Collection System Rehabilitation and Pump Station Improvements

Summary

- This project includes improvements to the sanitary sewer collection system to reduce infiltration/inflow and to reduce energy consumption.
    - Sanitary sewer installation to replace existing sewer lines: The work includes 13,110 LF of 15-inch to 8-inch sanitary sewer, 10,480 LF of 6-inch laterals, and 63 manholes.
    - Lining using the CIPP method: The work includes 4,595 LF of 8-inch sanitary sewer lining and 50 manhole chimney lining.
    - Pump station improvements include improvements at three lift stations: At the Sewage Treatment Facility Influent Pump Station (PS1) new pumps, valve, piping, flow metering and stationary standby electrical power generators will be installed. At both the Woodlan (PS4) and Havenwood (PS6) Pump Stations, a stationary standby electrical power generator will be installed.
- Estimated Loan Amount: $2,500,000
- Estimated Energy Efficiency (Green) portion of the loan: $1,865,617 (75%) This may go to $$1,981,852 if the laterals are approved.

Background

- The collection system is in need of rehabilitation due to age. The existing lagoons would require expansion if the infiltration/inflow is not reduced. There is no land available for expansion of the lagoons so a mechanical treatment plant would be the proposed alternative.
- The existing Sewage Treatment Facility Influent Pump Station improvements will reduce the kilowatt hours consumption for the lift station.

Results

- The present infiltration/inflow (i/i) is approximately 526,423 gallons per day (gpd). The improvements are expected to remove approximately 40% of the infiltration/inflow, or approximately 211,948 gpd.

- The existing energy usage at the six lift stations and the estimated savings at these lift stations with the proposed improvements at the local energy cost is,

Energy Usage and Cost Savings[1]				
Pump Station	**Existing Situation**		**Reduction/Savings After Improvements**	
	Kilowatt – Hour Usage	**Electrical Cost**	**Kilowatt – Hour Usage**	**Electrical Cost**
PS 1	144,000	$8,258	16,060	$1,044
PS 2	13,536	$1,269	4,015	$261
PS 3	1,152	$185	0	$ -
PS 4	18,948	$1,977	8,030	$522
PS 5	155,880	$10,132	30,295	$1,969
PS 6	7,500	$740	2,008	$131
Total	341,016	$22,561	60,408	$3,927
% Savings			**18%**	**17%**

- The energy savings is shown to be 18% and the energy cost savings is shown to be 17%.
- Comparing the present worth cost for the existing waste stabilization pond system along with the proposed collection system improvements to increasing the treatment capacity with a mechanical treatment plant, the proposed project is shown to be cost effective.

Cost Effective Analysis		
	Alternative – Expand WWTP	**Alternative – Collection System Improvements**
Capital Cost	$3,340,000[1]	$2,147,835
Annual O & M Costs for Plant and Collection System	$340,000	$180,000
Present Worth of O & M (3%, 20 years)	$5,058,000	$2,678,000
Total Present Worth Cost (rounded)	$8,398,000	$4,826,000

- The payback period for the green components is less than 14 years – Capital Cost of Improvements divided by O & M Cost Savings ($2,147,835/ ($340,000-$180,000).

Conclusions

- The proposed improvements will result in an energy cost savings of 17%.
- The proposed project is cost effective.
- The proposed project has less than a 14 year payback period. The improvements to the collection system have an expected life of over 14 years.
- The standby generators will allow for possible power factor cost savings if used to reduce the peak usage spikes.

---

[1] Asset Management Plan and Business Plan dated April 26, 2010 prepared by Schnelker Engineering, Inc.