

**DW-SRF 2010 Project**

Proposal for Green Project Reserve Methodology using format from EPA's • June 22, 2009 guidance for GPR business cases

**ESTIMATE OF VALUE OF WATER LOSS WORKSHEET**

1 Date:	5-Mar-10
2 PWSID #	90130
3 System	<b>BATH WATER DISTRICT</b>
4 Project Name	Main Replacement Project
5 Location	Centre Street
6 Engineering Consultant	Wright-Pierce, Daniel Flagg, P.E.
7 Existing Main size, age, and type	6" and 8" cast iron unlined pipe
8 Proposed New Water Main size and type	12" Ductile Iron cement lined pipe
9 New Main Pipe Length	2,500
10 Estimated Project Cost	\$ 409,022

Note: Data from Utilities Annual Report (2008) to Maine Public Utilities Commission

Page	Line	Description	Units	2008
W-12	15	Total Production Water	gallons per year	377,223,000
W-12	17	Total Revenue Water	gallons per year	333,686,000
W-12	19	Total Non-Revenue Water	gallons per year	43,537,000
W-12	19	Percent Non-Revenue Water		12%
W-12	22	Utility Usage - treatment	gallons per year	1,932,000
W-12	23	Utility Usage - hydrant flushing	gallons per year	3,250,000
W-12	14	Utility Usage - bleeders	gallons per year	6,268,000
W-12	26	Utility Usage - all other (running customers & blow-offs)	gallons per year	6,950,000
W-12	30	Fire Protection	gallons per year	1,300,000
W-12	31	Main Breaks	gallons per year	2,000,000
W-12	35	Flushing Mains	gallons per year	75,000
W-12	36	Total Accounted for Non-Revenue Water	gallons per year	21,775,000
W-12	37	Total Unaccounted Non-Revenue Water	gallons per year	21,762,000
		<b>Estimated Water Loss From ALL Breaks, Leaks, &amp; Bleeders</b>	<b>gallons per year</b>	<b>37,055,000</b>
		<i>(PUC Accounts total of lines 14, 26,31,35 and 37)</i>		
		<b>% of Water Loss of Total Production Water</b>		<b>10%</b>
		<i>(PUC Lines 14,26,31,35,37 divided by Line 15)</i>		
W-9	9	Total Transmission Mains	feet	55,369
W-9	23	Total Distribution Mains	feet	228,477
		Total Mains in Service	feet	283,846
			miles	54
		<u>Estimated Distribution System Losses:</u>		
		Loss Water per mile of pipe	gallons per mile per year	689,284
		Loss Water per foot of pipe per year	gallons per foot per year	131
		Loss water per foot of pipe per day	gallons per foot per day	0.36
		<u>Water loss will vary with age of water main - assume Straight line projection as follows:</u>		
		0 to 25 year old pipe	0 % of Total Loss gallons per mile per year	-
		26 to 50 year old pipe	10% of Total Loss gallons per mile per year	68,928
		51 to 75 year old pipe	30% of Total Loss gallons per mile per year	206,785
		over 75 year old pipe	60% of Total Loss gallons per mile per year	413,570
			All Losses:	689,284
		Age of Main to be replaced	years	100
		Length of Main to be Replaced	mile	0.47
		<b>CALCULATED WATER LOSS - FOR PROPOSED PROJECT</b>	<b>gallons per year</b>	<b>195,819</b>
W-2	29c	Total PRODUCTION COST of Water	\$/year	\$ 1,162,359
W-12	15	Total Production Water	1,000 gallons per year	377,223
		Production Cost of Water	per 1,000 gallons	\$ 3.08
		<b>PROJECTED ANNUAL VALUE of WATER LOSS</b>	<b>per year</b>	<b>\$ 603</b>

Annual Savings \$	603
PV Factor ( uniform series present worth factor (1%, 75 years):\$	52.587
<b>Present Value of Savings over Economic life of pipeline:\$</b>	<b>31,730</b>
<b>Project Cost \$</b>	<b>409,022</b>
PV Percent of Project Cost:	8%
<b>ESTIMATED % Green</b>	<b>8%</b>
<b>\$ Amount Green \$</b>	<b>31,730</b>



Maine Center for Disease  
Control and Prevention  
An Office of the  
Department of Health and Human Services

John E. Baldacci, Governor

Brenda M. Harvey, Commissioner

Department of Health and Human Services  
Maine Center for Disease Control and Prevention  
286 Water Street  
# 11 State House Station  
Augusta, Maine 04333-0011  
Tel: (207) 287-2070; Fax: (207) 287-4172  
TTY: 1-800-606-0215

State of Maine Drinking Water Program  
GREEN PROJECT RESERVE  
BUSINESS CASE for a  
WATER MAIN REPLACEMENT

**ESTIMATE OF VALUE OF WATER LOSS**

April 13, 2010

The Fiscal Year (FY) 2010 Appropriation Law (P.L. 111-88) included additional requirements affecting the Drinking Water State Revolving Fund (SRF) program. EPA has developed *Draft Procedures for Implementing Certain Provisions of EPA's Fiscal Year 2010 Appropriation Affecting the Clean Water and Drinking Water State Revolving Fund Programs* dated March 3, 2010. Public Law 111-88 included the language "Provided, that for fiscal year 2010, to the extent there are sufficient eligible project applications, not less than 20% of the funds made available under this title to each State for the Clean Water and Drinking Water State Revolving funds and not less than 20% of the funds made available under this title to each State for Drinking Water State Revolving Fund capitalization grants shall be used by the State for projects to address green infrastructure, water or energy efficiency improvements, or other environmentally innovative activities."

One of the project area identified in the EPA Green Project Guidance Documents is identified as Water Efficiency Improvements "*distribution pipe replacement or rehabilitation to reduce water loss and prevent water main breaks*". A Business Case Analysis is required for a water main replacement project to be approved as providing "Water Efficiency Improvements".

The purpose of this document is to provide public water utilities regulated by the Maine Public Utilities Commission (MPUC) with a standard procedure for calculating an estimate of the value of the water losses saved in conjunction with a water main replacement project. This method does not preclude a utility from providing an alternative calculation methodology based on project specific information. Such alternative documentation shall be reviewed and may be approved by the MDWP.

The Maine Public Utilities Commission (MPUC) requires all Maine water utilities file an Annual Report with the Commission. The Annual Report is the source of much information useful for preparing an estimate of value of water loss for a Business Case analysis of Green Project Reserve.

The attached methodology utilizes specific data from a utility's Annual Report to the MPUC. Page W-12 provides a detailed analysis of utilities water production and consumption information. Specific details include Production Water (line 15), Revenue Water (Line 17), as well as estimated water losses from bleeders, blow-offs, main breaks, service leaks, and main flushing.

Page W-9 of the PUC Annual Report provides information on total transmission and distribution mains in service as well as annual additions and deletions.

With information on Page W-12, one can calculate total water losses from all breaks, leaks, and bleeders. From Page W-9, one can identify the total length of mains in service. With these two pieces of information, one can calculate the estimated water loss in gallons per foot of pipe per day.

Knowing that older water mains and services will typically be the source of more leaks, or water losses, a ratio to distribute water losses by the age of mains. Pipes 0 to 25 years old are not expected to leak therefore no water loss is attributed to pipes less than 25 years old. Pipes 26 to 50 years old will account for 10% of all water losses. Pipes 51 to 75 years old will account for 30% of water losses and pipes older than 75 years will represent 60% of all pipeline water losses.

Using the average water loss per foot and the specific pipeline proposed for replacement, one can allocate water losses associated with the proposed project.

Using the water production cost information found on Page W-2, one can calculate the Annual Projected Value of Water Loss associated with the proposed project.

The MPUC allows depreciation of water distribution mains over a 75 year period. Using the MPUC time period (which should be the absolute minimum that a new water main will remain in service, or economic life) a Present Value (PV) calculation can be made of the an Annuity (Annual Value) of Water Loss using a 1% value of money over 75 years.

MPUC defines "Service Life" as the average length of time a unit of equipment will remain in service taking into account factors such as the effect of normal wear and tear, economic and technological obsolescence and public requirements.

The resulting PV can be compared with the Project Cost Estimate to determine the % of project expense attributed to the value of reduced water loss.

**ANNUAL REPORT**  
For Water Utilities  
**OF**

*Name*

BATH WATER DISTRICT

*Address*

1 LAMBARD STREET  
BATH, MAINE 04530

**TO THE**  
**PUBLIC UTILITIES COMMISSION**  
**OF THE**  
**STATE OF MAINE**  
**FOR THE**  
**YEAR ENDED DECEMBER 31, 2009**

Signature of Person  
responsible for report

\_\_\_\_\_

TITLE \_\_\_\_\_  
TELEPHONE \_\_\_\_\_

E\_MAIL \_\_\_\_\_

**WATER UTILITY PLANT ACCOUNTS**

Line Number	ACCT. NO. (a)	ACCOUNT NAME (b)	CURRENT YEAR (c)	WATER UTILITY PLANT ACCOUNTS	
				.1 Source of Supply & Pumping Expenses-Operations (d)	.2 Source of Supply & Pumping Expenses- Maintenance (e)
1	601	Salaries and Wages - Employees	507,989		
2	603	Salaries and Wages - Officers, Directors and Majority Stockholders			
3			6,000		
4	604	Employee Pensions and Benefits	294,906		
5	610	Purchased Water			
6	615	Purchased Power	84,787	81,744	
7	616	Fuel for Power Purchased			
8	618	Chemicals	66,766		
9	620	Materials and Supplies	136,333	2,180	
10	631	Contractual Services - Engineering	3,836		
11	632	Contractual Services - Accounting	8,000		
12	633	Contractual Services - Legal	2,778		
13	634	Contractual Services - Management Fees			
14	635	Contractual Services - Other	70,777		
15	641	Rental of Building/Real Property			
16	642	Rental of Equipment	1,670		
17	650	Transportation Expenses	10,879		
18	656	Insurance - Vehicle	3,477		
19	657	Insurance - General Liability	11,772		
20	658	Insurance - Workman's Compensation	12,554		
21	659	Insurance - Other	2,966		
22	660	Advertising Expense	2,791		
23	666	Regulatory Commission Expenses -			
24		Normalization of Rate Case Expense			
25	667	Regulatory Commission Expenses - Other			
26	670	Bad Debt Expense	5,703		
27	675	Miscellaneous Expenses	13,913		
28					
29		<b>Total Water Utility Expenses</b>	<b>1,247,897</b>	<b>83,924</b>	<b>0</b>

**WATER TREATMENT**

FOR EACH SUPPLY, CHECK AND/OR SPECIFY THE TYPE OF TREATMENT USED

Line Number	Name of Source	Chlorination	Fluoridation	Flocculation/Coagulation	Sedimentation	Filtration	Iron/Manganese Removal	Lead/Copper	Other Treatment (specify)
1	Nequasset Lake	X	X	X	X	X			Chlorine and Chloramines
2									Caustic Soda Addition
3									Polymer Aid
4									Phosphate Addition
5									
6									
7									
8									
9									
10									
11									
12									

**FEET OF TRANSMISSION AND DISTRIBUTION MAINS**

Explain any important items included in column (f)

Line Number	Kind of Pipe (Galvanized, Cast Iron, Ductile, etc) (a)	Diameter in inches (b)	In Use First of Year (c)	Added During Year (d)	Retirements during Yr (e)	Adjustments Dr. (or Cr.) during Yr (f)	In Use End of Year (g)
1	Transmission						
2	Cast Iron	20	302				302
3	Cast Iron	16	18,277				18,277
4	Cast Iron	12	16,080				16,080
5	Ductile Iron	16	15,547				15,547
6	Subaqueous (Ductile Iron)	16	5,163				5,163
7							
8							
9	Total Transmission		55,369	0			55,369
10	Distribution						
11	Cast Iron	16	1,039				1,039
12	Cast Iron	12	24,417				24,417
13	Cast Iron	10	5,389				5,389
14	Cast Iron	8	41,598		640		40,958
15	Cast Iron	6	73,830				73,830
16	Cast Iron	4	6,991		1,100		5,891
17	Ductile Iron	16	14,710				14,710
18	Ductile Iron	12	21,236	5,740			26,976
19	Ductile Iron	10					
20	Ductile Iron	8	23,140	1,730			24,870
21	Ductile Iron	6	2,956				2,956
22	Ductile Iron	4	121				121
23	Galvanized Iron	2	3,915		400		3,515
24	Galvanized Iron	1	403				403
25	Galvanized Iron	3/4	197				197
26	Copper	2	70				70
27	Copper	1	6,228	284			6,512
28	Copper	3/4	615		284		331
29	Plastic	2	1,622	400			2,022
30	Total Distribution		228,477	8,154	2,424		234,207

### WATER PRODUCTION AND CONSUMPTION

1. Show quantities of water produced and purchased and the quantities delivered to consumers and lost or unaccounted for during the year. Where estimates are used, the basis thereof should be set forth in a footnote.

Line Number	Month (a)	Thousand Gallons Delivered to Mains				
		Purchased (b)	Groundwater		Surface Water	
			By Pumping (c)	By Gravity (d)	By Pumping (e)	By Gravity (f)
1	January				36,415	
2	February				30,887	
3	March				32,624	
4	April				25,637	
5	May				26,582	
6	June				25,402	
7	July				27,876	
8	August				28,638	
9	September				29,804	
10	October				28,962	
11	November				24,611	
12	December				29,145	
13	Totals	0	0	0	346,583	0
14						THOUSAND GALLONS
15	Total PRODUCTION WATER					346,583
17	Total REVENUE WATER (Page W-3, line 20, col. e) or 287,381					287831
19	Balance as NON-REVENUE WATER State Percentage: 16.95%					58752
21	Description and estimated consumption of Non-Revenue Water					
22	Utility Usage-at source/treatment plants					1060
23	Utility Usage-flushing hydrants	Number flushed:	160		3400	
24	Utility Usage-bleeders	Number in use:	5		8508	
25	Utility Usage-meter bench	Number meters tested:			0	
26	Utility Usage-other purposes (specify):					
27	City Maintenance/Fire Department Training					2750
28	Pipe Replacement					2200
29	Other Domestic Use					2000
30	Fire Protection	Number of hydrant-using fires:	6		1750	
31	Main Breaks	Number of breaks:	11		1850	
32	Service Line losses before meters	Number of cases:	6		1200	
33	Other Non-Revenue uses/losses (specify): Flushing lines for summer construction projects					53
34	Innaccurate 5/8" residential meters (2.5% of billed amount)					3106
35	Innaccurate commercial/industrial meters (1% of billed amount)					632
36	Total Accounted for Non-Revenue Water (Lines 22 through Lines 35)					28509
37	Unaccounted for Water					30243
38	Total Non-Revenue Water (Lines 36 plus Line 37)					58752
40	System DEMAND Data					
41	Average Daily Demand:	Quantity (mgd)	1.406		Date	
42	Maximum Day Demand:	Quantity (mgd)	1.598			
43	Peak Hour Demand:	Quantity (mgd)	4			

Remarks Note: Non-revenue water is water that was produced and used but did not produce water revenues; unaccounted for water is a subset of this.