

Drinking Water State Revolving Fund Green Project Reserve  
- Interim GPR Justification -



**City of Athol Drinking Water Project**  
**SRF Loan #DW1906 (pop. 696)**  
**\$3,286,000**

**Interim Green Project Reserve Justification**

**Categorical GPR Documentation**

1. REPLACING 190 MALFUNCTIONING WATER METERS WITH NEW METERS (Water Efficiency). Categorical GPR per 2.2-3a: *...replacing existing malfunctioning water meters; also 2.2-9: Projects that result from a water efficiency assessment such as water audits. (\$83,000).*
2. REPLACES DISTRIBUTION PIPING (Water Efficiency). Categorical GPR per 2.4-1 *...reducing water consumption; per 2.4-3: Efficient water use...reducing the amount of energy required by a drinking water system...therefore, there are also energy and financial savings; also per 2.4-4: Proper water infrastructure management should address where water losses could be occurring...fix them...replacing aging infrastructure; also per 2.5-2: Distribution pipe replacement ...to reduce water loss and prevent water main breaks (\$80,000).*

**Business Case GPR Documentation**

3. INSTALLS A SCADA SYSTEM (Energy Efficiency) Business Case GPR per 3.5-1: *energy efficient retrofits...; also, per 3.5-7: automated and remote-control systems (SCADA) that achieve substantial energy savings (\$147,700).*

# 1. EXISTING WATER METER REPLACEMENT<sup>1</sup>

## Summary

- Replacing 190 malfunctioning water meters with new meters. In addition to the meter component, the overall project also includes transmission line replacement and improvements to the distribution system.
- Loan amount = \$3,286,000
- GPR portion of loan (meters) = 2.5% (\$83,000)

## Background

- The existing water meters are approximately 15 years old, are not radio-read, are malfunctioning, and not reliable.
- Increased water loss, due to leaks and inaccurate meter readings, are partly attributed to the old meters.

## Results

- A water study conducted by the City indicated the water meters may be one source of the 5% water leakage measured in the audit.
- The audit indicated the meters were not properly accounting for flows and that this type of meter could not be recalibrated.
- The Facilities Planning Study recommended the replacement of the meters.



## Other Benefits

- Replacing the old meters will increase water efficiency by decreasing the amount of water lost and by providing more accurate water-use information to customers and the system.

## Conclusion

- Accurate metering of water consumption is an important conservation measure because providing more accurate water bills sends a strong price signal to customers and will result in more efficient consumption.
- Water leakage and inaccuracy increases with water meter age; therefore, an investment in water meters today will lead to additional water and dollar savings over time. Also, the water savings from the meter replacement will extend the life of the water supply and delay capital expansion projects.
- **GPR Costs:** Replacing malfunctioning water meters with AMR meters = \$83,000
- **GPR Justification:** The project is Categorical GPR-eligible (Water Efficiency) per Section 2.2-3a: *replacing existing malfunctioning water meters*; also GPR-eligible per Section 2.2-9: *projects that result from a water efficiency assessment such as water audits*<sup>2</sup>.

<sup>1</sup> City of Athol Facilities Planning Study, May 2019 Update, Keller Engineers

<sup>2</sup> 2010 EPA Guidelines for Determining Project GPR-Eligibility. Attachment 2.

## 2. Distribution System Upgrade

### Summary

- Distribution and transmission piping requires replacement in order to: (i) reduce water losses; (ii) reduce pumping costs; and (iii) provide adequate drinking water flow and pressure.
- Loan amount = \$3,286,000
- Estimated energy efficient (green) portion of loan = \$80,000 (2.4%)

### Background<sup>3</sup>

- The City of Athol owns and operates a public drinking water system largely constructed in the 1970's and 1980's. The system includes about 9 miles of water distribution pipe, and the source water for the system is produced by two wells. Storage for the system is accomplished with three storage tanks, two ground level steel tanks, and an elevated steel tower tank.
- The distribution system consists of 10, 6, and 4-inch PVC mains. The transmission and distribution lines are undersized, aging, and possibly leaking.
- Current peak daily water demand = 339 gpm. Current water loss through leaking pipe is estimated at 27,400 gpd.

### Results

Approximately 6,500 feet of new pipeline will be installed, replacing the old pipe. Replacing these lines with properly sized lines will result in:

- Saving water, as the replacement pipe will eliminate existing system losses of 1%; and
- Saving energy through reduced pumping costs for less energy to pump through properly sized lines (reduced friction factor).
- These improvements are estimated to save the City \$2,000 annually through water and energy conservation.

### Conclusion

- The replacement of undersized water pipe with properly sized pipe decreases system friction, increases water flow, and saves energy by reducing the amount of pumping required.
- **GPR Costs:** Transmission System Upgrades = (\$2,000)(40years) = \$80,000
- **GPR Justification:** The prioritized replacement of undersized water distribution and transmission piping as recommended in the Facility Planning Study is GPR-eligible by a Business Case (Water Efficiency) GPR per 2.4-1...*reducing water consumption*; 2.4-3: *Efficient water use...reducing the amount of energy required by a drinking water system...therefore, there are also energy and financial savings*; also GPR per 3.5-5: *Projects that achieve the remaining increments of energy efficiency*.

<sup>3</sup> City of Athol Facilities Planning Study, May 2019 Update, Keller Engineers

## 3. SCADA CONTROL TECHNOLOGY

### Summary

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- Energy efficiencies will be realized from new SCADA system to improve remote electronic sensing and control of the water system.
- Loan amount = \$3,286,000
- Estimated energy efficiency (green) portion of loan = 4.5% (\$147,700)
- Estimated total annual energy and labor savings = **\$37,500**

### Background/ Results

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- Installing a supervisory control and data acquisition (SCADA) will considerably reduce labor costs, reduce energy consumption, and monitor the system.

### Energy Efficiency Improvements

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- The new SCADA system will monitor activities in all three wells and both the new standpipe and elevated water storage tank.
- The central SCADA computer will be located at City Hall.
- This will result in energy savings to the City by minimizing the troubleshooting and travel time of system operators, maximize the life of the system equipment, and providing automated reports of the system that allow the City to make informed decisions about their water system.
- Remote SCADA monitoring saves labor costs = 1 person 5 hours per day in the summer + 1 person 3 hour per day in the winter = \$37,500/yr. in labor costs.<sup>4</sup>

### Conclusion

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- Preliminary Estimate: SCADA savings would be approximately \$37,500 per year in labor costs = payback of 4 years, therefore SCADA costs are GPR-eligible.
- Additional process cost savings will be delineated during the design stage by the design engineer in the Final GPR Justification.
- **GPR Costs:**  
SCADA = **\$147,700**
- **GPR Justification:** SCADA system costs are GPR-eligible by a Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings.*

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<sup>4</sup> Cost savings delineated by Keller, the design engineer.