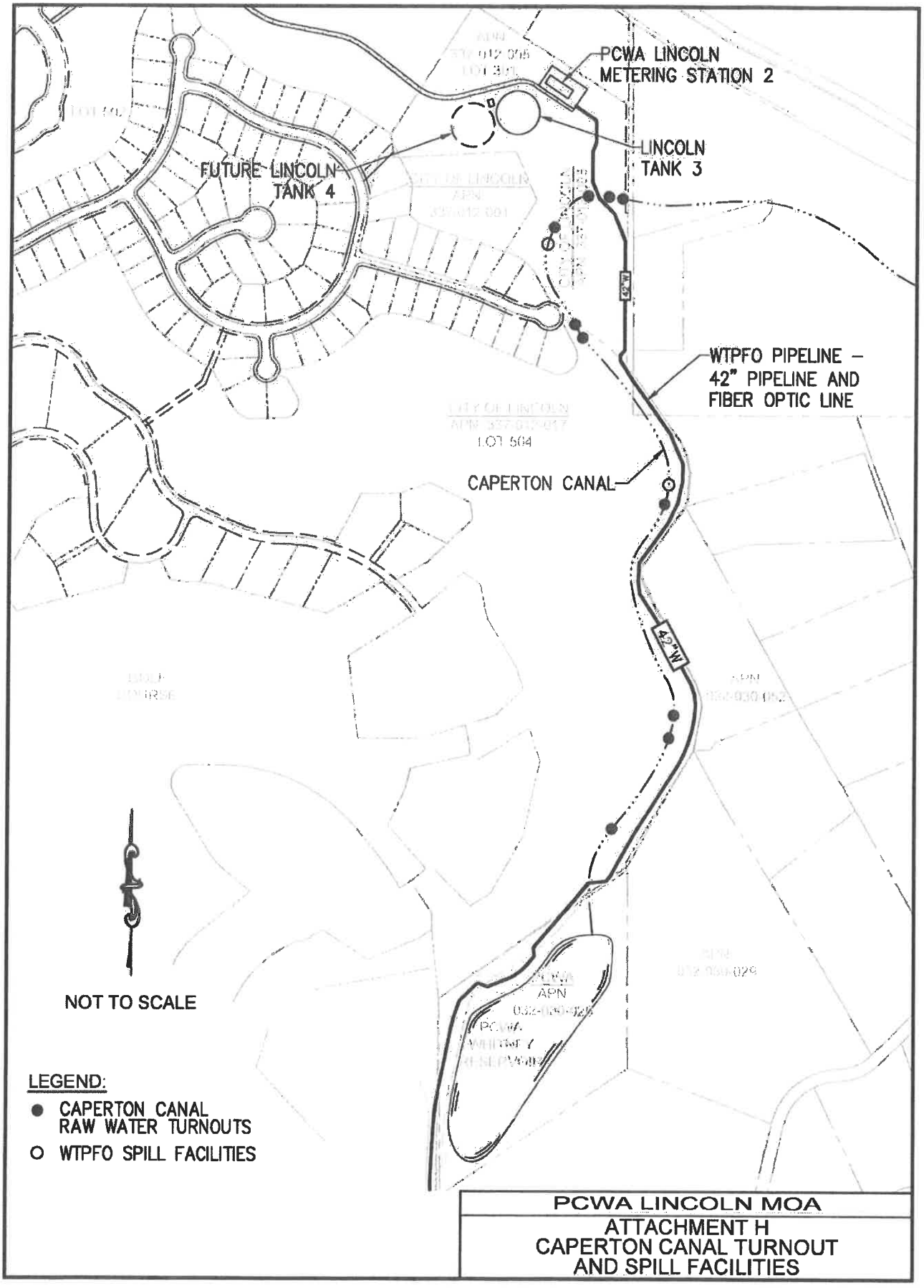
PCWA LINCOLN MOA
ATTACHMENT F
PCWA LINCOLN MOA
PAGE 3 OF 3



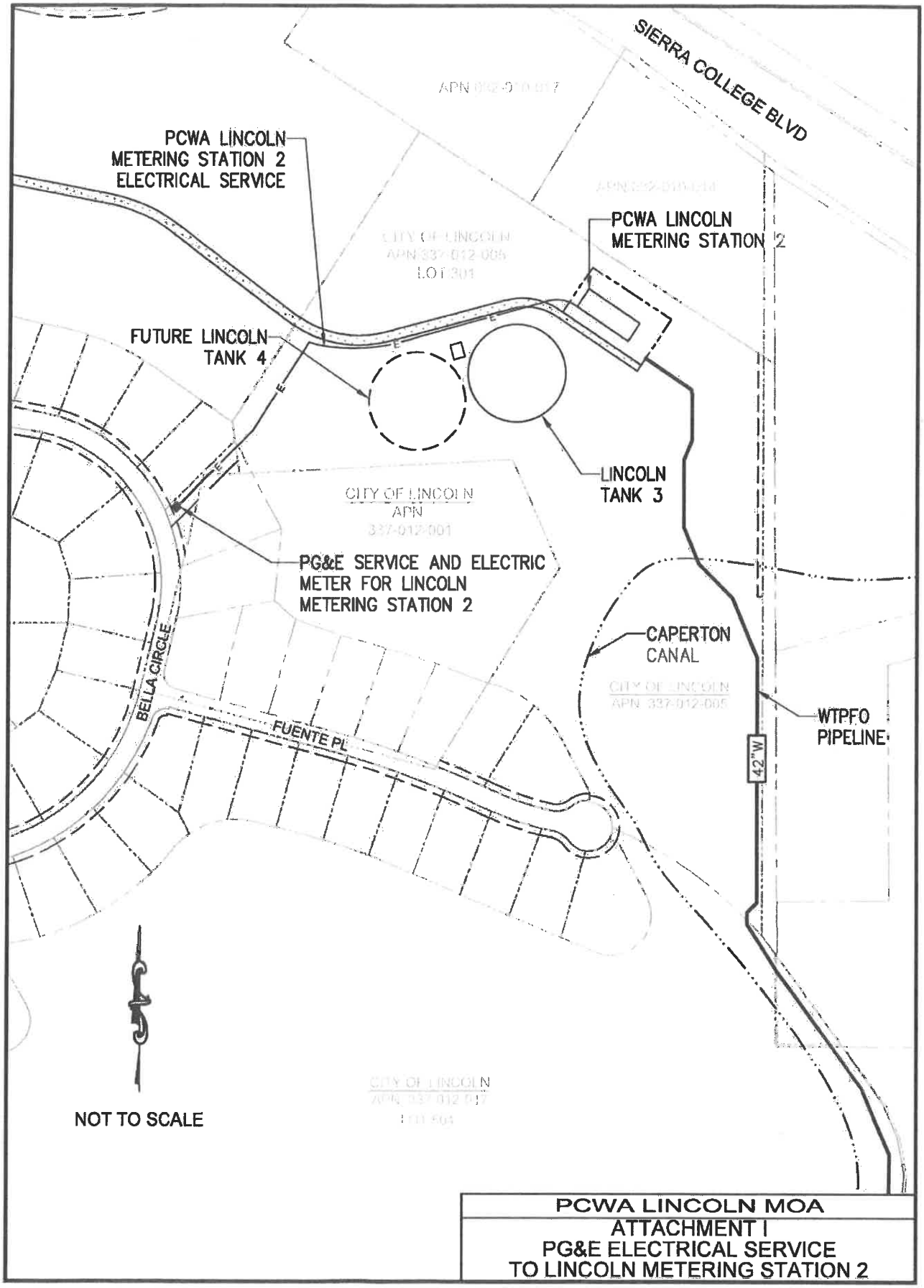
PCWA LINCOLN MOA

ATTACHMENT G
WATER TRANSMISSION PIPE AND FIBER OPTICS (WTPFO) EASEMENT



PCWA LINCOLN MOA

ATTACHMENT H
CAPERTON CANAL TURNOUT AND SPILL FACILITIES



PCWA LINCOLN MOA
ATTACHMENT I
PG&E ELECTRICAL SERVICE TO LINCOLN METERING STATION 2

SUMMARY OF CALIFORNIA RECORDING LAWS

1. Any instrument, paper, or notice submitted for recording must be authorized or required by law to be recorded, meet the requirements of statute, and contain original signatures except as otherwise provided by law, or be originally certified by a government agency.
2. Any document submitted must indicate the title or titles of the document(s) contained therein. Titles should appear on the first page, directly below the space reserved for the Recorder.
3. Recording fees for documents which contain only 8 ½" by 11" pages will not change. However, for any document which contains a sheet or sheets which do not measure 8 ½" by 11", an additional fee of $3.00 for every page of that document will apply.**
4. Any document submitted for recording shall have at least a ½" margin on each vertical side. In addition, the top 2 ½" of the first page shall be reserved for recording information with the left hand 3 ½" used by the public to show the name of the person requesting recording and the name and address to which the document is to be returned following recording. The right hand portion of the space is for use by the recorder only.
5. If a document modified, releases, or cancels provisions of a previously recorded document, it must contain the recorders identification number of the prior document.

**** (PCWA REQUIRES 8 ½" BY 11" AND 12 FONT TIMES NEW ROMAN)**

GUIDELINES FOR PREPARATION OF NEW FORMS

In addition to compliance with the requirements outlined above, any form developed for recording should also follow these general guidelines.

1. 8 ½" by 11" single-sided sheet of white paper, preferably 16 lb or heavier.
2. If multiple notary acknowledgements are used, they should be on separate 8 ½" by 11" sheets, and not stapled or taped to the document on half sheets.
3. Exhibits should appear on separate pages, be properly marked, and be referred to in the body of the main document. Exhibits, including plats, must have the ½ inch vertical margin.
4. All information required by the statute which provides for the creation of the document must be there. In addition, all recording requirements must be met.

RECORDING REQUESTED BY AND
FOR THE BENEFIT OF:

Placer County Water Agency

No fee required, pursuant to Gov't
Code § 27383.

AND WHEN RECORDED MAIL TO:

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

Space above for Recorder's use only

For internal use only:
T12N, R07E, Sec. 30, NE ¼
Facility Name: Lincoln Metering Station #2
APN: 337-012-005
Project No. and Name: FA 2521 – Lincoln-Penryn Phase III Pipeline Ptn. Pcl1 Bk.511 Pg 371
Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D) Transfer to Government Agency
The undersigned grantor(s) declare(s)
Documentary transfer tax is $0 per R&T Code § 11922

[X] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale
[ ] Unincorporated Area of [X] City of Lincoln

Declared by: _____

GRANT OF EASEMENT FOR UTILITIES AND ACCESS

FOR VALUABLE CONSIDERATION, the **CITY OF LINCOLN** (hereinafter called "GRANTOR") hereby grants to the **PLACER COUNTY WATER AGENCY**, (hereinafter called "AGENCY") a non-exclusive permanent easement for utilities purposes, including but not limited to, electrical lines and associated conduit, telecommunication lines and associated conduit, and appurtenances associated thereto, together with a non-exclusive permanent easement for access in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B", the description in Exhibit "A" controls.

The easement granted herein is a right-of-way for the purpose of ingress and egress for access across GRANTOR'S property.

GRANTOR further grants to the AGENCY:

(a) the right to grade the easement area for the full width thereof as well as the right to surface the area if required to prevent erosion and/or ensure safe passage;

(b) the right from time to time to trim and to cut down and clear away any and all trees, stumps, brush and landscaping now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove, if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(c) the right to use gates in all fences which cross or inhibit access to the easement area and the right to install Agency locks on existing or future gates installed in any such fences;

INDEMNITY

The AGENCY hereby covenants and agrees to indemnify and hold harmless the GRANTOR from and against any and all claims, demands, causes of action, damages, losses and liabilities of every kind and nature whatsoever arising out of or in connection with the issuance of this Right of Entry, as granted to the AGENCY or by any wrongful or negligent act or omission of the AGENCY or of its agents or employees in the course of their employment.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

City of Lincoln

By: _____

Print Name: Sean Scully

Title: City Manager

Date: 6/27/23

(Signature must be acknowledged by a Notary Public)

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 (Date) before me, Gwen Scanlon, Notary Public, (Here Insert Name and Title of the Officer)

personally appeared Sean Scully (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Grant of Easement COL to PCWA APN #337-012-005
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

EXHIBIT "A"
PUBLIC UTILITY EASEMENT
LEGAL DESCRIPTION

All that real property situated in the City of Lincoln, County of Placer, State of California, located in Section 30, Township 12 North, Range 7 East, M.D.M., being a portion of Lot 301 as shown on the "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Official Records more particularly described as follows:

Easement 1

A strip of land 20 feet in width the centerline of which is described below:

Commencing at the Northeast corner of said Lot 301, thence along the North line of said Lot 301 North 57"10'47" West, 179.36 feet; thence leaving said North line South 33°46'37" West, 37.01 feet; thence North 56°13'23" West, 177.00 feet; thence South 33°46'37" West, 91.00 feet to the **True Point of Beginning**; thence along the arc of a curve to the left having a radius of 80 feet, through a central angle of 48°21'57", subtended by a chord bearing North 80°24'21" West, 65.54 feet, an arc distance of 67.53 feet; thence South 75°24'40" West, 307.32 feet; thence along the arc of a curve to the right having a radius of 130 feet, through a central angle of 46°58'47", subtended by a chord bearing North 81°05'56" West, 103.63 feet, an arc distance of 106.59 feet; thence South 32°49'13" West, 250.66 feet; thence South 45°04'33" West, 8.68 feet to a point on the Northeasterly line of Lot 304 as shown on the "Final Map No. 2003-155 Verdera Village 18" filed in Book Z of Maps at Page 33, Placer County Official Records from which the most Northerly corner of said Lot 304 bears North 07°40'33" West, 20.10 feet.

Sidelines of described 20 foot strip of land are to be elongated or shortened to end on the Eastern boundary line of said Lot 304.

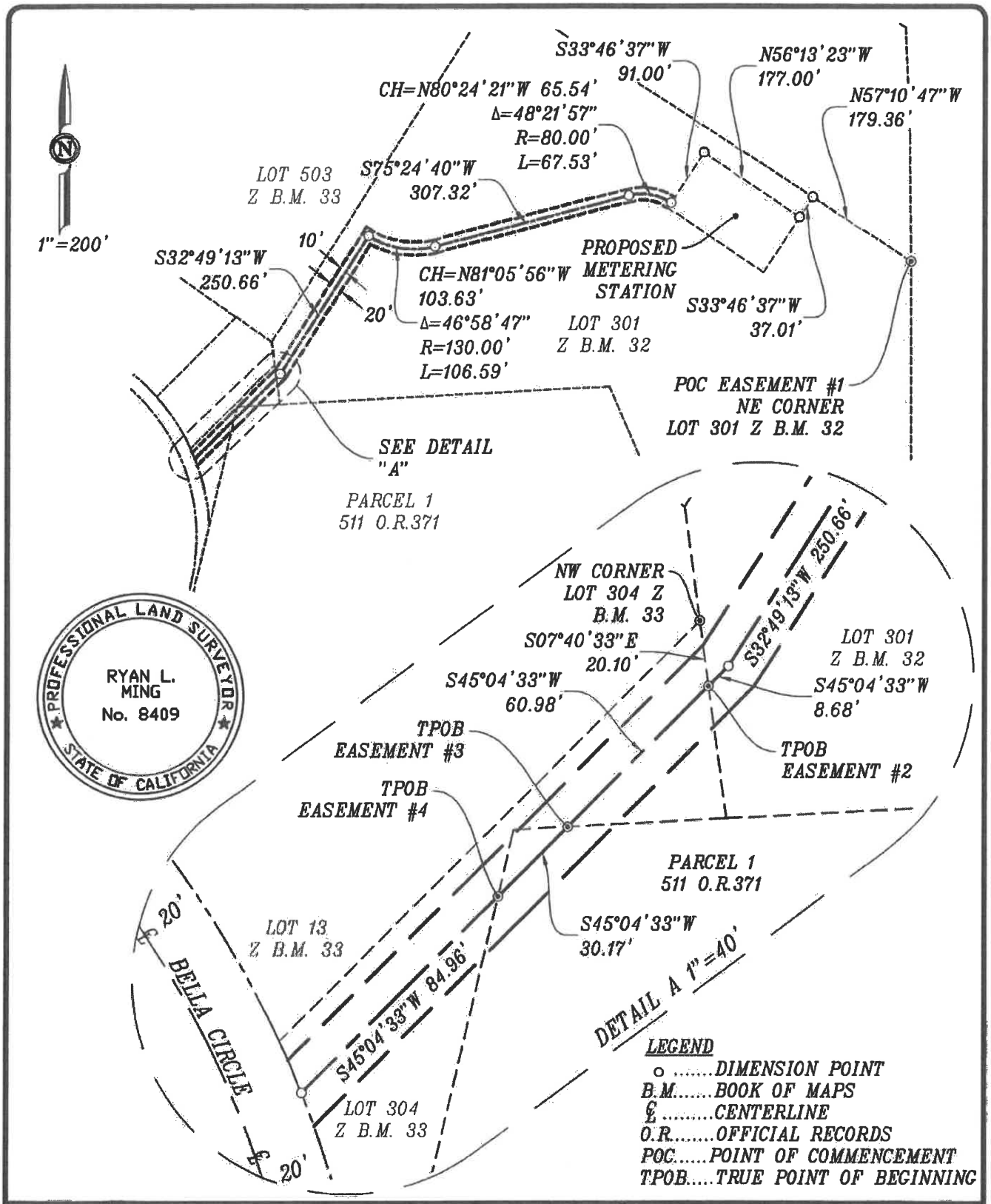
The Basis of Bearings for this description is the Northerly line of said lot 301 North 57°10'47" East as shown on the "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Official Records

End of description

This description has been prepared by me or under my direct supervision in conformance with the Professional Land Surveyor's Act.

Ryan L. Ming P.L.S. 8409

2/14/23
Date



SHEET 1 OF 1

EXHIBIT B

PUBLIC UTILITY EASEMENT
PORTION OF LOT 301 Z B.M. 32, LOT 304 & PARCEL 1 511 O.R. 371
AS SHOWN ON "VERDERA VILLAGE 18" Z B.M. 33
CITY OF LINCOLN COUNTY OF PLACER STATE OF CALIFORNIA

UNICO ENGINEERING
110 BLUE RAVINE RD SUITE 101 | FOLSOM, CA 95630
PHONE: 916.900.6623 | unicoengineering.com

RECORDING REQUEST BY

Placer County Water Agency
No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T. 12N., R. 07E., SEC. 30, NE1/4
A.P. No: 337-012-005-000, 337-012-008-000 and 337-012-001-000 Project Type: treated
Project: FA2521 – Lincoln/Penryn Phase 3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11911

GRANT DEED

FOR VALUABLE CONSIDERATION, the **City of Lincoln, a municipal corporation** (hereinafter GRANTOR) hereby grants to **Placer County Water Agency** (hereinafter AGENCY), in fee simple title, all that certain real property situated in the City of Lincoln, County of Placer, State of California, described as follows:

See attached legal description marked as Exhibit "A"
and corresponding plat map marked as Exhibit "B"

In the event of any conflict between the PROPERTY, as described in Exhibit "A", and the PROPERTY as depicted in Exhibit "B", the description of the PROPERTY in Exhibit "A" controls.

GRANTOR also grants to AGENCY a non-exclusive easement for ingress to and egress from the PROPERTY over and across all that certain real property owned by GRANTOR described as follows: Lot 301 and Lot 503 of the Final Map No. 2003-156 Verdera Large Lot Subdivision, recorded on September 22, 2003, in Book Z of Maps, Page 032, Placer County Official Records; and over and across that certain parcel identified as Parcel 1 in the Grant Deed recorded on November 21, 1947, in Book 511 at Page 371, Placer County Official Records.

The above-described easement for ingress to and egress from the PROPERTY is limited to the most reasonable route required by AGENCY to access the PROPERTY.

City of Lincoln, a Municipal Corporation

By: _____ 6/27/23
Sean Scully Date
City Manager

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency)

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 before me, Gwen Scanlon, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Sean Scully
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Grant Deed COL to PCWA APN's 337-012-005, -008 & -001
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'

A portion of Lot 301 as shown on "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records, located in Section 30, Township 12 North, Range 7 East, M.D.M., City of Lincoln, Placer County, California, described as follows:

Beginning at a point from which the Northeast corner of said Lot 301 bears the following two (2) courses:

1) North 33°46'37" East 37.01 feet to the North line of said Lot 301,
2) Along said North line, South 57°10'47" East 179.36 feet,

Thence, from Said Point of Beginning, South 33°46'37" West 101.00 feet;

Thence, North 56°13'23" West 177.00 feet;

Thence, North 33°46'37" East 101.00 feet;

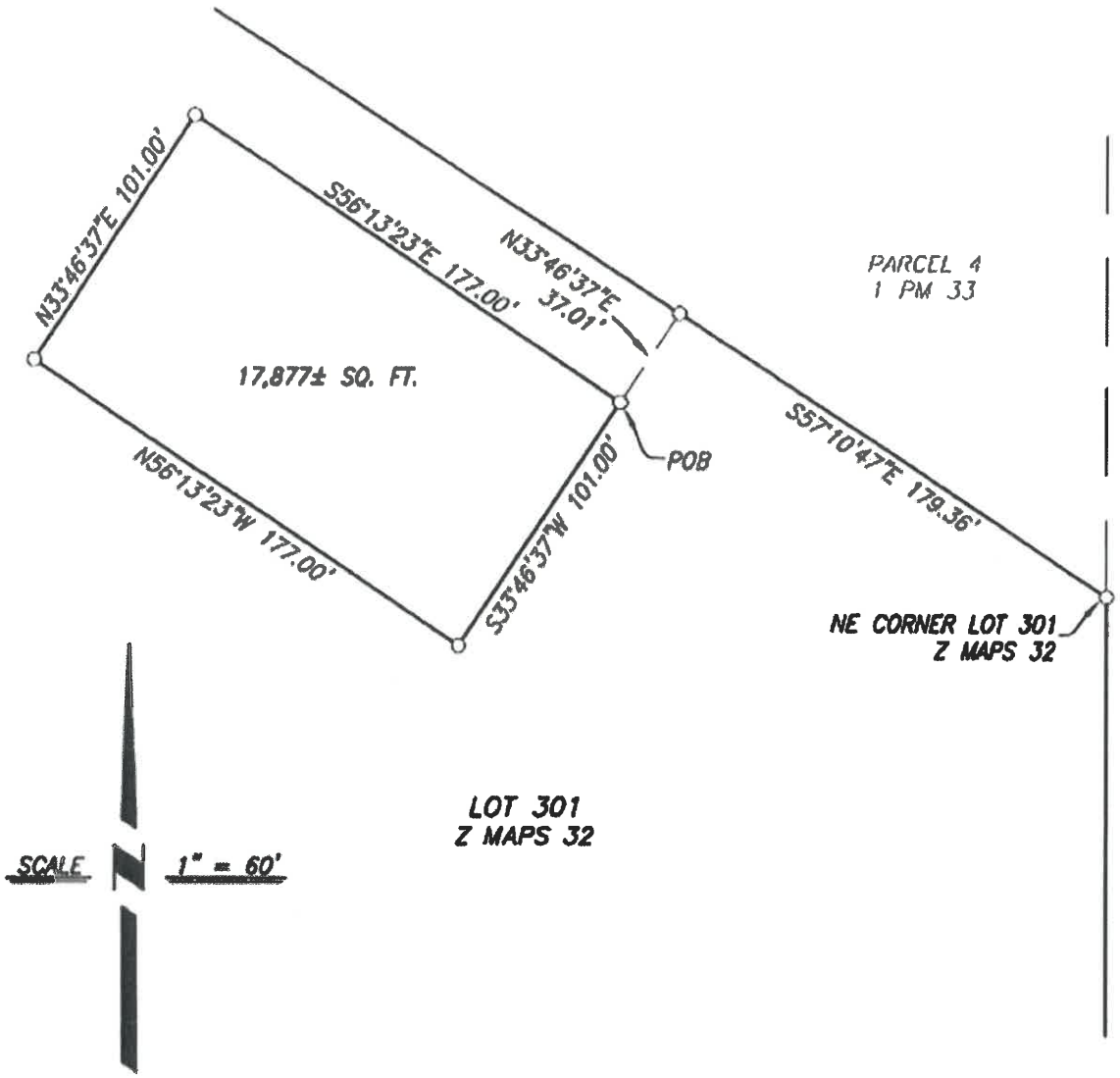
Thence, South 56°13'23" East 177.00 feet to the Point of Beginning.

Containing 17,877 square feet, more or less.

The Basis of Bearings of this description is "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records.

3/22/19

Exhibit 'B'



A PORTION OF LOT 301, Z B.M. 32
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
EXP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Pleasant Grove Blvd Suite 130 · Roseville, CA · 95678
Phone 916-773-4008 Fax 916-773-4496

DRAWN BY:	BB
CHECKED BY:	MH
SHEET:	1 OF 2
DATE:	03-22-19

FILE: K:\11.5600\SURVEY\EASEMENT 5.dwg

RECORDING REQUEST BY

City of Lincoln

No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

City of Lincoln City Clerk
600 6th Street
Lincoln, CA 95648

This space for recorder's use only

For internal use only:
T.___N.,R.___E.SEC.___,___1/4
A.P. No: 337-012-007
Project: Verdera 5MG Water Tank #3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11922

GRANT OF ACCESS AND PIPELINE EASEMENT

FOR VALUABLE CONSIDERATION, **VERDERA COMMUNITY ASSOCIATION** (hereinafter called "GRANTOR") hereby grants to the **City of Lincoln, a Municipal Corporation** (hereinafter "CITY") a non-exclusive permanent easement for the purpose of ingress and egress to adjoining lands across GRANTOR'S property, described as Lot 502 of the Verdera Large Lot Subdivision, as recorded in Book Z of Maps, at Page 032, by existing roads and lanes thereon, or if at any time no such roads or lanes exist, then over such route as shall be most convenient to second party doing as little damage to said premises as practicable, pursuant to the purpose of the right granted.

Additionally, GRANTOR grants herein a non-exclusive easement to construct, reconstruct, maintain, repair, replace and operate any size water pipeline or pipelines, conduits, above and below ground appurtenant facilities, including but not limited to metering equipment, water sampling stations, gate valves, air valves, and blow-off valves. Said easement shall be in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B, the description in Exhibit "A" controls.

GRANTOR further grants to CITY:

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof;

(b) the right from time to time to trim and to cut down and clear away any and all trees, stumps, and brush now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the CITY'S rights hereunder; provided, however, that all trees which the CITY is hereby authorized to cut and remove, if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be removed by the CITY;

(c) the right to install, maintain, and use gates in all fences which cross or inhibit access to the easement area and the right to install City locks on existing or future gates installed in any such fences; and

(d) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground.

Any damages caused by CITY on GRANTOR'S property, including damage to paved surfaces, shall be repaired and restored by CITY to GRANTOR'S satisfaction at CITY'S sole expense.

Any work performed by CITY on GRANTOR'S property, is at CITY'S sole expense. CITY shall provide written notification to GRANTOR at least 48-hours in advance of any proposed work on GRANTOR'S property.

INDEMNITY

The CITY hereby covenants and agrees to indemnify and hold harmless the GRANTOR from and against any and all claims, demands, causes of action, damages, losses and liabilities of every kind and nature whatsoever arising out of or in connection with the issuance of this Grant of Easement, as granted to the CITY or by any wrongful or negligent act or omission of the CITY or of its agents or employees in the course of their employment.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

Tony P. Manning

Name Tony Manning
President, Verdera Community Association

06·03·2022

Date

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the City and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On June 3, 2022 before me, Odilia Anne Gix, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Tony Manning
Name(s) of Signer(s)

,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ODILIA ANNE GIX
Notary Public - California
Placer County
Commission # 2360640
My Comm. Expires Jun 9, 2025

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Odilia A. Gix

Place Notary Seal and/or Stamp Above *Signature of Notary Public*

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement Verdera HOA

Document Date: _____ Number of Pages: 4

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'
40' Pipeline Easement

A portion of Lot 502 as shown on "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records, located in Section 30, Township 12 North, Range 7 East, M.D.M., Placer County, California, described as follows:

A 40' wide strip of land, the centerline of which is described as follows:

Beginning at a point on the East line of said Lot 502, from which the Northeast corner thereof bears North 02°21'36" West 141.95 feet; thence, from the Point of Beginning, along the following five (5) courses:

1) South 88°07'54" West 8.06 feet,
2) South 80°22'36" West 20.00 feet to the beginning of a 650.00 foot radius tangent curve to the left,
3) Along said curve through a central angle of 27°51'44" a distance of 316.09 feet,
4) South 52°30'52" West 97.02 feet;
5) North 82°29'08" West 132.26 feet to a point on the Northwest line of said Lot 502.

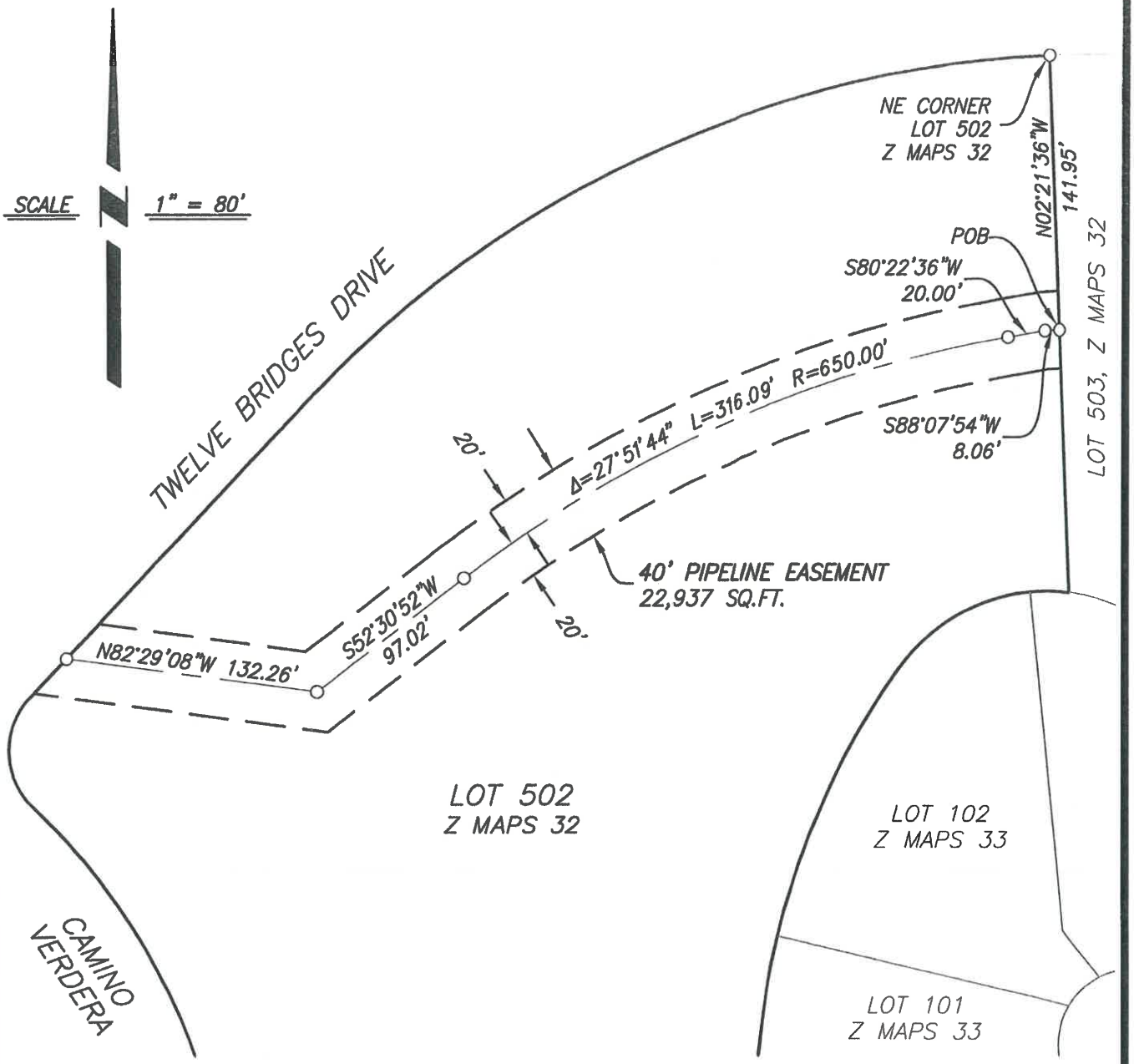
The sidelines of the above described strip of land to be lengthened or shortened so as to terminate at the boundary of said lot 502.

Containing 22,937 square feet, more or less.

The Basis of Bearings of this description is "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records.

6/30/2020

Exhibit 'B'



40' PIPELINE EASEMENT
LOT 502, Z B.M. 32
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
EXP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Pleasant Grove Blvd. Suite 130 · Roseville, CA · 95678
Phone: 916-773-4006 Fax: 916-773-4498

DRAWN BY:	BB
CHECKED BY:	MH
SHEET:	1 OF 2
DATE:	06-30-20

FILE: K:\113600\SURVEY\WATERLINE ESMT LOT 502.dwg

City of Lincoln

CERTIFICATE OF ACCEPTANCE
GRANT OF ACCESS AND PIPELINE EASEMENT

Ref: APN 337-012-007

The City of Lincoln, a Municipal Corporation, hereby accepts the **GRANT OF ACCESS AND PIPELINE EASEMENT,** a non-exclusive permanent easement for the purpose of ingress and egress to adjoining lands across property owned by **VERDERA COMMUNITY ASSOCIATION**, described as Lot 502 of the Verdera Large Lot Subdivision, as recorded in Book Z of Maps, at Page 032, in the County of Placer, State of California, as further described in that certain document entitled **GRANT OF ACCESS AND PIPELINE EASEMENT** consisting of the preceding five pages (attached), signed by Verdera Community Association President Tony Manning and dated 06-03-2022.

City Clerks Statement:

I herby certify that Resolution No. 2023-044 was adopted on the 14th day of March, 2023, by the City Council, City of Lincoln, authorizing the City Manager to accept the GRANT OF ACCESS AND PIPELINE EASEMENT on behalf of the City and is attached hereto.

6/27/2023 _____ Gwen Scanlon _____

Date Gwen Scanlon, City Clerk, City of Lincoln

Certificate of Acceptance:

This is to certify that the interest in real property conveyed to the City of Lincoln, a Municipal Corporation, by the within instrument, the provisions of which are incorporated by the attached document as though fully set forth in this certification, is hereby accepted by the undersigned office, on behalf of the City pursuant to the authority conferred by the City of Lincoln City Council Resolution No. 2023-044, and the City consents to recordation thereof by its duly authorized officer.

6/29/23 _____ _____

Date Sean Scully, City Manager, City of Lincoln

See following page for Acknowledgement

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 before me, Gwen Scanlon, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Sean Scully,
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon

Place Notary Seal and/or Stamp Above *Signature of Notary Public*

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Cert. of Acceptance Vedera HOA to COL Grant of Access & Pipeline Easement

Document Date: APN# 337-012-007 Number of Pages:

Signer(s) Other Than Named Above:

Capacity(ies) Claimed by Signer(s)

Signer's Name:	Signer's Name:
☐ Corporate Officer – Title(s):	☐ Corporate Officer – Title(s):
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other:	☐ Other:
Signer is Representing:	Signer is Representing:

RECORDING REQUEST BY

Placer County Water Agency

No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T.___N.,R.___E.SEC.___,___1/4
A.P. No: 337-012-007 project type: treated
Project: Lincoln Metering Station #2

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11922

GRANT OF EASEMENT FOR INGRESS AND EGRESS

FOR VALUABLE CONSIDERATION, **VERDERA COMMUNITY ASSOCIATION** (hereinafter called "GRANTOR") hereby grants to the **Placer County Water Agency, a public body,** (hereinafter called "AGENCY"), a non-exclusive permanent easement for purposes of ingress and egress over and across, that certain parcel of land described as Lot 502 of the Verdera Large Lot Subdivision, as recorded in Book Z of Maps, at Page 032, by means existing roads and lanes thereon, or if at any time no such roads or lanes exist, then over such route as shall be most convenient to second party doing as little damage to said premises as practicable, pursuant to the purpose of the right granted.

GRANTOR further grants to the AGENCY:

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof;

(b) the right from time to time to trim and to cut down and clear away any and all trees, stumps, and brush now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove,

if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be chipped, or removed at the discretion of the AGENCY; and

(c) the right to install, maintain, and use gates in all fences which cross or inhibit access to the easement area and the right to install AGENCY locks on existing or future gates installed in any such fences.

Any damages caused by AGENCY on GRANTOR'S property, including damage to paved surfaces, shall be repaired and restored by AGENCY to GRANTOR'S satisfaction at AGENCY'S sole expense.

Any work performed by AGENCY on GRANTOR'S property, is at AGENCY'S sole expense. AGENCY shall provide written notification to GRANTOR at least 48-hours in advance of any proposed work on GRANTOR'S property.

INDEMNITY

The AGENCY hereby covenants and agrees to indemnify and hold harmless the GRANTOR from and against any and all claims, demands, causes of action, damages, losses and liabilities of every kind and nature whatsoever arising out of or in connection with the issuance of this Grant of Easement for Ingress and Egress, as granted to the AGENCY or by any wrongful or negligent act or omission of the AGENCY or of its agents or employees in the course of their employment.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

Tony L. Manning — 06·03·2022

Name Tony Manning — Date

President, Verdera Community Association

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On June 3, 2022 before me, Odilia Anne Gix, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Tony Manning
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

ODILIA ANNE GIX
Notary Public - California
Placer County
Commission # 2360640
My Comm. Expires Jun 9, 2025

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Odilia A. Gix
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement Verdera HOA

Document Date: 6/3/2022 Number of Pages: 2

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

RECORDING REQUEST BY AND
FOR THE BENEFIT OF

Placer County Water Agency

No fee required, pursuant to Gov't
Code § 27383.

AND WHEN RECORDED MAIL TO
Placer County Water Agency
Attn: Real Property Program Manager
P.O. Box 6570
Auburn, CA 95604

For internal use only: SPACE ABOVE FOR RECORDER'S USE ONLY
T12N, R07E, SEC. 29 SW ¼ & SEC 30 SE ¼
Facility Name: Caperton Canal; Spill No.
APN: 337-012-017 Project Type: Raw
Project No. and Name:

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D) Transfer to Government Agency
The undersigned grantor(s) declare(s)
Documentary transfer tax is $0 per R&T Code § 11922

[X] computed on full value of property conveyed, or
[ ] computed on full value less value of liens or encumbrances remaining at time of sale
[ ] Unincorporated Area of [X] City of Lincoln

Declared by: _____

GRANT OF EASEMENT FOR SPILL

FOR VALUABLE CONSIDERATION, **the CITY OF LINCOLN** (hereinafter called "GRANTOR") hereby grant (s) to **PLACER COUNTY WATER AGENCY**, a public body, (hereinafter called "AGENCY") its successors and assigns an exclusive easement in, on, over, under, and across that certain real property in the County of Placer, State of California, described in the grant deed recorded as Document No. 2010-0000486, Placer County Official Records (the "Property").

The easement granted herein is a right-of-way to conduct spill flows, consistent with historic use in terms of both flow rate and total volume, from the Caperton Canal across the Property. Such spills shall be released by the AGENCY at AGENCY Canal Station 505+26 and travel downhill in a generally westerly direction.

GRANTOR further grants to the AGENCY the right of ingress to and egress from the easement area over and across the Property by means of roads and lanes thereon, if such there be, otherwise by such route or routes as shall cause the least practical damage and inconvenience to GRANTOR; provided, further, that if any portion of such land is or shall be subdivided and dedicated roads or

highways on such portion shall extend to the easement area, this right of ingress and egress on the Property shall be confined to such dedicated roads and highways.

GRANTOR reserves the right, at GRANTOR'S sole expense, to change the location at which the AGENCY releases the spill water to a new location suitable for the GRANTOR'S convenience; provided that GRANTOR shall pay all expenses of the AGENCY resulting from such change in location. GRANTOR shall notify the AGENCY a minimum of thirty (30) business days in advance of any such planned change to the location of the spill to allow AGENCY to make the appropriate preparations.

GRANTOR further grants to AGENCY the following incidental rights:

(a) the right from time to time to trim and to cut down and clear away any and all trees, stumps, landscaping, and brush now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all wood from all trees which the AGENCY is hereby authorized to cut and remove shall continue to be the property of GRANTOR, but all tops, lops, brush, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(b) the right to install, maintain, and use gates in all fences which cross or inhibit access to the easement area and the right to install Agency locks on existing or future gates installed in any such fences;

(c) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground; and

(d) the right to line, seal, patch, or replace pipelines and other facilities, installed in the easement area.

INDEMNITY

The AGENCY hereby covenants and agrees to indemnify and hold harmless the GRANTOR from and against any and all claims, demands, causes of action, damages, losses and liabilities of every kind and nature whatsoever arising out of or in connection with the issuance of this Grant of Easement, as granted to the AGENCY or by any wrongful or negligent act or omission of the AGENCY or of its agents or employees in the course of their employment.

ENCROACHMENT

Subject to application for and receipt of an encroachment permit from the AGENCY, GRANTOR reserves the right to use the easement area for purposes which will not interfere with the AGENCY'S full enjoyment of the rights herein granted; provided, that GRANTOR shall not obstruct the easement area nor modify the course of the natural flow.

GRANTOR:

CITY OF LINCOLN

By: _____

Print Name: Sean Scully

Title: City Manager, City of Lincoln

Date: 6/27/23

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 *Date* before me, Gwen Scanlon, Notary Public *Here Insert Name and Title of the Officer*,

personally appeared Sean Scully *Name(s) of Signer(s)*,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement for Spill Ctl to PCWA Apn# 337-012-017

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

RECORDING REQUEST BY

Placer County Water Agency
No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T. 12N., R. 07E., SEC. 29, NW/4
A.P. No: 032-020-053-000 project type: treated & raw
Project: FA2521 – Lincoln/Penryn Phase 3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11911

GRANT OF EASEMENT

FOR VALUABLE CONSIDERATION, **City of Lincoln, a Municipal Corporation** (hereinafter called "GRANTOR") hereby grants to the **Placer County Water Agency**, a public body, (hereinafter called "AGENCY") a non-exclusive, permanent easement in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B", the description in Exhibit "A" controls.

The easement granted herein is a right-of-way to construct, reconstruct, maintain, repair, replace and operate any size water pipeline or pipelines, conduits, lined or unlined canals, open ditches, flumes, and above and below ground appurtenant facilities, including but not limited to metering devices, water sampling stations, gate valves, electrical/electronic equipment including poles, antennae, solar panels, fiber optic conduits, and electrical cabinets, and equipment necessary to convey and/or meter water and the right to convert said ditch or flume to pipeline.

GRANTOR further grants to the AGENCY

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof;

(b) the right of ingress and egress over and across GRANTOR'S remaining lands as described in that certain document, recorded on September 20, 2017, in document number 2017-0072626 Official Records of Placer County, by means of roads and

lanes thereon, if such there be, otherwise by such route or routes as shall cause the least practical damage and inconvenience to GRANTOR; provided further, that if any portion of Grantor's land is or shall be subdivided and dedicated roads or highways on such portion shall extend to the easement area, this right of ingress and egress on GRANTOR'S remaining land shall be confined to such dedicated roads and highways thence along and adjacent to said easement;

(c) the right from time to time to trim and to cut down and clear away any and all trees, stumps, brush and landscaping now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(d) the right to install, maintain, and use gates in all fences which inhibit access to the easement area and the right to install Agency locks on such existing or future gates;

(e) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground; and

(f) the right to limit or prohibit access to the easement area during construction or repair of the facilities within the easement. AGENCY shall endeavor to keep any such disruptions to the shortest time reasonably necessary to complete such construction or repairs; and

(g) the right to line, seal, patch, or replace pipelines, canals, ditches, conduits and other facilities, installed in the easement area.

ENCROACHMENT BY GRANTOR

Subject to all of the rights and easements granted to AGENCY herein, GRANTOR reserves the right to use the easement area; provided, that GRANTOR shall not erect or construct any building or other structure in the easement area or cut and/or fill over any AGENCY pipeline, or appurtenant facilities in the easement area or drill or operate any well, or drill any holes for fence posts or other structures, or construct any reservoir or other obstruction in the easement area, or diminish or substantially add to the ground cover over the easement area, or otherwise use the easement area in any way that interferes with AGENCY's full enjoyment and use thereof. If issued an encroachment permit by the AGENCY, GRANTOR may construct fences within or crossing the easement, provided that GRANTOR shall provide a gate or gates of sufficient width to allow ingress and egress to the easement by the AGENCY for personnel, trucks and equipment and a means for AGENCY to install its own lock on any such gates.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

GRANTOR
City of Lincoln, a Municipal Corporation

By: _____ 6/27/23
Sean Scully
City Manager
Date

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 (Date) before me, Gwen Scanlon, Notary Public, (Here Insert Name and Title of the Officer)

personally appeared Sean Scully (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon

Place Notary Seal and/or Stamp Above

Signature of Notary Public

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement COL to PCWA Apn # 032-020-053

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'
Pipeline and Canal Easement

All that land described in the Grant Deed to the City of Lincoln recorded September 20, 2017 as Document No. 2017-0072626, Placer County Records, being located in Section 29, Township 12 North, Range 7 East, M.D.M.

3/22/19

RECORDING REQUEST BY

Placer County Water Agency
No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T. 12N., R. 07E., SEC. 30, NE1/4
A.P. No: 337-012-005-000 project type: treated
Project: FA2521 – Lincoln/Penryn Phase 3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11911

GRANT OF EASEMENT

FOR VALUABLE CONSIDERATION, **City of Lincoln, a Municipal Corporation** (hereinafter called "GRANTOR") hereby grants to the **Placer County Water Agency**, a public body, (hereinafter called "AGENCY") a non-exclusive, permanent easement in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B", the description in Exhibit "A" controls.

The easement granted herein is a right-of-way to construct, reconstruct, maintain, repair, replace and operate any size water pipeline or pipelines, conduits, and above and below ground appurtenant facilities, including but not limited to metering devices, gate valves, electrical/electronic equipment and fiber optic conduits, as necessary to convey, monitor, and/or meter water.

GRANTOR further grants to the AGENCY:

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof; and surface the area if required to prevent erosion and/or ensure safe passage.

(b) the right of ingress and egress over and across GRANTOR'S remaining lands as described in that certain document, recorded on August 05, 2008, in document number 2008-0063334 Official Records of Placer County, by means of roads and lanes thereon, if such there be, otherwise by such route or routes as shall cause the least practical damage and inconvenience to GRANTOR; provided further, that if any portion of Grantor's land is or shall be subdivided and dedicated roads or highways on such portion shall extend to the easement area, this right of ingress and egress on GRANTOR'S remaining land shall be confined to such dedicated roads and highways;

(c) the right from time to time to trim and to cut down and clear away any and all trees, stumps, brush and landscaping now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove, if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(d) the right to install, maintain, and use gates in all fences which inhibit access to the easement area and the right to install Agency locks on such existing or future gates;

(e) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground; and

(f) the right to line, seal, patch, or replace pipelines, canals, ditches, conduits and other facilities, installed in the easement area.

ENCROACHMENT BY GRANTOR

Subject to all of the rights and easements granted to AGENCY herein, GRANTOR reserves the right to use the easement area; provided, that GRANTOR shall not erect or construct any building or other structure in the easement area or cut and/or fill over any AGENCY pipeline, or appurtenant facilities in the easement area or drill or operate any well, or drill any holes for fence posts or other structures, or construct any reservoir or other obstruction in the easement area, or diminish or substantially add to the ground cover over the easement area, or otherwise use the easement area in any way that interferes with AGENCY's full enjoyment and use thereof. If issued an encroachment permit by the AGENCY, GRANTOR may construct fences within or crossing the easement, provided that GRANTOR shall provide a gate or gates of sufficient width to allow ingress and egress to the easement by the AGENCY for personnel, trucks and equipment and a means for AGENCY to install its own lock on any such gates.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

GRANTOR
City of Lincoln, a Municipal Corporation

By: _____ Date 6/27/13
Sean Scully
City Manager

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 before me, Gwen Scanlon, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Sean Scully
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement COL to PCWA Apn # 337-012-005

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'
Pipeline Easement

A portion of Lot 301 as shown on "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records, located in Section 30, Township 12 North, Range 7 East, M.D.M., City of Lincoln, Placer County, California, described as follows:

Beginning at the Southeast corner of said Lot 301; Thence, from the Point of Beginning, along the South line of said Lot 301, being an 800.00 foot radius curve to the left, from a radial bearing of South 48°04'01" West, through a central angle of 05°01'10" a distance of 70.08 feet;

Thence, leaving said South line along the follow twenty-seven (27) courses:

1) North 45°01'37" East 12.84 feet to a point which is 40.00 feet West of the East line of said Lot 301,
2) North 00°01'37" East 472.95 feet,
3) North 22°28'23" West 70.24 feet to the beginning of an 80.00 foot radius tangent curve to the left,
4) Along said curve, through a central angle of 22°30'00" a distance of 31.42 feet,
5) North 44°58'23" West 48.69 feet to the beginning of a 120.00 foot radius tangent curve to the right,
6) Along said curve, through a central angle of 22°30'00" a distance of 47.12 feet,
7) North 22°28'23" West 34.08 feet to the beginning of a 120.00 foot radius tangent curve to the right,
8) Along said curve, through a central angle of 22°30'00 a distance of 47.12 feet,
9) North 00°01'37" East 93.54 feet to the beginning of a 70.00 foot radius tangent curve to the right,
10) Along said curve, through a central angle of 22°30'00" a distance of 27.49 feet,
11) North 22°31'37" East 19.31 feet to the beginning of a 30.00 foot radius tangent curve to the left,
12) Along said curve, through a central angle of 22°30'00" a distance of 11.78 feet,
13) North 00°01'37" East 78.06 feet,
14) North 56°13'23" West 90.93 feet to a point from which the Northeast corner of said Lot 301 bears North 33°46'37" East 138.01 feet and South 57°10'47" East 179.36 feet;
15) North 33°46'37" East 60.00 feet,
16) South 56°13'23" East 98.95 feet,
17) South 00°01'37" West 123.49 feet to the beginning of a 70.00 foot radius curve to the right,
18) Along said curve, through a central angle of 22°30'00" a distance of 27.49 feet,
19) South 22°31'37" West 19.31 feet to the beginning of a 30.00 foot radius curve to the left,
20) Along said curve, through a central angle of 22°30'00" a distance of 11.78 feet,
21) South 00°01'37" West 93.54 feet to the beginning of an 80.00 foot radius tangent curve to the left,
22) Along said curve, through a central angle of 22°30'00" a distance of 31.42 feet,
23) South 22°28'23" East 34.08 feet to the beginning of an 80.00 foot radius tangent curve to the left,
24) Along said curve, through a central angle of 22°30'00" a distance of 31.42 feet,
25) South 44°58'23" East 48.69 feet to the beginning of a 120.00 foot radius tangent curve to the right,
26) Along said curve, through a central angle of 22°30'00" a distance of 47.12 feet,

27) South 22°28'23" East 78.20 feet to the East line of said Lot 301,

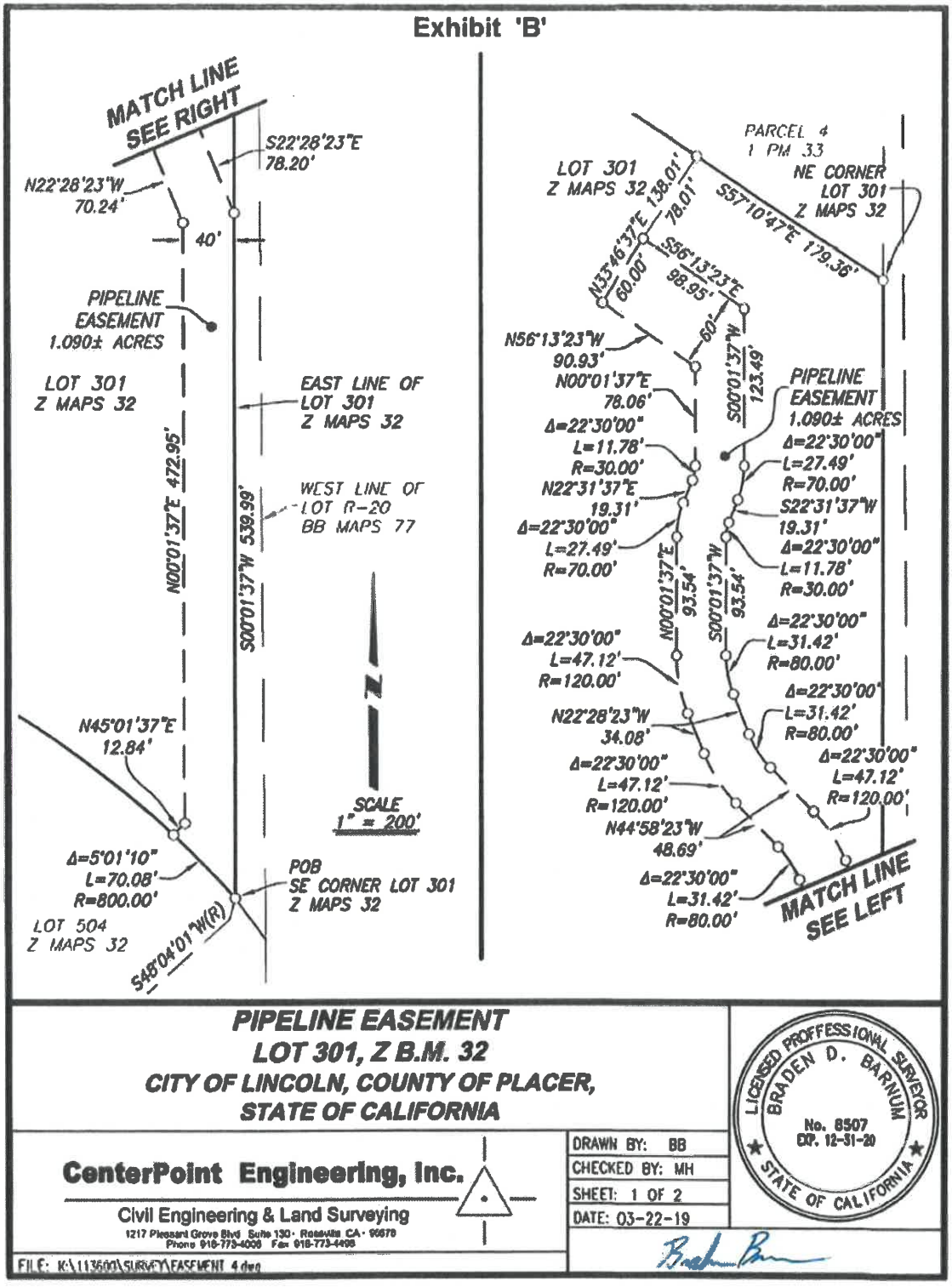
Thence, along said East line of Lot 301, South 00°01'37" West 539.99 feet to the Point of Beginning.

Containing 1.090 acres, more or less.

The Basis of Bearings of this description "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records.

3/22/19

Water Esmt Lot 301



Water Esmt Lot 301

RECORDING REQUEST BY

Placer County Water Agency
No fee required, pursuant to Gov't
Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T. 12N., R. 07E., SEC. 29 SW/4 and SEC. 30 E/2
A.P. No: 337-012-017-000 project type: treated
Project: FA2521 – Lincoln/Penryn Phase 3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11911

GRANT OF EASEMENT

FOR VALUABLE CONSIDERATION, **City of Lincoln, a Municipal Corporation** (hereinafter called "GRANTOR") hereby grants to the **Placer County Water Agency**, a public body, (hereinafter called "AGENCY") a non-exclusive, permanent easement in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B", the description in Exhibit "A" controls.

The easement granted herein is a right-of-way to construct, reconstruct, maintain, repair, replace and operate any size water pipeline or pipelines, conduits, and above and below ground appurtenant facilities, including but not limited to metering devices, gate valves, electrical/electronic equipment and fiber optic conduits, as necessary to convey, monitor, and/or meter water.

GRANTOR further grants to the AGENCY:

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof; and surface the area if required to prevent erosion and/or ensure safe passage.

(b) the right of ingress and egress over and across GRANTOR'S remaining lands as described in that certain document, recorded on January 5, 2010, in document number 2010-0000486 Official Records of Placer County, by means of roads and lanes thereon, if such there be, otherwise by such route or routes as shall cause the least practical damage and inconvenience to GRANTOR; provided further, that if any portion of Grantor's land is or shall be subdivided and dedicated roads or highways on such portion shall extend to the easement area, this right of ingress and egress on GRANTOR'S remaining land shall be confined to such dedicated roads and highways;

(c) the right from time to time to trim and to cut down and clear away any and all trees, stumps, brush and landscaping now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove, if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(d) the right to install, maintain, and use gates in all fences which inhibit access to the easement area and the right to install Agency locks on such existing or future gates;

(e) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground; and

(f) the right to line, seal, patch, or replace pipelines, canals, ditches, conduits and other facilities, installed in the easement area.

ENCROACHMENT BY GRANTOR

Subject to all of the rights and easements granted to AGENCY herein, GRANTOR reserves the right to use the easement area; provided, that GRANTOR shall not erect or construct any building or other structure in the easement area or cut and/or fill over any AGENCY pipeline, or appurtenant facilities in the easement area or drill or operate any well, or drill any holes for fence posts or other structures, or construct any reservoir or other obstruction in the easement area, or diminish or substantially add to the ground cover over the easement area, or otherwise use the easement area in any way that interferes with AGENCY's full enjoyment and use thereof. If issued an encroachment permit by the AGENCY, GRANTOR may construct fences within or crossing the easement, provided that GRANTOR shall provide a gate or gates of sufficient width to allow ingress and egress to the easement by the AGENCY for personnel, trucks and equipment and a means for AGENCY to install its own lock on any such gates.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

GRANTOR
City of Lincoln, a Municipal Corporation

By: _____ Date 6/29/23
Sean Scully
City Manager

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency)

CALIFORNIA ACKNOWLEDGMENT CIVIL CODE § 1189

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 (Date) before me, Gwen Scanlon, Notary Public, (Here Insert Name and Title of the Officer)

personally appeared Sean Scully (Name(s) of Signer(s))

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: Grant of Easement COL to PCWA Apn # 337-012-017

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'
Pipeline Easement

A portion of Lot 504 as shown on "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records, located in Section 30 and Section 29, Township 12 North, Range 7 East, M.D.M , Placer County, California, described as follows:

Pipeline Easement #1

Beginning at the Southeast corner of said Lot 504, also being the Northeast corner of the parcel described in the Grant Deed to Placer County Water Agency recorded in Book 1655 at Page 356, Placer County Records; Thence, from the Point of Beginning, along the South line of said Lot 504, South 55°36'28" West 395.18 feet;

Thence, leaving said south line along the follow nineteen (19) courses:

1) North 40°17'40" East 251.03 feet,
2) North 85°17'40" East 70.30 feet,
3) North 40°17'40" East 15.83 feet,
4) North 29°02'40" East 158.33 feet to the beginning of a 1020.00 foot radius tangent curve to the right,
5) Along said curve, through a central angle of 4°27'39" a distance of 79.41 feet,
6) North 33°30'19" East 264.56 feet to the beginning of a 530.00 foot radius tangent curve to the left,
7) Along said curve, through a central angle of 29°07'49" a distance of 269.46 feet,
8) North 04°22'30" East 2.75 feet to the beginning of an 180.00 foot radius tangent curve to the left,
9) Along said curve, through a central angle of 32°46'44" a distance of 102.98 feet,
10) North 28°24'14" West 271.79 feet,
11) North 33°40'06" West 150.56 feet,
12) North 07°37'48" West 58.28 feet,
13) North 02°09'48" East 84.68 feet,
14) North 36°54'50" East 209.23 feet,
15) North 26°24'25" East 85.50 feet,
16) North 11°57'36" East 90.14 feet,
17) North 01°01'01" East 64.56 feet,
18) North 23°09'48" West 127.21 feet,
19) North 36°20'06" West 111.91 feet to the East line of said Lot 504,

Thence, along said East line of Lot 504 the following fifteen (15) courses:

1) South 89°57'20" East 45.96 feet,
2) South 37°02'32" East 138.81 feet,
3) South 23°37'26" East 63.39 feet,
4) South 10°45'30" East 71.30 feet,
5) South 04°08'17" West 100.03 feet,
6) South 13°11'52" West 41.31 feet,
7) South 36°29'50" West 307.51 feet,
8) South 17°23'51" West 21.69 feet,
9) South 17°38'16" East 48.80 feet,
10) South 27°59'56" East 472.29 feet,
11) South 18°05'32" East 60.96 feet,
12) South 05°19'27" East 38.49 feet,
13) South 11°02'33" West 177.87 feet,

14) South 31°42'10" West 538.38 feet,
15) South 00°36'10" West 38.42 feet to the Point of Beginning.

Containing 2.580 Acres, more or less.

Pipeline Easement #2

Beginning at the Northeast corner of said Lot 504; Thence, from the Point of Beginning, along the East line of said Lot 504, South 00°22'52" East 63.03 feet;

Thence, leaving said East line the following three (3) courses:

1) North 36°20'06" West 22.61 feet,
2) North 32°29'07" West 110.60 feet,
3) North 00°01'37" East 33.68 feet to the North line of said Lot 504 being an 800.00 foot radius non-tangent curve to the right,

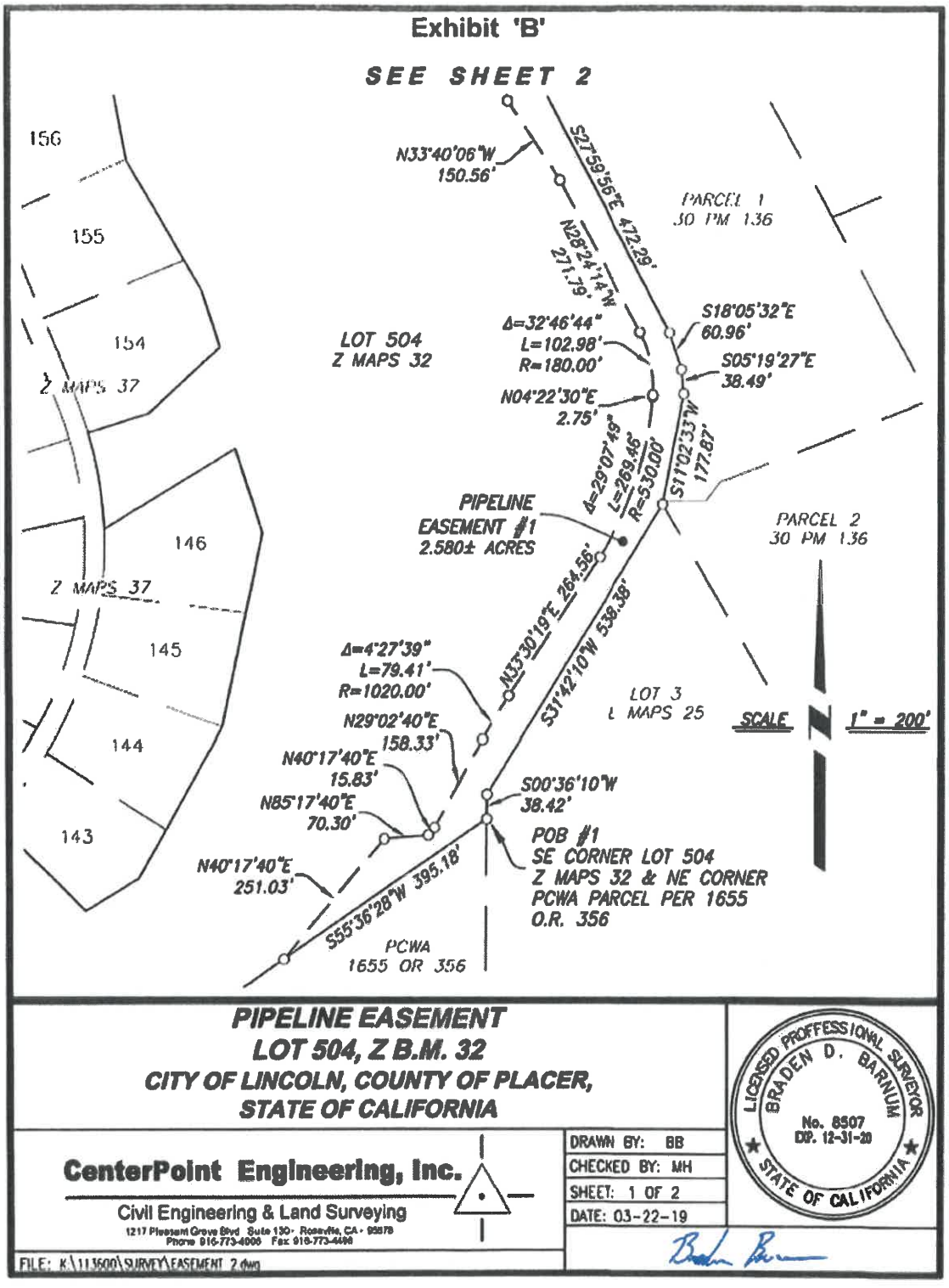
Thence, along said curve, from a radial bearing of South 43°09'41" West, through a central angle of 04°54'20" a distance of 68.49 feet;

Thence, South 36°21'57" East 41.27 feet to the Point of Beginning.

Containing 3,804 square feet, more or less.

The Basis of Bearings of this description is "Final Map No. 2003-156 Verdera Large Lot Subdivision" filed in Book Z of Maps at Page 32, Placer County Records.

3/22/19



Water Esmt Lot 504

RECORDING REQUEST BY

Placer County Water Agency
No fee required, pursuant to Gov't Code § 27383.

AND WHEN RECORDED MAIL TO

Placer County Water Agency
P.O. Box 6570
Auburn, CA 95604

This space for recorder's use only

For internal use only:
T. 12N., R. 07E., SEC. 31, NE1/4
A.P. No: 337-012-040-000 project type: treated
Project: FA2521 – Lincoln/Penryn Phase 3

Exempt from fee imposed by the building Homes & Jobs Act (SB2)(GC27388.1)
Reason for exemption: GC27388.1(D)
Documentary Transfer Tax: $0.00 Rev & Tax Code § 11911

GRANT OF EASEMENT

FOR VALUABLE CONSIDERATION, **City of Lincoln, a Municipal Corporation** (hereinafter called "GRANTOR") hereby grants to the **Placer County Water Agency**, a public body, (hereinafter called "AGENCY") a non-exclusive, permanent easement in, on, over, under, and across that certain real property in the County of Placer, State of California, described in Exhibit "A" attached hereto and incorporated herein by reference, and depicted on Exhibit "B", the map attached hereto showing the boundaries of the easement. In the event of any conflict between the description of the easement in Exhibit "A" and its depiction on Exhibit "B", the description in Exhibit "A" controls.

The easement granted herein is a right-of-way to construct, reconstruct, maintain, repair, replace and operate any size water pipeline or pipelines, conduits, and above and below ground appurtenant facilities, including but not limited to metering devices, gate valves, electrical/electronic equipment and fiber optic conduits, as necessary to convey, monitor, and/or meter water.

GRANTOR further grants to the AGENCY:

(a) the right to grade and travel upon for the purpose of patrolling and maintaining the easement area for the full width thereof; and surface the area if required to prevent erosion and/or ensure safe passage.

(b) the right of ingress and egress over and across GRANTOR'S remaining lands as described in that certain document, recorded on January 5, 2010, in document number 2010-0000486 Official Records of Placer County, by means of roads and lanes thereon, if such there be, otherwise by such route or routes as shall cause the least practical damage and inconvenience to GRANTOR; provided further, that if any portion of Grantor's land is or shall be subdivided and dedicated roads or highways on such portion shall extend to the easement area, this right of ingress and egress on GRANTOR'S remaining land shall be confined to such dedicated roads and highways;

(c) the right from time to time to trim and to cut down and clear away any and all trees, stumps, brush and landscaping now or hereafter in the easement area and to trim and cut down and clear away portions of any trees extending onto or over the easement area which may interfere with the exercise of the AGENCY'S rights hereunder; provided, however, that all trees which the AGENCY is hereby authorized to cut and remove, if valuable for timber or wood, shall continue to be the property of GRANTOR, but all tops, lops, brush, stumps, and refuse wood shall be burned, chipped, or removed at the discretion of the AGENCY;

(d) the right to install, maintain, and use gates in all fences which inhibit access to the easement area and the right to install Agency locks on such existing or future gates;

(e) the right to mark the location of pipelines and other underground facilities in the easement area by suitable markers set in the ground; and

(f) the right to line, seal, patch, or replace pipelines, canals, ditches, conduits and other facilities, installed in the easement area.

ENCROACHMENT BY GRANTOR

Subject to all of the rights and easements granted to AGENCY herein, GRANTOR reserves the right to use the easement area; provided, that GRANTOR shall not erect or construct any building or other structure in the easement area or cut and/or fill over any AGENCY pipeline, or appurtenant facilities in the easement area or drill or operate any well, or drill any holes for fence posts or other structures, or construct any reservoir or other obstruction in the easement area, or diminish or substantially add to the ground cover over the easement area, or otherwise use the easement area in any way that interferes with AGENCY's full enjoyment and use thereof. If issued an encroachment permit by the AGENCY, GRANTOR may construct fences within or crossing the easement, provided that GRANTOR shall provide a gate or gates of sufficient width to allow ingress and egress to the easement by the AGENCY for personnel, trucks and equipment and a means for AGENCY to install its own lock on any such gates.

ASSIGNMENT

The provisions hereof shall inure to the benefit of and bind the successors and assigns of the respective parties hereto, and all covenants shall apply to and run with the land.

GRANTOR

City of Lincoln, a Municipal Corporation

By: _____ Date 6/27/23

Sean Scully
City Manager

(Signature(s) must be acknowledged by a Notary Public)
(Document must be Accepted by the Agency and may be submitted to escrow)

CALIFORNIA ACKNOWLEDGMENT **CIVIL CODE § 1189**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Placer }

On 6/27/2023 before me, Gwen Scanlon, Notary Public,
Date *Here Insert Name and Title of the Officer*

personally appeared Sean Scully
Name(s) of Signer(s)

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

GWEN SCANLON
Notary Public - California
Placer County
Commission # 2403304
My Comm. Expires May 31, 2026

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Gwen Scanlon
Signature of Notary Public

Place Notary Seal and/or Stamp Above

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document
Title or Type of Document: Grant of Easement COL to PCWA Apn # 337-012-040
Document Date: _____ Number of Pages: _____
Signer(s) Other Than Named Above: _____

Capacity(ies) Claimed by Signer(s)

Signer's Name: _____	Signer's Name: _____
☐ Corporate Officer – Title(s): _____	☐ Corporate Officer – Title(s): _____
☐ Partner – ☐ Limited ☐ General	☐ Partner – ☐ Limited ☐ General
☐ Individual ☐ Attorney in Fact	☐ Individual ☐ Attorney in Fact
☐ Trustee ☐ Guardian or Conservator	☐ Trustee ☐ Guardian or Conservator
☐ Other: _____	☐ Other: _____
Signer is Representing: _____	Signer is Representing: _____

Exhibit 'A'
Pipeline Easement

A portion of Lot 512 as shown on "Final Map No. 2003-224 Verdera Village 13 - Phase 3" filed in Book Z of Maps, at Page 58, Placer County Records, located in Section 31, Township 12 North, Range 7 East, M.D.M., Placer County, California.

All that portion of said Lot 512 lying Northerly of the following described line:

Beginning at a Point on the East Line of Said Lot 512, from which the Southwest corner of Lot 1 as shown on "Tract No. 382 Clover Valley Ranch Unit No. 1", filed in Book L of Maps, at Page 25, Placer County Records, bears South 00°47'26" East 75.00 feet; said Point of Beginning is on the North line of the Water Pipeline Easement described Document No. 2000-0059691, Placer County Records;

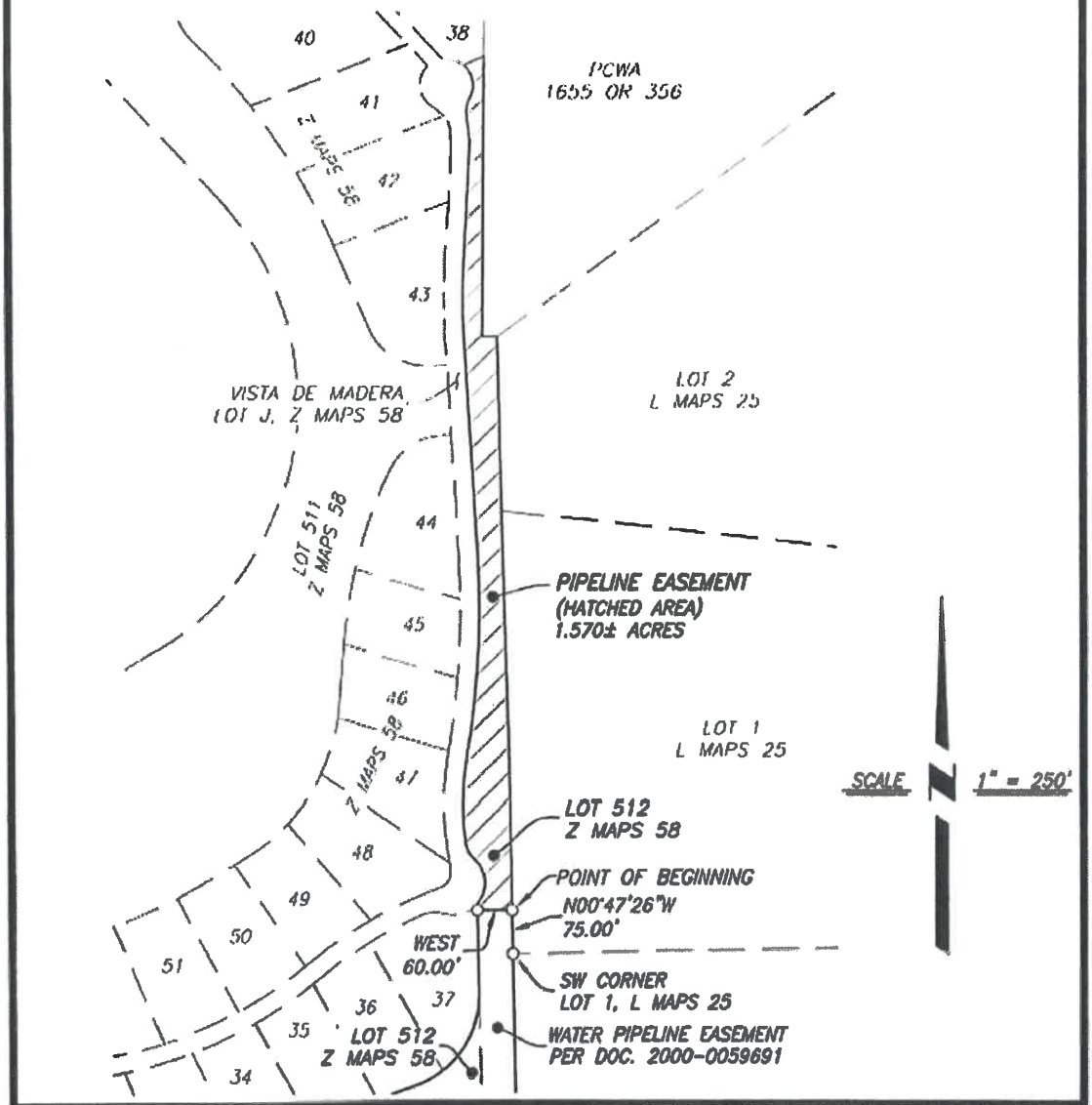
Thence, along the North line of said Water Pipeline Easement, West 60.00 feet to a point on the West line of said Lot 512.

Containing 1.570 Acres, more or less.

The Basis of Bearings of this description is "Final Map No. 2003-224 Verdera Village 13 - Phase 3" filed in Book Z of Maps, at Page 58, Placer County Records.

3/22/19

Exhibit 'B'



PIPELINE EASEMENT
LOT 512, Z B.M. 58
CITY OF LINCOLN, COUNTY OF PLACER, STATE OF CALIFORNIA

LICENSED PROFFESSIONAL SURVEYOR
BRADEN D. BARNUM
No. 8507
EXP. 12-31-20
STATE OF CALIFORNIA

CenterPoint Engineering, Inc.
Civil Engineering & Land Surveying
1217 Pleasant Grove Blvd Suite 130 · Roseville, CA · 95678
Phone: 916-773-4008 Fax 916-773-4498

DRAWN BY:	BB
CHECKED BY:	MH
SHEET:	1 OF 2
DATE:	03-22-19

FILE: K:\113600\SURVEY\EASEMENT 1.dwg

T12N, R07E, SEC 30 SE ¼ & SEC 31 NE ¼
APN: 032-010-020
WHITNEY RESERVOIR PARCEL

RIGHT OF ENTRY AGREEMENT
City of Lincoln Access Through PCWA's Whitney Reservoir Property
1275 Camino Verdera, Loomis, CA 95650

This Right of Entry Agreement (the "Right of Entry") is entered into by and between Placer County Water Agency ("Agency") and the City of Lincoln, a municipal corporation ("Lincoln"). For purposes of this Right of Entry, Lincoln includes its agents, employees, contractors, subcontractors and invitees. The parties agree as follows:

1. **Premises**: Agency grants Lincoln permission to enter its property located at 1275 Camino Verdera, Loomis, California, also identified as Placer County Assessor Parcel Number (APN) 032-010-020 (the "Premises"), for access purposes. Lincoln may access the Premises with Lincoln's vehicles, equipment and personnel for purposes of and relating to the operation and maintenance of Lincoln's facilities associated with the parties' Lincoln-Penryn Pipeline Phase III Project. The Premises is depicted on Exhibit "A", attached hereto and incorporated herein by reference.

2. **Description of Access Rights**: During the Term of this Right of Entry, Lincoln shall have the following rights to the Premises.

   a. For the purposes of this Right of Entry, Lincoln and Agency agree to work together to generate an expected work schedule for each day of the week that Lincoln intends to access the Premises (the "Normal Business Hours"). Should Lincoln desire to access the Premises beyond the Normal Business Hours, Lincoln shall obtain the Agency's prior written authorization for such use.

   b. There are two gates located at the Premises that are Agency-owned and maintained. Lincoln shall install its own locks on each gate using a daisy-chain locking method such that each party may independently operate and use the gates for access to the Premises.

   c. Due to the vulnerability of the Whitney Reservoir site, Lincoln's access across the Premises shall be limited to driving between Lincoln's Tank #1 and Tank #3 sites for routine operation and in-house maintenance activities.

   d. Lincoln may drive a full-size, highway-legal pick-up truck not exceeding a one (1) ton payload capacity.

   e. Lincoln may access the Premises with alternate vehicles, as it is understood that such vehicles may change from time to time over the term of this Right of Entry,

provided however, that the use of such alternate vehicles shall be restricted to routine operation and maintenance activities.

f. Lincoln shall not use the access route for construction equipment or other heavy equipment without prior written permission from the Agency and any additional insurance requirements as stipulated by the Agency.

3. **Conditions and Restrictions/Standards of Use:**

a. While the Agency's intent is to provide Lincoln with a permanent access route with respect to the Premises, the Agency has an obligation to protect the water supply and therefore, Lincoln's failure to strictly follow any of the conditions and restrictions set forth herein may result in termination of this Right of Entry.

b. Lincoln shall use the road across the northwesterly portion of the Premises (depicted on Exhibit "A" as "Shared Access – Primary"), as the road is currently established. If the northwesterly road is not passable, Lincoln shall have the right to use the road southeasterly of the Whitney Reservoir (depicted on Exhibit "A" as "Shared Access – Secondary") until such time as the primary northwesterly access road becomes passable. Lincoln access across the "Dam Road" shall be prohibited.

c. Lincoln shall close and lock all gates after passing through the gates. Under no circumstances shall any gate be left open, unlocked or "false-" or "dummy-locked".

d. The Premises is protected by a security alarm system and such system is owned and maintained by the Agency. The Agency shall provide Lincoln with an access code to disarm and re-arm the system. This code shall not be shared with any person or persons not directly employed by Lincoln, including any third-party vendor, contractor, or any other person or entity not employed by Lincoln.

e. Lincoln shall be responsible for setting any alarms upon leaving the Premises and securing the site each time Lincoln access the Premises, using the safety and security measures then in use by the Agency. Safety and security systems may change over the term of this Right of Entry, and the Agency shall promptly communicate any such changes to Lincoln if and when they occur.

f. Lincoln shall not perform any work within the Premises without the prior written authorization from the Agency.

g. Lincoln shall immediately notify the Agency of any damage to the property or any improvements within the Premises.

h. Agency maintains the access roads within the Premises in a passable condition for its use only. If Lincoln desires to make additional improvements to the northwesterly or southeasterly access road, such improvements shall be at Lincoln's sole cost and expense. Any improvements to the access roads by Lincoln may commence only after receiving prior written authorization from the Agency.

i. Lincoln agrees and understands that the refueling of any vehicle(s) or equipment within the Premises is strictly forbidden.

j. Lincoln shall not do anything or permit anything to be done, in or about the Premises that might subject the Agency to any liability or responsibility for any injury or damages to any person or property by reason of any activity, use, business operation or other practice conducted on the Premises.

k. Disposal, Use and Storage of Hazardous Materials. Lincoln shall not store or dispose of hazardous materials on the Premises, nor cause, permit, or allow any officer, agent, employee, contractor, permittee, or invitee of Lincoln to store or dispose of hazardous materials on the Premises.

For purposes of this Right of Entry, "hazardous materials" means any and all substances, products, by- products, waste, or other materials of any nature or kind whatsoever, commonly referred to or defined in any law as a hazardous material or hazardous substance (or other similar term)including, but not limited to: petroleum products, asbestos, chemicals, solvents, flammable materials, explosives, urea formaldehyde, PCB's, chlorofluorocarbons, freon, radioactive materials, or any other toxic material which may be hazardous or harmful to the air, water, soil, environment or affect industrial hygiene, occupational health, safety and/or general welfare conditions.

l. Explosive Materials. Any vehicles containing explosive materials or explosive liquids are expressly prohibited within the Premises.

4. **Insurance:** The parties shall maintain insurance coverage throughout the course of this Right of Entry in accordance with the provisions specified in that certain Memorandum of Agreement Between Placer County Water Agency and the City of Lincoln for Metering Facilities Known as Lincoln Metering Station No. 1 & 2 and Related Facilities (the "MOA") entered into by the parties on June 15, , 2023.

5. **Indemnity:**

a. Agency agrees to save harmless and indemnify Lincoln from any liability, claim or demand which may be made by any person resulting from the negligence of the Agency in the performance of its responsibilities under this Right of Entry, and

further agrees, at its own cost and expense, to defend any action which may be brought against Lincoln resulting from such negligence of the Agency upon request from Lincoln, and further agrees to pay or satisfy any judgment which may result from such action. The foregoing provisions shall not be applicable to claims or actions that arise from the negligence of Lincoln in its performance of the terms of this Right of Entry.

b. **Lincoln** agrees to save harmless and indemnify the Agency from any liability, claim or demand which may be made by any person resulting from the negligence of Lincoln in the performance of its responsibilities under this Right of Entry, and further agrees, at its own cost and expense, to defend any action which may be brought against the Agency resulting from such negligence of Lincoln upon the request from the Agency, and further agrees to pay or satisfy any judgment which may result from such action. The foregoing provisions shall not be applicable to claims or actions that arise from the negligence of the Agency in its performance of the terms of this Right of Entry.

6. **Damage or Destruction to Agency's Premises, Facilities or Improvements**: If damage occurs to the Premises or to any Agency improvements or facilities on, over, above or below the Premises, Lincoln shall: 1) immediately notify Agency of the type and extent of the damage or destruction; 2) upon Agency's authorization to do so, repair or replace the damaged or destroyed facility, improvement or portion of the Premises; or 3) reimburse Agency, upon receipt of an invoice from Agency, for its costs of labor and materials should Agency determine that the repair or replacement of the damaged or destroyed facility, improvement or portion of the Premises shall be completed by Agency.

7. **Term**: This Right of Entry shall be effective as of the date it is signed by the parties (the "Effective Date") and shall remain in full force and effect until terminated in writing by the parties upon thirty (30) days' prior written notice.

8. **Access Maintained for Agency Operations and Maintenance:** Lincoln shall not, at any time during the term of this Right of Entry, hinder, prevent, block or limit access to the Premises by Agency staff of Agency contractors, subcontractors, consultants or invitees.

9. **Inspection of Premises by Lincoln**: Agency makes no representations as to the condition or suitability of the Premises for the purposes of this Right of Entry and Lincoln accepts the Premises in their As-Is, Where-Is condition.

10. **Notices:** Any and all notices or demands by or from Agency to Lincoln or Lincoln to Agency, shall be in writing. They shall be served either personally or by mail. If served personally, services shall be conclusively deemed made at the time of service. If served by mail, service of notices or demands shall be conclusively deemed made as of the time of deposit in the United States mail, postage paid, return receipt requested.

Any notice or demand may be given to:

Lincoln:	Agency:
City of Lincoln	Placer County Water Agency
Attn: Public Works Director	Attn: Brian Rickards
600 Sixth Street	P.O. Box 6570
Lincoln, CA 95648	Auburn, CA 95604

Any party hereto may change the address for notice by giving written notice to the other party according to this Section 10.

11. Surrender at End of Term. Lincoln agrees on the last day of the Term, or sooner termination of this Right of Entry, to surrender the Premises with appurtenances to the Agency in the same condition as when received, reasonable wear and tear thereof accepted. If Lincoln, at the termination of this Right of Entry has not restored the Premises to their original condition, the Agency may take necessary action to restore the Premises to Agency's satisfaction and invoice Lincoln for the cost thereof.

12. Default.

a. Events of Default. The occurrence of any of the following shall constitute a default by Lincoln or, as and where the context allows, by Agency:

(i). In the case of either Lincoln or Agency, failure to perform any other provision of this Right of Entry if the failure to perform is not cured within thirty (30) days after written notice has been given to the defaulting party. If the default cannot be reasonably cured within thirty (30) days, the defaulting party shall not be in default of this Right of Entry if the defaulting party commences to cure the default within the thirty (30) day period and diligently and in good faith continues to endeavor to cure the default.

(ii). The discontinuance of Lincoln's operation and maintenance activities such that access across the Premises is no longer necessary.

b. Default Notices. Notices given under this paragraph shall specify the alleged default and applicable Right of Entry provision or provisions connected thereto, and shall demand that the defaulting party cure the default or quit the Premises. No such notice shall be deemed a forfeiture or termination of this Right of Entry unless the non-defaulting party so elects in the notice. The purpose of the notice

requirements set forth in this paragraph is to extend the notice requirements of the unlawful detainer statutes of California, and to provide the defaulting party a reasonable opportunity to cure the alleged default.

c. Remedies. Upon the occurrence of any one or more of the defaults referenced in Section 13(a) above, Agency shall have the right to terminate this Right of Entry. Upon such termination, Lincoln's right to possession of the Premises shall terminate and Lincoln shall surrender possession and vacate the Premises immediately according to the provisions of Section 12, above. Election by Agency to terminate this Right of Entry shall not prejudice any rights or claims Agency may have for sums remaining due it or for damages or pursuing such other remedies as may be available to Agency by law or equity, all remedies of Agency to be cumulative and not alternative.

13. Entire Agreement: This Right of Entry constitutes the entire agreement relating to the subject matter hereof. Any other prior agreements, promises, negotiations, or representations concerning the subject matter hereof not expressly set forth in this Right of Entry are of no force and effect. Any amendment to this Right of Entry shall be of no force and effect unless it is in writing and signed by each party.

ACKNOWLEDGED:

City of Lincoln, a municipal corporation

By: _____

Print Name: Sean Scully

Title: City Manager

Date: 6/27/23

ACCEPTED:

Placer County Water Agency

By: _____

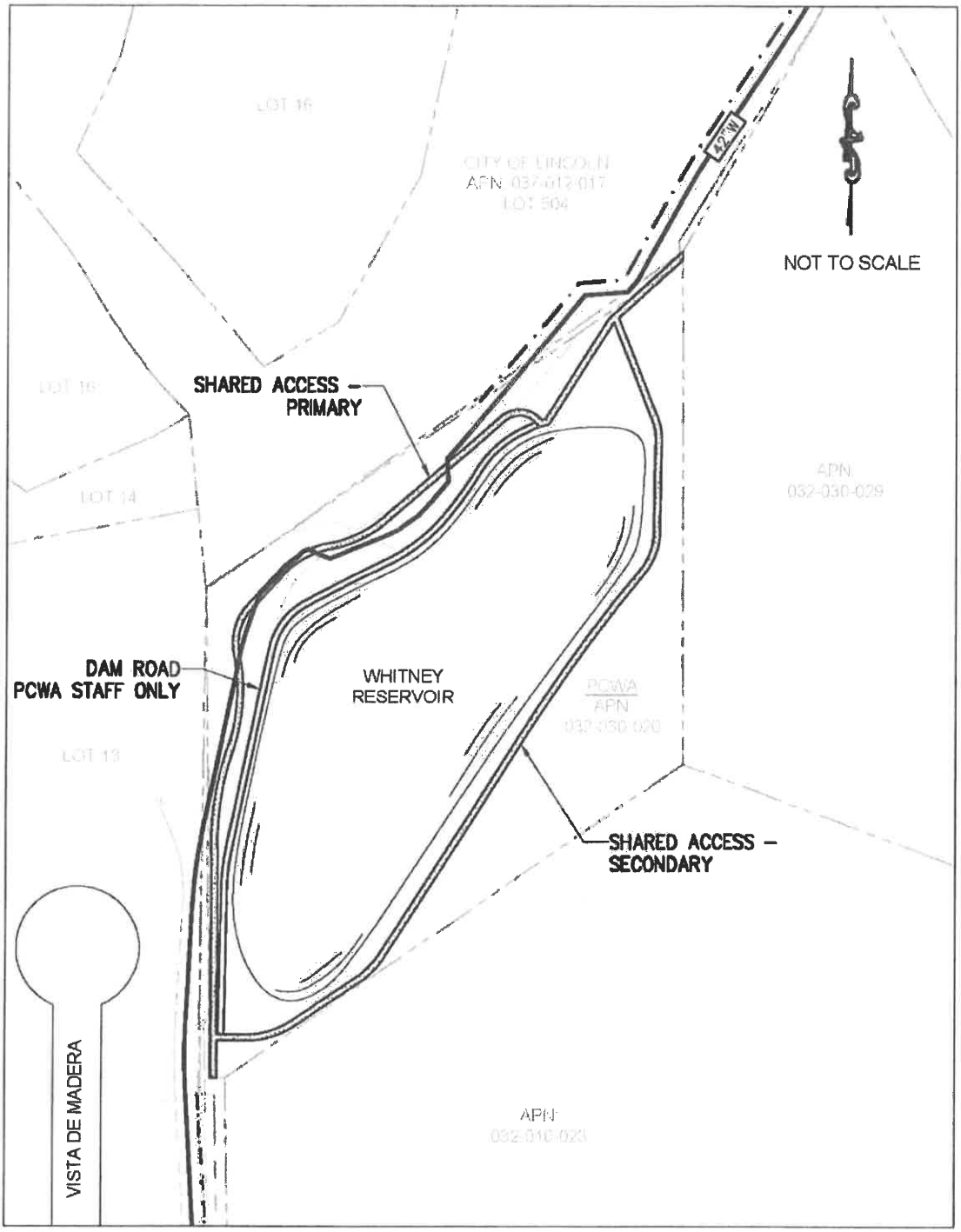
Print Name: Jeremy Shepard

Title: Director, Technical Services Department

Date: _____

Exhibit "A"

Premises


LOT 16
CITY OF LINCOLN
APN: 037-012-017
LOT 504
42 PW
NOT TO SCALE
SHARED ACCESS – PRIMARY
LOT 15
LOT 14
APN
032-030-029
DAM ROAD
PCWA STAFF ONLY
WHITNEY
RESERVOIR
PCWA
APN
032-030-020
LOT 13
SHARED ACCESS – SECONDARY
VISTA DE MADERA
APN
032-010-023

RESOLUTION 2023 - 044

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF LINCOLN AUTHORIZING THE CITY MANAGER TO EXECUTE A MEMORANDUM OF AGREEMENT AND AMENDMENT NO. 1 TO THE WATER SUPPLY AGREEMENT BETWEEN THE PLACER COUNTY WATER AGENCY AND THE CITY OF LINCOLN; AND AUTHORIZING THE CITY MANAGER TO EXECUTE DEEDS TO PCWA AND ACCEPT A DEED FROM VERDERA COMMUNITY ASSOCIATION

WHEREAS, On December 10, 2012, the City and Placer County Water Agency (PCWA) entered into a Water Supply Contract which included provisions for the financing, design and construction of the Lincoln-Penryn Phase 3 Project (CIP 307, Project) consisting of a water transmission main along the City's easterly limits and a pressure reducing/metering station near Sierra College Boulevard and Twelve Bridges Drive; and

WHEREAS, On September 13, 2016, the City Council adopted a resolution authorizing the City Manager to execute Amendment No.1 to Facilities Agreement No. 2521 (FA 2521) for the upsizing of the pipeline from a 30-inch diameter pipeline to a 42-inch diameter pipeline and upsize the metering station to accommodate 42-inch and 60-inch pipelines; and

WHEREAS, On December 11, 2018, the City Council adopted a resolution authorizing the City Manager to execute Amendment No.2 to FA 2521 to modify terms of treated water capacity in exchange for the City's cost to design and construct the project, and to provide for roles and responsibilities in construction management; and

WHEREAS, On April 13, 2021, in coordination with PCWA the City Council adopted a resolution accepting the CIP 307 improvements and authorizing the City Clerk to file a Notice of Completion for the Project; and

WHEREAS, a Memorandum of Agreement (MOA) was developed by PCWA and City Staff that describes the various details, entitlements, operations, necessary agency cooperation, responsibilities and locations of shared facilities that were constructed with the Project as contemplated in FA 2521 with respect to matters involving shared and interdependent use of facilities not previously addressed in FA 2521 including identifying shared site access, maintenance of shared access roads, easements and shared fiber optic conduits; and

WHEREAS, FA 2521, the MOA and the City Council Agenda Report associated with this resolution describe in detail the various land transactions needed to complete the Project; and

WHEREAS, In recent years the City's maximum day unregulated water consumption for the high elevation water pressure zone near Catta Verdera has reached or exceeded the current PCWA contract maximum of 1.1-million gallons; and

WHEREAS, City Staff, in consultation with PCWA staff, have determined that increasing the City's maximum day unregulated water supply from PCWA to the high elevation water supply zone in Catta Verdera should be increased by 58,750-gallons to provide for approximately five years of growth plus 59,509-gallons for a 5% operational

contingency for a total increase of 118,259-gallons for a revised contract daily maximum of 1,249,686-gallons or, as defined by PCWA as 1,086.7-Units of Capacity (UOCs); and

WHEREAS, PCWA's current rate for unregulated water is $22,805 per UOC, the cost to purchase the recommended additional maximum day supply in the proposed Amendment No.1 to the Water supply Agreement is $2,345,124.91; and

WHEREAS, the $2,345,124.91 cost to purchase the recommended additional maximum day supply would be covered by redeeming water connection credits generated by the City's construction of CIP 307; and

WHEREAS, execution of the above mentioned Memorandum of Agreement, Amendment No. 1 to the Water Supply Agreement, and acceptance of land grants require subsequent review and ratification by the PCWA Board of Directors.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Lincoln authorizes the City Manager to take any actions necessary to execute:

1. A Memorandum of Agreement with Placer County Water Agency regarding facilities constructed by CIP 307 memorializing the various details, entitlements, operations, necessary agency cooperation, responsibilities and locations of shared facilities that were constructed with CIP 307 as contemplated in FA 2521 with respect to matters involving shared and interdependent use of facilities not previously addressed in FA 2521 including identifying shared site access, maintenance of shared access roads, easements and shared fiber optic conduits.
2. Grant deeds for the new PCWA Lincoln Metering Station No. 2 and various project related easements conveyed to PCWA, and acceptance of an easement from Verdera Community Association.
3. Amendment No. 1 to the Water Supply Agreement with PCWA to increase the unregulated supply contract daily maximum usage by 118,259-gallons for a revised contract daily maximum of 1,249,686-gallons or 1,086.7-Units of Capacity (UOCs) as defined by PCWA. This includes redeeming water connection credits resulting from construction of CIP 307 and in accordance with PCWA Facilities Agreement 2521.

PASSED AND ADOPTED this 14th day of March, 2023.

AYES: COUNCILMEMBERS: Andreatta, Karleskint, Brown, Lauritsen, Joiner

NOES: COUNCILMEMBERS:

ABSENT: COUNCILMEMBERS:

Paul Joiner, Mayor

ATTEST:

Gwen Scanlon, City Clerk

CONTRACT BETWEEN PLACER COUNTY WATER AGENCY

AND CITY OF LINCOLN FOR A TREATED WATER SUPPLY

adopted by PCWA Board on 12/10/2

This contract made this 13th day of November, 2012, by and between the Placer County Water Agency, hereinafter referred to as the "Agency", a public agency created by the California Legislature by the Placer County Water Agency Act, and the City of Lincoln, a municipal corporation, located within the Agency, hereinafter referred to as "Lincoln."

RECITALS

The Agency and Lincoln entered into a water supply contract on February 24, 1998, which was supplemented on July 13, 1999, November 7, 2002 and again on December 11, 2006 and expires on December 31, 2012.

The Agency recognizes and acknowledges an existing contribution by Lincoln of $4 million towards facilities construction, as set forth in the Supplement to the Contract between the Agency and Lincoln, dated December 11, 2006, which contribution entitles Lincoln to 351.7 future EDU's (404,455 gpd) through the unregulated delivery facilities.

The Agency and Lincoln now wish to enter into a new water supply contract that consolidates and supersedes the February 24, 1998, as amended and sets forth their mutual understandings and agreement regarding water supplies from the Agency in the future.

NOW, THEREFORE, the above Recitals are true and correct and incorporated herein by reference, and the parties hereto mutually agree as follows:

ARTICLE 1 – TERM OF CONTRACT

This contract ("Contract") shall supersede the contract of February 24, 1998, as amended and supplemented, and shall become effective on January 1, 2013 and remain in effect through December 31, 2032.

ARTICLE 2 – OPTION FOR CONTINUED SERVICE

At the expiration of the term of this Contract, Lincoln shall be entitled to renewals of this Contract for successive periods not to exceed twenty years at a time, provided that the terms and conditions of each such renewal are agreed upon not later than one year prior to the expiration of the then-existing contract. The renewal contract shall provide for service of water under the same conditions of service as the then-existing contract including time, place, amount and rate of delivery, provided *that* the conditions of service may be altered if necessary to meet regulatory or legal requirements imposed on Agency or Lincoln.

ARTICLE 3 – POINTS OF DELIVERY AND INTERTIES

(a) Points of Delivery. All water furnished pursuant to the Contract shall be delivered to Lincoln at the Lincoln Metering Station adjacent to Lincoln's 5 million gallon storage tank near the Catta Verdera development as shown on **Exhibit A** attached hereto and incorporated herein by reference, and at other locations that may in the future be agreed to in writing by the parties. All locations where water is to be delivered are hereinafter referred to

collectively as "Points of Delivery". Upon agreement as to additional Points of Delivery, Exhibit A shall be amended to show those Points of Delivery. Upon agreement by the Agency, which shall not be unreasonably withheld, Lincoln may also elect to take delivery of water from the Agency at a point along the Agency's existing 18-inch line in Athens Road, provided that Lincoln pays the Agency's full Water Connection Charge ("WCC") at the time of request for such delivery and complies with such additional terms and conditions as are appropriate at that location. Lincoln shall be solely responsible for all costs of constructing the Points of Delivery and all costs of operating and maintaining all Lincoln's facilities beyond the Points of Delivery, provided, however, that the costs of construction of metering stations and facilities upstream of the Points of Delivery shall be a credit against future Water Connection Charges.

(b) Interties. The Agency and Lincoln recognize that there is a mutual benefit in having interties between their respective distribution systems to provide for the exchange of water between Agency and Lincoln under emergency conditions and during planned maintenance periods. These interties will be established and operated in a manner mutually agreed to in writing.

ARTICLE 4 – EXISTING AND PLANNED INFRASTRUCTURE

(a) Existing Infrastructure. The location of the major existing and planned infrastructure elements associated with the delivery of treated water from the Agency to Lincoln are also shown on **Exhibit A**.

(b) Penryn-Lincoln-Sunset Pipeline. Phases 1A, 1B and 2 segments of the Penryn-Lincoln-Sunset pipeline have been completed in accordance with prior agreements between the parties. The Phase 3 segment was envisioned in a prior agreement but has not been constructed as of the date of this Contract.

The Phase 3 segment will extend a pipeline from the Lincoln Metering Station north to Lincoln's City Pond site. The Phase 3 segment will include a new Metering Station at the City Pond site similar to the existing Lincoln Metering Station. Lincoln and the Agency are in the process of negotiating a Facilities Agreement for the construction of the Phase 3 segment, which shall cover issues of timing, funding and changes in Lincoln's Maximum Delivery Entitlement, and the Agency recognizes the existing contribution by Lincoln of $4 million towards the future construction.

(c) Lincoln Metering Station. The existing Lincoln Metering Station, located at the northerly end of the Phase 1B pipeline, includes two separate metering facilities: one for the unregulated metered delivery of water to the high elevation lots of the Catta Verdera development, and one for the flow-regulated metered delivery to the Lincoln Pressure Zone. "Regulation" as used in this Article means the Agency's ability to control the rate of flow and limit flow fluctuations. The Lincoln Metering Station is designed to deliver up to 20 mgd combined (both regulated and unregulated delivery).

(d) Future Facilities. Exhibit A also shows the approximate location of the proposed Ophir Water Treatment Plant ("Ophir WTP") and transmission lines needed to

connect it to the existing Foothill-Sunset system. Completion of these future facilities will increase the Agency's maximum delivery rate capability to Lincoln and the remainder of the Agency's service area.

(e) Reservation of Transmission Capacity. As of the date of this Contract, all payments made by Lincoln, whether direct investments in pipelines or payments of the Agency's WCC, have been incorporated into the calculation of Lincoln's Maximum Delivery Entitlement and Lincoln has no separate or additional rights to transmission capacity in the Agency's system.

ARTICLE 5 – MAXIMUM DELIVERY ENTITLEMENTS

(a) General Provisions

The Agency will supply Lincoln with water each year at the Points of Delivery, up to the maximum quantities and maximum rates of flow specified in this Article, subject to the terms and conditions of this Contract.

During the non-peak season, generally from September to May, but not during a PG&E water service outage, Lincoln may exceed the maximum quantities and flow rates to which it is entitled under the Contract for purposes of performing maintenance on its system, provided that the Agency is notified in advance and determines it has the capability to provide such accommodation of flow rates and quantities.

In an emergency situation within Lincoln's system Lincoln shall have equal access to the Agency's storage and delivery capacity on the same basis as other Agency customers if needed.

In an emergency situation within Agency's system, Lincoln agrees to utilize its alternative groundwater supplies and internal storage capacity to the maximum extent feasible at the request of the Agency.

(b) Current Maximum Delivery Entitlement. As of the date of this Contract, the maximum amount of water which Lincoln may require the Agency to deliver to Lincoln through the regulated delivery facilities in a single day is 17,774,452 gallons, and through the unregulated delivery facilities in a single day is 726,972.5 gallons, for a combined total of 18,501,424.5 gallons per day (Maximum Delivery Entitlement). For purposes of this Contract, a day shall be the twenty-four hour period beginning one second after midnight.

(c) Service to High Elevation Lots. It is anticipated that ultimately there will be approximately 600 dwelling lots within Lincoln's service area at elevations higher than can be served by gravity from the Lincoln Pressure Zone. The Agency agrees that Lincoln may elect to take unregulated delivery from the Agency for these lots, provided that Lincoln first pays to the Agency the Agency's full WCC, as it exists at the time of such payment. To date, Lincoln has paid for WCC credits for a maximum day water delivery of 726,972.5 gallons for the unregulated deliveries for the high elevation lots in Lincoln that are served by the Agency's storage facilities. Should Lincoln desire to purchase additional maximum day capacity for service to high elevation lots, Lincoln shall submit to the Agency a written request specifying the additional maximum day water delivery required. Assuming there is adequate capacity in

the Agency's system to accommodate this request, as determined in the Agency's sole discretion, Lincoln shall pay the full WCC cost per gallon as it exists at that time.

(d) Service to Lincoln Pressure Zone. With the exception of the unregulated delivery to the Catta Verdera high elevation lots, under normal operating conditions Lincoln shall, at its own expense, provide all storage and groundwater facilities necessary to regulate pressures and to accommodate hourly changes in demands within its Lincoln Pressure Zone while receiving uniform regulated deliveries from the Agency.

Lincoln will provide to the Agency on a routine basis, but not more frequently than daily, the required daily volume of water to be delivered to Lincoln. The Agency shall operate control valves which regulate the rate of flow of water from the Agency's system to Lincoln's at the Points of Delivery. At the option of the Agency, deliveries to Lincoln may be made at a uniform rate of delivery over a twenty-four hour period, or at fluctuating rates not to exceed plus or minus 10 percent of the daily average delivery rate, *provided however, that* the Agency may temporarily halt delivery if Lincoln's storage facilities become full.

(e) Increases in Maximum Delivery Entitlement Through Existing Facilities.

The Agency's Foothill-Sunset-Ophir ("FSO") water system has an approximate maximum permitted treatment capacity of 66 mgd and an unallocated treatment capacity of approximately 5.7 mgd as of the date of this Contract, which unallocated capacity is available on a first-come, first-served basis upon payment of the applicable WCC. Lincoln shall have the right to access any or all of the then-unallocated treatment and transmission capacity within

the Agency's FSO water system by paying the WCC applicable to Lincoln in effect at the time payment is made until the existing FSO system reaches capacity, as objectively and quantifiably determined by PCWA.

(f) Annual Notification. The Agency shall notify Lincoln annually in writing of the then-remaining water and capacity which the Agency is able to deliver to and from the FSO water system, and the amount of water and capacity which has been committed to and from the FSO water system since the date of the immediately preceding report.

ARTICLE 6. WATER CONNECTION CHARGES

(a) WCC Applicable to Lincoln for Service from Agency's Existing Infrastructure.

The Agency's current full WCC is composed of five components: (1) a treatment plant component, the amount of which is generally intended to cover the costs of delivering raw water to the treatment plant and providing treatment and clearwell storage facilities; (2) a groundwater component, the amount of which is generally intended to cover the costs of providing groundwater pumping and treatment facilities which the Agency determines is necessary to insure water supply reliability, for emergency backup, periods of drought, or for maintenance or peak management; (3) a storage component, the amount of which is generally intended to cover the costs of providing distribution system storage facilities; (4) a transmission component, the amount of which is generally intended to cover the costs of providing regional transmission facilities; and (5) a planning component, the amount of which is generally intended to cover the costs of regional planning efforts.

Except for service to high elevation lots, as provided in Article 5, the Parties agree that the Agency will not provide distribution system storage or groundwater service to Lincoln and will be providing only a portion of the planning required by Lincoln. Therefore, the WCC components applicable to Lincoln to increase its Maximum Delivery Entitlement from the existing Foothill-Sunset-Ophir system shall be the Agency's treatment component, transmission component and one-half the planning component. As of the date of this agreement the Agency's WCC components for the PCWA Zone 1 treated water service and the amounts applicable to Lincoln for one (1) equivalent dwelling unit (EDU) are as shown in the following table. Also shown is the assumed maximum day demand for one (1) EDU which was used to calculate these charges, and a calculation of the WCC amount per gallon per day of maximum demand ($/GPD).

Component (effective 01/01/12)	Zone 1	Lincoln
Treatment	$5,834	$5,834
Groundwater	648	0
Storage	2,755	0
Transmission	6,807	6,807
Planning	162	81
Total	$16,206	$12,722

1 EDU Max Day Water Use, GPD	1,150	1,150
$/GPD	$14.09	$11.06

The Maximum Delivery Entitlement for Lincoln shall be increased by one gallon per day from the existing FSO water system for each $11.06 of WCC payment received by the Agency in 2012.

Beginning January 1, 2013 and each year thereafter, until the Agency determines that there is no remaining unallocated capacity in the existing FSO water system, the amount of WCC payment required to increase Lincoln's Maximum Delivery Entitlement shall be increased by the percent increase in the ENR San Francisco Construction Cost Index over the preceding year.

(c) Increases in Maximum Delivery Entitlement Requiring New Infrastructure.

Additional increases in Lincoln's Maximum Delivery Entitlement requiring new infrastructure may be made available to Lincoln through implementation of negotiated Facilities Agreement(s) that include provisions for joint financing of the planning, design, environmental processing and mitigation, and construction of the proposed source water supply, water treatment and transmission infrastructure and appurtenances necessary to increase the maximum rate of delivery from the Agency to Lincoln. The Agency agrees to cooperate with Lincoln in the planning and development of infrastructure in the Agency's facilities upstream of the Points of Delivery and interties which Lincoln requires to meet its development needs, provided, however, that this Contract imposes no obligation on PCWA to construct or enhance its existing infrastructure. PCWA shall own and operate all such infrastructure. Lincoln shall have exclusive rights to the portion of capacity in said infrastructure represented by the proportion of funding provided by Lincoln, to be defined in those Facilities Agreement(s).

ARTICLE 7 – LIMITATION ON AGENCY SERVICE

Except for those properties that abut the existing Agency pipeline in Athens Road, the Agency will not provide treated water service within Lincoln's sphere of influence as of the date of this Contract; provided that Lincoln offers to furnish such service to those areas upon the same terms and conditions that it furnishes service to areas outside its city limits.

ARTICLE 8 – OTHER LINCOLN WATER SOURCES

Lincoln has a developed groundwater system which is integrated into its municipal water system; a portion of Lincoln's sphere of influence lies within Nevada Irrigation District's (NID) service area and Lincoln is pursuing a separate treated water supply from NID to serve that portion of the city. In addition, Lincoln is planning on developing its recycled water sources to meet local irrigation requirements. Both of these source developments may affect Lincoln's need for water supplied under this Contract. The Agency acknowledges that Lincoln has the right to use these other water sources within the City in any way it determines is best.

ARTICLE 9 – MEASUREMENT

All water furnished pursuant to this Contract shall be measured by the Agency at the Points of Delivery. Such measurements shall be with equipment chosen by the Agency and approved by Lincoln. All measuring equipment shall be installed and maintained by the Agency and the Agency shall pay for all installation and maintenance. The Agency shall have the primary obligation to measure the quantity of water delivered to Lincoln. Lincoln may request, at any time, investigation of the measurements being made as well as the charges associated

with those measurements. Errors in measurement and charges discovered by the investigation will be corrected by the Agency. Lincoln may, at its own cost, at any time, inspect the measuring equipment and the records of such measurements for the purpose of determining the accuracy of the equipment and measurements.

ARTICLE 10 – RATES OF PAYMENT FOR WATER

(a) Current Rates and Charges. Beginning the earlier of January 1, 2014 or the effective date of the next change in Agency's rates, and continuing until otherwise agreed to in writing by both parties, the rates and charges that Lincoln shall pay the Agency for all water furnished under this Contract shall be the Agency's Schedule No. 1 – Treated Water – for Metered Industrial and Resale Service within the Western Water System, which is the Agency's lowest volumetric rate for treated water. Until January 1, 2014, Lincoln shall pay the Agency's rates and charges implemented in 2009 that Agency designated as applicable to Lincoln.

(b) Changes in Rates and Charges. The Agency may alter its rates and charges at any time as it deems necessary; provided, however, it shall give Lincoln 45 days' written notice of its intention to consider any changes in rates and charges and shall hold a public hearing at which Lincoln and any members of the public can present evidence in support of or in opposition to any such proposed changes and provided further *that* no increase in rates to be charged to Lincoln shall become effective until 90 days after the Agency has notified Lincoln in writing of the rate change.

ARTICLE 11 – RESERVED

ARTICLE 12 – TIME AND METHOD OF PAYMENTS

On or before the tenth day of each month, the Agency shall send Lincoln a statement of charges due for all water actually delivered to Lincoln during the preceding month. Lincoln shall pay all statements via electronic transfer within thirty (30) days after they are received.

ARTICLE 13 – WATER SHORTAGES

At times there may occur a shortage in the quantity of water available for delivery to Lincoln pursuant to this Contract. In the event of any shortage (due to natural causes, casualties, regulatory requirements or any other causes) which causes the total quantity of water available to the Agency for distribution to Lincoln and to the Agency's other customers to be less than the total of all quantities required by Lincoln and the other customers, the Agency reserves the right to apportion the available water supply among Lincoln and others entitled to receive water from the Agency. In such events, no liability shall accrue against the Agency or any of its officers, agents or employees for any damage, direct or indirect, arising from such shortage or shortages or resulting allocations. The Agency shall give Lincoln written notice as far in advance as possible of any such reduction in water deliveries, which notice shall state the basis for the reduction and the anticipated duration. Also, if the Agency's supply of water for its Zone No. 1 is reduced by events outside the control of the Agency, or is being fully utilized by the Agency's then-existing customers, and as a result the Agency is unable to increase Lincoln's Maximum Delivery Entitlement then, notwithstanding any other provision of this Contract, the Agency shall not be required to increase its rate of delivery to Lincoln.

ARTICLE 14 – OPERATION AND MAINTENANCE

The Agency may temporarily discontinue or reduce the amount of water to be furnished to Lincoln as provided for herein for the purpose of maintaining, repairing, replacing, investigating or inspecting any of the facilities necessary for furnishing water to Lincoln. Insofar as it is feasible, the Agency will give Lincoln reasonable notice in advance of any such temporary discontinuance or reduction, except in cases of emergency, in which case no advance notice need be given. The Agency shall schedule its routine maintenance of facilities so that, to the extent feasible, such discontinuances or reduction in delivery will result in minimum impact to Lincoln's customers.

ARTICLE 15 – WATER QUALITY

All water delivered by the Agency pursuant to this Contract shall meet all applicable Federal, State of California and Placer County water quality requirements for water for domestic use. If public notification is required to be given to Lincoln's customers because the quality of the water fails to meet standards, Agency shall so notify Lincoln in writing as promptly as reasonably feasible, and Lincoln shall be responsible for sending such notices, *provided that* the Agency shall reimburse Lincoln for its reasonable costs in doing so. The Agency shall provide Lincoln with copies of any reports received by the Agency from health departments concerning the quality of the water being furnished to Lincoln. Lincoln shall indemnify the Agency against any claims of damages of any nature whatsoever that may result

from a failure of Lincoln to provide notice to its customers of water quality problems pursuant to this Article 15.

ARTICLE 16 – INDEMNIFICATION

Except for any claim or action for damages based upon the quality of water prior to its reaching the Points of Delivery, neither the Agency nor its officers, agents or employees shall be liable for the control, carriage, handling, use, disposal, or distribution of water furnished to Lincoln pursuant to this Contract after such water has passed the Points of Delivery, nor for the claims of damages of any nature whatsoever, including but not limited to, property damage, personal injury, or death, arising out of or connected with the control, carriage, handling, use, disposal or distribution of such water beyond the Points of Delivery,; and Lincoln shall indemnify, defend and hold harmless the Agency and its officers, agents and employees from any such damages or claims of damages.

ARTICLE 17 – OBLIGATIONS OF LINCOLN TO MAKE PAYMENTS

The obligations of Lincoln arising out of or pursuant or incidental to this Contract shall constitute general obligations of Lincoln, and Lincoln shall use all the powers and resources available to it under the law to collect the funds necessary for and to pay its obligations to the Agency under this Contract. Lincoln as a whole is obligated to pay to the Agency the payments becoming due under this Contract, notwithstanding any individual default by its water users, constituents or others in the payment to Lincoln of assessments, taxes, tolls, or other charges levied by Lincoln.

ARTICLE 18 – INTEREST ON OVERDUE PAYMENTS

Interest shall accrue at the legal rate of interest charged on judgments issued in California courts on any unpaid charges to be paid by Lincoln to the Agency pursuant to this Contract from their due date until paid, and Lincoln hereby agrees to pay such interest.

ARTICLE 19 – DEFAULT

In the event of any default by Lincoln for a period of more than sixty (60) days in the payment of any money required to be paid to the Agency hereunder, the Agency in its discretion may suspend delivery of water during the period when Lincoln is delinquent in its payments or obligations due to the Agency under the terms of this Contract. Action taken pursuant to this Article shall not deprive the Agency of or limit any remedy provided by this Contract or by law for the recovery of money due or which may become due under this Contract.

ARTICLE 20 – REMEDIES NOT EXCLUSIVE

The use of either party of any remedy for the enforcement of this Contract is not exclusive and shall not deprive the party using such remedy of, or limit the application of, any other remedy provided by law.

ARTICLE 21 – ASSIGNMENT

The provisions of this Contract shall apply to and bind the successors and assigns of the respective parties, but no assignment or transfer of this Contract, or any part hereof or interest herein, shall be valid without the consent of the non-assigning party.

ARTICLE 22 – AREA SERVED BY LINCOLN

Without the prior written consent of the Agency, water delivered to Lincoln pursuant to this Contract shall not be sold or otherwise disposed of by Lincoln for use outside Lincoln's city limits as they may exist from time to time, except to those customers outside the city limits located in the area shown on Exhibit "B" attached hereto and incorporated herein by reference that were receiving service from Lincoln as of the date of the 1998 contract. The consent of the Agency shall not be unreasonably withheld. Refusal of the Agency to grant consent shall be based upon the lack of water or capacity in Agency facilities or the intention of the Agency to provide service to the area outside Lincoln's sphere of influence. Lincoln shall require annexation to the Agency's Zone No. 1 as a condition to providing water service to any new customers outside of Lincoln's city limits that are connected to Lincoln's water system after the date of this Contract.

ARTICLE 23 – OPINIONS and DETERMINATIONS

Where the terms of this Contract provide for action to be based upon opinion, judgment, approval, review or determination of either party, such terms are not intended to be and shall never be construed as permitting such opinion, judgment, approval, review or determination to be arbitrary, capricious or unreasonable.

ARTICLE 24 – NOTICES

All notices, including but not limited to rate or WCC increases, that are required either expressly or by implication to be given by any party to the other under this Contract shall be

signed for the Agency and for Lincoln by such officers as they may, from time to time, authorize in writing to so act. All such notices shall be deemed to have been given and delivered personally if enclosed in a properly addressed envelope and deposited in a United States Post Office for delivery by registered or certified mail. Unless and until formally notified otherwise, all notices shall be addressed to the parties at their addresses as shown on the signature page of this Contract.

ARTICLE 25 – INSPECTION of BOOKS and RECORDS

The proper officers or agents of Lincoln shall have full and free access at all reasonable times to the account books and official records of the Agency insofar as the same pertain to the matters and things provided for in this Contract, with the right at any time during office hours to make copies thereof at Lincoln's expense, and the proper representatives of the Agency shall have similar rights in respect to the account books and records of Lincoln.

ARTICLE 26 – AMENDMENTS

This Contract may be amended at any time by mutual written agreement of the parties, except insofar as any proposed amendments are in any way contrary to applicable law.

ARTICLE 27 – WAIVER; REMEDIES CUMULATIVE

Failure by a party to insist upon the strict performance of any of the provisions of this Contract by the other party, irrespective of the length of time for which such failure continues, shall not constitute a waiver of such party's right to demand strict compliance by such other party in the future. No waiver by a party of a default or breach of the other party shall be

effective or binding upon such party unless made in writing by such party, and no such waiver shall be implied from any omission by a party to take any action with respect to such default or breach. No express written waiver of a specified default or breach shall affect any other default or breach and/or period of time specified. All of the remedies permitted or available to a party under this Contract, or at law or in equity, shall be cumulative and alternative, and invocation of any such right or remedy shall not constitute a waiver or election of remedies with respect to any other available right or remedy.

ARTICLE 28 – CONSTRUCTION of LANGUAGE of CONTRACT

The provisions of this Contract shall be construed as a whole according to its common meaning and purpose of providing a public benefit and not strictly for or against any party. It shall be construed consistent with the provisions hereof, in order to achieve the objectives and purposes of the parties. Wherever required by the context, the singular shall include the plural and vice versa, and the masculine gender shall include the feminine or neutral genders or vice versa.

ARTICLE 29 – MITIGATION of DAMAGES

In all situations arising out of this Contract, the parties shall attempt to avoid and minimize the damages resulting from the conduct of the other party.

ARTICLE 30 – GOVERNING LAW

This Contract, and the rights and obligations of the parties, shall be governed and interpreted in accordance with the laws of the State of California.

ARTICLE 31 – CAPTIONS

The captions or headings in this Contract are for convenience only and in no other way define, limit or describe the scope or intent of any provision or section of the Contract.

ARTICLE 32 – PARTIAL INVALIDITY

If any provision in this Contract is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

ARTICLE 33 – RELATIONSHIP of the PARTIES

The relationship of the parties to this Contract shall be that of independent contractors. Each party shall be solely responsible for any workers compensation, withholding taxes, unemployment insurance and any other employer obligations associated with the described work or obligations assigned to them under this Contract.

ARTICLE 34 – WATER CONSERVATION

The Agency is required by federal and state laws and regulations to implement various water conservation measures and require its customers, whether they be retail, wholesale, or resale customers, to abide by these measures in order to prevent the waste of water. Lincoln shall, within its service area, implement the water conservation measures adopted by the Agency from time to time for the Agency's Zone No. 1 Water System and shall require its customers to comply with those measures to the same extent that other customers within the Agency's Zone No. 1 are required to do so.

ARTICLE 35 – YEAR

The term "year" as used in this Contract shall mean the calendar year beginning on each January 1.

IN WITNESS WHEREOF, the parties hereto have executed this Contract as of the date first above written.

ATTEST:

Clerk, Board of Directors
Placer County Water Agency
P O. Box 6570
Auburn, California 95604

PLACER COUNTY WATER AGENCY

12/10/12
Chairman of the Board

ATTEST:

Clerk
City of Lincoln
600 6th Street
Lincoln, California 95648

CITY OF LINCOLN

Mayor

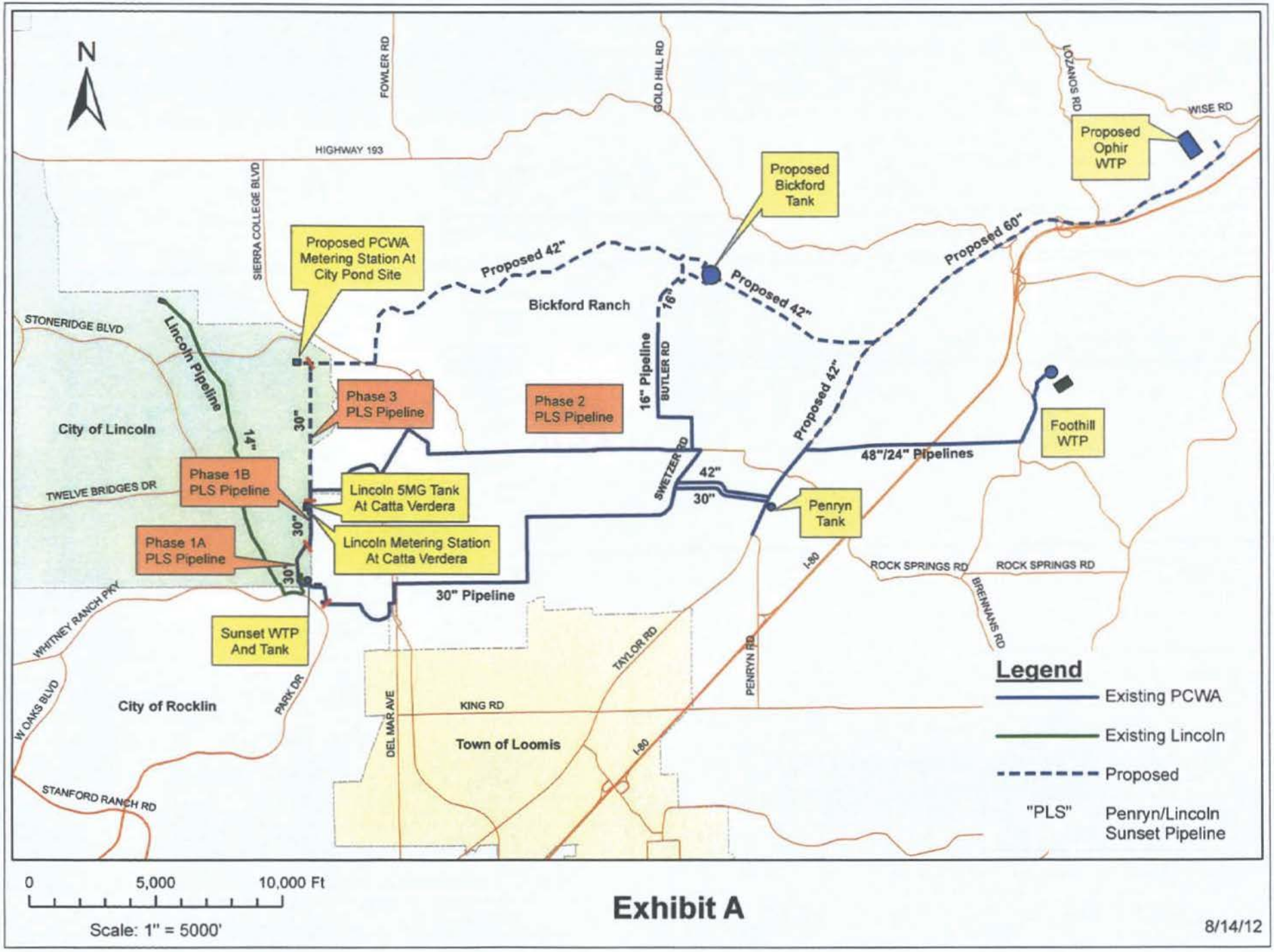


Exhibit A

8/14/12

AMENDMENT NO. ONE TO FACILITIES AGREEMENT NO. 2521

FOR DESIGN AND CONSTRUCTION OF PHASE 3 LINCOLN/PENRYN PIPELINE

AND METERING STATION BETWEEN PLACER COUNTY WATER AGENCY AND THE CITY OF LINCOLN

This Amendment, by and between Placer County Water Agency, hereinafter called "Agency," and the City of Lincoln, California, hereinafter called "Lincoln," shall be effective on the date last executed by either the Agency or Lincoln.

Whereas, Lincoln and the Agency entered into Facilities Agreement No. 2521 ("FA 2521") on October 17, 2013 for design and construction of the Phase 3 Lincoln/Penryn Pipeline and Metering Station; and

Whereas, this pipeline and metering station will initially serve Lincoln from the Agency's Foothill Water Treatment Plant ("WTP") and Lincoln is constructing it because their need for the pipeline preceded that of the Agency; and

Whereas, Lincoln is the lead agency under the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq., CEQA) for environmental documentation and review under the California Environmental Quality Act and covered the Phase 3 Lincoln/Penryn Pipeline and Metering Station within the Revised Twelve Bridges Specific Plan Subsequent Environmental Impact Report in 1998 and an addendum to this document in 1999 ("Previous CEQA Documents"); and

Whereas, this pipeline is planned to later serve Lincoln and western Placer County from the Agency's proposed Ophir WTP via a proposed pipeline through the Bickford Ranch development project; and

Whereas, the diameter of the Phase 3 Lincoln/Penryn Pipeline is sized assuming Lincoln takes approximately half the supply from Ophir WTP being delivered through the Bickford Ranch development; and

Whereas, Lincoln is considering several options in its long-term water supply planning and may not need half the supply provided by Ophir WTP; and

Whereas, the Agency wishes to provide flexibility in where water from Ophir WTP is delivered and also maximize the ability for Ophir WTP to backup Foothill WTP; and

Whereas, increasing the diameter of the Phase 3 Lincoln/Penryn Pipeline from 30-inches to 42-inches ("Pipe Increase") would provide this flexibility and redundancy; and

Whereas, the Agency has requested that Lincoln increase the Phase 3 Lincoln/Penryn Pipeline accordingly; and

Whereas, the Agency is acting as the Lead Agency under CEQA for the Pipe Increase and has determined and finds that the environmental impacts of the Pipe Increase will not result in a new or more severe significant effect than those identified in the Previous CEQA Documents. Furthermore, all of the pertinent mitigation measures identified in the Previous CEQA Documents will be implemented as part of the Pipe Increase project. Therefore, the conditions under which

preparation of a subsequent Initial Study/Mitigated Negative Declaration (IS/MND) or EIR would be required have not been triggered pursuant to Section 15162 of the State CEQA Guidelines.

Now, therefore, it is agreed as follows:

1. The Agency finds that:
    a. On the basis of an addendum prepared for this action, and concurrent consideration of the addendum and the previous EIR and addendum referenced above, the environmental impacts of the Pipe Increase will not result in a new or more severe significant effect than those identified in the Previous CEQA Documents.
    b. All of the pertinent mitigation measures identified in the Previous CEQA Documents will be implemented as part of the Pipe Increase project.
    c. The conditions under which preparation of a subsequent Initial Study/Mitigated Negative Declaration (IS/MND) or EIR would be required have not been triggered pursuant to Section 15162 of the State CEQA Guidelines.
2. Lincoln will increase the diameter of the Phase 3 Lincoln/Penryn Pipeline from 30-inches to 42-inches in its design plans and specifications and construct the pipeline with the larger diameter. Appurtenant piping within the Metering Station to deliver water from the Bickford Ranch development to western Placer County will also be increased in diameter.
3. The Agency will pay for the increased cost of the project as a result of this Amendment in accordance with the terms of the original facilities agreement.

4. The Agency will defend, indemnify, and hold Lincoln, its elected and appointed commissioners, officers, agents, and employees harmless from and against any and all damages, claims, costs and liabilities arising out of the approval of the Pipe Increase, including claims under the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.)
5. All other terms of FA 2521 remain unchanged.

In witness whereof, the parties hereto have executed this Agreement on the dates written below.

PLACER COUNTY WATER AGENCY

BY: _____

Date: August 4, 2016

ATTEST:

_____
Clerk, Board of Directors

CITY OF LINCOLN

_____
Signature

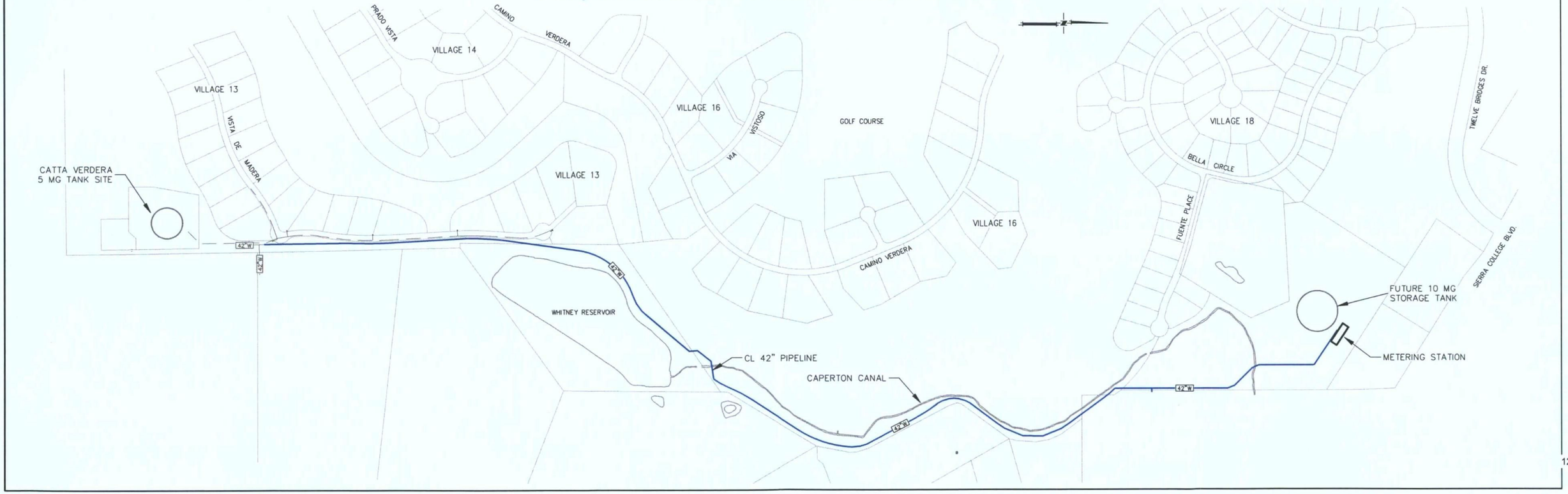
_____
Print name

City Manager
Title

Date: 9/16/16

City of Lincoln
600 Sixth Street
Lincoln, CA 9564

Penryn-Lincoln Pipeline Phase 3 - December 21, 2015



PENRYN-LINCOLN PIPELINE PHASE 3 - AREA OF DISTURBANCE

UBORA *ENGINEERING & PLANNING*

"EXCELLENCE"

2901 DOUGLAS BOULEVARD, SUITE 285
ROSEVILLE, CA 95661 (916) 780-2500
www.uborainc.com

PENRYN-LINCOLN PIPELINE PHASE 3 - AREA OF DISTURBANCE

UBORA *ENGINEERING & PLANNING*

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ROSEVILLE, CA 95661 (916) 780-2500
www.uborainc.com

PCWA
water • energy • stewardship

PLACER COUNTY WATER AGENCY
SINCE 1957

BOARD OF DIRECTORS
Gray Allen, District 1
Primo Santini, District 2
Mike Lee, District 3
Robert Dugan, District 4
Joshua Alpine, District 5

Einar Maisch, General Manager

BUSINESS CENTER
144 Ferguson Road
MAIL
P.O. Box 6570
Auburn, CA 95604
PHONE
(530) 823-4850
(800) 464-0030
WWW.PCWA.NET

August 8, 2016
File No.: FA 2521

Ray Leftwich, P.E.
City Engineer
City of Lincoln
600 Sixth Street
Lincoln, CA 95648

SUBJECT: FA 2521 Phase 3 Lincoln / Penryn Pipeline and Metering Station

Dear Ray:

Enclosed find two copies of the contract referenced above, which was approved by the PCWA's Board of Directors on August 4, 2016. Please sign both copies and return one fully executed copy to the attention.

Should you have any questions please contact me at (530) 823-4801.

Sincerely,

Stephanie Wens

Stephanie Wens
Administrative Aide

Enclosure

RESOLUTION NO. 16- 29 OF THE BOARD OF DIRECTORS OF THE PLACER COUNTY WATER AGENCY APPROVING AN ADDENDUM TO A PREVIOUSLY CERTIFIED SUBSEQUENT ENVIRONMENTAL IMPACT REPORT FOR PHASE 3 OF THE LINCOLN/PENRYN PIPELINE AND METERING STATION

WHEREAS, the *Revised Twelve Bridges Specific Plan Subsequent Environmental Impact Report* ("1998 SEIR"), and an *Addendum to the Revised Twelve Bridges Specific Plan Subsequent Environmental Impact Report for the 30-Inch Pipeline and Water Storage-Tank* ("1999 Addendum") were certified by the City of Lincoln; and

WHEREAS, Placer County Water Agency was a responsible agency under CEQA for the 1998 SEIR and 1999 Addendum and was consulted by the City of Lincoln in preparation of and certifications of those documents; and

WHEREAS, Placer County Water Agency has reviewed and considered the information and findings contained in the City's 1998 SEIR and 1999 Addendum; and

WHEREAS, the State CEQA Guidelines Section 15164 provide the authority for a responsible agency to adopt an addendum to the environmental analysis for changes made to a project that was previously the subject of an Environmental Impact Report (EIR), conditioned that changes or additions are necessary and do not result in new significant impacts and preparation of a subsequent EIR.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Placer County Water Agency as follows:

1. This Board hereby finds and declares that all of the above recitals are true and correct.

2. This Board finds that (a) no substantial changes have been proposed in the project which would require major revisions of the 1998 SEIR or 1999 Addendum, (b) no substantial changes have occurred with respect to the circumstances under which the project is being undertaken which would require major revisions in that 1998 SEIR or 1999 Addendum, and (c) no new information, not known at the time the 1998 SEIR and 1999 Addendum was certified as complete, has become available.

3. Under Public Resources Code section 21166, no new environmental impact report is required to be prepared by the City of Lincoln or Placer County Water Agency prior to approval of Phase 3 of the Lincoln/Penryn Pipeline and Metering Station project. None of the conditions that would trigger a subsequent or supplemental document are applicable.

4. Based upon the aforedescribed evidence, the Board hereby approves the Addendum for Phase 3 of the Lincoln/Penryn Pipeline and Metering Station project submitted to it in conjunction with the 1998 SEIR and 1999 Addendum, and hereby directs the Agency staff to prepare and file a Notice of Determination in the prescribed form in compliance with the California Environmental Quality Act.

The foregoing resolution was duly passed at a regular meeting of the Board of Directors of the Placer County Water Agency held on August 4, 2016, by the following vote on roll call:

AYES DIRECTORS: Graham "Gray" Allen, Joshua Alpine, Robert Dugan, Primo Santini, III, and Chair Michael "Mike" Lee

NOES DIRECTORS: None

ABSENT DIRECTORS: None

PLACER COUNTY WATER AGENCY

FACILITIES AGREEMENT NO. 2521

FOR DESIGN AND CONSTRUCTION OF PHASE 3 LINCOLN/PENRYN PIPELINE AND METERING STATION PLACER COUNTY WATER AGENCY – CITY OF LINCOLN

THIS AGREEMENT, by and between PLACER COUNTY WATER AGENCY, hereinafter called "Agency," and the City of Lincoln, California, hereinafter called "Lincoln," shall be effective on the date executed by the Agency.

W I T N E S S E T H:

WHEREAS, Lincoln and the Agency entered into an agreement for water supply dated February 24, 1998 ("1998 agreement") that provided a framework for provision of water supply facilities for Lincoln, and a July 13, 1999 supplement ("1999 supplement") to the 1998 agreement further defined the facilities, delivery points, and phasing of construction of the water supply facilities, now referred to as the Lincoln/Penryn Pipeline, which has been constructed in phases; and

WHEREAS, construction of Phases 1a, 1b, and 2 of the Lincoln/Penryn Pipeline have been completed; and

WHEREAS, the 1999 supplement required a separate agreement to further define the terms of construction of the Lincoln/Penryn Pipeline and Metering Station, which agreement is to include reimbursement for Agency costs, and credits to Lincoln for costs incurred; and

WHEREAS, on December 11, 2006, the Agency Board of Directors approved a further supplement to the 1998 agreement which allowed Lincoln to increase its maximum delivery

entitlement based upon the Water Connection Charge (WCC) in effect on November 2, 2006, provided that Lincoln deposit $4,000,000 with the Agency, and construct and convey to the Agency, prior to May 1, 2012 a metering and pressure reducing station and related appurtenances and property at Lincoln's City Pond Site, referred to herein comprehensively as the "Metering Station"; and

WHEREAS, Lincoln has paid $4,000,000 to the Agency for participation in the construction of a pipeline from the Bickford Tank to Lincoln's City Pond Site, and

WHEREAS, Lincoln has requested that the remaining funds from the $4,000,000 paid by Lincoln on December 11, 2006 to upsize the pipeline from the Bickford tank to the City Pond Site be applied to the construction of the Phase 3 Pipeline and Metering Station; and

WHEREAS, the Phase 3 Pipeline extension from the Agency's Foothill Sunset Plant/Foothill Pressure Zone requested by Lincoln will require the installation of approximately 6040 feet of 30-inch diameter pipeline, construction of the Metering Station at the City Pond Site, telemetry and SCADA controls, and associated appurtenances, all of which will be described more fully in the Lincoln Penryn Phase 3 project plans to be prepared by Ubora for Lincoln as shown in Exhibit A, and which are all collectively hereinafter referred to herein as the "Facilities"; and

WHEREAS, Lincoln desires to connect the Facilities to the Agency's water system and have the Agency assume ownership of such Facilities, as further described herein, and the responsibility for furnishing water service therefrom; and

WHEREAS, the Agency is willing to accept the Facilities in accordance with the provisions of this Agreement, the Agency's Personnel and Administrative Manual, Improvement Standards, Technical Provisions, Standard Drawings, and approved drawings and specifications not covered in the Agency's Standards; and

WHEREAS, Lincoln intends to engage a qualified contractor and has agreed to bear expenses to furnish and install the Facilities as further described in this agreement ("Agreement"), and

NOW, THEREFORE, IT IS AGREED as follows:

1. Deposit: The following cash deposits shall be paid to the Agency upon submission of a copy of this Agreement duly executed by Lincoln on or before ninety (90) days after the execution of the Agreement by the Agency's Board of Directors or before installation of the Facilities under this Agreement is commenced, whichever is earlier:

(a)	Engineering review, inspection, CEQA compliance and other costs	$40,000
	TOTAL	$40,000

The amount for Item 1(a) represents an estimated cost. Item 1(a) is in addition to any amount previously paid by Lincoln, and shall be charged on an actual cost basis. The actual cost as determined by the Agency for engineering review, supervision, inspection, compliance with the California Environmental Quality Act, the preparation and administration of this Agreement, inspection and testing of the Facilities, water system outages, tests and other associated activities, and costs associated with mediation, arbitration, or attorneys' fees incurred by the Agency in connection with this Agreement shall be charged against the amount deposited for Item 1(a). Should the amount of deposit for Item 1(a) become depleted the Agency may require an additional deposit be paid by Lincoln before proceeding with further work Any cost over and above the amount deposited for Item 1(a), less the amount of deposit retention referred to in paragraph 3, shall be paid upon demand, and any excess shall be refunded within 90 days after completion and acceptance of the work.

2. Minimum Deposit/Retention. Lincoln shall maintain a minimum balance of the deposit referred to in paragraph 1, Item 1(a), in an amount of $1,000 or more until completion and acceptance of the work. In order for the Agency to reimburse itself for actual costs incurred after the

date of completion and acceptance of the work, the Agency shall retain $1,000 for a period of three (3) years from the date of completion and acceptance of the work. Within 90 days thereafter the Agency shall return to Lincoln any remaining deposit balance.

3. Time: If the construction and installation of the Facilities provided for herein is not commenced within one (1) year after the date of execution of this Agreement by the Agency and completed within twelve (12) months after that date, the Agency shall have the right to terminate this Agreement at any time thereafter. Upon such termination by the Agency, the Agency shall refund any portion of the deposit made for engineering review and inspection costs, pursuant to Paragraph 1, that has not been used by the Agency prior to the date of such termination.

4. Plans: It is the responsibility of Lincoln to prepare plans and specifications for the Facilities and submit them to the Agency for acceptance. All materials to be furnished and all construction shall be in accordance with the Agency's Improvement Standards, Technical Provision, Standard Drawings, and other plans and specifications not the Agency standards. The plans and specifications, when accepted in writing by the Agency, shall become a part of this Agreement

5. Installation of Facilities: Lincoln shall construct and install the Facilities described in the plans and specifications accepted by the Agency in accordance with the provisions of this Agreement and the Agency's Personnel and Administrative Manual, Improvement Standards, Technical Provisions and Standard Drawings No work may be done except by a California State Licensed Class A contractor or forces approved by the Agency. Lincoln shall comply with all laws and regulations, including any prevailing wage and other employment laws and regulations such as California Labor Code Sections 1720 *et seq.*, to the extent they are applicable to construction and installation of the Facilities. A minimum of three qualified bids shall be provided. Prior to awarding a contract for construction, Lincoln shall allow PCWA to review and reject any bids.

6. Property and Rights-of-Way: No construction work shall be performed or installation

made until Lincoln provides the following easements or fee title for the properties that contain or will contain facilities that will be conveyed to the Agency in accordance with this Agreement, as follows: fee title property underlying the Metering Station, non-exclusive access easements over access roads to Agency facilities, non-exclusive pipeline and access easements over pipeline alignments, and non-exclusive canal and access easements over canals and canal spill locations on the properties All easements shall be provided in a form acceptable to the Agency and must be reviewed, approved, submitted into escrow by the Agency, and recorded.

7. Grade Established· No work shall be performed or installation made until street subgrades have been established to the satisfaction of the Agency.

8. Inspection: The Agency shall provide one or more inspectors to inspect the construction and installation of the Facilities. The Agency shall be fully responsible for inspection of all Facilities. The cost of inspection shall be charged against the deposit provided in paragraph 1.

9. No Water Deliveries to Facilities Prior to Acceptance: No water shall be delivered to the Facilities until all of the Facilities have been completed and accepted by the Agency, unless delivery prior thereto is approved by the Agency in writing.

10. Acceptance: The Agency assumes no obligation for operation or maintenance of the Facilities included in this Agreement until such time as they are formally accepted in writing by the Agency. Any costs incurred by the Agency due to emergency or other repairs prior to final acceptance by the Agency shall be billed to, and paid by, Lincoln.

Lincoln shall be notified in writing of acceptance of such Facilities when they are satisfactorily installed in accordance with the Agency Accepted Plans and the Agency's current Improvement Standards, Technical Provisions and Standard Drawings, all grading and paving is completed, all required easements are received, accepted and recorded by the Agency; the required maintenance guarantee is posted; and Lincoln has no monies due the Agency on any accounts with the Agency.

Immediately upon notice by Agency of acceptance, all rights, titles, and interest in the pipeline, metering station and all other portions of the Facilities, shall be vested in the Agency.

11. Indemnification: Lincoln shall assume the defense of, and indemnify and save harmless the Agency, its Directors, employees, agents and volunteers, from all claims, costs, losses, damages and expenses, including attorney's fees of any kind arising from the design of the Facilities, performance of work under this Agreement or from challenges to the adequacy of the environmental review for such work, including but not limited to claims for personal injury or death, claims for damage to property, alleged damages due to runoff onto other properties, and claims for loss of business; and Lincoln agrees to require in any contract entered into with anyone for the performance of work under this Agreement that all work will be done pursuant to the Agency's Improvement Standards, Technical Provisions and Standard Drawings, and that the contractor will indemnify and save harmless the Agency, its Directors, employees, agents and volunteers from all claims of any kind arising from the contractor's performance of work covered by this Agreement, including, but not limited to, claims for personal injury and death, claims for damages to property and claims for loss of business, except for active negligence, sole negligence, or willful misconduct of the Agency.

12. Insurance: Lincoln or Lincoln's contractor shall carry Automobile Liability insurance in the amount of at least $1,000,000, and Commercial General Liability in the amount of at least $1,000,000 per occurrence and $2,000,000 aggregate with a maximum $5,000 deductible, which insurance shall be primary and underlying to the Agency's insurance and Commercial General Liability and shall specifically name the Agency as an additional insured and certificate holder. Before work is commenced, Lincoln or Lincoln's contractor shall furnish the Agency with a certificate(s) of insurance and Additional Insured Endorsement (ISO CG 2010) or equivalent as satisfactory proof that Lincoln or Lincoln's contractor carries the insurance required by the Agreement and Worker's Compensation Insurance in compliance with the laws of the State of California. Lincoln's insurance shall be primary

and any insurance or self-insurance maintained by the Agency shall be excess and not contribute to it The insurance carriers will have a Best Rating of no less than A:-VII or equivalent or as otherwise approved by the Agency.

13. Performance, Payment and Maintenance Bonds: The estimated cost of the Facilities is $3,600,000. Prior to construction or installation of any of the Facilities and during all such construction and installation, Lincoln shall ensure that the Agency is provided a Performance Bond with a penal sum of 100% of the estimated cost of the Facilities. The performance bond shall be in a form substantially as that attached hereto as Exhibit B, that is acceptable to the Agency. In addition, prior to construction, Lincoln shall ensure that the Agency is provided a Public Works Payment Bond with the identical penal sum in a form substantially as that attached as Exhibit C that is acceptable to the Agency Lincoln shall ensure that the Performance Bond and Payment Bond are maintained in full effect at all times until the Agency accepts the Facilities.

After completion of work and before acceptance by the Agency, a Maintenance Bond in the amount of 50% of the estimated cost of the Facilities shall be provided to the Agency by Lincoln or Lincoln's Contractor A cash deposit in an amount adequate to cover such guarantee may be provided. Such maintenance guarantee shall remain good for a period of one (1) year after acceptance by the Agency of the Facilities All bonds shall be issued by California admitted surety insurers.

14 Special Conditions:

A) The Facilities shall consist of a 30 inch diameter pipeline and ancillary facilities to deliver water from the 30 inch Tee heading north from the Phase 2-42 inch pipeline that supplies the Agency's Metering Station at Catta Verdera to Lincoln's City Pond Site, and a new Metering Station and related ancillary facilities meeting the Agency's specifications to be constructed and installed at Lincoln's City Pond Site. Lincoln shall convey to the Agency fee title to sufficient land for the Metering Station and to facilitate the operation and maintenance of

the Facilities, together with all necessary access easements.

B) Lincoln shall be the Lead Agency under the California Environmental Quality Act (CEQA), and shall perform any actions and assume all costs for compliance and mitigation under CEQA related to the installation of the Facilities. All such costs shall be reimbursable as allowed under section 14H.

C) PCWA has already credited Lincoln with the WCC based on the $4,000,000 paid by Lincoln in accordance with the Supplement to the Contract between Placer County Water Agency and City of Lincoln for a Water Supply dated December 11, 2006 Upon completion of the Facilities and acceptance by the Agency, Lincoln shall be entitled to 351.7 EDU's (404,455 gallons per day) through the unregulated delivery facilities. Should the cost of Facilities exceed the monies paid by Lincoln under the December 11, 2006 contract, the Agency will credit Lincoln additional maximum day water delivery. Such additional increases in the maximum day water delivery over and above the current maximum daily flow applied pursuant to the December 11, 2006 contract shall be calculated by dividing the cost of the Facilities less the monies paid by Lincoln per the 2006 Supplemental Agreement by the cost per gallon of the WCC components applicable to Lincoln, consisting of either treatment and transmission components and one half of the planning component applicable for the 18-inch regulated meter, or full Zone 1 WCC components applicable for the 8-inch unregulated meter.

D) Lincoln has requested that the funds remaining from the $4,000,000 amount paid per the December 11, 2006 Supplement to the Water Supply Contract be used to assist in funding the Facilities. Once the Facilities are under construction, the Agency will release funds remaining from the $4,000,000 deposit on a monthly basis. Prior to release of funds, Lincoln shall provide a summary invoice with support documentation showing total expenses, a breakdown of costs that are the responsibility of Lincoln and which costs are the responsibility

of the Agency, copies of contractor pay records and any approved change orders. Raw water system right of way costs shall be separately tracked and identified for purposes of reimbursement payments. The Agency will make payment to Lincoln within 30 days provided that the information and backup meets the submission requirements of this Agreement.

E) The Agency shall reimburse Lincoln in the form of cash payments for the costs of raw water system right of way acquisition; these costs shall be in addition to the allowable Facilities costs The amount to be reimbursed for the raw water system right of way acquisition shall not exceed $40,000, per the estimated costs from Ubora Engineering. If the actual cost at acceptance is greater than $40,000 this Agreement shall be amended, subject to Agency approval, to provide reimbursement equal to the actual costs

F) PCWA shall not apply monthly service charges for the WCCs credited to Lincoln under this Agreement until the Facilities have been accepted and metered flows are delivered to Lincoln through the Metering Station at the City Pond Site.

G) WCC credits shall be applied to Lincoln for the following allowable Facilities costs incurred by Lincoln: CEQA compliance and mitigation, pipeline, Metering Station design and construction, permitting, surveying, potable water system right of way acquisition, electrical instrumentation and control design and construction, PLC programming and integration, fencing and landscaping design and installation at the metering station, inspection, testing, staff costs of a designated Lincoln project manager plus other reasonable internal staff costs when working on the Facilities, advanced funding required under Section 1 for Agency staff costs, bonding and warranties as required by this Agreement. Internal Lincoln staff costs shall be applied at Lincoln's fully burdened rate without additional overhead applied. Only firms prequalified by PCWA shall be allowed to provide PLC programming and network integration services. Allowable Facilities costs shall also include construction of access roads to Agency

canals and pipelines connecting to the Facilities, including vehicle turn arounds and basic bridges over the canal where needed

H) PCWA shall credit Lincoln costs for the access road to Lincoln's future tank site and the Metering Station as follows:

From the Twelve Bridges subdivision road to the midpoint of the future tank location: 50% of cost of approved road design.

From the future tank site to the Metering Station: 100% of cost of approved road design.

Lincoln shall be solely responsible for the following costs, which shall be subtracted from the request for credits or payment: any costs for canal or pipeline access roads that exceed the minimum width or design approved by PCWA for its facilities, fencing for public exclusion or screening along the pipeline rights of way other than at the Metering Station site, and project features applied for recreational or aesthetic purposes. Lincoln shall be solely responsible for the cost of any warranty work per section 10.

Changes to the preceding definitions, or change orders during construction, shall be credited or reimbursed only if approved in writing by both Lincoln and PCWA in advance of incurring expenses for those changes.

15 Placing Work in Service: If desired by the Agency, portions of the work may be placed in service or locked off when completed, and Lincoln shall provide proper access to the work for this purpose. Such use and operation shall not constitute an acceptance of the work, and Lincoln shall be liable for defects due to faulty construction throughout the duration of this Agreement and thereafter as provided under Warranties and Repairs

16. Warranties and Repairs: Lincoln hereby agrees to pay to the Agency or to make at its own expense, all repairs, replacements or payments necessitated by defects in materials or

workmanship supplied under the terms of this Agreement which exist or manifest within one year after the date of final acceptance of the work, including defects that are in existence during such one year period but which do not become apparent until thereafter. Lincoln shall be fully responsible for all direct and indirect damages and expenses to the Agency proximately caused by such defects in materials or workmanship including defects in materials or workmanship supplied to Lincoln's Contractor by any subcontractor or manufacturer or equipment. As to any equipment which bears a guarantee or warranty in writing or by law for a period longer than one year, Lincoln hereby stipulates and agrees that such guarantee shall inure to the benefit of the Agency for such longer period. Lincoln shall make all repairs and replacements or payments promptly upon receipt of written order for same from the Agency. If Lincoln fails to make the repairs, replacements or payments promptly, the Agency may do the work, and Lincoln and its Surety shall be liable for the cost thereof.

17. Assignment of Agreement: The provisions of this Agreement shall apply to and bind the successors and assigns of the respective parties, but no assignment or transfer of this Agreement, or any part hereof, or interest herein, shall be valid until and unless approved by the Agency.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the date written below.

PLACER COUNTY WATER AGENCY

BY: Graham L Allen

Date: 10/17/13

ATTEST:

Clerk, Board of Directors

CITY OF LINCOLN

Signature

Jim Estep

Print name

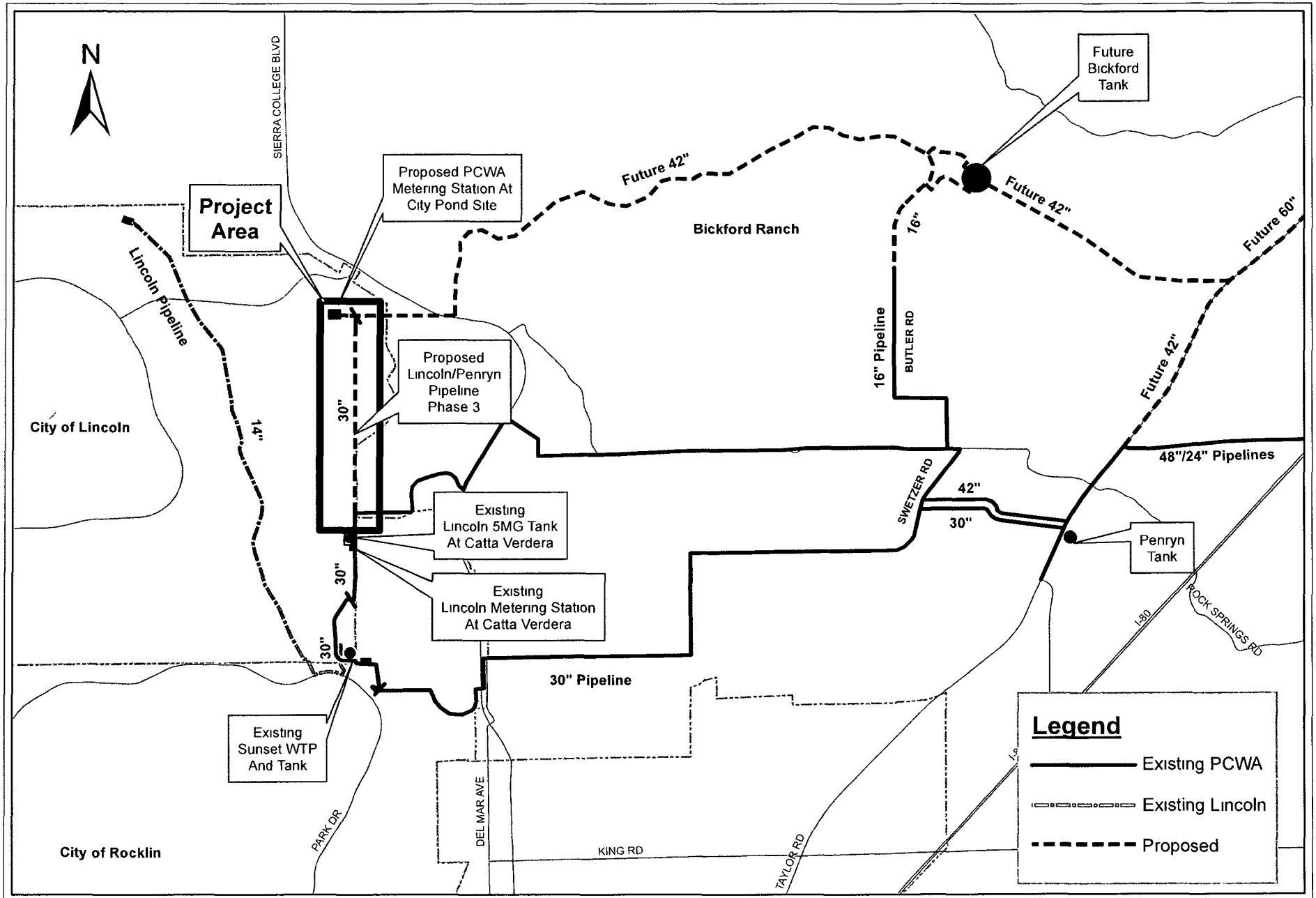
City Manager

Title

Date: 10/10/13

City of Lincoln
600 Sixth Street
Lincoln, CA 95648

Exhibit A



FA 2521
Lincoln/Penryn Pipeline Phase 3

10/11/12

EXHIBIT B

Faithful Performance Bond
(1 of 2)

Whereas, Placer County Water Agency, and _____ (hereinafter designated as "Principal") have entered into an agreement dated _____ (the "Agreement") whereby Principal agrees to install and complete certain designated public improvements, and identified as project _____; and

Whereas, Principal is required under the terms of that Agreement to furnish a bond for the faithful performance of that Agreement.

Now, therefore, we, the Principal and _____, as surety, are held and firmly bound unto Placer County Water Agency, in the penal sum of _____ dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the Agreement and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless Placer County Water Agency, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by Placer County Water Agency in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work to be performed thereunder or the specifications accompanying the same shall in anywise affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the work or to the specifications.

Faithful Performance Bond
(2 of 2)

In witness whereof, this instrument has been duly executed by the Principal and surety above named, on _____, 20____.

[SURETY]

(Seal)

BY: _____

Its: _____

(PRINCIPAL)

Seal)

BY: _____

Its: _____

NOTARY STAMP
ATTACH POWER OF ATTORNEY

(The signature of the Surety on
this Bond must be acknowledged
before a Notary Public)

EXHIBIT C

Bond for Security of Laborers and Materialmen
(1 of 2)

Whereas, Placer County Water Agency, and _____ (hereinafter designated as "Principal") have entered into an agreement dated _____ (the "Agreement") whereby Principal agrees to install and complete certain designated public improvements, and identified as project _____; and

Whereas, Under the terms of the Agreement, the Principal is required before entering upon the performance of the work, to file a good and sufficient payment bond with the Placer County Water Agency to secure the claims to which reference is made in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code of the State of California.

Now, therefore, the Principal and the undersigned, as corporate surety, are held and firmly bound unto Placer County Water Agency and all contractors, subcontractors, laborers, materialmen, and other persons employed in the performance of the Agreement and referred to in Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code in the sum of _____ dollars ($_____), for materials furnished or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to this work or labor, that the surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay, in addition to the face amount thereof, costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by Placer County Water Agency in successfully enforcing this obligation, to be awarded and fixed by the court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims under Title 15 (commencing with Section 3082) of Part 4 of Division 3 of the Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration or addition.

Bond for Security of Laborers and Materialmen
(2 of 2)

In witness whereof, this instrument has been duly executed by the Principal and surety above named, on _____, 20____.

[SURETY]

(Seal)

BY: _____

Its: _____

(PRINCIPAL)

(Seal)

BY: _____

Its: _____

NOTARY STAMP

ATTACH POWER OF ATTORNEY

(The signature of the Surety on this Bond must be acknowledged before a Notary Public)

PCWA
water • energy • stewardship

PLACER COUNTY WATER AGENCY
SINCE 1957

BOARD OF DIRECTORS
Gray Allen, District 1
Primo Santini, District 2
Mike Lee, District 3
Robert Dugan, District 4
Joshua Alpine, District 5

David Breninger, General Manager
Ed Tiedemann, General Counsel

BUSINESS CENTER
144 Ferguson Road
MAIL
P.O. Box 6570
Auburn, CA 95604
PHONE
(530) 823-4850
(800) 464-0030
WWW.PCWA.NET

October 18, 2013

Jim Estep
City of Lincoln
600 Sixth Street
Lincoln, CA 95648

RE: FACILITIES AGREEMENT 2521
LINCOLN/PENRYN PIPELINE PHASE 3

Dear Mr. Estep:

Enclosed is a fully executed Facilities Agreement for the aforementioned project.

Thank you for your continued interest in our agency.

Sincerely,

Darcy Erickson
Office Assistant

Enclosure

Temporary Water Sales Agreement Between the Nevada Irrigation District (NID), Placer County Water Agency (PCWA), and the City of Lincoln (Lincoln)

This agreement is made and entered into this 26th day of October, 2004, by and between the Nevada Irrigation District, hereafter referred to as "NID", Placer County Water Agency, hereafter referred to as "PCWA", and the City of Lincoln, hereafter referred to as "Lincoln".

Recitals

A. NID is authorized to provide water for irrigation, municipal and domestic use within its boundaries, in accordance with Division 11 of the California Water Code. PCWA is a county water agency created in 1959 by the California Legislature (statutes of 1957, Chapter 1234) and is authorized to provide water for the same uses within its service area.

B. NID's boundaries overlap portions of PCWA's Zone 1 service area and Lincoln's city limits.

C. Lincoln currently purchases treated surface water from PCWA pursuant to a long-term contract between Lincoln and PCWA, and delivers the treated water to its customers, some of whom are in that portion of the city that is also within the boundaries of NID.

D. NID currently does not have infrastructure to provide treated water within its service area in the vicinity of Lincoln.

E. NID and Lincoln have entered into an agreement for joint planning and site evaluation of a domestic water treatment plant to be owned by NID to serve Lincoln's long-term needs within NID's boundary.

F. PCWA currently has infrastructure in place to treat and deliver surface water to Lincoln for use by customers of Lincoln within NID's boundaries, but requires raw water from NID for treatment and delivery to Lincoln for re-delivery to residents within NID's boundaries.

G. NID has raw water available that can be temporarily delivered to PCWA for this purpose until such time as NID has other means available to serve Lincoln's needs within NID's boundary.

H. PCWA is desirous of substituting NID's water for the water PCWA now delivers to Lincoln for use within NID's boundaries so that it can reallocate a similar amount of water to PCWA customers which may include Lincoln, for use outside of NID's boundaries.

I. Lincoln is desirous of purchasing additional treated water capacity from PCWA's system throughout the life of this temporary water sales agreement.

AGREEMENT

Now, therefore, the parties mutually agree as follows:

1) NID agrees to sell PCWA raw water that will be delivered to PCWA's treatment plants. PCWA will treat and deliver equivalent quantities of water to Lincoln, less losses, for distribution to customers of Lincoln that are within the boundaries of NID as described in Exhibit A.

2) NID water delivered and sold to PCWA including a 10 percent loss factor will be measured and will be equal to an amount retailed by Lincoln to customers within the boundaries of NID plus the 10 percent loss factor.

3) Lincoln will ensure that all treated water use within NID's boundaries will be metered and Lincoln will provide such metered water sales information that will include a 10 percent loss factor to NID and PCWA on a monthly basis. An annual water balance will be completed by NID by January 31 of each year.

4) PCWA shall pay NID for water delivered at the NID's municipal rate for raw water, subject to changes to that rate authorized by NID's Board from time to time. (Rate Schedule 5-R)

5) Water sold and delivered by NID under the terms of this agreement is untreated water which has flowed in open canals, conduits and flumes, and which has been stored in reservoirs. Such water is not potable and NID does not represent or guarantee that it is fit for domestic purposes. PCWA shall be solely responsible for any treatment, storage, or transmission of said water to Lincoln for human consumption in accordance with laws and regulations applicable to potable water.

6) Raw water delivered by NID under this agreement is subject to scheduled and unscheduled outages. It will be PCWA and/or Lincoln's responsibility to provide an alternate treated water supply during such outages so that deliveries to Lincoln's customers by NID will not be disrupted.

7) It is understood and agreed that in a year which is considered or deemed by NID to be a drought year or in a year which in the estimation of NID requires rationing or curtailment of water use, NID at its discretion may impose a drought surcharge, and/or reduce or restrict the raw water service to PCWA, in proportion to any reduction, limitation or curtailment of treated water customers within the District.

8) It is understood and agreed that in any year in which PCWA determines it must ration or curtail water deliveries in its Zone 1, and if NID is able to deliver water to PCWA, for delivery to Lincoln, PCWA will make that water available to Lincoln for delivery to Lincoln's customers in NID's boundaries.

9) It is also understood that PCWA shall not be required to deliver water to Lincoln obtained from NID pursuant to this agreement whenever PCWA determines that it does not have sufficient capacity in its facilities to treat and deliver such water to Lincoln. PCWA will notify NID whenever PCWA does not have capacity to deliver such water to Lincoln.

10) This agreement is intended to be a temporary agreement to be in effect until such time as NID constructs a treatment plant and other facilities sufficient to enable NID to supply treated water to Lincoln for those customers within Lincoln that are also within NID's boundary. This agreement is not intended to usurp nor weaken NID's water rights nor customer base.

11) This Water Sales agreement may not be modified without the express written consent of NID, PCWA, and Lincoln.

12) NID, PCWA, and Lincoln will each comply with all legal requirements applicable to each of their respective services and obligations under this agreement.

City of Lincoln

Mayor

City Clerk

Nevada Irrigation District

President

Secretary

Placer County Water Agency

Chair of the Board

Board Secretary

Appendix B

Water Use Factor Technical Memorandum

WEST YOST
Water. Engineered.

2020 Research Park Drive
Suite 100
Davis CA 95618

530.756.5905 phone
530.756.5991 fax
westyost.com

TECHNICAL MEMORANDUM

DATE: December 17, 2025

Project No.: 206-60-24-56
SENT VIA: EMAIL

TO: Araceli Cazarez, PE, City of Lincoln

FROM: Colton Short, EIT, #174039
Angie Yan, EIT, #172428

REVIEWED BY: Brenda Estrada, PE, RCE #67062

SUBJECT: City of Lincoln 2023 Water Use Factors Development Methodology

In 2021, West Yost developed water use factors for the City of Lincoln (City) using 2019 water consumption data. Currently, the City is in the process of completing their 2024 Water Master Plan Update (WMPU). As part of the work for the WMPU, West Yost has updated the water use factors using 2023 water consumption data. This technical memorandum (TM) details the update of and presents the recommended City's water use factors .

DEVELOPMENT OF WATER USE FACTORS

Since 2019, the COVID pandemic occurred which altered how people work, with many continuing to work remotely from home. In addition, customers have continued to conserve water. These changes have had an impact on water consumption trends. To capture the changes, new unit water use factors were developed using the 2023 water consumption data.

The City projects future system demands using land-use based unit water use factors. To develop these factors, the City provided West Yost with the following data:

- 2023 metered water consumption data in a spreadsheet with meter IDs,
- Spatially-located water meter locations, and
- City of Lincoln existing zoning land use and parcel information in Geographic Information System (GIS).

Water use factors were then determined by using the following methodology:

- Metered water consumption data was filtered to exclude rate descriptions that do not represent potable water consumption (i.e., reclaim water, hydrant water, and null). In addition, accounts which did not include a full year's worth of data were excluded from the analysis.
- Annual 2023 water consumption data were linked to the spatially-located water meters using register number.

- Spatially-located metered water consumption was then linked to the parcel file with the City's land use designations by using a spatial join.

This methodology allowed West Yost to develop water use factors for land use designations used in the City's current General Plan. The following sections discuss the methodologies for updating residential and non-residential unit water demand factors.

General Methodology

Unit water demand factors were developed using 2023 meter data and existing land use information in GIS format. The City's metered water consumption data was spatially joined to the GIS parcels. Some records were manually linked to land use data if the meter was located outside of its respective parcel. The unit water demand factor for each land use designation was calculated by dividing the total metered water consumption by the associated dwelling units or the parcel area per land use for residential and non-residential land uses, respectively. Figure 1 shows the spatial distribution of linked meter data. Figure 2 shows the land use areas used to develop the unit water demand factors.

The parcel area calculation did not include streets and therefore resulted in "net" unit water use factors. The "net" unit water use factors were then adjusted to account for streets so they could be applied to the gross acreage information provided by City staff for future development.[1] The following sections describe the updated unit water use factors by land use designation.

Unit Water Use Factors

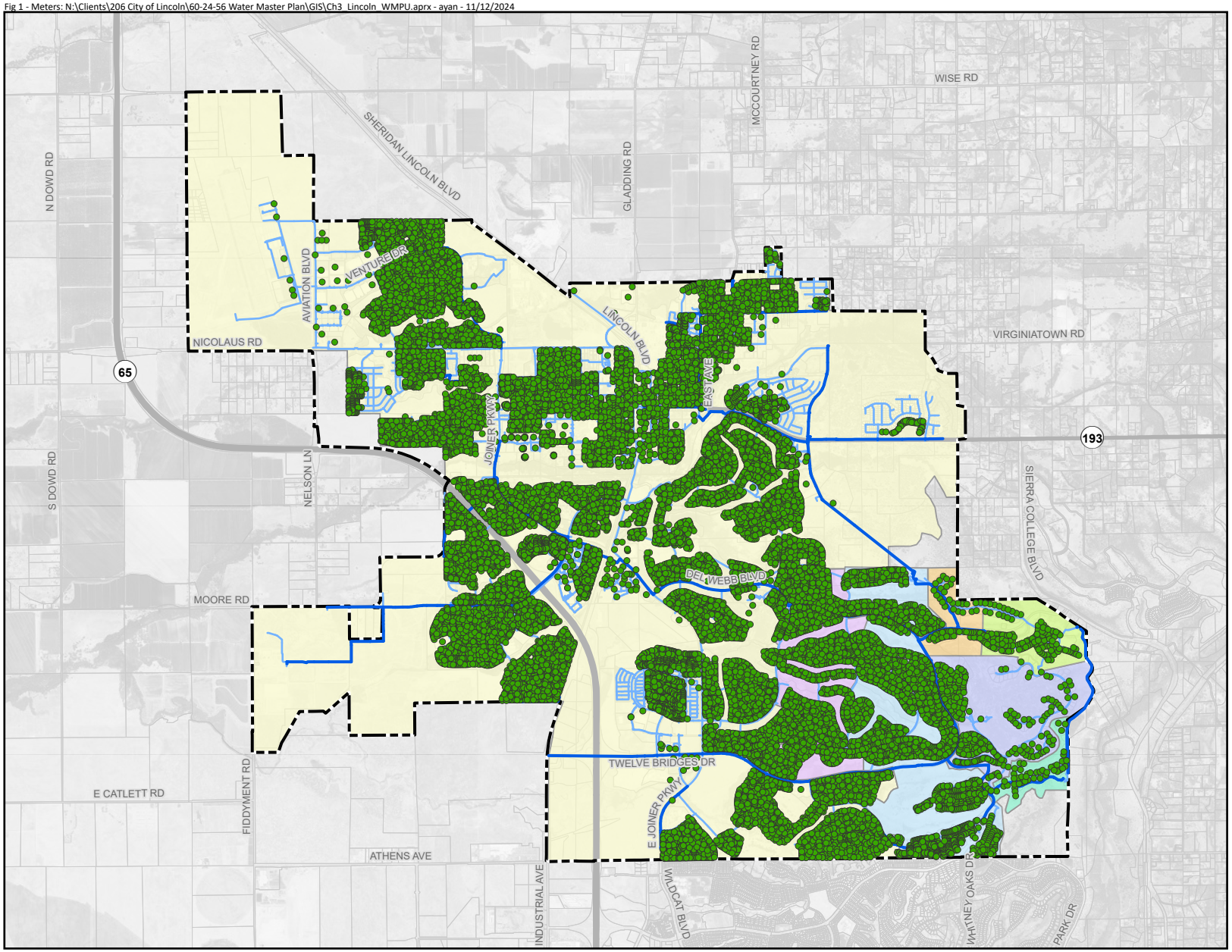
Unit water use factors were developed by joining the spatially-located metered water consumption data and the land use data. Single-family residences (Low Density Estates, Low-Density Residential, and Medium-Density Residential) are typically served by a single meter. High-Density Residential and non-residential land uses may have multiple meters. To calculate residential unit water use factors, the total annual water use was divided by the associated total dwelling unit counts[2] for the parcels with 2023 water use. To calculate the non-residential unit water use factors, the total annual water use was divided by the total parcel acreage per respective land use. As described in the following sections, some adjustments were made to include or exclude water use from select meters and parcel acreage as necessary to develop water use factors which are representative of water use expected in future development.

In 2021, each unit use factor was increased by 5 percent to be conservative and account for variability in annual water use. This 5 percent increase was not applied to the unit use factors developed in this TM due to the State Water Board's adoption of the 2018 Water Conservation Legislation to Making Water Conservation a California Way of Life (Senate Bill [SB] 606 and Assembly Bill 1668) on July 3, 2024, which requires water purveyors to calculate and be held to annual urban water use objectives to improve water use efficiency.

[1] The gross acreage within the existing City limits is 15,425 acres, and the net acreage within the City limits assigned to an existing or planned land use is 13,798 acres. Therefore, a factor of 1.12 (15,425 acres divided by 13,798 acres) was used to convert from net acreage to gross acreage.

[2] Mintier & Associates and Matrix Design Group, Inc. March 2008. *City of Lincoln General Plan 2050.* Table 4-1. General Plan Land Use Designations and Development Standards.

Fig 1 - Meters: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch3_Lincoln_WMPU.aprx - ayan - 11/12/2024



Spatially Located Water Meters

City Limit

Existing Pipelines

Distribution Pipeline (<18-inch)

Transmission Pipeline (≥18-inch)

Pressure Zones

375 Zone

475 Zone

575 Zone

610 Zone

650 Zone

750 Zone

775 Zone

Notes:

1. GIS meter shapefile provided by the City of Lincoln in 2024.
2. Meters shown in this figure represent metered potable water used only for the purpose of developing unit water use factors and does not represent all of the City's water meters.

Prepared by:

WEST YOST

N

0 3,000 6,000 Feet

Prepared for:

City of Lincoln

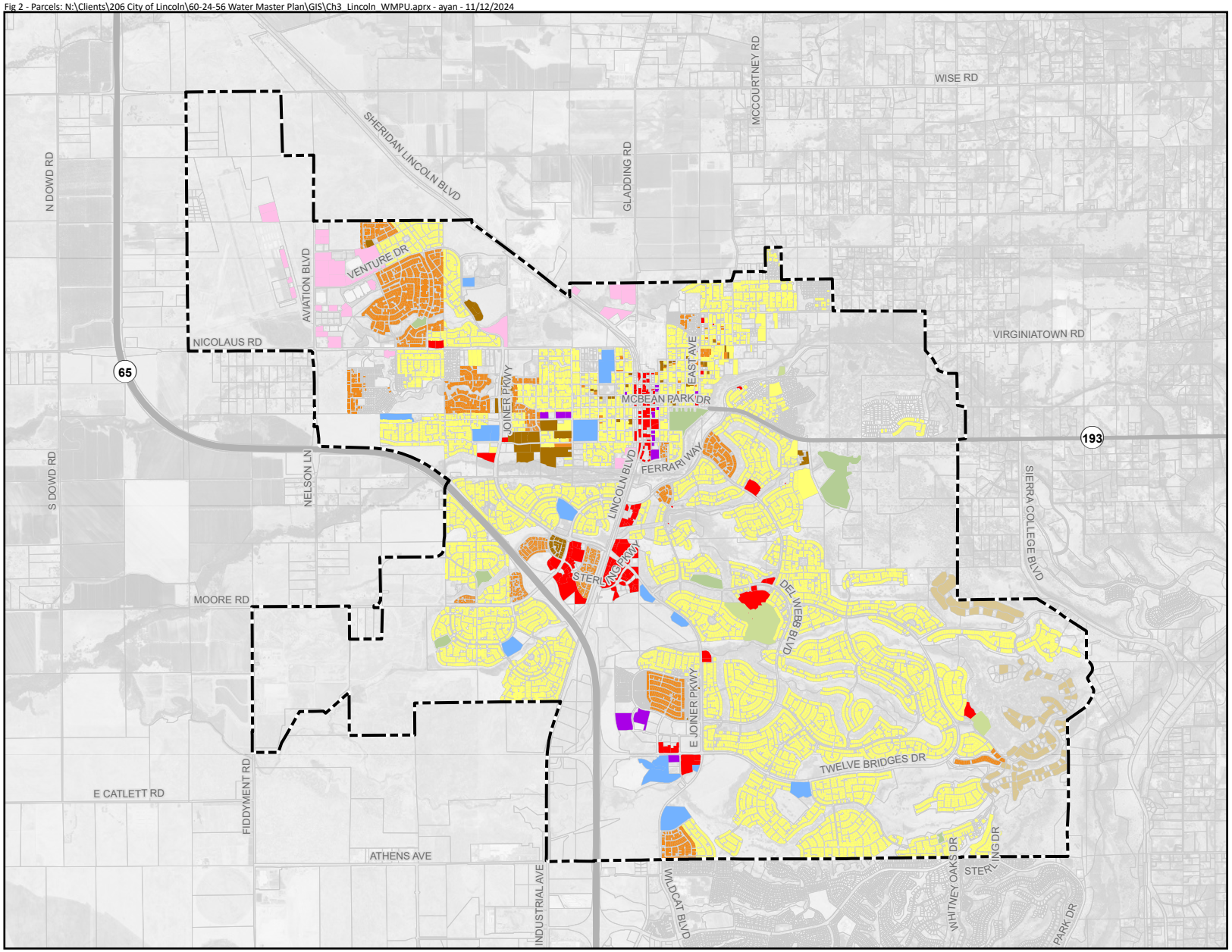
Water Master Plan Update

Lincoln Live. Life. Lincoln

Spatially Located Water Meters

Figure 1

Fig 2 - Parcels: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch3_Lincoln_WMPU.aprx - ayan - 11/12/2024



City Limit

Zoning

- Country Estates
- Low Density Estates
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial
- Business and Professional
- Industrial
- Public Facilities
- Parks and Recreation

Notes:

1. GIS zoning and land use shapefiles provided by the City of Lincoln in 2024.
2. Zoning is only shown for parcels which were used to calculate acreage in the unit water use factor development.
3. Land use for meters originally categorized as open space were revised by the City. The parcels for these meters were manually drawn in, and therefore, the land use shown is not an exact match to the City's Zoning Map.
4. Mixed Use land use is not shown since the associated parcel has not been developed, and therefore, was not used to calculate the unit water use factor.
5. Recommended unit use factors for Public Facilities, and Parks and Recreation were not based on the parcels shown.
6. Parks and Recreation zoning shown represents the total park area served by a meter and in some cases can include multiple parcels, some of which may not directly have a meter.

Prepared by:

WEST YOST

N

0 3,000 6,000

Feet

Prepared for:

City of Lincoln

Water Master Plan Update

Lincoln Live. Life. Lincoln

Parcels Used in Water Use Factor Calculations

Figure 2

Low Density Estates

The 2021 water use factor update listed a Country Estates land use. However, recent Specific Plans have included a Low Density Estates designation as a planned land use with similar characteristics as the Country Estates. For this update, a single Low Density Estates water use factor was developed to represent the Low Density Estates and Country Estates land use designations. The Low Density Estates land use designation represents residential parcels with a density of up to 2 dwelling units per acre (du/ac) and Country Estates land use designation represents residential parcels with a density of 1 to 2.9 du/ac. Low Density Estates parcels tend to include large multi-story homes on lots of 20,000 square feet or greater, with large yards and extensive landscaping. Similar to Low Density Estates, Country Estates parcels tend to be large parcels with large single-family homes. It was assumed that there is a single dwelling unit on each existing Low Density Estates parcel. A Low Density Estates unit use factor of 1.46 acre-feet per dwelling unit (af/du) was calculated from the 2023 meter consumption data and is recommended for the City to adopt. This represents an increase of approximately 7 percent from the 2021 calculated unit use factor.

Low Density Residential

The Low Density Residential land use designation represents residential parcels with a density of 3 to 5.9 du/ac. Low Density Residential land use consists of traditional single-family homes on individual lots. It was assumed that there was a single dwelling unit on each existing Low Density Residential parcel. A Low Density Residential unit use factor of 0.39 af/du was calculated from the 2023 meter consumption data and is recommended for the City to adopt. This represents a decrease of approximately 3 percent from the 2021 calculated unit use factor.

Medium Density Residential

The Medium Density Residential land use designation represents residential parcels with a density of 6 to 12.9 du/ac. Medium Density Residential land use consists of traditional single-family homes on lots which are slightly smaller than those of Low Density Residential use. It was assumed that 10 dwelling units, the median of the Medium Density Residential dwelling unit range, was on each existing Medium Density Residential parcel. The calculated unit use factor using the 2023 meter consumption data was approximately 30 percent lower than the 2021 calculated unit use factor. While the City has seen a decrease in water demands, it was decided a more conservative approach to account for demand variability be used to calculate the unit use factor. A Medium Density Residential unit use factor of 0.30 af/du was calculated based on the average from the 2021 and 2023 meter consumption data and is recommended for the City to adopt. This represents a decrease of approximately 16 percent from the 2021 calculated unit use factor.

High Density Residential

The High Density Residential land use designation represents residential parcels with a density of 13 to 20 du/ac or greater. The High Density Residential land use designation includes higher density living styles, such as condominiums, townhouses, triplexes and fourplexes, and multi-family residential units. It was assumed that 17 dwelling units, the median of the High Density Residential dwelling unit range, was on each existing High Density Residential parcel. The calculated unit use factor using the 2023 consumption data was approximately 24 percent lower than the 2021 calculated unit use factor. While the City has seen a decrease in water demands, it was decided a more conservative approach to account for demand variability be used to calculate the unit use factor. A High Density Residential unit use factor of 0.18 af/du was calculated based on the average from the 2021 and 2023 meter consumption data and is

recommended for the City to adopt. This represents a decrease of approximately 12 percent from the 2021 calculated unit use factor.

Commercial

A single Commercial water use factor was developed to represent the Neighborhood Commercial and Community Commercial land use designations. The calculated unit use factor using the 2023 consumption data was approximately 28 percent lower than the 2021 calculated unit use factor. While the City has seen a decrease in water demands, it was decided a more conservative approach to account for demand variability be used to calculate the unit use factor. A Commercial unit use factor of 1.45 acre-feet per acre (af/ac) was calculated based on the average from the 2021 and 2023 meter consumption data and is recommended for the City to adopt. This represents a decrease of approximately 14 percent from the 2021 calculated unit use factor.

Business and Professional

A single Business and Professional water use factor was developed to represent the Business and Professional and Employment Center land use designations. These land use types include offices and other buildings associated with professional services. The calculated unit use factor using the 2023 consumption data was approximately 48 percent lower than the 2021 calculated unit use factor. While the City has seen a decrease in water demands, it was decided a more conservative approach to account for demand variability be used to calculate the unit use factor. A Business and Professional unit use factor of 1.15 af/ac was calculated based on the average from the 2021 and 2023 meter consumption data and is recommended for the City to adopt. This represents a decrease of approximately 24 percent from the 2021 calculated unit use factor.

Mixed Use

The Mixed Use land use designation represents developments that physically and functionally provide space to integrate residential and commercial use. Generally, mixed use developments are anticipated to consist of buildings with commercial use on the first floor and residential use on all floors above the first. There is currently only one meter associated with the Mixed Use land use designation, and that respective area has yet to be developed. Since there is no current consumption data associated with this land use, an updated unit water use factor from the City's consumption data could not be developed. Therefore, it is recommended for the City to continue to use the previously developed Mixed Use unit use factor of 2.00 af/ac from the 2021 water use factor update, which was developed based on other agencies in the Central Valley with similar climates.

Industrial

A single Industrial land use designation was developed to represent the Industrial, Light Industrial, and Industrial Planned Development land use designations. To remain consistent with the 2021 water use factor update, water use and parcel acreage for Sierra Pacific Industries sawmill plant and Gladding McBean clay plant have been excluded from the calculations since these large manufacturing plants have above average industrial water use and are not representative of future Industrial developments within the City. Additionally, the water use and parcel acreage at 466 Airport Road were also excluded from the analysis as it was assumed that the large parcel acreage does not accurately represent the extent of water use serving the parcel. An Industrial unit use factor of 0.47 af/ac was calculated from the 2023 meter consumption data and is recommended for the City to adopt. This represents an increase of approximately 10 percent from the 2021 calculated unit use factor.

Public Facilities

The Public Facilities land use designation represents public facilities, churches not associated with a residence, and schools. Water use and parcel acreage associated with the City Wastewater Treatment Facility was excluded from the calculations as it was assumed that the large parcel acreage does not accurately represent the extent of water use serving the parcel. The unit use factor calculated from the 2023 consumption data was significantly lower than the 2021 water use factor. To be conservative, it is recommended for the City to continue using the previous Public Facilities unit use factor of 1.80 af/ac from the 2021 water use factor update, which was developed based on other agencies in the Central Valley with similar climates.

Parks and Recreation

The Parks and Recreation land use designation represents irrigated public parks and areas maintained for recreation, such as sports fields, courts, and playgrounds. The unit use factor calculated from the 2023 meter consumption data was significantly lower than the 2021 water use factor. To be conservative, it is recommended for the City to continue using the previous Parks and Recreations unit use factor of 3.55 af/ac from the 2021 water use factor update, which kept the same factor developed in the 2017 Water Master Plan.

RECOMMENDED WATER USE FACTORS

Table 1 summarizes the recommended unit water use factors for the City to use for future water system planning and compares them with the factors previously developed and adopted in 2021. Low Density Residential, Medium Density Residential, High Density Residential, Commercial, and Business and Professional water use factors saw a decrease from the previous factors, which is consistent with water conservation trends observed throughout the Central Valley and may be a result of the efforts outlined in the City's 2020 Urban Water Management Plan. Low Density Estates (previously Country Estates) and Industrial water use factors saw slight increases in water use by 7 and 10 percent, respectively. Mixed Use, Public Facilities, and Parks and Recreation water use factors did not change. Based on the work completed to develop these water use factors, they are appropriate for the City to adopt and use in projecting future water demands.

Table 1. Recommended Unit Water Demand Factors

Water Use Factor	General Plan Land Use Designation(s)	af/du/yr	af/ac/yr	Change from 2021 Water Use Factor TM, Percent[a]
Residential				
Low Density Estates	Low Density Estates Country Estates	1.46	--	+7%
Low Density Residential	Low Density Residential	0.39	--	-3%
Medium Density Residential	Medium Density Residential	0.30	--	-16%
High Density Residential	High Density Residential	0.18	--	-12%
Non-Residential				
Commercial	Neighborhood Commercial	--	1.45	-14%
	Community Commercial	--		
Business and Professional	Business and Professional	--	1.15	-24%
	Employment Center	--		
Mixed Use[b]	Mixed Use	--	2.00	No change
Industrial	Industrial	--	0.47	+10%
	Light Industrial	--		
	Industrial Planned Development	--		
Public Facilities[c]	Public Facilities	--	1.80	No change
Parks and Recreation[c]	Parks and Recreation	--	3.55	No change

(a) Unit water use factors developed in 2021 included an additional factor of 5 percent to be conservative and account for variability in annual water use. This factor is not applied to the current recommended water use factors due to the 2018 Water Conservation Legislation to Making Water Conservation a California Way of Life adopted by the State Water Board on July 3, 2024.

(b) The City did not have any Mixed Use consumption during the 2023 year, therefore, it is recommended for the City to continue using the Mixed Use unit water use factor developed in 2021.

(c) The calculated Public Facilities and Parks and Recreation water use factors were significantly lower than the 2021 unit water use factor. To be conservative, it is recommended for the City to continue using the previous Public Facilities and Parks and Recreation unit use factors.

Appendix C

System Servicing Plan Technical Memorandum

WEST YOST
Water. Engineered.

2020 Research Park Drive
Suite 100
Davis CA 95618

530.756.5905 phone
530.756.5991 fax
westyost.com

TECHNICAL MEMORANDUM

DATE: January 22, 2026

Project No.: 206-60-24-56
SENT VIA: EMAIL

TO: Araceli Cazarez, PE, City of Lincoln

CC: Chris Nelson, City of Lincoln

FROM: Brenda Estrada, PE, RCE #67062

REVIEWED BY: Jim Mulligan, PE, RCE #52627

SUBJECT: City of Lincoln – System Servicing Plan

INTRODUCTION AND PURPOSE

This technical memorandum (TM) summarizes findings from the City of Lincoln's (City) Water Master Plan Update (WMPU). The purpose of this TM is to document the system servicing strategy, including projected water demands, supply capacity, system evaluation, capital improvement planning, and staffing needs to support buildout of the City's water system. The TM integrates results from key technical analyses and establishes a framework for the City's long-range water system planning.

PLANNING FRAMEWORK AND DATA SOURCES

This TM integrates data and findings from the following WMPU chapters:

- Chapter 3 – Water Demand Analysis
- Chapter 4 – Water Supply Analysis
- Chapter 7 – Existing System Evaluation
- Chapter 8 – Future System Evaluation
- Chapter 10 – Capital Improvement Program

The planning horizon extends through full buildout consistent with the City's General Plan. Land use based projections, service area boundaries, and system hydraulic evaluations provide the foundation for the system servicing plan.

PLANNED DEVELOPMENT

The General Plan 2050 (GP) serves as a long-term policy guide for the City's growth and is the basis for the future growth projections used for facility planning along with input from the City's Community Development Department. The GP framework identifies multiple new development areas as shown on Figure 1. In Chapter 3 of the WMPU, the development of the future growth areas was classified in 5-year increments through a 20-year period with any remaining area assumed to be developed at buildout based

on input from the City's Community Development Department. Growth is expected primarily in Village 1 and Village 5 over the next 20 years. The time frames associated with each Village and Special Use District (SUD) on Figure 1 are as follows:

- Village 1 is anticipated to be substantially completed within 10 years.
- SUD B is anticipated to begin development in the next 5 years and be substantially completed within 15 years.
- Villages 5 and 7 are anticipated to begin development in the next 5 to 10 years and be substantially completed within 15 to 20 years.
- Villages 2, 3, 4, and 6 and SUD-A and -C are assumed to develop in buildout (beyond 20 years).

Each planned growth area's water service strategy considers:

- Land use and density
- Topography and pressure zones
- Phasing

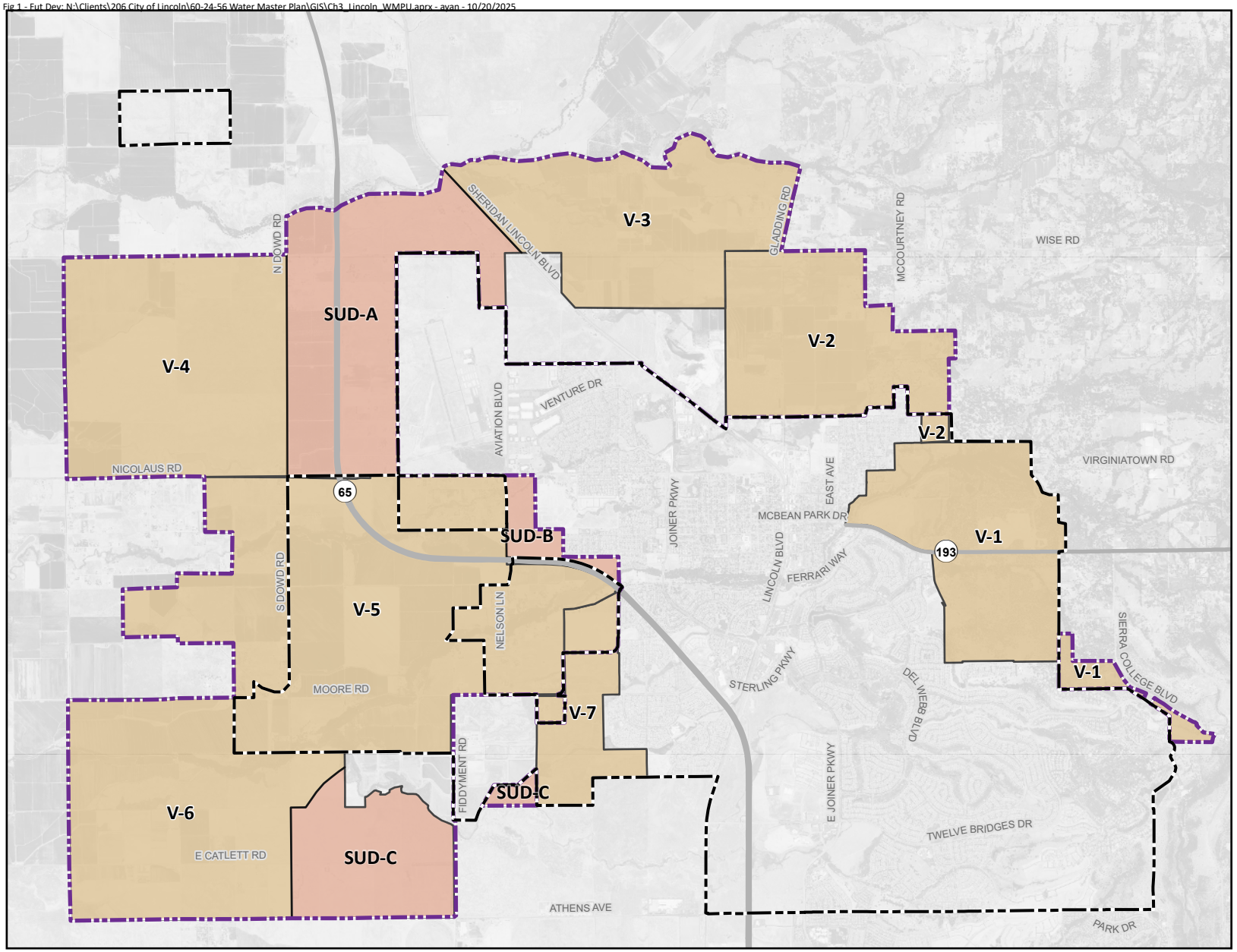
The servicing approach maintains consistency with the City's long-range growth policies and ensures water infrastructure aligns with planned land use and timing assumptions.

PROJECTED DEMANDS

Chapter 3 of the WMPU establishes the basis for the City's updated water demand projections. The City's historical and current water use were evaluated to determine per capita water use and land-use based unit use factors.

Approximately 97 percent of future water connections are expected to be single-family residential, reflecting the City's anticipated development mix. Peaking factors (i.e., average day to maximum day to peak hour) were established based on historical water consumption data. Demand projections were summarized in five-year increments and provided the basis for system hydraulic model evaluations and supply planning. Table 1 summarizes the total projected demand estimates based on the planned development discussed in the previous section.

Fig 1 - Fut Dev: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch3_Lincoln_WMPU.aprx - ayan - 10/20/2025



City Limit
Sphere Of Influence
Village Boundary
Special Use District

Notes:
1. GIS zoning and land use shapefiles provided by the City of Lincoln in 2025.

Prepared by:

WEST YOST

N

0 3,500 7,000
Feet

Prepared for:

City of Lincoln
Water Master Plan Update

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Future Development Areas

Figure 1

Table 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

The projections indicate that growth in demands is proportional to growth in planned development. The City's average day demand is projected to approximately quadruple by buildout. These estimates provide the foundation for system capacity evaluation and capital improvement planning.

WATER SUPPLY AND SERVICING STRATEGY

As detailed in Chapter 4 of the WMPU, the City's water supply portfolio includes both surface water and groundwater resources to ensure a balanced, redundant water supply. The existing surface water and groundwater supplies provide sufficient capacity for existing demands through the 15-year maximum day demand. After the 15-year time frame, the City would need to expand its water supply sources to meet future demands.

Long-term planning includes maintaining redundancy though maximizing available surface water through surface water agreements and continued sustainable groundwater use along with evaluating additional opportunities for future water sources. Future water source opportunities include increased use of recycled water as development occurs on the westside of the City, potential groundwater recharge, and aquifer storage and recovery (ASR) to ensure a sustainable groundwater basin.

The servicing strategy is designed to ensure:

- Adequate supply for projected maximum day demands through buildout.
- Operational flexibility and redundancy.
- Consistency with contractual supply agreements and reliability targets.

SYSTEM CAPACITY AND PHASING PLAN

The hydraulic analyses performed as part of Chapters 7 and 8 of the WMPU evaluated transmission pipelines, pumping facilities, and storage needs to assess system performance under future growth scenarios. The analyses verified that planned facility improvements maintain required pressure and fire flow criteria throughout the service area.

Key elements of the phasing plan are listed below:

- Near-Term (0-5 years): Target reliability improvements and address localized deficiencies.
- Mid-Term (5-15 years): Expand capacity to support development in Village 5 and other developments.
- Long-Term (15+ years): Complete storage, transmission, and booster improvements for buildout of the sphere of influence.

The phasing plan ensures that infrastructure expansion aligns with development pacing and funding availability. Coordination with developers is essential for phasing and cost allocation.

CAPITAL IMPROVEMENT IMPLEMENTATION STRATEGY

The Capital Improvement Program (CIP) outlined in Chapter 10 of the WMPU identifies the projects necessary to address deficiencies, support new development, and maintain service reliability. Key elements include:

- New transmission pipelines to extend service to growth areas
- Additional storage facilities to meet emergency and operational needs
- Booster pump station improvements and inter-zone connections
- Distribution system upgrades to enhance fire flow and reliability

CIP projects were grouped into near-term, mid-term, and long-term implementation phases based on demand triggers and hydraulic priorities as shown on Figure 2. The CIP also provides planning-level cost estimates for guidance on budgeting and rate-setting purposes.

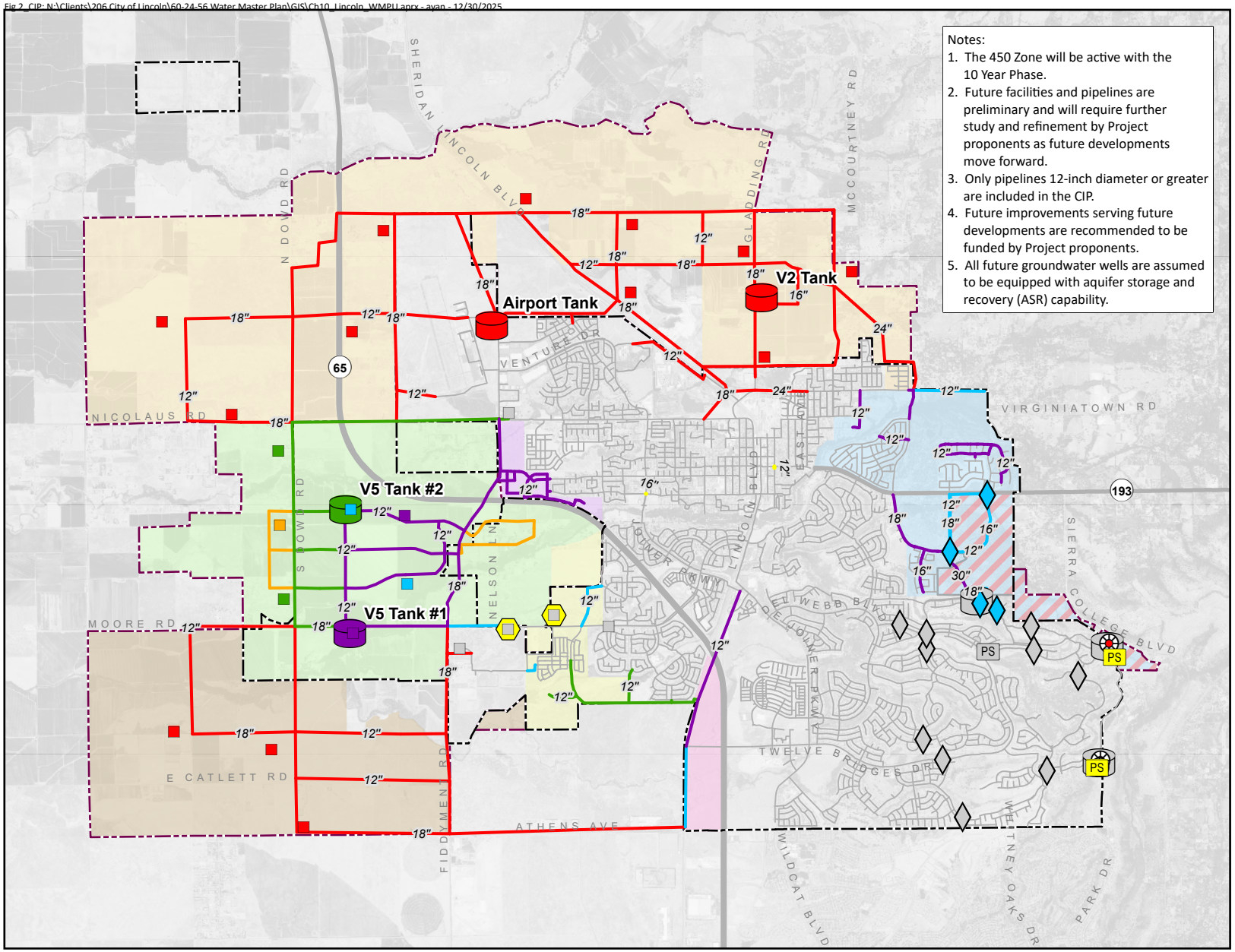
GROWTH AREA SERVICING STRATEGY

The growth area servicing strategy extends the existing 375 Pressure Zone, adds a new 450 Pressure Zone, and adds new facilities to efficiently serve planned developments. The servicing approach emphasizes:

- Hydraulic efficiency
- Redundancy and reliability
- Maintainability

Expansion of the system will occur incrementally in advance of development, guided by the hydraulic model and the City's adopted master plan framework.

Fig 2_CIP: N:\Clients\206 City of Lincoln\60-24-56 Water Master Plan\GIS\Ch10_Lincoln_WMPU.aprx - ayan - 12/30/2025



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

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Recommended Capital Improvement Projects

Figure 2

STAFFING PLAN AND RECOMMENDATIONS

The staffing evaluation assesses current and future resource needs for the City's Water Division. Staffing projections are based on the City's growth in connections and benchmarked against similar sized agencies. The evaluation methodology included the following:

- Evaluation of current staffing structure and responsibilities.
- Review of projected connections and staffing benchmarks.
- Development of a projected staffing plan.

The City's current Water Division staff is undersized for the existing system and will also require expansion with future growth. The benchmarking performed using peer agencies indicates an optimal range of 0.7 to 1.1 full-time employees (FTE) per 1,000 connections; the City currently operates at 0.4 full-time employees per 1,000 connections. As the City continues to grow, staffing should adjust based on the connections being added. The future staffing should focus on distribution maintenance, water quality, customer service, and management support.

Attachment A provides a detailed review of the staffing evaluation performed.

SUMMARY OF FINDINGS

Table 2 summarizes the key findings of the City's System Servicing Plan based on the WMPU analyses. The findings confirm that, with implementation of planned infrastructure, supply strategies, and staffing adjustments, the City's water system can reliability support projected growth through full buildout while maintaining service standards and operational resilience.

Table 2. Summary of Findings

Topic	Summary of Findings
Planned Growth	Future development is primarily concentrated in Villages 1 and 5 within the next 20 years, with remaining Villages and Special Use Districts assumed to develop at long-term buildout. Growth assumptions are consistent with the City's General Plan 2050 and Community Development input.
Water Demand Projections	Average day demand is projected to increase from approximately 9.0 mgd under existing conditions to approximately 35.3 mgd at buildout. Maximum day demand is projected to increase from 16.9 mgd to approximately 66.9 mgd. Demand projections include 10 percent non-revenue water and reflect land use-based development assumptions.
Water Supply Adequacy	The City's existing surface water and groundwater supplies are sufficient to meet current demands. With planned system enhancements and supply management strategies, the City can reliably meet projected demands through buildout while maintaining redundancy and operational flexibility.
Long-Term Supply Strategy	Long-term planning emphasizes maximizing surface water use, sustainable groundwater management, and evaluating supplemental strategies such as recycled water expansion, groundwater recharge, and ASR to enhance supply reliability.
System Capacity	Hydraulic modeling confirms that, with implementation of recommended improvements, the system can maintain required pressure and fire flow criteria under future demand conditions throughout the service area.
Infrastructure Phasing	Capital improvements are phased to align with development timing, address near-term reliability and deficiencies, expand mid-term capacity for planned growth areas, and complete long-term facility improvements required for full buildout of the sphere of influence.
Capital Improvement Program	The recommended CIP identifies transmission, storage, pumping, and distribution improvements necessary to support growth and maintain service reliability. Projects are prioritized based on hydraulic need and demand triggers, with growth-related improvements anticipated to be funded by project proponents where applicable.
Growth Area Servicing	Future development will be served through extension of the existing 375 Pressure Zone and implementation of a new 450 Pressure Zone. The servicing strategy emphasizes hydraulic efficiency, redundancy, and incremental expansion consistent with development phasing.
Staffing Needs	Existing Water Division staffing levels are undersized for the current system and will require incremental increases as connections grow. Benchmarking indicates a target staffing range of approximately 0.7 to 1.1 FTEs per 1,000 connections to maintain reliable operations and regulatory compliance of the water system through buildout.

Attachment A

Detailed Review of the Staffing Evaluation Performed

BACKGROUND

As the City of Lincoln continues to expand toward buildout, the Water Department must plan for a corresponding increase in staffing to maintain reliable operation, maintenance, and regulatory compliance. The City's projected growth will be driven primarily by residential development—approximately 97 percent of future water connections are expected to be single-family residential units.

The number of projected residential water connections was derived from Table A, which summarizes future development by housing type and density. Each dwelling unit in the country estates, low-, and medium density residential categories was assumed to correspond to one water service connection. These projections were aggregated in five-year increments through buildout to estimate total future water service connections.

As new developments are constructed, additional water infrastructure—such as mains, valves, meters, hydrants, and backflow devices—will be added to the system, requiring additional maintenance and operational effort. Accordingly, Lincoln's Water Department must scale staffing levels proportionally with the number of service connections to sustain service quality, maintain system integrity, and meet regulatory requirements.

BENCHMARKING AND COMPARABLE SYSTEMS

To estimate future staffing needs, benchmarking was performed using data from comparable California water utilities, summarized in Table B. The comparable cities include the cities of Roseville, Tracy, Yuba City, and Woodland. These systems were selected for their similar service population, anticipated growth trajectory, and operational structure. Key factors for each of the comparable cities were considered and normalized to the operations of Lincoln in order to provide an apple-to-apples comparison. For example, water treatment staff for the City of Roseville were not contained in the total number of staff, to better represent the fact that Lincoln does not operate a surface water treatment plant.

While there is no universal industry standard for water department staffing, benchmarking studies—including those from the American Water Works Association (AWWA)—indicate that the ratio of water staff per 1,000 water connections is a widely used and reasonable metric for comparing system staffing efficiency. This analysis of comparable systems demonstrated that a correlation exists between the number of staff per 1,000 water connections and overall system size and complexity.

For example:

- The City of Roseville, which serves approximately 52,000 connections, maintains roughly 0.8 water department employees per 1,000 connections.
- The City of Tracy, with approximately 25,000 connections, operates with about 0.9 employees per 1,000 connections.

Of the comparable systems it is important to recognize the relevance and reliability of the Roseville data as a benchmark: Roseville is geographically adjacent to Lincoln and has experienced growth since the 1990's to current buildout very analogous to the projected growth of Lincoln (a doubling of the water system connections to buildout).

These benchmarks provide a credible basis for projecting Lincoln's staffing needs as the system expands. Using this relationship allows Lincoln to rationalize future staffing levels in proportion to growth in water connections, while considering operational efficiency and budget constraints. The current water operator staffing structure includes staff from the Water Quality Division and staff from the Streets Division with a 15 percent allocation for water distribution system maintenance and leak repair. As shown in Table B, the City of Lincoln is currently at a 0.4 FTEs per 1,000 connections. This is based on a total of 10 FTEs (eight FTEs in the Water Division and the equivalent of two FTEs in the Streets Division based on the previously mentioned 15 percent allocation) and approximately 25,000 existing connections.

Recommendations

The results of the staffing projection analysis are summarized in Table C. The table presents the recommended number of full-time equivalent (FTE) staff additions in five-year increments through buildout, based on projected growth in water service connections. As the City water system expands from roughly 25,000 connections to over 58,000 connections at buildout and applying the benchmark of 0.8 FTEs per 1,000 connections, the City Water Division staff should be increased from 10 FTEs to 47 FTEs.

This projection applies the benchmark ratio derived from comparable utilities (staff per 1,000 water connections) to Lincoln's projected total connections at each interval. The analysis anticipates a steady increase in staffing over time to align with the pace of development, ensuring adequate operational capacity as new infrastructure is commissioned.

Key recommendations include:

- Incrementally increasing staff levels in five-year intervals to match system growth.
- Targeting a staffing ratio consistent with efficient, full-service utilities such as Roseville and Tracy.
- Reassessing staffing projections periodically to reflect updated growth forecasts, technology improvements, and operational efficiencies.
- Using the projected staffing plan to inform future budget planning and rate-setting efforts, ensuring sustainable operations throughout Lincoln's expansion period.
- Periodically assess the City Water Division and Streets Division structure as continued growth will require specialized positions that may ultimately need to be managed under one department.

By adopting a data-driven approach tied to projected water connections and validated by peer system benchmarks, the City of Lincoln can responsibly plan and justify future staffing additions that support reliable water service delivery to a growing community.

Table A. Excerpt from Table 3.9 as Basis for Operational Staffing Projection					
Residential Connections	2023-2028	2029-2033	2034-2038	2039-2043	2044-2050
Country/Low Density Estates	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
Total	**3,272**	**8,137**	**12,365**	**14,247**	**35,456**
Total Per 5 year Increment	**3,272**	**4,865**	**4,228**	**1,882**	**21,209**
Total Connections	**25,957**	**30,822**	**35,050**	**36,932**	**58,141**

Source: Table 3.9 Water Master Plan Update 2025

Table B. Comparable Water Systems			
System	No. FTEs	No. Connections (1,000s)	FTEs per 1,000 Connections
City of Roseville	42	56	0.8
City of Woodland	17.5	18	1.0
City of Yuba	16	19	0.8
City of Tracy	27	28	1.0
City of Lincoln	10	25	0.4

Sources:
City of Roseville Environmental Utilities Department, Water Division - 2025
City of Woodland Public Works Engineering Department - 2025
City of Yuba City Public Works Engineering Department - 2025
City of Tracy Public Works Department - 2025
City of Lincoln Public Works Department - 2025

Table C. City of Lincoln Water and Streets Divisions - Staffing Projection Through City Buildout

Item	Current	Planned	Division	Other Resources Needed	Notes	Position to Add	Year Range/Connections Added/Total Connections[a]				
							2023-2028/3,272	2029-2033/4,865	2034-2038/4,228	2039-2043/1,882	2044-2050/21,209
							25,957	30,822	35,050	36,932	58,141
							Full-Time Equivalents (FTEs) to Add Per 5-Year Increment				
Supervisory Control and Data Acquisition System (SCADA)	TESCO	Water Division dedicated staff	Water/Streets	Cyber training	-	Instrument Tech	1	-	2	1	-
Residential Meter Testing & Meter Repair	City of Sac	Water Division dedicated staff	Water/Streets	Meter Test Bench	-	Meter Tech/ Certified Distribution Operator	1	1	1	-	1
Development Support (Warranty Inspections, New Meter Installations, System Tie-Ins and Shutdowns	Ad Hoc from Water or Streets based on availability	Water Division dedicated staff	Water/Streets	-	In response to robust development in the City	Certified Distribution Operator	1	-	1	-	2
Administrative Support	Shared	Water Division dedicated staff	Water/Streets	-	Admin can be assigned to Metering Program Support (AMI)	Administrative Assistant	-	1	-	1	1
Bacteriological Sampling	Third party lab	Water Division dedicated staff	Water/Streets	Field sampling stations	Distribution sampling stations added as City grows per DDW water system permit. This will include water quality reporting.	Certified Distribution Operator	-	1	-	-	1
Backflow Testing	Water Division	Water Division dedicated staff	Water/Streets	-	Backflow quantity increases as City grows	Certified Backflow Tester	-	-	2	-	1
Metering Program Support (AMI)	None	Water Division dedicated staff	Water/Streets	-	This support can be done by adding admin staff	See Administrative Support	-	-	1	1	-
Recycled Water Program	None	Water Division dedicated staff	Water/Streets	Consultant support	City expansion of RW system and desire for groundwater recharge	Certified Backflow Tester/Cross Connection Specialist	1	-	-	-	1
Water Conservation and Regulatory-Driven Community Outreach	None	Water Division dedicated staff	Water/Streets	-	-	Analyst	1	-	-	-	1
Groundwater Program (Operations, Maintenance, ASR)	Water Division dedicated staff	Water Division dedicated staff	Water/Streets	-	Project 10 more wells and two storage tanks added to system through buildout	Certified Treatment and Distribution Operator	-	1	-	1	2
Inventory Control (Warehousing)	None	Water Division dedicated staff (or shared staff)	Water/Streets	Warehousing software integrated into Computerized Maintenance Management System (CMMS). Training.	-	Analyst who understands water infrastructure	1	-	-	1	-
CMMS and Asset Management	None	Water Division dedicated staff	Water/Streets	-	Work orders supported via scheduling and job-kitting	Maintenance Coordinator	1	-	1	-	-
Pressure Reducing Valves (PRVs), Control Valves	None	Water Division dedicated staff	Water/Streets	-	Increased system complexity from City growth requires specialized skills to balance potential new pressure zones	Certified Distribution Operator	-	1	-	-	1

Table C. City of Lincoln Water and Streets Divisions - Staffing Projection Through City Buildout

Item	Current	Planned	Division	Other Resources Needed	Notes	Position to Add	Year Range/Connections Added/Total Connections[a]				
							2023-2028/3,272	2029-2033/4,865	2034-2038/4,228	2039-2043/1,882	2044-2050/21,209
							25,957	30,822	35,050	36,932	58,141
							Full-Time Equivalents (FTEs) to Add Per 5-Year Increment				
Distribution System Maintenance (Leak Repairs, Main Flushing, Valve Exercising, Hydrant Maintenance)	Behind schedule, no formal program in place	Water Division dedicated staff	Water/Streets	Portable or truck-mounted, electric or hydraulic valve operators	Worker safety	Certified Distribution Operator	2	1	1	-	2
Large Meter Testing	None	Water Division dedicated staff	Water/Streets	Contract with large meter test bench	-	Certified Distribution Operator	-	1	-	1	-
Groundwater Program Management (Includes All GW Quality and Engineering Needs)	None	Engineering	Water/Streets	Consultant support	Studies and approach needed	Engineer	-	-	1	-	2
						Total FTEs Projected Per 5-Year Increment	**9**	**7**	**10**	**6**	**15**

(a) Total water connections projections shown in Table B.

Appendix D

Calibration Results

LOWER ZONES RESULTS

Figure D-1. PCWA Intertie Metering Station (Conspiracy Point Tank) - Flow and Pressure Comparison (7/11/2024)

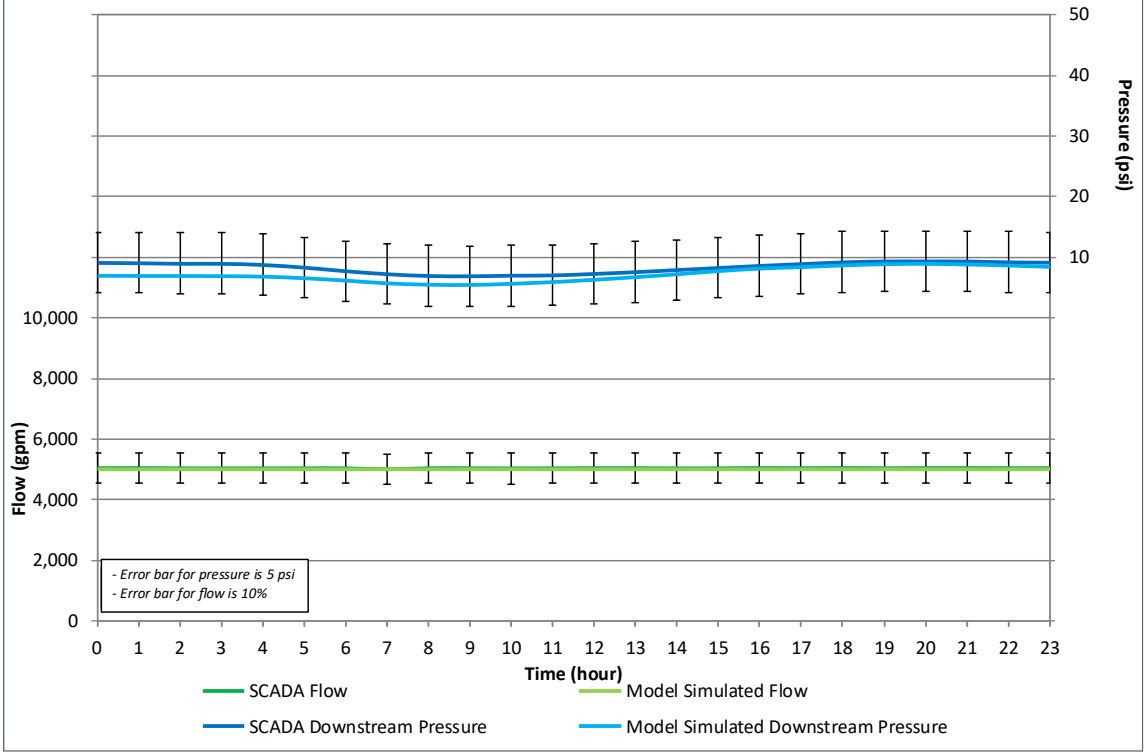


Figure D-2. PCWA Intertie Metering Station (Verdera Tank #3) - Flow Comparison (7/11/2024)

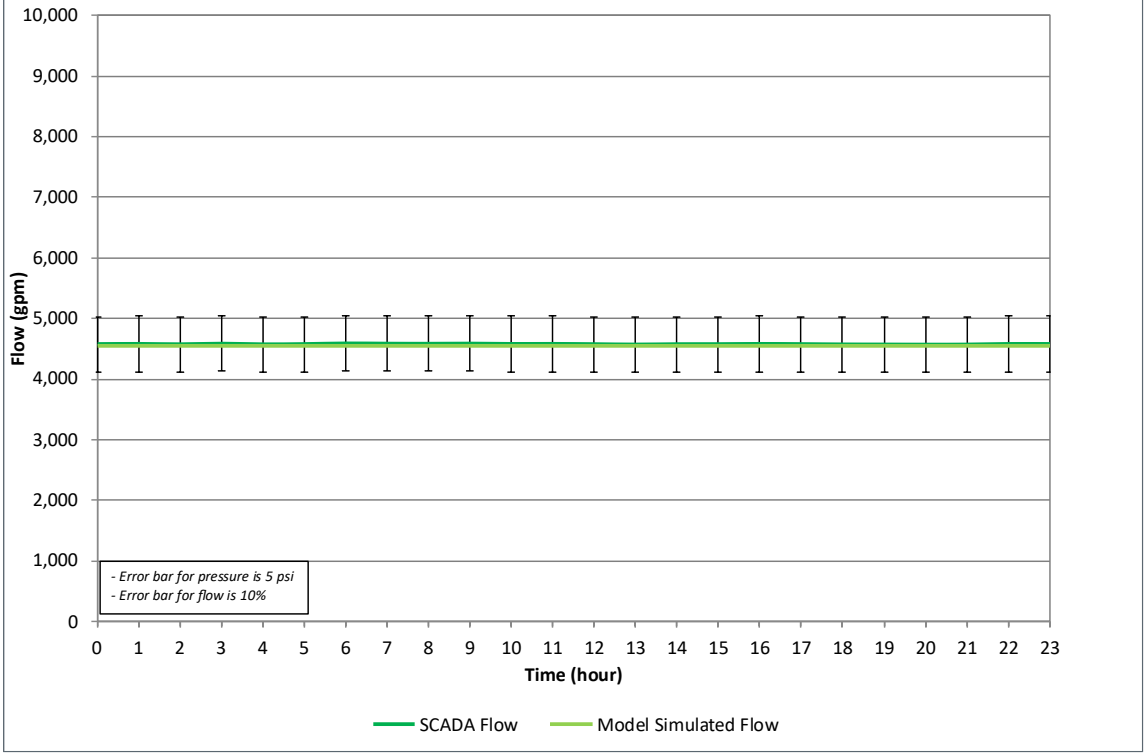


Figure D-3. 3 MG Tank Inlet Altitude Valve - Inflow and Pressure Comparison (7/11/2024)

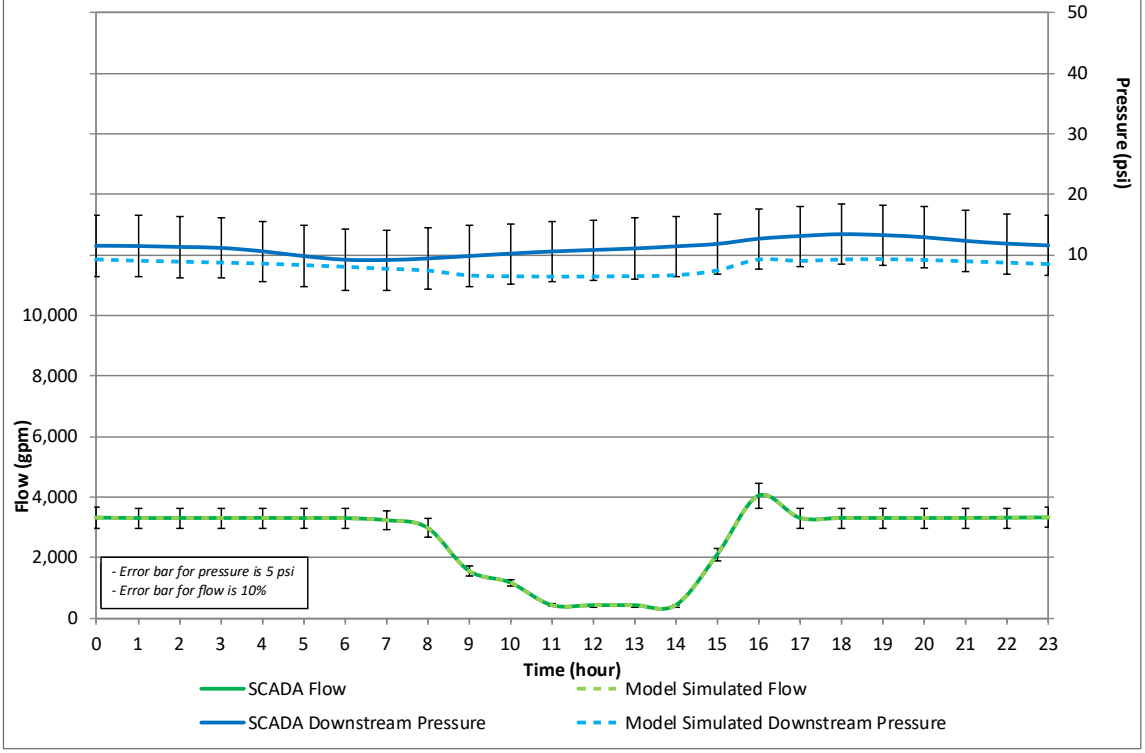


Figure D-4. Conspiracy Point Tank - Tank Level and Outflow Comparison (7/11/2024)

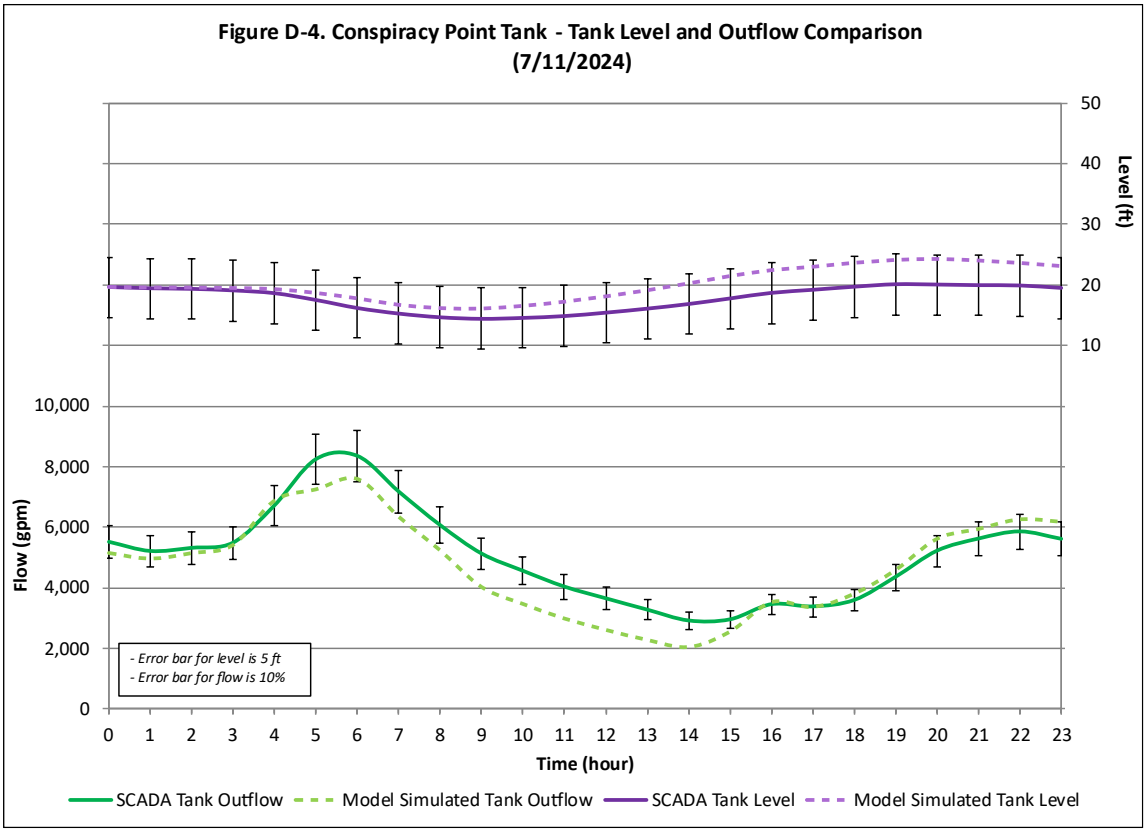


Figure D-5. Verdera Tank #3 - Tank Level and Outflow Comparison (7/11/2024)

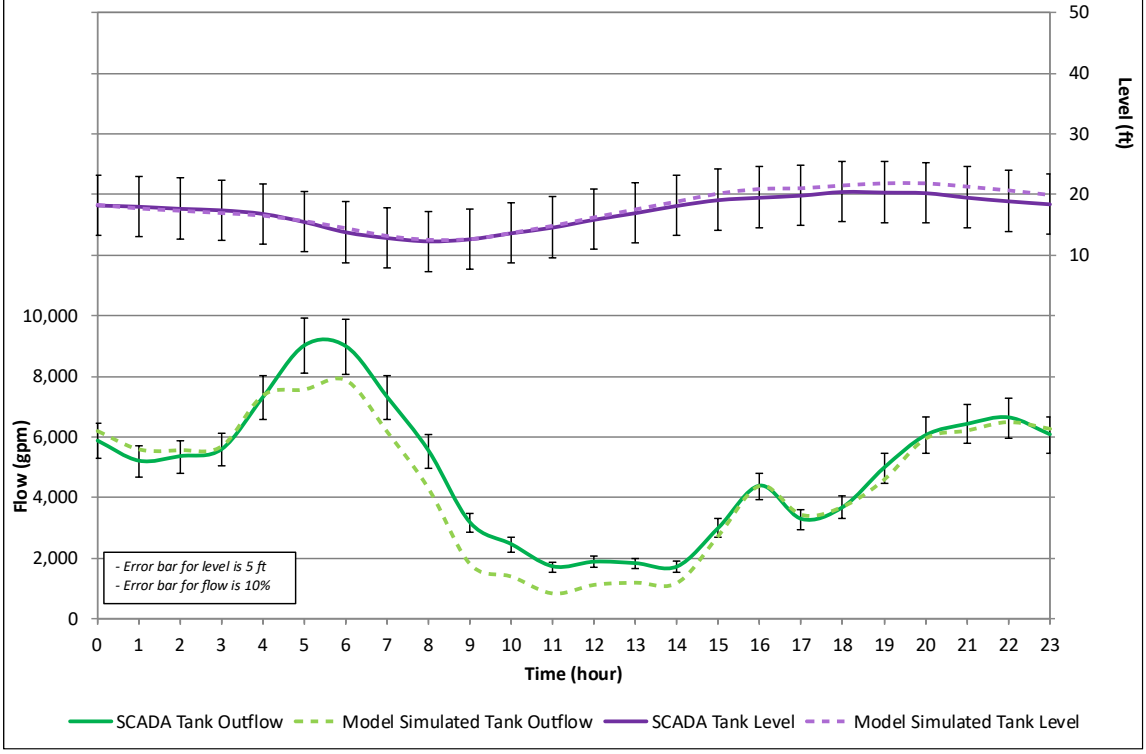
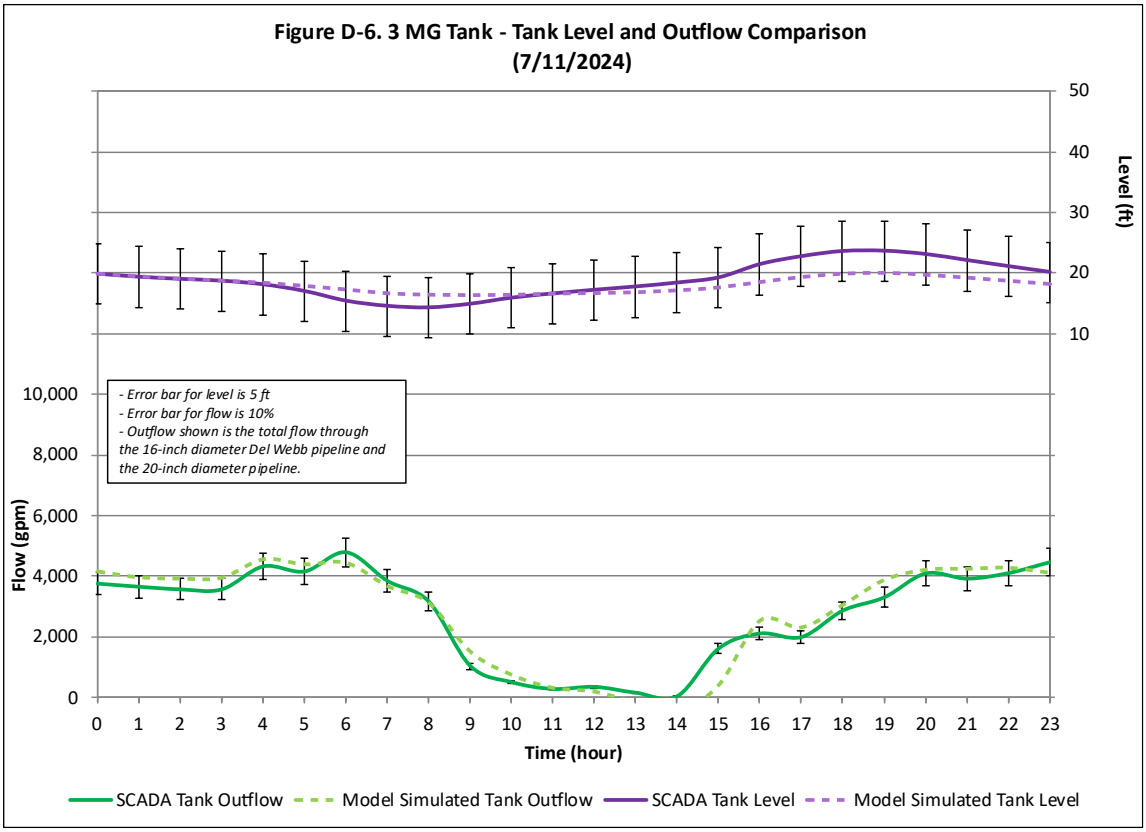


Figure D-6. 3 MG Tank - Tank Level and Outflow Comparison (7/11/2024)



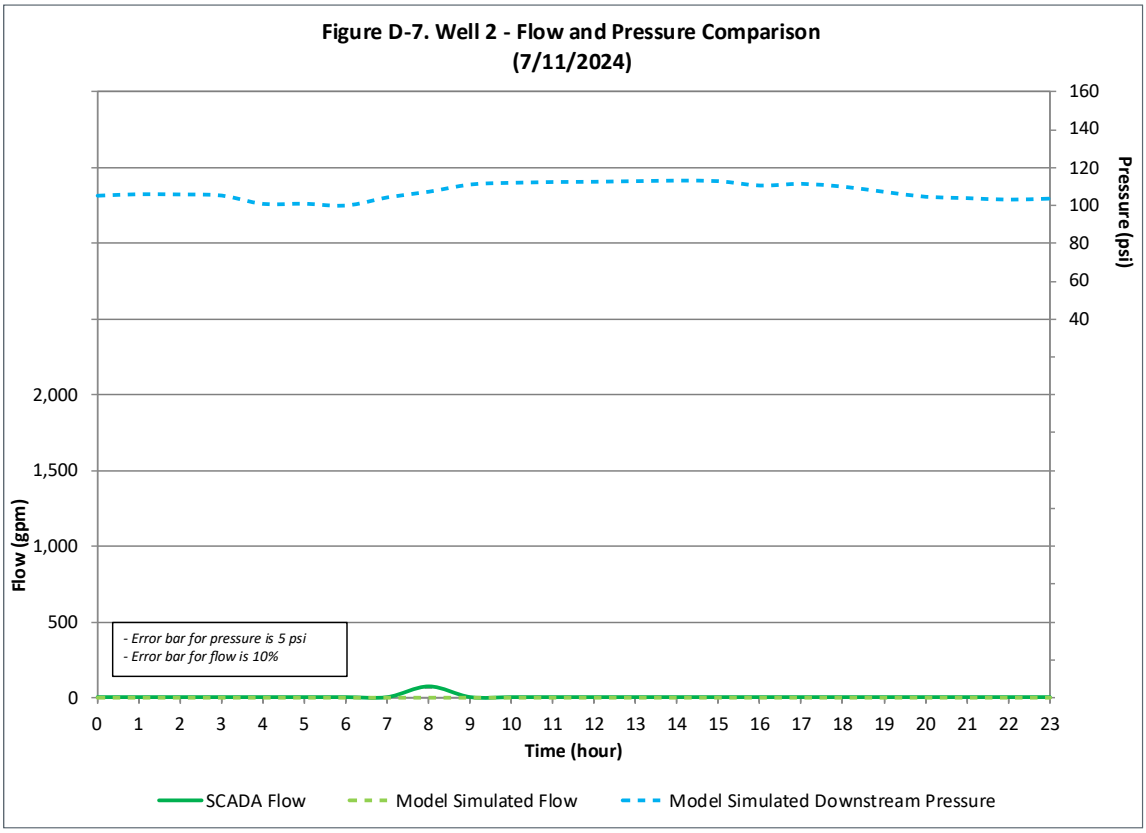


Figure D-7. Well 2 - Flow and Pressure Comparison
(7/11/2024)
Flow (gpm)
Pressure (psi)
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Flow
Model Simulated Flow
Model Simulated Downstream Pressure

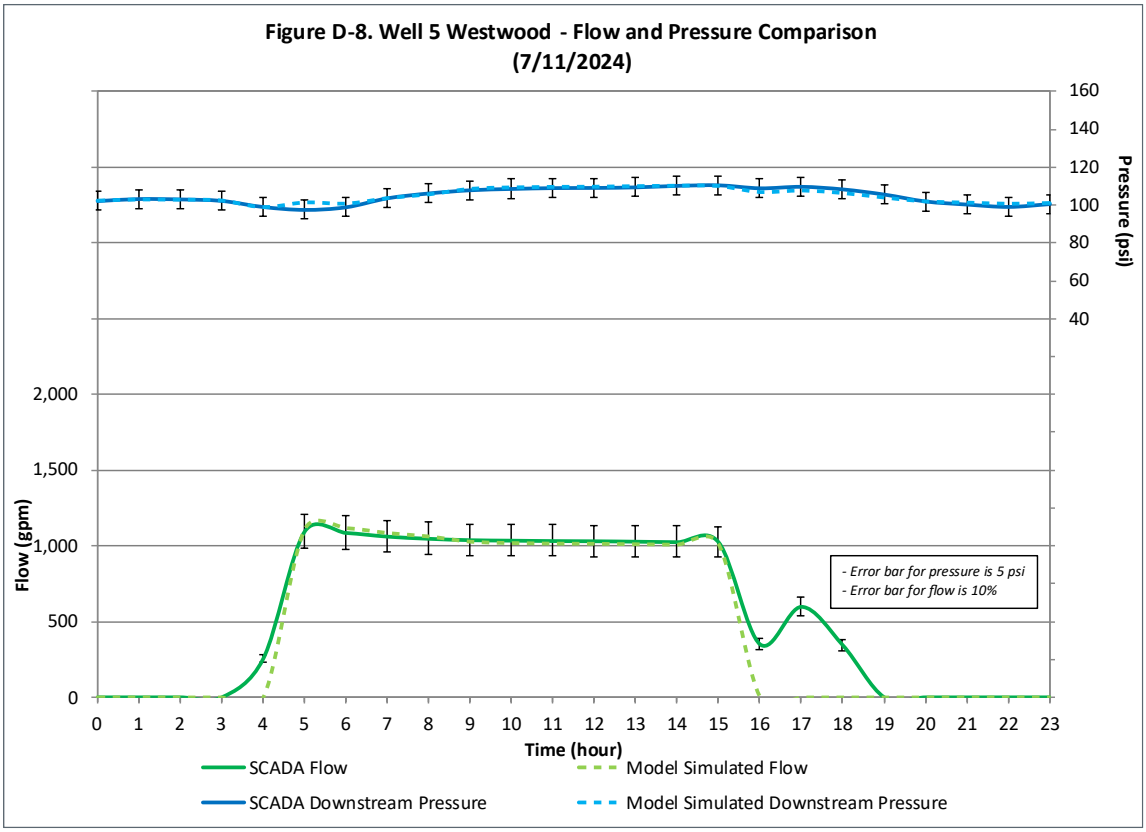


Figure D-8. Well 5 Westwood - Flow and Pressure Comparison
(7/11/2024)
Flow (gpm)
Pressure (psi)
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Flow
Model Simulated Flow
SCADA Downstream Pressure
Model Simulated Downstream Pressure

Figure D-9. Well 6 Moore - Flow and Pressure Comparison (7/11/2024)

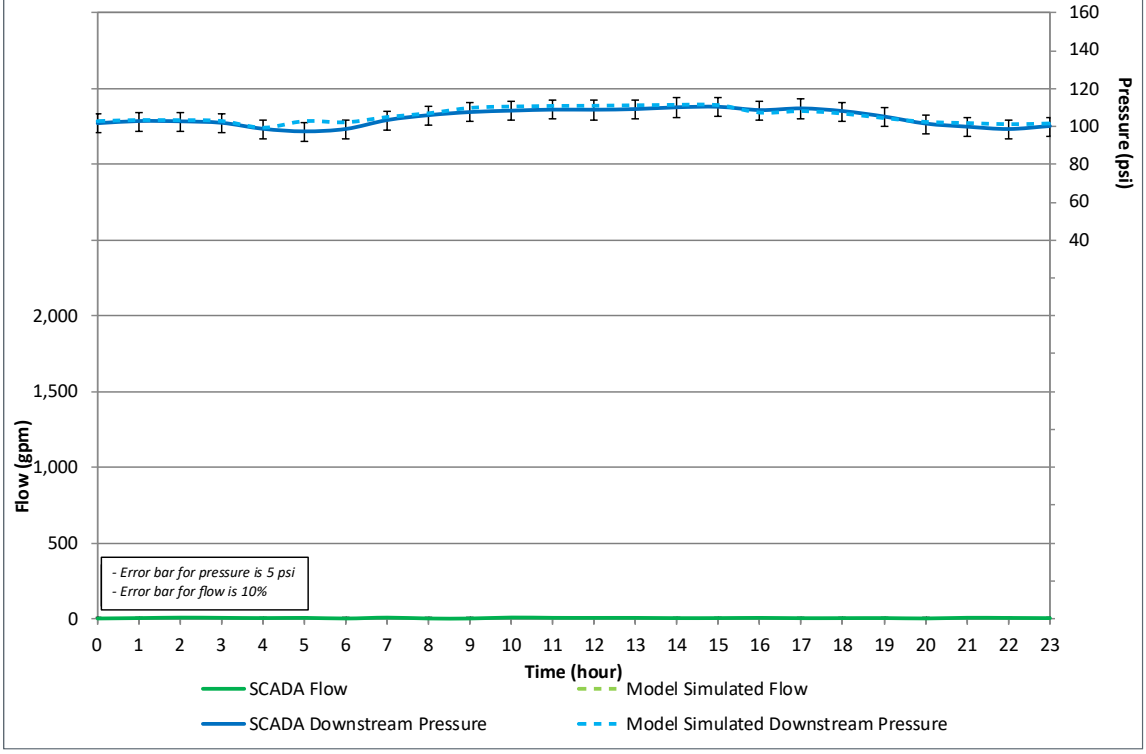


Figure D-10. Well 7 Fiddyment - Flow and Pressure Comparison (7/11/2024)

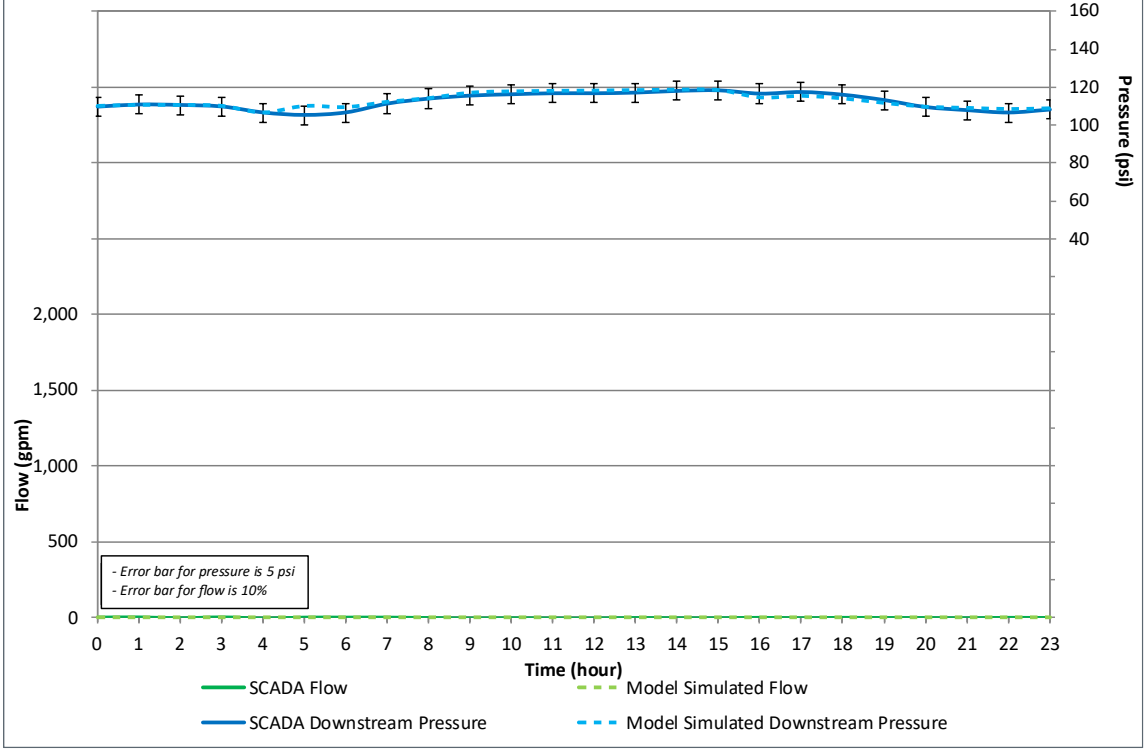


Figure D-11. Well 8 Nelson - Flow and Pressure Comparison (7/11/2024)

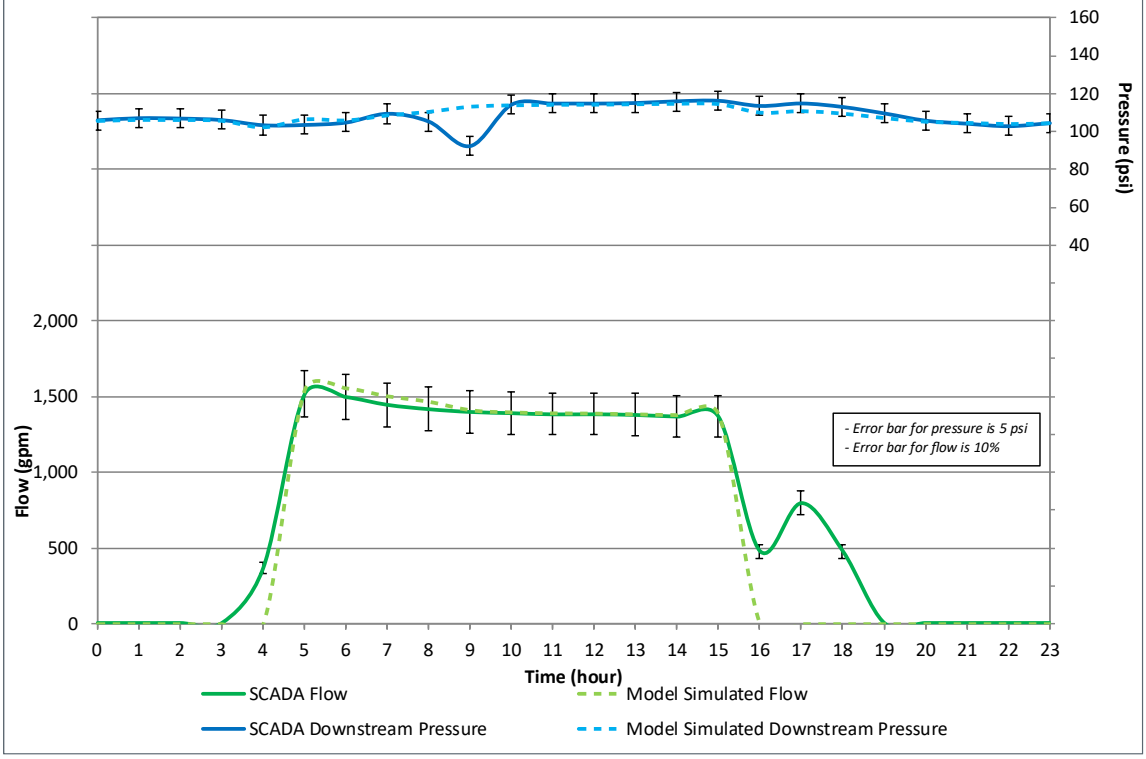
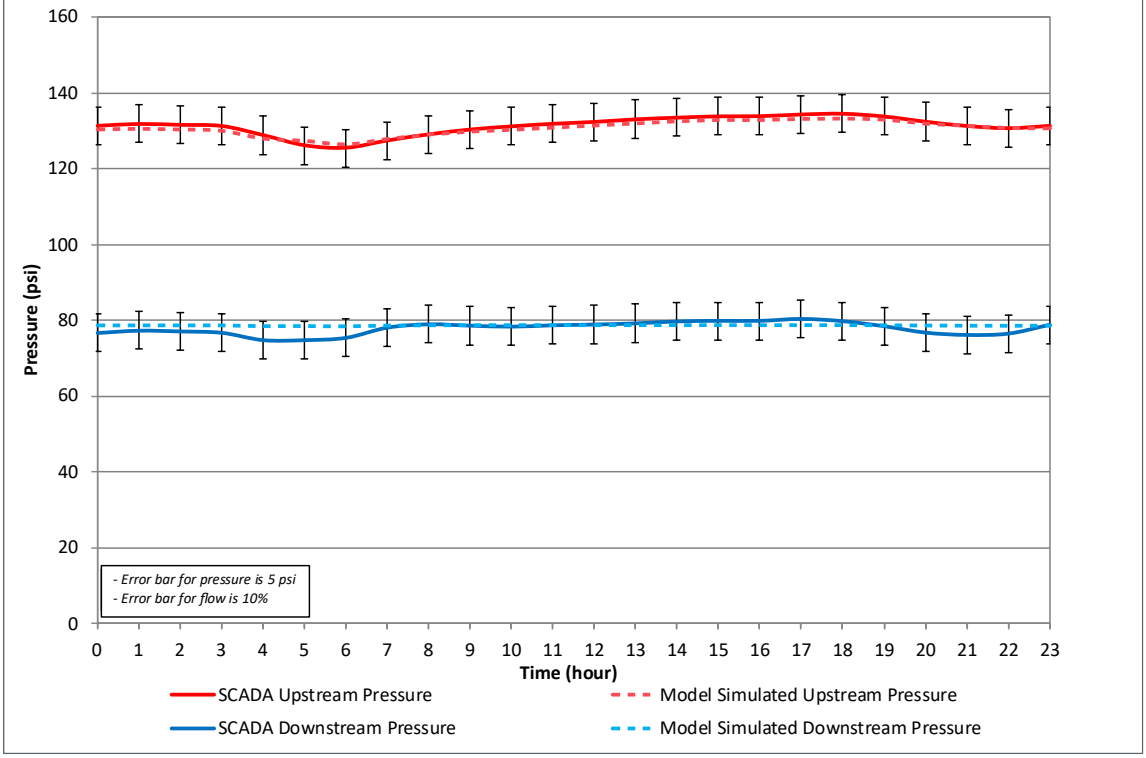


Figure D-12. Stoneridge PRV 06 - Pressure Comparison (7/11/2024)



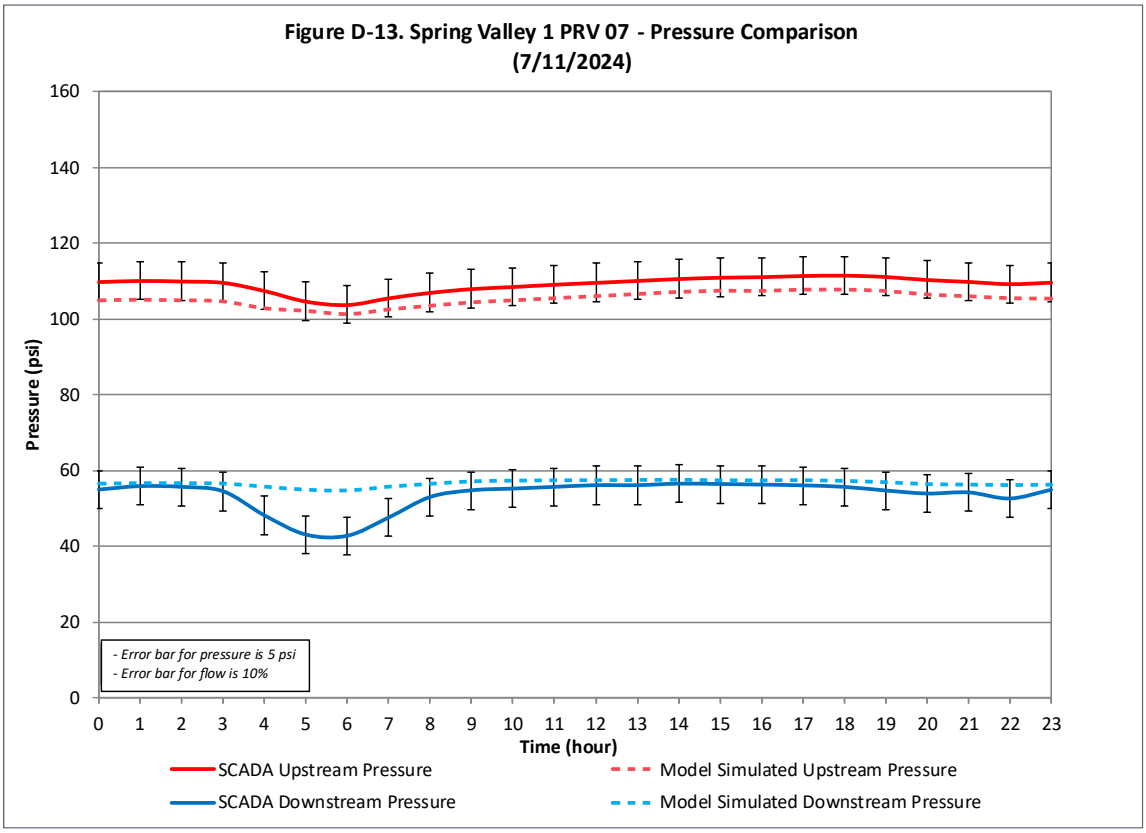


Figure D-13. Spring Valley 1 PRV 07 - Pressure Comparison
(7/11/2024)
Pressure (psi)
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Upstream Pressure
SCADA Downstream Pressure
Model Simulated Upstream Pressure
Model Simulated Downstream Pressure

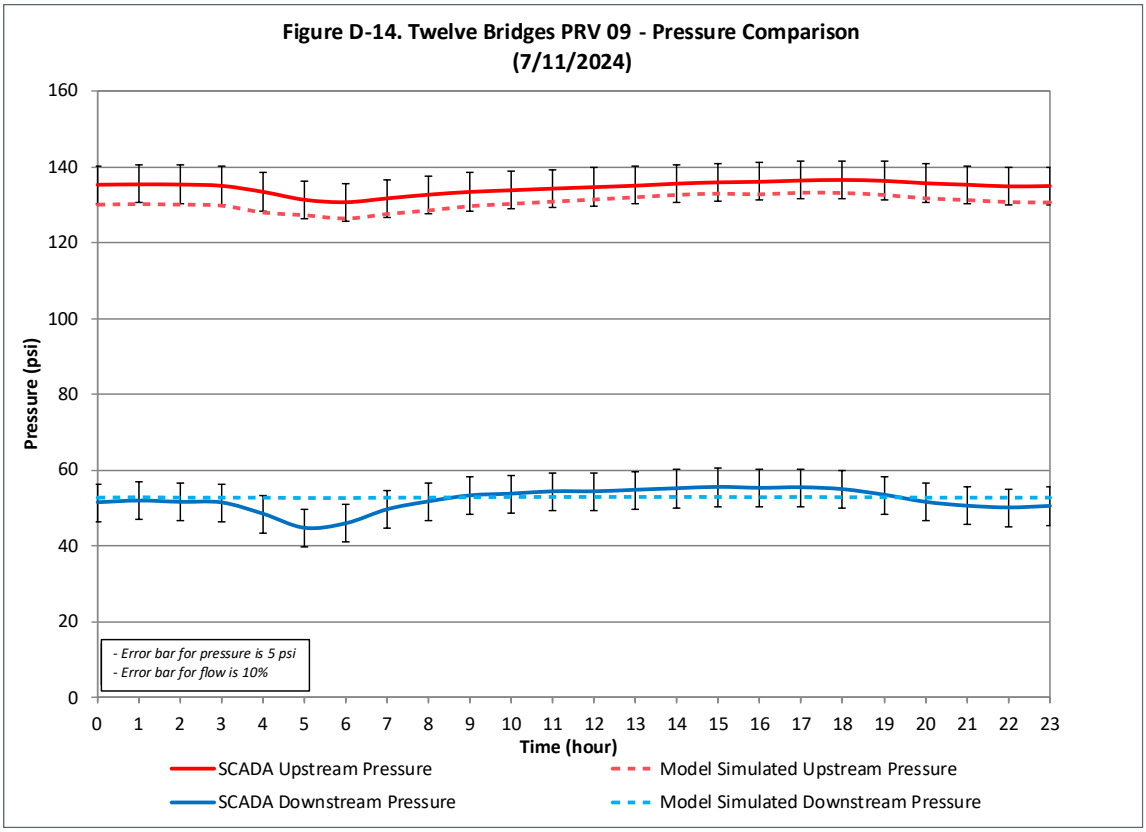


Figure D-14. Twelve Bridges PRV 09 - Pressure Comparison
(7/11/2024)
Pressure (psi)
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Upstream Pressure
SCADA Downstream Pressure
Model Simulated Upstream Pressure
Model Simulated Downstream Pressure

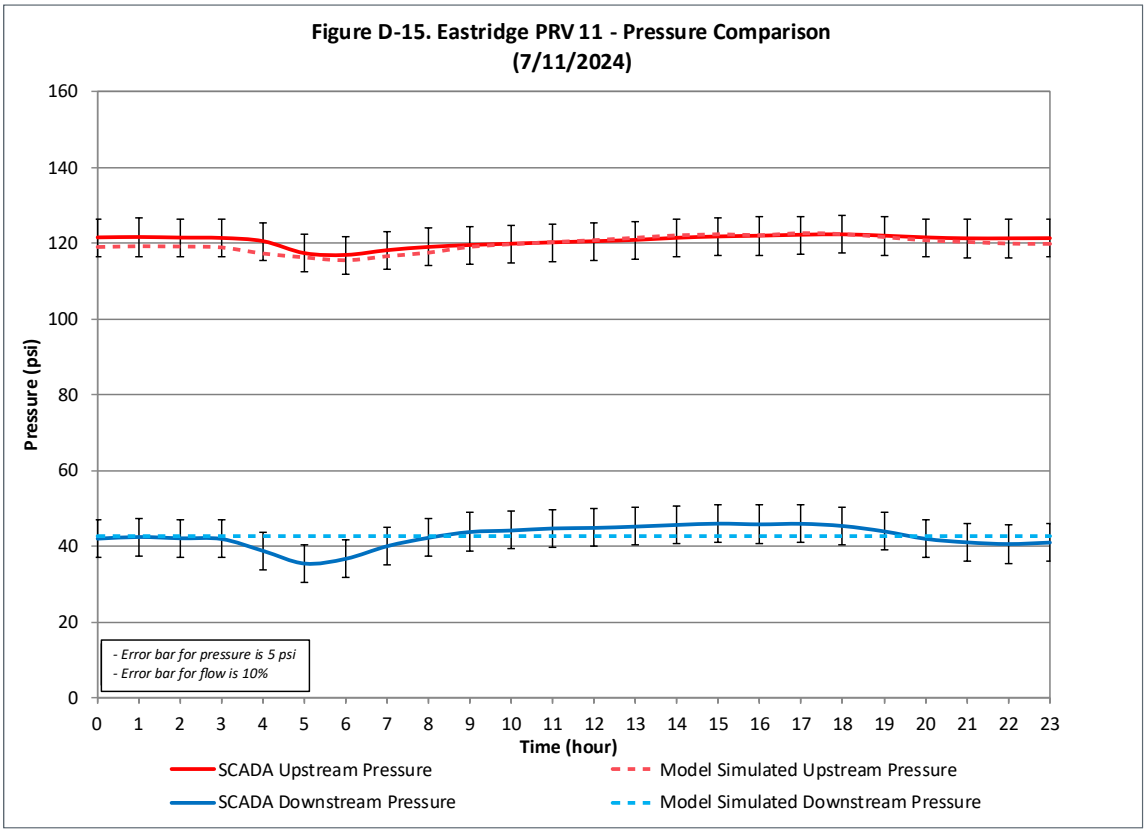


Figure D-15. Eastridge PRV 11 - Pressure Comparison
(7/11/2024)
Pressure (psi)
160
140
120
100
80
60
40
20
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Upstream Pressure
Model Simulated Upstream Pressure
SCADA Downstream Pressure
Model Simulated Downstream Pressure

750 AND 610 ZONES RESULTS

Figure D-16. Verdera Tank #3 Bypass - Flow and Pressure Comparison (7/11/2024)

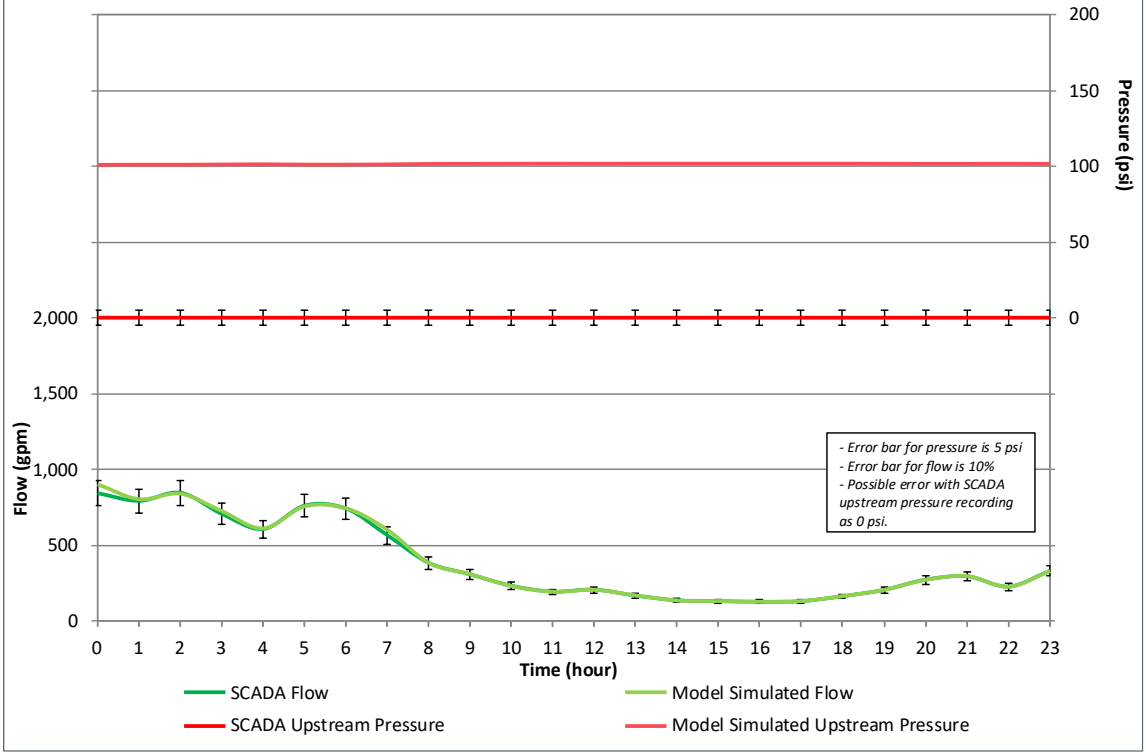
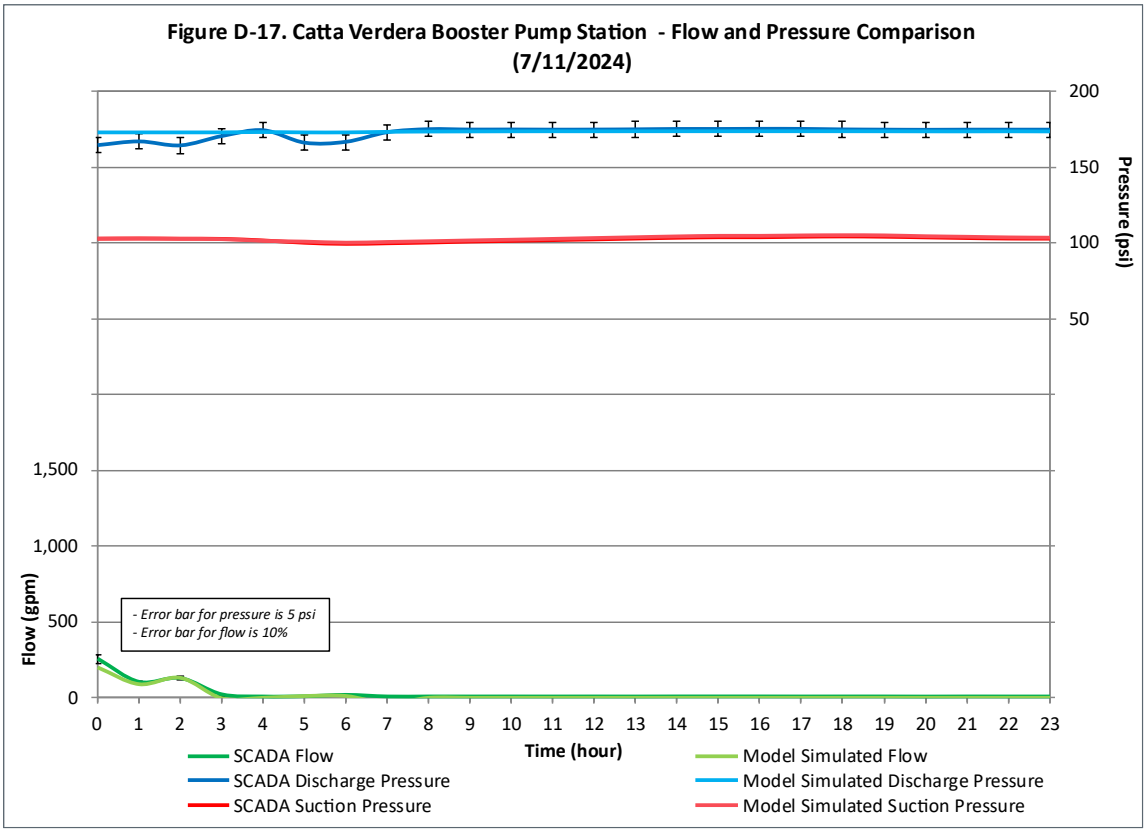


Figure D-17. Catta Verdera Booster Pump Station - Flow and Pressure Comparison (7/11/2024)



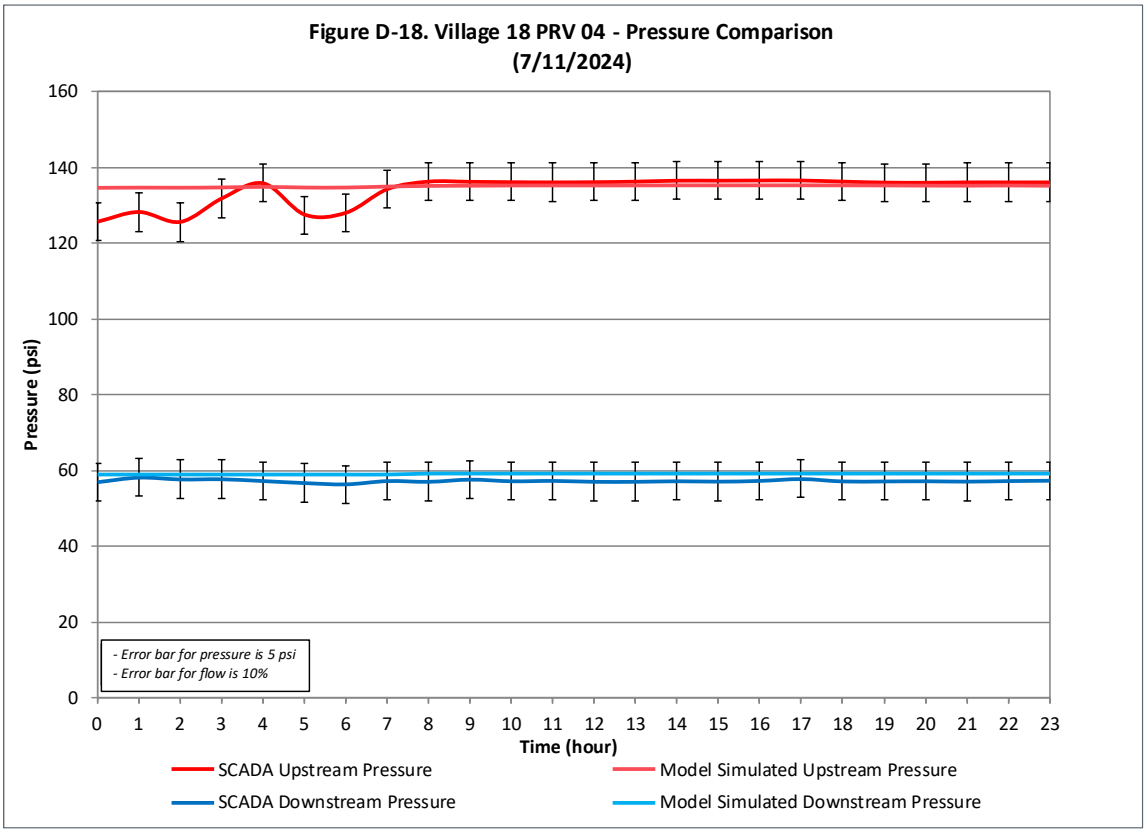


Figure D-18. Village 18 PRV 04 - Pressure Comparison
(7/11/2024)
Pressure (psi)
160
140
120
100
80
60
40
20
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Upstream Pressure
Model Simulated Upstream Pressure
SCADA Downstream Pressure
Model Simulated Downstream Pressure

775 AND 650 ZONES RESULTS

Figure D-19. Conspiracy Point Tank Bypass - Flow Comparison (7/11/2024)

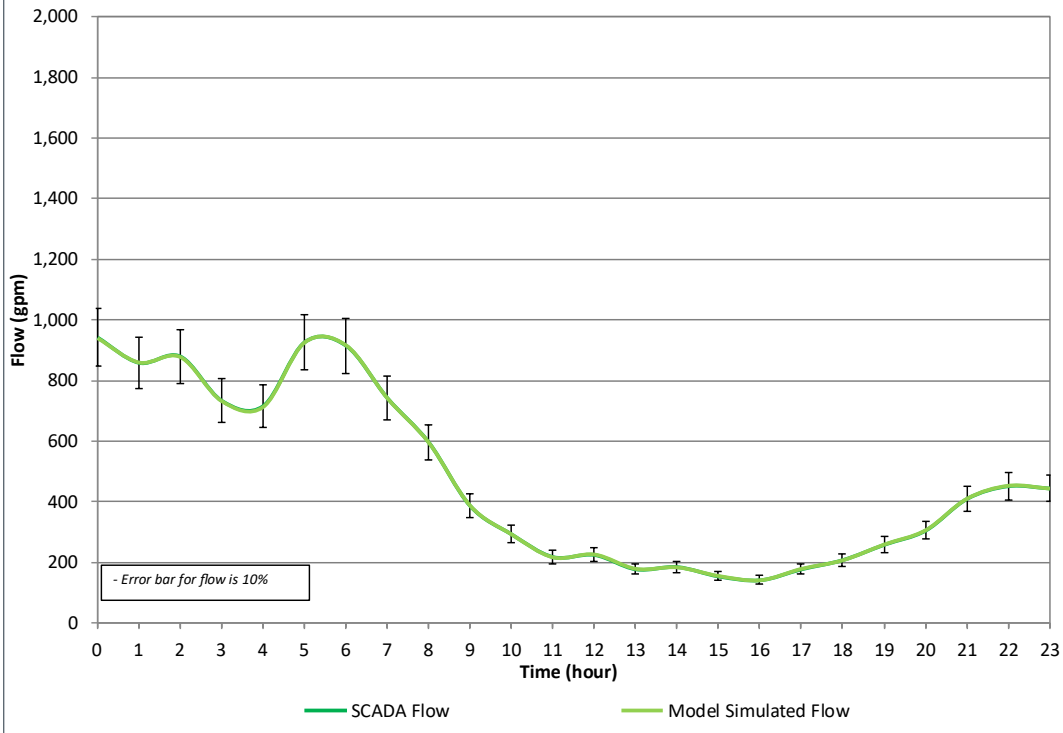
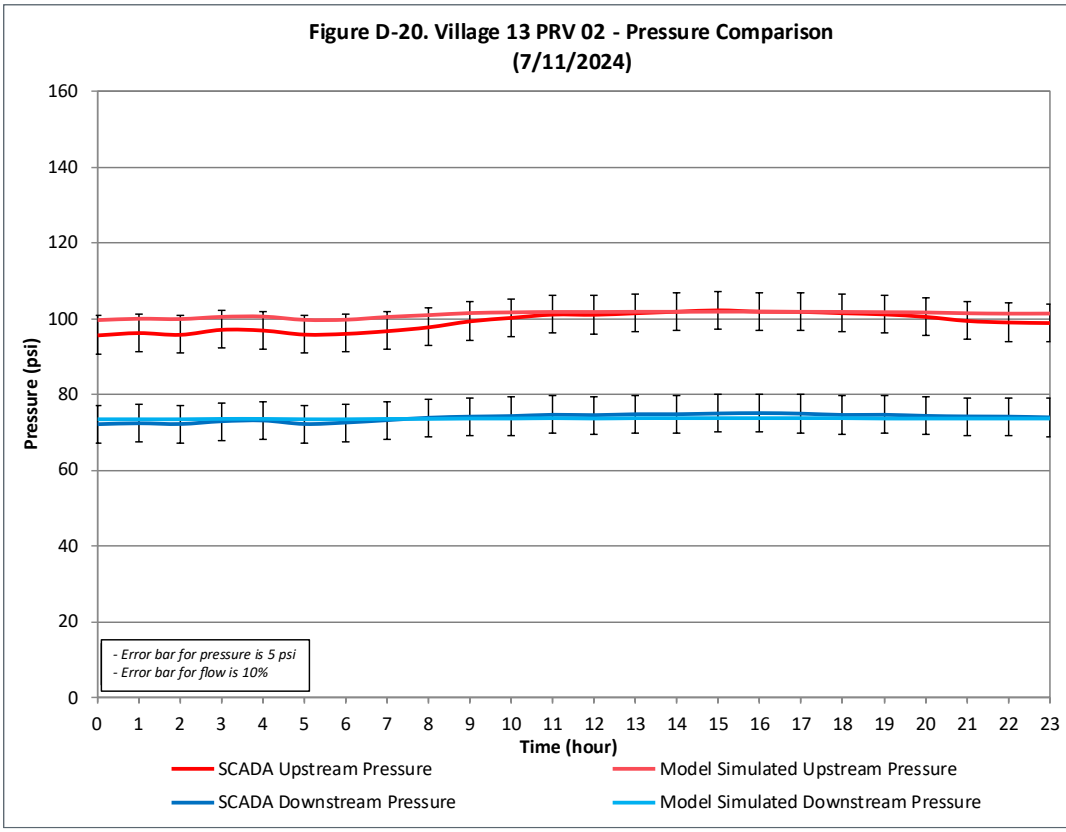


Figure D-20. Village 13 PRV 02 - Pressure Comparison (7/11/2024)



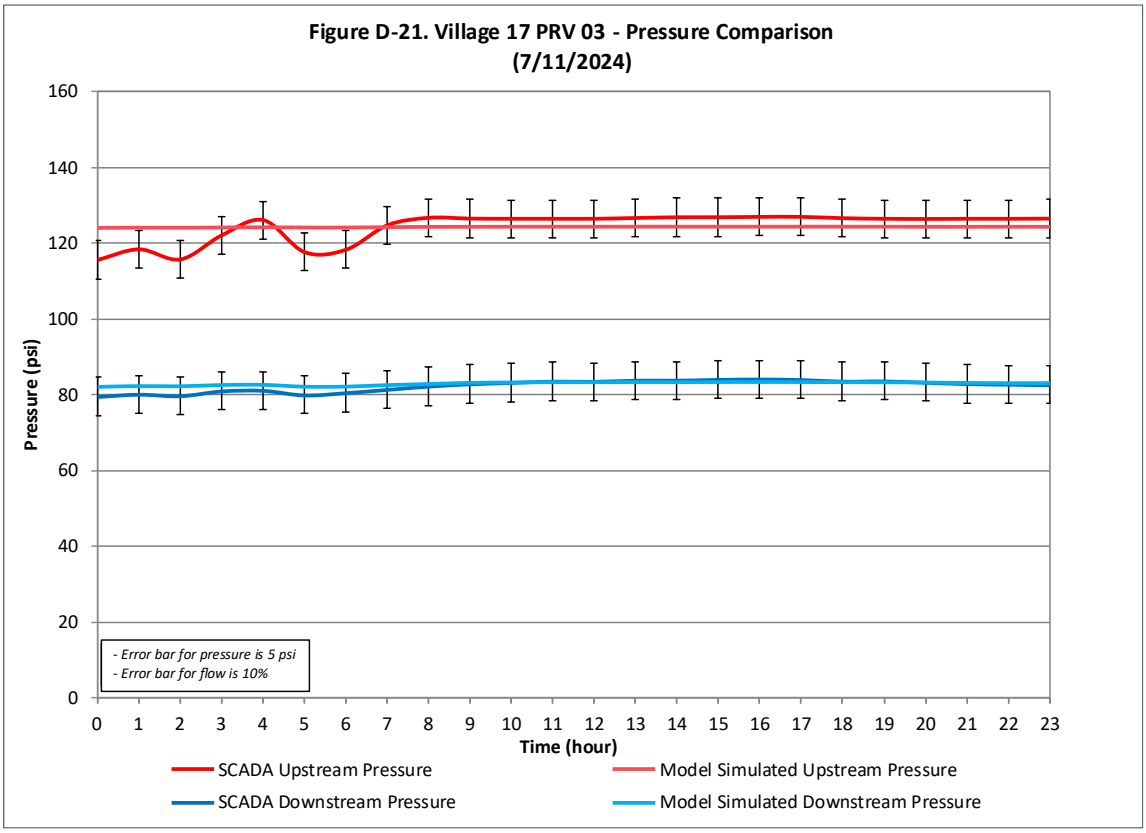


Figure D-21. Village 17 PRV 03 - Pressure Comparison
(7/11/2024)
Pressure (psi)
160
140
120
100
80
60
40
20
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
Time (hour)
- Error bar for pressure is 5 psi
- Error bar for flow is 10%
SCADA Upstream Pressure
Model Simulated Upstream Pressure
SCADA Downstream Pressure
Model Simulated Downstream Pressure

Appendix E

HPR Results

LOWER ZONES RESULTS

Figure E-1: HPR 1, 377 Ashwood Wy
July 11, 2024 (375 Zone)

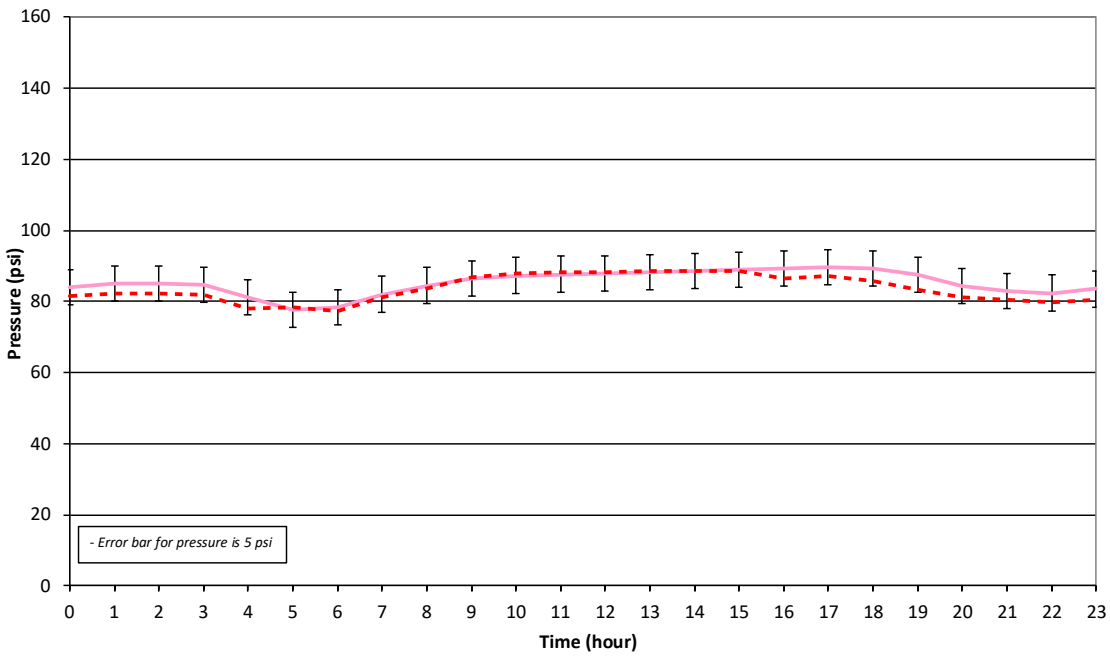


Figure E-2: HPR 2, 1316 McBean Park Dr
July 11, 2024 (375 Zone)

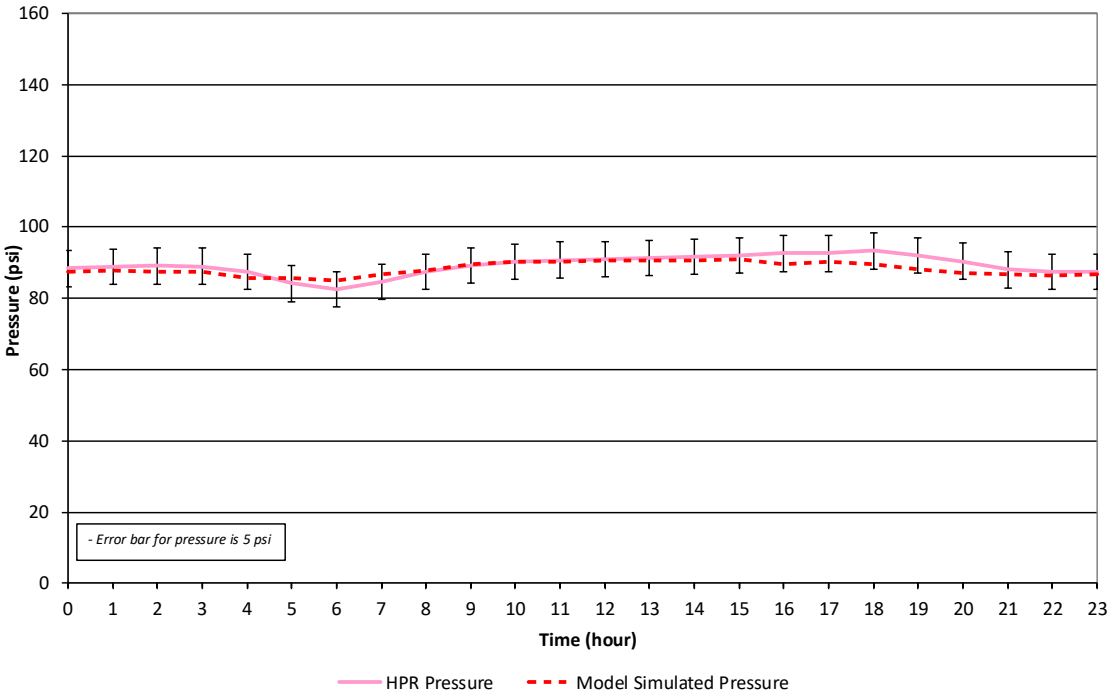


Figure E-3: HPR 3, 893 D St
July 11, 2024 (375 Zone)

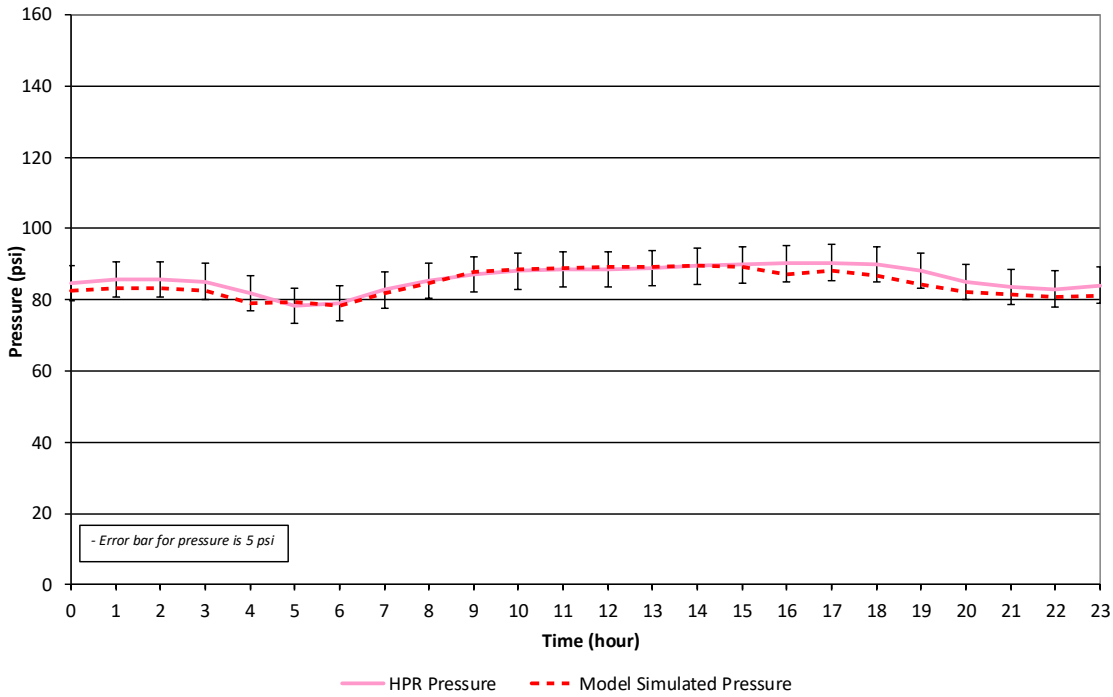


Figure E-4: HPR 4, 588 1st St
July 11, 2024 (375 Zone)

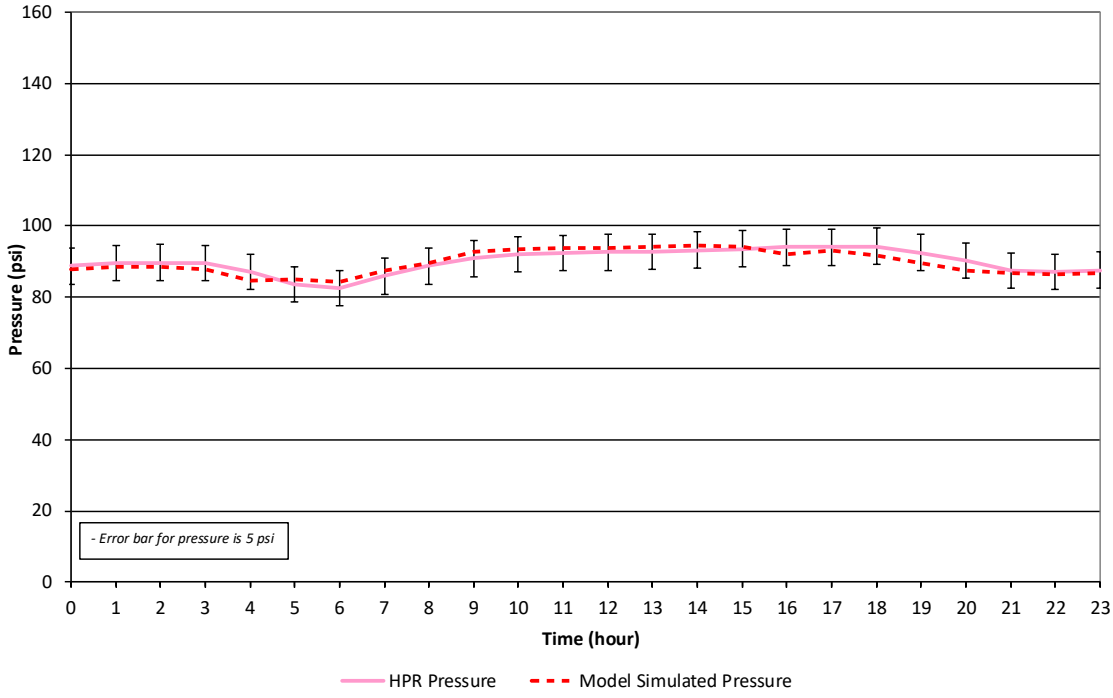


Figure E-5: HPR 5, 6th St & 7th St
July 11, 2024 (375 Zone)

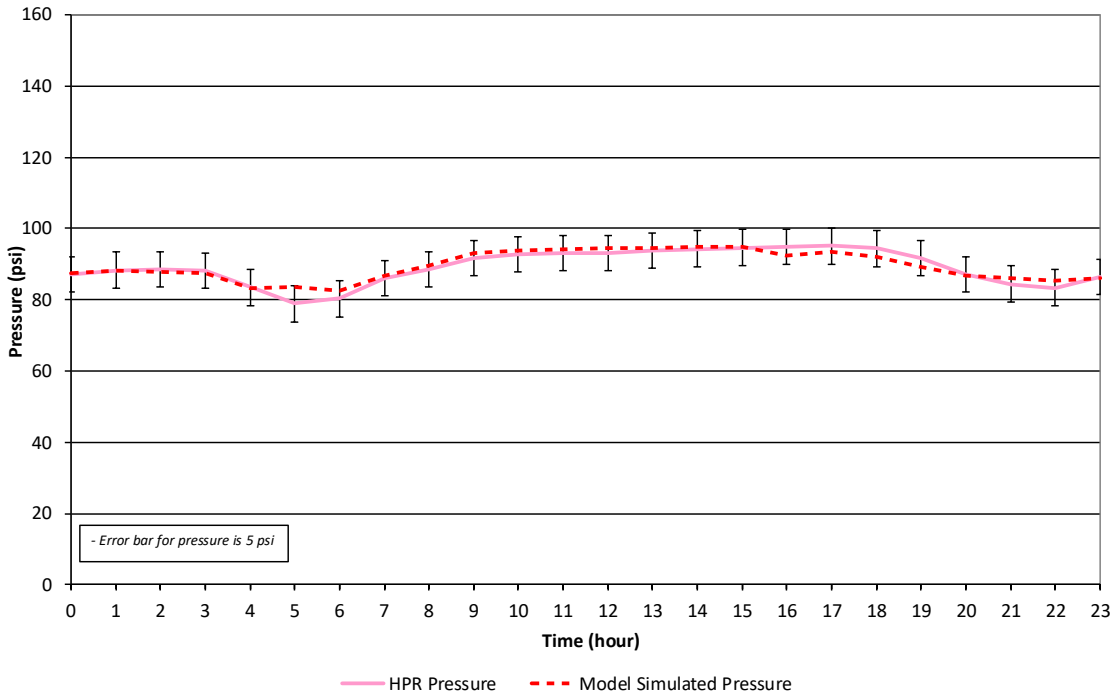


Figure E-6: HPR 6, 567 O St
July 11, 2024 (375 Zone)

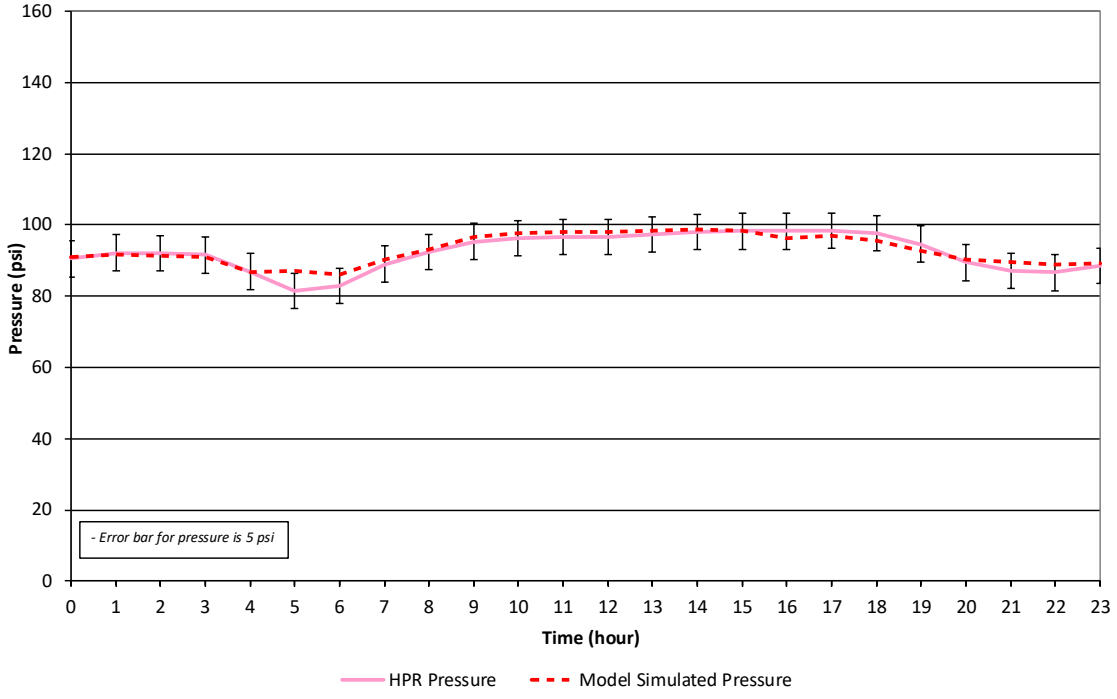


Figure E-7: HPR 7, 1480 Flightline Dr
July 11, 2024 (375 Zone)

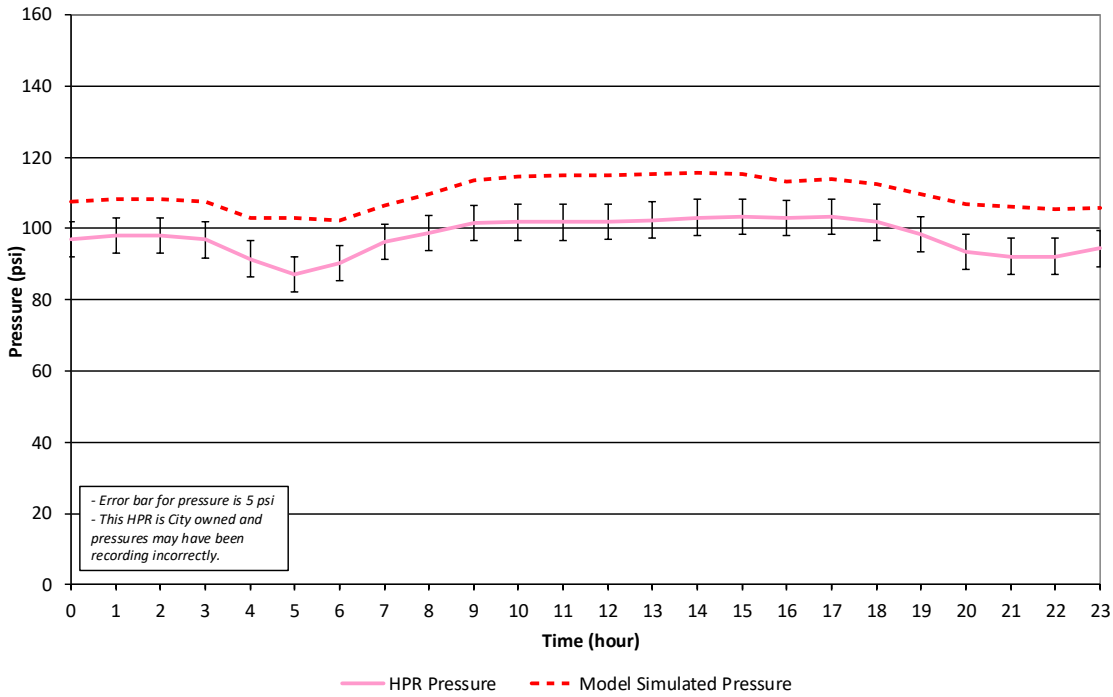


Figure E-8: HPR 8, 2700 3rd St
July 11, 2024 (375 Zone)

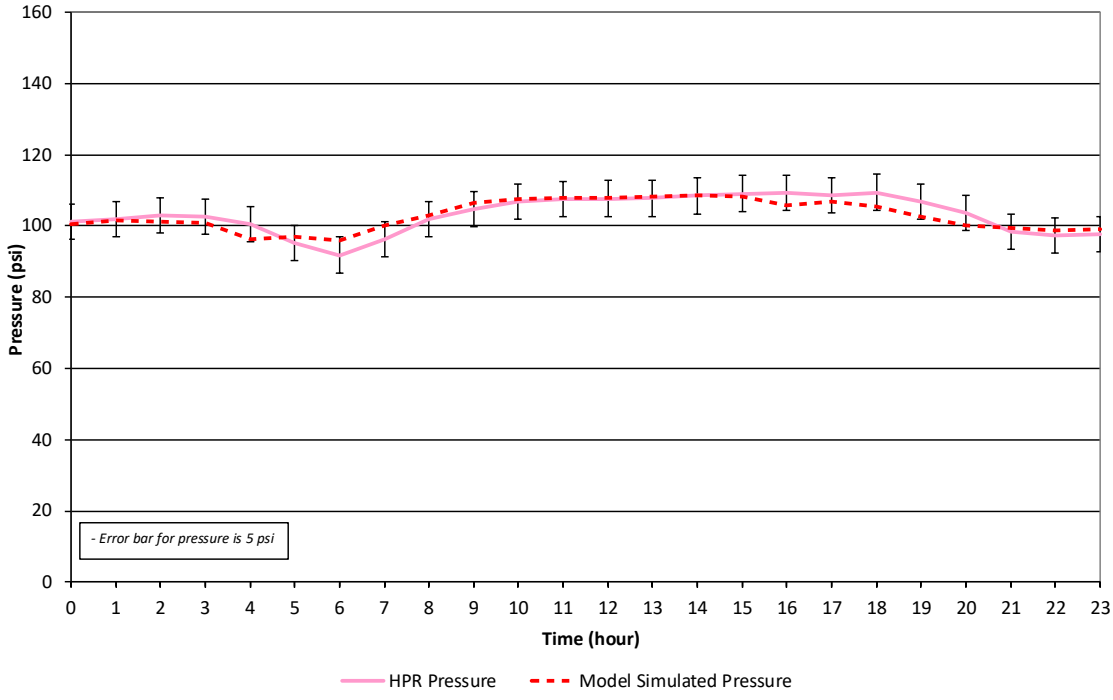


Figure E-9: HPR 9, 2003 Torino Wy
July 11, 2024 (375 Zone)

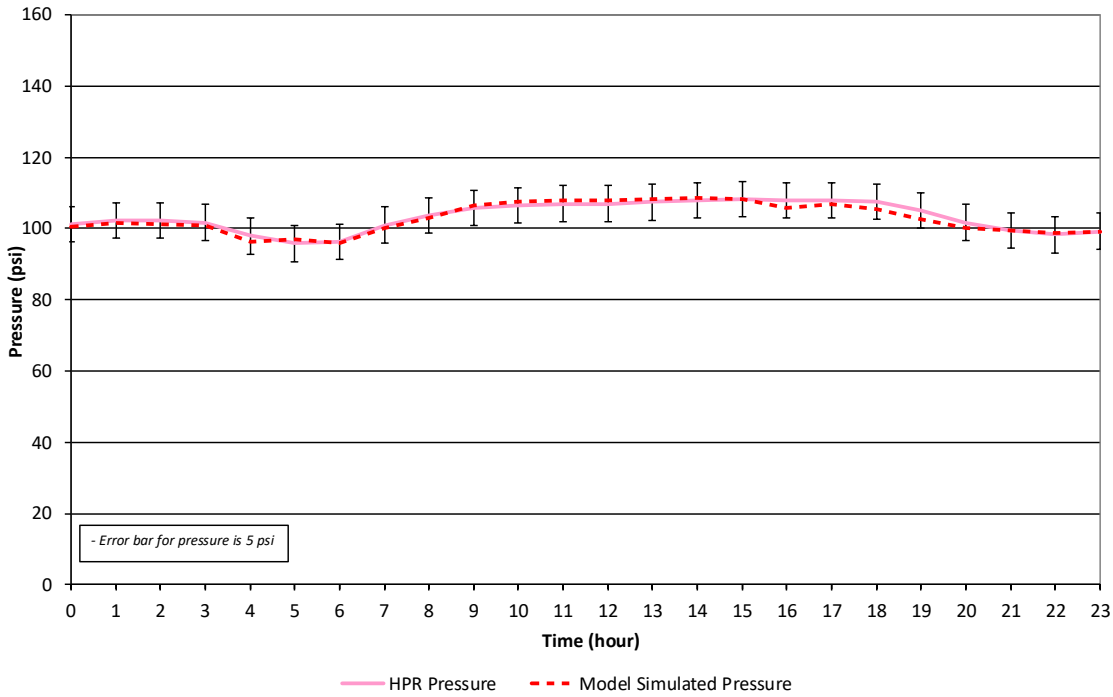


Figure E-10: HPR 10, 485 Twelve Bridges Dr
July 11, 2024 (375 Zone)

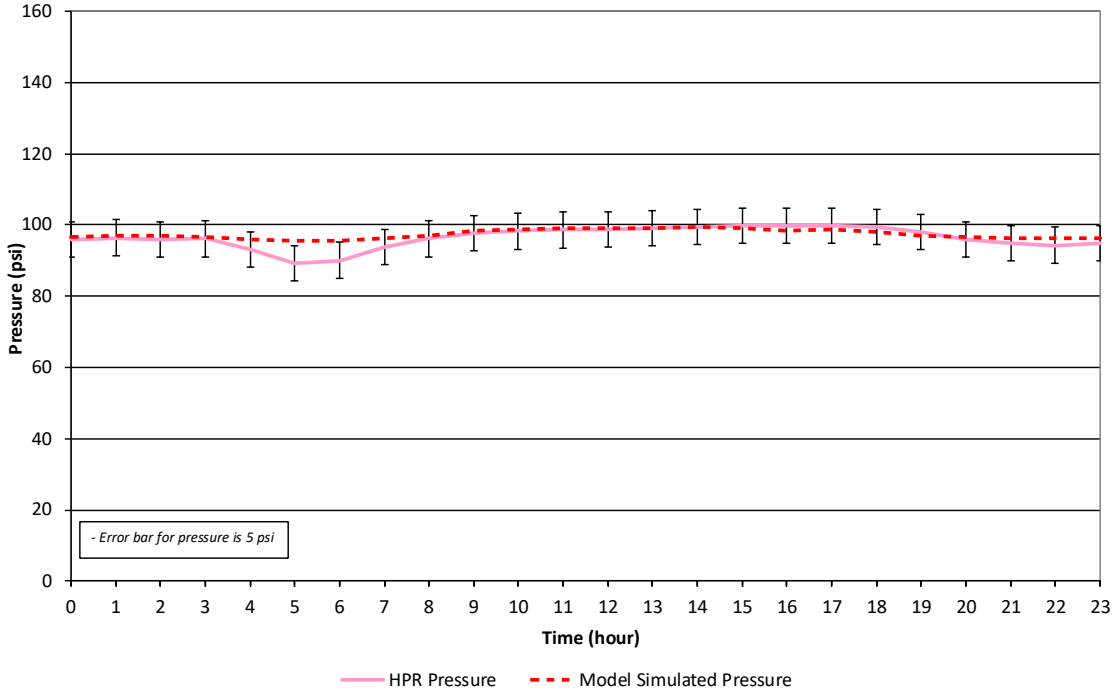


Figure E-11: HPR 11, Stoneridge Blvd & Del Webb Blvd
July 11, 2024 (475 Zone)

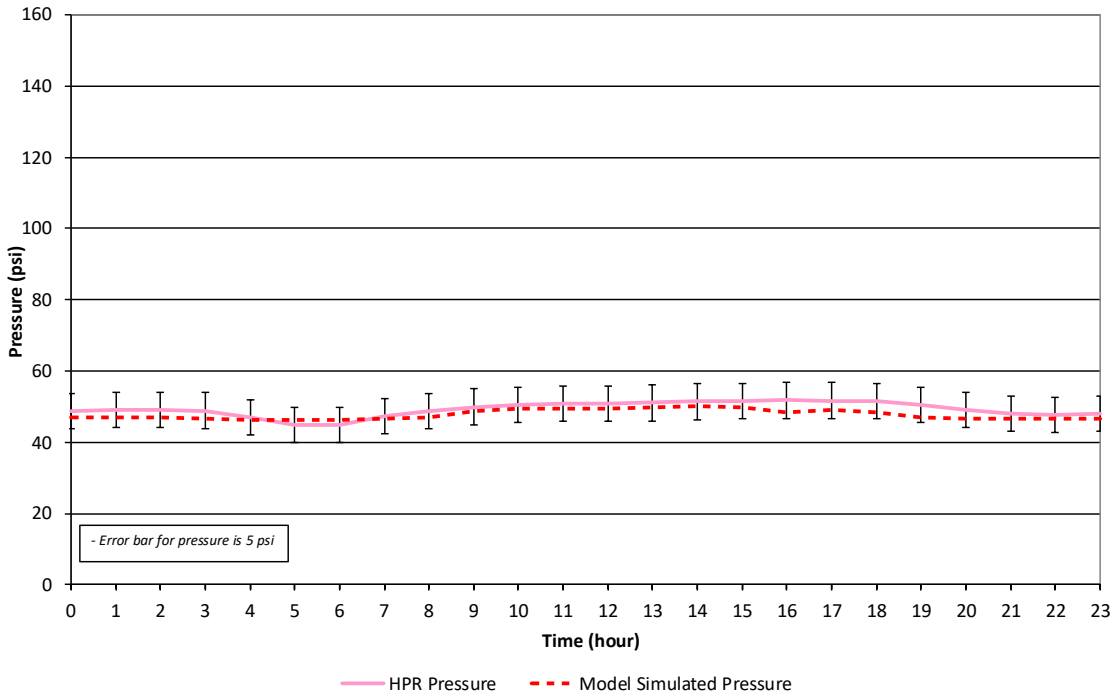


Figure E-12: HPR 13, Grand Pheasant Ln & Rossi Ln
July 11, 2024 (575 Zone)

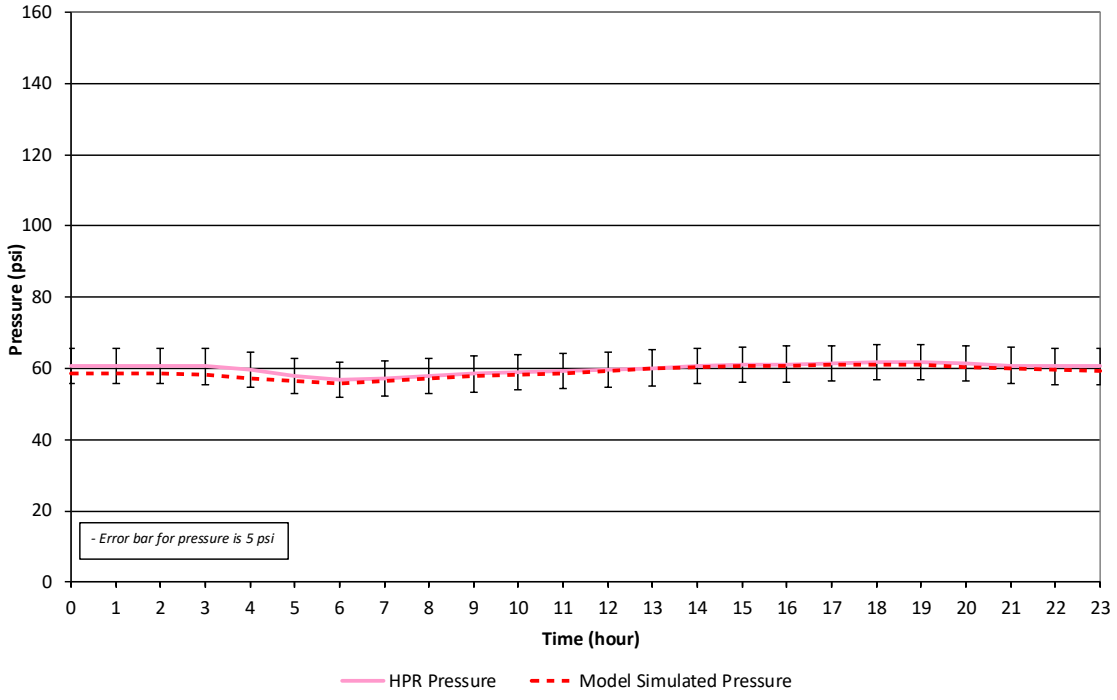


Figure E-13: HPR 15, 280 Oak Tree Ln
July 11, 2024 (375 Zone)

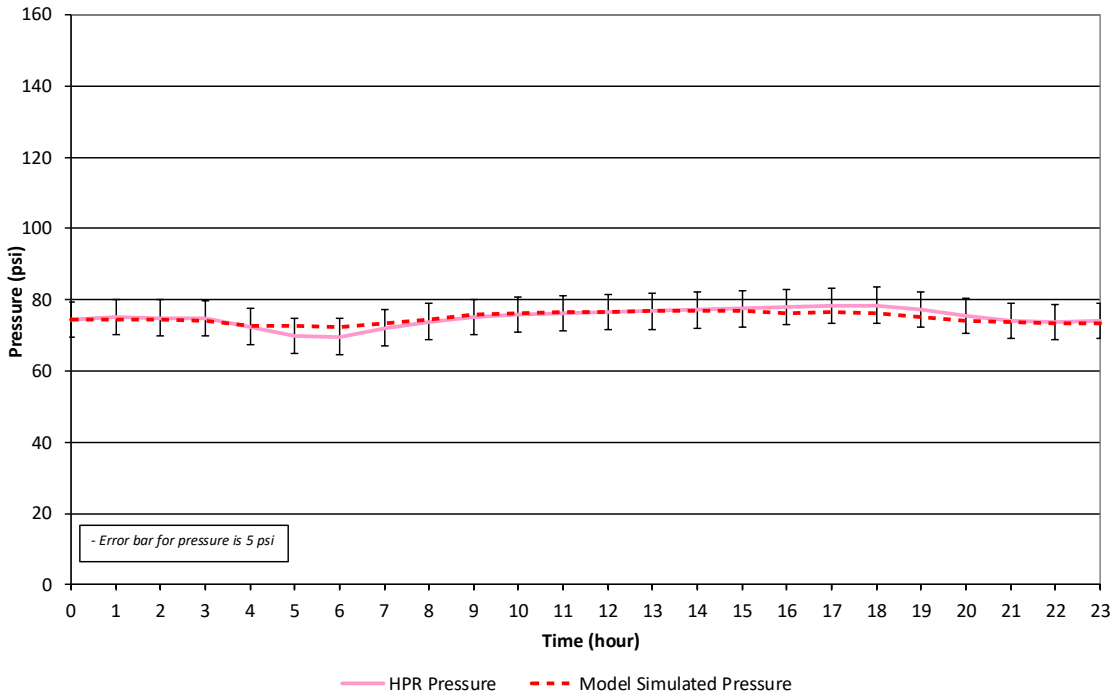


Figure E-14: HPR 16, 500 Business Park Dr
July 11, 2024 (375 Zone)

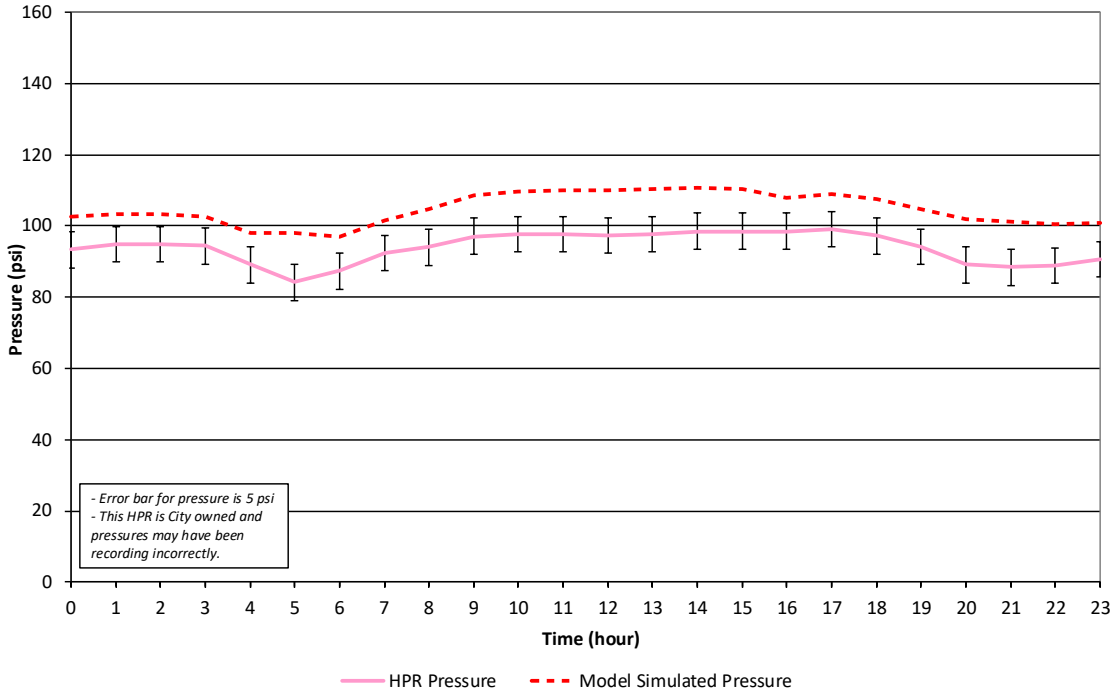


Figure E-15: HPR 17, 1996 Beale Cir
July 11, 2024 (375 Zone)

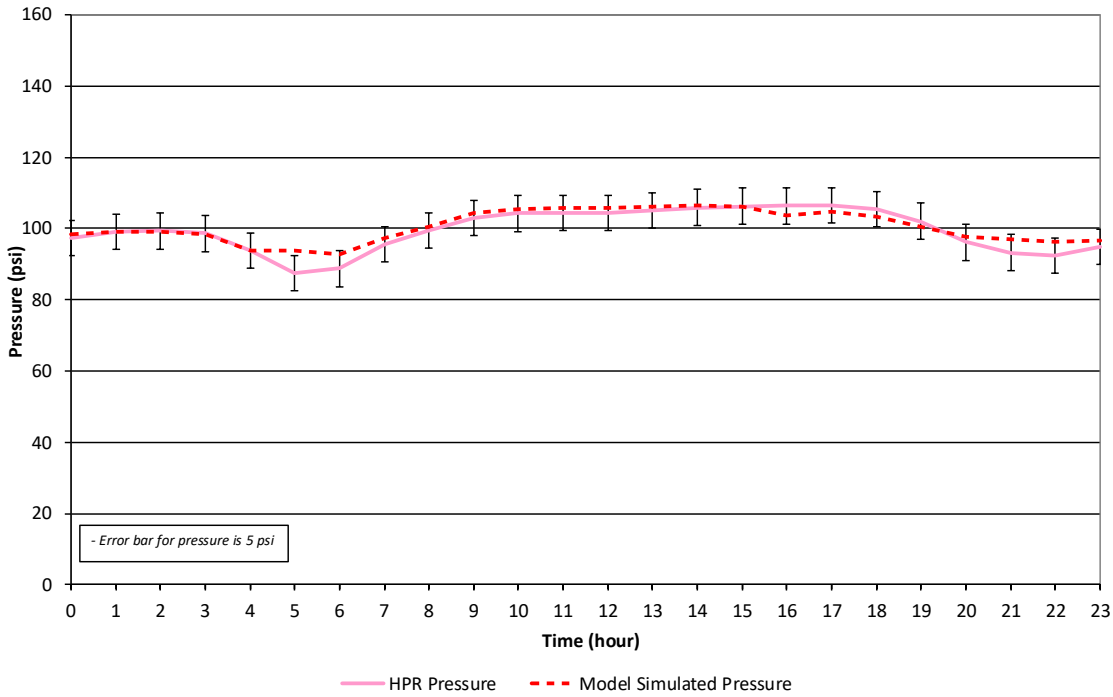


Figure E-16: HPR 18, 1301 Lincoln Blvd
July 11, 2024 (375 Zone)

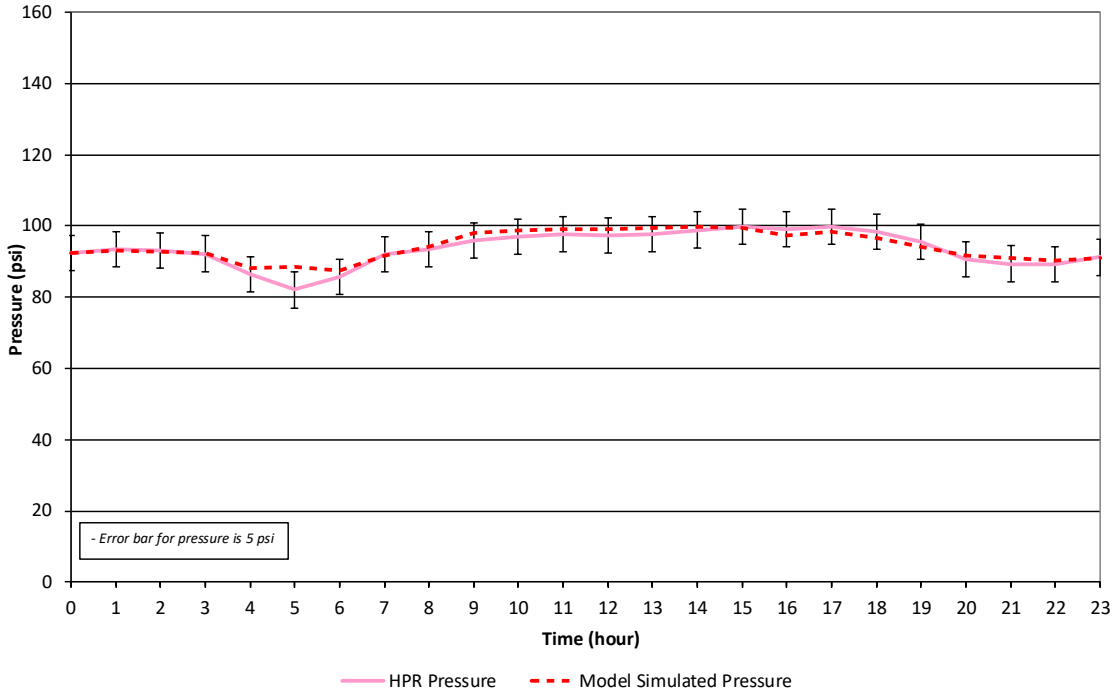


Figure E-17: HPR 19, 1226 Shea Falls Dr
July 11, 2024 (375 Zone)

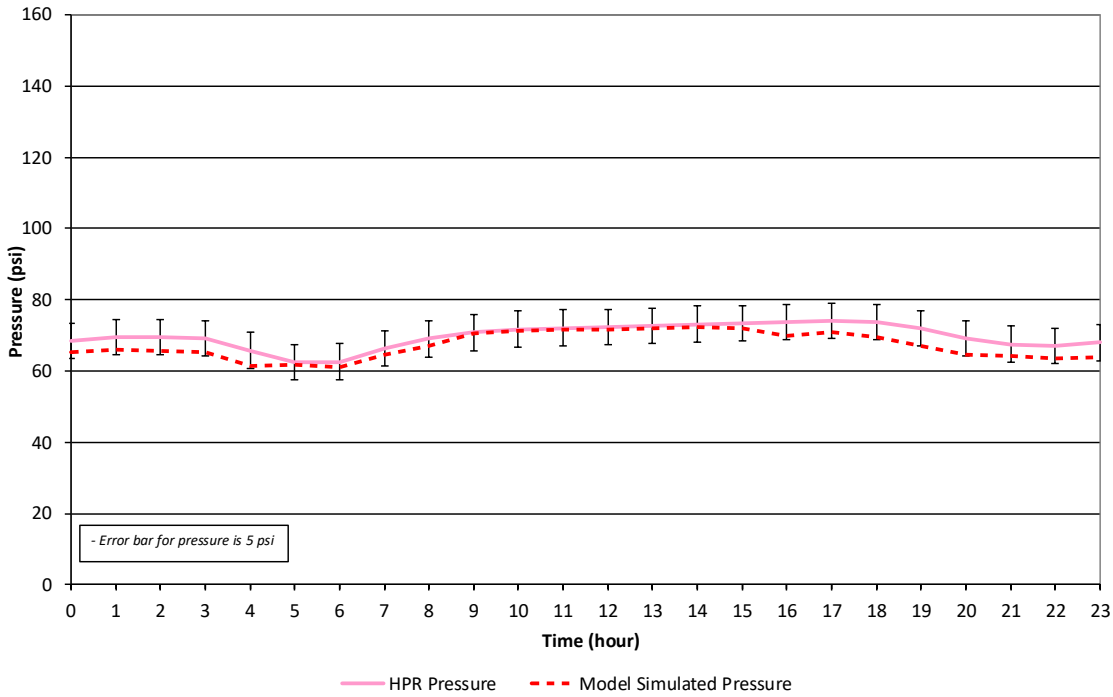


Figure E-18: HPR 20, 600 Birkdale Pl
July 11, 2024 (375 Zone)

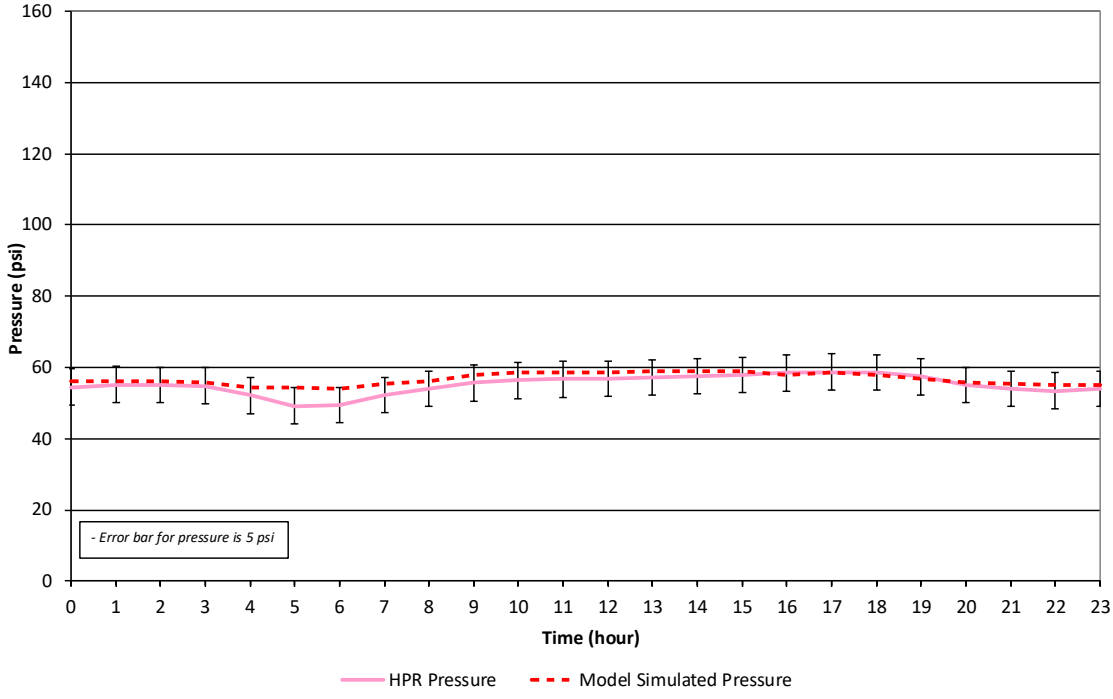


Figure E-19: HPR 22, Stoneridge Blvd
July 11, 2024 (575 Zone)

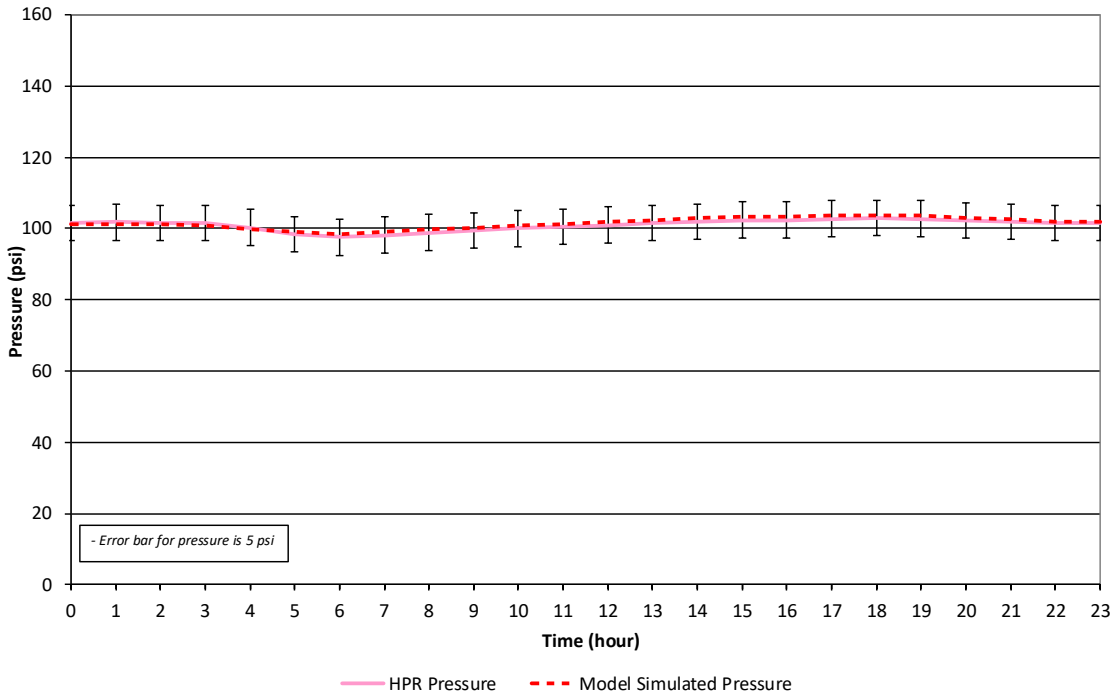


Figure E-20: HPR 23, Eastridge Dr
July 11, 2024 (575 Zone)

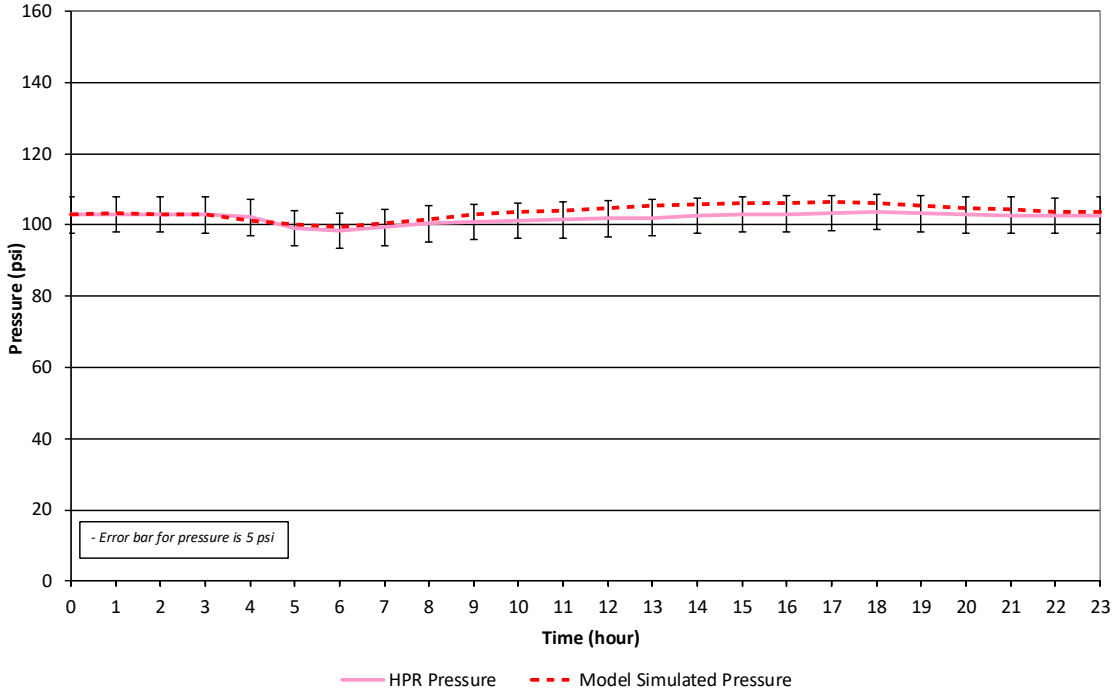
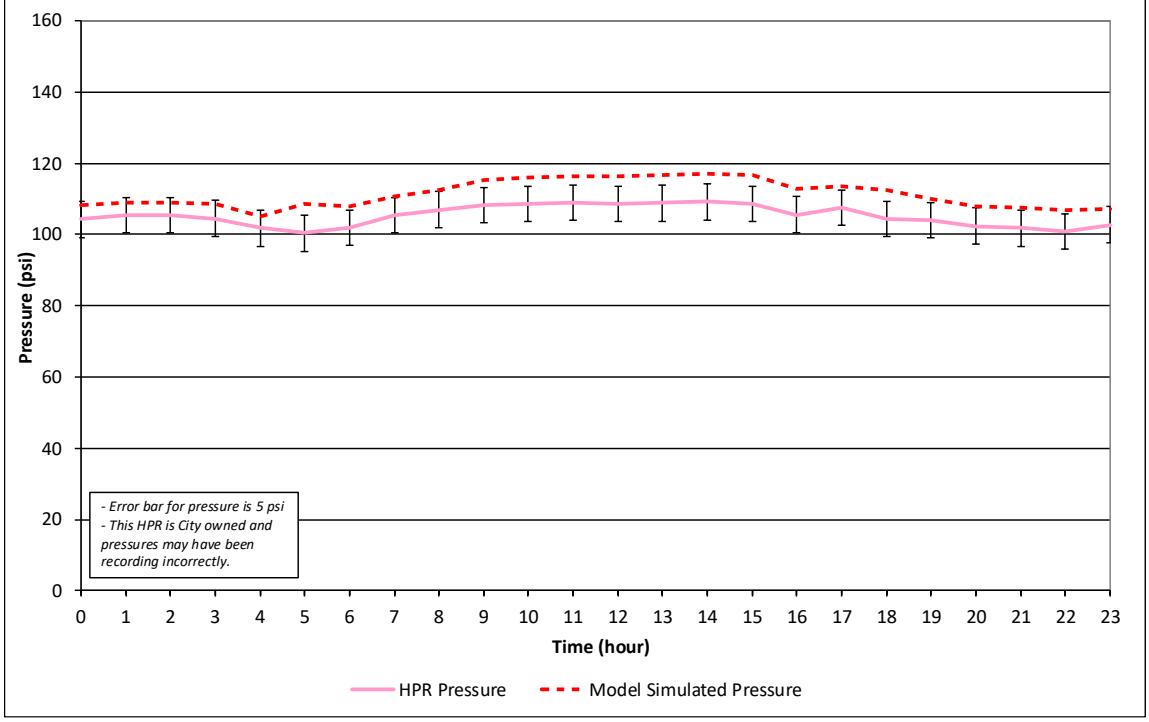


Figure E-21: HPR 24, Behind Wastewater Treatment Plant
July 11, 2024 (375 Zone)



750 AND 610 ZONES RESULTS

Figure E-22: HPR 21, 1600 Bella Cir
July 11, 2024 (750 Zone)

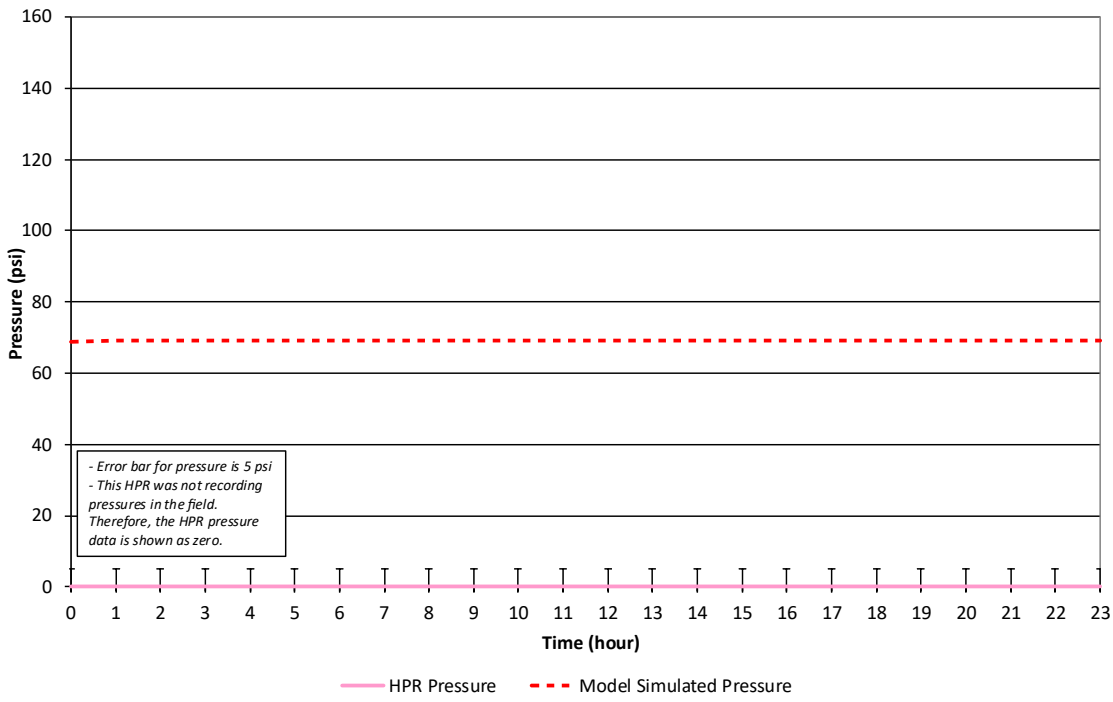
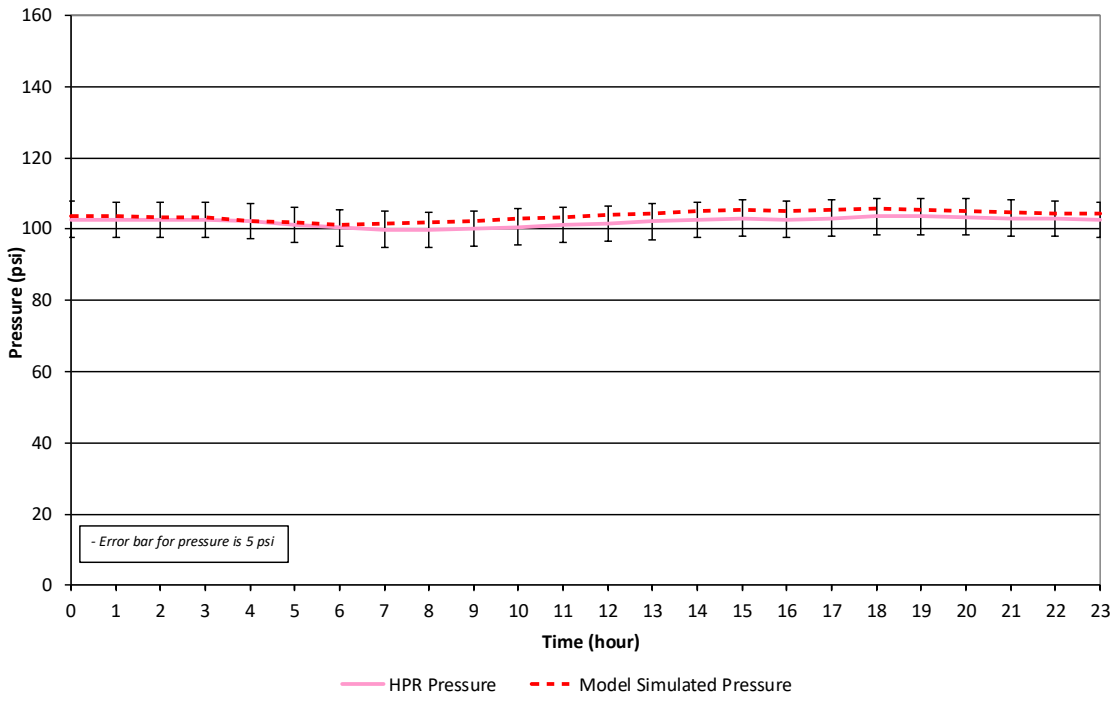
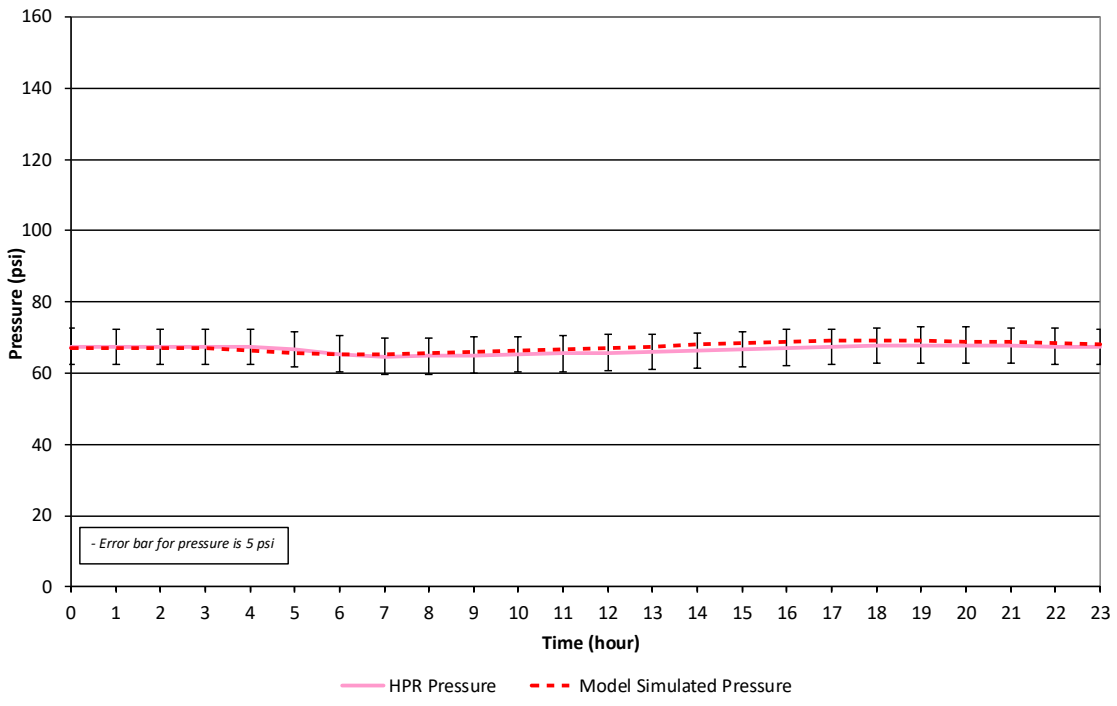


Figure E-23: HPR 14, 3646 Camino Cielo
July 11, 2024 (610 Zone)



775 AND 650 ZONES RESULTS

Figure E-24: HPR 12, 3312 Vista De Madera
July 11, 2024 (775 Zone)



Appendix F

10-Year Pipeline Rehabilitation and Replacement Program Details

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
8198	1	4	2025
8856	6	4	2025
2130	380	4	2025
824	4	4	2025
1188	65	4	2025
4316	408	4	2025
822	4	4	2025
1190	54	4	2025
8214	1	4	2025
812	364	4	2025
3618	10	4	2025
3637	2	4	2025
1223	427	4	2025
8175	5	4	2025
1305	7	4	2025
863	1	4	2025
4087	32	2	2025
6806	6	4	2025
3632	306	4	2025
2170	18	4	2025
3920	383	4	2025
503	81	4	2025
4077	21	2	2025
4078	28	2	2025
8533	132	2	2025
3471	16	4	2025
8212	13	4	2025
8215	12	4	2025
1025	334	4	2025
8487	2	6	2025
8197	2	6	2025
4805	55	6	2025
3699	25	6	2025
3738	200	6	2025
1606	4	6	2025
2053	14	6	2025
3614	81	6	2025
8195	11	6	2025
8196	4	6	2025
8216	3	4	2025
2086	60	6	2025
792	319	4	2025
1023	134	4	2025
791	22	4	2025
4302	278	6	2025
New Pipeline (2nd Street)	984	14	2025
6600	25	4	2026
6598	6	4	2026
772	21	6	2026
1024	56	4	2026
6623	4	6	2026
6624	396	6	2026
4190	253	4	2026
3643	56	6	2026
4164	26	6	2026
2132	324	6	2026
9702	4	6	2026
4575	5	6	2026
4201	82	6	2026
2176	33	4	2026
3931	1	6	2026
6629	97	6	2026
6630	90	6	2026
2175	299	4	2026
11045	9	4	2026
9762	4	6	2026
9706	10	6	2026
1607	173	6	2026
3616	1	6	2026
3617	1	6	2026
3615	44	6	2026
6622	141	6	2026
823	12	6	2026

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
8186	4	6	2026
472	321	6	2026
1774	34	6	2026
6616	47	6	2026
6621	1	6	2026
1931	76	6	2026
1225	273	6	2026
1222	310	6	2026
8434	1	4	2026
8435	2	4	2026
526	436	4	2026
504	108	4	2026
1300	292	4	2026
505	4	4	2026
5337	22	4	2026
8164	425	4	2026
8163	26	6	2026
6665	42	4	2026
1221	3	6	2026
1224	2	4	2026
4186	3	6	2026
1165	9	6	2026
1633	327	4	2026
1301	2	4	2026
8182	13	4	2026
1625	32	4	2026
6606	340	6	2026
1624	176	6	2027
4191	30	6	2027
8218	2	4	2027
8174	1	4	2027
8173	1	4	2027
1083	358	6	2027
1626	2	6	2027
1627	2	6	2027
1631	3	6	2027
579	245	6	2027
445	83	4	2027
532	4	6	2027
2579	453	4	2027
3638	15	6	2027
6605	2	6	2027
1623	2	4	2027
1621	1	4	2027
1620	5	6	2027
1622	418	4	2027
2148	54	6	2027
8650	1	4	2027
8651	5	4	2027
781	5	4	2027
782	22	4	2027
1619	305	6	2027
8219	2	4	2027
1226	52	4	2027
8176	53	4	2027
5049	281	4	2027
454	56	6	2027
4525	26	6	2027
8181	3	6	2027
8185	2	4	2027
1087	6	4	2027
2209	5	6	2027
4520	2	6	2027
1088	4	6	2027
5048	9	6	2027
5318	5	4	2027
2084	31	4	2027
8165	2	4	2027
2573	44	6	2027
4526	281	6	2027
862	362	6	2027
4189	414	6	2027
4518	465	6	2027

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
6607	487	6	2027
4527	296	6	2027
1079	14	6	2027
1067	1	4	2027
3094	59	6	2027
3095	28	6	2027
3196	306	6	2027
3610	55	6	2028
6617	485	4	2028
2144	485	4	2028
783	324	4	2028
785	469	4	2028
2578	26	6	2028
4317	439	6	2028
4315	456	6	2028
3563	52	10	2028
4203	63	8	2028
382	55	6	2028
829	18	6	2028
6592	204	8	2028
4318	436	6	2028
6615	405	6	2028
4303	436	6	2028
4181	595	8	2028
2119	3	8	2028
335	2	8	2028
1889	1	12	2028
6601	11	8	2028
280	4	6	2028
6608	356	14	2028
4517	67	14	2029
1230	277	14	2029
279	224	6	2029
1929	178	8	2029
4187	237	14	2029
805	232	14	2029
831	184	14	2029
8220	1	6	2029
806	105	14	2029
727	324	10	2029
2020	131	10	2029
3564	161	10	2029
2230	102	10	2029
726	1	10	2029
5050	226	10	2029
2111	433	10	2029
1890	1	10	2029
3642	127	8	2029
3558	190	6	2029
6590	85	8	2029
6591	37	8	2029
3557	376	8	2029
4183	38	4	2029
4156	5	8	2029
4179	1	8	2029
5042	21	8	2029
4510	6	8	2029
4295	85	8	2029
4309	5	8	2029
4308	5	8	2029
5039	5	8	2029
4182	68	12	2029
8858	95	16	2029
8859	54	8	2029
8172	13	6	2029
4519	2	6	2029
8217	1	6	2029
6618	480	6	2029
2137	385	8	2029
8014	244	8	2029
1029	13	8	2029
3636	2	6	2029
6599	382	6	2029

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
6612	65	6	2029
8500	1,043	8	2029
6610	15	6	2029
6609	393	6	2029
811	32	6	2029
2136	349	6	2029
2083	53	6	2029
230	427	6	2029
859	12	6	2030
2255	62	6	2030
1086	21	6	2030
6594	61	8	2030
6593	38	8	2030
2134	15	8	2030
8486	15	8	2030
2206	188	8	2030
4180	247	8	2030
2205	312	8	2030
3205	241	8	2030
1610	517	8	2030
8034	1	6	2030
1070	240	6	2030
1078	33	6	2030
1069	1	6	2030
8119	3	6	2030
1990	1	6	2030
3781	21	6	2030
3787	140	6	2030
2149	139	6	2030
8138	28	6	2030
3789	318	6	2030
2171	2	6	2030
3790	9	6	2030
618	179	6	2030
1973	3	6	2030
8137	29	8	2030
4529	139	8	2030
766	238	8	2030
4086	302	6	2030
3784	257	6	2030
8118	246	6	2030
4807	1	6	2030
5124	2	6	2030
4806	26	6	2030
1077	14	6	2030
1076	304	6	2030
1068	303	6	2030
1075	335	6	2030
1618	25	6	2030
4099	9	6	2030
4095	260	6	2030
4102	294	6	2030
273	3	6	2030
2060	279	6	2030
4100	230	6	2030
4101	40	6	2030
3608	480	6	2030
1160	267	6	2030
1161	32	6	2030
3630	29	6	2030
3631	236	6	2030
2182	112	6	2030
2181	4	6	2030
2203	2	6	2030
6632	2	6	2030
2201	1	6	2030
3395	4	6	2030
3611	3	6	2030
1163	2	6	2030
3626	4	8	2030
3924	32	8	2030
7205	1	6	2030
3621	3	6	2030

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
3926	2	6	2030
1162	2	8	2030
3394	67	6	2030
3622	324	6	2030
6631	144	6	2030
3623	197	6	2031
2200	215	6	2031
3612	244	6	2031
2197	90	6	2031
3925	256	6	2031
3624	309	6	2031
3613	150	6	2031
3627	187	8	2031
3620	61	6	2031
7206	95	8	2031
3635	92	6	2031
3923	3	8	2031
3629	392	8	2031
3634	237	8	2031
3633	291	8	2031
3628	202	8	2031
6633	96	6	2031
6625	427	6	2031
2173	176	6	2031
2172	15	6	2031
8203	32	6	2031
8532	175	6	2031
3619	25	8	2031
7842	374	6	2031
1752	594	6	2031
893	65	8	2031
1615	4	8	2031
1800	71	8	2031
8156	28	8	2031
8178	1	6	2031
4184	1,566	6	2031
887	262	8	2031
8177	53	6	2031
8857	293	20	2031
8180	47	8	2031
11046	10	6	2031
8210	6	10	2031
2180	2	6	2031
821	2	6	2031
8224	2	6	2031
5313	2	6	2031
8121	1	6	2031
1977	5	8	2031
3473	15	8	2031
825	48	10	2031
3472	9	8	2031
2102	20	6	2031
7843	30	6	2031
8199	3	6	2031
4299	22	6	2031
4165	2	6	2031
8211	6	8	2031
3625	4	8	2031
2202	2	6	2031
9737	4	6	2031
6595	4	6	2031
282	32	6	2031
3788	12	6	2031
4530	26	8	2031
755	1	8	2031
6626	26	6	2031
7911	1	10	2031
11044	15	6	2031
8171	4	6	2031
4521	5	6	2031
4654	5	6	2031
1164	9	6	2031
5492	44	6	2031

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
5047	438	8	2032
2204	250	6	2032
8485	1,159	8	2032
3922	4	6	2032
1918	40	6	2032
6603	4	8	2032
2229	6	8	2032
2071	11	8	2032
4192	459	8	2032
4193	394	6	2032
1059	62	8	2032
1643	379	8	2032
6657	6	8	2032
2079	2	8	2032
8153	39	8	2032
3912	1	12	2032
3195	190	8	2032
8424	5	8	2032
8425	220	8	2032
5329	69	12	2032
1975	2	8	2032
529	2	18	2032
527	66	8	2032
8183	12	8	2032
2082	40	6	2032
2081	278	6	2032
1082	367	6	2032
1022	1	6	2032
1021	1	6	2032
1018	81	6	2032
275	297	6	2032
1081	43	6	2032
1080	241	6	2032
274	47	6	2032
272	86	6	2032
278	1	6	2032
1020	1	6	2032
1019	1	6	2032
4172	286	8	2032
5041	145	8	2032
8004	2	8	2032
6611	13	6	2032
2063	267	6	2032
2067	4	6	2032
2066	13	6	2032
2064	4	6	2032
1200	253	8	2032
2121	221	6	2032
4096	261	6	2032
8166	44	8	2032
3204	4	16	2032
6613	92	14	2032
6584	2	6	2032
5484	188	18	2032
6614	7	8	2032
8191	83	8	2032
8490	143	12	2032
5340	5	8	2032
4089	1	8	2032
4088	1	8	2032
802	206	6	2032
4170	40	8	2032
4171	2	8	2032
804	162	6	2032
827	136	8	2032
2244	41	8	2032
2243	100	8	2032
2120	455	8	2032
2068	26	10	2032
1378	4	6	2032
1343	5	8	2032
832	241	10	2032
229	243	6	2032

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
834	45	10	2032
833	182	10	2032
2065	248	10	2032
1531	234	10	2032
4084	224	6	2032
4085	544	14	2032
271	265	10	2033
2080	251	8	2033
270	242	10	2033
2077	488	8	2033
4092	234	10	2033
2075	25	8	2033
2076	476	8	2033
4091	63	10	2033
1017	2	10	2033
2061	1	8	2033
1588	177	8	2033
8488	13	6	2033
2078	2	8	2033
2237	350	10	2033
1379	478	8	2033
845	67	8	2033
2238	2	8	2033
2239	1	10	2033
828	26	10	2033
1591	2	6	2033
2122	1	8	2033
2123	255	8	2033
2236	412	10	2033
1589	106	8	2033
1590	172	6	2033
2107	174	8	2033
4090	312	8	2033
768	40	8	2033
4098	174	6	2033
4097	266	6	2033
1614	6	6	2033
4094	121	6	2033
4093	162	6	2033
801	162	6	2033
3698	1	24	2033
5338	0	18	2033
3783	10	6	2033
8144	7	24	2033
3782	308	24	2033
1989	1	6	2033
8143	1	8	2033
4208	56	8	2033
3938	2	8	2033
3939	1	24	2033
5339	550	24	2033
4162	5	8	2033
5341	2	8	2033
3411	6	8	2033
10639	13	24	2033
5033	22	4	2033
8478	2	14	2033
3393	356	24	2033
9316	61	24	2033
2157	382	6	2033
8213	12	14	2033
4655	124	14	2033
581	7	14	2033
3857	255	6	2033
3474	27	6	2033
2155	524	14	2033
11380	5	14	2033
2156	59	14	2033
4076	258	14	2033
4075	7	14	2033
506	2	6	2033
8497	51	6	2033
6666	45	14	2033

Appendix F. 10-Year Pipeline R&R Program			
Pipeline ID	Length, ft	Diameter. Inches	Replacement Year
1159	2	6	2033
4082	2	6	2033
4081	276	6	2033
6667	85	14	2033
11994	222	14	2033
4083	102	6	2033
4080	165	6	2033
533	5	6	2033
1157	114	6	2033
4079	2	6	2033
1158	1	6	2033
1340	2	6	2033
586	217	6	2033
587	118	6	2033
7196	1	8	2033
7832	60	8	2033
4608	5	8	2033
4647	128	12	2033
3917	1	8	2033
6658	417	8	2033
4070	5	8	2034
4068	131	12	2034
4073	79	8	2034
4072	178	8	2034
5306	123	12	2034
3849	133	8	2034
8522	689	8	2034
8523	689	8	2034
7195	155	12	2034
8903	82	8	2034
11379	4	6	2034
11378	15	6	2034
2150	5	14	2034
1085	5	14	2034
1335	45	14	2034
1228	1	8	2034
1227	1	8	2034
1229	28	14	2034
1899	4	10	2034
2036	3	10	2034
2072	2	8	2034
724	5	10	2034
2112	2	8	2034
725	9	10	2034
846	3	10	2034
4173	4	8	2034
4176	355	8	2034
5467	251	12	2034
8474	4	12	2034
5156	2	14	2034
5157	2	14	2034
1616	173	8	2034
8484	19	8	2034
5165	2	12	2034
5163	3	8	2034
5164	1	8	2034
1741	2	8	2034
5475	1	8	2034
8146	3	12	2034
5155	1,025	24	2034
5314	3	14	2034
1199	31	6	2034
2058	3	8	2034
4104	130	6	2034
323	226	8	2034
1613	3	6	2034
723	39	8	2034
728	446	8	2034
722	254	8	2034
719	30	8	2034
1597	852	16	2034
2124	23	16	2034
2100	623	16	2034

Appendix G

Cost Estimating Assumptions

This appendix details West Yost's assumptions for estimating probable construction costs for the recommended water system facilities. Construction costs were developed based on a combination of data supplied by manufacturers, published industry standard cost data and curves, construction costs for similar facilities built by the City of Lincoln (City) and/or other public agencies, and construction costs previously estimated by West Yost for similar facilities with similar construction cost indexes.

The costs presented in this appendix are for construction only and do not include estimating or construction uncertainties (e.g., variations in final quantities) or cost estimates for engineering, legal services, environmental review, inspections, and/or contract administration. Some of these items are referred to as contingency costs and are addressed in the last section of this appendix. It should also be noted that the construction costs presented in this appendix represent capital infrastructure costs and do not include costs for purchase of additional surface water supplies, supply reliability, or operation and maintenance.

All estimated construction costs have been adjusted to reflect August 2025 dollars based on the construction cost index (CCI) of 20-cities average (13913.52). These costs should be used for conceptual cost estimates only and should be updated regularly. Construction costs presented in this appendix are not intended to represent the lowest prices in the industry for each type of construction or higher costs based on current supply-chain issues and/or construction volatility experienced in 2021 and 2022; rather they are representative of average or typical construction costs.

These planning-level construction cost estimates have been prepared for guidance in evaluating various facility improvement options and are intended only for budgetary purposes within the context of this master planning effort. Cost estimates prepared for this master planning effort are developed in accordance with the guidelines of the Association for the Advancement of Cost Engineering (AACE) International for a Class 5 Estimate. AACE International defines a Class 5 Estimate in the following manner:

> *Class 5 Estimate: This estimate is prepared based on limited information, where little more than proposed plant type, its location, and the capacity are known. Strategic planning purposes include, but are not limited to, market studies, assessment of viability, evaluation of alternate schemes, project screening, location and evaluation of resource needs and budgeting, and long-range capital planning. Examples of estimating methods used would include cost/capacity curves and factors, scale up factors, and parametric and modeling techniques. Typically, little time is expended in the development of this estimate. The expected accuracy ranges for this class estimate are –20 to – 50 percent on the low side and +30 to +100 percent on the high side.*

The following sections of this appendix describe the assumptions used to estimate the probable construction costs for the planning and design of recommended water system facilities for the City's water system:

- Water System Construction Costs
- Contingency Costs

WATER SYSTEM CONSTRUCTION COSTS

The following sections present the construction cost estimates used to project probable construction costs for recommended water system facilities in the City's water system and are categorized by type of improvement, including the following:

- Potable Water Pipelines
- Treated Water Storage Tanks
- Treated Water Booster Pump Stations
- Groundwater Production Wells
- Aquifer Storage and Recovery Wells
- Pressure or Flow Regulating Stations and Valves
- Backup Power Generators Plug-In Adaptors

Potable Water Pipelines

Unit construction costs for potable water pipelines 8- through 20-inches in diameter are provided in Table 1. These unit costs are categorized by typical pipeline construction either in developed areas (e.g., in urban or suburban roads) or undeveloped areas (e.g., across open fields or in rural roads) and are representative of pipeline construction under common or normal conditions. Special or difficult conditions would increase costs significantly.

The unit construction costs presented below are based on recent bids provided by the City and generally include pipeline materials, trenching, placing and jointing pipe, valves, fittings, hydrants, service connections, placing imported pipe bedding, native backfill material, and partial asphalt pavement replacement, if required. However, the costs presented in Table 1 do not include jacking and boring pipe or constructing boring and receiving pits. Jack and bore costs are shown in Table 2 and should be added where required.

Table 1. Unit Construction Costs for Pipelines[(a)]

Pipeline Size	Unit Construction Cost, dollars/linear foot(b)	
	Developed Areas	Undeveloped Areas
8-inch diameter	490	320
12-inch diameter	680	485
16-inch diameter	825	640
18-inch diameter	885	690
20-inch diameter	935	670
24-inch diameter	1070	840
30-inch diameter	1260	1090

(a) Based on August 2025 CCI of 20-cities average (13913.52).
(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Table 2. Unit Construction Costs for Jack and Bore[a]	
Pipeline Size	Unit Construction Cost, dollars/linear foot[b]
12-inch diameter (24-inch diameter casing)	1,070
16-inch diameter (30-inch diameter casing)	1,335
18-inch diameter (32-inch diameter casing)	1,420
24-inch diameter (36-inch diameter casing)	1,605

(a) Based on August 2025 CCI of 20-cities average (13913.52).
(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Treated Water Storage Reservoirs

Table 3 summarizes the estimated construction costs for treated water storage reservoirs between the size range of 1.0 to 4.0 MG. These costs generally include the installation of the storage reservoirs, site piping, earthwork, paving, instrumentation, and related sitework. These costs are representative of construction under normal excavation and foundation conditions and would be significantly higher for special or difficult foundation requirements.

Table 3. Construction Costs for Treated Water Storage Tanks[a]		
	Estimated Construction Cost, million dollars[b]	
Capacity, MG	Above-ground Concrete	Above-ground Steel
1.0	3.6	2.6
2.0	4.7	3.5
3.0	6.0	4.4
4.0	7.1	5.3
5.0	8.2	6.4
6.0	9.4	7.3

(a) Based on August 2025 CCI of 20-cities average (13913.52).
(b) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Treated Water Pump Stations

Pump stations may be required to lift water to the operating hydraulic grade of the City's pressure zones. Estimated construction costs for pump stations, as shown in Table 4, are based on enclosed stations with architectural and landscaping treatment suitable for residential areas. Pump station costs can vary considerably, depending on architectural design, pumping head, and pumping capacity. Therefore, these costs presented below are representative of construction under common or normal conditions and would be significantly higher for special or difficult conditions.

Pump station cost estimates include the installation of the pumps, site piping, earthwork, paving, a chemical feed system (hypochlorite), on site backup/standby power generator, SCADA, and related sitework.

Table 4. Construction Costs for Pump Stations[a]	
Firm Capacity, mgd[b]	Estimated Construction Cost, million dollars[c]
0.5	1.5
1	1.5
2	1.7
3	1.9
4	2.2
5	2.5
6.5	2.8

(a) Based on August 2025 CCI of 20-cities average (13913.52).
(b) Equal to the total pumping capacity with the largest pump out of service or on standby.
(c) Estimated construction costs do not reflect an adjustment to account for the current economic bidding climate.

Groundwater Production Wells

Well construction costs are based on construction activities including pilot hole drilling, water quality/soil sampling, pilot hole reaming, well construction, well development and providing the necessary housing, pump, motor, automatic control equipment, discharge piping, SCADA, and disinfection equipment.

Construction costs for new groundwater wells are estimated to be approximately $2,244,295 per well (assuming a well capacity between 100 gallons per minute [gpm] and 500 gpm). These estimates are based on recent bids for similarly sized wells and representative of construction under normal drilling conditions. Costs would be significantly higher for special or difficult locations, or if specialized wellhead treatment is required.

Aquifer Storage and Recovery Wells

Aquifer storage and recovery (ASR) wells are used to inject treated surface water into a suitable aquifer during times when surplus water is available. The same wells are used to withdraw the stored water from the aquifer when other supplies are limited. ASR well construction costs include the construction of the ASR well; all required civil, mechanical, and electrical equipment; above ground facilities (i.e., masonry building); conveyance pipelines; ASR flow control valves, piping, and mechanical and controls; and one monitoring well. Cost of land purchase or lease is not included.

Construction costs for new ASR wells are estimated to be approximately $2,881,100 per well assuming an 18-inch diameter well (constructed to a depth of 500 feet), conveyance pipeline length of 200 feet, and one monitoring well (constructed to a depth of 500 feet). These estimates are based on construction costs from West Yost's expertise with ASR wells and information from other public agencies and are representative of construction under normal drilling conditions. Costs would be significantly higher for special or difficult locations, or if specialized wellhead treatment is required.

Pressure or Flow Regulating Stations and Valves

Interconnections (i.e., pressure regulating stations or check valves) are required to provide water supply between pressure zones during peak demands and/or emergency conditions. The construction cost for a new pressure regulating station or an existing pressure regulating station upgrade under normal conditions is estimated to be approximately $323,195. The construction cost for a new pressure regulating station or an existing pressure regulating station upgrade under special or difficult conditions (e.g., construction in high traffic areas) is estimated to be approximately $406,630. The construction cost for a new check valve connection is estimated to be approximately $7,395, should it be deemed necessary with the installation of PRV stations but are not required.

Construction cost estimates for a pressure regulating station include the installation of control valve(s), a concrete utility vault, access hatches, site piping, earthwork, paving, SCADA, and related sitework.

Backup Power Generators Plug-In Adaptors

On-site backup power plug-in adaptors and transfer switches are recommended so pumps can continue delivering water to the distribution system in the event of a power outage. Generators should be sized to meet the power demands of the pumps. The construction cost to retrofit existing facilities with a plug-in adaptor and transfer switch is estimated to be approximately $237,640 per location. This cost is representative of construction under normal conditions and would be significantly higher for special or difficult conditions.

CONTINGENCIES AND OTHER PROJECT COSTS

Contingency costs must be reviewed on a case-by-case basis because they will vary considerably with each project. However, to assist City staff with budgeting for these future construction projects, contingency costs have been added to the planning budget as percentages of the estimated construction cost using these two categories: Construction Contingency Costs and Other Project Cost Allowances.

- **Construction Contingency Costs**: 15 percent

  The construction costs presented above are representative of the construction of water system facilities under normal construction conditions and schedules; consequently, it is appropriate to allow for estimating and construction uncertainties unavoidably associated with the conceptual planning of projects. Factors such as unexpected construction conditions, the need for unforeseen mechanical items, and variations in final quantities are only a few of the items that can increase project costs. An allowance of 15 percent of the base construction cost will be included to cover such project related construction contingencies.

- **Other Project Cost Allowances:** 30 percent

  Other project costs have been divided into three (3) subcategories, totaling 30 percent (10 percent engineering, 10 percent construction management, and 10 percent program implementation)

  — Engineering costs associated with new facilities include preliminary investigations and reports, right-of-way acquisition, foundation explorations, preparation of drawings and specifications during construction, surveying and staking, sampling of testing material, and start-up services. For this study, engineering costs are assumed to be 10 percent of the base construction cost estimate.

  — Construction management covers such items as contract management and inspection during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that construction management charges will equal approximately 10 percent of the base construction cost estimate.

  — Program implementation costs cover items such as legal fees, environmental/CEQA compliance requirements, financing expenses, administrative costs, and interest during construction. The cost of these items can also vary, but for the purpose of this study, it is assumed that program implementation costs will equal approximately 10 percent of the base construction cost estimate.

An example application of these allowances to a project with an assumed base construction cost of $1.0 million is shown in Table 5. As shown, the total cost of all project construction contingencies (construction, design, construction management, and administration costs) is approximately 49.5 percent of the base construction cost for each project.

Table 5. Example Application of Contingency Costs

Cost Component	Percent	Cost, dollars
Estimated Base Construction Cost before Mark-ups[(a)]	-	1,000,000
Construction Contingency Costs	15	150,000
Estimated Construction Cost with Contingency	**-**	**$1,150,000**
Other Project Costs		
Engineering	10	115,000
Construction Management	10	115,000
Program Implementation	10	115,000
Total Project Cost Allowances	-	345,000
Estimated Total Project Cost		**$1,495,000**

(a) Assumed cost of an example project.

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