

Clean Water State Revolving Fund Green Project Reserve
- Interim -



Moore W&S Association Wastewater System Project
SRF Loan #WW 1303
\$625,000

Interim Green Project Reserve Justification

Categorical GPR Documentation

1. PREMIUM ENERGY EFFICIENT PUMPS AND MOTORS (Energy Efficiency). Energy efficient pumps and motors will be installed in two rehabilitated lift stations. Business Case per GPR 3.2-2: *if a project achieves a 20% reduction in energy efficiency, then it may be justified using a business case (\$20,000).*

Business Case GPR Documentation

2. ENERGY-SAVINGS UPGRADE OF LIFT STATION VALVING AND PRESSURE SEWER LINES (Energy Efficiency). Business Case per GPR 3.5-4: *I/I correction projects that save energy from pumping and reduced treatment costs. (\$170,000)*

1. LIFT STATIONS

Summary

- The existing lift stations require renovations to cost effectively pump wastewater to the total evaporative lagoons. It is proposed to achieve this by implementing new lift station corrosion resistant components and high efficiency motors.
- Estimated loan amount = \$625,000
- Estimated GPR portion of loan = 3.2 % (\$20,000)

Background

- The only power consumption within the wastewater system is attributed to the two wastewater lift stations, which have become dilapidated and obsolete.
- The existing pumps and associated piping within the lift stations have many associated leaks, which causes a portion of pumped water to fall from the discharge line back into the lift station. This results in pumping the same water multiple times.
- It is proposed to replace the existing obsolete and inefficient pumps and motors with new energy efficient pumps and motors.

Calculated Energy Efficiency Improvements

- The existing pumps will be replaced with new high efficiency (2) 5 HP and (2) 3 HP motors (assuming pumping capacity of 180 gpm for each pump). The new 5 HP pumps are anticipated to run for 375 hours per year and the new 3 HP pumps are anticipated to run for 40 hours per year. The existing motors have the following characteristics: (2) 3 HP and (2) 1.5 HP (assuming pumping capacities of 77 gpm and 100 gpm respectively). The existing 3 HP pumps run approximately 880 hours per year and the existing 1.5 HP pumps run for approximately 75 hours per year.

$$\text{Existing Energy Usage} = 2.24 \text{ kW} \times 880 \text{ hrs/yr} + 1.119 \text{ kW} \times 75 \text{ hrs/yr} = 2055.1 \text{ kWh/yr}$$

$$\text{New Energy Usage} = 3.73 \text{ kW} \times 375 \text{ hrs/yr} + 2.234 \text{ kW} \times 40 \text{ hrs/yr} = 1488.1 \text{ kWh/yr}$$

$$\text{Energy savings} = 2055.1 \text{ kWh/yr} - 1488.1 \text{ kWh/yr} = 567 \text{ kWh/yr} = 28\% \text{ savings}$$

$$\text{Cost savings} = 567 \text{ kWh/yr} \times \$0.08/\text{kWh} = \$45.36/\text{yr}$$

- With the combination of the new high efficiency lift station pump motors and replacement of interior lift station components the expected saving in electrical power usage approaches approximately 25% under historical costs.

Conclusion

- The project would result in a more energy efficient operation = 25% of the energy requirement of historical costs.

- **GPR Costs:**

$$\begin{array}{r} 4 \text{ New Lift Station Pumps} = \underline{\quad \$20,000} \\ \text{Total} = \quad \quad \quad \underline{\quad \$20,000} \end{array}$$

- **GPR Justification:** The replacement of the lift station motors as recommended in the CIP is Categorical Case GPR-eligible per Section 3.2-2¹.

¹ Attachment 2. EPA Guidance for Determining GPR Eligibility for FY12 SRF Projects, Pg. 9

2. RENOVATION OF LIFT STATION VALVING AND PRESSURE SEWER LINES

Summary

- This project will include the replacement of concrete pressure sewer mains with new PVC pressure sewer mains that connects the two lift stations to the rehabilitated lagoon system.
- Estimated loan amount = \$625,000
- Estimated GRP portion of loan = 27.2 % (\$170,000)

Background

- The new PVC pressure mains will have better head characteristic to reduce energy consumption when pumping through approximate 4,200 ft. of 6" pipeline.
- Switching from a concrete pipe to a PVC pipe could reduce the dynamic head requirements by 30%.
- In addition the check valves that were installed in the lift stations in the 1970's are dilapidated and not functioning correctly which allows backflow from the pressure sewer lines when the pumps shut off.
- It has been observed at the pressure sewer line entrance into the existing lagoons that as soon as the pumps shut off the inlet box is sucked dry because the wastewater backflows into the pressure sewer lines.
- The Association would realize significant savings through a reduction of energy costs as well as operation and maintenance costs.

Conclusion

- It is estimated that replacing the pressure sewer lines with a lower head loss material could potentially reduce the overall wastewater system energy costs by 10%.
- Since approximately 15% of the pumped flow goes back into lift station, a pumping cost savings by replacing the check valves would be realized.
- Reducing overall pumping costs by 25% with the above recommendation is cost effective.
- **GPR Costs:** Replacing 4,200 feet of pressure sewer main and lift station check valves = \$170,000
- **GPR Justification:** The replacement of pressure sewer lines and check valves by the Association as recommended in the CIP is GPR-eligible by a Business Case per Section 3.5-4² (Energy Efficient): *1/1 correction projects that save energy from pumping and reduced treatment costs.*

² Attachment 2. EPA Guidance for Determining GPR Eligibility for FY11 SRF Projects, P.10