COLORADO
Department of Public Health & Environment

Water Pollution Control Project Needs Assessment (PNA) Form
Water Quality Control Division

1. Applicant Information:

Entity Name	St. Mary's Glacier Water and Sanitation District				
Facility Name:	St. Mary's Glacier Water and Sanitation District			Original ID:	
Mailing Address 1:	PO Box 1529	Mailing Address 2:		County:	
City:	Idaho Springs	State:	CO	Zip Code:	80452
Property Address 1:	PO Box 1529	Property Address 2:		County:	
City:	Idaho Springs	State:	CO	Zip Code:	80452
Latitude :	39.7517291	Longitude :	-104.992107		
Name of Project:	Wastewater Infrastructure Improvements Project				

Type of Project (Check all that apply)

- ☑ Treatment
- ☐ Construction project resulting in increase or decrease in design capacity of existing wastewater treatment plant
- ☐ Modification of wastewater treatment plant that will not result in a change to treatment capacity
- ☐ New or relocated wastewater treatment plant outfall
- ☐ New or expansion of lift station
- ☐ Collection system (gravity sewer mains less than 24-inches in diameter)
- ☑ New interceptor (24-inch diameter or larger pipeline)
- ☑ In-Kind Replacement (Replacement of any process or hydraulic treatment conveyance component with an identical or similar component. Usually in cases where equipment has reached end of life and replacement is necessary to maintain compliance)
- ☐ Stormwater
- ☐ Non-Point Source Discharge

Please enter the following information for your organization if you have it. Visit http://fedgov.dnb.com/webform and https://www.sam.gov/portal/public/SAM/ for details. Note: you will be required to obtain both of these items prior to loan execution.

Owner Information:

First Name:	Jimmy	Middle Name:	F	Last Name:	Nikkel
Phone Number:	970-669-3611				
Mailing Address1:	550 W. Eisenhower Blvd.		Mailing Address2:		
City:	Loveland	State:	CO	Zip Code:	80537
E-mail:	jimn@pinnacleconsultinggroupinc.com				

Consulting Engineer Information:

First Name:	Craig	Middle Name:		Last Name:	Matsuda

Phone Number:	303-971-0030				
Mailing Address1:	12596 W. Bayaud Ave. Ste.330		Mailing Address2:		
City:	Lakewood	State:	CO	Zip Code:	80228
E-mail:	craig.matsuda@lamprynearsonc.om				

Self-Certification:

☑ Yes ☐ No Does the system intend to self-certify all or a portion of the project?

If yes, please identify the portions of the project that the system will self-certify.

☑ Collection system piping

Provide additional explanation, if necessary:

By design criteria definition, there are no existing "interceptor sewers." The collection system improvements include rehabilitation and replacement of portions of the existing 8- and 12-inch gravity sewer.

All wastewater treatment facility improvements, such as replacement of blowers, pumps, and clarifier mechanism, will be self-certified.

Streamlined Review:

☑ Yes ☐ No Does the system intend to use the streamlined review process for all or a portion of the project?

If yes, please identify the portions of the project that the system will utilize streamlined review process.

☑ Wastewater treatment new construction or modifications that do not include an alternative technology

Yes No Does the system intend to use the streamlined review process for all or a portion of the project?

2. Executive Summary

Significant infiltration and inflow (I&I) into the collection system, discharge permit compliance schedules, aging wastewater treatment facility (WWTF) infrastructure, and public health and safety concerns necessitate this project.

Compliance
The following improvements are prioritized to bring the WWTF into compliance with the discharge permit and electrical and building related codes:
Install a tertiary treatment system (chemical feed and media filter) for removal of metals to satisfy future limitations;
Install new influent and effluent flow monitoring equipment to record WWTF flows;
Install proper HVAC in the WWTF building;
Install backup power generator to provide emergency power to essential WWTF equipment;
Clean and reline the lagoon;
Replace corroding and damaged electrical equipment; and
Relocate chemical feed and storage into separate rooms from electrical equipment.

Public Health and Safety
The health and safety of facility personnel is of utmost importance. The following improvements are intended to provide staff a safe working environment:
Reconfigure the sump pump design with a local control panel and automated lead-lag pumping system to prevent flooding of the basement and potential electrical shock related hazards. The sump pumps will be connected to the backup power generator so they continue to operate during power outages;
Install proper HVAC in the WWTF building;
Replace the existing headworks with a new masonry headworks building with proper ventilation and access;
Construct building addition on the south end of the existing building to house relocated chemical feed equipment and storage, backup power generator, and storage area; and
Replace electrical equipment that is currently corroded and a risk to operate.

Improved Operations and Maintenance
Ease of access, operation, and maintenance of the WWTF is crucial for improved equipment life and efficiency, and reduced operating costs. The following priorities are included to improve

3.System Structure and Operation

3.1 Legal Ownership of System (TMF: Managerial-1)

First Name:	St. Mary's Glacier Water and Sanitation District				
Mailing Address1:	550 W. Eisenhower Blvd.		Mailing Address2:		
City:	Loveland	State:	CO	Zip Code:	80537
Phone Number:	970-669-3611	Fax:			

3.2 Organizational Chart

Include an Organizational Chart as Attachment 2.

3.3 Current Operator in Responsible (ORC) Charge

First Name:	Gabrielle	Middle Name:		Last Name:	Begeman		
Certification Number:	10679	Certification Expiration Date:					
Operator Certification Level (check one)	☐ Staff Operator	☑ Contract Operator					
Treatment	☐ Class D	☐ Class C	☐ Class B	☑ Class A			
Distribution	☑ Class 4	☐ Class 3	☐ Class 2	☐ Class 1			
Combined Treatment/Distribution	☐ Class S						

3.4 Operator Certification

☑ Yes ☐ No Do the system operators have adequate operator certification levels for the proposed project as defined by Regulation 100 Water and Wastewater Facility Operators Certification Requirements?

Explain the impact of the proposed project on the required operator in responsible charge (ORC) certification level and other predicted staffing changes.

The proposed project will have no impact on the system's certification level and are not anticipated to increase staffing requirements.

3.5 20-year cash flow projection

Include a copy of the 20-year cash flow projection as Attachment 4.

4. Project Purpose and Need

Discuss the issue or concern that the proposed project will address. Specific issues are outlined below. All issues must be discussed in each sub section below even if they are not the project driver.

4.1 Compliance

Summarize the system's compliance status that necessitates the proposed project.

The facility currently meets the discharge permit requirements. The discharge permit has a compliance schedule for metals requiring discharge limitations for cadmium, copper, lead, and zinc (all dissolved) starting October 1, 2020. Currently, the facility is required to report effluent metals concentrations on a quarterly basis. Per the reported DMR data, concentrations of lead and copper have exceeded the future October 1, 2020 discharge limitations. It is suspected that lead and copper are leaching from the distribution system, or possibly sourced from I/I and ultimately flowing to the WWTF. Under a separate project, a corrosion control program will be added to the water distribution system. Future metals limitations necessitate WWTF improvements.

4.2 Existing facility limitations

Summarize existing water system facility(ies) limitations that necessitate the proposed project.

The existing equipment installed when the conventional activated sludge wastewater facility was constructed in year 2000 is approaching the end of their useful service life. Other issues include:
~Significant collection system I&I.
~Influent flow measurement weir is undersized for peak flow events. No effluent flow meter
~No mechanical screening. An ineffective manually cleaned perforated plate is installed that allows solids to pass and causes maintenance issues such as clogging RAS/WAS pumps.
~The headworks lack proper HVAC and does not satisfy code.
~Aeration basin diffusers, mixers, and blowers are approaching the end of their useful service life and lack controls (i.e. no dissolved oxygen sensors and automated variable speed operation of blowers).
The blowers are manually operated at a constant speed and not adjusted daily, leading to inefficient operation. With potential WWTF rerating, the blowers may also require upsizing.
~Secondary clarification equipment is approaching the end of its useful life and does provide appropriate surface skimming.
~Piping gallery in basement of building is corroded and some associated valving is in poor or inoperable condition and requires replacement.
~Chemical feed pumps are not automatically flow-paced and are inefficient when influent flows fluctuate. Chemical storage needs to be relocated to prevent freezing and to bring up to building code.
~Process building chemical feed and storage area is shared with electrical control equipment without proper HVAC.
~Power issues from XCEL. No onsite back-up power generation is available.
~Influent and effluent automatic samplers require replacement.
~Facility could benefit from an improved SCADA system with more alarms and automated controls.

4.3 Operations and Maintenance Issues

Summarize operational and maintenance (O&M) issues with the existing water facilities.

Wastewater O&M issues include:
~No mechanical screen is available. An ineffective 1/2-in perforated plate is installed that allows solids to pass that negatively impact downstream pump and other equipment operation.
~Headworks does not have appropriate ventilation and is a safety hazard.
~The valves in the piping gallery in the building basement are in poor condition and inoperable.
~No onsite back-up power generation is available.
~RAS/WAS pumps are constant speed pumps subject to plugging and operational problems due to solids passing the perforated plate.
~The existing alarms and autodialer are not functional.
~The secondary clarifier equipment is aged and does not provide proper surface skimming.
~The WWTF is operated manually and lacks efficiency and automation in the operation of blowers and RAS/WAS pumps.
~Chemical feed pumps are not automatically flow paced and existing chemical storage is subject to freezing due to lack of HVAC.
~Chemical storage, building electrical, and HVAC systems are inadequate and need to be brought up to code.
~The collection system has severe I&I issues that need to be addressed.

5. Existing Facilities Analysis

5.1 Existing Source Water– Section required for treatment and supply projects

☐ Not applicable (for collection system piping, lift stations, interceptors, only)

Existing Permitted Treatment Capacity: Flow: 0.6 MGD Loading: Pounds per Day BOD5

5.1.1 Area Discharge Permits

Identify all other discharge permits for facilities discharging to the same stream segment as the existing treatment facilities.

The facility discharges to stream segment COSPCL09a. Per Regulation 38, the WWTF is the only discharger to the stream segment.

5.1.2 Service Area

Describe the existing service area including residential, commercial and industrial users, as well as flows and loads from the service area.

The service area has an estimated population of 316 people, comprised of 255 residences, one condominium with 31 units, and one commercial entity (bed and breakfast with eight rooms). It should be noted that the service area includes transient residences occupied for only portions of the year. There are no industrial users. From 2014, the average 30-day influent flows reported range from 0.0053 mgd to 0.220 mgd, with an annual average of 0.0375 mgd (6.3% of hydraulic capacity). Average 30-day influent organic loadings are 58 ppd BOD5 (185 mg/l BOD5 based on average 0.0375 mgd flow, 83% of organic capacity).

5.1.3 Facilities Layout and Description

Describe existing facilities including design capabilities and conditions of existing treatment processes including treatment processes used and major design parameters (e.g. process capacities, unit loading rates, side stream flows, and solids handling).

The service area has an estimated population of 316 people, comprised of 255 residences, one condominium with 31 units, and one commercial entity (bed and breakfast with eight rooms). It should be noted that the service area includes transient residences occupied for only portions of the year. There are no industrial users. From 2014, the average 30-day influent flows reported range from 0.0053 mgd to 0.220 mgd, with an annual average of 0.0375 mgd (6.3% of hydraulic capacity). Average 30-day influent organic loadings are 58 ppd BOD5 (185 mg/l BOD5 based on average 0.0375 mgd flow, 83% of organic capacity).

5.1.4 Existing Process Flow Diagram

Provide a process flow diagram of the existing treatment system as Attachment 5.

5.1.5 Wastewater Flows

Please describe the existing wastewater flows and influent characteristics (including toxic pollutants), discharge permit limits, and overload conditions. Discuss and analyze the average, peak, dry, and wet weather flows. Describe flow contributions from residential, commercial, and industrial users, as well as infiltration and inflow.

Data summarized below was collected by the District and submitted in DMR's since 2014. The service area is comprised of single-family and condominium residential contributors and one commercial contributor (bed and breakfast). I&I is an issue being addressed through this project. The District suspects that I&I contributes up to approximately 60% of the influent flow to the WWTF during runoff months (May, June, July, and August).

Influent:
~0.0375 mgd annual average daily flow (0.6 mgd hydraulic capacity)
~0.220 mgd max 30-day average flow (this single event is considered an outlier since the next greatest MMF is 0.0453 mgd)
~0.300 mgd max day flow
~0.150 mgd peak hour flow (based on AADF and assumed peaking factor of 4.0)
~58 ppd BOD5 average (185 mg/l BOD5 based on average 0.0375 mgd flow)(70 ppd BOD5 organic capacity)
~No influent ammonia data is available.
~No metals influent data is available. It is suspected that I&I and distribution system corrosion are the source of metals in the WWTF influent.

Effluent:
~7.79 mg/l BOD5 annual average (30 mg/l limit)
~10.8 mg/l TSS annual average (30 mg/l limit)
~1.01 mg/l ammonia annual average
~0.096 ug/l Cd annual average (0.15 ug/l limit starting October 1, 2020)
~53.3 ug/l Cu annual average (2.7 ug/l limit starting October 1, 2020)
~0.233 ug/l Pb annual average (0.54 ug/l limit starting October 1, 2020)
~32.7 ug/l Zn annual average (46 ug/l limit starting October 1, 2020)

5.1.6 Appropriateness of Treatment Technologies

Discuss if the existing treatment process(es) are appropriate to meet the current discharge permit considering existing influent quality and discharge permit limits.

The existing treatment processes are appropriate for meeting all current discharge permit limitations. The existing treatment processes will require significant capital and operational improvements to remove metals to meet future discharge limitations. The addition of a corrosion control process for the distribution system (in separate project) will reduce the overall concentration of metals in the influent wastewater, however additional treatment processes for metals removal at the WWTF are still anticipated to be necessary.

5.1.7 Capacity of Treatment Technologies

☑ Yes ☐ No Is the capacity of the existing wastewater treatment system appropriate to accommodate wastewater flows through the next 20 years?

Please explain:

The facility has sufficient hydraulic capacity, but has historically exceeded the current 70 ppd BOD5 organic capacity. The facility's hydraulic capacity will be derated and organic capacity will be increased. The facility's aeration basins were sized for the ultimate organic loading of 360 ppd BOD5; however, the blower equipment will need to be upgraded to meet greater than 70 ppd BOD5 loadings.

The WWTF was designed and constructed in the year 2000 for a service area build-out population of 1,800 people and 0.6 mgd design flow (which includes I&I). The service area population in the 2010 census was 283 at an annual growth rate of approximately 1.2%. The current estimated population is 316 people. At the 1.2% rate of growth, the 2039 population is estimated to be 404 people. Between 2014 and present day, the average influent flow is 0.0375 mgd, or 119 gpcd. At this average flow per capita, the 20-year projected flow is approximately 0.050 mgd (only 8% of WWTF hydraulic capacity)

The collection system is comprised of 4-inch PVC service lines and 8-, 10-, and 12-inch vitrified clay pipe (VCP) mains. The slope of the gravity flow collection system pipe is unknown. A 12-inch main can convey 1.06 mgd at the 10 State Standards minimum slope of 0.0022%, well in excess of projected 20-year peak flows. Without further data on the existing collection system, the capacity of the system appears to be sufficient for all current and future flows.

5.1.8 Operational Controls

Describe if the existing treatment processes have appropriate operational controls.

The WWTF is currently operated manually by the Operations Staff and lack appropriate controls to optimize the treatment system. The WWTF requires several operational control improvements. The following is a summary of current controls:
~Manually cleaned perforated plate (no mechanically cleaned screen)
~Influent flow measured by ultrasonic sensor and trapezoidal flume.
~Aeration system has a non-functional timer control system that should be replaced with DO controls. One aeration basin lacks a mixer. Blowers are operated at constant speed and not flow-paced or DO controlled.
~Secondary clarifier lacks appropriate surface skimming and requires operators to manually removed scum.
~RAS/WAS pumps are constant speed and manually operated in on/off mode, and are therefore not flow-paced.
~Chemical feed pumps are constant speed and manually operated. The lack of flow-paced controls results in inefficient use of chemicals. No level indicators are available to monitor the quantity of chemical remaining.
~No backup power generator.
~Influent and effluent automatic samplers are in need of replacement.

5.2 Collection - Required for collection system, lift station, and interceptor projects only

☑ Not applicable (for treatment and outfall projects, only)

6.Facility Planning Analysis

6.1 Planning Area Description

6.1.1 Project Area Map
Provide a map or maps showing the current and projected service area for the 20-year planning period; identify environmental features such as streams, lakes, wetlands, and floodplains for the entire planning area. On the map, identify the locations of municipal and industrial treatment plants, sludge management areas and facilities, pretreatment plants, lift station sites and any significantly developed areas served by onsite or unconventional systems. Include the map as Attachment 7.

6.1.2 208 Plan Coordination

☐ Yes ☐ No Is the project within or near the boundaries of a 208 Agency or regional council of governments (COG)?

6.1.3 Local and Regional Issues

☑ Yes ☐ No Were local and regional planning efforts considered?

Please describe.

The service area is isolated from neighboring communities and is maintained by SMGWSD. There is no 208 Agency and Clear Creek County defers planning reviews to CDPHE. Planning efforts for the collection system and WWTF improvements will be completed by SMGWSD.

☐ Yes ☑ No Was consolidation with another wastewater system / treatment facility considered?

Please describe.

Consolidation was not considered due to the distance between the WWTF and neighboring facilities (Idaho Springs, Blackhawk, Empire).

6.2 Population and Water Demand Projections (TMF: Technical-2)

For a 20 year planning period, forecast the population growth, projected increase in Equivalent Residential Taps (ERT), and projected drinking water demands.

Current SFEs - As Calculated in the Prequalification Form: 196

Population and Demand Projections - The department generally accepts two methodologies for projecting water flows over the 20 year planning period. Other methodologies are acceptable with a clear explanation and all assumptions and parameters listed:

☑ Method 1: Population based projections. Recommended for primarily residential systems and/or for systems without potable water meter data.

☐ Method 2: Equivalent Residential Unit (EQR) Analysis. Recommended for systems with a high multifamily, commercial, and industrial users.

Method 1 and 2 templates can be found at the end of this form.
Attach the population projection as Attachment 8.

Discuss supporting data and reasons for projected future growth during the 20 year planning period.
Note: Projects designed solely to serve future development or population growth are not eligible for State Revolving Fund financing.

The WWTF was designed and constructed in the year 2000 for a service area build-out population of 1,800 people and 0.6 mgd design flow. The service area population in the 2010 census was 283 at an annual growth rate of approximately 1.2%. The service area has a current estimated population of 316 people, comprised of 255 residences, one condominium with 31 units, and one commercial entity (bed and breakfast with eight rooms). It should be noted that the service area includes transient residences occupied for only portions of the year. There are no industrial users. At a 1.2% growth rate, the 20-year projected population is 404 people.

This project is focused on improved operation and maintenance at the WWTF to meet discharge limitations. This project is not designed solely to serve future development or population growth. The population is steady and significant growth is not anticipated. The WWTF has sufficient rated capacity to handle flow from the 20-year projected population of 404 people.

Identify waste load projections for major effluent parameters such as BOD, TSS, ammonia, phosphorus, metals, etc.

Average effluent concentrations based on 0.0375 mgd influent flow:
~7.79 mg/l BOD5 annual average (30 mg/l limit)
~10.8 mg/l TSS annual average (30 mg/l limit)
~1.01 mg/l ammonia annual average
~0.096 ug/l Cd annual average (0.15 ug/l limit starting October 1, 2020)
~53.3 ug/l Cu annual average (2.7 ug/l limit starting October 1, 2020)
~0.233 ug/l Pb annual average (0.54 ug/l limit starting October 1, 2020)
~32.7 ug/l Zn annual average (46 ug/l limit starting October 1, 2020)

7.Assessment of Alternatives

This section should contain a description of the reasonable alternatives that were considered in planning a solution to meet the identified needs. If the proposed project includes new technology then the please discuss whether or not the technology is covered in the CDPHE Design Criteria.

7.1 Alternatives

For each alternative, please provide:
1. A description of the alternative addressing the issues identified in Section 4: Project Purpose and Need. (TMF: Technical-7)
2. Capital cost estimates and annual operation and maintenance costs.
3. Advantages and Disadvantages of each alternative.

Alternative 1 Title : Compliance, Health, and Safety Driven Improvements

Alternative 1 Description (2000 character limit):

The following improvements are prioritized to bring the WWTF into compliance with the discharge permit, WWTF inspection, and electrical and building related codes:
□Further monitor and evaluate influent BOD5 loadings against current rated capacity;
□Install a tertiary treatment system (chemical feed and media filter) for removal of metals to satisfy future limitations;
□Install new influent and effluent flow monitoring equipment to record WWTF flows;
□Install proper HVAC in the WWTF building;
□Install backup power generator to provide emergency power to essential WWTF equipment;
□Clean and reline the lagoon;
□Replace corroding and damaged electrical equipment; and
□Relocate chemical feed and storage into separate rooms from electrical equipment.

The health and safety of facility personnel is of utmost importance. The following improvements are intended to provide staff a safe working environment:
□Reconfigure the sump pump design with a local control panel and automated lead-lag pumping system to prevent flooding of the basement and potential electrical shock related hazards. The sump pumps will be connected to the backup power generator so they continue to operate during power outages;
□Install proper HVAC in the WWTF building;
□Replace the existing headworks with a new masonry headworks building with proper ventilation and access;
□Construct building addition on the south end of the existing building to house relocated chemical feed equipment and storage, backup power generator, and storage area; and
□Replace electrical equipment that is currently corroded and a risk to operate.

Alternative 1 Capital and Operation and Maintenance Costs (2000 character limit):

See Attachment 9

Alternative 1 Advantages and Disadvantages (2000 character limit):

See Attachment 9. The proposed improvements are prioritized because they are anticipated to provide the greatest value to the project within the District's estimated construction budget.

Alternative 2 Title : Operation and Maintenance Improvements

Alternative 2 Description (2000 character limit):

Ease of access, operation, and maintenance of the WWTF is crucial for improved equipment life and efficiency, and reduced operating costs. The following priorities are included to improve the facility's operations and maintenance:
□Install a proper headworks mechanical screen to eliminate large debris that are currently clogging the RAS/WAS pumps and requiring constant Operations staff maintenance;
□Install a grit removal system to prolong the life of downstream equipment;
□Replace corroded and aged return activated sludge and aeration piping;
□Replace blowers with higher efficiency units equipped with VFDs to provide operational flexibility to optimize the aeration system. The VFDs will also provide added protection against the low-phase voltage and brownouts;
□Replace clarifier equipment, adjust weirs for improved operation, and add skimmer for automatic scum removal;
□Provide storage space in the building addition to accommodate the District's hydro-jetter and spare parts;
□Install a Supervisor Control and Data Acquisition (SCADA) system and related instrumentation and controls (DO probe in aeration basins, alarms) to automate the WWTF operation. Doing so will reduce the time and labor required to operate the facility and help optimize the facility's operation, leading to money saving efficiencies.
□Install new influent and effluent flow monitoring equipment. Tie into SCADA system for automated data recording;
□Re-grade the driveway into the WWTF site for easier access by all vehicle types;
□Purchase a new maintenance truck with plow, storage boxes, hitch and other accessories to properly maintain and access WWTF site, roadways, and collection system during inclement weather, and;
□Relocate and install a new hot water heater.

Alternative 2 Capital and Operation and Maintenance Costs (2000 character limit):

See Attachment 9

Alternative 2 Advantages and Disadvantages (2000 character limit):

See Attachment 9. The proposed improvements are prioritized because they are anticipated to provide the greatest value to the project within the District's estimated construction budget.

Alternative 3 Title : Collection Systems Improvements

Alternative 3 Description (2000 character limit):

The sanitary sewer collection system is comprised of:
- Primarily original VCP pipe, with approximately 1,300-ft of replaced or sliplined pipe.
- 41,900-ft 8” pipe
- 2,270-ft 10” pipe
- 2,180-ft 12” pipe
- 46,350-ft total collection system.
- 159 manholes

Alternative 3 Capital and Operation and Maintenance Costs (2000 character limit):

See Attachment 9

Alternative 3 Advantages and Disadvantages (2000 character limit):

See Attachment 9. The proposed improvements are prioritized because they are anticipated to provide the greatest value to the project within the District's estimated construction budget. CCTV is proposed in the sewer segments indicated in the attached map to evaluate if CIPP or remove and replace construction methods are required. These sewer lines are prioritized in the collection system improvements.

Provide discussions of additional alternatives as Attachment 19.

8. Selected Alternative

8.1 Justification of Selected Alternative

Please demonstrate why the selected alternative best meets system needs based on both monetary and non-monetary considerations.

See Attachment 9 - The proposed improvements includes all improvements listed in the three alternatives above.

8.2 Technical Description and Design Parameters

For the selected alternative, please describe all proposed project components and assumed design parameters.

Compliance with the discharge permit designed to code and CDPHE design criteria.
The following improvements are prioritized to bring the WWTF into compliance with the discharge permit and electrical and building related codes:
- Install a tertiary treatment system (chemical feed and media filter) for removal of metals to satisfy future limitations;
- Install new influent and effluent flow monitoring equipment to record WWTF flows;
- Install proper HVAC in the WWTF building;
- Install backup power generator to provide emergency power to essential WWTF equipment;
- Clean and reline the lagoon;
- Replace corroding and damaged electrical equipment; and
- Relocate chemical feed and storage into separate rooms from electrical equipment.

Public Health and Safety
The health and safety of facility personnel is of utmost importance. The following improvements are intended to provide staff a safe working environment:
- Reconfigure the sump pump design with a local control panel and automated lead-lag pumping system to prevent flooding of the basement and potential electrical shock related hazards. The sump pumps will be connected to the backup power generator so they continue to operate during power outages;
- Install proper HVAC in the WWTF building;
- Replace the existing headworks with a new masonry headworks building with proper ventilation and access;
- Construct building addition on the south end of the existing building to house relocated chemical feed equipment and storage, backup power generator, and storage area; and
- Replace electrical equipment that is currently corroded and a risk to operate.

Improved Operations and Maintenance
Ease of access, operation, and maintenance of the WWTF is crucial for improved equipment life and efficiency, and reduced operating costs. The following priorities are included to improve the facility's operations and maintenance:
- Install a proper headworks mechanical screen to eliminate large debris that are currently cl

8.3 Proposed Process Flow Diagram

Include a proposed treatment facility process flow diagram or map of the collection system, lift station, or interceptor, as applicable as Attachment 10.

8.4 Appropriateness of Treatment Technologies

Discuss appropriateness of the proposed treatment process(es) to meet proposed discharge limits considering anticipated influent wastewater quality.

The only new equipment/treatment processes proposed for this project are mechanical screening and tertiary treatment for metals removal. Mechanical screening is standard for removal of solids before the secondary wastewater treatment processes. The aeration system will be upgraded with DO and VFD controls to optimize and automate treatment while satisfying discharge limitations.

Corrosion control efforts are being implemented by the District (separate project) to reduce the concentration of metals (primarily copper) leached out of the distribution system and conveyed to the WWTF. Even with corrosion control in the distribution system, influent WWTF metals concentrations are still anticipated to be greater than future discharge limitations and will require removal through a tertiary treatment system (chemical addition and filtration).

8.5 Environmental Impacts

Describe direct and indirect impacts on floodplains, wetlands, wildlife habitat, historical and archaeological properties, etc., including any projected permits and certifications. Indicate the need for a stormwater permit application, 401/404 permit applications, and CDOT and railroad permit applications.

Per FEMA, there are no floodplains in the project area. Per the attached NWI map, there are wetlands located in the vicinity of the project. The only known historical property is the Alice School House which will not be negatively impacted by the Project. No stormwater, 404, CDOT, or railroad permits are anticipated. Archaeological discoveries will be reported if encountered during the Project. These conditions will be evaluated in greater detail when the exact scope of collection system improvements is defined through CCTV investigation.

8.6 Land Requirements

Identify all necessary sites and easements, permits and certifications, and specify if the properties are currently owned, to be acquired, or leased by the applicant.

The lands where all proposed WWTF improvements are owned and maintained by the St. Mary's Glacier Water and Sanitation District. All collection system work is anticipated to be completed on existing pipe. No new pipe alignments are anticipated.

8.7 Construction Challenges

Discuss construction challenges such as subsurface rock, high water table, limited access, or other conditions that may affect cost of construction or operation of a facility.

The limited construction window due to freezing winter conditions, high runoff and groundwater, and mountainous terrain are challenges for improvements requiring open excavations (such as collection system improvements and yard piping/foundation work at the WWTF). These factors increase the cost and extend the duration of construction.

8.8 Operational Aspects

Discuss the operator staffing requirements, operator certification level requirements, the expected basic operating configuration and process control complexities, and the operational controls and equipment that allows operational personnel to respond to routine and unanticipated treatment challenges, such as flow rate, fluctuations in influent quality, process monitoring and chemical feed dosing.

The operator certification level required for the facility remains Class B. Additional staffing requirements are not anticipated as a result of this Project's improvements. New equipment and controls proposed in this project which will facilitate ease of operation include:
~Mechanically cleaned screen to replace manually cleaned perforated screen.
~Automated DO and blower controls for the aeration system to replace the existing manually and constant speed operation.
~Alarms notifying operations staff of high water levels, pumping issues, etc.
~Continuous flow monitoring.
~Computer/control system/SCADA for automated data collection and system controls.
~New chemical feed room with appropriate HVAC to eliminate existing freezing and storage issues.

8.9 Costs

Summarize the capital costs associated with the selected alternative. The 20 year cash flow projection included in Attachment 4 must reflect the capital and operation and maintenance costs associated with the selected alternative.

Total estimated project costs including contractor overhead and profit, contingency, mobilization/general conditions, and engineering:
~WWTF Improvements: $2,334,000
~Collection System Improvements: $1,955,000
~Total Construction Costs: $4,289,000

Total estimated engineering costs associated with the project:
~Engineering Planning and Design Phase: $429,000

Current Equivalent Residential Taps (ERT)

Secondary Treatment (Category I)	43
Advanced Treatment (Category II)	11
Infiltration/Inflow (Category IIIA)	46
Sewer System Rehabilitation (Category IIIB)	0

New Collector Sewers (Category IVA)	0
New Interceptors (Category IVB)	0
CSO Correction (Category V)	0
Storm Sewers (Category VI)	0
Recycle Water Distribution (Category X)	0
Nonpoint Source Pollution Control Activities (Category VII)	0
TOTAL: (should total 100%)	100

Please include an estimate of the projected increase in and total average monthly user charges. Does the user charge system allow for billing, collection, and enforcement?

8.10 Green Project Reserve

Check one or more green category that applies to the project:

☐ Green Infrastructure ☐ Water Efficiency ☐ Energy Efficiency ☐ Environmentally Innovative

Describe any green components incorporated into the selected alternative.

The system must reference the most recent copy of the EPA Green Project Reserve guidance and procedures. These references are available on the CDPHE WQCD GLU website under "Green Project Reserve": https://www.colorado.gov/pacific/cdphe/wq-green-project-reserve
Include a business case for the project as Attachment 11, if applicable.

8.11 Environmental Checklist

Include the Environmental Checklist for the Selected Alternative as Attachment 12.

8.12 Project Implementation

8.12.1 Proposed Schedule

Request for PELs	9/30/2019	Site Application Submittal Date	11/28/2019
Process Design Report/Basis of Design Report Submittal Date	5/13/2019		
Final Plans and Specifications Submittal Date (for Non-Streamlined Review only)	7/27/2019		
Discharge Permit	05/09/2020	Miscellaneous Permits	07/15/2020
Public Meeting Date	07/15/2019	Loan Application Submittal Date	08/14/2020

Advertisement for Bids Publication Date	11/2/2020	Construction Contract Award Date	12/29/2020
Construction Start Date	1/13/2020	Construction Completion Date	09/29/2019

8.12.2 Public Meeting

Provide documentation of a public meeting held or describe when and where the meeting will be held. The meeting must be noticed for 30 days. Provide the public notice, proof of publication, sign in sheet, and agenda as Attachment 14 or provide to your project manager in the Grants and Loans Unit after the meeting has taken place.

☐ Include the public meeting documentation as Attachment 14.

Or, will be provided to the Grants and Loans Unit project manager after the meeting takes place.

9. Projecting Water Flows Method 1: Population based projections

Assumptions/Data			Information Source
Current System Population	316	People	Calculated from historic population growth
Current Service Area Population (If providing water to neighboring community)	316	People	
Population Growth Rates	1.2	% increase/year	
Average Daily per Capita Flow Rate	119	Gallons per capita day	37,500 gpd AADF/316 capita
Average Day Maximum Month per Capita Flow Rate	696	Gallons per capita day	220,000 gpd MMF/316 capita
Maximum Daily per Capita Flow Rate	949	Gallons per capita day	300,000 gpd Mad day/316 capita
Peak Hour Factor	4		Hourly data not available. Assumed peaking factor of 4
Average Influent BOD5 Concentration	185	mg/L	DMR data (2017-Present)
Average Day Maximum Month Influent BOD5 Concentration	447	mg/L	DMR data (2017-Present)

Year	System Population	Service Area Population (if different)	Average Daily Flow	Maximum Daily Flow	Peak Hour Flow	Average BOD5 Loading (pounds per day)
+0	0	0	37500	22000	150000	58
+5	335	335	39800	233600	159200	61
+10	356	356	42300	247900	169200	65
+15	379	379	45000	263900	180000	69
+20	404	404	47900	281300	191600	74

10. Projecting Water Flow Method 2: Equivalent Residential Taps (ERT)

Current Equivalent Residential Taps (ERT)			
A	Number of active residential taps:	0	Units

B	Total Annual Potable Water Use less Irrigation Usage (gallons per year) – Residential	0	
C	Estimated equivalent residential potable water usage Annual flow per EQR = A/B	0	Gallons per SFE
D	Wastewater flow from commercial users	0	Gallons per ft2
E	Equivalent EQRs per 1000 ft2 of commercial space EQRs per 1000 ft2=D*1000/C	0	SFEs per 1000 ft2
F	Commercial space in service area	0	1000 ft2
G	Commercial EQRs Commercial EQRs = F*E	0	SFEs
H	Wastewater flow from industrial users	0	1000 ft2
I	Equivalent EQRs per 1000 ft2 of industrial space EQRs per 1000 ft2 = H*1000/C	0	1000 ft2
J	Industrial space in service area	0	1000 ft2
K	Industrial EQRs Industrial EQRs = H*J	0	1000 ft2
L	Length of sewer pipe in collection system	0	1000 ft2
M	Infiltration/Inflow contribution per 1000 feet of sewer pipe	0	1000 ft2
N	Equivalent EQRs per 1000 feet of sewer pipe EQRs per 1000 LF=M/C	0	1000 ft2
O	Infiltration/Inflow EQRs Infiltration/Inflow EQRs = L/1000*N	0	1000 ft2
P	Total EQR = A + G + K + N	0	1000 ft2

Population and Flow Assumptions / Data			Information Source
Current System Population	_____	People	_____
Current Service Area Population (If providing water to neighboring community)	_____	People	_____
Population Growth Rates	_____	% increase/year	_____
Average daily flow per ERT	_____	Gallons per capita day	_____
Maximum daily flow per ERT	_____	Gallons per capita day	_____
Peak Hour Factor	_____	Gallons per capita day	_____

Year	System Population	Service Area Population (if different)	Residential Taps (ERTs)	Multifamily Residential Taps (ERTs)	Commercial/ Industrial Taps (ERTs)	Irrigation Taps (ERTs)	Total Taps (ERTs)	Average Daily Flow	Maximum Daily Flow	Peak Hour Flow
+0										
+5										
+10										
+15										
+20										