

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

Applicant: City of Burton Project No: Burton DWRP #7398-01
Project Name: Project System Improvements - Phase 3

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 Please see attached..

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, 24 water main breaks have occurred on the water mains that are proposed for replacement, an average of 0.68 breaks/mile/year.
2. Identify the length, diameter, age and type of pipe to be replaced: 16,460 feet of 6-inch cast iron

pipe; 721 feet of 4-inch cast iron pipe; 728 feet of 2-inch pipe (thought to be cast iron - to be identified in the field) ; 613 feet of 1-inch pipe (unknown material - to be identified in the field); all approximately 70 +/- years old.

3. Each break is estimated to result in the average loss of 83,500 gallons of water, calculated to total 200,400 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 project area has approximately 630 homes, which consume approximately 140,000 gallons per day. The amount of water loss per year is equivalent to almost one and a half days of water consumed by the 630 homes. Replacing the 70 year old cast iron pipe with new PVC C909 pipe will nearly eliminate this loss.
5. The energy savings from pumping/delivering water through the new water mains versus the old ones is estimated at 641,000 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:
As illustrated in the 2013 City of Burton Water System Improvements Plan, the already undersized existing water main has been made worse by tuberculation. It is estimated that the existing water main has a Hazen-Williams roughness constant of 65-70. New PVC C909 can be assumed to have a roughness constant of 130. The age and material of the existing water main are considered to be the central issues rather than the existing soils.
7. Total projects costs for the water main replacement component of the project are \$ 4.7 million.
8. Identify the source of data used for these calculations: City GIS and City historical records as illustrated in the 2013 City of Burton Water System Improvements Plan.

Submitted by:

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Name

May 22, 2015

Date

Senior Associate

Title

To: Jonathan Berman
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File: 2075108902

Date: May 22, 2015

Reference: Burton DWRP Phase 3 (2016) – Green Factsheet

During the project planning phase for the City's water infrastructure upgrades, "Green" or environmental friendly components were identified. These "Green" components were identified for the water main replacement. The "Green" components are listed below:

- Having a more efficient water distribution system by minimizing water loss from the project area by reducing water main break/leakage frequency.
- Reducing energy needed for pumping costs as a result of replacing or rehabilitating the existing water mains. Reduction in operational costs of the regional system is an indirect improvement.
- The utilization of PVC pipe will reduce the receptiveness to corrosion experienced compared to existing cast iron water mains.

The table below summarizes an attempt to estimate the water loss that will be avoided with the implementation of the project.

Burton DWRP Phase 3 (2016) - 10 Year Water Main Break Summary					
Diameter	Length (LF)	Number of Breaks Over 10 Years	Breaks Per Mile Per Year	Volume of Water Loss Per Break* (gal)	Total Volume of Water Loss Per Year (gal)
1	613	0	-		
2	728	2	1.45	12,000	2,400
4	721	0	-		
6	16,460	22	0.71	90,000	198,000
Totals	18,522	24	0.68		200,400

**assumed 100 gpm for 2 inch, 750 gpm for 6 inch, and a 2 hour flow time.*

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