

**Green Business Case
Town of Pine Bluffs, Wyoming
2011 Water Distribution Replacement Project**

Green Reserve Project Description

The project being approved can be generally described as the installation of approximately 15,000 linear feet of 6-inch to 8-inch PVC water main and all associated valves, fire hydrants, fittings, service lines, service connections, and appurtenances.

Documents submitted and reviewed by the State:

The Wyoming State Revolving Funds has reviewed the following documents which are attached:

1. Lidstone and Associates, Inc spreadsheet detailing Green Project Reserve components dated October 17, 2011.

List of eligible Green Project Reserve components:

1. Identify the component(s) – For purposes of Drinking Water State Revolving Fund (DWSRF) funding, the portion of this project that will result in conservation of water (replacement of leaking mains), elimination of wastage of water (replacement of inoperable isolation valves) and a reduction in power usage and operating costs is considered eligible for Green Project Reserve.
2. Total project construction cost = \$ 2,550,000
3. Total 2011 Loan/Grant Request = \$ 2,550,000
4. Total project cost eligible for Green Project Reserve = \$ 1,930,000

Green Reserve Project – Categorical Project:

This project is not considered categorically green as defined by the USEPA guidance documents.

Green Reserve Project – Business Case Evaluation:

“As stated in the USEPA March 2, 2009 Memorandum, for traditional projects that are not categorically green, for the project, or components of the project, to be counted towards the 20% requirement, the State project files must contain documentation that a clear business case for the project (or portion) investment includes achievement of identifiable and substantial benefits that qualify as Green Project benefits. The documentation should reference to a preliminary engineering or other planning document that makes clear that the basis upon which the project (or portion) was undertaken included identifiable and substantial benefits qualifying for the Green Project Reserve. The March 12, 2009 USEPA webcast slides 20 and 21 state that two components, the technical component and financial component, must be provided in the Business Case.”

Green Project Reserve Type:

This project fits in the water efficiency and energy efficiency type.

Technical Component Evaluation:

A large portion of the Town of Pine Bluffs’ existing water distribution system is more than 50 years old. Many of the distribution mains, isolation valves, and appurtenances have exceeded their design life and are deteriorating rapidly. These outdated mains are subject to frequent breaks and leaks, requiring repair. Due to the number of aged and inoperable isolation valves, when leaks or breaks do occur, a

significant amount of water is wasted due to the Town's inability to quickly isolate the section of line for repair.

The Town of Pine Bluffs Water System Improvement Project involves the replacement or addition of approximately 15,000 feet of water main. Mains identified for replacement were selected based on their age and maintenance history. The replacement of these mains will reduce leakage, decrease maintenance, reduce water wasting and associated treatment costs, and improve the overall efficiency of the water system.

The Town of Pine Bluffs' maintenance supervisor, Tom McDonough, estimates that there are on average four to five minor leaks (i.e., corporation stop/saddle tap leaks) each year due to aged infrastructure. Each of these breaks averages a loss of about 12,000 gallons of water before the line can be isolated and repaired. This results in an estimated loss of 60,000 gallons per year due to minor leaks on the deteriorated mains.

In addition to the minor leaks which result in water loss and increased maintenance for the Town, the major main breaks are even more problematic and are becoming increasingly common. Over the past decade, there have been multiple documented cases of major main failures throughout the proposed project area. Based on the Town's experience, once a rupture occurs on an aged water main, additional breaks tend to occur in close succession in the vicinity of the original break. A few of the recent major breaks are detailed below:

- In 2002, the 4 inch main near 4th and Main Streets ruptured and required approximately six hours to isolate and repair. Assuming that water flowed at a rate of 200 gpm for two and half hours before being isolated, it is estimated that approximately 30,000 gallons of water were wasted as a result of this rupture. As with all major breaks, flushing was required to disinfect the main, which resulted in an estimated 5,000 gallons of wasted water. Therefore, the total loss from this incident is estimated at 35,000 gallons. This 4 inch main was originally constructed by the Civilian Conservation Corp (CCC) during the 1930s. While repairing this main, efforts to isolate the break continued to fail when the old pipe continued to fragment.
- A similar main break occurred in 2005 on Market Street. In this instance, the time required to repair the line failure was approximately eight hours, mostly paid in overtime wages, and the water losses were approximated at 35,000 gallons.
- Since approximately 2007, major main failures in the proposed project area have become even more frequent, usually occurring at least once per year. In 2007, the same 4th Street main failed again, this time near the Pine Street intersection. To isolate this section of the distribution system, it was necessary to close isolation valves within a four block radius. This resulted in water losses of approximately 45,000 gallons and took seven hours for the Town to address, mostly at overtime wages.
- In 2008, the 4th Street 1930's vintage line ruptured once again, only two blocks away from the previous year's repair. Due to a serious shortage of operational isolation valves in this area of town, it was necessary to shut the water off directly below the storage tank, which disrupted service to every resident. It's estimated that the water lost through this rupture was approximately 25,000 gallons and the inconvenience was felt by the entire Town.

- Recently, a feed line to a fire hydrant slated for replacement on Market Street failed, which resulted in approximately 30,000 gallons of water lost before it could be repaired.
- The 4 inch main on Miller Street ruptured, which required the Town to isolate an area of approximately 24 blocks. The estimated loss from this break was approximately 55,000 gallons.
- The 4 inch main on 7th Street ruptured recently which required shutting down multiple blocks in each direction to isolate and repair the break, with water losses estimated to be approximately 30,000 gallons.

On average, between the four to five minor leaks and one major line failure the Town has experienced over the past decade, approximately 100,000 gallons of water are lost annually. This amount only reflects the amount of water associated with *repaired* leaks each year. Due to the age of these water mains, there is suspected additional unaccounted water caused by slow or unidentified leaks, leaking fittings, faulty valves, etc. The Town estimates that this volume may represent 10% of their annual produced water. Given the average age of these water mains (50+ years) and the deteriorated condition of this iron pipe, a catastrophic failure is anticipated. Several of the water mains have been in the ground for over 80 years and have clearly exceeded their design life by two to threefold.

The Town of Pine Bluffs has practiced water conservation for over 30 years. As the town grew it purchased several shallow (28 to 130 foot) agricultural wells. The Extrom well, originally dug in 1922 was one of the earliest town wells. Over the years, some of these wells were deepened and some were abandoned as they no longer provided adequate water supply. Because the agricultural users were in the same area, the Town became increasingly concerned with the amount of water available to residents as well as the water quality and potential impacts due to agricultural chemicals. Since 1976, the shallow aquifer in eastern Laramie County Wyoming has been part of a Groundwater Control Area and the construction of new wells is closely administrated. Since 1995 water levels have continued to drop and in some cases water levels have declined over 35 feet and water yields have decreased from over 500 gpm to less than 50 gpm. The Town has spent over \$1M to protect their water supply and have completed two deep (Cretaceous Age) 600 to 800 foot water wells, explored and completed supplementary shallow wells and completed an isolated transmission line to allow better water treatment and blending opportunities. In 2009 and 2010 the Town completed a new water meter replacement project to ensure that all water was accounted. Water conservation is extremely important to the Town of Pine Bluffs. The replacement of aged water mains is part of the Town's ongoing water conservation program.

Financial Component Evaluation:

Unaccounted water, in the form of line leakage, main breaks, and water wasting, results in increased treatment and pumping costs. This project will reduce the amount of unaccounted water and reduce the associated costs with producing that water and repairing main failures.

The Town estimates it costs approximately \$1,200 in labor to repair a typical minor leak. With the combined cost of parts, equipment, and backfill material, the total estimated cost to the Town to repair a minor leak is \$3,400. With an average of five minor leaks per year, the Town is currently spending approximately \$17,000 a year on parts and labor to repair minor corporation or saddle tap leaks.

The labor costs to repair a major line failure are typically \$2,000 with another \$3,000 in parts, equipment and resurfacing, for a total of \$5,000.

The Town of Pine Bluffs is a small town and the \$22,000 a year spent repairing their deteriorating mains is a significant strain on their emergency reserve budget. In addition to the actual repair costs, the approximately 100,000 gallons of water lost each year results in increased pumping and chlorination costs.

Green Reserve Project – Evaluation Conclusion:

Replacing the aged and deteriorated mains will reduce the overall system water loss, reduce the energy and treatment costs associated with producing this wasted water, and save the Town's limited resources that are currently being strained by the increasing number of main failures. Experience has indicated that without replacing the mains that have so significantly outlived their design life, the number of main failures will increase drastically. As the Town continues to provide 'patchwork' repair on each aged main, they can anticipate additional nearby breaks will occur in quick succession. These additional and ongoing breaks and leakage will impact the Town both fiscally and will result in continued waste of water.

The remaining (not considered green) portions of this project include the installation of new water mains to complete loops and improve pressures in certain areas of Town. As mentioned previously, only those components that involve the replacement of aged and deteriorating mains (water conservation) were deemed "green" eligible for DWSRF funding purposes. Therefore, the total "green" component of the work is \$1,930,000, or 75% of the total SRF loan.