

Drinking Water State Revolving Fund Green Project Reserve

- Interim -



Wayside Estates Homeowners Association (HOA) Drinking Water Project SRF Loan #DW1903 (pop. 50) \$648,150

Interim Green Project Reserve Justification¹

Categorical GPR Documentation

1. INSTALL 23 WATER METERS (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 (\$34,500).*

Business Case GPR Documentation

2. REPLACES LEAKING DISTRIBUTION PIPING (Water Efficiency). 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 (\$282,000).*
3. INSTALLS NEW WELL WITH ENERGY-EFFICIENT PUMP AND VFD CONTROLLER (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient ...new pumping system...including VFD (\$31,900).*

¹ Costs, analyses, and text to be updated by the loan recipient in the GPR Technical Memorandum, due with submission of the Final Design

1. NEW WATER METERS²

Summary

- The Wayside Estates Homeowners Association (HOA) will install 23 water meters in a previously unmetered community water system.
- Loan amount = \$648,150
- GPR portion of loan = 5.3% (\$34,500) (preliminary)

Background

- Wayside Estates is a small residential community northeast of the City of Heyburn, in Minidoka County, Idaho.
- The HOA services approximately 23 single family residences.
- The population serviced by the HOA is approximately 50 people.
- As an unmetered community, the drinking water consumptive values are very high in comparison with metered communities.

Results

The project consists of upgrading an old, substandard water system by:

- Drilling an additional well and outfitting it with an energy-efficient pump and VFD;
- Replacing undersized, 1.5 inch galvanized distribution piping with new four inch C900 PVC pipe;
- Installing water meters to institute a consumptive-based water charge.



Conclusion

- Metering of water consumption is an important conservation measure because providing water bills based on consumptive use results in more efficient consumption.
- **GPR Costs:** Purchase and install meters = \$34,500
- **GPR Justification:** The project is Categorical GPR-eligible (Water Efficiency) per Section 2.2-2: *Installing any type of water meter in previously unmetered areas*³.

² Wayside Estates Homeowners Association Water Facility Plan, Mountain Waterworks, August 2018.

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

2. Distribution System PIPE REPLACEMENT

Summary

- Replacement of leaking distribution piping with new 4-inch C-900 PVC pipe will eliminate the current substantial water loss by the system.
- Loan amount = \$648,150
- GPR portion of loan = \$282,000 = 44% (Preliminary Cost)

Background

- Construction of the water system was completed in 1969, with the water source being constructed prior to the distribution network in the early 1960's. The system comprises of a single supply well, booster tanks, water mains, and disinfection unit.
- The well supplies water to 23 connections in a single pressure zone.
- The water distribution system is comprised of approximately 2,500 feet of 1½-inch galvanized and plastic water main.
- The distribution system currently experiences substantial leakage.
- ADF = 6,000 gpd



Results

- Unaccounted-for Water (UAF) is water that is lost in the distribution piping from the water source to the connection due to leakage. UAF is dependent on the age and condition of the piping. Due to the system's age and leakage reported by the operator, HOA UAF = 20 percent.
- Distribution pipe replacement is a primary component of this project due to the high UAF that is occurring in the existing system. The undersized 1.5 inch pipe will be entirely replaced with 2,500 LF of 4-Inch C900 PVC water main.

Conclusion

- Replacing the 2,500 feet of leaking undersized distribution piping will conserve water and power. The estimated 20% water loss will be eliminated; energy will be conserved as less water will need to be pumped, and pumping through properly sized mains will require less energy.
- **GPR Costs:** Replacing 2500 feet of distribution piping = \$282,000
Total GPR Costs = \$282,000 (preliminary)
- **GPR Justification:** Replacement of distribution piping is GPR-eligible by a Business Case (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.*⁴

⁴ 2012 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.

3. New Pump/VFD Controller

Summary

- The HOA will install a new well pump with high efficiency motor controlled by Variable Frequency Drive (VFD).
- Loan amount = \$648,150
- Energy savings (green) portion of loan = \$31,900 (4.9%) (Preliminary)

Background

- The Wayside Estates public water system is supplied by a single groundwater source located on a dedicated well lot within the subdivision.
- The well pump motor is single phase and is not connected to a variable frequency drive (VFD).
- The well supplies water directly to the distribution system with one pressure zone and two hydropneumatic tanks for low water usage periods.



Existing Well Pump

Cost Effectiveness of Improvements⁵

Motors/VFDs:

The Baseline Standard Practice (BSD) for comparison is a standard Epack motor not controlled by a VFD⁶.

- **BSD: Existing Pump - no VFD**
Berkeley pump, standard efficiency (60% assumed)
Motor rating = 5 hp
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 27,220 kW-hr
- **Proposed Pump - no VFD, with premium efficiency motor**
Efficiency = (80.0%)
Motor rating = 5 hp
% Annual Usage = 40% (average daily operation throughout the year)
Energy usage = 16,330 kW-hr
- **Proposed Pump - VFD operation with premium efficiency motor**
Efficiency = (80.0%)
Motor rating = 5 hp
% Annual Usage = 50% (average daily operation throughout the year, assume average operation at 70% full power)
Energy usage = 14,290 kW-hr
- **Energy Reduction – comparing existing pump to new premium pump**
Energy usage, existing = 27,220 kW-hr
Energy usage, new premium pump = 16,330 kW-hr
- **Energy Reduction - comparing premium pump with VFD to premium pump without VFD**
Energy usage, w/o VFD = 16,330 kW-hr
Energy usage, w/ VFD = 14,290 kW-hr
- Replacing the old pump with a new premium pump results in a 40% energy reduction.

⁵Energy cost @ \$0.12/kWh.

⁶NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

Conclusion

- The combined annual energy savings for utilizing premium pump and VFD is estimated to be 12,930 kWh/year per motor/VFD system - corresponding to an energy reduction of 47.5% when compared to the Baseline Standard Practice.
- The premium energy-efficient pumps/VFDs are categorically GPR eligible as they achieve greater than 20% reduction in energy consumption and are cost-effective with a payback period of 20 years, assuming power cost of \$0.12 per kWh.
- **GRP Costs Identified:**
Well VFD (\$9,400) + Pump & Motor (\$22,500) = **Total = \$31,900**
- **GPR Justification:**
The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2 page 9⁷: *Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR; also, per 3.5-9: VFDs can be justified based upon substantial energy savings.*

⁷ Attachment 2. April 21, 2010 EPA Guidance for Determining Project Eligibility