COLORADO
Department of Public Health & Environment

Drinking Water Project Needs Assessment (PNA) Form

Water Quality Control Division

General Information

Facility Name:	Buffalo Mountain Metropolitan District			Original ID:	
Mailing Address 1:	106 Adams Avenue PO Box 2430	Mailing Address 2:		County:	
City:	Silverthorne	State:	CO	Zip Code:	80498
Property Address 1:	106 Adams Ave	Property Address 2:		County:	
City:	Silverthorne	State:	CO	Zip Code:	80498
Latitude :	39.7517291	Longitude :	-104.992107		
Name of Project:	BMMD Infrastructure Upgrades				

Type of Project (Check all that apply)

☑ Treatment ☑ Distribution / Transmission ☑ Water Supply ☐ Water Storage

Please enter the following information for your organization if you have it.

1. Applicant Information:

First Name:	Will	Middle Name:		Last Name:	Yates
Phone Number:	970-513-1300				
Mailing Address1:	PO Box 2430	Mailing Address2:			
City:	Silverthorne	State:	CO	Zip Code:	80498
E-mail:	will@bmmd.org				

Consulting Engineer Information:

First Name:	Deron	Middle Name:		Last Name:	Dircksen
Phone Number:	970-384-9012				
Mailing Address1:	118 West 6th Street	Mailing Address2:			
City:	Glenwood Springs	State:	CO	Zip Code:	81631
E-mail:	derond@sgm-inc.com				

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.

☐ Distribution system piping ☑ Pump station (without integral treatment) ☑ Valves, hydrants, and/or meters

Provide additional explanation, if necessary:

SGM will engineer stamp and sign the distribution system projects x3, Pressure Reducing Vault projects x2,
Buffalo Mountain Metro District will self-certify the remainder of the projects including SCADA, hydrants, valves, booster pump upgrades, emergency interconnect, etc.

2. Executive Summary

Buffalo Mountain Metro District is a small, mostly residential community located between approx. 9000' and 9600' in Summit County that was formed and built in the early 1970s. The district has been proactive in replacing failed isolation valves, replacing watermains and storage tanks, we have added PRV vaults, rehabbed tanks and booster stations to better our water distribution system but there is much more work to be accomplished and construction rates are continuing to increase. Our water mains are approx. 9-14' deep and the lower portion of the district is only served via 1 water transmission line with no redundancy. We are seeing an increase in watermain breaks, especially in wintertime. Having main breaks without proper isolation valves and redundant feed sources, creates large/prolonged outages and emergencies repairs are extremely difficult with 4+' of frost and other shallow utilizes above. Every outage presents the possibility of contamination and is a disruption to our customers and commercials business. We believe the proposed valve/ water main replacements, PRV vaults, interconnect with the Town of Silverthorne, water main looping project, booster station and WTP station upgrades, and well rehab projects will greatly enhance our ability to have smaller, less duration outages and to alleviate them in general. These projects will increase fire flow capacity in times of emergencies, will help with water quality in the distribution system, and will better prepare our water system for future drought conditions. Summit County experienced a major wildfire(s) during the summer of 2018 where the fire ended less than 100' from structures in our district. This event reiterated the need for proper fire flow as we are surrounded by national forest and wilderness areas that will always pose a risk in times of drought. The drought has also affected our very reliable ground water supply that has reduced our production capacity during lower water table periods.

3.System Structure and Operation

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

First Name: Joe Newhart

Mailing Address1: Po Box 2430 Mailing Address2:

City: Silverthorne State: CO Zip Code: 80498

Phone Number: 970-513-1300 Fax:

3.2 Organizational Chart

Include an Organizational Chart as Attachment 2.

3.3 Plans (TMF: Managerial-2)

Monitoring Plan - Include a copy of the Monitoring Plan as Attachment 3.
Cross Connection Control Plan - Include a copy of the Cross Connection Control Plan as Attachment 4.

Water Conservation Plan (if system sells over 2,000 acre feet of water annually) - Include a copy of the Water Conservation Plan as Attachment 5. ☑ Not Applicable

3.4 Current Operator in Responsible (ORC) Charge (TMF: Technical-14)

First Name: Matthew Middle Name: Last Name: Willitts

Certification Number: CWP-WA-00189 Certification Expiration Date: 02/20/2025

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 ☐ Class T

3.5 Operator Certification (TMF: Technical-15)

☑ 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.

Water/Distribution crews will be onsite to assist with inspections of new infrastructure installations that will follow AWWA procedures for testing new water main, hydrants, valve replacements, PRVs, etc. Their current certifications and past experience is adequate to perform such tasks with current staffing.

3.6 Record Keeping (TMF: Managerial-3)

Describe the system's record retention policy that meets the requirements of the Colorado Primary Drinking Water Regulations (Regulation 11) including: record type, retention period, and record location.

The district collects and maintains data and records per CDPHE and Colorado Special District regulations. Files are kept on site at our office at 106 Adams Ave, Silverthorne, CO 80498. All digital information is backed up onsite and offsite daily.

3.7 Annual Budget (TMF: Financial-1)

☑ Yes ☐ No Does the system prepare an annual budget?

☑ Yes ☐ No Does the system prepare and maintain a Capital Improvement Plan?

Please provide a narrative of the process for annual budgeting and financial planning.

See attachment

3.8 Financial Status (TMF: Financial-2)

Describe the current financial status and multi-year financial planning for the system including O&M costs, existing debt, required reserve accounts, rate structure, other capital improvement programs, and the system's reserve policies.

The District's most current cash flow projection was prepared in conjunction with preparation of the District's 2023 budget in November 2022. An updated projection will be prepared in conjunction with preparation of the 2024 budget in October and November of 2023. The projection includes the 2021 audited actual amounts as a point of reference, the 2022 forecast, the 2023 preliminary budget and projections for 2024 through 2043. Major items included in the District's 20 year cash flow projection are:
1. Generally, operations are expected to continue as they are currently but an inflation factor anticipating ongoing inflation. General inflation has been projected at 3% per year but water and sewer user fees were inflated at 5% for 2024 through 2027.
2. Capital improvements have been projected based on the District's water and wastewater capital improvement plan as prepared by the District's independent engineers.
3. The projection assumes additional borrowing of $6,000,000 in 2024 and $5,000,000 in 2038.
The enclosed copy of the long range projection includes the details. Questions are welcome if you have questions as you review of the projection.

20-year cash flow projection
Include a copy of the 20-year cash flow projection as Attachment 8.

3.9 Audits (TMF: Financial-5)

Has the system submitted audits to the Department of Local Affairs or has the received State exemption of the statutory audit requirement?

☑ Yes - Provide a copy of the most recent audited financial statement or exemption from State as Attachment 9. ☐ No

3.10 Insurance (TMF: Financial-6)

Does the system maintain general liability insurance?

☑ Yes - Provide a copy of the most recent audited financial statement or exemption from State as Attachment 9. ☐ No

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 Health and Compliance

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

Our treatment and distribution systems are in CDPHE requirements, awaiting EPA regulations and guidance on PFAS thou. However, increasing number of main breaks pose a threat to water quality and the replacement of such pipes can potentially decrease that risk. Automated PRV vault will download water to lower pressure zones in times of large water mains breaks and fire flow events. Increasing the amount and replacing fire hydrants will better prepare fire fighting crews in times of urban or wildland fire emergencies. Better telemetry equipment will make the distribution system much for reliable and additional station equipment will also create another source of automation if radio fail.

4.2 Existing facility limitations

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

Our aging pump stations need equipment upgrades to better monitor the system, increase redundancy and to increase flow rates to better provide for fire protection, for water main breaks and in general to better provide water in upper zones in times of high-water demand. Lack of functioning isolation valves and interconnecting zones makes main breaks challenging and difficult to provide water, especially to our upper zones. Our district sits on a very steep hillside and is also shaped in a narrow patch surrounded by national forests and the Eagles Nest Wilderness Area. This limits options for alternate sources of water and for water main and utility construction projects.

4.3 Operations and Maintenance Issues

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

Crews must manually turn isolation valves in the distribution system to download water, this can cause over pressurization of lower zones and the valves might not “seat” when done causing a water leak. We have had multiple water main breaks and valve failure while turning the water back on after leak repairs. Many of the booster stations do not have automation and instrumentation which creates a lot of inspections and hands on to keep the system running. Automation and redundancy is our goal for the future.

5. Existing Facilities Analysis

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

☐ Not applicable (for distribution and storage projects, only)

5.1.1 Raw Water Supply (TMF: Technical-2)
Explain the system’s existing raw water source(s), seasonal variability, and availability. Explain the system’s raw water quality including primary water quality parameters of concern, variability and potential sources of contamination in the watershed or source aquifer. Identify whether sources are classified as surface water, groundwater, or groundwater under direct influence of surface water (GWUDI). Explain water usage including multiple sources of differing qualities.

Source Name	Source Classification	Source Description

5.1.2 Water Rights (TMF: Technical-3)

The District’s water rights portfolio, consisting of multiple decrees and augmentation plans, provides a secure legal supply for all anticipated growth. The District’s primary augmentation plan, Case No. 90CW222, provides a reliable legal supply for the Buffalo Mountain Metro Wells. The wells divert under the Valaer Ditch priority in the summer (April 1 through October 31), which is junior to the Shoshone and Cameo call but is protected by the Green Mountain Reservoir historic users’ pool (HUP), meaning that the wells can continue to divert in times of a Shoshone or Cameo call. In the winter (November 1-March 31) diversions will occur under the Buffalo Mountain Well and Gallery 1970 priority, which is also HUP protected.
Both summer and winter diversions are HUP protected; therefore, the BMMD water rights can continue to divert even during a Cameo or Shoshone call. If downstream calls cause the District’s right at any time of the year to be out of priority, then Green Mountain Reservoir HUP water is required though the Green Mountain Reservoir Operating Policy to replace the District’s depletions.
The District’s domestic water rights are secure based on the seniority of the Valaer Ditch rights and the obligation of Green Mountain Reservoir’s Operating Policy to replace any out-of-priority depletions on calls originating downstream or upstream of the reservoir.
The District currently has water rights for up 2,860 single family residential equivalent units (EQRs) per the limitations in Case No. 90CW222. The District’s water rights have a diversion limitation of 3.6 cfs during the period of April 1 – October 31 and 2.637 cfs during the period of November 1 – March 31. Between 2019 and 2021, the Districts maximum weekly average diversion rate was 0.51 cfs, and the average monthly diversion rate over that time was 0.31 cfs. The District is significantly below its diversion limits on a monthly average basis, even with the District being close to its buildout capacity

5.2 Existing treatment– Required for treatment and supply projects only

☐ Not applicable (for distribution and finished water storage projects, only)

5.2.1 Overall treatment description (TMF: Technical-5)
Provide a current treatment description including: treatment processes used, major design parameters (e.g., process capacities, detention times, unit loading rates, disinfection log inactivation).

BMMD collects groundwater from 4 wells that are located on our property in Silverthorne, CO. The wells move water to our clearwell where chlorine is added then it's pumped into the distribution system.

5.2.2 Existing Process Flow Diagram (TMF: Technical-8)
Include an existing treatment facility process flow diagram as Attachment 13.

5.2.3 Current Compliance Status (TMF: Technical-1)
Discuss the system’s current compliance status with Regulation 11, as well as violations and significant deficiencies documented during sanitary surveys.

Our water treatment and distribution are in compliance with current CDPHE requirements. We are still waiting on EPA direction on PFAS and are planning on attending upcoming training events to prepare for what’s to come. The district did receive a sanitary deficiency in 2019 for backflow program compliance. We quickly came back up to speed and the program is running well with well over 90% testing rates annually since.

5.2.4 Appropriateness of Treatment Technologies (TMF: Technical-6)
Discuss if the existing treatment process(es) are appropriate to meet Regulation 11 considering existing source water quality and potential sources of contamination.

Our pristine groundwater does not require much treatment and our current system suffices to meet proper disinfection requirements. We are however looking to replace the current chlorine generation system, MIOX, with new or might look at other products in the near future like Sodium hypochlorite.

5.2.5 Capacity of Treatment Technologies (TMF: Technical-7)
Is the capacity of the existing water treatment system appropriate to meet water demands through the next 20 years?

☑ Yes ☐ No

Please explain:

Yes. Our water conservation and meter replacement programs have actually lowered our water demand in recent years and we are 98% built out. We expect our capacity to meet our demand as long as there are not major changes to our very consistent groundwater source.

5.2.6 Operational Controls (TMF: Technical-10)
Describe if the existing treatment process(es) has appropriate operational controls.

The district has been working diligently to upgrade our water plant and distribution systems, including our SCADA system. Our WTP had a recent upgrade in 2021 that installed new clavals, VFDs, flow meters, groundwater sensors, SCADA computer, etc. We are still working on improvements to our SCADA system that will also increase control and automation of our systems. There are many distribution projects (booster station upgrades, PRV vaults, etc) that will also help with managing water in each pressure zone.

5.2.7 Residuals Management (TMF: Technical-9)
If the treatment process produces waste residuals, please discuss the water system's residuals management strategy.

N/A our system does not produce waste residuals or byproducts.

List documentation for all existing discharge permits and/or residuals for the water treatment plant including residuals for disposal or beneficial use (e.g., NPDES discharge permits, EPA UIC Permit, HMWMD radioactive materials license, HMWMD Solid Waste licenses).

N/A = the district has no discharge permits as we send our collection system to the Joint Sewer Authority where they treat our wastewater.

Include a copy of discharge permits and/or residual documentation as Attachment 14 ☑ Not Applicable

5.3 Distribution - Required for distribution and storage projects only

☐ Not applicable (for supply and treatment projects, only)

5.3.1 Overall Distribution System Description (TMF: Technical-11 and -12)
Discuss the existing finished water distribution system including: gravity vs. pumped pressurization, facility age, material type, condition of materials, amount of AC pipe, number of pressure zones, pump stations, and storage tanks.

The District's distribution system consists of approximately 70,097 linear feet of 4, 6, 8, 10, 12 and 16-inch pipe, predominantly ductile iron pipe (DIP). There are six pressure zones in the system, each with a dedicated pump station and storage tank. There is no AC pipe in the system.
Raw water is drawn from wells, chlorinated, then pumped up to the higher pressure zones. The system has a combined 1,230,000 gallons of potable water storage.

Discuss the estimated distribution system losses (i.e., the percent of water lost in the distribution system and not delivered/billed to customers).

A water loss study was performed in 2022 that analyzed production and billing data from 2019 and 2020. This study showed distribution system losses of 18% and 12% for 2019 and 2020, respectively.

5.3.2 Pressure (TMF: Technical-13)
Discuss if the existing distribution system is designed to maintain a minimum pressure of 20 psi at all ground level points in the distribution system under all conditions of flow as required in the CDPHE Design Criteria for Potable Water Systems (Design Criteria). The Design Criteria also recommends a normal working pressure in the distribution system of approximately 60 psi, and not less than 35 psi. Discuss how the distribution system meets the required and recommended distribution system pressures.

A hydraulic model was developed as part of a 2022 water system assessment that identified 14% of model nodes (not individual customers) as having a water service pressure below 55 psi. All of these nodes except those along Stephanie's Way remain above 35 psi under normal operating conditions. All homes along Stephanie's Way have individual booster pumps to provide adequate service pressure.

Include a map illustrating any locations where a minimum pressure of 20 psi cannot be provided under all conditions of flow as Attachment 15. ☐ Not Applicable

5.3.3 Meters (TMF: Financial-4)
Discuss if the existing distribution system includes water meters.

The district has recently added new mag style water meters on our wells lines and are in the process of replacing all failed water meters in booster stations on the hillside, 3 stations. Every property in the district is served with a Badger ultrasonic style (newer) water meters that were replaced around 2018. There are still approx. 197 Older style meter that we are planning on replacing in the next 5 years or sooner, if we receive any type of external funding. Property water meters talk 4 times a day to our automated meter reading system or AMR that relays the data back to us. The district has recently switch billing systems and with that also comes an online customer portal for people to view their water usage directly. They will be able to automatically receive texts or emails notifying they of leaks in the household. All these projects should help us track our water more accurately so we can work on our unaccounted water.

6.Facility Planning Analysis

6.1 Planning Area Description

6.1.1 Project Area Map
Provide a map showing a minimum of a 3-mile radius around the project area that includes environmental features (lakes, streams, wetlands, floodplains). Map must include current and proposed service area, existing drinking water facilities (plants, major distribution lines, water sources, storage facilities), existing wastewater outfalls/permitted discharge points, and any new or affected sources with regard to the pertinent watershed. Include the map as Attachment 16.

6.1.2 Urban Growth Boundary

☐ Yes ☑ No Is the project within or near an urban growth boundary?

6.1.3 Local and Regional Issues

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

Please describe.

The district has been in communications with Summit County government to see if they have any plans or intentions to rezone or add large employee housing developments. They have not indicated any interest or future plans.

☑ Yes ☐ No Were local and regional water quality and/or quantity efforts considered?

Please describe.

All projects will be minimizing erosion and sedimentation and will using best management practice's to prevent materials from entering waterways.

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

If yes, describe the consolidation considerations. If no, please indicate why consolidation was not considered.

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 ERT - As Calculated in the Prequalification Form: 989

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 water meter data

☐ Method 2: Equivalent Residential Taps (ERT) Analysis. Recommended for systems with a high multifamily, commercial, industrial, irrigation demands.

Method 1 and 2 templates can be found at the end of this form.
Attach the population projection as Attachment 17.

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.

As of the end of 2022, the District served 2,212 single family residential equivalent units (EQRs), with a population of 2,650 people (average of 1.2 people per EQR). This is consistent with the predominance of second homeowners.
The District is already at 97% of the buildout allowed by its agreements with the Joint Sewer Authority, so significant growth is not expected to occur. The District has a limit of service of 2,285 EQRs which is the growth limitation imposed by the capacity of the Blue River Wastewater Treatment Plant (BRWWTP), per an intergovernmental agreement (IGA) with the Silverthorne-Dillion Joint Sewer Authority.
The District's anticipated growth rate of 0.1% per year was estimated for the September 2022 Rate Study. This growth rate was based on input from District staff from past typical growth. This equates to about 2.2 EQRs added each year. In 2043 (20 years), the number of EQRs served would be 2,259 EQRs, or 98.8 % of buildout. The resulting population served in 2043 at the current average rate of 1.2 people per EQR would be approximately 2,706 people.
District demands (based on pumping at the well head, including transit loss) were 262.6 acre-feet (AF) (85,568,458 gallons) in 2019, 245.3 AF (79,931,236 gallons) in 2020, 231.5 AF (75,534,493 gallons) in 2021, and 215.9 AF (70,345,584 gallons) in 2022 with an annual average demand of 238.8 AF.
The resulting average daily demand is 99 gallons per day per EQR (gpd/EQR), and an average annual demand of 0.111 acre-feet per year per EQR (AF/yr/EQR). Again, this low per-capita usage is consistent with the predominance of second homeowners in the District. At the projected 2,259 EQRs in 2043, the resulting projected water demand is 252 AF/year.

6.3 Source Water Planning

6.3.1 Overall Water Resource Management Description (TMF: Technical-2)
For a 20 year planning period, describe the system's water resource management plan.

The District provides potable water to its constituents via four wells drilled in the Blue River alluvium: Buffalo Mountain Metro Wells No. 1, 2R, 3, and 4 (BMMD Wells). The District collects wastewater from its constituents and then conveys it to the Blue River Wastewater Treatment Plant which is managed by the Silverthorne-Dillion Joint Sewer Authority (JSA) where it is treated and returned to the Blue River.
The District monitors water usage, well pumping, and well water levels, but generally does not have concerns regarding physical or legal water supply. The BMMD Wells have a secure legal supply provided by the augmentation plan in Case No. 90CW222 (described in more detail in 6.3.2. Water Rights).
The District has below average water usage. The average daily demand is 99 gallons per day per EQR (gpd/EQR) and 83 gpd per person. The District has very little irrigated area; therefore its water usage is mainly indoor demand and is relatively consistent throughout the year.
The District monitors water levels in its wells with water level transducers which are connected to its SCADA system. The District is currently working on a wellfield operations and maintenance plan for regular operations of its wellfield to maintain the longevity of its wells. The District employs best management practices, such as regularly exercising each well, allowing each well to rest periodically, and maintaining, cleaning, and replacing components regularly as needed. The District monitors the water level in its wells and periodically calculates specific capacity of the aquifer. Measuring a well's specific capacity is a good way to monitor changes in well production, and can be used to evaluate when a well needs to be cleaned or eventually replaced.

6.3.2 Water Rights (TMF: Technical-3)
For the 20 year planning period, discuss how the system will be able to meet the projected population and increased industrial/commercial water demands.

The District's water rights portfolio, consisting of multiple decrees and augmentation plans, provides a secure legal supply for all anticipated growth. The District's primary augmentation plan, Case No. 90CW222, provides a reliable legal supply for the Buffalo Mountain Metro Wells. The wells divert under the Valaer Ditch priority in the summer (April 1 through October 31), which is junior to the Shoshone and Cameo call but is protected by the Green Mountain Reservoir historic users' pool (HUP), meaning that the wells can continue to divert in times of a Shoshone or Cameo call. In the winter (November 1- March 31) diversions will occur under the Buffalo Mountain Well and Gallery 1970 priority, which is also HUP protected.
Both summer and winter diversions are HUP protected; therefore, the BMMD water rights can continue to divert even during a Cameo or Shoshone call. If downstream calls cause the District's right at any time of the year to be out of priority, then Green Mountain Reservoir HUP water is required though the Green Mountain Reservoir Operating Policy to replace the District's depletions.
The District's domestic water rights are secure based on the seniority of the Valaer Ditch rights and the obligation of Green Mountain Reservoir's Operating Policy to replace any out-of-priority depletions on calls originating downstream or upstream of the reservoir.
The District currently has water rights for up 2,860 single family residential equivalent units (EQRs) per the limitations in Case No. 90CW222. The District's water rights have a diversion limitation of 3.6 cfs during the period of April 1 – October 31 and 2.637 cfs during the period of November 1 – March 31. Between 2019 and 2021, the Districts maximum weekly average diversion rate was 0.51 cfs, and the average monthly diversion rate over that time was 0.31 cfs. The District is significantly below its diversion limits on a monthly average basis, even with the District being close to its buildout capacity

Provide documentation supporting the system's water rights, if not provided in section 5.1.2 above, as Attachment 18.

6.3.3 Source Water Supply Capacity (TMF: Technical-4)
For the 20 year planning period, discuss if the source water supply infrastructure is capable of delivering adequate source water to meet projected needs.

In summary, the District has a secure legal supply. Growth will be limited first by the wastewater plant capacity-driven 2,285 EQR cap, then the decreed EQR limits (2,600 EQRs for the District plus 260 for Mesa Cortina). Diversion limits are not a practical concern (described in more detail in 6.3.2. Water Rights). In addition, the District's currently installed well pumps have the capacity to meet current demands (97% of buildout) and all anticipated future demands).
The wells are located close to the Blue River immediately below Dillon Reservoir, and the well logs show that the screened intervals for all wells are completed in sand and gravel, which is typically good material for producing water supply.
Water level data compiled from surrounding wells in the vicinity of BMMD reveals that the alluvial aquifer is recharged primarily by flows from the Southwest, although some recharge from the Blue River occurs as well. Data from the USGS' StreamStats Service indicates that the watershed that contains BMMD is the same as the one that feeds the Dillon Reservoir, with the addition of Salt Lick Gulch and Ryan Gulch drainages to the West/Southwest and the Straight Creek drainage to the Northeast.
In the long term, given the proximity to recharge sources (including seepage from Dillon Reservoir), the physical supply available to the wells indicate that recharge is not a concern.
The District monitors water levels in its wells with water level transducers which are connected to its SCADA system. While the water level transducers have only been in place for about a year, the District has also been monitoring water level manually since 2020. SGM compared this recent water level data to limited water level data from well completion reports and previous pump installation reports available prior to 2020. These recent and long-term observations indicate that seasonal recharge is occurring, and that the aquifer fluctuates over time, but that the average aquifer levels have sta

7.Assessment of Alternatives

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 : Water Main Replacement and Looping

Alternative 1 Description (2000 character limit):

BMMD has three water main distribution projects proposed. Two water main distribution projects are replacing old problematic water mains and the third is installing a looped redundant water main at the lower end of the distribution system where redundancy is critical to supply water to our neighbors. These projects will also include new water valves and fire hydrants.

The alternative for the two water main distribution replacement projects is to do nothing. There is a chance the existing water mains that have leaked in the past and needed emergency repairs is done leaking and therefore will not be problematic anymore. There is potential that there will be no more water breaks which pose a threat to water quality.

The alternatives for the proposed looped redundant water main are to do nothing or a different alignment. To do nothing would keep the District relying on one water main supplying all the District's water. This proposed looped redundant water main is proposed to be approximately 1,100 linear feet. This would eliminate approximately 25% of the sole source of water pipe providing water to the entire District. The second alternative would be a different alignment which would reduce the length of pipe but would go through private property. The proposed alignment is currently located in right-of-way.

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

It is difficult to calculate the current Operation and Maintenance Cost of a water main break. It is estimated that a water main fix is $10,000 for an easy repair and $50,000 for a difficult repair. However, some water breaks during winter require additional summer work to reopen the road to get appropriate compaction which leads to additional costs.

There is no current Operation and Maintenance Cost for the looped redundant water main. This new looped redundant water main will provide years of service and provide the District with redundancy and resiliency.

Alternative 1 Advantages and Disadvantages (2000 character limit):

These water main replacement and looping projects provide a lot of advantages to the District such as eliminate water main breaks, provide good quality and quantity of water to our neighbors, provide redundancy and resiliency to our drinking water system, provide operational flexibility, save time, and save money.

The disadvantages are having to construct these projects. Construction projects are problematic for residents, emergency vehicles, safety, cost money, etc.

Alternative 2 Title : Pressure Reducing Vaults

Alternative 2 Description (2000 character limit):

The two proposed Pressure Reducing Vaults will connect different pressure zones in the distribution system. Pressure Reducing Vaults will automate downloading water to lower pressure zones in times of large water demands such as fire flow events. The alternatives to constructing these PRVs is to do nothing or to construct new larger water tanks to provide the required storage. Th do nothing alternative would make the District not have sufficient fire flow storage, flexibility, redundancy, etc. The new larger water tanks alternative would be more expensive than the proposed PRVs. Larger water tanks would require the District to acquire additional property. Finding a similar elevation for a new water tank to keep similar pressures is very difficult if not impossible since the District is mostly built out and is constrained by Forest Service property, etc. Larger water tanks are problematic due to water quality too which may lead to water tanks having to circulate water or to waste water during low demand.

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

The Capital cost of PRVs is significantly lower than construction water tanks. PRVs are approximately $500K where a new water tank is approximately $2M as well as acquiring additional property, piping, and other miscellaneous.

Alternative 2 Advantages and Disadvantages (2000 character limit):

The advantages of PRVs is the flexibility it provides to the distribution system including fire flow protection, flexibility, redundancy, resiliency, etc.
The disadvantages is the future O&M that comes with PRVs, however this is less O&M than larger water tanks.

Alternative 3 Title : SCADA

Alternative 3 Description (2000 character limit):

Upgrades to our SCADA system will benefit our water treatment and distribution systems significantly in multiple ways. We will increase our redundancy with additional ways of station communications, automated reporting will create more accurate water production and water loss numbers, we plan to connect our water meter reading system to SCADA to obtain lose water calculations that will be used to pinpoint leaks faster and to lower the number as much as possible. SCADA integrators are planning on using newly installed groundwater pressure transducers or level sensors to help minimize impacts to our aquifers and to alleviate large drawn downs. Recent years of drought have reiterated the need for water conservation and to lessen the impact on our ground water source as much as possible. More data and programming can make our system much more efficient for not only water consumption but for electrical as well.

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

District spends approx $110,000 annually on water distribution pumping costs. Failed wells pumps in winter time are very difficult to replace and maintain.

Alternative 3 Advantages and Disadvantages (2000 character limit):

Further automating and adding redundancy will only result in increasing our capabilities and resilience in times of power loss and emergencies. All automation has inherent ricks but we are also adding multiple levels of redundancy and emergency alternatives in the process.

Provide discussions of additional alternatives as Attachment 19.

8. Selected Alternative

8.1 Justification of Selected Alternative (TMF: Technical-6)

Please demonstrate why the selected alternative best meets system needs based on both monetary and non-monetary considerations. For treatment facility projects, if the EPA-BAT technology is not selected then the report must include a treatment rational.

The two water main replacement projects best meets system needs by providing a reliable water distribution system, water quality, and water quantity for the District. These replacement projects will be cheaper than reacting to water main breaks. This selected alternative is industry standard which will provide years of service.

The water main looping project best meets system needs by providing a reliable redundant water distribution system for the District. This looping project is at the lower end of the distribution system where there is only one water supply main. Having a redundant water distribution system for the district is helpful for operations, potential future water main breaks, etc. This water main looping project reduces the one water supply main by approximately 25%.

Pressure Reducing Vaults best meets system needs by providing additional water storage capacity to lower pressure zones for fire flows, operational flexibility, water quality, etc. The approximate $500k is cheaper than expanding water tanks.

8.2 Technical Description and Design Parameters (TMF: Technical-5)

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

Ryan Gulch Road (Lodgepole to Lodgepole) is proposed to be 1,400 linear feet of water main, material will be ductile iron pipe, polyethylene wrap, gate valves, water services, fire hydrants, 10-feet separation from sewer, appropriate depth, tracer wire, screened rock, warning tap, backfill, testing (pressure, high chlorine, low chlorine, bac-t), traffic control, safety, asphalt replacement, etc.

Burgundy Circle is proposed to be 500 linear feet of water main, material will be ductile iron pipe, polyethylene wrap, gate valves, water services, fire hydrants, 10-feet separation from sewer, appropriate depth, tracer wire, screened rock, warning tap, backfill, testing (pressure, high chlorine, low chlorine, bac-t), traffic control, safety, asphalt replacement, etc.

Ryan Gulch Road Looping is proposed to be 1,100 linear feet of 12-inch diameter water main, material will be ductile iron pipe, polyethylene wrap, gate valves, water services, fire hydrants, 10-feet separation from sewer, appropriate depth, tracer wire, screened rock, warning tap, backfill, testing (pressure, high chlorine, low chlorine, bac-t), traffic control, safety, asphalt replacement, etc.

Pressure Reducing Vaults will be prefabricated vaults connected to the existing water distribution system at two locations. Prefabricated vaults are expected to be similar to previous installed vault so that equipment will be similar. The piping to the existing distribution system will be ductile iron pipe, polyethylene wrap, gate valves, tracer wire, screened rock, warning tape, traffic control, safety asphalt replacement, etc.

8.3 Proposed Process Flow Diagram

Include a proposed treatment facility process flow diagram or map of the distribution system, as applicable as Attachment 20.

8.4 Appropriateness of Treatment Technologies (TMF: Technical-6)

Discuss appropriateness of the proposed treatment process(es) to meet Regulation 11 considering anticipated source water quality and potential sources of contamination.

Water quality and public health is and always will be the main priority of the district. All proposed projects will have limited possibility to degrade water quality. New construction does pose a potential risk to the distribution system but not if all AWWA required steeps are taken. Replacement of water lines and adding new lines with all approved AWWA materials should not effect water quality. All water and sewer services will stay online during the process to alleviate public impacts.

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.

A completed environmental checklist is being submitted with this PNA that address all environmental resources of note, both within the area of direct impact from project construction and the overall planning area of the BMMD service area. In summary, there are no extraordinary resources or unusual potential for impact as a result of the proposed project. No activity would occur in floodplains; pending a field investigation, there are no recorded or expected wetlands in the project area; there are no cultural resources present because BMMD was built out in the late 1970s and 1980s; there no known or expected significant wildlife habitat areas. In addition, because BMMD is fully built out and the proposed project would not enable additional growth, indirect impacts are very limited because there is no reasonably-foreseeable construction that would occur as a result of the project.

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.

PRV vault 6/5 - The district has obtained a easement from the homeowner to install the below ground vault.
Watermain/valve replacement, hydrant replacements, looping projects all fall with the county ROW and our allowable space to work in. We are obtain an easement for PRV 5/4 but initial talks with property owners indicate willingness on their part to courporate.

8.7 Construction Requirements

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

Bury depth is a minimum of 9' but mains have been found as deep as 14'. Our hillside is steep and has limited, 1 main road that serves the majority of the district and has the main water transmission line. Work on the road present challenges with traffic control and maintaining access for the public and for emergency services. The majority of our watermain has gas and electric shallow utilities directly above. This creates very difficult challenges having crews safely perform their work, trench boxes and shoring, etc. Our very short window for construction also dictates how much we can be accomplished in a summer. Normal construction season starts in May or June and has to end by Oct 15th, per county ROW regulations.

8.8 Operational Aspects

Discuss the operator staffing requirements, operator certification level requirements (including distribution), 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, chemical feed dosing, and process monitoring.

Current water/sewer staff will be onsite to perform AWWA testing procedure's for all projects. They hold the proper lisences to perform such tasks. A certified engineer with be onsite to perform construction activities as well. We plan to keep every property in water service during these projects as well as fire hydrants. Field staff will be available to response to issues and emergencies as presented. Proper planning and inspections will hopefully alleviate major issues.

8.9 Costs (TMF: Financial-2 and -3)

Summarize the capital costs associated with the selected alternative. The 20 year cash flow projection included in Attachment 7 must reflect the capital and operation and maintenance costs associated with the selected alternative. (No more than 2,000 Characters)

Water Infrastructure Upgrades: $4.5M
Mainline Projects/Abandonments: $770K
Source Water/Treatment Plant Projects: $320K

Cost Category Selection (Assign a percent to each applicable category)

Planning and Design Only (non-construction)	5
Construction - Treatment	0
Construction - Transmission and distribution	90
Construction - Source	5
Construction - Storage	0
Purchase of Systems	0
Restructuring	0
Land Acquisition	0
Water Rights	0
Other	0
Total: (must equal 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?

None, the district has been proactive in increasing our water and sewer rates to complete planned projects. Rates were raised 34% in 2023 to prepare for the large amount of projects on our list and to pay back a potential loan. Our rate study shows that this large increase as well as a 3-5% for the foreseeable future, should be able to fund all of our planned projects.

8.10 Environmental Checklist

Include the Environmental Checklist for the Selected Alternative as Attachment 22.

8.11 Project Implementation

8.11.1 Proposed Schedule

Loan application	11/03/2023	Design Plans (60 day review period)	01/01/2024
Advertisement for bids	02/05/2024	Award Contracts	03/04/2024
Start Construction	06/03/2024	Complete Construction	10/10/2025

8.11.2 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 23 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 23.

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	2650	People	Monitoring Plan
Current Service Area Population (If providing water to neighboring community)	3116	People	Both Monitoring Plans
Population Growth Rates	0.1	% increase/year	SGM Rate Study
Average Daily per Capita Flow Rate	72.67	Gallons per capita day	Water Meters/attached spreadsheet
Maximum Daily per Capita Flow Rate	89.25	Gallons per capita day	Water Meters/attached spreadsheet
Peak Hour Factor	3.72	Gallons per capita day	Water Meters/attached spreadsheet

Year	System Population	Service Area Population (if different)	Average Daily Flow	Maximum Daily Flow	Peak Hour Flow
+0	0	0	192817	236520	9855
+5	2663	3131	196068	240089	10003
+10	2676	3147	199374	243712	10154
+15	2690	3163	202736	247389	10307
+20	2703	3178	206155	251123	10463

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

Current Equivalent Residential Taps (ERT)		
A	Number of active residential taps:	0
B	Total annual consumption (gallons per year) - Residential	0
C	Estimated equivalent residential tap water usage Annual flow per ERT = B / A	0
D	Total annual consumption (gallons per year) - Commercial / Industrial / Irrigation	0
E	Estimated Commercial / Industrial / Irrigation flow in ERT # of commercial / industrial / irrigation ERT = D / C	0
F	Total ERTs = A + E	0

Population and Flow Assumptions / Data			Information Source
Current System Population	2650	People	Monitoring Plan
Current Service Area Population (If providing water to neighboring community)	3116	People	Both monitoring plans
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						0				
+5										
+10										
+15										
+20										