



## **Fernwood S&W District FY12 WW System Upgrade Project**

**SRF Loan# WW1208 (pop. 451)**

**\$688,859**

### **Final Green Project Reserve Justification**

#### **Business Case GPR Documentation**

RENOVATION OF GRAVITY WASTEWATER COLLECTION SYSTEM EXPERIENCING EXCESSIVE I/I (Energy Efficiency). Business Case GPR per 3.5-4: *I/I correction projects that save energy from pumping and are cost effective (\$150,000)*

# 1. RENOVATION OF GRAVITY WASTEWATER COLLECTION SYSTEM<sup>1</sup>

## Summary

- Repair of the District's gravity wastewater collection system to reduce excessive inflow and infiltration (I/I).
- Estimated loan amount = \$688,859
- Estimated energy efficient (green) portion of loan = 22% (\$150,000)

## Background<sup>2</sup>

- During seven months of wet weather periods in the spring and in the fall, the lift station pumps up to .12 MGD resulting in 22 to 24 hour pump runtimes.
- The average daily flow (ADF) during the dry weather months is .03 MGD resulting in 4 hour daily pump runtimes. So total volume to be treated by a BPA = .12 - .03 = .09 MGD x 7mo x 30 da/mo = 18.9 MG.
- Repair of approximately 20 manholes and installation of approximately 700 feet of 8" sewer main reduced wet weather ADF to .06 MGD as compared to a historical wet weather ADF of approximately .12 MGD (Volume saved = 7mo x 30da/mo x [.12MGD - .06MGD]) = 25.2 MG



## Results<sup>3</sup>

### 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 =  $(18.9/31) \times \$2,452,750 = \$1,495,386$ ; (ii) Collection system piping replacement and manhole repair = \$150,000.

### Energy Savings

- Existing lift station: reducing system I/I by 50% results in a direct reduction in energy consumption of 50% by the existing lift station during the months of high groundwater levels, for the 40 year life of the project =  $(25.2/31) \times \$41,320 = \$33,589$
- BPA: the selected alternative avoids pumping wastewater for 40 years from the equalization basin to the WWTP. The 40-year O&M pumping costs =  $(18.9/31) \times \$937,460 = \$571,548$ .



## 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 energy is saved from reduced lift station pumping costs (at least 50% lower for the existing lift station, while long-term BPA energy costs are eliminated), along with significantly reduced treatment costs.
- In addition, the I/I correction project is cost effective, incurring less capital cost than the BPA.
- **GPR Costs:** GPR-eligible energy savings = Existing LS. + BPA = \$33,589 + 571,548 = \$605,137  
∴ GPR costs = **\$150,000** (repair of 20 manholes + replacing 700 feet of sewer)
- **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 3.5-4 (Energy Efficient): *Infiltration/Inflow (I/I) correction projects that save energy from pumping and reduced treatment costs*

<sup>1</sup> Fernwood Phase 1A Preliminary Engineering Report, Mountain Waterworks, November, 2012

<sup>2</sup> S. Hurley Mountain Waterworks email to K. McNeill, IDEQ 3-3-2015 and 6-16-15

<sup>3</sup> Based on the I/I project GPR analysis for the City of Cascade FY12 Wastewater project.

*and are cost effective.*