

City of Red Lodge, Montana

2022 Wastewater Preliminary Engineering Report (PER)

April 26, 2022

Chad Hanson, PE

Gina Barry, PE



Preliminary Engineering Report (PER)



Evaluation of Existing Wastewater System

System History

- » Serves City of Red Lodge and adjacent subdivisions
- » **Early 1900s:** City's original collection system and treatment system installed
- » **Several additions to City's collection system throughout the years (Country Club Estates, Remington Ranch Subdivision, Spires Subdivision, Diamond C Links Subdivision)**
- » **2011: Two-cell lagoon system upgraded**
 - » Three-cell aerated lagoon system with discharge to Rock Creek
 - » Headworks
 - » Ultraviolet Disinfection
- » **2017: Highway 212 Lift Station Upgrades**
 - » Upgraded lift station to wet well, valve vault lift station
 - » Installed 3,295 linear feet of 8-inch HDPE force main
 - » Converted existing 12-inch forcemain to gravity main

System Components

» Collection System

- » Consists of 141,496 linear feet of sewer and forcemain pipe and 454 manholes
- » Documented excessive inflow and infiltration
- » Multiple holes in pipes with large rocks on top

» Pumping Systems

- » Spires Lift Station
- » Highway 212 Lift Station – pumps clogging due to rags and wipes

» Treatment System

- » Headworks consisting of mechanical, helical screen, grit removal chamber, and grit settling chamber
- » Three cell aerated system
- » UV disinfection before discharging to Rock Creek



▲ Large Hole in Sewer Pipe with Large Rock Above Hole

Collection System Inflow and Infiltration (I&I)

- » Original system consisted of combined storm and sewer system
 - » Peak stormwater inflow equals 5 MGD
 - » Blows off manhole covers, floods headworks building
 - » City currently working on project to separate storm from sewer
- » Infiltration
 - » Infiltration of groundwater through sewer joints, holes, and fractures
 - » Some areas where groundwater is gushing through joints



▲ Infiltration Gushing Through Pipe Joint

Infiltration and Inflow Flows

- » **Average Wastewater Flows from 2017-2021**

- » 319 gallons per capita day (gpcd)

- » **Average Winter Water Usage**

- » 79 gpcd

- » Representative of Actual Wastewater Flows

- » **75% of Wastewater Flows from I&I**

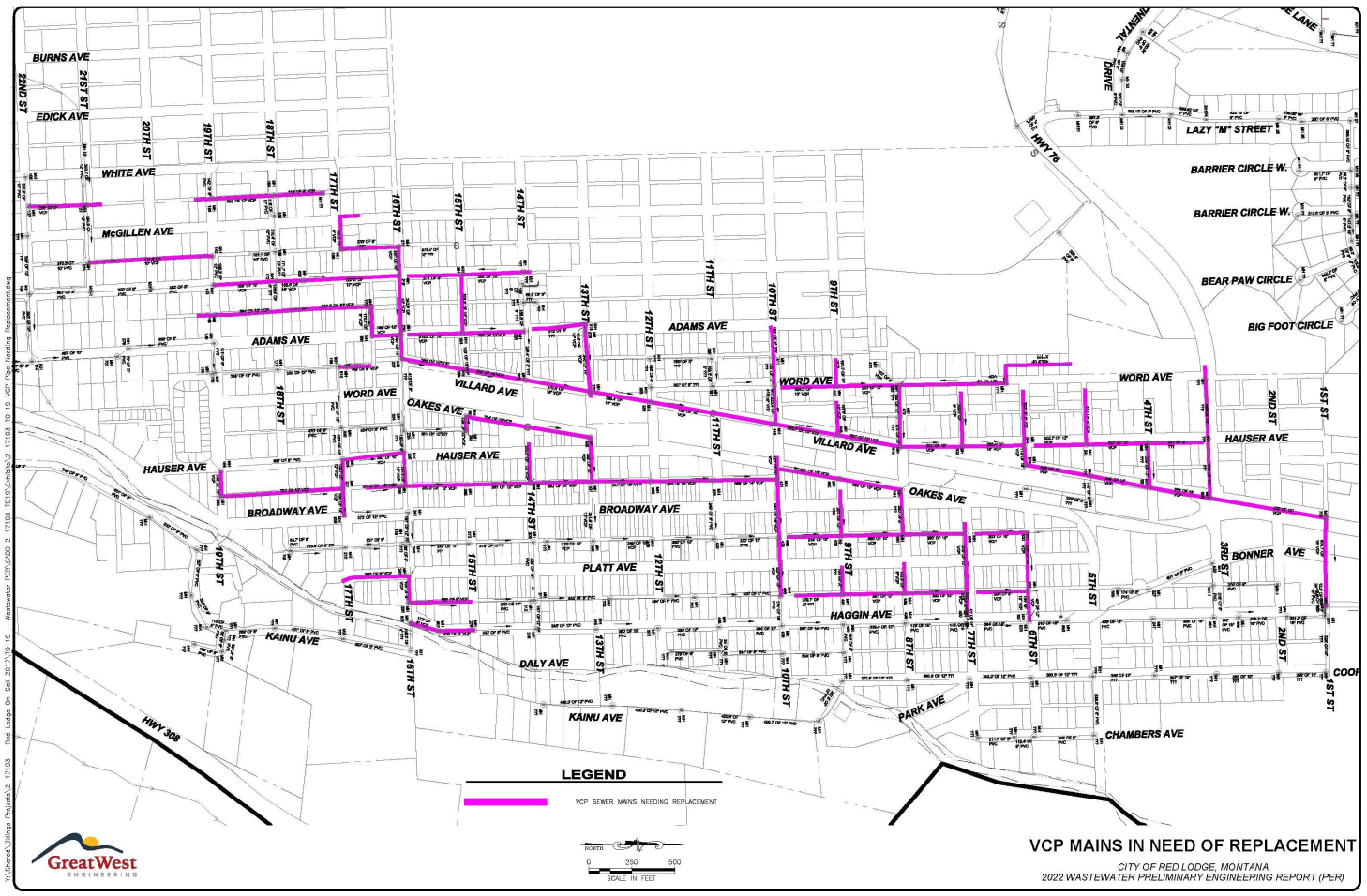
- » Extra I&I reduces available treatment capacity for growth

- » Increases lift station pumping costs and treatment costs

Alternative Development

Collection System Alternatives

- » **All outdated VCP sewer main needs replacement (≈ 33,080 feet)**
- » Alternative C-2: Cured-In-Place-Pipe (CIPP)
- » Alternative C-4: Open Cut Sewer Main Replacement



S:\Shared\Utilities\Infastruc\22-21702 - Red Lodge, Mt - Wastewater\2022\2022-21702_VCP Mains Replacement.dwg
 2/2/2023 10:16 AM - Instructor: 2022\2022-21702_VCP Mains Replacement.dwg



VCP MAINS IN NEED OF REPLACEMENT
 CITY OF RED LODGE, MONTANA
 2022 WASTEWATER PRELIMINARY ENGINEERING REPORT (PER)



Lift Station Alternative

- » **Highway 212 Lift Station Pumps Regularly Clog from Rags/Wipes**
- » **Alternative LS-2: Install Grinder Pump Upstream of Wet Well**
 - » Grinder will shred wipes and rags into small pieces
 - » Clogging of pumps will be eliminated

Life Cycle Costs

» Capital Costs

- » Cost estimate for design and construction based upon similar bid tabs
- » Construction cost index used to account for inflation and to estimate 2024 Construction costs

» O&M Costs

- » Reduced O&M from not having to repair sewer main breaks

» Salvage Value

- » Depreciated value at end of 20-year planning period

Collection System Life Cycle Costs

RED LODGE COLLECTION SYSTEM ALTERNATIVES PRESENT WORTH ANALYSIS		
ITEM	ALTERNATIVE C-2	ALTERNATIVE C-4
Capital Costs	\$12,428,000	\$17,351,000
Annual O&M Costs	-\$22,664	-\$22,664
20-Year Salvage Value	\$3,482,000	\$3,635,000
Present Worth of Salvage Value	\$1,085,700	\$1,133,400
Present Worth of Annual O&M Cost	-\$477,967	-\$477,967
Present Worth Cost	\$10,864,333	\$15,739,633

Lift Station Life Cycle Costs

RED LODGE LIFT STATION ALTERNATIVE PRESENT WORTH ANALYSIS	
ITEM	ALTERNATIVE LS-2
Capital Costs	\$97,000
Annual O&M Costs	-\$600
20-Year Salvage Value	\$24,000
Present Worth of Salvage Value	\$7,500
Present Worth of Annual O&M Cost	-\$12,654
Present Worth Cost	\$76,846

Selection of Preferred Alternative

Criteria to Rank Alternatives

- » Life Cycle Costs
- » Operation and Maintenance (O&M)
- » Permitting
- » Social Impacts
- » Environmental Impacts
- » Sustainability Considerations
- » Public Health and Safety
- » Land Acquisition

Collection System and Lift Station Decision Matrix

Decision Matrix																	
Alternative	Life Cycle Costs		Operation and Maintenance		Permitting		Social Impacts		Environmental Impacts		Public Health and Safety		Sustainability		Land Acquisition		TOTAL
	Weight:	10	Weight:	7	Weight:	4	Weight:	5	Weight:	5	Weight:	10	Weight:	4	Weight:	3	
	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	Score	Wtd.	
Collection System Alternatives																	
C-2	6.6	66	7.0	49	6.0	24	8.0	40	8.0	40	9.0	90	7.0	28	5.0	15	262
C-4	3.5	35	7.0	49	6.0	24	6.0	30	8.0	40	9.0	90	7.0	28	5.0	15	221
Lift Station Alternative																	
LS-2	5.0	50	8.0	56	7.0	28	7.0	35	9.0	45	8.0	80	7.0	28	5.0	15	257

It is important to note that the above scoring and weighting are subjective. Alternatives that score overall within 10 pts of each other may essentially hold the same degree of preference.

Project Phasing

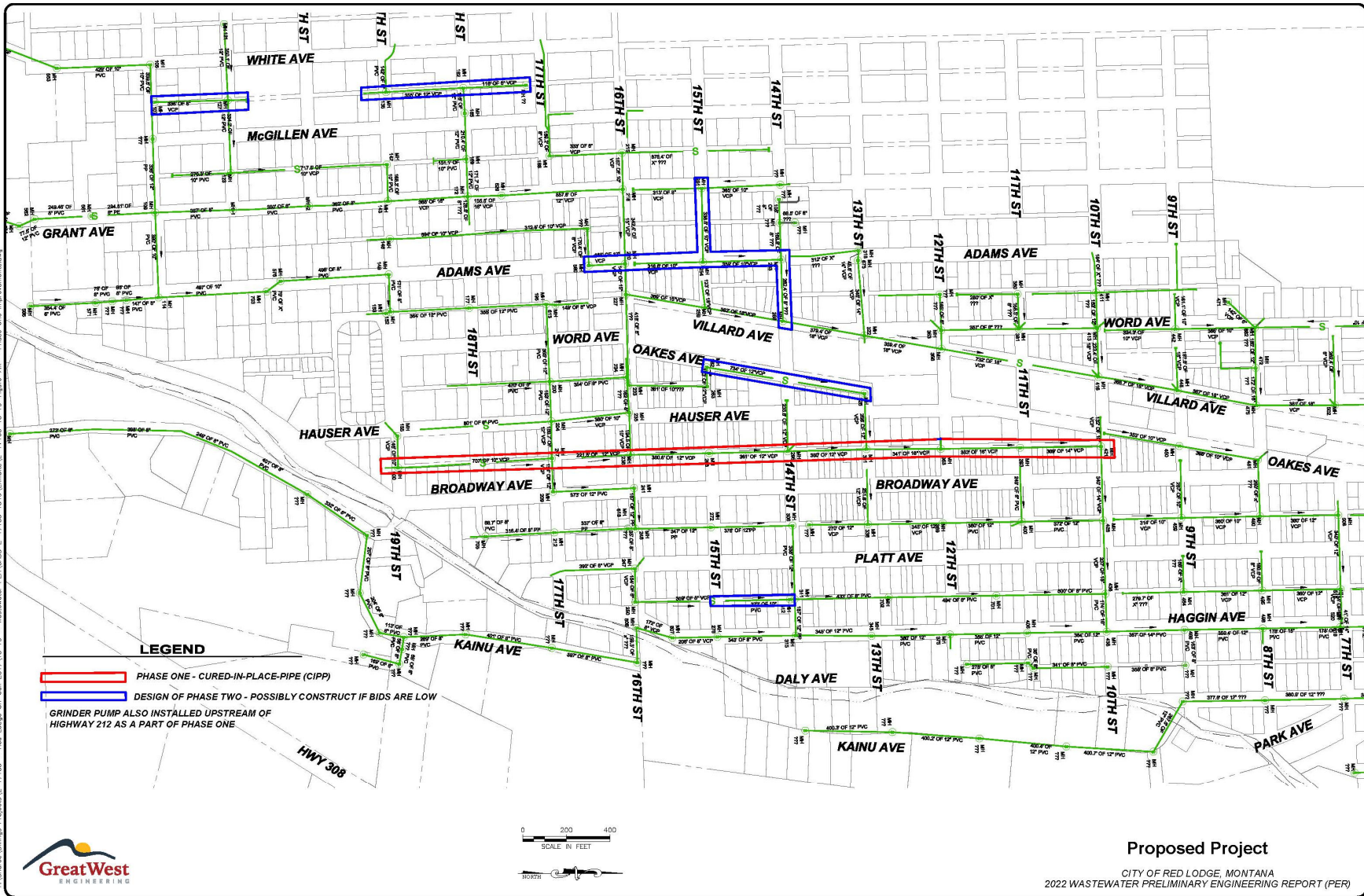
- » **Alternative C-2 total cost = \$12.4 million, not feasible to complete in one project**
- » **Alternative C-2 broken into phases**
 - » Phases prioritized by worst condition determined by sewer videoing
 - » Worst condition mains include mains with large holes, lots of infiltration and/or exfiltration
- » **Phase One**
 - » Alley between Broadway and Hauser from 19th to 10th
 - » Highest priority from sewer videos, deep main
 - » \$1.27 million
- » **Phase Two**
 - » Rest of worst condition mains from sewer videos
 - » Design, possibly construct if bids are low
- » **Rest of Phases**
 - » Prioritized from conditions from sewer videos
 - » Will be determined once sewer videos are complete



▲ Hole in bottom of pipe where sewer exfiltrating

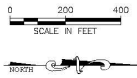


▲ Huge Hole and Boulder in Sewer Pipe



LEGEND

- PHASE ONE - CURED-IN-PLACE-PIPE (CIPP)
 - DESIGN OF PHASE TWO - POSSIBLY CONSTRUCT IF BIDS ARE LOW
- GRINDER PUMP ALSO INSTALLED UPSTREAM OF HIGHWAY 212 AS A PART OF PHASE ONE



Proposed Project

CITY OF RED LODGE, MONTANA
2022 WASTEWATER PRELIMINARY ENGINEERING REPORT (PER)



Funding Strategy and Implementation Plan

Target Rate

- » Established for each community by Montana Department of Commerce to determine eligibility for certain grant and loan programs.
- » Target rates are calculated as percentage of median household income (MHI).
 - » Water & Wastewater = 2.3%
 - » Water Only = 1.4%
 - » Wastewater Only = 0.9%
- » MHI data comes from American Community Survey (ACS), and Commerce is using the 2015-2019 data set for this funding cycle.

Current Rates and Target Rates

» Commerce Lists MHI for City at \$48,311

- » Water Only Target Rate = 1.4% of MHI = \$56.36
- » Wastewater Only Target Rate = 0.9% of MHI = \$36.23
- » Combined Target Rate = 2.3% of MHI = \$92.60

» Existing Rates

- » Average Residential Rate Based on $\frac{3}{4}$ " Service (1 Equivalent Dwelling Unit or EDU)
- » Water = \$41.38 per month
 - » Existing Water Rate at 73% of Targe Rate
- » Sewer = \$50.87 per month
 - » Existing Wastewater Rate at 140% of Targe Rate
- » Combined water and sewer = \$92.25 per month
 - » Existing Combined Rate at 100% of Targe Rate

American Rescue Plan Act (ARPA)

Local Fiscal Recovery Funds (Bucket A)

- Direct Allocation to Incorporated Towns and Cities and Counties
- City has not obligated all of its local fiscal recovery funds.



Minimum Allocation Grants (Bucket B)

- \$150 million set aside in House Bill 632 for water and sewer projects.
- Must be obligated by January 1, 2023 or rolls into competitive grant.
- 50-50 match required.
- City obligated its minimum allocation grant to the Phase 1, 2, & 3 Stormwater projects.



Competitive Grant (Bucket C)

- Competitive grant program established in HB632 for water and sewer projects.
- Two rounds to date have expended State's funding.
- May be a third round for unobligated Bucket B monies.



Montana Coal Endowment Program (MCEP)



**Various Grant Amounts Available
Depending on Rates vs. Target Rates**

\$500,000 if Rates At or Exceed Target Rate
\$625,000 if Rates > 125% of Target Rate
\$750,000 if Rates > 150% of Target Rate



50-50 Match Required



Cannot Exceed 50% of Project Costs



Community Development Block Grant (CDBG)



Up to \$600,000 for Public Facility Grants



> 50% Low to Moderate Income (LMI)

Commerce lists Red Lodge's LMI as 49%.



User Rate Must Meet or Exceed Target Rate

DNRC Renewable Resource Grant and Loan Program (RRGL)



Up to \$125,000 for Public Facility Grants



Conserve, Manage, Develop, or Protect Renewable Resources

Rural Development (RD)



Grant and Low Interest Loan Packages

Grants

- Eligibility Determined by Median Household Income (MHI)
 - Up to 75% of Project Costs grant eligible if MHI < \$42,440
 - Up to 45% of Project Costs grant eligible if \$42,440 < MHI < \$53,000 (tentative)
- Must Alleviate Health or Sanitation Concerns in Communities with Population Less Than 10,000

Loans

- 40 year Term Typical
- Interest Rates
 - Poverty = 1.5%
 - Intermediate = 2.0%
 - Market = 2.5%

State Revolving Funds (SRF)



Low Interest Loans

Currently 2.0% Interest
20 year Term Typical



Potential Loan Forgiveness

Maximum of 25% of Project Cost for
Wastewater
Community Must Be At or Above Target Rate



Proposed Project Funding for Phase 1

Funding Source	Amount
ARPA Local Fiscal Recovery Funds	\$200,000
MCEP Grant	\$500,000
DNRC Grant	\$125,000
City Reserves	\$500,000
Total	\$1,325,000

Implementation Schedule

- » Apply for MCEP and DNRC Grant Applications in May 2022
- » Surveying and Field Work in Fall 2023 (utilizing reserves)
- » Design in Winter/Spring of 2023 (utilizing reserves)
- » Submit to DEQ by May 2023
- » Results of MCEP and DNRC in Spring 2023
- » Bid in July 2023 (dependent upon grant awards)
- » Construction Fall of 2023 and/or Spring of 2024

Questions and/or Comments

Chad Hanson, PE

chanson@greatwesteng.com

Gina Barry, PE

gbarry@greatwesteng.com

Great West Engineering

(406) 652-5000

**Water/Wastewater ▪ Transportation ▪ Grant Services ▪ Solid Waste ▪
Structural ▪ Bridges ▪ Natural Resources ▪ Planning**

BILLINGS

6780 Trade Center Avenue
Billings, MT 59101
Phone (406) 652-5000

BOISE

3050 N. Lakeharbor Lane,
Suite 201
Boise, ID 83703
Phone (208) 576-6646

GREAT FALLS

702 2nd Street South #2
Great Falls, MT 59405
Phone (406) 952-1109

HELENA

2501 Belt View Drive
Helena, MT 59604
Phone (406) 449-8627
Fax (406) 449-8631

SPOKANE

9221 N. Division St.,
Suite F
Spokane, WA 99218
Phone (509) 413-1430

