

**Swendsen, Kurt (DEQ)**

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**From:** Steve Nagy <snagy@fveng.com>  
**Sent:** Wednesday, May 15, 2013 1:07 PM  
**To:** Swendsen, Kurt (DEQ)  
**Cc:** jerry@beecherwater.us; Kevin@beecherwater.us  
**Subject:** Beecher Project Plan 7389-01  
**Attachments:** 813800 DWRF - GPR Meters-FINAL.doc; 813800 Watermain Replacement.pdf

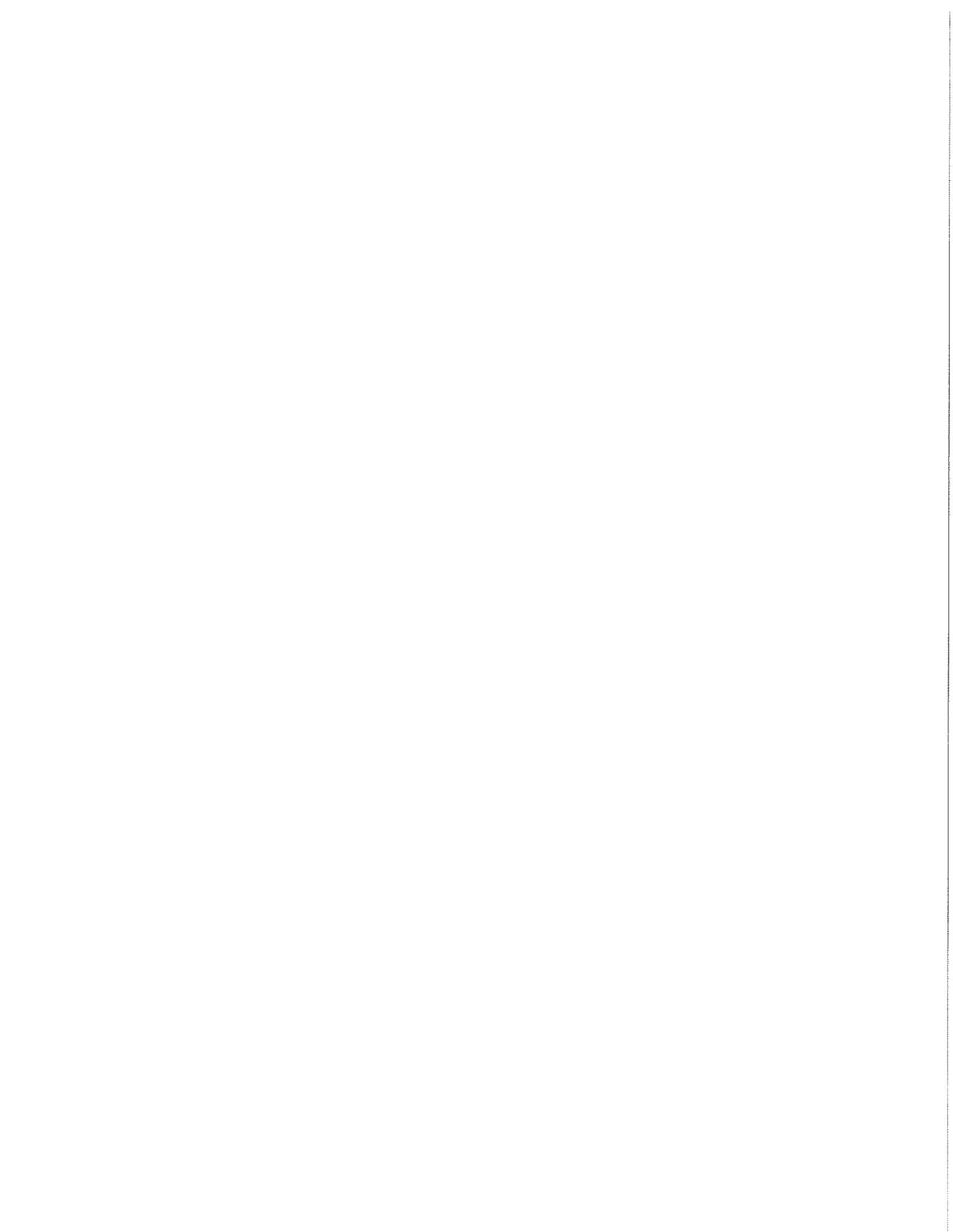
Kurt,  
The attached files contain the Green Project Reserve memo and template for the radio read meter reading system and watermain replacement portions of the project plan. Will this electronic copy be sufficient or do you need a hard copy mailed. Please let me know if you need anything else.

Thanks,  
Steve

**Steven J Nagy, PE**  
Grand Blanc Group Manager

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## RADIO READ METER READING SYSTEM

### *Water Efficiency*

#### Summary

The new radio read meter reading system is an optimization improvement to the existing waterworks system that will enable the Beecher Metropolitan District to better manage its water system and provide customers with improved customer service. The operational change in the way that water usage readings are obtained and billed will lead to cost savings and water conservation. The current manual meter reading is highly inefficient and can result in human error in usage calculations. The current reading and billing system costs the District approximately \$92,200 annually in staff time alone. The age of the existing meters (20-30 years) undoubtedly under reports water use as old meters slow down and register lower volumes as they age. This under reporting accounts for 13,750,000± gallons of unbilled lost water annually, resulting in \$4,000± of unbilled energy cost. Annual lost revenue due to meter inaccuracies amounts to \$17,500±. The current inability to quickly identify and isolate water breaks or leaks leads to additional water pumpage and treatment costs.

- Installation of radio read meters is a categorical GPR component under Water Efficiency as defined by the USEPA guidance documents.
- A Business Case is not required for this categorical component of the project.
- Approximately 2600 water meters will be replaced with new radio read water meters. The Beecher Metropolitan District has taken a proactive approach in the purchasing and replacement of radio read meters recently to reduce cost and improve meter accuracy.

Total DWRP Project Plan Requested Loan Amount = \$2,289,000.

Total Radio Read Meters Eligible for GPR = \$802,000.

Radio Read Meters Categorically Green Portion of Loan = 35%.

#### Background

##### District Benefits

- Installation of the radio read meters will eliminate the need for District employees to visit each residential meter location 4 times and each commercial meter location 12 times annually to log water usage. With approximately 3400 water customers, this reduces the number of miles travelled and carbon emissions. It is estimated that the District currently spends \$43,500 annually for an operations employee and another \$48,800 annually on administration expenses to read the meters, enter the readings, complete re-reads, cleaning up reading or input errors, and address customer complaints. This staff time spent can be allocated to more productive tasks.
- Current water usage available on real time basis. This is useful when preparing final bills for user changes.
- Leak detection, high/low flow consumption, and no flow/tampering alerts.
- More rapid identification and isolation of breaks and major leaks, reducing water losses.
- Water leakage and inaccuracy increases with water meter age. Replacing the approximately 2600 meters that are 20 -30 years old will result in more accurate metering of water consumption.

- With users realizing their actual water use, they will take corrective measures to prevent leaks and drips, conserving water as a natural resource.

Water User Benefits

- Customers can be notified and a leak fixed in a process up to 90 times faster than before (daily monitoring vs. quarterly reads), improving customer service and satisfaction.
- Access to current water usage will simplify final billing for dwelling occupancy changes.
- Access to real time water usage leads to water conservation by sending a stronger price signal to the customer.

**Results**

|   |                     |
|---|---------------------|
| Estimated Existing Costs (operations and administration personnel): |                     |
| Current Annual Meter Reading and Administration Expenses:           | \$ 92,200±          |
| Current Annual Equipment Expenses:                                  | \$ 9,300±           |
|   | \$101,500±          |
| Estimated Future Costs:   |                     |
| Projected Annual Meter Reading and Administration Expenses:         | \$37,200±           |
| Projected Annual Equipment Expenses:                                | \$ 100±             |
|   | \$37,300±           |
| Estimated Annual Costs Savings:                                     |                     |
| Existing Costs – Future Costs (\$101,500 - \$37,300)                | \$64,200± (savings) |
| Lost Revenue From Unbilled Water                                    | \$17,500±           |
| Total   | \$81,700±           |
| Annual Budget for Water Operations (2012-2013):                     | \$917,350           |
| Percent of Savings and Increased Revenue:                           | 8.9%                |

**Eligible Components**

|  |                   |
|--|-------------------|
| Purchase New Meters                                      | \$520,000±        |
| Installation of New Meters                               | \$ 97,000±        |
| Estimated Construction Costs                             | \$617,000±        |
| Design/Construction Engineering and Administration (25%) | \$154,000±        |
| Legal/Administration (5%)                                | \$ 31,000±        |
| <b>Total Project Cost</b>                                | <b>\$802,000±</b> |

**Conclusion**

The radio read meters is an optimization improvement to the District's water distribution system that will enable the District to better manage its water system and provide users with improved customer service. The new meters will allow water customers to identify waste and consider corrective measures which will translate into "smarter" water use. More efficient water use and meter reading abilities will reduce energy consumption and operational expenses.

**Drinking Water Revolving Fund  
Green Project Reserve Qualification Template**

Applicant: Beecher Metropolitan District Project No: 7389-01  
Project Name: Beecher Metropolitan District Water System Improvements

Identify by page number from the project plan, or attach excerpts, where water efficiency or energy efficiency improvement justification is provided or discussed to support the need for the recommended green project reserve component: Pages 5, 6, 10, 11, 20, and 21.

Please ensure all requested information is provided to enable an assessment by the Michigan Department of Environmental Quality (DEQ) of whether the project or project component can qualify for funding from the green project reserve.

**Meter Replacements with Conventional Meters**

1. Over the last five years, water lost or unaccounted for in the system has averaged \_\_\_\_\_ gallons per year and is \_\_\_\_\_ percent of the water produced each year.
2. Identify the source of this information (i.e. water audit, water conservation study, production and billing records): \_\_\_\_\_
3. Identify the portion of the water loss that is likely due to inaccurate meters: \_\_\_\_\_
4. The expected reduction in water loss by installing replacement traditional water meters in all or a portion of the system is \_\_\_\_\_ gallons per year, reducing the water loss percentage to \_\_\_\_\_.
5. It takes \_\_\_\_\_ kilowatt hours (kWh) of electricity to produce and distribute 1,000 gallons of water. At a cost of \$ \_\_\_\_\_ per kWh, the estimated annual electrical cost for the water loss due to inaccurate meters based on the five-year average is \$ \_\_\_\_\_.
6. Based on the average cost per year for the loss and the estimated cost of \_\_\_\_\_ for replacing the meters, the project will pay for itself in \_\_\_\_\_ months/years.
7. Attached all relevant data and calculations that were used to provide answers to these questions.

**Water Main Replacement**

1. Over the last ten years, 45 water main breaks have occurred on the water mains that are proposed for replacement, an average of 4 breaks/mile/year.
2. Identify the length, diameter, age and type of pipe to be replaced: 6,900 feet of 4" and 6" diameter cast iron pipe which is 60 to 70 years old.

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3. Each break is estimated to result in the average loss of 400,000 gallons of water, calculated to total 1,800,000 gallons/year of water lost for those water mains.
  4. Present the data indicating how this is a significant source of water loss in the system and how the pipes proposed for replacement are likely to generate the greatest return in leak reduction. The 2012 water loss for the Beecher Metropolitan District was 118,929,500 gallons. The proposed pipes to be replaced will result in a 1.5% reduction in lost water.
  5. The energy savings from pumping/delivering water through the new water mains versus the old ones is estimated at 2,862 Kwh/year.
  6. Describe the condition of the replaced mains with respect to friction/head loss etc from tuberculation or other deterioration issues. As appropriate, identify if the soils are corrosive and contributing to the deterioration/breaks or leaks in the mains, and how the replacement mains are designed to address future corrosion:  
The replaced mains have increased friction/head losses due to accumulated deposits from iron and minerals from the ground water source. Soils do not appear to be contributing to the deterioration of the pipes. The replacement main will have a manufactured protective coating on the outside surface of the pipe and will be wrapped with a plastic protective wrap during
  7. Total projects costs for the water main replacement component of the project are installation. \$1,290,000.
  8. Identify the source of data used for these calculations: Beecher Metropolitan District records, Water Reliability Study prepared by Fleis & VandenBrink Engineering, Inc., DWRP Project Plan prepared by Fleis & VandenBrink Engineering, Inc.

Submitted by:

Steven J. Nagy, PE  
Name

5/15/19  
Date

Group Manager for Fleis & VandenBrink Engineering, Inc.  
Title

