Project # L20-03-096.02

Preliminary Engineering Report

For

Green Valley Sanitary District
Sewer Collection System

December 2021

Revised
December 2023

Prepared For
Green Valley Sanitary District
Rapid City, South Dakota

I HEREBY CERTIFY that this Preliminary Engineering Report was prepared by me or under my direct supervision and that I am a duly Registered Engineer under the laws of the State of South Dakota.

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FOR
GREEN VALLEY SANITARY DISTRICT
SEWER COLLECTION SYSTEM

Pennington County, South Dakota

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GREEN VALLEY SANITARY DISTRICT (GVSD)

PRELIMINARY ENGINEERING REPORT (WASTEWATER)

I. DISCUSSION OF THE PROBLEM

GVSD is located east of Rapid City and is generally bounded on the west by Reservoir Road, on the east by Anderson Road, on the south by Southside Drive, and on the north by SD Hwy 44. Rapid Creek divides the District nearly in half. A large part of GVSD is located within a designated FEMA floodplain, which limits the ability to develop portions of undeveloped property as well as limits the ability of lots to subdivide. Many of the lots within GVSD are long and narrow which also restricts subdividing those lots due to minimum frontage. There are areas where expansion is anticipated and those are discussed in more detail in the future conditions section of this report. A Project Vicinity Map can be found in Appendix A.

Currently GVSD has no sewer collection system. Lots are served by individual on-site septic systems. The area has high groundwater and many of the residents of the District have experienced failed septic systems. A comprehensive list of failed septic systems that could have caused health and safety issues has been provided by Pennington County and can be found in Appendix W.

The 2004 Report by SDSM&T titled *Ground Water Reconnaissance – 2004: Green Valley Sanitary District*, indicates that the concentration of septic systems within the GVSD is likely a contributing factor to the water quality within Rapid Creek. This report can be found in Appendix B.

Options are very limited on replacement septic systems once a system fails. Due to high ground water levels, the perc rates required by county ordinance for design and installation of a conventional septic system in many cases cannot be met. The soil will not perc. The option of utilizing a mound system is also unfavorable because of the perc rates and the considerable upfront costs ($18,000.00-$25,000.00 per system) to the landowner that would create a major financial burden to many of the District members.

Rapid City does not allow individual connections to the Rapid City trunk line installed along Southside Drive and Reservoir Road. GVSD and the County currently are allowing holding tanks to be installed as a short-term solution to bridge the time gap between system failure and installation of the GVSD proposed sewer collection system.

II. EXISTING AND FUTURE CONDITIONS

A. Project Need and Planning Area Identification

GVSD was developed to bring water and sewer services to its residents. The water project was completed in 2013. In various discussions with SD DANR, USDA-RD, Pennington County, as well as other agencies, the project need for a sewer collection system is apparent. The high ground water has led to contamination of many of the shallow wells previously used for drinking water. Failing septic systems as well as high ground water tables are likely contaminating the ground water and may be impairing Rapid Creek due to the proximity of the creek.

For these reasons, the Pennington County Board of Commissions is in support of a new sanitary sewer system. See Appendix C for Pennington County Board of Commissioners Project Support Letter.

GVSD is just over a one (1) square mile and is bounded on the west by Reservoir Road, on the east by Anderson Road, on the south by Southside Drive, and on the north by SD Hwy 44. The properties south of Southside Drive are part of the GVSD. Additionally, Sparrow Hawk Drive, which is located east of Reservoir Road and south of Southside Drive, is also part of the GVSD. A Green Valley Sanitary District Boundary and Flood Hazard Map is included in Appendix D.

GVSD receives water service from Rapid Valley Sanitary District (RVSD).

B. Existing Wastewater Flows and Treatment Systems

Currently GVSD has no municipal collection and treatment. All lots with homes have an individual on-site septic system. Therefore, there is no existing flow data or system to report. Flow projections will be developed in the future conditions section of the report.

C. Effluent Limitations

GVSD has negotiated a contract with RVSD for operation and maintenance with treatment of the GVSD sewage from the City of Rapid City. Therefore, all effluent limitations would be set by the City of Rapid City, and GVSD will be required to meet those limits under the agreement. GVSD has adopted the necessary ordinances to meet those limitations within the GVSD system.

The City of Rapid City's current treatment plant averages 9.5 MGD and has a capacity of 15 MGD. The City plans to add another clarifloculator in the future to increase that capacity by approximately 9 MGD. The City sees no issue adding GVSD flows to their system. A letter provided by the City of Rapid City Public Works Director states that the City has sufficient capacity to provide GVSD with treatment and is agreeable that RVSD be allowed to operate and maintain the system. This arrangement is acceptable to the City as long as it is

agreeable to the agreement between the City of Rapid City and RVSD. See Appendix F for the Public Works Director's letter and Appendix T for the agreement between the City of Rapid City and RVSD.

D. Infiltration and Inflow (I/I)

1. Cost Effective Analysis for System with Excessive I/I

Since there is no collection system currently in place, I/I analysis cannot be done.

2. Sewer Use Ordinance and Sewer Maintenance Program

GVSD has negotiated with RVSD for operation and maintenance of the proposed sewer system. As part of that agreement, GVSD will adopt the Rapid Valley's applicable sewer use ordinance.

E. Future Conditions

1. Population and Land Use Projections

Although Pennington County is increasing in population, the belief is GVSD will not see the same growth in its residents. The 2010 Census data shows the population of Pennington County was 100,948 and the projected 2017 population to be 110,141. Nearly 70,000 of that population live within the City of Rapid City.

GVSD does not have any plan to expand the district boundaries at this time, which restricts the population growth within GVSD. Most of the district is developed. The vast majority of lots are long and narrow which also restricts subdividing many of the existing lots due to the minimum required frontage per county ordinance. The frontage cannot be met and generally, flagpole lots are not allowed by Rapid City Planning which is who reviews/approves platting within GVSD as they fall within the 3-mile platting jurisdiction. Another restricting factor is that a large portion of GVSD falls within a FEMA identified floodway, which nearly prohibits development.

The number of proposed sanitary sewer services was determined by a door to door survey relaying the project scope and surveying the resident's existing septic system.

From the survey, two hundred eighty-three (283) residents were determined to have homes with septic systems. Ten (10) of those two hundred eighty-three (283) homes did not take part in the survey.

RVSD supplied a list of accounts they provide water for to cross track the survey (see Appendix G). RVSD shows two hundred seventy-one (271) water accounts. The reason for discrepancy is not all residents connected to the water system.

An additional home has been added after the survey was conducted which also hooked up to the water. That makes two hundred seventy-two (272) water accounts and an overall two hundred eighty-four homes within the District.

Green Valley Sanitary District Boundary and Flood Hazard Map was also used to cross check the addresses with homes (see Appendix D).

GVSD has decided to assess only the lots that have homes on them; a total of two hundred eighty-four (284). These lots will be assessed and should be the basis for calculating debt payment.

Seventeen (17) additional lots have been identified that do not have homes on them, but are deemed buildable and outside of the floodplain.

Twenty-one (21) additional lots have been identified as vacant lots, but are within the floodplain. These lots could potentially develop but will require more of a process to do so.

With completion of a municipal water and sewer system, the expectation is that some number of lots, that are able to meet ordinance requirements, may replat and subdivide. In June 2018, GVSD looked at undeveloped property not located in the floodway; portions that might develop located in the floodplain, as well as undeveloped property outside of the floodplain. The potential area of development totaled 260.5 AC. With an assumed average lot size of 1.5 AC, that would allow for an additional one hundred seventy-four (174) lots. Based on the one hundred seventy-four (174) lots, GVSD requested and was approved for only an additional two hundred (200) water taps from RVSD for use over the next 25 years. As part of these additional water taps, the GVSD has agreed to adopt an ordinance restricting the minimum lot size to 1 AC within the GVSD.

The accumulative total number of lots, including existing and future lots, totals five hundred twenty-two (522) lots (284+17+21+200). The areas anticipated to develop are shown in Appendix H titled Green Valley Sanitary District Assumed Development Areas.

LOTS TO BE ASSESSED OPENING DAY: 284 LOTS

2. Forecasts of Flows and Waste Loads

Waste loads will be consistent with residential waste. GVSD has no industrial facilities and does not see much potential for industrial waste in the future.

GVSD has negotiated an agreement with RVSD for operation and maintenance of either a gravity sewer system or a pressurized system. The gravity sewer system would also include a pressurized force main. RVSD currently has an agreement in place with the City of Rapid City for treatment which will also include the treatment of the GVSD sewage. All effluent limitations would be set by the City of Rapid City. GVSD has adopted the necessary ordinances to meet those limitations within the GVSD system.

To determine the amount of wastewater flow produced by GVSD, SD DANR outlines several ways to determine the gallons per day (gpd) in the "Recommended Design Criteria Manual: Wastewater Collection and Treatment Facilities". Generally, in larger communities that use more than 1 MGD of water, a person is assumed to generate 100 gpd per capita. For more communities that use less than 1 MGD of water, a person is assumed to use 75 gpd per capita. Flows may also be calculated by using eighty percent (80%) of the actual water consumption use.

GVSD in total used eight million five-hundred thousand (8.5 million) gallons of water in the year 2023. There are two hundred seventy-two (272) water accounts within the District. The following is a breakdown for a daily water use per account:

8,500,000 gallons/year
708,333 gallons/month
23,611 gallons/day (30 days/month)
272 accounts
87 gallons/day/account

Per the calculation above, GVSD's gallons per day is well under the 1 MGD criteria. Utilizing the other two scenarios, the following was calculated:

Less than 1 MGD
284 accounts @ 75 gpd/capita * 2.5 capita/household = 53,250 gpd.

80% of Water Consumption
284 accounts @ 87 gpd/account * 80% = 19,766 gpd.

For this report, the design standard of 75 gpd/capita will be utilized for the calculation since that number is the most conservative.

Current Sanitary Sewer Flow Estimate (284 Households)
53,250 gpd.

Full Buildout Sanitary Sewer Flow Estimate (522 Households)
522 accounts @ 75 gpd/capita * 2.5 capita/household = 97,875 gpd.

3. Flow Reduction

GVSD will promote the use of low flow devices through its newsletter and ordinance.

III. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Optimum Operation of Existing Facilities

Optimization of existing facilities is not an alternative for GVSD as there is currently no sewer system in place.

B. Regionalization

GVSD has no intent to develop a stand-alone collection and treatment system to service GVSD residents. GVSD is proposing to fund and construct a sewer collection system to service residents of the District; however, they have contracted with Rapid Valley for operation and maintenance of their system. RVSD has an agreement with the City of Rapid City for the treatment of the RVSD sewer which would include GVSD sewer. Currently, the City of Rapid City has verbally committed to treat GVSD's sewer, but Rapid City is working on an amendment with RVSD to service Green Valley. GVSD is out of RVSD's district boundary. GVSD believes this concept falls in line with the SD DANR's regionalization concept of smaller entities combining with other entities to develop a regional facility versus numerous smaller treatment facilities.

C. Unsewered Areas

Currently all of the GVSD is unsewered and utilizes on-site individual septic systems for waste treatment. During the 2012 water project, 272 water meter pits were installed; however, the operating agreement with Rapid Valley Sanitary District allowed only water service to existing homes.

The proposed project will provide service to every resident located within the GVSD boundary, as it exists today. GVSD has no intent of expanding the boundary of the District.

The District is experiencing failing septic systems with the only option being a mound type system with a significant cost. High ground water is also a contributing factor.

GVSD and Pennington County have developed a short-term solution for failing systems until the GVSD collection system can be funded and constructed – that being holding tanks.

D. Conventional Collection System

Three (3) scenarios have been considered under the conventional collection system.

The first scenario was to locate the sewer collection system outside of the paved streets either in the right-of-way outside the paving or generally along rear property lines within existing or secured easements. On the surface, it would appear that this option would reduce costs simply due to not needing to replace the asphalt streets; however, this option is not seen as a viable option.

The right-of-way outside of the street is full of utilities to include natural gas, electric, and telecommunication. During the water project, the alignment shifted across the street to avoid utilities in order to provide the required separation and provide area for construction to make the project constructible. This was easier to accomplish with a water distribution system than it is with a sewer collection system without adding a significant number of manholes, which increases costs.

The second area considered was to place the proposed collection system along rear property lines, which would require a large number of easements from landowners. It is anticipated that some landowners may provide easements at no cost; however, it is also assumed that many landowners would want some level of compensation for the easement, which increases costs. In addition to the easement issue, maintenance becomes more difficult when constructed in an easement on rear property lines versus within right-of-way. Many of the rear property lines are currently overgrown with trees and brush and would require removal of trees and brush in order to construct the sewer main. The removal of trees is anticipated to be a very significant concern with landowners and would likely be an issue in obtaining easements based on comments and concerns expressed through the water project.

The third scenario is to locate the sewer system within the street section. This is a more standard installation and there are no utilities currently located within the paved section other than Southside Drive and Reservoir Road. It does increase the project cost due to the replacement of the asphalt street sections. For this report, it was felt that a 10-foot-wide patch would not be a feasible option and the entire street section would deteriorate during construction and ultimately need to be replaced. Even with the additional cost due to asphalt replacement, it was felt that the best installation location of the sewer was in the middle of the street section. This causes some sewer services to be longer where the septic tanks are located in the rear yard; however, not all the septic systems are located in the rear yards. The location of the septic systems seems to vary by neighborhood.

The location of sewer in Reservoir Road and Southside Drive is anticipated to be offset from the centerline due to the City of Rapid City's sewer trunk line located along centerline of these two (2) streets.

This will be evaluated during the design with some locations, especially along Reservoir Road, possibly shifting to an easement just outside of the right-of-way line. The number of homes is minimal and securing easements may be feasible. These areas were included in the cultural resources inventory completed by Quality Services of Rapid City.

E. Alternative Collection Systems

The EPA produced a document titled “Alternate Wastewater Collection Systems”, dated October 1991. Three (3) main systems are discussed in this document. Pressure systems, vacuum systems, and small diameter gravity systems. The document indicates that a common requirement of all alternative collection systems is proper administration and management. The needs of these technologies are different from conventional sewers therefore operating staff must be trained in the particular needs of these systems. In general, these systems are smaller sized and have a shallow bury which typically save installation costs but pose a potential issue from surface damage. Cost savings is generally seen when these types of systems are placed in sparsely populated areas with greater lengths between service lines.

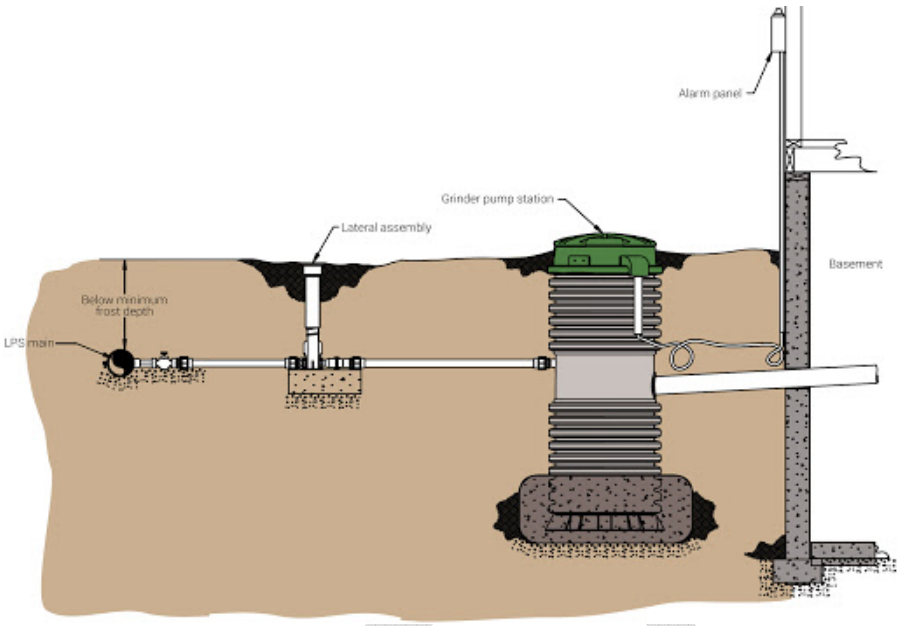
The preferred option is that the proposed system needs to comply with the RVSD Design Criteria to be able to be turned over to RVSD once the loan is paid off.

The more cost-effective option needs to be considered. RVSD would operate and maintain a gravity or pressure system that will allow GVSD sewer to be treated by the City.

1. Pressure System

Pressure systems generally consist of a pumping unit installed on each property in an underground holding tank which is in turn connected by a 1.25” HDPE pipe to either a 2”, 3”, or 4” HDPE network of pipes. These pipes then transfer wastewater to the sewer system or treatment plant.

Each pumping unit will be inserted into a ninety three-inch (93”) underground tank. Each system will also provide twenty-four hours (24) of storage depending on water usage. The maintenance for these units is typically put on the homeowner. See below for a typical system layout.



Typical Pressurized Sanitary Sewer System (Steinbrecher Companies, Inc.)

2. **Vacuum Systems**
   There are different types of vacuum systems, which can include vacuum toilets too.

3. **Small Diameter Gravity Systems**
   These systems generally consist of building sewers, interceptor tanks, service laterals, collector mains, cleanouts, manholes, vents, and lift stations.

   GVSD prefers to turn over the sewer system to a larger entity. Since GVSD does not plan to develop their own treatment facility with the Rapid City Waste Treatment Facility located within a mile of the boundary, GVSD will be required to construct a collection system that meets RVSD and the City of Rapid City construction standards and specifications to dedicate the proposed system to RVSD upon debt retirement.

   Any connection to the Rapid City sewer line with Rapid Valley providing operation and maintenance of the system and ultimately ownership, will require construction in accordance with both design standards.

F. Treatment Systems

Since GVSD is not proposing to develop a treatment system as part of the proposed project, no evaluation of treatment systems has been included in this PER. GVSD has contracted with RVSD for operation and maintenance, and Rapid Valley has an agreement with the City of Rapid City for treatment of its waste and Rapid City will dictate the type of treatment used in its treatment facility.

G. Municipal Treatment of Industrial and Federal Facilities Wastes

GVSD is not proposing to develop a treatment system. GVSD's preference is to turn over the proposed sewer collection system to the RVSD upon debt retirement. The City of Rapid is the most feasible option for treatment as they treat all of the Rapid Valley sewer, currently. Since the initial PER, GVSD has negotiated an agreement with RVSD for operation and maintenance of the proposed system and an agreement is being amended to allow RVSD to service GVSD between the City of Rapid City and RVSD. Rapid City has stated they have the capacity to treat GVSD's sewage.

H. Pennington County and City of Rapid City Assistance

USDA RD has requested that GVSD ask for assistance in sharing the cost of asphalt replacement from either the City or County of the road where the sewer will be placed. Both the City and the County rejected to offer any cost sharing.

Also, USDA RD wanted GVSD to determine if the County would allow gravel to be placed instead of asphalt patching. The County requires that if the existing road is damaged during construction, the road must be replaced back in the same condition or better. See Appendix S for correspondence.

IV. EVALUATION OF PRINCIPAL ALTERNATIVES AND PLAN ADOPTION

A. Do-Nothing

The do-nothing alternative is not considered to be a feasible option for various reasons. It does not correct the violations with failing septic systems, which will continue, as the systems are aging. It does not remove possible ground water contamination and contamination of Rapid Creek as the septic systems remain in place.

The do-nothing option is the cheapest short-term option for GVSD residents; however, when faced with a failing septic system, the maintenance and replacement of that septic system over time, the cost may not be the least expensive. As ground water contamination continues, the problems are much harder to correct at a higher cost and impact a much larger area.

As this is not considered a feasible option, no further evaluation has been completed.

B. Conventional Gravity Sewer Collection System

1. Project Description.

   The sanitary sewer main is expected be composed of eight-inch (8") sewer main with four-inch (4") sewer services. The main will be placed along the road section to avoid existing utilities in the ditch other than between Greenwood Lane and Green Oak Lane. The idea is to acquire easements along the property lines to avoid a creek crossing.

A part of the proposed layout is a single lift station near Anderson Road and Dunn Road on the north side of the creek. This will be designed to handle all the flows north of the creek. Appendix O graphically shows the location of the proposed lift station stie.

The initial review of the size is 40' deep at the current location selected with two (2) pumps sized to handle a total dynamic head of 110 gpm at 8.73 feet of total head. Power will be provided by West River Coop and all power fees are incorporated within the cost estimate. See Appendix V for the lift station assumptions.

There will be four (4) connection points to adjacent City of Rapid City mainlines. Two (2) connections will be along Reservoir Road to the City of Rapid City sewer main, one (1) connection near Anderson Road and Southside Drive to the City of Rapid City sewer main and one (1) near Anderson Road and Highway 44 to the RVSD sewer main. There will be a monthly fee charged to GVSD of $260 per connection to a City of Rapid City sanitary sewer main. This cost will be built into the monthly user fee.

There is an additional one-time recovery fee collected by the City of Rapid City that equals $253,368.99. See Appendix U for information provided by the City of Rapid City.

Based on the floodplain and current development along Reservoir Road, the sewer main will only be placed a quarter mile north of Southside Drive and end with a manhole. There will be a sewer main south of Rapid Creek along Reservoir Road that will run parallel to the City of Rapid City's trunk line to pick up the three (3) homes directly south of the creek and one (1) just south of the large slough area. It is not cost feasible to run a line the entirety of Reservoir Road.

As a part of this project, each resident will be disconnected from their existing septic system and be connected to the sewer main. Each tank will be abandoned in place.

The Rapid City Wastewater Treatment Facility is the most feasible option for treatment with RVSD to operate and maintain the GVSD proposed system.

This option reduces one hundred percent (100%) of the septic systems within the GVSD. It eliminates the ground water contamination potential from failing septic systems and reduces the potential contamination of Rapid Creek. This option also reduces additional costs to homeowners such as pre-treatment components and maintenance of those components and provides regionalization of smaller systems with larger ones as the direction SD DANR prefers to go versus having individual smaller treatment

facilities. This option also allows GVSD the ability to turn over the system at some point to another entity for ownership, operation, and maintenance of the system. GVSD does not have a full-time staff qualified to operate a collection system or treatment facility.

2. Design Criteria.
   The Rapid Valley Sanitary District Design and Construction Standards, City of Rapid City Infrastructure Design Criteria, 10 States Standards, SD DANR Design Guidance, and Pennington County Ordinance requirements will be used for design criteria on the proposed system.

   GVSD prefers to dedicate the system to RVSD upon debt retirement and therefore, the proposed system would need to be designed with Rapid Valley's criteria in order for RVSD to assume ownership of the system following debt retirement.

3. Map.
   A schematic layout of the proposed gravity sewer system is included in Appendix I.

4. Land Requirements.
   Acquisition of property to install one (1) lift station has been discussed with the affected landowner shown in Appendix O. This would service the area north of the creek. GVSD's preference is that the lift station be located in a platted parcel that GVSD owns versus an easement.

   To avoid a creek crossing and service all property owners on Greenwood Drive, GVSD is proposing to secure an easement between Greenwood Drive and Green Oak Drive. See Appendix I.

   The initial schematic layout placed the proposed sewer in the asphalt of Reservoir Road and Southside Drive, however, through discussions with GVSD, it may be possible to eliminate some construction costs by placing segments of sewer along Reservoir Road outside the right-of-way in an easement. This will be evaluated during the design.

5. Potential Construction Problems.
   Potential construction issues include:
   - High ground water.
   - The sewer system depths will potentially be deeper than normal to achieve minimum grades, especially toward the east end of the system which is the down-stream end of the system.

6. Sustainability Considerations.
   The sewer rate structure will need to be set to provide for debt retirement and any required reserve accounts including operation and maintenance costs. The agreement with Rapid Valley provides that RVSD will operate and maintain the sewer system covered by RVSD user fees and an administration fee.

   It is anticipated that the rate structure would include two (2) components:

   1. Debt reduction and reserve accounts (Annual Assessment)
   2. Monthly user fee (to be the same as Rapid Valley rates) to include operating costs and the City of Rapid City monthly fee.

7. Cost Estimates.
   The probable estimate of cost is included in Appendix J. The total project cost is $23,806,889. This includes the following:
   - Engineer's Opinion of Probable Construction Cost with a ten percent (10%) contingency.
   - Engineering Services
   - Bidding Services
   - Legal and Administrative Services
   - Additional Services
     - Landowner Negotiations
     - Permitting Assistance
     - Special Assessment Assistance
     - Funding Administration
     - Extensive Geotechnical Exploration
   - Rapid City Connection Fee
   - Land Acquisition / Easement Procurement
   - Short Term Asset Fund

   The intention for this project is to fund the remaining project costs through USDA RD. There are costs included in the Probable Estimate Cost required by USDA RD to provide a true estimated cost of the project. These costs include the following:
   - Full Time Construction Services
   - Interim Financing Interest
   - Financial Audit every Five (5) Years

   SD DANR previously awarded GVSD with a consolidated grant in the maximum amount of two million dollars ($2,000,000 and a CWSRF grant in the maximum amount of three hundred seventy thousand dollars ($370,000).

West Dakota Water Development District (WDWDD) awarded GVSD with one hundred twenty-five thousand dollars ($125,000) of grant money toward the project. The award amounts are included in Appendix K.

The total current funding amounts to $2,495,000. This report will assume the same grant award.

The assumption for a USDA RD loan would run forty (40) years with three percent (3.0%) interest rate.

With the assumption of two hundred eighty-four (284) assessments and zero (0) grant from USDA RD with a forty (40) year loan with 3% interest, the annual P&I will be as follows:

Probable Estimate of Cost	$23,806,889.00
Current Grant Funds	($2,495,000.00)
Probable Estimate of Cost after Grant Funds	$21,311,889.00
Accumulated Interest over 40-years	$15,308,867.00
Probable Estimate of Cost to be Assessed	$36,620,756.00
Amount per Assessment	$128,946.32
Amount per Assessment per Year	$3,223.66
Amount per Assessment per Month	**$268.64**

The cost of operation and maintenance to the District includes a financial audit five (5) years after completion of the project and short lived assets to include two (2) pumps, a SCADA system, control panel, and valves all for the lift station.

From discussions with RVSD, they charge each of their current customers based on water usage and multiply that number by a sewer rate, plus a base rate.

The utility rate structure would be the same as residents of Rapid Valley with an additional eight dollars and fifty cent ($8.50) administration fee to cover O&M costs. RVSD's rate currently is $24.03 per first one thousand (1,000) gallons and $5.88 per one thousand (1,000) gallons after.

Also included in the utility rate structure will be the monthly City of Rapid City fee. This cost is $260 per month per connection. With four (4) connections to the City of Rapid City, the total monthly cost is $1,040. The monthly cost per resident equates to $3.66.

To calculate user costs, the average per account of 87 gpd as stated above will be utilized. The rate structure is assumed as follows:

87 gpd * 30 days = 2,610 gallons / month

	1,000 gallons =	$24.03
2,610 gallons – 1,000 gallons =	1,610 gallons	
	1,610 gallons / 1,000 gallons x $5.88 =	$ 9.47
Admin Fee =		$ 8.50
City of Rapid City Monthly Connection Fee =		$ 3.66
		$45.66

The total monthly cost per user that includes the RVSD utility rate and the assessment from the USDA RD loan with zero (0) grant from USDA RD is approximately **$315.17.**

As part of the USDA RD loan requirements is that GVSD accumulates a one (1) year loan reserve over a ten (10) period.

Annual Assessment per User	$2,666.75
Assessed over 10 Years	$322.37
Monthly Cost per User	**$26.86**

Monthly Cost per User for first 10-years **$342.03**

C. Small Diameter Sanitary Sewer Pressure System

1. Project Description.

The pressure sanitary sewer main is expected to be composed of two-inch (2”), three-inch (3”), four-inch (4”), and six-inch (6”) sewer main with one quarter inch (1-¼”) sewer services. The main will be placed under the road section to avoid existing utilities in the ditches. The benefit of this type of system is that most of the system can be directionally bored and not disturb the roadway above the line and can be minimum depth.

The wastewater will be transferred from each individual pumping unit installed on the homeowners’ property into the proposed sanitary sewer system.

The pumping units will be installed with an airtight lid that will be 18 to 24 inches above ground to provide flood proof.

The factory certified hydraulic analysis of the sewer main is offered to ensure proper force main operating velocities; a minimum of maintaining 2 feet per second or greater. The wastewater is macerated into a slurry as it is evacuated into the pumping unit. A minimum of 2 feet per second keeps the system self-scouring. Conversely, if too much pressure is generated, the collection system would typically be in a freeze/closed valve situation rather than a plugged line.

The system accounts for over pressure through the alarm panels. If a wattage draws more than 1700 is registered from the pump motor, the system shuts down for 20 minutes. After the shutdown, the system reboots and if the water level is high enough, energizes the pump. If the watts increase, once again, up to/beyond 1700 watts, the system shuts down for another 20 minutes. A third shutdown would occur before the alarm panel goes into alarm mode (audible/visual indication) and the LCD in the panel reads 'Over Pressure'.

A major advantage GVSD has with this type of system is that the system will have full pressure flows on day 1. A lot of times when these types of systems are installed for new developments, it may take many years to get the desired flow to be able to self-clean the system. GVSD gets that as soon as the system is turned on.

There will be one (1) connection point to an adjacent mainline near Anderson Road and Highway 44 to the RVSD sewer main. RVSD will have a twenty-four-inch (24") going into the City of Rapid City's forty-two-inch (42") outfall line with the use of a dog-house style manhole. This will be sufficient for handling the GVSD flow described above.

This is different compared to the gravity option which has several proposed connections into the City of Rapid City sewer infrastructure. The pressurized aspect of this option allows the sewer to be carried to one (1) single point and eliminates the extra costs of the one (1) time City fee and the monthly connection fee.

This alternative replaces the existing failing septic tanks. Each pumping unit will be inserted into a ninety three-inch (93") underground tank. Homeowners will be tasked with maintaining these tanks.

Based on the floodplain and current development along Reservoir Road, the sewer main will only be placed a quarter mile north of Southside Drive and will end. The pressurized system was expected to be able to pump the three (3) homes in this area. It is not cost feasible to run a line the entirety of Reservoir Road.

As a part of this project, each resident will be disconnected from their existing septic system and be connected to the sewer main. Each tank will be abandoned in place.

The Rapid City Wastewater Treatment Facility is the most feasible option for treatment with RVSD to operate and maintain the GVSD proposed system.

RVSD already has in-place certified maintenance staff to be able to operate and maintain this type of system due to the existing pressurized force mains for lift stations in their current infrastructure.

RVSD will maintain the pressure main and service lines in the right-of-way. Each homeowner will be expected to maintain the service line within their property including the tank, pump, alarm panel, and the electricity needed to power the pump and panel.

This option reduces one hundred percent (100%) of the septic systems within the GVSD. It eliminates the ground water contamination potential from failing septic systems and reduces the potential contamination of Rapid Creek. This option provides regionalization of smaller systems with larger ones as the direction SD DANR prefers to go versus having individual smaller treatment facilities. This option also allows GVSD the ability to turn over the system at some point to another entity for ownership, operation, and maintenance of the system. GVSD does not have a full-time staff qualified to operate a collection system or treatment facility.

2. Design Criteria.
   The Rapid Valley Sanitary District Design and Construction Standards, City of Rapid City Infrastructure Design Criteria, 10 States Standards, SD DANR Design Guidance and Pennington County Ordinance requirements will be used for design criteria on the proposed system.

3. Map.
   A schematic layout of the proposed pressurized sanitary sewer system is included in Appendix L.

4. Land Requirements.
   During construction, there will need to be temporary construction easements or owner agreements to allow the contractor to install the pumping units and abandon the existing private septic systems which will be conducted during the design phase when specific pumping unit locations are determined.

5. Potential Construction Problems.
   Potential construction issues include:
   - High ground water.
   - Installation of underground tanks.

6. Sustainability Considerations.
   The sewer rate structure will need to be set to provide for debt retirement and any required reserve accounts including operation and maintenance costs. The agreement with Rapid Valley provides that RVSD will operate

and maintain the sewer system covered by RVSD user fees and an administration fee.

It is anticipated that the rate structure would include two (2) components:

1. Debt reduction and reserve accounts (Annual Assessment)
2. Monthly user fee to include operating and maintenance costs and the City of Rapid City monthly fee.

7. Cost Estimates.

The probable estimate of cost is included in Appendix M. The total project cost is $23,806,889. This includes the following:

- Engineer's Opinion of Probable Construction Cost with a ten percent (10%) contingency.
- Engineering Services
- Bidding Services
- Legal and Administrative Services
- Additional Services
  - Landowner Negotiations
  - Permitting Assistance
  - Special Assessment Assistance
  - Funding Administration
  - Extensive Geotechnical Exploration
- Rapid City Connection Fee
- Land Acquisition / Easement Procurement
- Short Term Asset Fund

The intention for this project is to fund the remaining project costs through USDA RD. There are costs included in the Probable Estimate Cost required by USDA RD to provide a true estimated cost of the project. These costs include the following:

- Full Time Construction Services
- Interim Financing Interest
- Financial Audit every Five (5) Years

SD DANR previously awarded GVSD with a consolidated grant in the maximum amount of two million dollars ($2,000,000 and a CWSRF grant in the maximum amount of three hundred seventy thousand dollars ($370,000).

West Dakota Water Development District (WDWDD) awarded GVSD with one hundred twenty-five thousand dollars ($125,000) of grant money toward the project. The award amounts are included in Appendix K.

The total current funding amounts to $2,495,000. This report will assume the same grant award.

The assumption for a USDA RD loan would run forty (40) years with three percent (3.0%) interest rate.

With the assumption of two hundred eighty-four (284) assessments and zero (0) grant from USDA RD with a forty (40) year loan with 3% interest, the annual P&I will be as follows:

Probable Estimate of Cost	$9,786,600.00
SDDANR Grant Funds	($2,495,000.00)
Probable Estimate of Cost after Grant Funds	$7,291,600.00
Accumulated Interest over 40-years	$5,237,740.00
Probable Estimate of Cost to be Assessed	$12,529,340.00
Amount per Assessment	$44,117.39
Amount per Assessment per Year	$1,102.93
Amount per Assessment per Month	**$91.91**

Each pumping unit will be the responsibility of the owner to maintain. The cost of operation and maintenance to the District includes a financial audit five (5) years after completion of the project and short lived assets to include two (2) pumps, a SCADA system, control panel, and valves all for the lift station.

From discussions with RVSD, they charge each of their current customers based on water usage and multiply that number by a sewer rate, plus a base rate.

The utility rate structure would be the same as residents of Rapid Valley with an additional eight dollars and fifty cent ($8.50) administration fee to cover O&M costs. RVSD's rate currently is $24.03 per first one thousand (1,000) gallons and $5.88 per one thousand (1,000) gallons after.

To calculate user costs, the average per account of 87 gpd as stated above will be utilized. The rate structure is assumed as follows:

87 gpd * 30 days =	2,610 gallons / month	
	1,000 gallons =	$24.03
2,610 gallons – 1,000 gallons =	1,610 gallons	
	1,610 gallons / 1,000 gallons x $5.88 =	$ 9.47
Admin Fee =		$ 8.50
		$42.00

The total monthly cost per user that includes the RVSD utility rate and the assessment from the USDA RD loan with zero (0) grant from USDA RD is approximately **$134.78.**

As part of the USDA RD loan requirements is that GVSD accumulates a one (1) year loan reserve over a ten (10) period.

Annual Assessment per User	$1,102.93
Assessed over 10 Years	$110.29
Monthly Cost per User	**$9.19**
Monthly Cost per User for first 10-years	**$143.97**

D. Environmental Impacts.

Both options eliminate septic systems, which is documented to be contributing to ground water contamination and possibly to the impairment of Rapid Creek. During construction, there will be a short-term impact of additional dust and noise; however, this will be for a limited duration. Construction is generally located in the right-of-way and private property were existing septic tanks are located, all of which have been disturbed previously, so no cultural or historical resources will be impacted.

The proposed project will have minimal or no impact to wetlands, wild and scenic rivers, fish, and wildlife. The project will be primarily located under surfaced roadways. There are no wild and scenic rivers located within the project.

There are identified wetlands within GVSD; however, the only wetland located within the construction area is along Reservoir Road. Final design will avoid the wetland if possible or reduce impact as much as possible. A wetland map is included in Appendix N.

This section of Rapid Creek is not listed as an impaired waterway by the "2022 South Dakota Integrated Report for Surface Water Quality Assessment".

Water quality is anticipated to improve due to the project. This section of Rapid Creek currently does not support immersion recreation due to Escherichia coli. This section also has an assigned TMDL.

The proposed project will remove septic systems, which is believed to be a contributing factor to the Rapid Creek impairment. With septic system removal, water quality is expected to improve which would be expected to improve fish and wildlife environments.

The project will have no impact on water use or quantity. GVSD is currently on a municipal water system.

SD DANR and USDA-RD funding requires several environmental agencies can review and comment on the proposed project. These agencies have been notified and provided the required review period. Agencies and responses include:

SD Air Quality Program

Based on the information provided, the proposed project will not cause a significant impact on the air quality in South Dakota if the project is approved. SD air quality regulations do require that facilities adding new electrical generators (before installation) purchase EPA certified systems for their specific operation. The Air Quality Program in Pierre will be

contacted on how to comply with the air quality requirements if the project is approved for funding.

SD Surface Water Quality Program

Appropriate erosion and sediment control measures shall be installed to control the discharge of pollutants from the construction site. Authorization under the General Permit for Storm Water Discharges Associated with Construction Activities and a Surface Water Discharge permit shall be sought for if the project is approved for funding.

Impacts to tributaries, creeks, wetlands, and lakes shall be avoided. This project will cross and be in close proximity to Rapid Creek. This waterbody is classified by the South Dakota Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:

(4) Warm water permanent fish life propagation water;
(7) Immersion recreation waters;
(8) Limited contact recreation waters;
(9) Fish and wildlife propagation, recreation, and stock watering waters;
(10) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to ensure that the thirty (30) day average total suspended solids criterion of 90 mg/L is not violated. No negative impacts to these uses are anticipated from the project.

Plans and specifications for the Sanitary Sewer Collection System Improvements will be submitted to the South Dakota Department of Agriculture and Natural Resources if the project is approved for funding.

SD Ground Water Quality Program

No adverse impacts to ground water quality is anticipated by this project. DANR has identified one release case of petroleum and other chemicals in the vicinity of the project. The release information is enclosed in Table 1. However, the locational information provided to DANR regarding releases is sometimes inaccurate or incomplete.

In the event that contamination is encountered during construction activities or is caused by the construction activity, Rapid City, or its designated representative, will report the contamination to DANR. Any contaminated soil encountered or caused by the construction activities will be temporarily stockpiled and sampled to determine disposal requirements and the construction material used in the contamination area should be evaluated for chemical compatibility and adjusted accordingly.

Table 1 - Known releases that may impact the Green Valley Sanitary District Sewer Collection System, as of February 10, 2020.

DENR ID	Site Name	City	County	Street	Material	Status	R1	Latitude	Longitude
2001.707	ATP - Anderson Farm	Rapid City	Pennington	5610 Anderson Road (NE at Anderson Rd & creek)	Petroleum	NFA	KM	44.029029	-103.110667

Status: C = Closed, NFA = No Further Action, O/M = Open/Monitoring, I=Inactive, T=Tracking
R1 = DENR reviewer's initials

SD Game, Fish & Parks

Based on the information provided, there is no anticipated significant impact to fish and wildlife resources.

US Department of Agriculture

Based on the information provided, there is no anticipated impact on prime or important farmland.

US Army Corp of Engineers

The Federal floodplain management criterion basically states that construction which could be damaged by floodwaters, or which could obstruct flood flows should not be located in the one percent (1%) annual chance floodplain. If this is not practicable, any residential construction that could be damaged by floodwater must be placed above the one percent (1%) annual chance floodwater surface elevation. Construction will be designed to minimize potential harm to or within the floodplain. Higher levels of protection will be identified to provide added safety. The lift station will be protected from at least the 500-year floodplain.

SD Office of Emergency Management

The proposed system changes in this area may affect a designated Special Flood Hazard Area (proposed project is located within an established A zone or regulatory floodway). Pennington County local government has the land use authority to approve or deny projects within their respective jurisdictions. Coordination with the County has taken place and the County is aware of the proposed project. Their adopted floodplain management ordinance will be followed.

State Historical Preservation Office

The SHPO/THPO consultation period is over for GVSD. No comments were received from THPO's. SHPO concurred with the finding of "No Adverse Effect" as long as the following mitigation measures are followed:

1. Site 39PN2007 (Railroad grade) is an eligible site and will be avoided. At Reservoir Road, the proposed sewer line will not extend north to the railroad bed. At Anderson Road and Highway 44, the proposed sewer line will stop south of the railroad bed at a terminal manhole. Any further service to the west of this manhole will be completed, by the developer, at such time the undeveloped area begins to develop.

2. Sites 39PN2272 and 39PN2313 (Little Giant and Cyclone irrigation ditches) will be directionally bored under where the proposed sewer line crosses and will be avoided by all other project activities.

   At Little Giant along Anderson Road, the proposed sewer line will run parallel with the ditch. The proposed sewer line will cross the irrigation ditch at Reservoir Road, Green Valley Drive, and Dunn Road and not Green Wood Drive. The Little Giant ditch is located just north of the GVSD boundary on Reservoir Road. The proposed sewer line will extend north to the boundary line and terminate. No crossing of the ditch will be required at this location.

   The Cyclone ditch crosses Reservoir Road just north of Sparrow Hawk Trail. The proposed sewer line will cross the ditch here to extend the proposed sewer line to the south. The ditch continues on the north side of Sparrow Hawk Trail, and the proposed sewer line will parallel the ditch on the south side. No crossing will be necessary at Sparrow Hawk Trail.

3. Site 39-PN2189 (South Side irrigation ditch) will be avoided by all project activities, and will be directionally bored under where the proposed sewer line crosses.

   The proposed sewer line will run parallel to the Southside ditch and is located on the north side of Southside Drive. An option does exist to locate the proposed sewer line on the south of Southside Drive if necessary.
   The Southside irrigation ditch crosses Southside Drive just east of Reservoir Road. The proposed sewer line is proposed to cross the ditch too service the homes along Reservoir Road north and south of Southside. There is no reason at this time to extend the proposed sewer line west of Reservoir Road. The undeveloped area in the northeast corner of Reservoir Road and Southside Drive will be the responsibility of a future developer to extend the proposed sewer line from the terminal manhole to east of the irrigation ditch.

4. Any other project activities changed or not submitted will include additional consultation (change in route, or staging areas).

5. Any historic properties found during project will be reported to SHPO within 48 hours.

Pennington County

The proposed project will require a Flood Plain Development Permit in Special Flood Hazard Areas (SFHA) within GVSD. No rise can occur in regulatory floodway and a “No-Rise Certification” will be required on any proposed encroachments. However, the lift stations have been located out of the floodway; so, a No-Rise will not be needed. Refer to Appendix O for

location and information of parcels. Also, all manholes will be solid rings and sealed to prevent infiltration.

These options have minimal impact on recreational opportunities at least in the short term. Long term: however, this option potentially reduces impairment of Rapid Creek, which would then potentially create a recreational use of Rapid Creek within GVSD. Refer to Appendix P for the Environmental Agency response letters.

Cultural Resource Inventory

A cultural resource inventory was conducted for the site. The report can be found in Appendix Q. The report identified two (2) properties that would need to be avoided during the proposed project. Both structures, PN00000997 (James Mid-Century Garage) located at 4600 Reservoir Road and PN00000998 (Johnson Shed) located at 4500 Reservoir Road, will be avoided by the proposed sewer line due to the line being placed in the northbound driving lane to avoid the structures all together.

V. SELECTED PLAN, DESCRIPTION, AND IMPLEMENTATION ARRANGEMENTS

A. Justification and Description of Selected Plan

The recommendation of this report is to select the pressure sewer collection system. The estimated costs are fairly similar to the other scenarios of the small diameter pressure system. See below for a breakdown:

	Gravity System	Pressure System
Monthly User Fee	$46.53	$42.87
Monthly Assessment	$268.64	$91.91
Total	$315.17	$134.78
First Annual Payment Factor	$26.86	$9.19
First 10 Years User Rate	**$342.03**	**$143.97**

A life cycle cost analysis was also reviewed for each alternative as a twenty (20) year present worth analysis that included operation & maintenance, salvage value, and short-lived assets. This cost analysis is based on the financial responsibilities of the borrower, GVSD as an entity.

The gravity sewer and pressure sewer alternatives focused on short lived asset costs (shown in breakdown below) and a financial audit five (5) years after the construction completion of the project. The future salvage value was estimated based on the cost of salvaged steel.

See below for a breakdown:

Present Worth Analysis & Short Lived Depreciation

Community Name: Green Valley Snitary District

Federal Discount Rate for Water Resources Planning (Interest Rate) i = 0.042
Number of Years, n = 20 years

Alternative 1: Gravity Sewer System		**Alternative 2:** Pressure Sewer System		**Alternative 3:**	
Initial Capital Costs =	$23,655,569	**Initial Capital Costs =**	$9,736,600	**Initial Capital Costs =**	$0
Annual Operations & Maintenance Costs =	$151,320	**Annual Operations & Maintenance Costs =**	$50,000	**Annual Operations & Maintenance Costs =**	$0
Future Salvage Value =	$8,000	**Future Salvage Value =**	$2,000	**Future Salvage Value =**	$0
Present Worth of 20 years of O & M =	$2,020,543	**Present Worth of 20 years of O & M =**	$667,639	**Present Worth of 20 years of O & M =**	$0
PW = Annual OM $*\frac{(1+i)^n-1}{i*(1+i)^n}$		**PW =** Annual OM $*\frac{(1+i)^n-1}{i*(1+i)^n}$		**PW =** Annual OM $*\frac{(1+i)^n-1}{i*(1+i)^n}$	
Present Worth of 20 yr Salvage Value =	$3,513	**Present Worth of 20 yr Salvage Value =**	$878	**Present Worth of 20 yr Salvage Value =**	$0
PW = FSV* $\frac{1}{(1+i)^n}$		**PW =** FSV* $\frac{1}{(1+i)^n}$		**PW =** FSV* $\frac{1}{(1+i)^n}$	
Alternate 1 Total Present Worth =	$25,672,599	**Alternative 2 Total Present Worth =**	$10,403,361	**Alternative 3 Total Present Worth =**	$0

Short Lived Depreciated Assets (items listed, life expectancy, are just examples, use your own data)

Item	Years of Life Expectancy	Number of Units	Replacement Cost	Funds to Set Aside Yearly
Lift Station Pumps	15	2	10000	$1,333
SCADA	10	1	6000	$600
Control Panel	15	1	3000	$200
Valves	20	4	2000	$400

Note:
This is not intended to include every piece of equipment in the system. It is to itemize the critical equipment or maintenance items that money should be set aside for via rates and charges.

No short lived assets with more than 15 years of life expectancy

As seen above, the gravity sewer system has the highest Present Worth value followed by the pressure system.

See below for a summary table using a one (1) to three (3) rating. A one (1) represents least ideal, a two (2) represents neutral, and a three (3) represents most ideal. The highest score was used to determine the recommended alternative.

Categories	Gravity Sewer	Pressurized Sewer
Regionalization	3	3
Constructability	1	2
Affordability	1	2
Ease of Maintenance	2	2
Score	7	9

To breakdown each category, the gravity sewer and the pressure sewer options scored the same because the systems would be taken over by another entity once the loan has been paid off and the raw sewage can flow into the City of Rapid City treatment plant.

For constructability, the gravity system was lower because there is high ground water throughout the area which means a high potential for dewatering during construction. The pressurize system was better because of the boring option, however, the installation of the pumping units on private properties will seem to be difficult.

For affordability, the pressurized system alternatives scored higher because the data showed that that option overall would be cheaper than the gravity system. However, none of the scenarios scored a three (3) because all alternatives are costly for the residents. Unfortunately, something needs to be done regarding the failing septic systems which is also a major cost to the land owner.

For ease of maintenance, the options scored the same because RVSD will operate and maintain either. RVSD already handles all water utilities.

The pressure sanitary sewer main is expected to be composed of two-inch (2”), three-inch (3”), four-inch (4”), and six-inch (6”) sewer main with one quarter inch (1-¼”) sewer services. The main will be placed along the road section to avoid existing utilities in the ditches. The benefit of this type of system is that most of the system can be directionally bored and not disturb the roadway above the line. The idea is to acquire easements along the property lines of Greenwood Lane and Green Oak Lane to avoid a creek crossing.

The wastewater will be transferred from each individual pumping unit installed on the homeowners’ property into the proposed sanitary sewer system.

There will be one (1) connection point to an adjacent mainline near Anderson Road and Highway 44 to the RVSD sewer main. This is different compared to the gravity option which has several proposed connections into the City of Rapid City sewer infrastructure. The pressurized aspect of this option allows the sewer to be carried to one (1) single point and eliminates the extra costs of the one (1) time City fee and the monthly connection fee.

This alternative replaces the existing failing septic tanks. Each pumping unit will be inserted into a ninety three-inch (93") underground tank. Homeowners will be tasked with maintaining these tanks.

Based on the floodplain and current development along Reservoir Road, the sewer main will only be placed a quarter mile north of Southside Drive and end with a manhole. There will be a sewer main south of Rapid Creek along Reservoir Road that will run parallel to the City of Rapid City's trunk line to pick up the three (3) homes directly south of the creek and one (1) just south of the large slough area. It is not cost feasible to run a line the entirety of Reservoir Road.

As a part of this project, each resident will be disconnected from their existing septic system and be connected to the sewer main. Each tank will be abandoned in place. This portion of the project will be directly funded by the SD DANR grant package.

The Rapid City Wastewater Treatment Facility is the most feasible option for treatment and the City has an amendment in the works with RVSD to operate and maintain the GVSD proposed system.

This option reduces one hundred percent (100%) of the septic systems within the GVSD. It eliminates the ground water contamination potential from failing septic systems and reduces the potential contamination of Rapid Creek. This option provides regionalization of smaller systems with larger ones as the direction SD DANR prefers to go versus having individual smaller treatment facilities.

This option also allows GVSD the ability to turn over the system at some point to another entity for ownership, operation, and maintenance of the system. GVSD does not have a full-time staff qualified to operate a collection system and or treatment facility. GVSD would need to hire staff or contract out operations and maintenance of the system.

A layout of the proposed system is included in Appendix L.

B. Design of Selected Plan

The Rapid Valley Sanitary District Design and Construction Standards, City of Rapid City Infrastructure Design Criteria, 10 States Standards, SD DANR Design Guidance and Pennington County Ordinance requirements will be used for design criteria on the proposed system.

GVSD intends to dedicate the system to RVSD upon debt retirement and, therefore, the proposed system must be designed with Rapid Valley's criteria in order for RVSD to assume ownership of the system following debt retirement.

C. Cost Estimates for the Selected Plan

The probable estimate of cost is included in Appendix M. The total project cost is $23,806,889. This includes the following:

- Engineer's Opinion of Probable Construction Cost with a ten percent (10%) contingency.
- Engineering Services
- Bidding Services
- Legal and Administrative Services
- Additional Services
  - Landowner Negotiations
  - Permitting Assistance
  - Special Assessment Assistance
  - Funding Administration
  - Extensive Geotechnical Exploration
- Rapid City Connection Fee
- Land Acquisition / Easement Procurement
- Short Term Asset Fund

The intention for this project is to fund the remaining project costs through USDA RD. There are costs included in the Probable Estimate Cost required by USDA RD to provide a true estimated cost of the project. These costs include the following:

- Full Time Construction Services
- Interim Financing Interest
- Financial Audit every Five (5) Years

SD DANR previously awarded GVSD with a consolidated grant in the maximum amount of two million dollars ($2,000,000 and a CWSRF grant in the maximum amount of three hundred seventy thousand dollars ($370,000).

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The total current funding amounts to $2,495,000. This report will assume the same grant award.

The assumption for a USDA RD loan would run forty (40) years with three percent (3.0%) interest rate.

With the assumption of two hundred eighty-four (284) assessments and zero (0) grant from USDA RD with a forty (40) year loan with 3% interest, the annual P&I will be as follows:

Probable Estimate of Cost	$9,786,600.00
SDDANR Grant Funds	($2,495,000.00)
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Accumulated Interest over 40-years	$5,237,740.00
Probable Estimate of Cost to be Assessed	$12,529,340.00
Amount per Assessment	$44,117.39
Amount per Assessment per Year	$1,102.93
Amount per Assessment per Month	**$91.91**

Each pumping unit will be the responsibility of the owner to maintain. The cost of operation and maintenance to the District includes a financial audit five (5) years after completion of the project and short lived assets to include two (2) pumps, a SCADA system, control panel, and valves all for the lift station.

The utility rate structure would be the same as residents of Rapid Valley with an additional eight dollars and fifty cent ($8.50) administration fee to cover O&M costs. RVSD's rate currently is $24.03 per first one thousand (1,000) gallons and $5.88 per one thousand (1,000) gallons after.

Based on the average per account of 115 gpd as stated above, the rate structure would be as follows:

115 gpd * 30 days =	3,450 gallons / month	
3,450 gpd x 80% =	2,760 sewer gallons / month	
	1,000 gallons =	$24.03
2,760 gallons – 1,000 gallons =	1,760 gallons	
	1,760 gallons / 1,000 gallons x $5.88 =	$10.34
Admin Fee =		$ 8.50
		$42.87

The total monthly cost per user that includes the RVSD utility rate and the assessment from the USDA RD loan with zero (0) grant from USDA RD is approximately **$134.78.**

As part of the USDA RD loan requirements is that GVSD accumulates a one (1) year loan reserve over a ten (10) period.

Annual Assessment per User	$1,102.93
Assessed over 10 Years	$110.29
Monthly Cost per User	**$9.19**

Monthly Cost per User for first 10-years **$143.97**

D. Environmental Impacts of Selected Plan

This option completely eliminates septic systems, which is documented to be contributing to ground water contamination and possibly to the impairment of Rapid Creek, or any type of underground tanks. During construction, there will be a short-term impact of additional dust and noise; however, this will be for a limited duration. Construction is generally located in the right-of-way, all of which have been disturbed previously, so no cultural or historical resources will be impacted.

The proposed project will have minimal or no impact to wetlands, wild and scenic rivers, fish, and wildlife. The project will be primarily located under surfaced roadways. There are no wild and scenic rivers located within the project.

There are identified wetlands within GVSD; however, the only wetland located within the construction area is along Reservoir Road. Final design will avoid the wetland if possible or reduce impact as much as possible. A wetland map is included in Appendix N.

This section of Rapid Creek is not listed as an impaired waterway by the "2022 South Dakota Integrated Report for Surface Water Quality Assessment".

Water quality is anticipated to improve due to the project. This section of Rapid Creek currently does not support immersion recreation due to Escherichia coli. This section also has an assigned TMDL.
The proposed project will remove septic systems, which is believed to be a contributing factor to the Rapid Creek impairment. With septic system removal, water quality is expected to improve which would be expected to improve fish and wildlife environments.

The project will have no impact on water use or quantity. GVSD is currently on a municipal water system.

SD DANR and USDA-RD funding requires several environmental agencies have the opportunity to review and comment on the proposed project. These agencies have been notified and provided the required review period. Agencies and responses include:

SD Air Quality Program

Based on the information provided, the proposed project will not cause a significant impact on the air quality in South Dakota and the project is approved. SD air quality regulations do require that facilities adding new electrical generators (before installation) purchase EPA certified systems for their specific operation. The Air Quality Program in Pierre will be contacted on how to comply with the air quality requirements if the project is approved for funding.

SD Surface Water Quality Program

Appropriate erosion and sediment control measures shall be installed to control the discharge of pollutants from the construction site. Authorization under the General Permit for Storm Water Discharges Associated with Construction Activities and a Surface Water Discharge permit shall be sought for if the project is approved for funding.

Impacts to tributaries, creeks, wetlands, and lakes shall be avoided. This project will cross and be in close proximity to Rapid Creek. This waterbody is classified by the South Dakota Water Quality Standards and Uses Assigned to Streams for the following beneficial uses:

(5) Warm water permanent fish life propagation water;
(11) Immersion recreation waters;
(12) Limited contact recreation waters;
(13) Fish and wildlife propagation, recreation, and stock watering waters;
(14) Irrigation waters.

Because of these beneficial uses, special construction measures may have to be taken to ensure that the thirty (30) day average total suspended solids criterion of 90 mg/L is not violated. No negative impacts to these uses are anticipated from the project.

Plans and specifications for the Wastewater Treatment Improvements will be submitted to SD DANR if the project is approved for funding.

SD Ground Water Quality Program

No adverse impacts to ground water quality is anticipated by this project. DANR has identified one (1) release case of petroleum and other chemicals in the vicinity of the project. The release information is enclosed in Table 1. However, the locational information provided to DANR regarding releases is sometimes inaccurate or incomplete.

In the event that contamination is encountered during construction activities or is caused by the construction activity, Rapid City, or its designated representative, will report the contamination to DANR. Any contaminated soil encountered or caused by the construction activities will be temporarily stockpiled and sampled to determine disposal requirements and the construction material used in the contamination area should be evaluated for chemical compatibility and adjusted accordingly.

Table 1 - Known releases that may impact the Green Valley Sanitary District Sewer Collection System, as of February 10, 2020.

DENR ID	Site Name	City	County	Street	Material	Status	R1	Latitude	Longitude
2001.707	ATP - Anderson Farm	Rapid City	Pennington	5610 Anderson Road (NE at Anderson Rd & creek)	Petroleum	NFA	KM	44.029029	-103.110667

Status: C = Closed, NFA = No Further Action, O/M = Open/Monitoring, I=Inactive, T=Tracking
R1 = DENR reviewer's initials

SD Game, Fish & Parks
Based on the information provided, there is no anticipated significant impact to fish and wildlife resources.

US Department of Agriculture
Based on the information provided, there is no anticipated impact on prime or important farmland.

US Army Corp of Engineers
The Federal floodplain management criterion basically states that construction which could be damaged by floodwaters or which could obstruct flood flows should not be located in the one percent (1%) annual chance floodplain. If this is not practicable, any residential construction that could be damaged by floodwater must be placed above the one percent (1%) annual chance floodwater surface elevation. Construction will be designed to minimize potential harm to or within the floodplain. Higher levels of protection will be identified to provide added safety. The lift stations will be protected from at least the 500-year floodplain.

SD Office of Emergency Management
The proposed system changes in this area may affect a designated Special Flood Hazard Area (proposed project is located within an established A zone or regulatory floodway). Pennington County local government has the land use authority to approve or deny projects within their respective jurisdictions. Coordination with the County has taken place and the County is aware of the proposed project. Their adopted floodplain management ordinance will be followed.

State Historical Preservation Office
The SHPO/THPO consultation period is over for GVSD. No comments were received from THPO's. SHPO concurred with the finding of "No Adverse Effect" as long as the following mitigation measures are followed:

1. Site 39PN2007 (Railroad grade) is an eligible site and will be avoided. At Reservoir Road, the proposed sewer line will not extend north to the railroad bed. At Anderson Road and Highway 44, the proposed sewer line will stop south of the railroad bed at a terminal manhole. Any further service to the west of this manhole will be completed, by the developer, at such time the undeveloped area begins to develop.

2. Sites 39PN2272 and 39PN2313 (Little Giant and Cyclone irrigation ditches) will be directionally bored under where the proposed sewer line crosses and will be avoided by all other project activities.

   At Little Giant along Anderson Road, the proposed sewer line will run parallel with the ditch. The proposed sewer line will cross the irrigation ditch

at Reservoir Road, Green Valley Drive, and Dunn Road and not Green Wood Drive. The Little Giant ditch is located just north of the GVSD boundary on Reservoir Road. The proposed sewer line will extend north to the boundary line and terminate. No crossing of the ditch will be required at this location.

The Cyclone ditch crosses Reservoir Road just north of Sparrow Hawk Trail. The proposed sewer line will cross the ditch here to extend the proposed sewer line to the south. The ditch continues on the north side of Sparrow Hawk Trail, and the proposed sewer line will parallel the ditch on the south side. No crossing will be necessary at Sparrow Hawk Trail.

3. Site 39-PN2189 (South Side irrigation ditch) will be avoided by all project activities, and will be directionally bored under where the proposed sewer line crosses.

   The proposed sewer line will run parallel to the Southside ditch and is located on the north side of Southside Drive. An option does exist to locate the proposed sewer line on the south of Southside Drive if necessary.

   The Southside irrigation ditch crosses Southside Drive just east of Reservoir Road. The proposed sewer line is proposed to cross the ditch too service the homes along Reservoir Road north and south of Southside. There is no reason at this time to extend the proposed sewer line west of Reservoir Road. The undeveloped area in the northeast corner of Reservoir Road and Southside Drive will be the responsibility of a future developer to extend the proposed sewer line from the terminal manhole to east of the irrigation ditch.

4. Any other project activities changed or not submitted will include additional consultation (change in route or staging areas).
5. Any historic properties found during project will be reported to SHPO within forty-eight (48) hours.

Pennington County

The proposed project will require a Flood Plain Development Permit in Special Flood Hazard Areas (SFHA) within GVSD. No rise can occur in regulatory floodway and a “No-Rise Certification” will be required on any proposed encroachments. However, the lift stations have been located out of the floodway; so, a No-Rise will not be needed. Refer to Appendix O for location and information of parcels. Also, all manholes will be solid rings and sealed to prevent infiltration.

These options have minimal impact on recreational opportunities at least in the short term. Long term however, this option potentially reduces impairment of Rapid Creek, which would then potentially create a recreational use of Rapid Creek within GVSD. Refer to Appendix P for the Environmental Agency response letters.

Cultural Resource Inventory

A cultural resource inventory was conducted for the site. The report can be found in Appendix Q. The report identified two (2) properties that would need to be avoided during the proposed project. Both structures, PN00000997 (James Mid-Century Garage) located at 4600 Reservoir Road and PN00000998 (Johnson Shed) located at 4500 Reservoir Road, will be avoided by the proposed sewer line due to the line being placed in the northbound driving lane to avoid the structures all together.

E. Arrangements for Implementation

1. GVSD Bylaws Discussion

   The topic was discussed with RD whether or not GVSD bylaws allowed GVSD to construct a sanitary sewer system and contract out maintenance of the system. The following bylaws outline that GVSD is able:

   34A-5-34. Contracts with municipalities for sewage treatment and disposal. The board of trustees may enter into contracts with any municipality for the purpose of using the facilities of the municipality for the treatment and disposal of sewage of the district or making the facilities of the district available to the municipality.

   34A-5-51. Contracts of consolidated district for purchase or use of sanitary facilities. A consolidated sanitary district may contract with any municipality or sanitary district, within or outside its corporate limits, for the purchase of facilities of the type which it is authorized to construct or acquire and operate, or may contract for the use of such facilities, and for the use of consolidated sanitary district facilities by another municipality or sanitary district, upon such terms as may be agreed. GVSD bylaws can be found in Appendix R.

2. Inter-Municipal Service Agreements

   The proposed project will require inter-municipal agreements. GVSD has executed an agreement with the with RVSD. As part of this agreement, RVSD will operate and maintain the system for GVSD and do meter reading and billing for GVSD. GVSD will receive no revenue from the sewer system. GVSD will develop a special assessment to pay the debt on the sanitary sewer system. A copy of the executed agreement between RVSD and GVSD is included in Appendix E.

   GVSD sewer will be treated by the City of Rapid City. The City of Rapid City has stated their treatment plant has the capacity to treat the GVSD sewer and the City of Rapid City is the process of amending their contract with RVSD to service GVSD. See Appendix F for approval letter.

Also attached is the agreement between RVSD and the City of Rapid City. See Appendix T for the signed agreement.

GVSD currently has decided that they do not wish to assess properties that do not have homes on them which has decreased the number of lots to two hundred eighty-four (284). As homes connect onto the proposed sewer line, they will be assessed then.

Once the loan on the sewer system is paid, GVSD intends to turn the sanitary sewer system over to Rapid Valley at no cost as part of the agreement.

GVSD plans to design and construct the proposed system per the design criteria of Rapid Valley, which will require plan approval through the RVSD and the City of Rapid City, as well as, SD DANR and Pennington County.

The proposed construction occurs within county right-of-way, which will require approval from Pennington County Highway.

3. Operation and Maintenance Requirements
   GVSD has negotiated an agreement with the RVSD for the operation and maintenance of the proposed system. Based on this agreement, the no operation or maintenance costs will be built into the user fee.

4. Pre-treatment Program
   The proposed collection system does not include a pre-treatment component.

5. Permits Required (Conditional Use, etc.)

   SD DANR Storm Water Pollution Prevention Plan (SWPPP) (1 AC plus disturbed):

   The total area of the project being disturbed will exceed one (1) AC so a SD DANR permit will be required. Based on the length of pipe installed and assuming a twenty-foot (20') wide disturbed area, the total area disturbed will be approximately twenty-four (24) AC.

   Pennington County grading, right-of-way, and floodplain development permits will be required for the project.

F. Land Acquisition

1. General Acquisition

   The proposed sewer collection system will be in highway right- of-way except for the area and no land acquisition is expected.

   During construction, there will need to be temporary construction easements or owner agreements to allow the contractor to install the pumping units and abandon the existing private septic systems which will be conducted during the design phase when specific pumping unit locations are determined.

G. Community Engagement

Green Valley Sanitary District has been informing the public regarding this project by giving updates at their monthly Board meeting. The Board will continue to provide updates and information throughout the project. As a part of this initial PER process, the Green Valley board also posted in the local newspaper regarding this project.

To pay back the loan portion of this project, Green Valley will be putting its residents on a Special Assessment tax through the County, like how to water infrastructure project is being paid back. The Special Assessment must be approved in a public meeting for the project to move forward.