

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: 4-May-10
 2 PWSID # 91330
 3 System **RANGELEY WATER DISTRICT**
 4 Project Name Main Replacement Project, Project ID # 2010-29
 5 Location Lake Street, & Rangely Lake House Road
 6 Engineering Consultant A.E.Hodsdon
 7 Existing Main size, age, and type 6" cast iron unlined, shallow - freezes in winter, dead ends
 8 Proposed New Water Main size and type 8" Ductile Iron Cement Lined
 9 New Main Pipe Length 1,950
 10 Estimated Project Cost \$ 378,330

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	25,664,000
W-12	17	Total Revenue Water	gallons per year	
W-12	19	Total Non-Revenue Water	gallons per year	
W-12	19	Percent Non-Revenue Water		
W-12	22	Utility Usage - treatment	gallons per year	
W-12	23	Utility Usage - hydrant flushing	gallons per year	
W-12	14	Utility Usage - bleeders	gallons per year	
W-12	26	Utility Usage - all other (running customers & blow-offs)	gallons per year	
W-12	30	Fire Protection	gallons per year	
W-12	31	Main Breaks	gallons per year	
W-12	35	Flushing Mains	gallons per year	
W-12	36	Total Accounted for Non-Revenue Water	gallons per year	-
W-12	37	Total Unaccounted Non-Revenue Water	gallons per year	-
Estimated Water Loss From ALL Breaks, Leaks, & Bleeders			gallons per year	
<i>(PUC Accounts total of lines 14, 26,31,35 and 37)</i>				
% of Water Loss of Total Production Water				0%
<i>(PUC Lines 14,26,31,35,37 divided by Line 15)</i>				
W-9	9	Total Transmission Mains	feet	
W-9	23	Total Distribution Mains	feet	
		Total Mains in Service	feet	96,720
			miles	18
Estimated Distribution System Losses:				
		Loss Water per mile of pipe	gallons per mile per year	-
		Loss Water per foot of pipe per year	gallons per foot per year	-
		Loss water per foot of pipe per day	gallons per foot per day	-
<i>Water loss will vary with age of water main - assume Straight line projection as follows:</i>				
		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 -
		51 to 75 year old pipe	30% of Total Loss	gallons per mile per year -
		over 75 year old pipe	60% of Total Loss	gallons per mile per year -
			All Loses:	-
		Age of Main to be replaced	years	90
		Length of Main to be Replaced	mile	0.37
CALCULATED WATER LOSS - FOR PROJECT			gallons per year)	1,728,000

Notes: See estimate prepared by A.E. Hodsdon, P.E. He estimates project will eliminate 2 winter bleeders wasting total of 2.72 MG per winter season
 Using N. Lamie revised estimate of water loss based on 2 bleeders @ 5 gpm each for 4 months per year which represent 6.7% of all production water.

W-2	29c	Total PRODUCTION COST of Water	\$/year	
W-12	15	Total Production Water	1,000 gallons per year	
		Production Cost of Water	per 1,000 gallons	\$ 1.16
PROJECTED ANNUAL VALUE of WATER LOSS			per year	\$ 2,004

Annual Savings	\$	2,004
PV Factor (uniform series present worth factor (1%, 75 years):	\$	52.587
Present Value of Savings over Economic life of pipeline:	\$	105,410
Project Cost	\$	378,330
PV Percent of Project Cost:		28%
ESTIMATED % Green		28%
\$ Amount Green	\$	105,410



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

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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.



A. E. Hodsdon
CONSULTING ENGINEERS
10 COMMON ST., WATERVILLE, ME
04901 (207) 873-5164

October 16, 2009
P-1857

Mr. Vernon Bean, Trustee
Rangeley Water District
P.O. Box 989
Rangeley, ME 04970

RE: ***Pre-Design Report for Bleeder Elimination for Rangeley Water District***

Dear Mr. Bean:

We have completed this pre-design letter report regarding your proposed SRF project for fiscal year 2010. The report includes a summary of the project and associated cost estimates.

PROJECT DESCRIPTION:

The proposed project involves the replacement of water mains on Lake Street and Rangeley Lake House Road. The existing pipe is hand laid, lead-joint pipe that is prone to leakage and freezing during the winter. This proposal will also eliminate two (2) bleeders used during the winter because of shallow mains. The combined flow for these two (2) bleeders amounts to about 15 to 30% of the daily flow for the system. The energy savings from these two (2) bleeders will be significant. The project will replace 2,000 l.f. of old shallow pipe.

PROJECT NEED:

The project is needed to eliminate wasted water and to ensure continued reliability for water service in the project area.

ALTERNATIVES:

The following alternatives were considered:

1. Continue running the bleeders and live with the problem.
2. Replace the pipe at proper depths. This is the selected option because it will solve the problems at a reasonable cost.
3. Insulate the existing pipe. This option was not selected as it involves considerable cost in construction yet we would still be left with old leaking pipe in the ground.

COST ESTIMATES:

Cost estimates for the proposed improvements have been prepared. Costs include construction costs and other project costs (engineering, administration, contingency, legal, etc.)

TO: Mr. Vernon Bean
RE: Pre-Design Report for Bleeder Elimination for Rangeley Water District

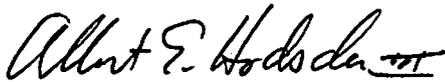
Page No. 2

ATTACHMENTS:

Cost estimates and a project site plan are attached.

We are pleased to provide this pre-design report for your engineering needs. Please feel free to call if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Albert E. Hodsdon III". The signature is written in a cursive style with a horizontal line at the end.

Albert E. Hodsdon III
Engineer

Enclosures

PIPE REPLACEMENT

Summary

- Replacement of 1,950 feet of shallow-1920s lead-jointed cast iron (CI) distribution pipe with new 8-inch ductile iron (DI) pipe to eliminate the need to run bleeders that wastes up to 20% of normal flow.
- Loan amount = \$378,330
- Water saving (green) portion of loan = 100%
- Annual water savings = 2.72 million gallons (MG) (2 x 7gpm x 4.5 mos.)

Background

- The water system includes approximately 18.6 miles of galvanized CI and DI distribution pipes ranging from 1.5 to 12 inches in diameter. The pump station pumps an average of 53,130 gallons per day in November and 97,500 gpd in February).
- As part of a water loss management plan, elimination of 2 of their 4 bleeders will reduce pumping substantially.
- The pre-1920s pipe account for 2.6% of the 18.6 miles of distribution pipe.

Results

- The elimination of these two (2) bleeders will reduce the winter water treatment by up to 20,000 gpd. This amounts to 22% of the total pumped in February.

Calculated Water Loss

- The flow from the bleeders is measured and set for the season. They each flow 5-7 gpm depending on the severity of the season.

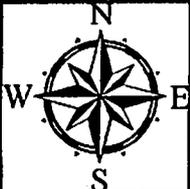
Conclusion

- By replacing the 1,950 feet of pipe the system anticipates conserving 2.72 MGY (22% of overall winter flow). The variable cost to pump/treat water is \$1.16 per 1,000 gallons. Cost savings from bleeders are estimated at \$3,150 (2720 x 1.16). This savings amounts to almost 1% of the district's revenue and 1 ½% of its O & M expenses).
- Additional benefits include reductions in unnecessary wear on equipment and reduced operation and maintenance expenditures. Discharge of the bleeders during the winter has caused noticeable erosion at the lake shore. This will be eliminated.

Rangeley Water District
Water Main Replacement
Preliminary Plan
Source: RWD GIS
A.E. Hodsdon Engineers

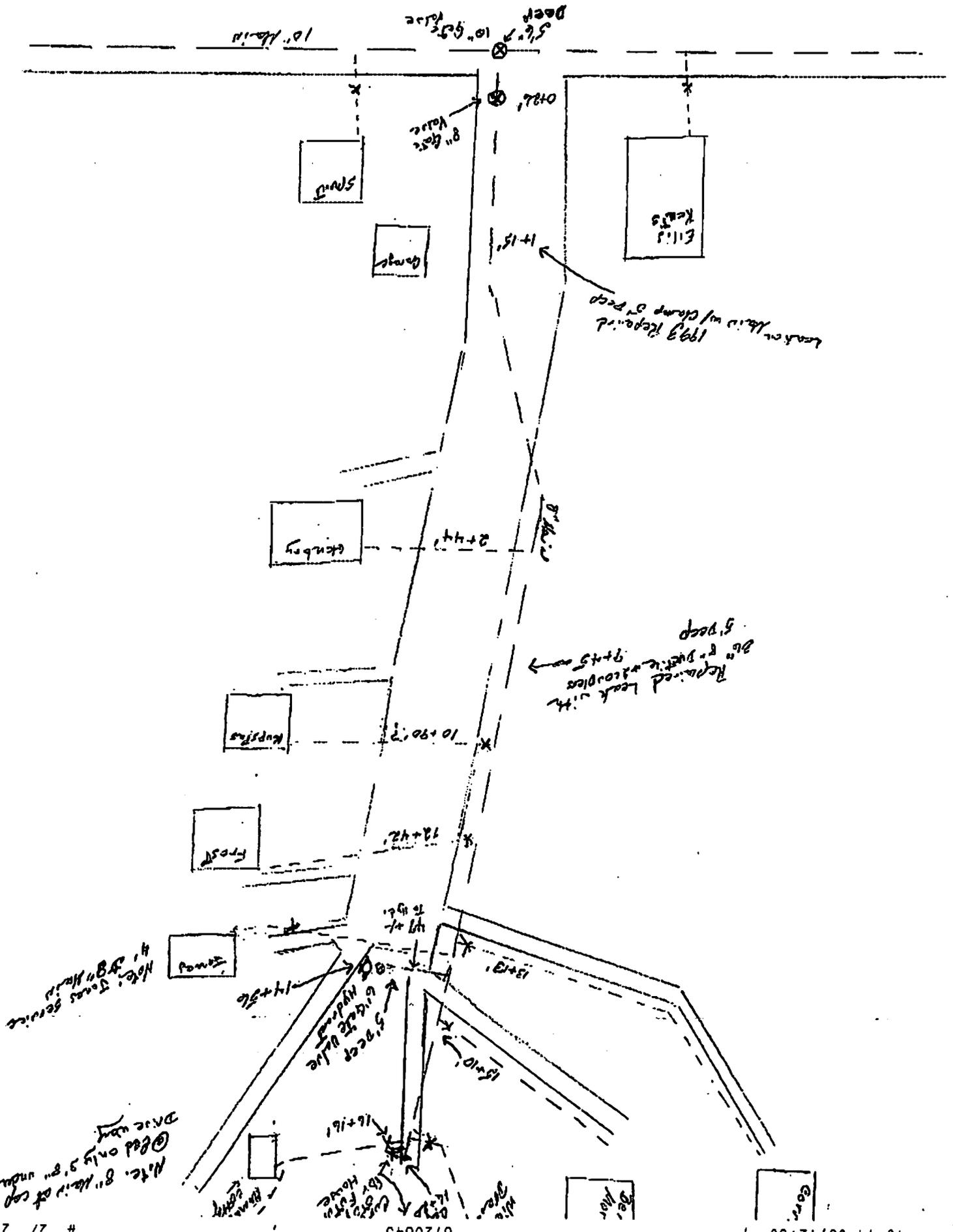
Install 600 LF Of 8"
Diameter Class 52 CLDI
Water Main

Install 1,300 LF Of 8"
Diameter Class 52 CLDI
Water Main



Rt. 4 Main Street

Kaypoley Inn



Leak on Main w/ clamp & pipe
1993 repaired

Repaired leak with
2 1/2\"/>

Note: Some service
4\"/>

Note: 8\"/>

WATER EXPENSE ACCOUNT MATRIX

Line Number	.3 Water Treatment Expenses- Operations (f)	.4 Water Treatment Expenses- Maintenance (g)	.5 Transmission & Distribution Expenses-Operations (h)	.6 Transmission & Distribution Expenses-Maintenance (i)	.7 Customer Accounts Expense (j)	.8 Administrative & General Expenses (k)
1	0	19		12,822	580	35,301
2						
3						21,037
4						10,605
5						
6						55
7						
8	4,929	610				
9	358		350	2,238	1,292	1,742
10						-3,401
11						2,050
12						634
13						
14						
15		500		9,413	8,641	9,977
16						84
17	1,829	736	1,786	86	1,308	256
18						
19						3,594
20						3,489
21						21,995
22						674
23						
24						
25						2,048
26						
27	919		93	245	1,920	5,708
28						
29	8,035	1,865	2,229	24,804	13,741	115,848

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		2,644			
2	February		2,745			
3	March		2,901			
4	April		2,097			
5	May		1,769			
6	June		1,696			
7	July		2,399			
8	August		2,612			
9	September		1,708			
10	October		1,932			
11	November		1,564			
12	December		1,597			
13	Totals	0	25,664	0	0	0
14	Total PRODUCTION WATER					THOUSAND GALLONS
15						25,664
16	Total REVENUE WATER (Page W-3, line 20, col. c) or					0
17	Balance as NON-REVENUE WATER					25664
18	State Percentage: 60.00%					
19	Description and estimated consumption of Non-Revenue Water					
20	Utility Usage-at source/treatment plants					
21	Utility Usage-flushing hydrants	Number flushed:				
22	Utility Usage-bleeders	Number in use:				
23	Utility Usage-meter bench	Number meters tested:				
24	Utility Usage-other purposes (specify):					
25						
26						
27						
28						
29						
30	Fire Protection	Number of hydrant-using fires:				
31	Main Breaks	Number of breaks:				
32	Service Line losses before meters	Number of cases:				
33	Other Non-Revenue uses/losses (specify):					
34						
35						
36	Total Accounted for Non-Revenue Water (Lines 22 through Lines 35)					0
37	Unaccounted for Water					
38	Total Non-Revenue Water (Lines 36 plus Line 37)					0
39						
40	System DEMAND Data		Quantity (mgd)	Date		
41	Average Daily Demand:					
42	Maximum Day Demand:					
43	Peak Hour Demand:					

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.

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17	Total REVENUE WATER (Page W-3, line 20, col. e) or					0
18						
19	Balance as NON-REVENUE WATER		State Percentage:	60.00%	25664	
20						
21	Description and estimated consumption of Non-Revenue Water					
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25	Utility Usage-meter bench	Number meters tested:				
26	Utility Usage-other purposes (specify):					
27						
28						
29						
30	Fire Protection	Number of hydrant-using fires:				
31	Main Breaks	Number of breaks:				
32	Service Line losses before meters	Number of cases:				
33	Other Non-Revenue uses/losses (specify):					
34						
35						
36	Total Accounted for Non-Revenue Water (Lines 22 through Lines 35)					0
37	Unaccounted for Water					
38	Total Non-Revenue Water (Lines 36 plus Line 37)					0
39						
40	System DEMAND Data		Quantity (mgd)	Date		
41	Average Daily Demand:					
42	Maximum Day Demand:					
43	Peak Hour Demand:					

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.