



City of Cascade FY12 Wastewater System Project

SRF Loan #WW 1205 (pop. 7,300)

\$2,231,455

Final Green Project Reserve Justification

Business Case GPR Documentation

- RENOVIATION OF GRAVITY WASTEWATER COLLECTION SYSTEM EXPERIENCING EXCESSIVE INFLOW AND INFILTRATION (Energy Efficiency). Categorical & Business Case GPR per 3.5-4 *Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs and are cost effective.* (\$978,780).

1. RENOVATION OF GRAVITY WASTEWATER COLLECTION SYSTEM

Summary¹

- To manage excessive inflow and infiltration (I/I) in the City of Cascade wastewater collection system, in lieu of providing storage for the I/I along with additional pumping and treatment capacity at the wastewater treatment plant (WWTP), the City chose to replace the most seriously deteriorated portions of the system.
- SRF loan amount = \$2,231,455
- Estimated energy efficient (green) portion of loan = \$978,780 (44%)

Background²

- The groundwater level in the study area ranges from 1' to 4' below the ground surface for approximately 4 months, from March 1 through June 30³. During this period the City's wastewater treatment plant pumps a daily average influent flow of approximately 0.46 MGD⁴ (= 55 MG). The plant measures a dry weather daily average wastewater flow of 0.2 MGD⁴ (= 24 MG). Therefore I/I volume during this 4 month period = 31 MG.
- Total annual Dry weather volume = .2 MGD x 365 days = 73 MG. Total annual volume = Dry weather volume + I/I volume = 73 MG + 31 MG = 104 MG. Therefore I/I = 31 ÷ 104 = 30% of overall annual flow.
- The FPS² recommended alternative was to eliminate I/I. This would require the replacement of 32,500 lineal feet of dilapidated gravity mains. Presently available funding will allow for replacement of approximately 27,815 lineal feet of the most dilapidated sections of the gravity wastewater collection system.

Results⁵

Cost Effectiveness

- To determine the overall cost effectiveness and energy savings of the selected alternative, it is compared to a Best Practicable Alternative (BPA). For I/I projects, the BPA consists of equalization of influent flow, followed by provision for additional downstream treatment of the increased wastewater I/I volume. The stored, equalized I/I volume would subsequently be transferred by metered pumping to the WWTP for treatment.
- The pipe replacement option is cost effective as the BPA is more expensive and energy intensive. Capital costs: (i) BPA = \$2,452,750; (ii) Collection system piping replacement = \$2,231,455.

Energy Savings

- Existing pump station: reducing system I/I by 30% results in a direct reduction in energy consumption of 30% by the existing lift station during the months of high groundwater levels, for the 40 year life of the project = **\$41,320**.
- BPA: the selected alternative avoids pumping wastewater for 40 years from the equalization basin to the WWTP. The 40-year O&M pumping costs = **\$937,460**.

Conclusion

- The significant reduction in the quantity of wastewater resulting from the elimination of I/I in the collection system makes the project GPR-eligible since it saves costs from less pumping and reduced treatment of wastewater. The I/I correction project is also cost effective, incurring less capital cost than the BPA.
- **GPR Costs**: GPR-eligible savings = **\$978,780**
- **GPR Justification**: The prioritized replacement of gravity sewer lines by the City as recommended in the FPS is Categorically GPR eligible per 3.5-4 *Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs and are cost effective.*

¹ 9-30-13 Correspondence with D. Barker, PE, Project Manager, Horrocks Engineers

² City of Cascade Sewer Facilities Planning Study, PEC, 2011

³ Measured by City staff at groundwater monitoring wells at the WWTP

⁴ Measured by City staff on a daily basis from pump flow meter records

⁵ City of Cascade Best Practicable Alternative Calculation, Paul Scoresby P.E., Schiess Engineering, October 2014