L. Green Project Reserve Business Case

Green Project Reserve Business Case Demonstrating Water Efficiency, Energy Efficiency and an Environmentally Innovative approach

for the

Timbers Water and Sanitation District Water Treatment Improvements

to accompany the application for a State Revolving Fund Loan

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Prepared by:
Mary Andre, P.E. and Tammy Lake, P.E.

of

Civil **D**esign **C**onsultants, Inc.
2145 Resort Drive Suite 100
Steamboat Springs, CO 80487
970.879.3022

Introduction

Water supply and treatment improvements are proposed for the Timbers Water and Sanitation District (Timbers) water system to provide the capability to comply with drinking water regulations. The water system is under an enforcement order for exceedances of Haloacetic Acids (HAA5), a disinfection byproduct (DBP) created when chlorine combines with naturally occurring organic compounds from the source water. The project is further described the evaluation report prepared by CDC, Inc, dated 6/2012. The proposed improvements have been reviewed in the context of the Green Project Reserve (GPR) guidelines of the EPA.

Timbers is pursuing a state revolving fund (SRF) loan for $350,000. The total project cost is $1,180,000. As is required for GPR projects, all work associated with this project has been determined to be eligible for SRF through a CDPHE eligibility assessment. Other funding sources for the project include: DOLA Energy/Mineral Impact Assistance Loan ($500,000) and Grant ($242,433), a Small Systems Training and Technical Assistance Grant ($25,000) for engineering design, and approximately $62,500 from Timbers reserves.

This report presents a business case for the project components demonstrating water efficiency. It should be noted, that additional green benefits relating to the project's energy efficiency and its environmentally innovative approach (sustainability) are also highlighted.

Water Efficiency

The following points address water efficiency contributions for the project:

- Less water will be used for backwash supply. As described in the evaluation report (CDC, 2012), the new well is anticipated to supply 70% of the water system's production requirements. This is expected to correspond to a 70% reduction in backwash supply for the creek water source's pressure filters. Using the average design criteria presented in this evaluation report for backwash supply (2225 gal/backwash cycle/filter, 75,000 gal/backwash cycle, 5.5 MG/yr production), the total backwash requirements without using the well would equate to 326,300 gallons/year. The water savings, with use of the well, are anticipated to be 70% of this value, or ~ 228,400 gal/year.
- Raw water rather than treated water can be used for backwash supply. The proposed improvements incorporate the capability to use either raw water or finished water for the backwash supply. It is anticipated that raw water will be used primarily but the capability to use finished water has been preserved to allow for backup redundancy. Therefore, the required backwash volume can be provided completely from the raw water storage and pumping resulting in up to a 100% reduction of treated water losses for backwash supply and also corresponding to a pumping cost reduction. This savings of 326,300 gallons is ~ 6% of the annual water production, and is equivalent to the total annual water usage of more than six families served by the Timbers water system (4,432 gal/account/year for 2011).
- Tank telemetry addition will prevent potential storage tank overflows. The addition of telemetry and remote equipment will eliminate the potential for storage tank overflow events, which have occurred previously. These events have not been as frequent as could be expected without functional tank telemetry due to the vigilance of the operator and

others residing in the service area to make frequent visits to the tank. The amount of water lost to tank overflows through the years is unknown, as there are not provisions in place to measure this water loss. The addition of tank telemetry and a Supervisory Control and Data Acquisition (SCADA) system will not only help to prevent any water loss due to tank overflows but will also provide the operator with tools for early detection of leaks. An additional benefit will be a reduction in the operational visits to the tank site.

Energy Efficiency

In addition to the primary case presented above for water efficiency, there will be energy savings as a result of this design. The following points address energy efficiency contributions for the project:

- Less required backwash volume corresponds to lower energy costs for pumping.
- Use of raw water instead of treated water for backwash supply lowers pumping energy.
- Premium efficiency motors are planned to be used for all pumps (two raw water pumps, two finished water pumps, and the well pump). In addition, the raw water pumps will be equipped with variable frequency drives.
- Lower electric costs are anticipated with the new building. The current electric costs for the existing water treatment building average approximately $400/month, according to the Timbers' bookkeeper. The main electrical demands would be related to heating the building and pumping the finished water. The existing building, of older construction and in need of upgrades, is not energy efficient. The new building is specified with insulation meeting the rating of R-38 for the roof and R-21 for the walls, and weatherstripping around the door. Similarly, the existing finished water pumps date back to the original installation and likely have poor efficiencies.

Environmentally Innovative

Finally, it is worth noting that there are also green components beyond those listed above for water and energy efficiency. "Environmentally innovative" is a term used in the EPA guidance to address project aspects that improve the sustainability of the water system, particularly from an environmental perspective. The following points address environmentally innovative contributions for the project:

- The treatment strategy brings to together multiple treatment technologies that are appropriate and sustainable for a small system contract operator.
- The proposed treatment for the creek water source incorporates direct filtration followed by bag/cartridge filtration as compliance filtration, allowing for adequate pretreatment to extend the bag/cartridge filter longevity and meet required water quality standards. Whereas with conventional filtration, another considered alternative, it may be difficult for a part-time contract operator to meet the rigid 0.3 NTU requirements consistently without potentially incurring more backwash waste, chemical waste, and/or operational labor.
- With the addition of a new water source for this project for blending, the water from the well is combined with the process water from the creek source after filtration and prior to

disinfection. The proposed approach appropriately treats each source without excessive or inappropriate backwash waste or chemical consumption. This prevents the unnecessary loss of water that would have been incurred for backwash cycles driven by volume throughput or time and avoids the associated inappropriate flow-paced chemical addition.

- It is anticipated that there will be substantial savings in bag/cartridge filter replacement. According to the Timbers' bookkeeper, the existing facility incurs disposable filter replacement costs in excess of $8,000/year, this equates to more than 100 filters bags/year. With improvements for pretreatment and increased driving head, these filter replacement costs and the corresponding volume of disposable filter bag/cartridge waste will be reduced. An additional benefit of less frequent bag/cartridge filter replacements will be less associated operational labor and an allowance for more time between needed operational visits.
- The addition of the groundwater source will increase water supply reliability, buffering low flow periods for the creek and providing redundancy in the event the watershed experiences a forest fire and subsequent impacts to the surface water supply. Similarly, this approach is also beneficial for the watershed and use of the well water will allow for more instream flows in McKinnis Creek.

Conclusions

The proposed improvements demonstrate substantial contributions for water efficiency, energy efficiency, and sustainability. Both the operational sustainability of the water system and environmental quality of the water resources of this watershed will benefit from this project.

For the reasons presented in this business case, this project is worthy of Green Project Reserve funding.