Bayview W&S District Drinking Water Project
SRF Loan #DW2012: $3,317,000 (pop. 1,088)

Preliminary Green Project Reserve Justification[1]

Categorical GPR Documentation

1. REPLACES LEAKING TRANSMISSION PIPING WITH NEW PIPE (Water Efficiency). Categorical GPR per 2.4-1: *Projects that result from a water efficiency related assessment;* Business Case 2.4-4: *Proper water infrastructure management should address where water losses could be occurring…fix them…replacing aging infrastructure.* ($xxxxxx).
2. INSTALLS PRESSURE SUSTAINING VALVES (Water Efficiency). Categorical GPR per 2.2-12: *Installing water efficient devices.* ($xxxxx).
3. UPGRADES AGING WATER METERS WITH RADIO-READ METERS (Water Efficiency). Categorical GPR per 2.2-3a: *…replacing existing malfunctioning water meters …* ($xxxx).

Business Case GPR Documentation

4. NEW 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* ($xxxxxxx).
5. INSTALLS SCADA FOR REMOTE MONITORING (Energy Efficiency). GPR Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings*. ($xxxxx).
6. INSTALLS ADVANCED FLUORESCENT LIGHTING (Energy Efficiency). GPR Business Case per 3.5-6: *Upgrade of lighting to energy efficient sources (such as…compact fluorescent, light emitting (LED) diode, etc).* ($xxxxxx).

[1] Information in red font—along with all data, including all costs— to be provided by the loan recipient in the GPR Technical Memorandum due at the time of final design approval.

1. TRANSMISSION LINE REPLACEMENT (PRELIMINARY)

Summary

- The acquisition, construction and installation of a new transmission line to replace leaking and aging pipes in the Farragut area to eliminate water loss and maintenance costs due to leakage.
- Loan amount = $3,317,000
- Pipe Replacement portion of loan = xx% ($xxxxx)

Background

- In 2014 the District repaired xx or more leaks in the transmission line.
- A Water Facilities Planning Study recommended the replacement of the 8" diameter cast iron transmission line.
- The new pipe eliminates substantial and numerous water leaks in the transmission line, it prevents entry of contaminated water, and provides a more secure water supply.

Conclusion

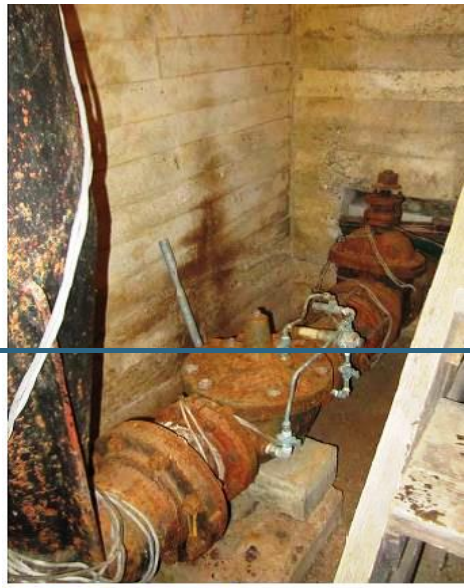
- By replacing the xxxxx feet of transmission pipe the District is conserving water and providing a more secure water supply.
- Other benefits include reductions in unnecessary O&M expenditures and eliminating potential health hazards associated with waterborne pathogens entering the water system.
- **GPR Costs**: Replacing xxxx feet of transmission piping = $xxxxxx
- **GPR Justification**:
  The project is Categorically GPR-eligible (Water Efficiency) per Section 2.4-1: *Projects that result from a water efficiency related assessment*; also (Water Efficiency) per a Business Case by 2.4-4: *Proper water infrastructure management should address where water losses could be occurring…fix them…replacing aging infrastructure*[2].

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

2. PRESSURE REDUCING VALVES (PRELIMINARY)

Summary

- Pressure Reducing Valves (PRVs) will be installed.
- Loan amount = $3,317,000
- GPR-eligible = x% ($xxxxx) (Engineer's design cost estimate)



Photograph 49: Farragut tank PRV

Background

- Pressure reducing valves will be installed/replaced to assist in moving water throughout the system efficiently.
- Installing pressure reducing valves will ensure a steady reliable pressure is maintained in supplied water.

Results

- Installing pressure-reducing valves (PRV) – is the most important feature for controlling the pressure in a system, improving reliability and reducing inefficiencies.

Conclusion

- Pressure Reducing Valve installation = $xxxxx
- The PRVs are categorically GPR-eligible as they are a water-efficient device.
- **GRP Costs Identified**:
  3 PRVs installed = $xxxxx (Engineer's design estimate)
- **GPR Justification**: PRVs are Categorically GPR-eligible (Water Efficiency) per Section 2.2-12[3]: *Installing water efficient devices…*

[3] Attachment 2. April 21, 2011 EPA Guidance for Determining Project Eligibility

Categorical

3. EXISTING WATER METER REPLACEMENT (PRELIMINARY)

Summary

- Replacing old and malfunctioning water meters.
- FY20 Amendment 1 = $3,317,000
- GPR portion of loan = xx% ($xxxx) (Engineer's design cost estimate)

Background

- The District's existing xx water meters are over xx years old and at the end of their service life. Meter accuracy has diminished over time, resulting in significant under accounting of water usage.
- The existing water meters are approximately vv years old, are not radio-read, are malfunctioning, and not reliable.
- Increased water loss, due to leaks and inaccurate meter readings, are partly attributed to the old meters.

Results

- The District's existing xx water meters will be replaced.

Other Benefits

- Replacing the old meters will increase water efficiency by decreasing the amount of water lost and by providing more accurate water-use information to customers and the system.

Conclusion

- Accurate metering of water consumption is an important conservation measure because providing more accurate water bills sends a strong price signal to customers and will result in more efficient consumption.

- Water leakage and inaccuracy increases with water meter age; therefore, an investment in water meters today will lead to additional water and dollar savings over time. Also, the water savings from the meter replacement will extend the life of the water supply and delay capital expansion projects.

- **GPR Costs**: Replacing malfunctioning water meters

  xx meters = $xxxxx (Design Cost Estimate)

- **GPR Justification**:

  - The project is Categorically GPR-eligible (Water Efficiency) per Section 2.2-2: *Installing any type of water meter in previously unmetered areas…* and 2.2-3a*: replacing existing malfunctioning water meters…*[4].

[4] 2010 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.

4. PREMIUM PUMPS AND VFDS (PRELIMINARY)

Summary

- As part of the upgrade project, the Bayview W&SD constructed a new booster pump station with pumps equipped with premium energy-efficient motors and VFDs.
- Total Loan amount = $3,317,000
- Estimated energy efficient (green) portion of loan = xx% ($xxxxx) (design cost estimate)

Background

- The Bayview water system had four active water supply wells, three storage tanks, one booster pump station, and over 70 miles of distribution system piping ranging in size from 4 inch to 24 inch in diameter.
- The Water System required increased water production capacity and increased storage capacity to address immediate and future projected deficiencies.
- As part of the project, a new booster pump station was constructed equipped with three (3) vertical turbine pumps with premium energy-efficient 125 hp motors with VFDs.

Photograph 10. Cape Horn Booster Pumps

GPR Justification

Motors/VFDs:

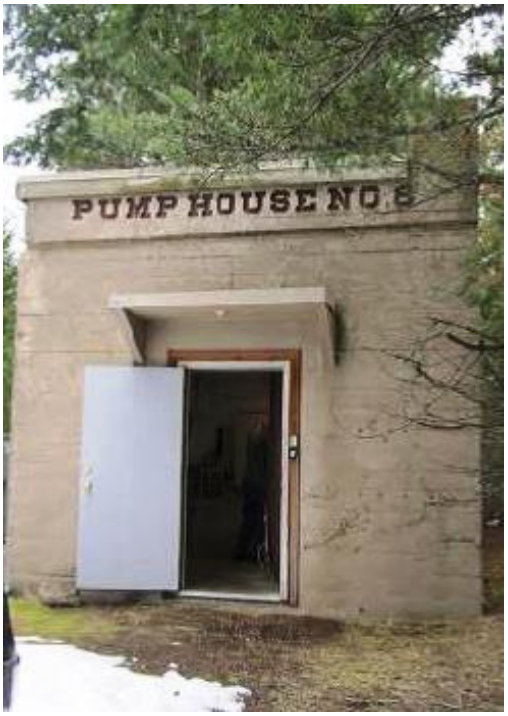
The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD[6]. Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Proposed Pumps - no VFD, standard Epact efficiency motor**
  Type: Vertical Turbine Hollow Shaft
  Motor rating = 125 hp; Motor type = standard efficiency (93.0%)
  % Annual Usage = 50% (average daily operation throughout the year)
  Energy usage = 125,078 kW-hr
- **Proposed Pumps - no VFD, with premium efficiency motor**
  Motor rating = 125 hp; Motor type = premium efficiency (95.4%)
  % Annual Usage = 50% (avg daily operation throughout the yr) ∴Energy usage = 122,076 kW-hr
- **Proposed Pumps - VFD operation with premium efficiency motor**
  Motor rating = 125 hp; Motor type = premium efficiency (95.4%)
  % Annual Usage = 50% (avg daily operation throughout the yr)
  ∴ 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
- The premium motors with VFDs result in a 21.1% energy reduction compared to non-VFD, standard efficiency motors.

[5] Bayview Water System Facility Plan, JUB Engineers, February 2020
[6] NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

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.
- The premium energy-efficient pumps/VFDs are categorically GPR eligible as they achieve greater than 20% reduction in energy consumption.
- **GRP Costs Identified**:
  Booster Station VFDs (**3** @ $18,000 ea. = $54,000) + Pumps & Motors (3 @ $55,000 = $165,000) = **Total = $220,000**
- **GPR Justification**:
  The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2 page 9[7]: *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

5. SCADA Control Technology (Preliminary)

Summary

- Energy efficiency from the installation of a SCADA system for remote electronic sensing of the water storage tank and pumping system.
- Loan amount = $3,317,000
- Estimated energy efficiency (green) portion of loan = 1.3% ($52,309) (design estimate)
- Estimated annual energy and labor savings = $9,500 per year.

Background / Results[8]

- The SCADA system is part of the project at the well site pump house building.

Energy Efficiency Improvements

- Remote SCADA monitoring saves labor costs = 1 person 1 hour per day = $9,500/yr in labor costs.

Conclusion

- Total SCADA savings would be approximately $9,500 per year in labor costs = payback of 5.3 years, therefore SCADA costs are GPR-eligible.
- **GPR Costs**:

  SCADA = $52,309
  Total = $52,309

- **GPR Justification**: SCADA system costs are GPR-eligible by a Business Case per 3.5-7[9]: *automated and remote-control systems (SCADA) that achieve substantial energy savings.*

[8] Carlin Bay POA Water System Facility Plan, Updated March 2020 , Welch Comer Engineers
[9] Attachment 1, April 21, 2012 EPA Guidance for Determining Project Eligibility

6. Energy Efficient LIGHTING (PRELIMINARY)

Summary

- Energy efficiency from the installation of light emitting diode (LED) lighting at the interior and exterior of the well site pump house building.
- Energy efficiency from the installation of occupancy sensors both interior and exterior of the well site pump house building.
- Loan amount = $3,317,000
- Estimated energy efficiency (green) portion of loan = 0.1% ($5,000) (design estimate)

Background / Results

- The lighting system is part of the project at the well site pump house building.

Energy Efficiency Improvements

- Occupancy sensors improve efficiency by approximately 91% over no sensors.
- LED lighting is approximately 58% more energy efficient than typical high-pressure sodium lighting for relatively the same light output.

Conclusion

- **GPR Costs**:

Occupancy Sensors = $ 500
LED Lighting = $ 4,500
Total = $ 5,000

- **GPR Justification**: Advanced fluorescent lighting and LED lighting is GPR-eligible by a Business Case per 3.5-7[5]: *Upgrade of Control Building lighting to energy efficient sources such as.....compact fluorescent, light emitting diode (LED).*