SEELEY LAKE
SEWER DISTRICT

Preliminary Engineering Report Update
Wastewater System Improvements

Updated
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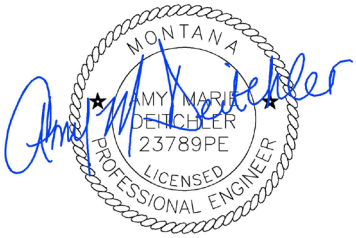
Prepared for:
Seeley Lake Sewer District



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1.0 EXECUTIVE SUMMARY

The 2018 Version 2 PER update only updates the funding scenario and public meeting information of the 2018 PER Update. All other information in this 2018 PER update is still relevant. We have reprinted the entire 2018 PER Update with the updated information for ease of user reading. Throughout this document, the 2018 PER Update will provide new information or update information as appropriate, and will generally not repeat accurate information reported in the 2012 Seeley Lake Sewer District Wastewater System Preliminary Engineering Report that is incorporated into this Amendment, attached under a separate cover. If not specifically updated or supplemented herein, the information in the 2012 PER does apply and is intended to support the conclusions, implementation plan and funding strategy presented herein.

1.1 Introduction and Background

Please see Section 1.1 Introduction and Background of the 2012 Wastewater PER.

The 2012 study focused on the central wastewater collection system alternatives, the wastewater treatment plant alternatives, and the site locations for the wastewater treatment plant. The District has retained Great West Engineering to complete the analysis of Phase 2 of collection system improvements as identified in the 2012 PER. As stated, this report updates the 2012 PER and the documents, in concert with each other, follow the interagency Uniform Preliminary Engineering Report Outline and meets all associated requirements.

Based on the recommendations in the Seeley Lake Sewer District 2012 Wastewater PER, Great West Engineering is currently completing the design of the Phase 1 collection system and treatment plant. The bid documents for these projects are anticipated to be completed in 2018 with bidding complete in early 2019. Construction of Phase 1 is anticipated to commence as soon as weather allows in 2019.

This PER update will focus on Phase 2 of the collection system, the second of the recommended four phases. The collection system phasing can be seen in Figure 2-2. No upgrades to the wastewater treatment plant will be necessary.

1.2 Problem Definition

Seeley Lake is an unincorporated community that for the most part was built prior to the establishment of Health Department regulations in 1966, thus many individual septic disposal systems do not comply with current regulations. This situation creates a public health hazard for the community and warrants the need for a centralized wastewater collection and treatment system.

Several conclusions were made during the development of the 2012 Wastewater PER. The major conclusions affecting the wastewater facilities are as follows:

- Groundwater in the area is relatively shallow. The Montana Bureau of Mines and Geology (MBMG) prepared a groundwater study for the Seeley Lake area and made the following conclusions. A copy of the report is included in Appendix A of the 2012 Wastewater PER.
    - Nitrate and chloride data suggests groundwater is being degraded by septic tank effluent.
    - Nitrate and chloride probability plots shown in Figures 10 and 12 of the MBMG Report also suggest septic tank contamination.
    - Figure 11 of the MBMG Report shows a positive correlation between elevated nitrate and chloride, suggesting contamination by septic tank effluent.
    - Additional development along the shoreline of the lake would likely result in septic tank effluent reaching the lake.
    - Indications of degradation might be a gradual increase in plants along the shore and decreased water visibility.
    - Development south of town is not likely to threaten the lake, as groundwater is more likely to flow toward the Clearwater River or Morrell Creek, but may cause degradation of the groundwater in this area.
- Groundwater monitoring in the Montana Bureau of Mines and Geology (MBMG) report demonstrates that upgradient of the central core of the community, nitrate and chloride

levels area at very low to non-detectable levels. In the 2004 PER, the wells downgradient of the core of the community showed the chloride concentrations ranged from a low of 7 mg/l to a high of 13.5 mg/l while nitrate concentrations ranged from a low of 1.6 mg/l to a high of 3.6 mg/l. Since 2004, additional data from the wells downgradient of the core area of the community has shown increased chloride concentrations ranging from 23 mg/l to 268 mg/l. Nitrate concentrations have correspondingly also elevated ranging from 0.57 mg/l to 12.4 mg/l. This strongly supports the conclusion that groundwater is being degraded by septic systems. Loading calculations presented in Table 5, page 32 of the MBMG report also demonstrate elevated nitrates.

- The presence of nitrate and chlorides is an indicator of the possible presence of disease causing organisms (See pages 44 and 45, of the Phase II Cumulative Effects Study in Appendix P of the 2012 Wastewater PER)

- Groundwater monitoring wells completed by the Sewer District confirm the presence of elevated nitrates, total coliforms and fecal coliforms in the groundwater downgradient of the community (Appendix N). The monitoring wells are located downgradient of the center of Town just before groundwater enters the lake as shown in Figure 3-1.

- Several studies on the quality of water in Seeley Lake have been completed. These studies have demonstrated elevated levels of nutrients (phosphorous and nitrates) in the lake. The lake is classified as meso-eutrophic to eutrophic with degrading water quality. The lake experiences algae blooms, occasionally with toxic blue-green algae (See Appendix B of the 2012 Wastewater PER). Increased nutrient loads to the lake from any source will facilitate eutrophication of the lake and increases water quality degradation. Lake water quality degradation may impair the recreational value of the lake and the economy of the area.

- Wastewater flows from lake shore cabins and other development east of the lake most likely enters the lake causing the potential for increases in plant growth. The portion of the lake south of the Clearwater discharge is more susceptible to plant growth impacts because the River does not “flush” this portion of the lake as efficiently.

- Through the use of groundwater flow path maps (See Plate 1, Appendix A of the 2012 Wastewater PER), seepage tests (page 16, Appendix A of the 2012 Wastewater PER),

and geologic descriptions (See Figures 4 and 5 on page 10, Appendix A of the 2012 Wastewater PER) the MBMG study demonstrated that groundwater flowing under the Town site flows into Seeley Lake.

- Discussions with the Missoula County Sanitarian and Jim Carlson, Director of the Missoula County Department of Health, indicated development within the community utilizing on-site septic systems for unapproved existing vacant lots less than ½ acre will not be allowed. Additionally, new or expanded commercial facilities will likely be required to install very large or advanced on-site treatment systems to satisfy state and county nondegradation regulations. This could severely limit economic growth within the District boundary.

- The cumulative effect model developed for Missoula County in cooperation with the University of Montana and Water Consulting indicates that septic tank densities are high in the Seeley Lake area for the hydrogeologic conditions that exist (See Phase III Report, Section 6 in Appendix P of the 2012 Wastewater PER).

- Current wastewater management within the District consists of standard septic tanks and drainfields on very small lots. Approximately 73% of the lots within the District are equal to or less than ½ acre in size. More specifically, 48% are less than 1/3 acre in size with 40% less than ½ acre in size for new on-site wastewater treatment when the home is served by a central water system. A full acre is required for new homes with a private well plus an on-site septic. Most residential homes in Seeley Lake do not satisfy these standards.

- A detailed review of the County septic permits was conducted. These records document that a significant percentage of the permitted systems were installed without solid header pipes for uniform distribution to the drainfields wastewater laterals and many lots were developed with seepage pits rather than drainfields. Appendix O of the 2012 Wastewater PER contains several County septic tank permits demonstrating how several of the systems were installed. Seepage pits do not provide for an aerobic phase of effluent treatment which is important in killing pathogens and breaking down waste. Both of these non-compliant systems are more likely to result in sewage surfacing in residential yards. The public health risks due to human exposure to raw sewage are clear. Additionally, as shown by the permits in Appendix O of the 2012 Wastewater

PER, many systems were constructed with atypical drainfield configurations leading to poor distribution of wastewater throughout the drainfield. As documented on page 12 of the Executive Summary of the Phase II Cumulative Effects Study, Volume 1 (Appendix P of the 2012 Wastewater PER) atypical drainfield configurations lead to non-uniform distribution within the pipelines and poor treatment.

- County septic regulations limit septic discharge to 600 gallons per acre per day. Many of the commercial lots in town cannot add new flows to the septic system because they don't have adequate acreage to meet this requirement. Businesses that have high flows such as carwashes, food and beverage establishments, motels, and laundry facilities are likely to find that growth is impossible due to an inadequate land base for septic disposal. The ability to construct assisted living facilities for the elderly is very difficult because of this requirement. Additionally, it is the goal of the Community Council to develop affordable housing within the community such as duplexes and four-plexes. Construction of these types of facilities will be difficult to impossible without a central sewer system.

- Because of the small lot size it has been difficult to locate replacement areas within the lots and substandard replacement systems in the form of seepage pits are still being allowed. Seepage pits provide poor treatment and inject sewage deeply where it can reach groundwater quickly without adequate treatment.

- County septic tank permits (Appendix O of the 2012 Wastewater PER) document that several metal septic tanks were installed in the 1970's.

- Land uses within the current district boundary consist of 312 residential homes, 42 commercial facilities, 9 institutional facilities, and 117 vacant lots. Commercial facilities consist of 20 retail stores, 8 restaurant/bars, 5 gas station/auto shops, 1 industrial facility, 7 business/offices, and 1 laundry mat. Institutional facilities consist of 5 churches, 1 senior citizens center, 1 grade school, 1 hospital and 1 fire hall.

- The per lot usage presented in Table 1-1 was compared to expected usage from an equivalent dwelling unit (EDU) based upon 100 gpcd. This per capita usage (100 gpcd) is the recommended value in DEQ Circular 2 for new collection systems in the absence of water meter data. One EDU for the Water District is defined as a total monthly water usage of 7,750 gallons (100 gpcd x 2.5 people/lot x 30 days). If influent flow

characteristics on an EDU basis were utilized the total flow for the residential lots the flows would increase.

- An environmental review of the proposed improvements found no significant environmental impact. Environmental conditions are expected to improve with the implementation of the wastewater improvements proposed by this PER.

- In 2009, non-resident visitors to the state contributed $2.27 billion in direct expenditures resulting in $2.33 billion in induced economic impacts to the state's economy. Seeley Lake experienced numerous recreation user days per year. Additionally, the area is a popular snowmobile area. The recreational and tourism value of the lake to the Town and to Montana's tourism business is significant and should be maintained and protected.

1.3 Alternatives Considered

Please see Section 1.3 Alternatives Considered of the 2012 Wastewater PER.

1.4 Preferred Alternative

Please see Section 1.3 Preferred Alternative of the 2012 Wastewater PER.

Phase 2 collection system will collect wastewater generated in each home to discharge into the central collection system. Phase 2 collection system will transport wastewater to the Phase 1 collection system and ultimately to the treatment plant. The Phase 2 collection system consists of a network of 8 inch diameter sewer mains, 4 inch diameter forcemains, and manholes located in street right of ways. The sewer pipes will be buried 6 to 22 feet and would generally slope to the northwest to the main lift station. Two smaller lift stations would also be necessary to service the area south (Figure 7-3) and west of the main community (Figure 7-2). The vast majority of the sewer mains would be buried less than 12 feet and laid at slopes to match the existing surface topography.

The Phase 2 collection system will deliver wastewater to the Phase 1 collection system. Phase 2 collection system will include two lift stations. The lift stations will be of the submersible type. With these type of lift stations, the wastewater is delivered to a concrete storage tank (wet well) with level controls and submersible wastewater pumps. The submersible pumps will be

attached to sliding rails that allow the pumps to be retrieved for maintenance, repair and replacement.

No additional improvements will be made to the treatment plant, as Phase 1 will be constructed in 2019 and is sized for Phase 2 collection system flows.

1.5 Project Costs and Budget

The proposed Phase 2 project total is estimated to be $6,528,500 with a projected total system annual O&M cost of $12,800 per year. These costs are detailed in Table 7-1 and 7-3, respectively.

Below is a summary of the funding package presented in Table 8-1, which the District will pursue for the Phase 2 collection system. In conversations with Steve Troendle, RD Program Specialist, the District should plan for a 25% grant appropriation. Based on this conversation, the District's chosen funding package for the Phase 2 collection system project, includes the following sources of funds:

- TSEP Grant: $500,000
- DNRC Grant: $125,000
- WRDA Grant: $660,000
- RD Grant: $1,415,250
- RD Loan: $3,578,250

Table 8-2 presents a detailed project budget based upon the proposed funding strategy. Assuming the overall funding strategy is successful, the project will increase the wastewater residential user rate for Phase 2 to $173.53. The current average monthly water rate is $64.58. The combined monthly rate is $238.11 which equates to 304% of the Seeley Lake CDP target rate.