



City of Georgetown FY12 Wastewater System Project
SRF Loan #WW 1207 (pop. 456)
\$2,936,721

Final Green Project Reserve Justification
Business Case GPR Documentation

1. INSTALLS NEW ENERGY-EFFICIENT MOTORS ON LAND APPLICATION PUMP (Energy Efficiency). Business Case per GPR 3.2-2: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case (\$50,745).*
2. RENOVATION OF GRAVITY WASTEWATER COLLECTION SYSTEM TO ELIMINATE AN EXISTING PUMP STATION (Energy Efficiency). Business Case GPR per 3.5-3 & 3.5-4: *projects that cost effectively eliminate pumping stations. (\$234,000)*

1. ENERGY EFFICIENT MOTORS¹

Summary

- The existing wastewater lagoon and land application system requires renovation to cost effectively meet current discharge standards. It was proposed to achieve this by improving lagoon flow characteristics, and to install energy efficient low-head, low-flow pumps to transfer the treated lagoon wastewater to the land application site.
- Eliminate the existing surface aerators and upgrade and replace the land application pump and motor with a new premium energy-efficient motor.
- Estimated loan amount = \$2,936,721 • Estimated GPR portion of loan = 1.7% (\$50,745)

Background

- An investigation showed that - by improving the lagoon headworks and directing the wastewater more effectively through the lagoon cells - only very limited aeration would be required. This would eliminate the need for the two existing mechanical surface aerators, resulting in considerable capital cost and energy savings.
- Engineering analysis of the existing land application site showed that the site was not large enough to completely provide final treatment of the finished wastewater. A new land application site was purchased at an adjacent location, enabling the use of low-head and low-flow energy efficient pumps to transfer the water from the treatment lagoon site to the winter storage lagoon.
- It was proposed to replace the existing obsolete and inefficient irrigation pump and motor with new energy efficient pump and motor.

Calculated Energy Efficiency Improvements

- The two existing 5 HP surface aerators will be unnecessary with the improvements. The aerators run 24 hours per day but are not run during winter months (December through March) when freezing temperatures cause operational problems.

$$\text{Energy Savings} = 7.46 \text{ kW} \times 5,760 \text{ hrs/yr} = 42,970 \text{ kWh/yr}$$

$$\text{Cost Savings} = 42,970 \text{ kWh/yr} \times \$0.07/\text{kWh} = \$3,008/\text{yr}$$

- The existing land application pump will be replaced with a new premium efficiency 25 HP motor (93.6% efficiency). The irrigation pump is anticipated to run for 1,000 hours per year. If a standard 25 HP (18.65 kW) motor is 89.3% efficient the following savings can be realized:

$$\text{Energy Savings} = 18.65 \text{ kW} \times 1,000 \text{ hrs/yr} \times (1 - (0.893 / 0.936)) = 856.8 \text{ kWh/yr}$$

$$\text{Cost Savings} = 856.8 \text{ kWh/yr} \times \$0.07/\text{kWh} = \$60/\text{yr}$$

If the premium efficiency motor costs \$500 more than a standard efficiency motor, the payback period would be 8.3 years which is less than the useful life of the motor.

- Two new low-head, low-flow transfer pumps will be installed with energy efficient pumps and 7.5 HP motors.
- With the combination of the removal of the surface aerators, and the new premium efficiency irrigation pump to be installed, the expected saving in electrical power usage approaches approximately 15% under historical costs.

Conclusion

- The project would result in a more energy efficient operation = 15 % of the energy requirement of historical costs.

- **GPR Costs:**

Aeration Equipment =	\$0
New Lift Pumps =	\$10,745
New Irrigation Pump =	\$40,000
Total =	\$50,745

- **GPR Justification:** The elimination of surface aeration, replacement of the irrigation pump, and addition of the low head and low-flow transfer pumps as recommended in the CIP is Business Case GPR-eligible per Section 3.2-2²: *if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case.*

¹ 9/13/13 GPR Justification, M. Jaglowski P.E., Keller Associates

² Attachment 2. EPA Guidance for Determining GPR Eligibility for FY12 SRF Projects

2. RENOVATION OF GRAVITY WASTEWATER COLLECTION SYSTEM³

Summary

- The City's gravity wastewater collection system requires renovation in order to eliminate an existing inefficient and unnecessary wastewater lift station.
- Estimated loan amount = \$2,936,721
- Estimated energy efficient (green) portion of loan = 8% (\$234,000)

Background⁴

- The lift station was installed at the time of the original wastewater collection system project (in the 1980's) in order to overcome construction challenges posed by high groundwater levels.
- Replacing the existing pressure main with a more efficient gravity sewer line would make the existing inefficient and outdated pump station redundant.
- To determine whether the lift station should be rehabilitated or eliminated, a twenty year present value analysis was completed for the lift station (see Table). The present value analysis assumed a real rate of return of 3.0%, an electrical cost savings of approximately \$2,150 per year, a 15 year life for pumps, and a 30 year life for the concrete wet well. The present value analysis shows the cost to rehabilitate the lift station and to continue to pump wastewater.

Table: Lift Station Present Value Analysis

Item	Rehabilitate Lift Station	
	Cost per Year	20 Year Present Value
Personnel Expenses	20,665	228,800
O&M Expenses	43,200	478,400
Sub-Total	63,865	707,200
20 Year Capital	6,000	66,400
20 Year Short Lived Assets	5,500	60,900
Total	\$75,365	\$834,500

- Eliminating the lift station would be cost effective because it is less expensive to install a gravity sewer line (\$234,000) than to rehabilitate and operate the lift station (\$834,500). The City would realize significant savings through the elimination of – or reduced costs for – energy, operation, and maintenance.

Conclusion

- Elimination of the existing lift station by installing a gravity sewer line to the WWTP is cost effective as it would be more expensive to rehabilitate, operate, and maintain the lift station than to install the new sewer line.
- **GPR Costs:** Replacing 2,410 feet of gravity sewer = \$234,000
- **GPR Justification:** The prioritized replacement of gravity sewer lines by the City as recommended in the Capital Improvement Plan is GPR-eligible by a Business Case per Section 3.5-3⁵ *Projects that cost effectively eliminate pumps or pumping stations.*

³ 7/27/13 Draft GPR Justification, M. Jaglowski P.E., Keller Associates

⁴ Georgetown Wastewater Facilities Planning Study, April 2011, Keller Associates

⁵ Attachment 2. April 21, 2010 EPA Guidance for Determining GPR Eligibility for FY11 SRF Projects, P.10