

CITY OF SPIRIT LAKE

WASTEWATER FACILITY EXPANSION, 2025

1. Background Narrative, Purpose and Need

The City of Spirit Lake owns and operates a land applied wastewater treatment facility located approximately one mile north of Spirit Lake, Idaho. The facility receives domestic wastewater from the City's wastewater collection system and produces Class C effluent through the use of an aerated and facultative lagoon system. Effluent is land applied to crop and forest land under the Idaho DEQ issued Municipal Wastewater – Reuse Permit M-002-05.

1. Site Management History

For many years the residents and businesses within the city utilized on-site septic systems for wastewater treatment. A portion of the community had a common collection system that discharged to Spirit Creek downstream of the Mill Pond. Spirit Creek is an intermittent stream that flows north from the Mill Pond into Bonner County in the spring when the lake overflows.

The existing wastewater treatment plant was originally constructed at its current location in Bonner County in 1977. That same year Panhandle Health District implemented rules that limited domestic septic systems to one residential system per five acres. This was implemented as a means to reduce wastewater pollution of the aquifer. The city installed the main wastewater collection infrastructure throughout the city between 1977 – 1978. The transmission mainline between the city and the wastewater treatment facility is approximately 7,400 feet in length and was installed along the abandoned railroad grade at the same time. The city continued with a series of upgrades beginning in 1983. The original plant consisted of three lagoons and land application to alfalfa and grass crops. Alfalfa has been grown and harvested by the city and in 2007 a forest crop was added to their Land Application system. Important events in the history and management of the plant and land application areas are summarized in Table 1.

Table 1. Spirit Lake Wastewater Treatment Plant Site Management History Timeline

Date	Event
1977	Existing plant constructed including aerated Cell No. 1, stabilization and storage Cell Nos. 2 and 3, Operations Building, chlorine system, and center pivot land application to Field No. 1.
1983	Plant upgrade, including lagoon excavation & liner installation, and piping and control system improvements.
1993	Cell No. 4 constructed.
2002-2003	Irrigation upgrade including the installation of the new enter Pivot No. 1 and Center Pivot No. 2, expansion of Field 2, the addition of Field 3 with wheel line irrigation, and improvements to the pumping system and piping network.
2003-2004	Wastewater treatment upgrades included the expansion of Lagoon No. 4 and construction of the headworks building and screening system.
2003-2004	Chlorine contact pipe was expanded with the addition of a 36-inch ductile iron pipe to the existing 21-inch AC pipe to increase chlorine contact time.
2006-2007	Field 4 was added with solid set lateral irrigation to forest land.

2007	Crop plan submitted and approved by DEQ.
2013	Plug valves within the flow box were replaced to allow for lagoon leak testing.
2014	Seepage rate testing of the lagoons in April - May, completed spring 2015.
2015	Wastewater Land Application Permit M-002-05 Renewed by DEQ
2016	Bonner County Approves File C990-15, Conditional Use Permit for Public Use Complex Facility Expansion
2016	Field 5 Forest area was added to the land application system.
2016	Aeration was added to Lagoon Cell No. 3
2017	Main Irrigation Pumps were upgraded along with metering installed for all 5 irrigation areas.
2019	Lagoon Cell No. 5 was added to increase treatment and storage capacity
2018-2023	City negotiates with the USFS to Purchase additional land for expansion of the treatment system
2024	City begins cleaning up trash, garbage, tires and debris previously dumped on the property
2025	City installs a fence with signage around the newly purchased property

The existing system is a land-based system which requires the city to add land application acres as growth within the service area occurs. Land based systems apply treated wastewater to a specific crop for irrigation purposes over the growing season. Land based systems are required to store wastewater during the non-growing season and then apply at agronomic rates during the growing season. Agronomic rates provide protection to the aquifer in that the irrigation rate is determined as the crop water requirement less normal precipitation. This is done to ensure that overapplication does not occur. Land based systems differ from other municipal plants that utilize a point source discharge to a river for final disposal. Because a large year around continuous river does not exist in Spirit Lake, the City's only choice for wastewater treatment and disposal was to utilize a land-based system.

In 1977 the city made arrangements with a farmer/cooperator to build the wastewater facility. This agreement allowed the city land for wastewater treatment and allowed the farmer irrigation water for his alfalfa crops. Since that time the city has purchased and acquired addition land and added to the land application system. Today the city irrigates 107.8 acres. The newly purchased parcel is 158 acres and capable of nearly doubling the current land application size.

2. Forward Planning

The city has invested in this property for expansion of their wastewater treatment facility. Outside of the purchase price, this has included; the 5-year process to purchase the land from the U.S. Government, cleanup of garbage and debris dumped on-site prior, and numerous hours spent planning for a long-term wastewater treatment solution.

When looking at expansion of the treatment system, the city is driven to find the most cost-effective solution. The new parcel shares a common corner point with the City's existing wastewater treatment plant property. The proposed site is adjacent to the existing facility, is large in size, and contains an actively growing forest crop. These factors are favorable when

looking to expand the existing system. The city has investigated other parcels in the area but most were not available or did not have adequate size to maintain a buffer between the land application area and the property boundary. The newly acquired land will provide the city the ability to effectively provide wastewater treatment for an additional 2,000 - 2,500 residents and businesses.

The facility layout as shown in the proposed site plan includes a 100-ft buffer strip between the property boundary and the land application area boundary. This buffer strip is comprised of an access maintenance road at the perimeter with a natural treed buffer. The natural treed buffer will act to mitigate aerosols and odors migration to adjoining parcels during the land application process.

The proposed facility will include several buildings to facility the treatment process. These buildings and associated parking areas will include some exterior lighting for safety purposes. Because of the small nature of the buildings and necessary parking area, glare from the facility lighting will be minimal and should not impact adjoining parcels. The southwest corner of the lot adjacent to State Highway 41 has currently been slated for location of the process buildings.

Operation of these facilities are not generally noise intensive. Noise associated with the process may include electrical motors for the aeration equipment, pumps for irrigation and potentially the irrigation center pivot machine. Noise from the facility should not impact adjoining parcels.

Odor mitigation is generally controlled though adequate aeration and treatment. Historically, if odors are present at the facility, it is in the spring time when the ice comes off the ponds and they go through the process of turning over. To mitigate odors associated with stagnant non-aerated water rising to the surface from the base of the lagoons, a series of aerators will be installed in the ponds to keep them mixed and oxygenated throughout the year.

The adjoining land surrounding the proposed site on the west, north and east sides includes both large timber company tracts, and 5 and 10-acre residential lots. To the south the site borders a residential lot, the Spirit Lake Industrial Park, and a commercial mini-storage development. The proposed use will remain timber and farmland and blend in with the existing bordering uses.

The current land use is Ag/Forest Land (10-20 AC). The current zoning is Rural 10 (R-10) and the proposed facility is in the area of City Impact for Spirit Lake.

The facility will include one operator for approximately 40 hours per week. This is generally Monday through Friday between the hours of 7:00 am and 4:30 pm. It is anticipated that the facility will generate the equivalent of 10 vehicle trips per day or roughly the same as one residential home.

3. Summary

The wastewater treatment plant expansion project represents an essential public facility. The urban area supported by the availability of clean water and wastewater treatment provides many of the crucial community services necessary for both the urban and rural areas. This includes the school system, fire and police protection centers, grocery stores, dining establishments,

community gathering spaces, churches and retail business. Both the urban and rural populations rely upon these services and these services rely upon adequate wastewater treatment. The proposed system will continue to provide an economic wastewater treatment solution for the greater Spirit Lake community.