

ADDENDUM NO. 1 TO  
PRELIMINARY ENGINEERING REPORT  
FOR  
WATER SYSTEM IMPROVEMENTS - 2022

PROJECT NO. 2021-062.100

JULY 2023

OWNER:

TOWN OF PALMER LAKE  
28 VALLEY CRESCENT  
PALMER LAKE, CO 80133

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TOWN OF PALMER LAKE  
PRELIMINARY ENGINEERING REPORT

BACKGROUND

This Addendum is made to the Preliminary Engineering Report (PER) for Water System Improvements - 2022 conducted for the Town of Palmer Lake dated Final November 2022. The Final PER presented recommended improvements grouped into three priorities consisting of the following:

Priority One

- New Arapahoe Formation Well
- Groundwater Treatment Plant Improvements
- Distribution System Replacements

Priority Two

- Distribution System Looping and Reinforcement

Priority Three

- Distribution System Extension to Serve Properties on Private Wells

The purpose of this PER Addendum is to update the recommended improvement items, priorities, and costs. Further discussions and clarifications are also presented following recent discussions with the Town staff.

This Addendum is structured in a similar format to the November 2022 PER with section and subsection numbers and titles corresponding to the original PER. Revised table numbers also correspond to those contained in the PER. Only those sections in which additional data has been developed or revisions and clarifications were necessary are presented. This Addendum shall be attached to, and shall become a part of, the November 2022 Preliminary Engineer Report for Water System Improvements for the Town of Palmer Lake. This Addendum represents the most current version of this report as of this writing.

## SECTION I - EXECUTIVE SUMMARY

The Town of Palmer Lake is a statutory Town with a 2020 estimated population of 2,636 people. The Town is located in central Colorado, in the northwest portion of El Paso County. The Town is located on Colorado Highway 105 on the south side of the Palmer Divide. The Town owns and operates a public drinking water system currently providing potable water to 1,015 active customers.

The Town's water system consists of reservoir storage, supply, groundwater well production, surface water and groundwater treatment, treated water storage, distribution and customer metering components. The Town delivers surface water supply from the Glen Park Reservoir on North Monument Creek, and groundwater supplies from the Denver and Arapahoe aquifers in the Denver Basin utilizing two wells.

The Town was incorporated in 1889. The original water system appears to have been constructed around 1867 with the adjudication of its original water rights. Several Water System Improvement projects have been conducted over the last century including distribution system extensions to new developments within the Town. The Town's surface water treatment plant (SW-WTP), treating water from Glen Park Reservoir, was constructed in the 1960's. New treatment process equipment was installed in 2012. In the late 1980's, the Town completed several water court filings to claim Denver Basin water underlying the corporate limits of the Town. The Denver Aquifer well, D-2, was constructed in 1987 and was replaced in 2021 as well D-2R. The new D-2R well went into service in 2023. In 2002, the Town constructed the Arapahoe Aquifer well, the groundwater treatment plant (GW-WTP) for iron and manganese removal, and the low zone water storage tank. Over the last 20 years, the Town Water Department has been replacing old lead joint cast iron pipe within the older areas of the distribution system. A second high zone distribution system storage tank was completed in 2019 to supplement the storage capacity of the 1960's high zone storage tank.

The Town surface water and groundwater rights are adequate to meet current and projected water demands. The Town's surface water supply has declined over the last 20 years due to long term drought conditions and increased water rights calls on the Glen Park Reservoir. Under worst case conditions of low surface water availability and the larger capacity groundwater well out of service, overall water supply capacity falls short of meeting existing and future maximum day demand conditions. Additional groundwater supply capacity is

recommended with a new Arapahoe well to firm up the supply capacity in meeting existing and future projected demands.

The distribution system is generally in good condition. Continued replacement of older cast iron pipe within the system piping is recommended. Distribution system improvements are also recommended to connect the east and west sides of the distribution system divided by Highway 105, and to reinforce overall water conveyance.

Water quality is generally compliant with water quality regulations. Elevated radium concentrations are present in the Denver and Arapahoe formations combined with elevated levels of iron and manganese. The GW-WTP was designed to provide iron and manganese removal, and subsequently radium is removed. The GW-WTP capacity is currently rated based on the use of both filters, however, levels of radium in the Denver Basin Aquifer are rising regionally. If raw water radium levels rise above the regulated limit, and radium compliance becomes dependent on the GW-WTP for removal, the facility will require the addition of a third filter to provide redundancy. Based on the 2022 radium sampling results from the new D-2R well, this recommendation remains in the Priority One recommendations.

The Town has approximately 141 private wells on individual properties for potable water supply. These were accepted by the Town for installation as the Town was unable to provide public water supply to these properties. The majority of these properties are located in the southeast quadrant of the Town on the northeast side of Highway 105. The necessary potable water supply improvements were determined in this report to serve these properties on private wells. Due to the high capital costs associated with providing public water to these in-Town properties, these necessary improvements are not recommended at this time.

This Preliminary Engineering Report presents a summary of the Town's water system components and an evaluation of the condition and needs of the system. Overall, the water system is well operated and in relatively good condition. The recommended improvements identified in this report include:

- Install new Arapahoe Aquifer groundwater well and pipeline to the GW-WTP.
- Replace lead joint cast iron and problematic pipe segments within the distribution system.

- Install new distribution system piping to loop together the east and west sides of Highway 105 and to provide distribution system reinforcement.
- Install third filter in the GW-WTP.

The recommended improvements have been grouped into two priorities. The first priority includes the recommended new Arapahoe well, replacement of older segments of distribution system piping, and GW-WTP improvements. The estimated project cost for these improvements is \$4,691,700. The second priority of recommended improvements includes distribution system upgrades to loop and reinforce the distribution system. The estimated project cost for these improvements is \$1,436,300. If the Priority One and Priority Two projects are combined into a single project, the combined project cost estimate is \$5,952,600. The third priority of improvements is to provide public water supply to those in-Town properties on private wells. The estimated project cost for these improvements is \$4,067,000. The third priority of water system improvements to provide water service to Town constituents on private wells is not recommended at this time.

A financial review of the Town of Palmer Lake's water fund indicates that the utility is well managed and in good financial condition. Funding of the needed improvements is recommended to be pursued using Drinking Water Revolving Fund (DWRF) loan funds available through the Colorado Water Resources and Power Development Authority (CWR&PDA) as administered by the Colorado Department of Public Health and Environment (CDPHE).

## SECTION II – INTRODUCTION

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION III – PLANNING AREA

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION IV – EXISTING WATER SYSTEM

### B. WATER SUPPLY

#### 2. Groundwater Rights

Clarification: The Colorado Division of Water Resources, 2020 “Groundwater Levels in the Denver Bedrock Aquifers” indicated that the Arapahoe aquifer had gained greater than 12 feet of water level. This information was based on short-term historic and basin-wide monitoring levels. A review of the 2022 “Groundwater Levels in the Denver Bedrock Aquifers” indicates a basin-wide 10-year decline in the Arapahoe aquifer of 13 feet. In the vicinity of Monument, the Arapahoe has declined between 12 feet and 16 feet.

## SECTION V – HISTORICAL AND PROJECTED WATER CONSUMPTION

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION VI – FUTURE WATER SUPPLY REQUIREMENTS

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION VII – EXISTING FINANCIAL STATUS OF THE WATER DEPARTMENT

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION VIII – EVALUATION OF EXISTING FACILITIES

### E. METERS

On December 16, 2021, EPA finalized the Lead and Copper Rule Revisions (LCRR), which further strengthen the protections against lead in drinking water. The overall goal of the LCRR is the replacement of all lead service lines and galvanized/steel service lines that have been subject to lead service line exposure. The LCRR requires a

comprehensive inventory of all service line materials and a comprehensive lead service line replacement plan be submitted to the CDPHE by October 16, 2024. The inventory will require service line material determination either by age (post 1986), records review, visual inspection (in-home and meter pits), excavation, or other predictive means. All service lines identified as unknown will be considered as lead or galvanized requiring replacement. The Town has indicated that there are several service lines that will need to be replaced under the requirements of the LCRR. The framework for the Lead Service Line Inventory has been established by CDPHE, and guidance documents for the Lead Service Line Replacement Plan are available from CDPHE.

## SECTION IX – WATER SYSTEM IMPROVEMENT NEEDS AND ALTERNATIVES

No revisions to the November 2022 Preliminary Engineering Report are made to this section.

## SECTION X – RECOMMENDED IMPROVEMENTS

The recommended improvements presented in the November 2022 Preliminary Engineering Report were presented in three priorities of work. The Priority Three improvements consisting of distribution system extensions to serve properties on private wells is not recommended at this time. Based on discussions with the Town staff, the Priority One recommended improvements have been updated to reflect improvements that have been completed, or are planned for completion, under other projects. The items have also been reordered based on their importance. Both Priority One and Priority Two improvements have been updated to reflect current construction costs. These updates are reflected in the following revised cost estimate tables:

TABLE 15  
TOWN OF PALMER LAKE  
PRIORITY ONE IMPROVEMENTS

Item	Description	Quantity	Unit Cost	Total Cost
<b>A. Distribution System Replacement</b>				
1.	Shady Lane - Greeley Blvd. to Laughing Water Dr.			
a.	Replace existing with 6" piping	1,600 LF	\$88	\$141,120
b.	6" gate valve	5 EA	\$3,500	\$17,500
c.	New fire hydrant	3 EA	\$9,050	\$27,150
d.	Service connections	32 EA	\$900	\$28,800
e.	Connection to existing piping	4 EA	\$4,500	\$18,000
f.	Asphalt replacement	1,067 SY	\$120	\$128,040
	Subtotal			\$360,610
2.	Park Street - Dixie St. to Milton St.			
a.	Replace existing with 6" piping	370 LF	\$88	\$32,634
b.	Service connections	6 EA	\$900	\$5,400
c.	Connection to existing piping	2 EA	\$4,500	\$9,000
d.	Asphalt replacement	247 SY	\$120	\$29,640
	Subtotal			\$76,674
3.	Glenway Street - High St. to Hwy. 105			
a.	Replace existing with 6" piping	1,110 LF	\$88	\$97,902
b.	6" gate valve	4 EA	\$3,500	\$14,000
c.	New fire hydrant	1 EA	\$9,050	\$9,050
d.	Service connections	16 EA	\$900	\$14,400
e.	Connection to existing piping	2 EA	\$4,500	\$9,000
f.	Asphalt replacement	740 SY	\$120	\$88,800
	Subtotal			\$233,152
4.	Valley Crescent Street - S Valley Rd. to Middle Glenway			
a.	Replace existing with 6" piping	625 LF	\$88	\$55,125
b.	6" gate valve	6 EA	\$3,500	\$21,000
c.	Service connections	4 EA	\$900	\$3,600
d.	Connection to existing piping	4 EA	\$4,500	\$18,000
e.	Asphalt replacement	417 SY	\$120	\$50,040
	Subtotal			\$147,765
5.	Glen Street at SW-WTP			
a.	Cap and abandon existing 6" CI piping	1 LS	\$8,000	\$8,000
	Subtotal			\$8,000
<b>B. New Arapahoe Formation Well</b>				
1.	Mobilization/demobilization	1 LS	\$250,000	\$250,000
2.	18" diameter hole	2,154 VF	\$110	\$236,940

Item	Description	Quantity	Unit Cost	Total Cost
3.	30" surface casing	40 VF	\$630	\$25,200
4.	10" diameter steel casing	1,601 VF	\$130	\$208,130
5.	10" stainless steel wire screen	553 VF	\$260	\$143,780
6.	Gravel pack	553 VF	\$150	\$82,950
7.	Cement grout	1,601 VF	\$30	\$48,030
8.	Well development	24 HRS	\$3,300	\$79,200
9.	72-hr pumping test	1 LS	\$60,000	\$60,000
10.	Geophysical log	1 LS	\$40,000	\$40,000
11.	Video log	1 LS	\$3,000	\$3,000
12.	Well pump, motor, level sensor and conductors	1 LS	\$210,000	\$210,000
13.	4" stainless steel drop pipe with centralizers	1,854 VF	\$105	\$194,670
14.	Pitless Unit	1 LS	\$30,000	\$30,000
15.	Electrical including new service, power panel, step-up transformer, VFD, pressure switches and pump control panel	1 LS	\$140,000	\$140,000
16.	Disinfection	1 LS	\$3,000	\$3,000
17.	Site work, fencing and piping	1 LS	\$15,000	\$15,000
18.	SCADA and control integration	1 LS	\$20,000	\$20,000
19.	Well house building, piping and valves	1 LS	\$100,000	\$100,000
20.	8" piping to Town WTP	3,200 LF	\$100	\$320,000
21.	Property purchase	1 LS	\$25,000	\$25,000
22.	Water Rights Filing	1 LS	\$30,000	\$30,000
	Subtotal			\$2,264,900
<b>C. Groundwater Treatment Plant Improvements</b>				
1.	Add third filter including installation, media, startup, and moving of existing filter	1 LS	\$360,000	\$360,000
2.	Piping modifications for filter move	1 LS	\$35,000	\$35,000
3.	Piping and valves	1 LS	\$100,000	\$100,000
4.	Filter control modifications	1 LS	\$30,000	\$30,000
5.	Add building exterior double doors for chemical deliveries	1 LS	\$10,000	\$10,000
	Subtotal			\$535,000
Total construction cost estimate				\$3,626,101
Project contingencies @ 15%				543,999
Engineering design/contract administration				271,100
Construction observation based on 150 calendar days				150,000
Other Engineering <sup>1)</sup>				85,000
Administrative expenses (advertising, legal counsel, bond counsel, and project audit)				15,500
Total preliminary project cost estimate				\$4,691,700

1) Other engineering costs includes: easements, environmental report, geotechnical services, reproduction, funding administration, CDPHE approvals, DWP permit and approvals, well sampling, Prequalification Application, Project Needs Assessment, and permits.

TABLE 16  
TOWN OF PALMER LAKE  
PRIORITY TWO IMPROVEMENTS

Item	Description	Quantity	Unit Cost	Total Cost
<b>A. Distribution System Looping and Reinforcement</b>				
1.	County Line Road - Oak Dale Rd. to Spruce Ave.			
a.	New 10" piping	800 LF	\$120	\$96,000
b.	10" gate valve	2 EA	\$4,500	\$9,000
c.	Connection to existing piping	2 EA	\$4,500	\$9,000
d.	Asphalt replacement	533 SY	\$120	\$63,960
	Subtotal			\$177,960
2.	East-West Loop - Northeast from Shady Lane to existing 6" on town property (formerly Living Word Chapel)			
a.	New 6" piping	580 LF	\$88	\$51,156
b.	New 6" HDPE bore across Monument Creek	100 LF	\$350	\$35,000
c.	6" gate valve	4 EA	\$3,500	\$14,000
d.	Connection to existing piping	2 EA	\$4,500	\$9,000
	Subtotal			\$109,156
3.	South Loop - Red Rock Ranch Dr. northeast from Forest View Way to Hwy. 105 thence northwest to existing 8"			
a.	New 8" piping	4,660 LF	\$100	\$466,000
b.	New 8" HDPE DR9 bore across Monument Creek	400 LF	\$350	\$140,000
c.	8" gate valve	4 EA	\$4,000	\$16,000
d.	New fire hydrant	2 EA	\$9,050	\$18,100
e.	Connection to existing piping	2 EA	\$4,500	\$9,000
f.	Asphalt replacement	400 SY	\$120	\$48,000
	Subtotal			\$697,100
Total construction cost estimate				\$984,216
Project contingencies @ 15%				147,684
Engineering design/contract administration				84,900
Construction observation based on 120 calendar days				120,000
Other Engineering <sup>1)</sup>				86,500
Administrative expenses (advertising, legal counsel, bond counsel, and project audit)				13,000
Total preliminary project cost estimate				\$1,436,300

1) Other engineering costs includes: easements, environmental report, geotechnical services, reproduction, funding administration, Prequalification Application, Project Needs Assessment, and permits.

The following Table is a summary of the three priorities of system improvements.

TABLE 18  
TOWN OF PALMER LAKE  
SUMMARY OF PROJECT COSTS

Description	Cost
Priority One - New Well, GW-WTP Improvements, and Distribution System Piping Replacements	\$4,691,700
Priority Two - Distribution System Looping and Reinforcement	\$1,436,300
Priority Three - Distribution System extension to Properties In Town with Private Wells	\$4,067,200
Grand Total Estimated Project Cost	\$10,195,200

SECTION XI – FUNDING OF THE RECOMMENDED IMPROVEMENTS

All construction and project cost estimate discussions in this Section shall be updated with the numbers presented in this Addendum No. 1. The following table presents the updated potential funding scenarios for the Priority One recommendations and combined Priority One and Two recommendations. The estimated project cost of the combined Priority One and Two recommendations accounts for a savings in soft costs versus constructing the two priorities in separate projects over time.

TABLE 19  
TOWN OF PALMER LAKE  
WATER SYSTEM IMPROVEMENTS  
POTENTIAL PROJECT FUNDING SCENARIO

Component	Priority One Only	Priorities One and Two
Project Cost <sup>1)</sup>	\$4,691,700	\$5,952,600
Local Match <sup>2)</sup>	\$0	\$0
DWRF Loan <sup>3)</sup>	\$4,691,700	\$5,952,600
Current O&M Expense (EQR/mo) <sup>4)</sup>	\$80.55	\$80.55
New Debt Service (EQR/mo) <sup>5)</sup>	\$19.88	\$25.22
Added Loan Reserve (EQR/mo) <sup>6)</sup>	\$1.99	\$2.52
Water Fund Reserves (EQR/mo) <sup>7)</sup>	\$8.04	\$8.04
Needed Average Monthly Bill (EQR/mo) <sup>8)</sup>	\$110.47	\$116.34
Current Average Revenue (EQR/mo) <sup>9)</sup>	\$101.84	\$101.84
Estimated Required Rate Increase	\$8.63	\$14.50

- 1) Total estimated project cost.
- 2) Local cash match from capital Improvements Fund reserves
- 3) Required loan amount for full project financing.
- 4) Based on 2021 budgeted operating expense of \$1,001,397 divided by 1036 EQRs and 12 months.
- 5) Monthly user debt burden for DWRF loan at 3.25% and 30 years, the annual payment is \$247,167 and \$313,593 respectively for Priority One and Priorities One and Two, divided by 1,036 EQR and 12 months.
- 6) Required 10% monthly reserve requirement on debt service.
- 7) Recommended Water Fund cash reserve rebuild of 100,000 per year.
- 8) Total projection of all monthly expenses.
- 9) Based on 2021 operating revenue of \$1,266,050 divided by 1,036 EQRs and 12 months.