

Drinking Water State Revolving Fund Green Project Reserve
- Final -



City of Idaho City Drinking Water Project
SRF Loan #DW 1104
\$2,354,000

Final Green Project Reserve Justification
Categorical & Business Case GPR Documentation

1. REPLACES 1,100 FEET OF 6" DIAMETER C900 PVC DISTRIBUTION PIPING WITH NEW 6" DIAMETER HDPE PIPE (Water Efficiency) Categorical GPR per 2.4-1: *Projects that result from a water efficiency related assessment such as water audits; also Business Case GPR per 2.4-4: Proper water infrastructure management should address where water losses could be occurring...fix them...replacing aging infrastructure (\$67,470).*
2. INSTALLS A SCADA SYSTEM (Water Efficiency) Categorical GPR per 2.4-1: *Projects that result from a water efficiency related assessment such as water audits; also, (Energy Efficiency) Business Case GPR per 3.5-1& 3.5-7: energy efficient retrofits (\$109,000).*
3. INSTALLS VFDs ON TWO HIGH SERVICE PUMPS (Water Efficiency) Categorical GPR per 2.4-1: *Projects that result from a water efficiency related assessment such as water audits; also, (Energy Efficiency) Business Case GPR per 3.5-1: Energy efficient retrofits...(VFDs). (\$7,500).*



1. PIPE REPLACEMENT¹

Summary

- Replacement of 1,100 feet of leaking distribution pipe with new 6-inch HDPE pipe to eliminate the loss of 61.5 million gallons of water per year (MGY), equal to 48% of the City's total water production.
- Loan amount = \$2,354,000
- GPR project = \$67,470
- Water saving (GPR) portion of loan = 3% (\$67,470)

Background

- The overall project addresses public health concerns associated with high turbidity levels and depressurization. It includes replacement of distribution piping along Placer Street, provision of two new wells for additional source water, construction of two reservoirs to increase storage capacity, and improvements to the treatment plant.
- A water audit² was performed by the City to determine the percent of unaccounted water loss from the beginning of the distribution system to the individual water meters and water service connections. The audit indicated extensive water loss attributed to leaking 65 year old 6" diameter tar wrapped steel distribution pipe along Placer Street. The audit confirmed a loss of over 48% of water entering the distribution system.
- Leaks are due to aging, leaking pipe connections, rock intrusion and poorly bedded pipe.
- The Water Facilities Planning Study recommended the replacement of 1,100 linear feet of 1940's era 6" diameter steel distribution pipe along Placer Street with 6" diameter HDPE pipe.

Calculated Water & Cost Savings

- The total amount of water lost in the distribution system was determined using the daily flow records maintained by the City. Water data shows that the City is currently producing 128MG/yr of drinking water.
- The results of the analysis show that from the beginning of the distribution system to the individual water meters, the City is losing 61.3MG/yr (= 48% of total production). The loss is attributed to leakage of water from old and cracked distribution pipe along Placer Street.
- By installing new 6" HDPE pipe the City anticipates conserving 61.3 MG/yr of treated drinking water.
- At a cost per unit of production of \$0.70 per 100 cubic feet, the cost savings of conserving 61.5 MGY of water is estimated at \$57,554 per year. The payback for the project in terms of water saved is less than one year.

Conclusion

- By replacing the 1,100 feet of leaking distribution pipe the City anticipates conserving 61.5 MGY (48% of overall water produced).
- Additional benefits include reductions in pumping costs and operation and maintenance expenditures.
- The project also eliminates potential health hazards associated with waterborne pathogens entering the water distribution system.
- **GPR Costs:** Replacing 1,100 feet of distribution piping = \$67,470
- **GPR Justification:**
 - The project is Categorically GPR-eligible (Water Efficiency) per Section 2.4-1: *Projects that result from a water efficiency related assessment such as water audits;*
 - Also GPR-eligible per a Business Case per 2.4-4: *Proper water infrastructure management should address where water losses could be occurring...fix them...replacing aging infrastructure*³.

¹ Idaho City Drinking Water Facility Plan, 2010, Pharmer Engineering

² Water Audit, 2009, Pharmer Engineering

³ Attachment 2. EPA Guidelines for Determining FY11 Project GPR-Eligibility.

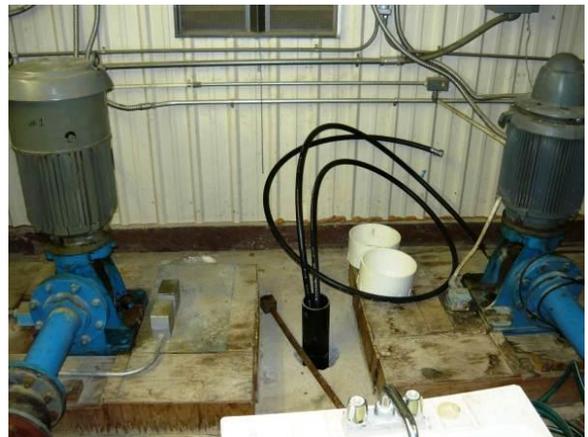
2. TREATMENT PLANT UPGRADE – SCADA SYSTEM

Summary⁴

- Treatment Plant renovation includes a new SCADA system.
- Estimated loan amount = \$2,354,000
- GPR project = \$109,000
- Estimated water efficiency (green) portion of loan = 4.6% (\$109,000)
- Estimated annual energy cost savings is \$34,675 per year.

Background⁵

- A Water audit was conducted by Pharmer Engineering in 2009 with available data from 2007 and 2008. The water audit was part of the Water System Planning Document completed in 2010.
- The Idaho City SCADA upgrade is designed to eliminate water losses due to plant inefficiencies.
- The plant produces approximately 128MG/year of drinking water and distributes only 101MG/year.
- It is estimated that the plant is losing water at a rate of 27 MG/yr.
- Cost to run the existing high-service pumps for one year equals approximately \$13,750.



Efficiency Improvements⁷

- SCADA automation at the plant will reduce water loss by 95% or 25.6MG/year (= 69,882 gpd).
- SCADA cost savings at the current City water billing rate of \$1.35/1000 gallons = $\$1.35 \times 69.882 = \95 per day (= \$34,675/yr.).
- Total annual cost savings due to SCADA = \$34,675.
- Total cost of the SCADA treatment plant upgrade = \$109,000.

Conclusion

- With SCADA, energy use will be reduced while conserving water at a rate of approximately 25.6 MGY.
- Payback on water treatment plant energy efficiency improvements = $\$109,000 \div \$34,675/\text{year} = 3.1$ years.
- **GPR Costs:** Installing SCADA = \$109,000
- **GPR Justification:**
 - The project is Categorically GPR-eligible (Water Efficiency) per Section 2.4-1: *Projects that result from a water efficiency related assessment such as water audits;*
 - Also GPR-eligible (Energy Efficiency) per a Business Case per 3.5-7... *(SCADA) that achieve substantial energy savings.*⁶

⁴ 3/17/11 & 9-20-13 Correspondence with Josh Reed, Design Engineer, Pharmer Engineering

⁵ Idaho City Drinking Water Facility Plan, Pharmer Engineers, 2010

⁶ Attachment 2. EPA Guidelines for Determining FY11 Project GPR-Eligibility p.20

3 . TREATMENT PLANT UPGRADE –VFDs

Summary⁷

- Treatment Plant renovation includes energy-efficiency upgrades by integrating new VFDs for the two high service pumps at the plant.
- Estimated loan amount = \$2,354,000
- GPR project = \$7,500
- Estimated water efficiency (green) portion of loan < 1% (\$7,500)
- Estimated annual energy cost savings is \$1,375 per year.

Background⁸

- The Idaho City VFD pump upgrade is designed to eliminate plant energy inefficiencies.
- The plant distributes approximately 101MG/year of drinking water.
- Cost to run the existing high-service pumps for one year equals approximately \$13,750.

Efficiency Improvements⁹

- The VFDs specified for the upgrade are units.
- The new VFDs at the water plant for the 15 HP motors will result in approximately a 10% cost savings over the power costs of the motors currently installed.
- Total annual cost savings due to VFDs = \$1,375/yr.
- Total cost of the treatment plant upgrade with VFDs = \$7,500.

Conclusion

- By upgrading the motor VFDs in the high-service pump station, energy use will be reduced an annual rate of approximately \$1,375/yr. The cost of the VFDs will be recovered in 5.5 years.
- **GPR Costs:** Installing VFDs = \$7,500
- **GPR Justification:**
 - The project is Categorically GPR-eligible (Water Efficiency) per Section 2.4-1: *Projects that result from a water efficiency related assessment such as water audits;*
 - Also GPR-eligible (Energy Efficiency) per a Business Case by Section 3.5-1: *Energy efficient retrofits... (VFDs).*¹⁰



Allen Bradley Power Flex 70 VFD

⁷ 3/17/11 & 9/10/13 Correspondence with Josh Reed, Design Engineer, Pharmer Engineering

⁸ Idaho City Drinking Water Facility Plan, Pharmer Engineers, 2010

⁹ 10/25/11 Memo to DEQ, Pharmer Engineering

¹⁰ Attachment 2. EPA Guidelines for Determining FY11 Project GPR-Eligibility p.20