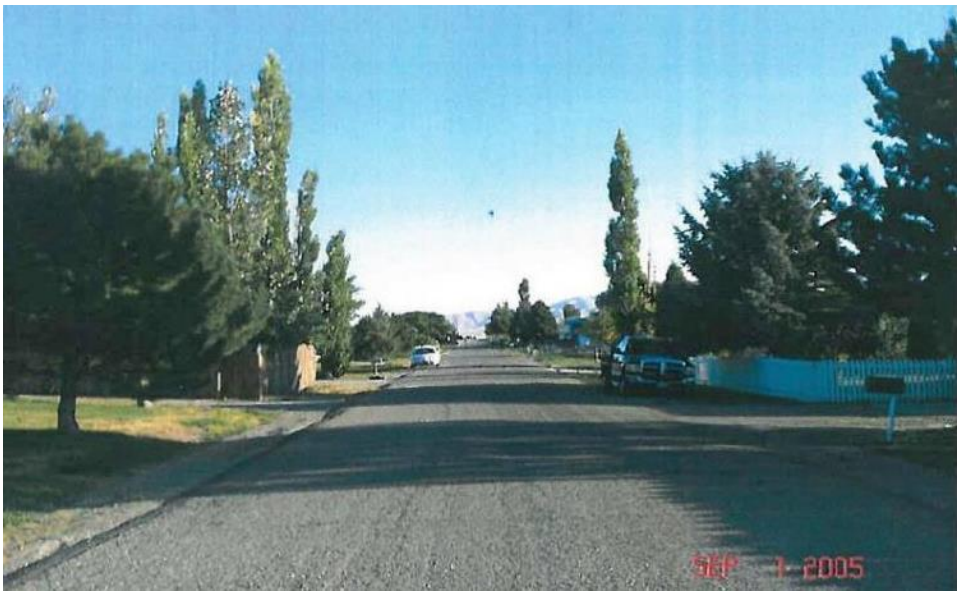
Drinking Water State Revolving Fund Green Project Reserve

- Preliminary -



Smith Road Water Users Assoc. Drinking Water Project

SRF Loan #DW1603 (pop. 57)

$840,090

Preliminary Green Project Reserve Justification

Categorical GPR Documentation

1. INSTALL 19 WATER METERS WITH AMR SYSTEMS (Water Efficiency). Categorical GPR per 2.2-2a*: Installing any type of water meter in previously unmetered areas if rate structures are based on metered use* ($37,000).

Business Case GPR Documentation

2. REPLACES LEAKING DISTRIBUTION PIPING (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 2.4-1…*reducing water consumption*; per 2.4-4: *Proper water infrastructure management should address where water losses could be occurring…fix them…replacing aging infrastructure;* also per 2.5-2: *Distribution pipe replacement …to reduce water loss and prevent water main breaks* ($71,000).
3. INSTALLS NEW WELL WITH ENERGY-EFFICIENT PUMP AND VFD CONTROLLER; REPLACES EXISTING WELL PUMP WITH NEW ENERGY-EFFICIENT PUMP AND VFD CONTROLLER (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient …new pumping systems…including VFDs* ($50,000).

Approved by the State of Idaho SRF Loan Program

March 2016

Categorical

1. New Water Meters[1] (Preliminary)

Summary

- The Smith Road Water Users Association (SRWUA) will install 19 remote-read water meters.
- Loan amount = $840,090
- GPR portion of loan (AMR) = 4% ($37,000)

Background

- The SRWUA services approximately 19 single family residences.
- The population serviced by SRWUA is approximately 57 people via 19 connections.
- As an unmetered community, the consumptive values are very high in comparison with metered communities.

Results

The project consists of:

- Abandoning Well #1 and drilling a replacement well, including an energy-efficient pump/ VFD which will become the primary water supply;
- Refurbishing Well #2 with a new energy-efficient pump/VFD as a supplemental well providing system redundancy;
- Installing new distribution piping of four inch C900 PVC pipe with flushing hydrants at each end of Smith Road to eliminate dead ends;
- Installing remote-read water meters.

Conclusion

- Metering of water consumption is an important conservation measure because providing water bills based on consumptive use sends a strong price signal to customers resulting in more efficient consumption.
- Implementation of a tiered rate structure, after meter installation, will further aid conservation efforts extending the life of the water supply system and delaying capital expansion projects.
- **GPR Costs**: Purchase and install meters = $37,000 (preliminary estimate)
  Total = $37,000
- **GPR Justification**: The project is Categorically GPR-eligible (Water Efficiency) per Section 2.2-2a*: Installing any type of water meter in previously unmetered areas if rate structures are based on metered use*[2].

[1] May 2015 Smith Road WUA Amendment to the FPS B Phinney, P.E., Keller Engineers
[2] 2012 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.

2. Distribution System Pipe Replacement (Preliminary)

Summary

- Replacement of leaking distribution piping with new 4-inch C-900 PVC pipe eliminating the loss of approximately X million gallons of water per year (MGY).
- Loan amount = $840,090
- GPR portion of loan = $71,000 (preliminary cost) = 8%
- Water saving (GPR) portion of loan = X%

Background

- The water system faces difficulties with both water quantity and quality. A few issues with the system include Maximum Contaminant Level (MCL) exceedance, well failure, loss of pressure, dead ends in the distribution system, unmetered flows, and a badly corroded and leaking water storage tank.
- Calculated system water loss = X

Results

- Distribution pipe replacement is a component of this project due to the high calculated water loss that is occurring in the existing system. The cost for replacement of the distribution system with C-900 PVC pipe is $71,000

Conclusion

- By replacing the X feet of old leaking distribution piping, it is estimated that the Association will conserve X MGY (X% of overall water to be delivered to distribution network).
- The project also eliminates potential health hazards associated with waterborne pathogens entering the water distribution system by replacing leaky pipes with new corrosion resistant materials.
- **GPR Costs**: Replacing X feet of distribution piping = $71,000
  Total GPR Costs = $71,000
- **GPR Justification**: The replacement of undersized water distribution piping as recommended in the Facility Planning Study is GPR-eligible by a Business Case GPR (Water Efficiency) per the criteria requirements of Section 2.4-1: …*reducing water consumption*; per 2.4-4: *Proper water infrastructure management should address where water losses could be occurring…fix them… replacing aging infrastructure;* also per 2.5-2: *Distribution pipe replacement …to reduce water loss and prevent water main breaks.*[3]

[3] 2012 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.

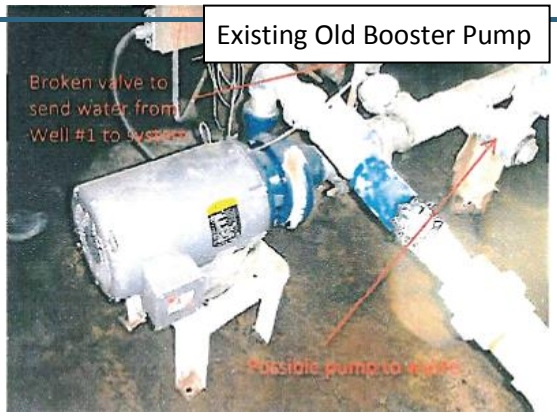
3. New Pump/VFD and Replacement Pump/VFDs (PRELIMINARY)

Summary

- A total of 2 new pumps will be installed and equipped with variable frequency drives (VFDs).
- Loan amount = $840,090
- Energy savings (green) portion of loan = 6% ($50,000)
- Simple pay-back period = X years (VFD) and X years (motor)

Background

- The system is short on redundancy, overall well capacity, storage capacity and emergency power supply.
- The project is eliminating the need for a booster pump. Removal of Well #1 will remove the non-premium efficiency pump and motor.
- A new well will be added to the system and the existing well #2 is are being rehabbed.
- All of the wells are being fitted with new pumps and motors with premium efficiency motors and VFD's.



Calculated Cost Effectiveness of Improvements[4] (Preliminary)

Motor Analysis: Booster Pump Station (eliminated)

- This 7.5 Hp pump, at least 35 years old, ran continuously when in use. It will be taken out of service.
- A similar EPAct motor would have a motor efficiency of approximately 94.5%[5].
- Energy savings of the Premium Energy-Efficient motor over the EPAct motor = 3,158 kWh/yr. = $315.80/yr[3].
- EPAct motor cost = $7,300; Premium motor cost = $8,700. Simple pay-back period for the cost difference of the Premium motor over the EPAct motor = **4.4 years**[3].

Motor Analysis: Well No.2 Refurbishment

- The new motors are premium energy-efficient 75-HP models; the motor efficiency will be at least 95.4%[4].
- A similar EPAct motor would have a motor efficiency of approximately 94.1%[5].
- Energy savings of the Premium Energy-Efficient motor over the EPAct motor = 3,803 kWh/yr. = $380.30/yr[3].
- EPAct motor cost = $5,800; Premium motor cost = $6,900. Simple pay-back period for the cost difference of the Premium motor over the EPAct motor = **2.9 years**[3].

Motor Analysis: New Well

- The new motor is a premium energy-efficient 400-HP model; the motor efficiency will be at least 96.2%[4].
- A similar EPAct motor would have a motor efficiency of approximately 95.4%[5].
- Energy savings of the Premium Energy-Efficient motor over the EPAct motor = 9,161 kWh/yr. =

[4] WEG Electric Motor Payback Tool, energy cost @ $0.10/kWh.
[5] NEMA MG-1 Table 12-11 Full Load Efficiencies of EPAct Efficient Electric Motors

(CONT.) NEW ENERGY EFFICIENT PUMPS & VFDS

$916.10/yr[3].

- EPAct motor cost = $22,500; Premium motor cost = $30,500. Simple pay-back period for the cost difference of the Premium motor over the EPAct motor = **8.7 years**[3].

VFD Analysis:

Well No.2 Refurbishment

- WITHOUT A VFD: New 75-HP pumps without VFDs have a motor efficiency = 95.4%[4]. Annual MWH utilized for this new system = 310.18; energy cost approximately = $31,018.
- WITH A VFD: New 75-HP pump with a VFD has a motor efficiency = 95.4%; VFD efficiency = 98%. Overall efficiency = 93.5%. Annual MWH utilized for this new system is = 223.64; energy cost approximately = $22,364.
- Therefore, using a VFD for the new pumps provides a decrease in energy consumption of 86.54 MWH for a savings = $8,654 annually. At a typical VFD cost of $9,800 the pay-back period = **1.4 years**.

VFD Analysis:

New Well

- WITHOUT A VFD: New 400-HP pump without VFDs have a motor efficiency = 96.2%[4]. Annual MWH utilized for this new system = 1490; energy cost approximately = $149,000.
- WITH A VFD: New 400-HP pump with a VFD has a motor efficiency = 96.2%; VFD efficiency = 98%. Overall efficiency = 94.3%. Annual MWH utilized for this new system is = 1074; energy cost approximately = $107,400.
- Therefore, using a VFD for the new pump provides a decrease in energy consumption of 416 MWH for a savings = $41,600 annually. At a typical VFD cost of $60,000 the pay-back period = **1.4 years**.

Conclusion

- **GRP Costs Identified**:

  VFDs (2 @ $X) = $X
  Pumps(2 @ $X) = $X
  Total = $50,000

- **GPR Justification**: The Pump/VFD system is Business Case GPR-eligible (Energy Efficiency) per Section 3.5-1: *Energy efficient retrofits, upgrades, or new pumping systems and treatment processes (including variable frequency drives (VFDs).*

This loan agreement is for design and construction of the following project:

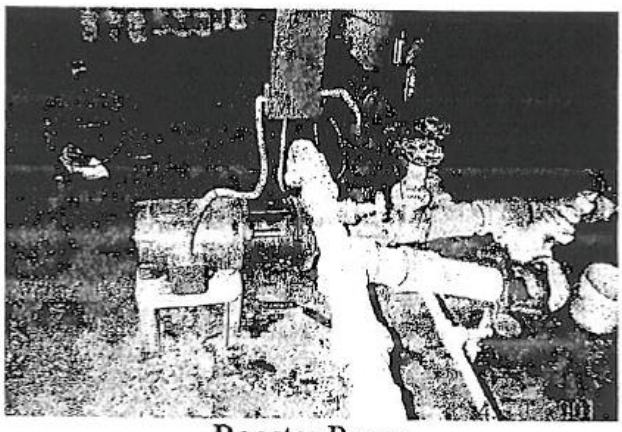
A.	Loan Project Number:	DW 1603
B.	Name and Address of Borrower:	Smith Road Water Users Association 11421 W 2 1/2 Mile Road Chubbuck, Idaho 83202
C.	Project Description:	This project consist of abandoning Well #1, refurbishing Well #2, constructing a new well house, installing new distribution piping, installing

The project consists of abandoning Well #1 and drilling a replacement well in the vicinity of Well #1 including an energy-efficient pump and VFD which will become the primary water supply, refurbishing Well #2 with a new energy-efficient pump and a VFD to act as a supplemental well providing system redundancy, installing new distribution piping consisting of four inch C900 PVC pipe with flushing hydrants at each end of Smith Road to eliminate dead ends, and installing remote-read water meters.

The distribution system will be built using four inch diameter C900 PVC pipe. Flushing hydrants will be supplied at each end of Smith Road where dead ends occur in the distribution system.

Photo 2. Booster pump with associated pipes and valves.

The booster pump is located inside the well house and was installed in 1975. It is a centrifugal 7.5–hp pump and runs continuously. It has a low-pressure cut-off.



Booster Pump