

Drinking Water State Revolving Fund Green Project Reserve
– Preliminary –



City of New Meadows Drinking Water Project
SRF Loan #DW1809 (pop. 475)
\$2,845,500

Preliminary Green Project Reserve Justification¹

Categorical GPR Documentation

1. UPDATE BOOSTER PUMP STATION WITH PREMIUM ENERGY-EFFICIENT PUMPS AND VFDS (Energy Efficiency). Categorical per GPR 3.2-2: *projects that achieve a 20% reduction in energy consumption; if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case*; also, per 3.5-9: *VFDS can be justified based upon substantial energy savings (\$500,000)*.
2. INSTALLS NEW SCADA SYSTEM TO ENHANCE REMOTE MONITORING (ENERGY Efficiency). GPR Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings. (\$150,000)*.

Prepared by the State of Idaho SRF Loan Program
July 2018

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. PREMIUM PUMPS AND VFDS (PRELIMINARY)

Summary

- As part of the upgrade project, the City of New Meadows will refurbish the booster pump station with pumps equipped with premium energy-efficient motors and VFDS.
- Total Loan amount = \$2,845,500
- Estimated energy efficient (green) portion of loan = 18% (\$500,000) (design cost estimate)

Background

The water system generally consists of the following:

- 2 active municipal wells
- 1 ground-level 250,000 gallon capacity water storage tank
- 1 booster pump station
 - 1 main 15 HP booster pump = 400 gpm
 - 1 10 HP jockey pump = 100 gpm
 - 1 standby pump = 1,000 gpm
- 41,000 feet of water main
- The booster pumps have reached their useful and requirement replacement.



GPR Justification

Motors/VFDs:

The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD³. Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Proposed Pumps - no VFD, standard Epact efficiency motor**
Type: Vertical Turbine Hollow Shaft
Motor = 125 hp; Motor type = standard efficiency (93.0% assumed at 75% of full load⁴)
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 125,078 kW-hr
- **Proposed Pumps - no VFD, with premium efficiency motor**
(95.4% assumed at 75% of full load)
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 122,076 kW-hr
- **Proposed Pumps - VFD operation with premium efficiency motor**
Motor = 125 hp; Motor type = standard efficiency (95.4% assumed at 75% of full load)
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 98,703 kW-hr
- **Energy Reduction - comparing with VFD to without VFD**
Energy usage, w/o VFD = 122,076 kW-hr
Energy usage, w/ VFD = 98,703 kW-hr

Therefore, the premium motors with VFDS result in a 21.1% energy reduction compared to non-VFD, standard efficiency motors.

² City of New Meadows Water Facilities Planning Study, Crestline and Mountain Waterworks, May 2018

³ NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

⁴ http://www.copper.org/environment/sustainable-energy/electric-motors/education/motor_text.html

PREMIUM PUMPS AND VFDs (CON'T)

Conclusion

- The combined annual energy savings for utilizing premium pumps and VFDs is estimated to be **26,375 kWh/year** per motor/VFD system - corresponding to an energy reduction of **21.1%** when compared to the Baseline Standard Practice.
- **GRP Costs Identified:**
Booster Station = **\$500,000**
- **GPR Justification:**
The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2 page 9⁵: *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.*

⁵ Attachment 2. April 21, 2010 EPA Guidance for Determining Project Eligibility

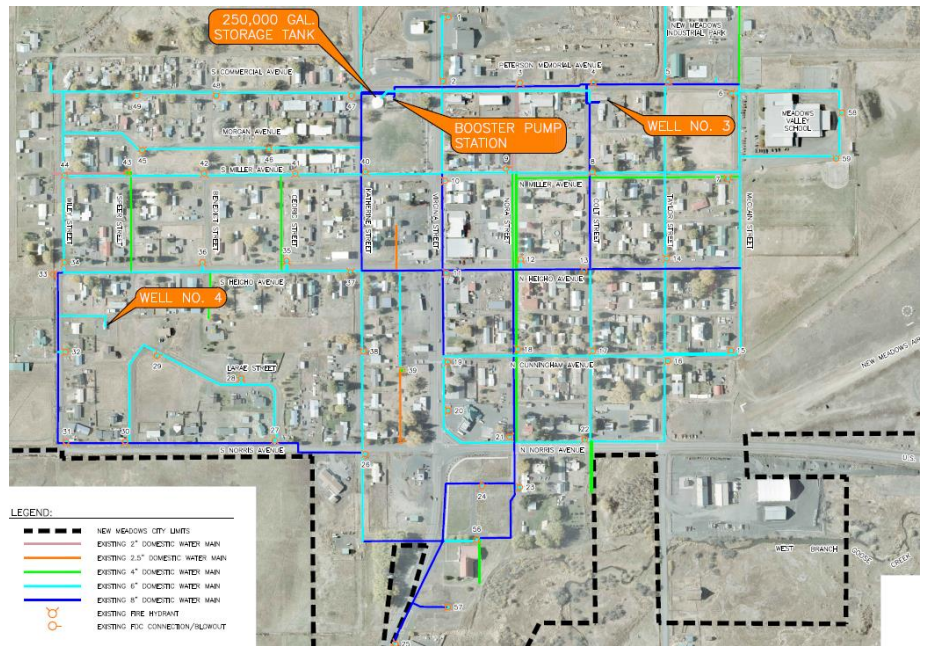
2. SCADA (PRELIMINARY)

Summary

- The City of New Meadows will install a new SCADA system to operate the majority of its wells and to collect information on pump operation, pressures, and storage volumes within the system.
- Loan amount = \$2,845,500
- Estimated energy efficiency (green) portion of loan = 5% (\$150,000) (engineers estimate)
- Estimated annual energy and labor savings = \$52,000 per year.

Background⁶

- The current electrical controls are insufficient to meet the monitoring and operational requirements of the water system.
- The SCADA system will be part of the project at the boost pump station and reservoir.



Energy Efficiency Improvements

- Remote SCADA monitoring saves labor costs = 2 people 1 hour per day = \$52,000/yr in labor costs.

Conclusion

- Total SCADA savings would be approximately \$52,000 per year in labor and energy costs = payback of 2.9 years; therefore SCADA costs are GPR-eligible by 3.5-7.
- **GPR Costs:** SCADA = \$150,000 (engineering estimate)
- **GPR Justification:** SCADA system costs are GPR-eligible by a Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings.*

⁶ City of New Meadows Water Facilities Planning Study, Crestline and Mountain Waterworks, May 2018