

**AGENDA
WORKSHOP
MONDAY MARCH 12, 2018 - 6:30 P.M.
CITY COUNCIL CHAMBERS**

1. OPENING - ROLL CALL
2. REVIEW DRAFT WATER PRELIMINARY ENGINEERING REPORT
Robert Peccia and Associates (Ryan Mitchell and Brad Koenig)
3. REVIEW OF WATER REVENUES/RATES
4. ADJOURN

CHAPTER 0. EXECUTIVE SUMMARY

0.A. INTRODUCTION AND BACKGROUND

The City of Columbia Falls authorized the preparation of this Preliminary Engineering Report (PER) to evaluate the City's public water system. The specific objectives of the PER include:

- Identify the planning area and physical limits of the existing water system;
- Evaluate the condition of the existing facilities;
- Update a computer model of the water system to be used to evaluation and future planning purposes;
- Identify any deficiencies with supply, storage, and distribution facilities;
- Summarize any health and safety issues associated with system deficiencies;
- Identify and evaluate alternatives for correcting identified deficiencies;
- Provide cost estimates for all alternatives;
- Identify a set of recommended improvements for implementation; and
- Assess the impact on water rates associated with implementation of the recommended improvements.

The public water system for the City of Columbia Falls consists of the following:

- Two wells completed in the Deep Flathead Alluvial Aquifer, referred to as the Clare Park and LP wells;
- One concrete, 2.2 MG storage tank; and
- Distribution system consisting mostly of aging 6-inch and 8-inch asbestos cement (1950's) and cast iron (1960's) pipe.

0.B. PROBLEM DEFINITION

Evaluation and analysis of the existing facilities resulted in identification of the following system deficiencies:

- Water production from the Clare Park well has exceeded the current deep aquifer water rights allocation for this well.
- There is only an additional 39 ac-ft (12,708,206 gallons) per year available for production before the entire deep aquifer allocation is exceeded. Current annual production is 517,452,000 gallons per year. By adding the available aquifer allocation, the current production rate equals 530,160, 206 gallons per year.
- Projecting recent production rate trends into the future shows that by the year 2037, approximately 750 million gallons per year may be needed for production, if leakage is not addressed.
- The current water supply capacity does not meet current maximum day demand with one well out of service, a violation of DEQ-1, Montana Public Water Systems Design Standards.

- At current and projected population growth rates, developed water supply capacity will not meet even average day demand with one well out of service in 7 years, or the year 2025. While the regulated standard uses maximum day as the criterion, not being able to meet average day demand is an even more emergent condition.
- Current water loss is 52%. Year 2016 distribution water loss was 55%.
- Based on a 2012 ISO hydrant flow data summary (**Appendix S**), submitted by the Fire Chief for Columbia Falls, the maximum required fireflow is 4,000 gpm for four hours, except for the Plum Creek main which requires 7,000 gpm. Hydraulic modelling efforts show that there are two sites in residential areas where the system potentially will not provide 20 psi at the required 1,000 gpm.
- There is presently only one tank and transmission main to meet year-round storage needs. If failure of the storage tank or transmission main were to occur for natural, or other causes, such as an earthquake, heavy snowfall that exceeded the snow load design of the tank, or catastrophic leakage due to failed aging infrastructure, the City would have no storage available with which to fight fires or to meet maximum day demands.
- A storage analysis shows that the City will need an additional 800,000 gallons of storage by 2037 to meet DEQ-1 requirements for meeting average day demand plus fireflow.

0.C. ALTERNATIVES CONSIDERED

0.C.1. WATER SUPPLY

- WS-1: Do Nothing.
- WS-2: Drill new wells in the Flathead Deep Aquifer.
- WS-3: Increase pumping capacity of existing wells and install new well.
- WS-4: Construct shallow wells using existing water rights for the shallow aquifer.
- WS-5: Build new surface water treatment plant at Cedar Creek.

0.C.2. WATER STORAGE

- ST-1: Do Nothing.
- ST-2: Construct 800,000-gallon elevated steel tank.
- ST-3: Construct ground level glass fused to steel, steel bolted tank.
- ST-4: Construct D110 Type 1 ground level prestressed concrete tank.

0.C.3. WATER DISTRIBUTION

- DS-1: Do nothing.
- DS-2: Water Loss Control Program.
- DS-3: Distribution system improvements.

0.D. PREFERRED ALTERNATIVES

The City's existing wells do not produce enough water to satisfy the City's current maximum day demand with the largest producing well out of service, as required by DEQ-1. But within approximately 7 years, at the current population growth rate, not only will the City not be able to meet DEQ-1 requirements for meeting maximum day demand with the largest producer out of service, but will not even be able to meet the fundamental public health and safety needs represented in average day demand. By the year 2037, a minimum additional 715 ac-ft/year of

water rights will be needed to meet the City's average day demands. The Phase 1 water supply improvements will satisfy the current and future user demand. Please see Chapter 2 for a detailed description of water demand.

The City's distribution system experiences over 52% water loss, a significant waste of one of Montana's non-renewable resources. The City has made every effort to locate and fix leakage in the system, as shown by the many leak detection reports from 2008 through 2015. See the extensive documentation of leak detection efforts made by the City in **Appendix V**. To date, there have been no significant source(s) of leakage identified as singularly responsible for the high level of system loss. Therefore, the Phase 1 Loss Control Program is an objective, comprehensive strategy to assess sources of leakage through office and field methods. Further assessment and intervention occurs through the Loss Control Program using various methods such as service-meter assessment, nighttime flow assessment using temporary flowmeters, alternative leak detection methods, etc. Please see **Chapter 2** for a detailed description of system water loss.

The City's Preferred Alternative is Phase 1:

- WS-3, with aquifer tests, new pumps, piping improvements needed, water rights.
- DS-2 Loss Control Program.

A more detailed review of the preferred alternative can be found in **Chapter 6** of this PER. The Phase One Water System Improvements are divided into a water supply improvements project to address the urgent need to satisfy current system demand, and a distribution system Loss Control Program to address the very high level of system leakage/water loss.

Subsequent planned phases are:

Phase 2:

- ST-4: Prestressed concrete 800,000-gal storage tank.

Future Phase:

- DS-3: Distribution System Repair and Replacement Program.

0.D.1. PHASE I WATER SYSTEM IMPROVEMENTS

The Preferred Alternative consists of the following components:

- Comprehensive aquifer testing of existing wells;
- Depending upon the results of the aquifer study, existing well pumps will be upsized and a new well /pump will be designed. Associated well piping and appurtenance will also be upsized as needed;
- Construction of a new 1,800 gpm well;
- Application for new water rights; and,

- Conduct a Water Loss Control Program. Please see Loss Mitigation Measures in **Chapter 2**.

0.D.2. PHASE 2 AND FUTURE PHASE WATER SYSTEM IMPROVEMENTS

Phase Two and Future Phase improvements will include construction of a new water storage tank and improvements to the City's water distribution system. These improvements will be completed as funding becomes available.

0.E. PROJECT IMPLEMENTATION

Table 6-1 in **Chapter 6** presents a detailed Project Implementation Schedule. As shown on **Table 6-1**, the Phase 1 Water System Improvements will be completed, including warranty inspection, by the end of 2021.

0.F. PHASE ONE WATER SYSTEM IMPROVEMENTS.

The phase one improvements are scheduled to be completed within the next five years. This includes:

- Comprehensive aquifer testing of existing wells;
- Upsizing pumping capacity of existing wells and associated piping and appurtenances;
- Construction of a new 1,800 gpm well;
- Application for new water rights; and,
- Conduct a Water Loss Control Program.

0.G. PHASE TWO WATER SYSTEM IMPROVEMENTS.

The Phase Two Improvements include:

- Construction of a prestressed concrete, 800,000-gal storage tank; and
- Possible construction of a new well, if demands and population growth occur as expected.

It is expected that the Phase Two Distribution System Improvements would occur during years 10 to 15 of the 20-year planning period.

0.H. FUTURE PHASE IMPROVEMENTS.

The Future Phase Improvements include the Alternative DS-3 distribution system improvements (Talbot connector and on 4th Ave East, N). It is assumed that these improvements would occur after the Phase Two Improvements are complete, likely in years 15 to 20 of the 20-year planning period.

0.I. PROJECT COSTS

Please see **Appendix Q** for detailed cost estimates, including annual operation and maintenance costs, and total present worth. **Table 0-1** shows a summary of the Phase 1 cost estimates.

Table 0-1: Summary of Phase 1 Cost Estimate

ITEM	TOTAL COST (2018 Dollars)
Phase 1- Alternative WS-3: Upsize existing pumps and new well	\$1,315,782
Phase 1- Alternative DS-2: Loss Control Program	\$207,700
TOTAL	\$1,523,482

Average user rates per Equivalent Dwelling Unit (EDU) for the water system, sewer system and for the combined systems as shown in **Table 6-4**, are based upon FY2016 City income from metered water service at \$700,804 and 2706 EDUs. The EDU worksheet may be found in **Appendix T**. The average water system user rate is \$21.58/EDU/month, the average wastewater system user rate is \$29.73/EDU/month. The combined system average user rate is \$51.31/EDU/month. The combined system target rate as calculated by the Montana Department of Commerce is \$73.04.



City of Columbia Falls Water Preliminary Engineering Report

Overview and Discussion on Preliminary Findings

Public Meeting – March 12, 2018

Robert Peccia and Associates

In General the PER includes:

- **Review the existing water system and its operating parameters.**
- **Identify areas where system improvements should be made. Develop alternatives to provide the community with reliable water service and improve operations through the planning period.**
- **Complete a list of recommended improvements for the water system and a funding strategy for implementation.**

Columbia Falls Water System Components

- **Two wells completed in the Deep Flathead Alluvial Aquifer referred to as Clare Park and LP wells.**
- **One concrete 2.2-million-gallon storage Tank**
- **Distribution system consisting mostly of aging 6-inch and 8-inch asbestos cement (1950's) and cast-iron pipe (1960's).**

Current and Future Operating Criteria

CRITERIA	VALUE
Existing Population (2017)	5,089
Annual Growth Rate	2.0%
Future Population (2037)	7,867
Current Average Daily Demand	1,323,847 gpd (919 gpm)
Average Day Demand per Capita	260 gal
<i>Typical per Capita Averages</i>	<i>60-100 gpcd</i>
Current Max Daily Demand	2,564,032 (1,781 gpm)
Future Average Daily Demand	2,045,420 gpd
Future Max Daily Flow	1,420 gpm

Concerns – Columbia Falls Water System

- **Water production from the Clare Park Well has exceeded the current deep aquifer water rights.**
- **There is only an additional 39 ac-ft (12.7-million-gallons) per year available for production before the entire deep aquifer allocation is exceeded.**
- **Future production rates are estimated at 750-million-gallons per year.**
- **The current water supply does not meet current maximum day demand with one well out of service.**
- **Developed water supply capacity will not meet average day demand with one well out of service in 7 years.**

Concerns – Columbia Falls Water System (cont.)

- **Current water loss is 52%. Normal water loss 10-20%.**
- **Two sites in the residential area where the system may not provide 20 psi at the required 1,000 gpm.**
- **If the one storage tank and transmission main fail, the City would have no storage available to meet fire flows or maximum daily demand.**

Alternatives: Water Supply

- **Drill 2 new wells in the Flathead Deep Aquifer to meet (2) 1,200 GPM wells.**
- **Increase pumping capacity of both existing wells and install new well. This would be based on aquifer testing. Target would be 2,400 GPM max. at Clare Park and 1,800 GPM max. at both LP and new well.**
- **Construct shallow wells using existing water rights for the shallow aquifer. **BAD IDEA****
- **Build new surface water treatment plant at Cedar Creek. **BAD IDEA****

Alternatives: Water Storage

- **Construct 800,000-gallon elevated steel tank.**
- **Construct ground level glass-fused-to-steel.**
- **Construct ground level pre-stressed concrete tank.**

Alternatives: Water Distribution

- **Water loss control program.**
- **Distribution system improvements.**

Summary of all Recommended Alternatives

➤ **Phase I**

- **Increase pumping capacity of existing wells by installing new pumps and install new well.**
 - Includes new pumps, aquifer testing, piping improvements and water rights.
- **Conduct a water loss control program.**

➤ **Phase II (sometime in the future) once leakage efforts are exhausted and storage needs can be re-evaluated**

- **New 800,000-gallon pre-stressed concrete storage tank.**

➤ **Future Phases**

- **Distribution system repair and replacement program.**



City of Columbia Falls Water Preliminary Engineering Report

Potential Well Location for One Proposed Well

List Of Water Loss Items

- **Combination of:**
 - **Complete an overnight tank draw down test.**
 - **Check calibration on well flowmeters.**
 - **Install temporary ultrasonic meters to identify leakage areas.**
 - **Employ leak location services as needed.**
 - **Data evaluation and Loss Mitigation Plan.**

Total Project Cost – Phase I Improvements

- ✓ Preliminary Estimate is \$1.5 Million.

Grant and Loan Funding Opportunities

- ✓ **TSEP Grants of \$500,000 to \$750,000 (biannual) – 7 Criteria**
 - **Must Exceed TSEP “Target Rate” (2.3% of MHI = \$73.04/mo for water + sewer).**
 - **Current Average Rate = \$51.31 (70% of Target Rate)**

- ✓ **RRGL Grants to \$125,000 (biannual) – “conservation of water resources”**
 - **Maximum of \$125,000**
 - **No match required**

- ✓ **CDBG Grants up to \$450,000 (annual)**
 - **Requires > 51% LMI Benefit (Income Survey or “Targeting”)**

Grant and Loan Funding Opportunities (cont.)

- ✓ **USDA Rural Development Grant/Loan Packages**
 - **Grant share is variable.**

- ✓ **MDEQ State Revolving Fund (SRF) Loans**
 - **(2) SRF Programs – Water Pollution Control and Drinking Water.**
 - **2.50% interest, 20 or 30 year loans.**

- ❖ Most Grants Require “Financial Need”.... also Health/Safety Issues
- ❖ Grant Applications are Ranked COMPETITIVELY, and Not All Funded

Columbia Falls Water System Improvements - 20 Year SRF Payback

<i>Item</i>	<i>SRF Loan Only</i>	<i>SRF & Local Cash</i>	<i>SRF, Local Cash, & DNRC RRGL</i>
Estimated Total Project Cost:	\$1,523,482	\$1,523,482	\$1,523,482
Local Cash Contribution		\$800,000	\$800,000
RRGL Grant			\$125,000
Subtotal Loan Share:	\$1,523,482	\$723,482	\$598,482
Bond Reserve (1/2 annual Pmt., assumed borrowed)	\$50,483	\$23,974	\$19,832
Total Loan Amount:	\$1,573,965	\$747,456	\$618,314
Assumed Loan Term	20	20	20
Interest Rate	2.50%	2.50%	2.50%
Annual Debt Service	\$100,965	\$47,947	\$39,663
plus Excess Coverage (110%)	\$10,097	\$4,795	\$3,966
Total Annual Debt Service:	\$111,062	\$52,742	\$43,629
Estimated System O&M Cost	\$53,644	\$53,644	\$53,644
Total Annual Water Cost (projected):	\$164,706	\$106,386	\$97,273
Avg. Monthly Cost per Wastewater Connection	\$5.07	\$3.28	\$3.00
Total EDU's	2,706	2,706	2,706
Existing Water Rate	\$21.58	\$21.58	\$21.58
Total Rate (Existing + Project)	\$26.65	\$24.86	\$24.58
Existing Sewer Rate	\$29.73	\$29.73	\$29.73
Current Combined Water and Sewer Rate	\$51.31	\$51.31	\$51.31
Projected Combined Water and Sewer Rate	\$56.38	\$54.59	\$54.31
DOC Targe Rate	\$73.04	\$73.04	\$73.04
Percent Target Rate	77%	75%	74%

Next Steps and Project Schedule

- ✓ **Develop Detailed Funding Strategy for Implementation.**
- ✓ **Second Public Meeting (on PER, Grant Application, and Rate Discussion).**
- ✓ **DNRC Grant Application Due May 15th.**