WWC ENGINEERING
1275 MAPLE STREET SUITE F, HELENA, MT 59601 | 406.443.3962

Memo

TO: Town of Sheridan

FROM: Peter Haun, P.E., WWC Engineering

DATE: 4/1/2022

SUBJECT: Town of Sheridan Wastewater System Capacity Assessment – Technical Memorandum

Introduction

The Town of Sheridan owns and operates a wastewater collection and treatment system that serves the town and its residents. Sheridan's wastewater system consists of gravity fed sewer laterals, mains, and manholes which collect and discharge wastewater to the Town's wastewater treatment facilities. The treatment facilities consist of two packaged lift stations, an aerated treatment lagoon, and three storage/treatment ponds for land application during summer months approximately 4.5 miles northwest of Town. The original installation of the wastewater collection and treatment system dates back to 1959. A portion of the collection system was rehabilitated in 2011 to address ongoing groundwater infiltration problems. The treatment system was upgraded in 2012 by replacing the existing gravity fed facultative lagoon with a PVC lined aeration lagoon, packaged lift stations on the influent and effluent sides of the system, and storage lagoons to provide increased storage capacity for treated effluent before the effluent is disposed of by irrigating croplands during summer months.

Northern Rockies Engineering completed a preliminary capacity assessment in 2020, which concluded that there is approximately 50 percent more capacity available for new service connections. The intent of this assessment is to conduct a similar analysis for the wastewater system to determine the current and future capacity and prioritize improvements to maintain and achieve additional capacity. The Town revised its Capital Improvements Plan (CIP) in May 2021. The top priorities identified in the CIP are lining rehabilitation of the collection lines to increase capacity, improve wastewater flow monitoring to accurately assess demand and capacity, and address frequent pump and motor failures to improve continuous operation of the system. WWC Engineering (WWC) prepared this updated capacity analysis using monitoring data collection and 2020 along with water usage records to assess whether the system has capacity for existing and future demands. This technical memorandum serves to outline the data, methods, and assumptions used to derive existing wastewater demands for the Town of Sheridan and evaluate whether the existing system has capacity to meet demands and quantify the surplus capacity available for future growth. The results of this capacity analysis demonstrates that the Town currently has 25% capacity available for future growth according to the design standards. However, improvements are planned as outlined in the CIP to increase capacity and better refine wastewater capacity and demand through continuous flow monitoring.

System Overview

The Town of Sheridan owns and operates a wastewater collection system and treatment facilities that serves the town and its residents. Figure 1 displays the vicinity map for the Town.

The collection system conveys sewage from homes and businesses and transports it to the treatment facilities. Sheridan's wastewater system consists of gravity fed sewer laterals, mains, and manholes which collect and discharge wastewater to the Town's wastewater treatment facilities. The treatment facilities consist of two packaged lift stations, an aerated treatment lagoon, and three storage/treatment ponds for land application during summer months that are located approximately 4.5 miles northwest of Town. A map of the treatment system is provided in Figure 2 and an overview of the collection system is provided in Figure 3.

The original treatment and collection system was constructed in 1959. The treatment system consisted of a 6.4-acre single cell facultative lagoon that was fed via gravity flow. Based on early documentation, the original system was designed to handle a population of 600. Excessive groundwater infiltration increased the hydraulic loading on the lagoon well above normal loads for a community of this size. The collection system consists of 27,000 feet (over 5 miles) of 8" and 10" clay tile and PVC pipe. Improvements to the collection system were completed in 2011 to reduce infiltration and inflow (I&I) by using an in-situ epoxy liner to rehabilitate the system.

About one year after the rehabilitation work was completed on the collection system, the wastewater treatment system was improved in 2012. The former gravity fed facultative lagoon was replaced with a PVC-lined aerated lagoon that is 1.72 acres in size with a capacity of 4.86 million gallons. Packaged lift stations were installed to provide control of raw wastewater entering the system and transport treated effluent to the storage lagoons. The aerated lagoon system treats wastewater to at least secondary standards using three primary mechanisms for treatment: settling, biological degradation, and chemical alternation. Treated effluent discharged from the aerated lagoon is stored in the storage lagoons during the non-irrigation season which allows additional natural biological treatment to occur before the wastewater is disposed of by irrigating the effluent on cropland during the summer months. The storage lagoons have a combined capacity of 33.52 million gallons.

Wastewater from the Town of Sheridan's collection system flows by gravity to the treatment lagoon site. A lift station (LS-1) discharges the wastewater into the aerated treatment lagoon via a 6-inch diameter force main. The treated effluent is discharged from the treatment lagoon into an 8-inch diameter effluent transmission main that flows to a second lift station (LS-2). This lift station discharges the wastewater into the storage lagoons via an 8" diameter force main. A map of the collection and treatment system is provided in Figure 2.

The lift stations are the submersible type, duplex package pumping stations utilizing two solids type pumps. LS-1 is capable of pumping 400 gallons per minute (GPM) at a design dynamic discharge head of 17.6 feet. LS-2 is capable of pumping 400 GPM at a design dynamic discharge head of 108.1 feet. The lift stations are equipped with automated pump control devices and various alarm features. The lift stations operate by alternating pumps between each cycle and are capable of handling higher flows with a lead/lag pumping control system. Both wet wells are underground structures constructed of pre-cast concrete. Since the packaged lift stations were installed in 2012, the Town has dealt with numerous pump and motor failures. The lift station's associated pump and motor failures are currently being addressed by replacing equipment.

The storage, or secondary, lagoons provide both treatment and storage functions. These lagoons have sufficient capacity to store up to 133 days of wastewater at the design flow of 252,400

GPD. This does not include the 1 foot of additional storage provided for sludge storage. The storage lagoon is designed and sized to be completely dewatered to the sludge storage depth every fall to provide full storage capacity through winter months.

Wastewater is pumped from the storage lagoons by a pump to center pivot sprinklers for irrigation during the summer months. The pump and sprinkler irrigation system may be started at a control panel located on the center pivot. The irrigation force main consists of a 10-inch diameter PVC pipe. The irrigation pivot was relocated and expanded on the property of a local farmer/rancher Beau Bradley. Modifications to the pivot included additional sections, removing the end gun, and providing specialized sprinkler heads with multiple orifices so the system can be operated through the existing agricultural irrigation supply or with the combined irrigation supply and effluent from the storage lagoons.

The two operating conditions are:

1. Condition 1: Bradley's irrigation pump (1,100 GPM) and the Town of Sheridan's irrigation pump (750 gpm) operate together at a combined rate of 1,850 GPM.

2. Condition 2: Bradley's irrigation pump operating only (1,100 GPM).

There are some improvements needed for the wastewater system but none of them are major renovations requiring significant capital over the next five to ten years. Based on a 2020 assessment of the wastewater system conducted by Northern Rockies Engineering (NRE), now WWC Engineering, there is significant capacity available for new service connections. Future work that limits I&I, such as collection system rehabilitation and limited replacement is beneficial to increase the system's capacity and avoid having to expand the size of the treatment system in the foreseeable future. The other immediate improvements are addressing the frequent pump and motor failures currently plaguing the lift station and record flow data continuously within the influent and effluent lift stations.

Figure 1. Town of Sheridan Vicinity Map

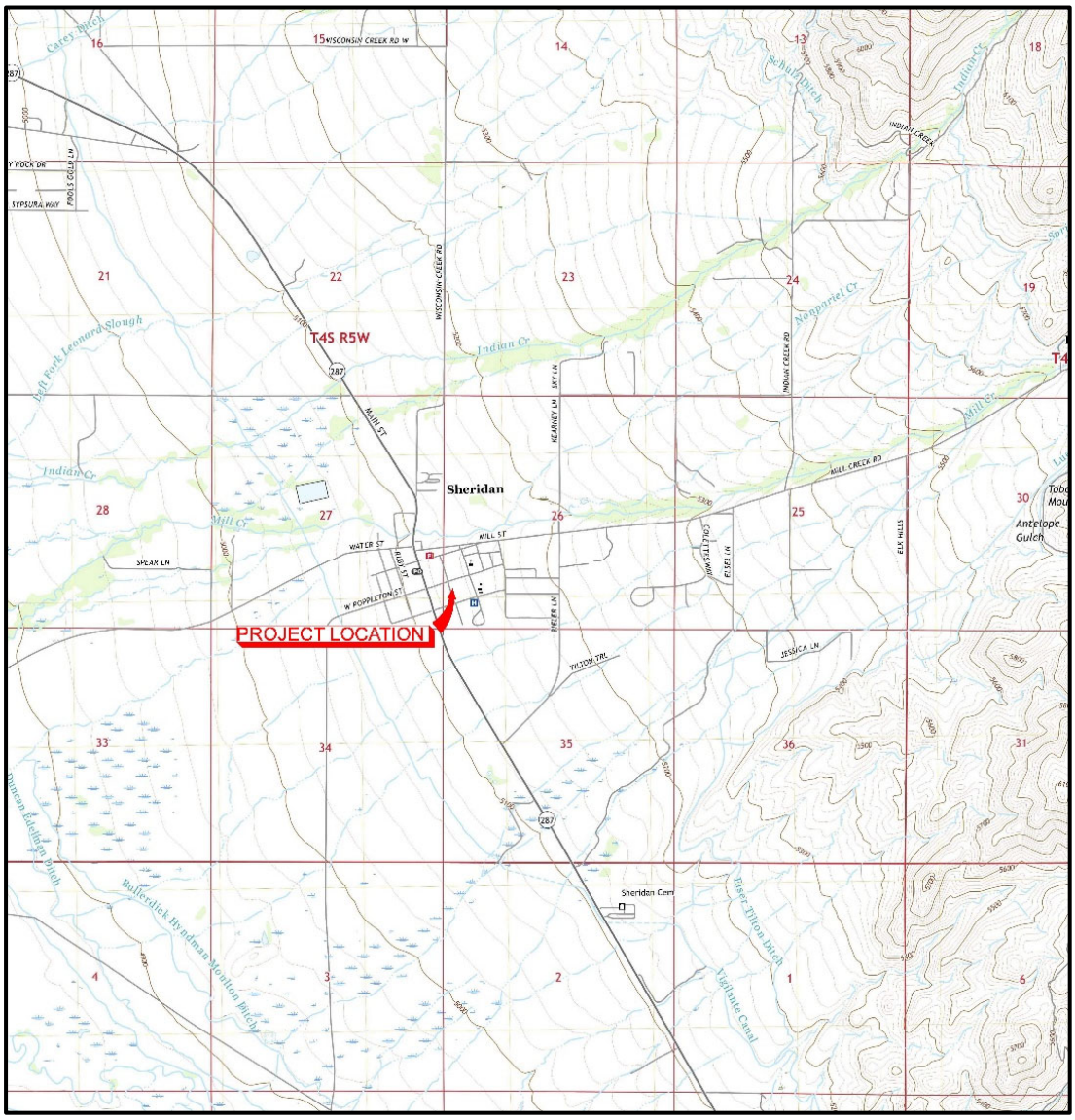


Figure 2. Town of Sheridan Wastewater Supply System Overview Map

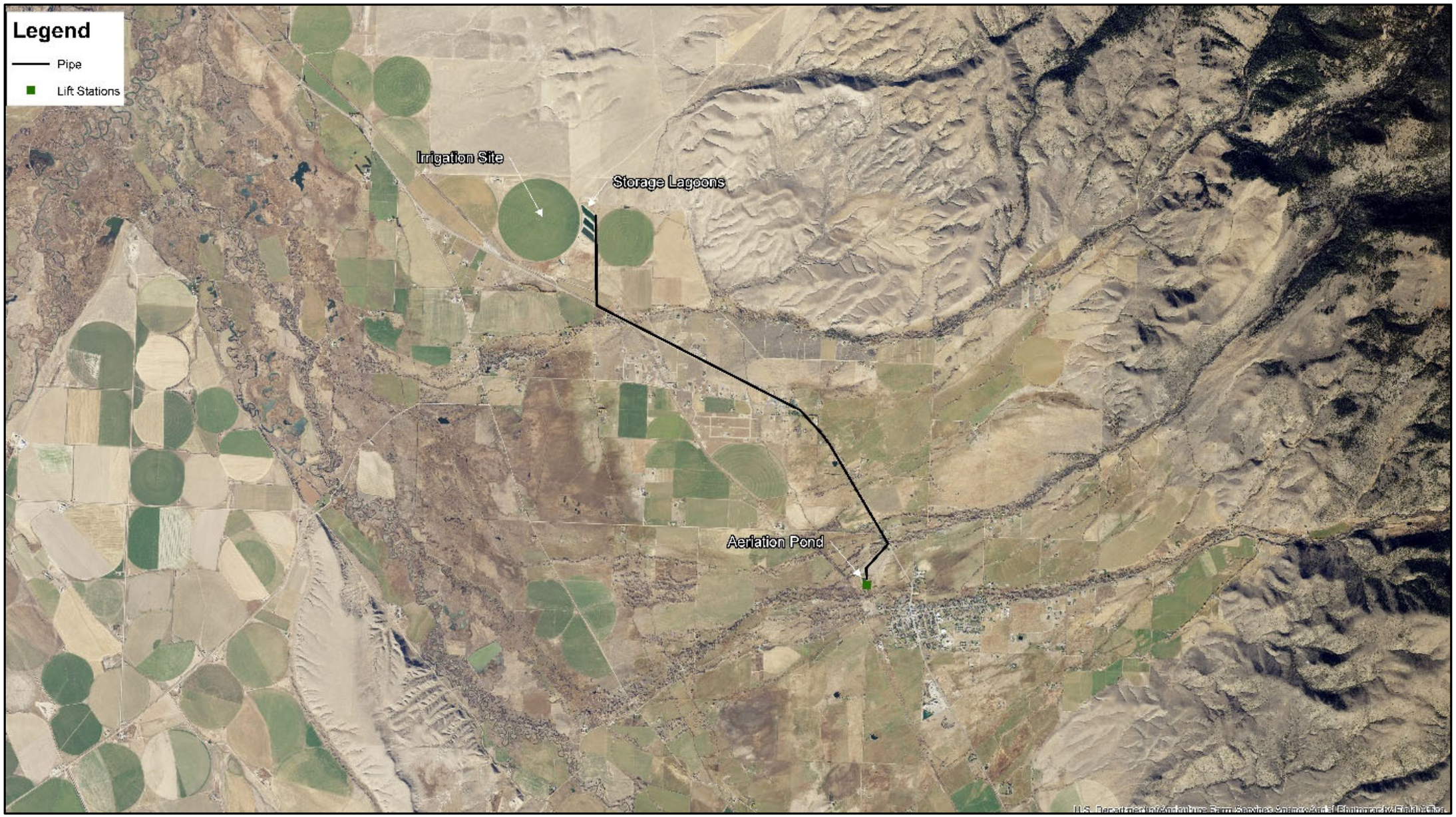
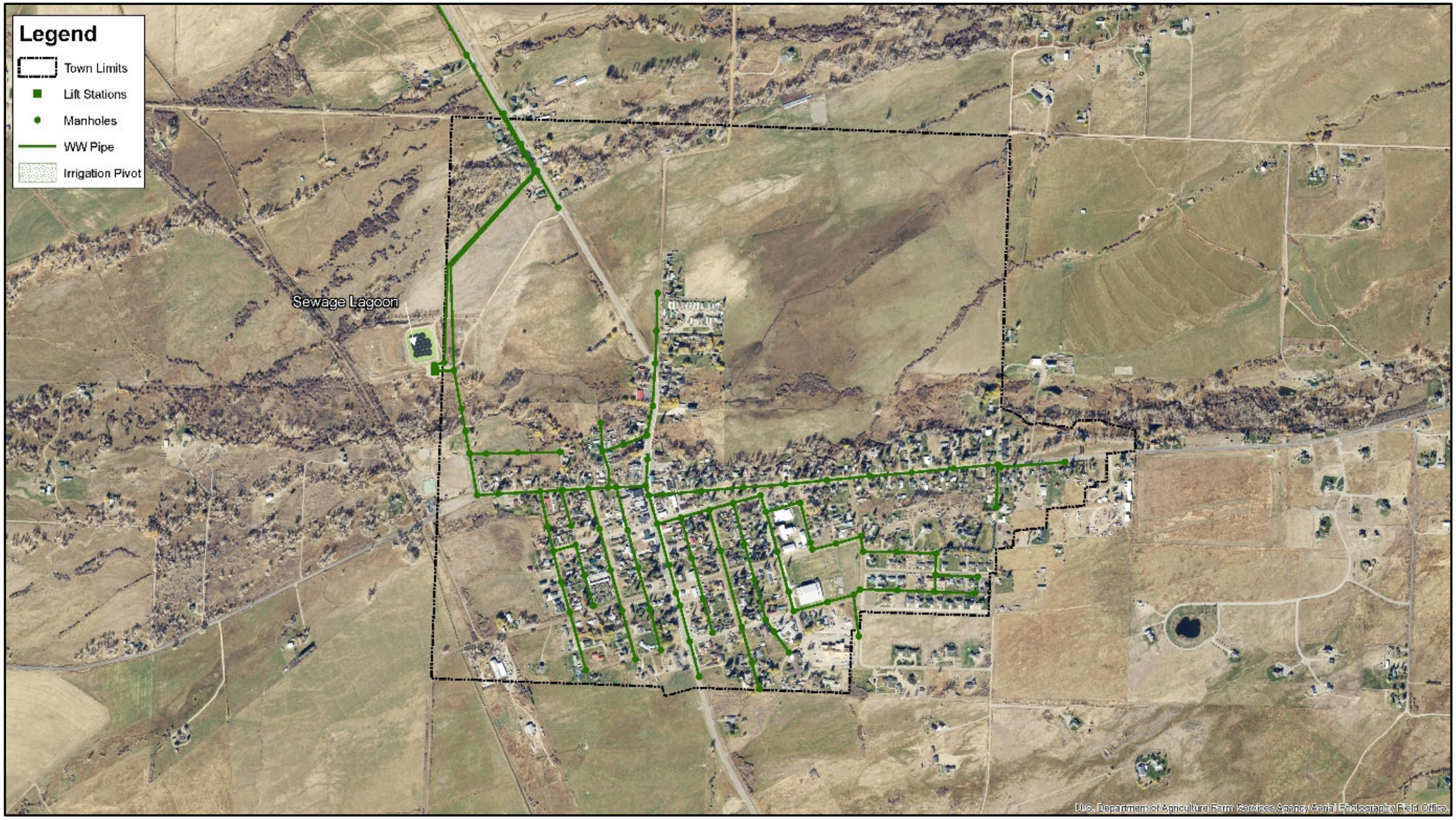


Figure 3. Town of Sheridan Wastewater Collection System Overview Map



Design Wastewater Flow

The wastewater improvements project completed in 2012 by Great West Engineering utilized flow monitoring studies and population estimates to perform wastewater flow projections for the design of the treatment system. Flow monitoring studies were conducted in 1997, 2006, and 2011 as part of the improvements project design. The flow study concluded that the representative seasonal flow rates for the Town were 247,000 GPD during the summer (June – August) and 111,000 gallons per day (GPD) during the winter (September – May). The 2012 population was estimated to be 647 people. This population produced the following corresponding per capita wastewater flow rates for 2012:

- Summer: 383 GPCD
- Winter: 172 GPCD

Great West applied a population projection from 2012 to 2032 based on an annual growth rate of 0.4% to determine the flow rates as the basis for the design. The 2032 population projected for the Town was 701. State design standards require a system to be designed using a minimum wastewater flow of 100 gallons per capita day (GPCD) unless flow monitoring demonstrates otherwise. The design used the 2012 flows for the existing population and extrapolated the design flow rate using 100 GPCD for future users. This assumed that new rehabilitation of the Town's collection system would occur using current design standards and construction methods to decrease infiltration. Maximum day and peak hourly flow rates were determined using standard peaking factors, which equated to 2.0 for maximum day and 3.89 for peak hourly flow. The peaking factors are only applied to the portion of wastewater contributed by the design population and not the I&I. For instance, the winter average daily flow of 116,800 GPD was used to develop the peak hourly flow by applying the 3.89 peaking factor to this flow rate. Due to the high I&I, the summertime flow rates were used to size the improvements. Table 1 outlines the design flow rates.

Table 1. Design Flow Rates

Design Population	Average Daily Flow (GPD)	Est. Maximum Daily Flow (GPD)	Est. Peak Hourly Flow (GPD)
701	252,400 (175 GPM)	322,730 (224 GPM)	455,232 (316 GPM)

The average daily flow rate of 252,400 GPD was used to size the aeration lagoon and storage ponds with the corresponding volumes and detention times as shown in Table 2. All values from the system design flow rates and system storage capacity were obtained directly from the 2013 Great West Design Report and Great West O&M Plan.

Table 2. System Storage Capacity

Unit	Volume (MG)	Detention Time (Days)
Storage Pond #1	12.64	50
Storage Pond #2	10.04	40
Storage Pond #3	10.84	43
Total	33.52	133

The total detention time capacity of the system equates to approximately four months of storage at the average design flow rate of 252,400 GPD. The storage lagoons are intended to be discharged over the months of April through October to limit the application of wastewater based on crop agronomic rates. The available treated wastewater for irrigation is directly related to the system storage capacity. The 33.52 MG of storage is reserved for winter months (November – March) when crop irrigation is not possible. As I&I is reduced through collection system improvements, the application period may be shortened to account for reduced flows. However, it is important for the town to continue to adhere to the application rates outlined in the O&M plan to ensure sufficient storage capacity for the following year is available and to ensure the nitrogen load applied to the land does not exceed the nitrogen uptake demand of the crops.

The storage ponds were designed the water balance shown in Table 3 that takes into account varying incoming flow rates to the storage ponds, precipitation, evaporative losses, and irrigation flow. The irrigation flow rates are distributed across the irrigation season (April – October) based on agronomic rates to ensure the nitrogen load being applied to the land never exceeds the nitrogen uptake demand of the crops being irrigated. The total required storage is denoted in **bold**. The design annual irrigation rate is 67.2 MG.

Table 3. Design Water Balance

Month	Wastewater Inflow	Precipitation	Evaporation	Irrigation	Seepage	Net Volume	Cumulative Storage
October	7,824	425	1,254	1,243	0	5,752	5,752
November	5,538	285	0	0	0	5,823	11,576
December	3,621	231	0	0	0	3,852	15,428
January	3,621	205	0	0	0	3,825	19,253
February	3,270	167	0	0	0	3,437	22,690
March	3,621	355	0	0	0	3,976	26,666
April	7,572	662	1,347	414	0	6,473	**33,139**
May	7,572	1,351	2,085	8,400	0	-1,562	31,577
June	7,572	1,534	2,349	13,485	0	-6,729	24,848
July	7,824	823	2,831	19,663	0	-13,846	11,003
August	7,824	796	2,407	15,896	0	-9,682	1,321
September	7,572	743	1,537	8,099	0	-1,321	0
Total	**73,432**	**7,577**	**13,810**	**67,199**	**0**	**0**	**0**

1. Volumes in 1,000 gallons.

Flow Monitoring

Northern Rockies Engineering (NRE) completed a study of the Town's wastewater system to determine capacity of the system. As part of this study, NRE staff monitored the wastewater inflow to the treatment lagoon and outflow to the storage ponds from April 1, 2020, through September 16, 2020. NRE also monitored groundwater levels during this period to assess the influence of groundwater on influent flow rates. Flow rates entering and leaving the treatment system were quantified by recording the meter readings on a weekly basis. While this method may provide average daily flow rates determined from a weekly total volume, it does not provide insight to the maximum daily or peak hourly flow rates entering the treatment system. The Town is currently working on installing and calibrating continuous flow monitors which will provide flow data with higher resolution to evaluate maximum daily and peak hourly flow rates, perform a water balance across the system, and evaluate compliance with design detention times. The average daily flow during the monitoring period was calculated to be 139,399 GPD. The summer (June – August) average daily flow rate was calculated to be 188,903 GPD. The winter average daily flow rate was calculated to be 80,894 GPD, however this is most likely elevated due to the monitoring period excluded January through March and the second half of September through December. Based on a 2020 population of 694 according to the 2020 census, this equates to the following:

- Annual Average Daily Flow: 201 GPCD
- Summer Average Daily Flow: 272 GPCD
- Winter Average Daily Flow: 117 GPCD

The significant difference between winter and summer flows indicates the influence of I&I on the system during the summer months still remains an issue, even after the lining rehabilitation performed on the collection system in 2011.

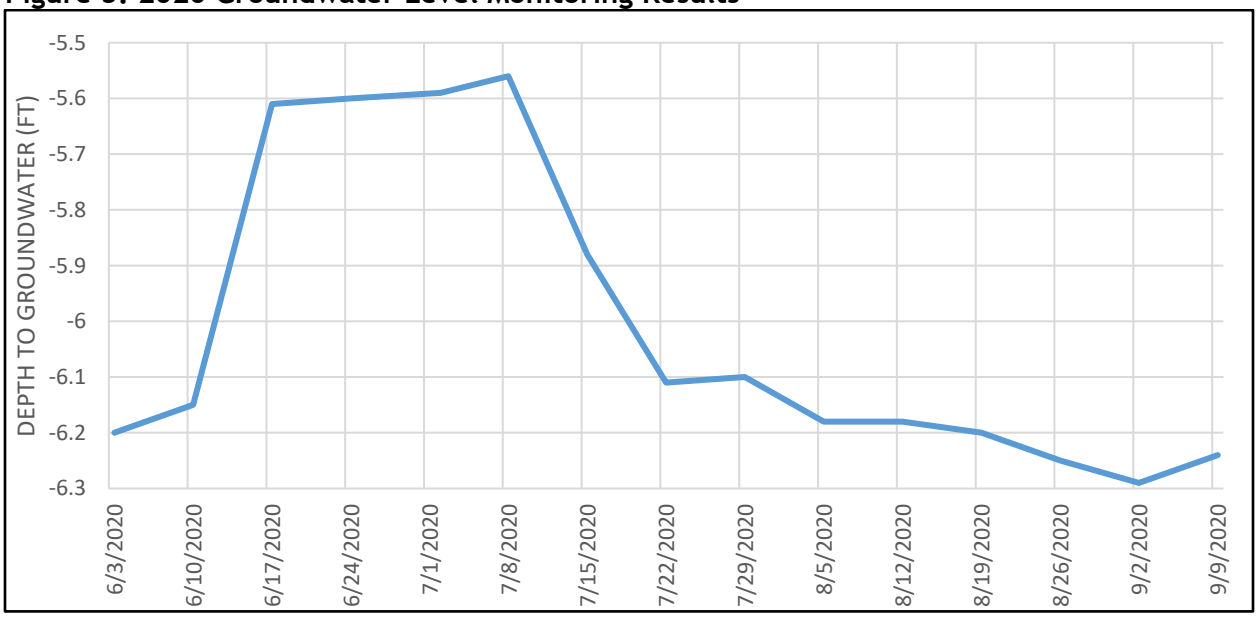
Water pumping data was obtained from the Town for the 2020 monitoring period as a comparison to the wastewater data to evaluate I&I. Water sales data would be more appropriate to use, but the water sales data is collected on a monthly basis that does not align well with the monitoring period. The average daily water pumped values were subtracted by the average daily wastewater flow rates collected from lift station #1 to evaluate I&I. It should be noted that in order to properly quantify I&I, long-term flow data, such as data collected over the course of a year should be compared to annual water sales data to properly quantify I&I. This data should be available in the near future as the Town works towards recording continuous flow data from the lift stations. The water pumped during the monitoring period is incorporated in Table 4.

Table 4. Lift Station #1 Flow Data

DATE	LS#1 Meter Reading (Gal)	Weekly LS#1 Flow (Gal)	Average Daily WW Flow (GPD)	Water Pumped Per Week (Gal)	Average Daily Water Pumped (GPD)	Water - Wastewater Flow Difference (GPD)
4/1/2020	52,481,607	-	-	-	-	-
4/8/2020	52,867,892	386,285	55,184	538,000	76,857	21,674
4/15/2020	53,250,496	382,604	54,658	547,900	78,271	23,614
4/22/2020	53,631,743	381,247	54,464	546,700	78,100	23,636
4/29/2020	54,002,336	370,593	52,942	669,400	95,629	42,687
5/6/2020	54,382,853	380,517	54,360	684,500	97,786	43,426
5/13/2020	54,783,286	400,433	57,205	784,900	112,129	54,924
5/20/2020	55,307,954	524,668	74,953	879,300	125,614	50,662
5/27/2020	55,863,487	555,533	79,362	986,600	140,943	61,581
6/3/2020	56,500,244	636,757	90,965	1,343,800	191,971	101,006
6/10/2020	57,536,955	1,036,711	148,102	1,200,800	171,543	23,441
6/17/2020	58,669,209	1,132,254	161,751	948,500	135,500	**-26,251**
6/24/2020	60,224,543	1,555,334	222,191	940,300	134,329	**-87,862**
7/2/2020	61,943,783	1,719,240	214,905	1,171,800	146,475	**-68,430**
7/8/2020	63,435,753	1,491,970	248,662	1,085,000	180,833	**-67,828**
7/15/2020	65,125,334	1,689,581	241,369	1,457,200	208,171	**-33,197**
7/22/2020	66,663,273	1,537,939	219,706	1,726,700	246,671	26,966
7/29/2020	68,146,048	1,482,775	211,825	1,560,000	222,857	11,032
8/5/2020	69,498,922	1,352,874	193,268	1,622,900	231,843	38,575
8/12/2020	70,759,122	1,260,200	180,029	1,642,600	234,657	54,629
8/19/2020	71,846,733	1,087,611	155,373	1,591,900	227,414	72,041
8/26/2020	73,019,884	1,173,151	167,593	1,440,300	205,757	38,164
9/2/2020	74,137,022	1,117,138	159,591	1,184,600	169,229	9,637
9/9/2020	75,038,915	901,893	128,842	1,191,100	170,157	41,315
9/16/2020	75,866,828	827,913	118,273	1,225,500	175,071	56,798

The difference between pumped water and wastewater entering lift station #1 does not have a consistent correlation based on the results presented in Table 4, however it does indicate the period when I&I is prevalent. This most notably occurs between mid-June through the middle of July in 2020. As a comparison, groundwater measurements were collected on a weekly basis during the monitoring period, which are shown in Figure 3. There is a strong correlation between the groundwater levels and the difference between water and wastewater flow data presented in Table 4, most notably between 6/17/2020 through 7/15/2020. This indicates that I&I still contributes a significant amount of flow to the system during the summer months. When the continuous monitoring system is operating, the Town will be able to quantify the I&I in the future, which will also provide a way to quantify the efficacy of collection system improvements.

Figure 3. 2020 Groundwater Level Monitoring Results



In addition to the flow monitoring conducted in 2020, the Town has also been recording the volume discharged from the storage ponds during the irrigation season. The Towns records the volume from the totalizer prior to the irrigation season and following the irrigation season to determine the annual flow rate. The recorded flow rate through the pivot does not take into account water losses in the system such as evaporation or potential leakage. However, this does provide a means to quantify the amount of wastewater in the system in comparison to the storage capacity. The total volume pumped from system startup to the end of the 2021 irrigation season was approximately 236.39 MG, which equates to an annual discharge volume of 26.3 MG. This assumes the first irrigation season was in the summer/fall of 2013.

Wastewater System Capacity

Treatment Capacity

Based on the monitoring data collected in 2021, the flow capacity of the wastewater system can be quantified. The average daily flow rate of 139,200 GPD (272 GPCD) based on the 2020 lift station #1 monitoring during the summer months (June – August) was selected as the current demand on the system to assess current capacity. Since the system was designed based on an average daily flow rate of 252,400 GPD, the system currently has capacity to meet demand and allow for future growth. The current average daily flow rate of 139,399 GPD represents approximately 55% of the system's flow capacity. This leaves approximately 113,001 GPD of flow available for future connections until the system reaches capacity. This value equates to 452 living units available for connection based on the MDEQ recommendation 2.5 persons per living unit and a flow of 100 GPD per person. This assumes that any future development will be designed with current standards and construction methods to decrease infiltration.

Storage Capacity

The 2020 monitoring was limited to a portion of the year and therefore it is difficult to assess the storage capacity based on the monitoring data. However, by combining the 2020 monitoring data with water sales data and an estimate of the current annual irrigation rate, a water balance was developed to determine current storage capacity. The water balance is shown in Table 5.

Table 5. 2020 Water Balance

Month	Estimated Inflow	Precip.	Evap.	Irrigation	Seepage	Net Volume	Cumulative Storage
October	**2,513**	425	1,568	486	0	883	883
November	**1,605**	285	0	0	0	1,890	2,773
December	**1,565**	231	0	0	0	1,796	4,569
January	**1,393**	205	0	0	0	1,597	6,166
February	**1,433**	167	0	0	0	1,600	7,766
March	**1,350**	355	0	0	0	1,705	9,471
April	1,629	662	1,661	162	0	468	**9,939**
May	2,061	1,351	2,398	3,287	0	-2,274	7,665
June	4,673	1,534	2,663	5,278	0	-1,735	5,930
July	7,046	823	3,145	7,695	0	-2,971	2,960
August	5,396	796	2,721	6,221	0	-2,749	210
September	4,067	743	1,851	3,170	0	-210	0
Total	34,729	**7,577**	**16,006**	**26,300**	**0**	**0**	**0**

1. Volumes in 1,000 gallons.

Since inflow data was unavailable for October through March, water sale values were used instead. The substituted data was applied only during the winter months when the Town's system is minimally influenced by I&I. Water sale volumes are generally greater than wastewater inflows during the winter months due to water losses in the distribution system. Based on these two factors, this approach is a conservative approximation. The total annual irrigation volume of 26.3 MG was distributed between the irrigation months (April-October) at the same percentage of the total as the design irrigation application schedule provided in Table 3. The evaporation values were equally adjusted to account for the differences in the total net volume. The maximum cumulative storage value was determined to be 9.94 MG, which equates to 30% of the system's storage capacity. Therefore, there is 23.58 MG worth of future storage available. The water balance provided in Table 5 will be updated in the future once the Town obtains inflow data for an entire year. It is also recommended that irrigation volumes be recorded on a monthly basis during the irrigation season.

Flow Capacity

Since monitoring data is not available for maximum daily flow or peak hourly flow at this time, the design peak hourly flow rate was used to assess the hydraulic capacity of the collection system just prior to lift station #1. When continuous monitoring data becomes available in the future, a more thorough hydraulic capacity analysis will be conducted for the remainder of the system. Since the winter average daily flow measured during the 2020 monitoring period (80,894 GPD) is less than the winter peak hourly flow rate used to determine the design peak

hourly flow rate (116,800 GPD), the design peak hourly flow of 455,232 GPD (316 GPM) was used to assess the hydraulic capacity of the sewer main leading to the treatment facility. By using manhole and pipe data provided in the 2011 Wastewater Improvements Project Record Drawings, the hydraulic capacity was calculated to be 46% between manholes MH-4 and MH-SS36 using the Manning Formula for uniform pipe flow. The full pipe capacity of this section of pipe is 688 GPM. The calculations are included in Appendix A.

Conclusion and Recommendations

While the improvements made to the collection system in 2011 certainly improved the I&I, the problem still persists. The EPA recommendations for collection system evaluations specify that a 125 GPCD flow should be considered the maximum acceptable per capita day flow with allowance for "reasonable" I&I. With a 272 GPCD flow during the summer months, I&I remains a significant problem for the Town of Sheridan and should be remedied to ensure sufficient system capacity in the foreseeable future. The Town has currently prioritized rehabilitating the remaining portions of the collection system that were not CIPP lined in 2011 to reduce the influence of I&I on the system. This is the primary method to improve both flow and storage capacity of the wastewater system.

The monitoring data currently available does not contain sufficient resolution to evaluate the demand against the design maximum day flow or peak hourly flow. However, based on the flows available and conversations with Town staff, the flows during the summer are within the capacity of the existing lift stations. The installation of the continuous monitoring equipment will also enable the town to assess maximum day and peak hourly flow rate to determine hydraulic demand of the system. The lift stations are capable of pumping in a lead/lag manner which enables the lift stations to maintain pumping capacity in the event of flows greater than the peak hourly flow of 316 GPM. In the event the influent exceeds the pumping rate of the lead pump, the lag pump engages to accommodate the additional flow. However, this would be limited by the full pipe flow capacity between MH-4 and MH-SS36 of 688 GPM. The Town is currently working to replace the pumps which have experienced frequent failures over the last few years.

The storage lagoons are intended to be discharged over the months of April through October to limit the application of wastewater based on crop agronomic rates and nitrogen loading. The available treated wastewater for irrigation is directly related to the system storage capacity. The 33.52 MG of storage is reserved for winter months (November – March) when crop irrigation is not possible. As I&I is reduced through collection system improvements, the application period may be shortened to account for reduced flows. However, it is important for the town to continue to adhere to the application rates outlined in the O&M plan to ensure sufficient storage capacity for the following year is available and to ensure the nitrogen load applied to the land does not exceed the nitrogen uptake demand of the crops. The entirety of the storage ponds need to be fully evacuated at the end of the irrigation season to ensure the full capacity of the storage ponds are available for the Town's wastewater during the winter months. It is also recommended that irrigation volumes be recorded on a monthly basis during the irrigation season to properly update the water balance for the system in the future.

Appendix A
Wastewater Collection System Hydraulic Calculations

Wastewater Collection System Downstream Pipe Hydraulics

Project: Town of Sheridan Wastewater Capacity Assessment
Project #: 2022-114
Calculations By: SLK
Checked By: PJH

Upstream Manhole #	Upstream Manhole Depth, ft.	US Ground Surface Elevation, ft.	Upstream Invert Out Elevation, ft.	Downstream Manhole #	Downstream Manhole Depth, ft.	DS Ground Surface Elevation, ft.	Downstream Invert In Elevation, ft.	Length of Pipe Run, ft.	Pipe Dia,, in.	Pipe Slope, ft./ft.	Pipe Material	Pipe Material Roughness Coefficient, n	Full Pipe Capacity GPM	Half Pipe Capacity GPM	Description	Total Existing Cumulative Flow* (GPM) (Peak Hour)	Total Added Flow (GPM) (Peak Hour)	Total Cumulative Flow (GPM) (Peak Hour)	Percent Full (% of Full Pipe Flow)
MH-1	4	5064.9	5061.05	MH-1A	6	5063.84	5059.91	216	10	0.00528	PVC	0.010	928.74	464.37	Utility Road to Lift Station	316.00	0.00	316.00	34.0%
MH-1A	6	5063.84	5057.51	MH-2	6	5062.65	5056.53	218	10	0.0045	PVC	0.010	857.14	428.57	Utility Road to Lift Station	316.00	0.00	316.00	36.9%
MH-2	6	5062.65	5056.41	MH-3	9	5063.9	5054.94	367	10	0.00401	PVC	0.010	809.08	404.54	Utility Road to Lift Station	316.00	0.00	316.00	39.1%
MH-3	9	5063.9	5054.84	MH-4	8	5062.2	5054.36	117	10	0.0041	PVC	0.010	818.83	409.42	Utility Road to Lift Station	316.00	0.00	316.00	38.6%
MH-4	8	5062.2	5054.26	MH-SS36	7	5060.5	5053.95	107	10	0.0029	PVC	0.010	688.11	344.05	Utility Road to Lift Station	316.00	0.00	316.00	45.9%
MH-SS36	7	5060.5	5053.9	LS#1	7	5060.5	5053.7	14	10	0.01429	PVC	0.010	1,527.99	763.99	Utility Road to Lift Station	316.00	0.00	316.00	20.7%

Notes/Assumptions:

1. Town of Sheridan Wastewater Improvement plans from 2011 were used for elevation data.
2. Pipe capacities were calculated using the Manning Formula for uniform pipe flow at given flow and depth using the pipe coefficients given.