Carroll County Water Authority

Evaluation of Water Conservation and Efficiency Under EPA Guidelines

I. Introduction

The U.S. Environmental Protection Agency ("EPA") Region 4 developed certain guidelines and recommended best practices to assist water providers in evaluating their water supply need and alternatives for meeting those needs with the incorporation of conservation and efficiency actions to first reduce need and second to address needs. This report addresses how the Carroll County Water Authority incorporated EPA's guidance and best practice recommendations into its analysis of 2065 water supply need and the alternatives for meeting that need.

II. Background

The Carroll County Water Authority ("CCWA") is charged with providing adequate water supplies to meet the demands of its service area and to make provisions to do so over a 50-year planning horizon. On December 28, 2008, CCWA filed a Section 404 Permit application to construct a 643-acre reservoir on Indian Creek to meet its 2060 water supply need of 18 mgd. The application was prepared and filed prior to EPA's 2010 guidelines, but it did incorporate conservation and efficiency measures. The U.S. Army Corps of Engineers ("USACE") processed the application until February 2016 when, upon the request of CCWA, it administratively withdrew the application. The administrative withdrawal was to allow CCWA time to update its permit application based on the January 28, 2016 updated need certification from the Georgia Environmental Protection Division ("EPD"). The January 28, 2016 certification from EPD was a result of months of study and consultation between CCWA and EPD on population projections and per capita usage rate. The ultimate certification of 6 mgd incorporates significant water conservation efforts to reduce the per capita usage rates and a very conservative estimate of population growth. Since 2016, CCWA has worked diligently to reevaluate alternatives for meeting the 6 mgd need and to prepare a revised Section 404 Permit application. This document will be included as a part of CCWA's Alternatives Analysis in the revised Section 404 Permit application.

III. Water System Management

CCWA's water system served approximately 17,500 customers as of August 2017. CCWA is the wholesale provider of water to five cities within Carroll County, Villa Rica, Temple, Mount Zion, Roopville, and Whitesburg, as well as Cleburne County, Alabama. Current water supply sources include the Snake Creek Reservoir with a permitted capacity of 8 mgd and three groundwater wells which are permitted for 0.75 mgd. The system includes approximately 772 miles of pipelines and 39 interconnections with water utilities within and around Carroll County.

CCWA's water system management reflects its efforts to operate efficiently and balance water supply and demand. To quantify the results of its efforts, CCWA began conducting water audits in 2011 using the AWWA WLCC Free Water Audit Software Program. The audits from the past five years along with a summary of the same are attached hereto in Appendix A. The 2016 validity score is 71% which is an improvement over the 2015 score of 61%.

CCWA is committed to continuing to make improvements as demonstrated in the policies and goals documented in its 2017 Water Conservation Plan, attached hereto as Appendix B and its 2017 Drought Contingency Plan, attached hereto as Appendix C. The strategies for improving future water audit scores address: leak detection and elimination, hydraulic modeling and distribution system maps, meter testing/replacement/calibration, preventing water tank overflows, flushing programs, prevent unauthorized water use and limited unmetered water use.

CCWA is also committed to addressing the demand-side of system management through sustained public education and public involvement in decisions. The current public education and outreach programs in place include: partnership with county schools to host fieldtrips and conduct classroom presentations, recreational uses of the Snake Creek Reservoir including the annual Gone Fishin' Fishing Tournament, distribution of water conservation literature, up to date website, and direct consultation with customers with high usage to assess leaks and opportunities for plumbing retrofits.

In addition to educational outreach efforts, CCWA places a high priority on keeping the public informed on its operations and to invite public input on plans for future water supply. The CCWA board holds monthly public meetings at which detailed operational, financial and infrastructure updates are given. There is opportunity for public comments at each meeting and the meetings are broadcast on a local cable station. Decision made on large projects, in particular the Indian Creek Reservoir, receive additional public input through special meetings held in the evening hours with notices published in the newspaper and letters sent to potentially impacted property owners. All of the information presented at the public meeting, including maps, is uploaded on the CCWA website.

Finally, CCWA does have an integrated resource management outlook and continues to take into consideration the influence water, wastewater, storm water and energy have on one another.

IV. Pricing for Efficiency

Full cost and conservation pricing is a key component to CCWA's plan for reducing water demand. In 2015, CCWA commissioned a rate study, attached hereto as Appendix D. CCWA evaluated its long-term contracts with its wholesale customers and determined that the rates charged were not fully covering costs and not in line with market standards. CCWA began meeting with its wholesale customers and negotiating new or amended contracts. The increase to rates will be gradual, but CCWA anticipates positive results and positive impacts on reducing water demands.

CCWA is already implementing a conservation rate structure which increases the cost per unit volume of water as consumption increases as detailed in its Water Conservation Plan. Its water rate structure includes a base rate for low water usage plus three additional tiers for higher consumption rates. The rates were last adopted in 2017 and are attached to the Water Conservation Plan. A copy of a typical water bill is also attached hereto as Appendix E.

V. Efficient Water Use

CCWA has water conservation policies and systems in place to facilitate efficient water use. The system in place for leak detection and elimination includes reactive and proactive components. The reactive component is reliance on reports from the general public and observations of unusual usage activity by water treatment plant personnel using the Supervisory Control and Data Acquisition ("SCADA") systems. Reports of leaks from either source are responded to based on their assessed priority. The proactive component is use of leak detection equipment which can pinpoint leaks based on acoustics.

Another efficiency measure CCWA uses is to limit unmetered water usage to: 1) Firefighting; 2) Sanitary use and sampling at the Snake Creek Water Treatment Plant; 3) Sanitary use at CCWA's Fairfield Wastewater Treatment Plant. Demand from these uses is low. CCWA does require the fire department to provide usage estimates for large fire fighting events. Additionally, CCWA requires all multi-family housing developments to have individual meters for each residence.

CCWA supports building smart for the future to encourage conservation including the use of high-efficiency plumbing fixtures in all new construction which includes renovations and additions. While CCWA supports conservation of rainwater for non-potable needs, these efforts are individual-customer driven at this time. Likewise, landscaping to minimize water use is individual-customer driven, but CCWA's conservation pricing and drought policies disincentives high water maintenance landscapes.

VI. Watershed Approaches

CCWA uses a watershed approach to plan for the operation and future expansion of its water system. It is an active participant in the Middle Chattahoochee Regional Water Council which prepares a Regional Water Plan for eleven counties including Carroll County. The Regional Water Plan includes forecasting future water supply needs, assessments of current water supplies and strategies and management practices to fill the gap between supply and demand. The Executive Director of the CCWA served as the chairman of the Council.

In 2015, CCWA worked with Paulding County and the Etowah Water & Sewer Authority to conduct a downstream flow analysis of the Alabama-Coosa-Tallapoosa River Basin ("ACT") to determine cumulative impacts to downstream flows resulting from the construction of the reservoir projects proposed by each. The study concluded that very minimal impacts to stream flow would occur as a result of the three reservoir projects. These results were verified and approved by the U.S. Army Corps of Engineers.

CCWA has and will continue to seek opportunities for and encourage wetland restoration, groundwater recharge, reuse of treated wastewater and graywater reuse. Currently, CCWA proposes to restore substantial acres of wetland on its Big Indian Creek Mitigation site in connection with permitting the Indian Creek Reservoir.

Protection of the water supply watersheds is critical. Carroll County has a watershed protection ordinance which establishes specific regulations regarding buffers, limits on development, limits on impervious surfaces, etc. CCWA will continue to work with the County to make sure its water sources are protected.

VII. Incorporation of the Guidelines in CCWA's Planning

Based on consideration of the foregoing policies, procedures and plans, CCWA reduced its 2065 projected demand from 10 mgd to 6 mgd by reducing the projected per capita usage rate from 110 gpcpd to 89 gpcpd. The impact of each efficiency measurer is shown on the Water Efficiency Evaluation Checklist attached hereto as Appendix F. Accordingly, conservation is a key component to CCWA's plan for meeting its 2065 demand but conservation alone cannot meet the unmet need. CCWA selected the Indian Creek Reservoir as the preferred alternative as it is the least environmentally damaging, practicable alternative capable of meeting the 6 mgd unmet need in 2065.

VIII. Conclusion

Water efficiency and conservation are key components to CCWA's current operations and its planning for the future. Incorporating water conservation into its 2065 demand projections allowed CCWA to reduce

its need from 10 mgd to 6 mgd resulting in a significantly smaller and less expensive water supply project which has fewer impacts to the environment. CCWA is committed to continuing to improve and evolve as new technologies and new best practices come to light.

IX. Appendices

A. Water Audits using AWWI software for the past 5-years
B. Water Conservation Plan
C. Drought Contingency Plan
D. 2015 Rate Study Summary
E. Copy of typical water bill
F. Water Efficiency Evaluation Checklist

Appendix A

Water Audit Parameter	2016	2015	2014	2013	2012	2011
Water Supplied						
Volume from Own Sources	1,989.596	1,679.470	1,596.065	1,447.425	1,581.843	1,601.280
Meter Error Adjustment	-4.08%	(14.375)	(6.190)	-	-	0.001
Water Imported	4.558	-	1.109	-	-	-
Water Exported	649.801	397.848	364.111	328.247	350.109	322.971
Water Exported as % of Water Supplied	*45.5%*	*31.5%*	*29.4%*	*29.3%*	*28.4%*	*25.3%*
Water Supplied	1,427.353	1,264.713	1,239.253	1,119.178	1,231.734	1,278.308
Authorized Consumption						
Billed Metered	1,055.089	981.501	990.765	936.282	973.275	1,030.129
Billed Metered as % of Water Supplied	*73.9%*	*77.6%*	*79.9%*	*83.7%*	*79.0%*	*80.6%*
Billed Unmetered	-	-	-	-	-	-
Unbilled Metered	8.501	8.315	8.354	1.047	1.006	0.862
Unbilled Unmetered	17.842	15.809	15.491	16.927	13.520	34.359
Authorized Consumption	1,081.432	1,005.625	1,014.610	954.256	987.801	1,065.350
Authorized Consumption as % of Water Supplied	*75.8%*	*79.5%*	*81.9%*	*85.3%*	*80.2%*	*83.3%*
Authorized Consumption + Exported Water as a % of Water Supplied + Water Exported	*83.3%*	*84.4%*	*86.0%*	*88.6%*	*84.6%*	*86.7%*
Water Losses	345.921	259.088	224.643	164.922	243.933	212.958
Apparent Losses						
Unauthorized Consumption	3.568	3.162	3.098	2.798	3.079	3.196
Customer Metering Inaccuracies	10.743	9.998	1.000	9.468	9.841	10.414
Systematic Data Handling Errors	2.638	2.454	0.020	-	-	-
Apparent Losses	16.949	15.614	4.118	12.266	12.921	13.610
Real Losses	328.972	243.474	220.525	152.656	231.012	199.348
Water Losses	345.921	259.088	224.643	164.922	243.933	212.958
Water Losses as % of Water Supplied	*24.2%*	*20.5%*	*18.1%*	*14.7%*	*19.8%*	*16.7%*
Water Losses as % of Water Supplied + Water Exported	*16.7%*	*15.6%*	*14.0%*	*11.4%*	*15.4%*	*13.3%*
Non-Revenue Water						
Non-Revenue Water	372.264	283.212	248.488	182.896	258.459	248.179
System Data						
Length of Mains	772	772	769	767	764	750
No. of Active & Inactive Customers	18,710	18,427	18,280	18,182	17,904	17,842
Service Connection Density	24	24	24	24	23	24
Operating Pressure	100	100	90	90	90	90
Cost Data						
Total Annual Operating Cost	$ 7,236,220	$ 7,225,782	$ 7,344,315	$ 6,996,938	$ 7,018,685.00	$ 6,670,843
Retail Cost	$ 7.02	$ 7.01	$ 7.56	$ 5.20	$ 5.27	$ 7.22
Variable Production Dost	$ 367.43	$ 374.34	$ 402.72	$ 465.44	$ 413.51	$ 409.77
Performance Indicators						
Financial Indicators						
Non-Revenue Water as % of Water Supplied	15.6%	22.4%	20.1%	16.3%	21.0%	19.4%
Non-Revenue Water as % of Operating Cost	2.4%	2.9%	1.8%	2.0%	2.4%	2.9%
Annual Cost of Apparent Losses	$ 115,872	$ 109,381	$ 31,134	$ 63,783	$ 68,091	$ 98,263
Annual Cost of Real Losses	$ 48,736	$ 91,142	$ 88,810	$ 71,052	$ 95,526	$ 81,687
Operational Efficiency Indicators						
Apparent Losses per Service Connection per Day	2.48	2.32	0.62	1.85	1.98	2.09
Real Losses per Service Connection per Day						
Real Losses per Length of Main per Day	1167.63	864.40	785.67	545.29	828.42	728.21
Real Losses per Service Connection per Day per PSI						
Unavoidable Annual Real Losses	254.63	253.04	226.74	234.39	232.35	221.21
Real Losses	328.971	243.48	220.53	152.66	231.01	199.35
Infrastructure Leakage Index	1.29	0.96	0.97	0.64	0.92	0.90
Validity Score	71	61	87	85	82	79

Carroll County Water Authority Water Audit Calculation and Validity, 2012 Calendar Year

AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.2

Back to Instructions

? Click to access definition

Water Audit Report for: Utility No. 83

Reporting Year: 2012 | 1/2012 - 12/2012

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	?	7	1,581.843	Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	?	5	0.000	over-registered MG/Yr
Water imported:	?	n/a	0.000	MG/Yr
Water exported:	?	8	350.109	MG/Yr
WATER SUPPLIED:			1,231.734	MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:
Billed metered:	?	9	973.275	MG/Yr		
Billed unmetered:	?	n/a	0.000	MG/Yr		
Unbilled metered:	?	10	1.006	MG/Yr		
Unbilled unmetered:	?	6	39.182	MG/Yr		39.182
AUTHORIZED CONSUMPTION:	?		1,013.463	MG/Yr		

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 218.271 MG/Yr

					Pcnt:	Value:
Apparent Losses						
Unauthorized consumption:	?		3.079	MG/Yr	0.25%	
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed						
Customer metering inaccuracies:	?	7	9.841	MG/Yr	1.00%	
Systematic data handling errors:	?	9	0.000	MG/Yr		
Apparent Losses:	?		12.921			
Real Losses (Current Annual Real Losses or CARL)						
Real Losses = Water Losses - Apparent Losses:	?		205.350	MG/Yr		
WATER LOSSES:			218.271	MG/Yr		

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

NON-REVENUE WATER

NON-REVENUE WATER: ? 258.459 MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	5	764.0	miles
Number of active AND inactive service connections:	?	9	17,904	
Connection density:			23	conn./mile main
Average length of customer service line:	?	10	0.0	ft (pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	3	90.0	psi

COST DATA

Total annual cost of operating water system:	?	10	$7,018,685	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	10	$5.27	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	?	10	$413.51	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	21.0%
Non-revenue water as percent by cost of operating system:	2.4%
Annual cost of Apparent Losses:	$68,091
Annual cost of Real Losses:	$84,914

Operational Efficiency Indicators

Apparent Losses per service connection per day:	1.98	gallons/connection/day
Real Losses per service connection per day*:	N/A	gallons/connection/day
Real Losses per length of main per day*:	736.39	gallons/mile/day
Real Losses per service connection per day per psi pressure:		gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	224.00	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	205.35	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.92	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 82 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Unauthorized consumption

3: Customer metering inaccuracies

For more information, click here to see the Grading Matrix worksheet

Carroll County Water Authority Water Audit Calculation and Validity, 2012 Calendar Year

AWWA WLCC Free Water Audit Software: Reporting Worksheet

WAS v4.2

Back to Instructions

? Click to access definition

Water Audit Report for: Utility No. 83

Reporting Year: 2013 | 1/2013 - 12/2013

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

WATER SUPPLIED << Enter grading in column 'E'

Volume from own sources:	?	9	1,447.425	Million gallons (US)/yr (MG/Yr)
Master meter error adjustment (enter positive value):	?	5	0.000	MG/Yr
Water imported:	?	n/a	0.000	MG/Yr
Water exported:	?	8	328.247	MG/Yr
WATER SUPPLIED:			1,119.178	MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:
Billed metered:	?	9	936.282	MG/Yr		
Billed unmetered:	?	n/a	0.000	MG/Yr		
Unbilled metered:	?	10	1.047	MG/Yr		
Unbilled unmetered:	?	6	27.737	MG/Yr		27.737
AUTHORIZED CONSUMPTION:	?		965.066	MG/Yr		

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 154.112 MG/Yr

Apparent Losses

					Pcnt:	Value:
Unauthorized consumption:	?		2.798	MG/Yr	0.25%	
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed						
Customer metering inaccuracies:	?	7	9.468	MG/Yr	1.00%	
Systematic data handling errors:	?		0.000	MG/Yr		
Systematic data handling errors are likely, please enter a non-zero value; otherwise grade = 5						
Apparent Losses:	?		12.266			

Choose this option to enter a percentage of billed metered consumption. This is NOT a default value

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses:	?		141.846	MG/Yr
WATER LOSSES:			154.112	MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER:	?		182.896	MG/Yr

= Total Water Loss + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	?	5	752.0	miles	
Number of active AND inactive service connections:	?	9	18,182		
Connection density:			24	conn./mile main	
Average length of customer service line:	?	10	0.0	ft	(pipe length between curbstop and customer meter or property boundary)
Average operating pressure:	?	3	90.0	psi	

COST DATA

Total annual cost of operating water system:	?	10	$6,996,938	$/Year
Customer retail unit cost (applied to Apparent Losses):	?	10	$5.00	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	?	10	$465.44	$/Million gallons

PERFORMANCE INDICATORS

Financial Indicators

Non-revenue water as percent by volume of Water Supplied:	16.3%
Non-revenue water as percent by cost of operating system:	2.0%
Annual cost of Apparent Losses:	$61,330
Annual cost of Real Losses:	$66,021

Operational Efficiency Indicators

Apparent Losses per service connection per day:	1.85	gallons/connection/day
Real Losses per service connection per day*:	N/A	gallons/connection/day
Real Losses per length of main per day*:	516.78	gallons/mile/day
Real Losses per service connection per day per psi pressure:		gallons/connection/day/psi
? Unavoidable Annual Real Losses (UARL):	223.24	million gallons/year
From Above, Real Losses = Current Annual Real Losses (CARL):	141.85	million gallons/year
? Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.64	

* only the most applicable of these two indicators will be calculated

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 85 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Unauthorized consumption

3: Systematic data handling errors

For more information, click here to see the Grading Matrix worksheet

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2014 | 1/2014 - 12/2014

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

								Pcnt:		Value:	
Volume from own sources:	+ ?	9	1,596.065	MG/Yr	+ ?	3	-0.50%	☻ ☺		MG/Yr
Water imported:	+ ?	5	1.109	MG/Yr	+ ?	3	0.05%	☻ ☺		MG/Yr
Water exported:	+ ?	9	364.111	MG/Yr	+ ?	4	-0.50%	☻ ☺		MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,239.253 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:		Value:	
Billed metered:	+ ?	9	990.765	MG/Yr				
Billed unmetered:	+ ?	n/a	0.000	MG/Yr				
Unbilled metered:	+ ?	10	8.354	MG/Yr				
Unbilled unmetered:	+ ?		15.491	MG/Yr	1.25%	☻ ☺		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: ? 1,014.610 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

224.644 MG/Yr

Apparent Losses

					Pcnt:		Value:	
Unauthorized consumption:	+ ?		3.098	MG/Yr	0.25%	☻ ☺		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	7	1.000	MG/Yr	0.10%	☻ ☺		MG/Yr
Systematic data handling errors:	+ ?	8	0.020	MG/Yr		☺ ☻	0.020	MG/Yr

Apparent Losses: ? 4.118 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 220.526 MG/Yr

WATER LOSSES: 224.644 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 248.488 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	5	769.0	miles
Number of active AND inactive service connections:	+ ?	9	18,280	
Service connection density:	?		24	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+ ?	3	90.0	psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$7,344,315	$/Year
Customer retail unit cost (applied to Apparent Losses):	+ ?	10	$7.56	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	+ ?	10	$402.72	$/Million gallons

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 87 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Unauthorized consumption
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2014 | 1/2014 - 12/2014

***** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 87 out of 100 *****

System Attributes:

	Apparent Losses:	4.118	MG/Yr
+	Real Losses:	220.526	MG/Yr
=	**Water Losses:**	**224.644**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	226.74	MG/Yr
	Annual cost of Apparent Losses:	$31,134	
	Annual cost of Real Losses:	$88,810	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	20.1%	
	Non-revenue water as percent by cost of operating system:	1.8%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	0.62	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	785.67	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	220.53	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.97	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2015 | 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

								Pcnt:		Value:
Volume from own sources:	+ ?	5	1,679.470	MG/Yr	+ ?	3			-14.375	MG/Yr
Water imported:	+ ?			MG/Yr	+ ?					MG/Yr
Water exported:	+ ?	7	397.848	MG/Yr	+ ?	1	-7.29%			MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,264.713 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:	
Billed metered:	+ ?	7	981.501	MG/Yr			
Billed unmetered:	+ ?	n/a		MG/Yr			
Unbilled metered:	+ ?	6	8.315	MG/Yr			
Unbilled unmetered:	+ ?		15.809	MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 1,005.625 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 259.088 MG/Yr

Apparent Losses

					Pcnt:	Value:	
Unauthorized consumption:	+ ?		3.162	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	3	9.998	MG/Yr	1.00%		MG/Yr
Systematic data handling errors:	+ ?		2.454	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 15.614 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 243.475 MG/Yr

WATER LOSSES: 259.088 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 283.212 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	1	771.7	miles
Number of active AND inactive service connections:	+ ?	7	18,427	
Service connection density:	?		24	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	+ ?	9	99.9	psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$7,225,782	$/Year	
Customer retail unit cost (applied to Apparent Losses):	+ ?	10	$7.01	$/1000 gallons (US)	
Variable production cost (applied to Real Losses):	+ ?	5	$374.34	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 61 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2015 | 1/2015 - 12/2015

***** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 61 out of 100 *****

System Attributes:

	Apparent Losses:	15.614	MG/Yr
+	Real Losses:	243.475	MG/Yr
=	**Water Losses:**	**259.088**	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	253.04	MG/Yr
	Annual cost of Apparent Losses:	$109,381	
	Annual cost of Real Losses:	$1,705,655	Valued at **Customer Retail Unit Cost**

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	22.4%	
	Non-revenue water as percent by cost of operating system:	27.5%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	2.32	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	864.40	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	243.47	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.96	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2016 | 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<---------- Enter grading in column 'E' and 'J' ---------->

					Pcnt:	Value:	
Volume from own sources:	9	1,989.596	MG/Yr	3	-4.08%		MG/Yr
Water imported:	5	4.558	MG/Yr	1	0.00%		MG/Yr
Water exported:	5	649.801	MG/Yr	1	-0.25%		MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 1,427.353 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	1,055.089	MG/Yr			
Billed unmetered:	n/a	0.000	MG/Yr			
Unbilled metered:	6	8.501	MG/Yr			
Unbilled unmetered:		17.842	MG/Yr	1.25%		MG/Yr

Use buttons to select percentage of water supplied **OR** value

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: 1,081.432 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 345.921 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		3.568	MG/Yr	0.25%		MG/Yr
Customer metering inaccuracies:	4	10.743	MG/Yr	1.00%		MG/Yr
Systematic data handling errors:		2.638	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 16.949 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 328.971 MG/Yr

WATER LOSSES: 345.921 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 372.264 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	1	771.9	miles
Number of active AND inactive service connections:	7	18,710	
Service connection density:		24	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 9 | 99.9 | psi

COST DATA

Total annual cost of operating water system:	10	$7,236,220	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$7.02	$/1000 gallons (US)
Variable production cost (applied to Real Losses):	5	$367.43	$/Million gallons

Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer metering inaccuracies
2: Water exported
3: Variable production cost (applied to Real Losses)

Appendix B

Carroll County Water Authority
Water Conservation Plan

Section 1: Introduction

The Carroll County Water Authority (CCWA) strives to deliver cost-effective and reliable supplies of potable water to the citizens of Carroll County. As Carroll County's population expands, CCWA is tasked with balancing available water resources and increasing water demand. CCWA is committed to ensuring water resources are available for a vibrant and growing community while prudently managing water demand.

CCWA's Water Conservation Plan is designed to:

- Reduce peak water demands through efficient water use, thereby, reducing capital expenditures for meeting increased capacity needs;
- Encourage wise use of water by helping our customers identify water as a finite resource;
- Contribute to ensuring an adequate clean potable water supply for our present and future customers;
- Educate the public on the need to conserve water;
- Enhance CCWA's commitment to responsible environmental stewardship; and
- Continue to improve system monitoring and maintenance.

The success of this Water Conservation Plan requires a partnership between CCWA and its potable water customers. CCWA must provide the assistance and support necessary to exercise proper stewardship over water resources and customers must manage their water use wisely. Through responsible application of best available water conservation practices and public education coupled with development of additional water resources, CCWA believes it can meet the projected growth of Carroll County well into the future.

Section 2: Background

CCWA utilizes both surface water and groundwater as raw water sources to provide potable water to its customers. CCWA maintains over 17,500 active service connections including multiple connections with municipal customers. The table below provides a more detailed breakdown of CCWA accounts:

Summary of Active Accounts – January 2017			
Class	**Number**	**% of Total Accounts**	**% of Total Consumption**
Agricultural	184	1.04	2.21
Commercial	435	2.47	4.46
Industrial	6	0.03	0.14
Irrigation	42	0.24	0.39
Municipal	24	0.14	36.52
Residential	16,839	95.67	56.15
Other	72	0.41	0.13

CCWA has 39 interconnections with water utilities within and around Carroll County. Some of the interconnections allow CCWA to sell water to neighboring utilities while others allow CCWA to purchase water, if necessary. A list of system interconnections is provided below:

Summary of Water System Interconnections		
Water Utility	**No. of Connections**	**Connection Type**
Cleburne Co., Alabama	2	Sell
City of Bowdon	3	Emergency Backup; Sell and Purchase
City of Carrollton	10	Emergency Backup; Sell and Purchase
City of Mt. Zion	3	Sell
City of Roopville	2	Sell
City of Temple	5	Sell
City of Villa Rica	5	Sell
City of Whitesburg	2	Sell
Douglasville-Douglas Co. WSA	2	Emergency Backup; Purchase
Haralson Co. Water Authority	2	Emergency Backup; Sell and Purchase
Heard Co. Water Authority	2	Emergency Backup; Sell and Purchase
Paulding Co.	1	Emergency Backup; Sell and Purchase

CCWA typically produces all water for its needs, mostly from its primary potable water source, the Snake Creek Reservoir (also known as the H.C. Seaton Reservoir). The Snake Creek Reservoir is an on-stream storage impoundment with a 32.5 mi^2 drainage basin above the reservoir's dam. This impoundment is capable of storing approximately 11,500 acre-feet (3,730 MG) of surface water at the 926 feet above mean sea level full pool elevation and has safe yield capacity of 13.5 million gallons per day (MGD) based on the 1984 – 1988 drought.

Raw water from the reservoir is pumped to the Snake Creek Water Treatment Plant (WTP), which was constructed and placed into service in 2001. The plant's original permitted capacity of 4 MGD was upgraded to 8 MGD in 2004, and CCWA is planning to upgrade the plant's permitted peak flow capacity to 12 MGD in the very near future. Ultimately, average day capacity at the Snake Creek WTP will be upgraded to the reservoir's safe yield capacity.

In addition to treating surface water impounded by the Snake Creek Reservoir, CCWA also has three crystalline aquifer groundwater wells with a combined permitted capacity of 0.75 MGD. The Bethesda, Abilene and Lake Paradise Wells were placed into service in 1990, 1999 and 2001, respectively.

Implementation of CCWA's Water Conservation Plan will require public education and awareness since the public's acceptance and responsibilities are critical component to its success. Therefore, CCWA's success depends in part on the willingness of its consumers to embrace and practice water conservation.

Section 3: System Management

3.1 Water Audit Data

CCWA began conducting water audits of its potable water treatment, distribution and billing systems for data collected during the 2011 calendar year using the AWWA WLCC Free Water Audit Software Program. The following are select performance indicators from the results of the 2016 water audit, a complete copy of which is included in Appendix A of this report:

- Volume From Own Sources: 1,989.60 MG
- Water Supplied (i.e., less wholesale): 1,427.35 MG
- Authorized Consumption 1,081.43 MG
- Total Non-Revenue Water: 372.26 MG
- Unavoidable Annual Real Losses (UARL): 254.63 MG
- Current Annual Real Losses (CARL): 328.97 MG
- Infrastructure Leakage Index (ILI): 1.29
- Validity Score: 71%

3.2 Current or Planned Programs to Improve Water Audit Scores

The following is a listing of programs and their descriptions that CCWA has implemented or plans to implement in an effort to improve future water audit scores.

3.2.1 Leak Detection and Elimination

CCWA detects and identifies the location of subsurface waterline leakage within its distribution system reactively and proactively as described below through a multiple pronged approach, including the following:

- Reports from the general public;
- Significant and/or unusual increases in demand; and
- Leak detection equipment deployment.

3.2.1.1 Reactive Leak Detection and Elimination

CCWA maintains a staff of highly trained water treatment plant personnel that utilize Supervisory Control and Data Acquisition (SCADA) systems as more fully described below in Section 4.1.2. Through the SCADA system, operators can continuously monitor distribution system parameters to quickly identify and report unusual events that could be caused by waterline breaks (e.g., decreasing system pressures, falling water storage tank levels, etc.). CCWA also maintains an emergency service telephone number that is available 24-hours per day, 365 days per year, to repair significant leaks that are reported outside regular business hours.

Maintenance crews are immediately dispatched to address leakage that appears to be significant based on the description provided by the report. Otherwise, on-call maintenance is dispatched to assess and prioritize reported leaks in accordance with: 1) potential threat to general public health, safety or welfare; 2) potential for property damage; and 3) estimated leakage flow rate.

Maintenance personnel quickly work to isolate reported leaks from the rest of the distribution system and then assess the next appropriate course of action. Maintenance crews are immediately dispatched to repair high priority leaks whereas lower priority leaks are repaired after nearby utilities have been field located.

3.2.1.2 Proactive Leak Detection and Elimination

CCWA deploys leak detection equipment in an effort to proactively identify and locate leakage that has no obvious indication (e.g., pooling water or falling water storage tank levels, etc.). This equipment utilizes specialized listening devices to identify and locate leaks in the water distribution system via a systematic or response-based survey of a specified area. Leaks are identified and pinpointed using acoustic equipment that can detect sounds or vibrations induced by water leaking from pressurized pipes. Personnel

employ ground or contact microphones to determine the presence and location of possible leaks, whereas computerized equipment may be deployed to automatically detect the presence of leaks and/or the specific location of an active leak. Proactively identified leaks are prioritized for repair as described in Section 2.2.1.1 above.

3.2.2 Hydraulic Modeling and Distribution System Maps

CCWA management uses a hydraulic model of its potable water distribution system to support capital improvement project planning and design. The model is also used to analyze flow patterns for improving water quality and is the basis for CCWA's water distribution system maps.

CCWA requires as-built drawings as a condition of accepting newly constructed infrastructure and uses this information to update its hydraulic model and distribution system maps. In addition, distribution system maps are provided to infrastructure maintenance and construction crews and mapping errors are incorporated into the model and maps when they are revised.

3.2.3 Meter Testing, Replacement, and Calibration

CCWA's efforts to minimize apparent water losses include testing and calibrating its large municipal water meters twice each year and periodically replacing smaller meters when test results indicate their accuracy has fallen below acceptable industry standards. All 2-inch and larger non-municipal meters were recently tested and meters that were outside acceptable accuracy standards were repaired or replaced.

Each month, CCWA's Billing Department compiles a zero read consumption report that consists of a listing of all meters that have little to no use over the most recent 30-day time period. All zero consumption meter readings are investigated to verify the meters are working properly and recording accurately. CCWA personnel further investigate water meters that register zero consumption for three consecutive months, and faulty meters are repaired or replaced as necessary.

3.2.4 Prevention of Tank Overflows

CCWA distribution system tank levels are monitored and controlled by SCADA and altitude valves as further described in Section 4.2 below to minimize tank overflows.

3.2.5 Flushing Programs

CCWA personnel flush the distribution system routinely to improve water quality and as needed to address customer water quality concerns.

3.2.6 Prevention of Unauthorized Water Use

With the exception of firefighting and waterline flushing, CCWA policy requires all flow from fire hydrants to be metered. Failure to use a hydrant meter when flowing a fire hydrant is considered unauthorized use and theft of service.

Connections to fire hydrants are routinely monitored throughout the distribution system to minimize theft and ensure usage is authorized. Authorized hydrant users are required to report meter readings to the CCWA Billing Department.

Unauthorized use and theft are also minimized by reading 100% of the system's meters each month, including idle meters associated with inactive accounts (vacant properties). Idle meters with water usage indicate potential theft, and all cases of potential theft are investigated.

CCWA policy requires all dedicated private fire lines to be fed through a double detector check valve (DDC) to assure flows are authorized. All dedicated private fire line flows as indicated by DDCs is investigated to determine if usage was authorized.

3.2.7 Unmetered Water Use

Unmetered water use is limited to: 1) Firefighting; 2) Sanitary use and sampling at the Snake Creek WTP; and 3) Sanitary use at CCWA's Fairfield Wastewater Treatment Plant. Water demand at the treatment plants for sanitary use and sampling is miniscule, and even firefighting volume is typically very low. Nevertheless, CCWA requests that the Carroll County Fire Department provide monthly estimates for firefighting water usage.

Section 4: Water Treatment Plant Water Management

Production and distribution system water management are accomplished at the Snake Creek Water Treatment Plant by monitoring and minimizing water usage at both the WTP and throughout the potable water distribution system.

4.1 Plant Production Water Management

Water volumes pumped from the reservoir and potable water pumped to distribution from the treatment plant are constantly monitored and the meters are calibrated at least annually. The accuracy rating of both the raw water mag meter and the finished water Venturi meter is within 0.5%. Orifice plate meters are used to monitor and control water production by each of the plant's four treatment trains and are also calibrated at least annually.

Total water usage within the treatment plant, which can be calculated by subtracting pump to distribution from raw water pumped volumes, includes water required for the

treatment process itself such as filter media backwash, upflow clarifier media backwash, treatment chemical carrier water, etc.. In 2016, water usage within the WTP was approximately 180 MG, which represents about 8.8% of total plant production.

Although in-plant water usage could be significantly reduced by recycling filter backwash water, doing so has potential for dire health consequences. For example, WTP filters can effectively remove *G. Lamlbia* and *C. Parvum* by trapping cysts and oocysts within filter media, but release these parasites into filter backwash water. Therefore, recycling filter backwash by mixing these waters to raw water prior to treatment can recycle these organisms, concentrate them within filter media and greatly increase the likelihood of finished water parasitic contamination. CCWA has decided that the increased risk of potentially exposing its customers to diseases such as Cryptosporidiosis, Giardia, or other such enteric organisms far exceeds the benefits of recycling filter backwash water.

4.2 Distribution System Water Management

The CCWA potable water distribution system includes nearly 800 miles of pipeline ranging in size from 2 – 24 inch, nine water storage tanks and seven remote booster pump stations.

Pipeline breaks and storage tank overflows are minimized by monitoring distribution system pressure and storage tank levels with two Supervisory Control and Data Acquisition (SCADA) Systems. Both SCADA systems can be accessed at either the WTP by plant personnel or by management from CCWA's administrative offices. Since one SCADA system is radio signal based while the other utilizes cellular phone technology, critical distribution system data can typically be accessed even when weather impacts radio or cellular phone signal strength. In addition to monitoring remote booster pumps, some remote valves can also be operated through SCADA.

Employee incentive programs are used to encourage fast and efficient water main break and tank overflow reporting, and also to assure repairs are completed quickly and effectively.

Section 5: Conservation Initiatives

The U.S. Water Resources Council defines water conservation as activities that are designed to:

- Reduce water demand;
- Improve water efficiency and reduce water waste/water loss; or
- Improve land management practices to conserve water.

Although CCWA has enacted water conservation policies in an effort to ensure an adequate and affordable future water supply for the citizens of Carroll County, future policies are expected to further enhance water conservation efforts. The objective of all

such water conservation policies is to reduce per capita water consumption, reduce seasonal water demand and encourage businesses to minimize water use. The following is an outline of programs currently being implemented or scheduled for implementation as part of CCWA's Water Conservation Plan.

5.1 Water Conservation Pricing

5.1.1 General

Water conservation pricing discourages inefficient and wasteful water use by increasing the cost per unit volume of water as consumption increases. Examples of water conservation pricing also include baseline usage rates combined with additional charges for excessive water use and/or seasonal surcharges. These types of rate structures encourage water conservation because the percent increase in cost rises faster than the percent increase in water usage.

5.1.2 CCWA Funding and Revenue Sources

CCWA funding is limited to water and wastewater user fees, and CCWA receives no subsidies from the local tax digest. Revenue sources include connection fees, monthly water and sewer usage charges, plus wholesale water sold to neighboring municipalities and charges for dedicated fire lines. All charges and fees, including usage rates, are set by CCWA's Board of Directors, reviewed annually and adjusted as necessary.

5.1.3 CCWA Conservation Pricing Structure

The rate structure adopted by CCWA encourages water conservation by increasing the unit cost of water as consumption surpasses predetermined levels or tiers. Conservation pricing applies to most CCWA customers but is not applicable to agricultural and industrial customers because their businesses are water dependent. Current water usage rates, which became effective in January 2017, are included as an appendix to this report (see Carroll County Water Authority Monthly Billing Water Rate Schedule).

CCWA's current water rate structure includes a base rate for low water usage (Tier 1) plus three additional tiers for higher consumption rates. Unit price increases as a percent of the base rate for residential customers are reported in the following table:

Residential Water Rate Schedule; ¾" Meter

Tier	Unit Range (748 gal./unit)	Cost as a Percent of Base Rate
1	0 – 8	100%
2	9 – 14	150%
3	15 – 20	175%
4	20 +	200%

Since sewer fees are based on metered water usage, CCWA customers that also receive sewer service can reduce sewer cost by purchasing a second water meter that does not charge for sewer use, provided that meter is dedicated to landscape irrigation. The following table provides a summary of irrigation meter rates. Note that cost of irrigation water exceeds the cost of standard residential water.

Irrigation Rate Schedule; ¾" Meter

Tier	Unit Range (748 gal./unit)	Cost as a Percent of Base Rate
1	0 – 8	150%
2	9 – 14	200%
3	15 – 20	250%
4	20 +	250%

5.2 Water Conservation Policies and Ordinances

5.2.1 High-Efficiency Plumbing Fixtures

High-efficiency plumbing fixtures are designed and manufactured to conserve water by limiting flow rates and/or volumes during usage. O.C.G.A. Title 8, Buildings and Housing, Chapter 2, Standards and Requirements for Construction, Alteration, Etc., of Buildings and Other Structures (§8-2-3), specifies installation of high-efficiency plumbing fixtures in all "new construction." For the purposes of the code, "new construction" also includes additions to existing buildings or altering existing buildings in connection with repairs and/or renovations. This statute specifies that flow rates from installed plumbing fixtures shall not exceed the following standards:

- Toilets: 1.28 gallons per flush
- Urinals: 0.5 gallons per flush
- Showerheads: 2.5 gallons per minute
- Kitchen Faucets: 2.0 gallons per minute
- Bathroom and Lavatory Faucets: 1.5 gallons per minute

5.2.2 Metering Water Usage at Multi-family Developments

Historically, water consumption at a typical multi-family development (e.g., apartment buildings, duplex housing, mobile home parks, etc.) was often metered by a single water meter. Multiple residents using a single water meters, however, cannot be incentivized to conserve water because all residents share the cost of water equally. Although existing multi-family developments and buildings with single meters are grandfathered, each unit

of newly constructed multi-family developments and buildings that receive potable water service from CCWA must be individually metered.

5.3 Public Education and Outreach

CCWA believes that protecting and conserving community water resources for future generations is not possible without enacting comprehensive stewardship practices that include both public education and community outreach. Although the general public is most often unaware of its impact to water resources, a well-designed public education and outreach program can positively impact public opinion, target specific audiences and be a cost effective way of providing critical information to large numbers of people.

Below is a partial listing of programs that CCWA is currently utilizing to raise water conservation awareness in Carroll County:

5.3.1 School Education

CCWA's public education and outreach program focuses primarily on school-age children because young children are easy to reach, impressionable and future community leaders. CCWA provides conservation educational programs through both classroom presentations and assorted community programs.

5.3.2 Field Trips and Site Visits

Local schools and the general public are welcome to tour CCWA's Snake Creek WTP for educational tours that provide a better understanding of the importance of clean safe water.

5.3.3 Recreational Reservoir Use

CCWA invites all Carroll County residents to fish and boat at the Snake Creek Reservoir to demonstrate how protected watersheds can benefit communities as recreational outlets. Informing fishing and boating permittees that swimming, littering and the use of gas powered motors are prohibited at the Snake Creek Reservoir not only protects the reservoir but also fosters an appreciation for this valuable resource within community members. CCWA also hosts the annual Gone Fishin' Fishing Tournament to further promote good stewardship of the community's water resource.

5.3.4 Water Conservation Literature

CCWA provides water conservation literature to its customers and the general public upon request and also furnishes literature during special events held throughout the community. Information pertaining to drought and water supply conditions is also provided to customers and the general public through literature, newspaper advertisements and billing inserts as local conditions warrant.

5.3.4 Leak Notification, Plumbing Retrofits and Home Leak Detection

Customers that appear to have higher than normal water consumption as identified by CCWA's billing software are notified that their private plumbing system or fixtures may be leaking. Customer service representatives are trained to emphasize the importance of identifying and repairing water leaks in order to minimize water usage cost. CCWA also offers plumbing retrofits to customer interested in decreasing water usage through water conservation.

Appendix A
2016 Carroll County Water Authority Water Audit
Page 1

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0
American Water Works Association

? Click to access definition
+ Click to add a comment

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2016 1/2016 - 12/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where

Master Meter and Supply Error Adjustments

WATER SUPPLIED

<--------- Enter grading in column 'E' and 'J' -------->

Volume from own sources:	+ ?	9	1,989.596	MG/Yr	+ ?	3	-4.08%			MG/Yr
Water imported:	+ ?	5	4.558	MG/Yr	+ ?	1	0.00%			MG/Yr
Water exported:	+ ?	5	649.801	MG/Yr	+ ?	1	-0.25%			MG/Yr
WATER SUPPLIED:			1,427.353	MG/Yr						

Pcnt: Value:

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

					Pcnt:	Value:	
Billed metered:	+ ?	7	1,055.089	MG/Yr			
Billed unmetered:	+ ?	n/a	0.000	MG/Yr			
Unbilled metered:	+ ?	6	8.501	MG/Yr			
Unbilled unmetered:	+ ?		17.842	MG/Yr	1.25%		MG/Yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: ? 1,081.432 MG/Yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) 345.921 MG/Yr

Apparent Losses

					Pcnt:	Value:	
Unauthorized consumption:	+ ?		3.568	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	+ ?	4	10.743	MG/Yr	1.00%		MG/Yr
Systematic data handling errors:	+ ?		2.638	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: ? 16.949 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 328.971 MG/Yr

WATER LOSSES: 345.921 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 372.264 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	+ ?	1	771.9	miles
Number of active AND inactive service connections:	+ ?	7	18,710	
Service connection density:	?		24	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: + ? (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: + ? 9 99.9 psi

COST DATA

Total annual cost of operating water system:	+ ?	10	$7,236,220	$/Year	
Customer retail unit cost (applied to Apparent Losses):	+ ?	10	$7.02	$/1000 gallons (US)	
Variable production cost (applied to Real Losses):	+ ?	5	$367.43	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 71 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer metering inaccuracies
2: Water exported
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software v5.0 Reporting Worksheet 1

2016 Carroll County Water Authority Water Audit
Page 2

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association

Water Audit Report for: Carroll County Water Authority (WSID #GA0450001)
Reporting Year: 2016 | 1/2016 - 12/2016

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 71 out of 100 ***

System Attributes:

Apparent Losses:	16.949	MG/Yr
+ Real Losses:	328.971	MG/Yr
= Water Losses:	345.921	MG/Yr
? Unavoidable Annual Real Losses (UARL):	254.63	MG/Yr
Annual cost of Apparent Losses:	$118,985	
Annual cost of Real Losses:	$120,874	Valued at Variable Production Cost

Return to Reporting Worksheet to change this assumption

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	26.1%	
	Non-revenue water as percent by cost of operating system:	3.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	2.48	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	1,167.63	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	328.97	million gallons/year
	? Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.29	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software v5.0 Performance Indicators 1

Appendix B

Carroll County Water Authority

Water and Sewer Rate Schedule

Date: January 2017

Rate Code	Type	Min. Monthly Charge	Base Water Rate	Tier 1: 3 - 8 units		Tier 2: 9 - 14 units		Tier 3: 15 - 20 units		Tier 4: 21 units & above	
				Cost per Unit	% of Base Rate	Cost per Unit	% of Base Rate	Cost per Unit	% of Base Rate	Cost per Unit	% of Base Rate
Agricultural	Flat	$15.00	$3.75	$3.75	100%	$3.75	100%	$3.75	100%	$3.75	100%
Industrial	Flat	$15.00	$3.75	$3.75	100%	$3.75	100%	$3.75	100%	$3.75	100%
Residential & Commercial	Increasing	$15.00	$3.75	$3.75	100%	$5.63	150%	$6.56	175%	$7.50	200%
Irrigation	Increasing	$15.00	$3.75	$5.63	150%	$7.50	200%	$9.38	250%	$9.38	250%
Fire Hydrant Meter	Flat	$80.00	$7.50	All usage through a fire hydrant meter will be billed at 200% of residential base water rate.							
Wholesale	Flat	N/A	All wholesale usage will be billed at the rate established by CCWA and per the water purchase agreement.								
Sewer	Flat	$15.62	$4.06	$4.06	100%	$4.06	100%	$4.06	100%	$4.06	100%

Notes: Rates are effective on monthly bills received during December 2015.

Minimum monthly water charge of $15.00 includes first two units of water.

Tier usage allowances and minimum monthly charges shown above are based on 3/4" and 1" water meters. Larger meters have increased allowances per tier and varying minimum monthly charges.

Sewer users fees are based on 108.25% of the Base Water Rate. Minimum monthly sewer charge of $15.62 includes first two units of sewer. Sewer user fee of $4.06 per unit of sewer after first two units.

Monthly Tier Ceiling Limits By Meter Size (Units)				
Meter Size	Tier 1	Tier 2	Tier 3	Tier 4
3/4"	8	14	20	N/A
1"	8	14	20	N/A
1 1/2"	40	70	100	N/A
2"	64	112	160	N/A
3"	120	210	300	N/A
4"	200	350	500	N/A
6"	400	700	1,000	N/A

Monthly Tier Ceiling Limits By Meter Size (Gallons)				
Meter Size	Tier 1	Tier 2	Tier 3	Tier 4
3/4"	6,000	10,500	15,000	N/A
1"	6,000	10,500	15,000	N/A
1 1/2"	30,000	52,500	75,000	N/A
2"	48,000	84,000	120,000	N/A
3"	90,000	157,500	225,000	N/A
4"	150,000	262,500	375,000	N/A
6"	300,000	525,000	750,000	N/A

Note: Tier ceiling limits are based on AWWA standard meter capacities.

Appendix C

Carroll County Water Authority - Drought Contingency Plan

Section 1: Introduction and Background

The Carroll County Water Authority (CCWA) provides potable water service to the citizens of unincorporated Carroll County, Georgia through retail accounts as well as to the cities of Mt. Zion, Roopville, Temple, Villa Rica and Whitesburg and Cleburne County, Alabama through municipal accounts.

The Authority's water supply includes one surface water source, the Snake Creek Reservoir (also known as the H.C. Seaton Reservoir) and three ground water wells. Surface water and groundwater average daily withdrawals are currently permitted at 8 million gallons per day (MGD) and 0.75 MGD, respectively.

CCWA's Drought Contingency Plan will focus primarily on the Snake Creek Reservoir rather than the groundwater wells for two reasons, including:

- Permitted withdrawal capacity from the Snake Creek Reservoir represents over 90% of the Authority's total water withdrawal capacity; and

- To date, previous droughts have had little to no impact on groundwater well production levels.

The Snake Creek Water Treatment Plant, which is also permitted at 8 MGD, treats surface water that is supplied by the Snake Creek Raw Water Pump Station located on the banks of the reservoir. The pump station consists of a wetwell, three submersible vertical turbine pumps and related ancillary equipment. Two of the submersible pumps are rated for 6.0 MGD and the third pump for 7.2 MGD.

Full-pool elevation of the Snake Creek Reservoir is elevation 926 feet above mean sea level (MSL). The centerline elevations of the three 24-inch diameter raw water intake pipelines feeding the wetwell are 916 feet above MSL, 906 feet above MSL, and 896 feet above MSL. The lowest elevation within the impoundment, the reservoir bottom just upstream of the dam, is 884 feet above MSL.

The purpose of a Drought Contingency Plan is to identify drought conditions, procedures for addressing drought conditions and drought impacts in order to mitigate the effects of drought within Carroll County. The contents of this report discuss CCWA's Drought Contingency Plan according to the requirements outlined in State of Georgia Code 12-5-20 and 12-5-31 and Department of Natural Resources, Environmental Protection Division (EPD) Rules 391-3-6 and 391-3-30.

Section 2: Pre-Drought Mitigation Strategies

During non-drought periods, irrigation outdoors for purposes of planting, growing, managing, or maintaining ground cover, trees, shrubs or other plants shall be in accordance with O.C.G.A. § 12-5-7(a.1)(1) and (2). Persons may irrigate outdoors daily for purposes of planting, growing, managing, or maintaining ground cover, trees, shrubs, or other plants only between the hours of 4:00 p.m. and 10:00 a.m. The Pre-Drought Mitigation Strategy, however, shall not create any limitation upon the following exempted outdoor water uses:

- Commercial agricultural operations as defined in Code Section 1-3-3;
- Capture and reuse of cooling system condensate or storm water in compliance with applicable local ordinances and state guidelines;
- Reuse of gray water in compliance with O.C.G.A. § 31-3-5.2 and applicable local board of health regulations adopted pursuant thereto;
- Irrigation of personal food gardens;
- Irrigation of new and replanted plant, seed, or turf in landscapes, golf courses, or sports turf fields during installation and for a period of 30 days immediately following the date of installation;
- Drip irrigation or irrigation using soaker hoses;
- Hand watering with a hose with automatic cutoff or handheld container;
- Use of water withdrawn from private water wells or surface water by an owner or operator of property if such well or surface water is on said property;
- Irrigation of horticultural crops held for sale, resale, or installation;
- Irrigation of athletic fields, golf courses, or public turf grass recreational areas;
- Installation, maintenance, or calibration of irrigation systems; or
- Hydroseeding.

Section 3: Drought Indicators

Drought indicators are used in many states and regions to measure levels of drought severity based on meteorology, hydrology and other factors. Indicators establish a baseline for normal conditions and quantitative measures for variation from those baselines. Common indicators are listed below:

- Precipitation;
- Stream Flow;
- Groundwater Level;
- Reservoir Level;
- Soil Moisture;
- Short Term Climate Predictions;
- U.S. Drought Monitor; and
- Water Supply Conditions.

Drought indicators are interrelated, not discrete, and drought determination is often based on the combined effect of the indicators.

For example, water supply conditions and storage capacities are an important drought indicator. These indicators are useful for long-term drought identification, but can be somewhat limited for short-term identification due to time lag effects and local drought mitigation strategies.

Precipitation

CCWA closely tracks precipitation rates because local rainfall is relied upon to fill its surface water reservoir and supply its groundwater wells. Local rainfall rates and patterns, however, must be understood and utilized before drought conditions are declared. The following is a table of monthly average precipitation rates (inches of rainfall) for Carroll County, Georgia as listed by U.S. Climate Data:

January	4.65	April	3.94	July	4.88	October	3.54
February	5.20	May	4.09	August	3.43	November	4.57
March	5.24	June	3.78	September	3.62	December	4.45

Average annual precipitation totals 51.39-inches locally, but it is important to note that historic rainfall rates are seasonal, with winter and spring typically wetter than summer and fall. For example, 3-inches of rain during August would not be unusual whereas this same precipitation rate in March could indicate a much drier than normal weather pattern.

Since drought is a response to below normal precipitation over a prolonged time period, one factor CCWA uses to assess drought and drought severity is the rate of precipitation during the previous 3, 6 and 12 months, compared with the same time periods historically. CCWA believes monitoring precipitation is important because below normal rainfall eventually decreases stream flows which impact water surface elevation at the Snake Creek Reservoir and the Authority's groundwater wells.

Stream Flow

Stream flow rates are also often used to indicate drought or drought potential. Stream flow rates alone can also be misleading because:

- Stream flows at or near stream head waters are prone to rapid fluctuation compared with flows further downstream;

- A single heavy rain event, even when stream flows are greatly reduced, can significantly replenish in-stream impoundments like the Snake Creek Reservoir; and

- Flow monitors located downstream of impoundments can be heavily influenced by impoundment rates of discharge.

Two U.S. Geological Survey (USGS) stream gages, #02337498 and #02337500, are used to monitor flows downstream of the Snake Creek Reservoir. Station #02337498, the primary monitoring station, was installed and placed into service in 2008 and is located approximately 300 feet downstream of the Snake Creek dam. Station #02337500 is located approximately three stream miles downstream of the dam near the City of Whitesburg, Georgia.

USGS gage #02337500 has been in service since 1954, and as such, is used for trending historic flows. This stream gage, however, has a larger drainage basin (35.5 square miles) when compared with the dam (32.5 square miles), and flow releases from the dam must be calculated and adjusted to reflect the differing drainage basin areas. Reservoir releases can be measured directly by USGS gage #02337498 due to the gage's close proximity to the dam.

Since these USGS gages are located downstream of the reservoir and heavily influenced by reservoir discharge rates, CCWA will not use these stream gages to assess drought. The Authority will utilize a flow monitoring weir located on Snake Creek in the headwaters of the Snake Creek Reservoir, when accessible. In addition, the Authority will monitor other regional USGS gages to provide a general overview and understanding of regional stream flows.

Reservoir Level and Remaining Water Supply

The Authority's Snake Creek Reservoir is an on-stream impoundment with a capacity of approximately 11,450 acre-feet, or 3.73 billion gallons. A safe yield analysis performed by the Authority's engineering consultant, Schnabel Engineering, concluded that the Snake Creek Reservoir has a safe yield capacity of 13.5 MGD. This safe yield capacity is based on the 1984 - 1988 drought.

Water utilities with raw water source impoundments often rely on departure from the reservoir's normal pool elevation as a key drought indicator. Reservoir level is typically the result of the following water mass balance:

Current Level = *Past Level* + *Recharge* – *Withdrawals* – *Evaporation* – *Discharge*

Recharge is the net effect of stream flows into the reservoir plus precipitation falling directly on or near the reservoir surface. When recharge exceeds the combined effect of withdrawals, evaporation and discharge, reservoir levels rise and when recharge is less, reservoir levels fall.

As can be seen from the water balance equation, reservoir levels are dependent on seasonal conditions and water usage/demands. Reservoir levels typically cycle annually, dropping as summer progresses due to increased usage and withdrawals that often correspond with decreased precipitation and increased evaporation. Conversely, increased precipitation coupled with decreased demand during the winter typically replenishes water supplies, and levels continue to increase during the wet spring months until the drier summer season returns. Therefore, lower winter or spring reservoir levels (and stream flows) may be more indicative of drought than those same levels (and flows) during late summer or fall.

Reservoir level alone can be a misleading drought indicator due to cyclical fluctuations, but also because:

- Similarly sized reservoirs with smaller surface areas fluctuate more rapidly than reservoirs with larger surface areas; and

- The percentage of stored water that is treatable is typically greater in deep reservoirs when compared to shallow reservoirs because water quality declines as depth approaches the reservoir bottom.

Perhaps the most important consideration for water utilities assessing drought severity is the length of time the raw water supply will remain viable, or Water Supply Viability. For example, a relatively large volume reservoir with low

demand will remain viable much longer than a smaller reservoir with high demand.

At full pool, approximately 3 billion gallons of water is available for withdrawal from the Snake Creek Reservoir through the existing intake pipes and raw water pump station. The length of time the raw water supply will remain viable can be calculated by simply dividing the volume of water accessible through the raw water pump station by the current daily withdrawal rate.

For the purposes of this Drought Contingency Plan, the Estimated Daily Withdrawal Rate is based on the 12-month running average withdrawal rate plus 10% contingency to assure the calculation is conservative. However, this withdrawal rate shall not exceed the maximum withdrawal rate permitted by Georgia EPD. To simplify the calculation, stream flow and rainfall replenishment are presumed to be the equivalent of discharge and evaporative water loss. In other words, since the net effect of discharge, stream flows and climatic conditions is zero, calculated reservoir level is only impacted by withdrawals.

This calculation indicates that withdrawals at a permitted 8 MGD withdrawal rate can be sustained for approximately 412 days.

Section 4: Drought Severity Level Definitions and Declarations

The State of Georgia under EPD Rule 391-3-30 establishes three Drought Response Levels designed to mitigate the impact of drought in affected areas within the State of Georgia. Strategies within the Drought Response Levels consist primarily of requiring public water utilities to initiate the following:

- Conduct public awareness campaigns designed to inform utility customers of the need to reduce outdoor water usage due to current climatic conditions; and/or

- Place specific restrictions on outdoor water uses and implement an enforcement strategy.

The Rule also provides water utilities with the ability to apply for a variance to impose either more stringent or less stringent usage restrictions than those imposed by the State, subject to the following:

- The utility must demonstrate that outdoor water use restrictions, as specified by the State, will not avoid or relieve a local water shortage and the degree to which additional restrictions will avoid or relieve such water shortage; or

- The utility must demonstrate that outdoor water use restrictions, as specified by the State, are not needed to avoid or relieve a local water shortage.

The following CCWA Drought Response Levels, as described in this Drought Contingency Plan, are based on the requirements of the Drought Response Levels establish by the State of Georgia under EPD Rule 391-3-30:

Drought Response Declarations

No single drought indicator should be solely relied upon in determining drought severity; therefore the CCWA management team will make drought assessments and determinations based on the combined effect of all applicable hydrologic indicators cited in Section 4, together with Water Supply Viability and most importantly, the health and safety of its customers. Based on all these factors and in consideration of more regional Drought Response Levels as determined by others, CCWA will determine an appropriate Drought Response Level for its service area within Carroll County, Georgia.

The specific thresholds contained below are not intended to be hard and fast rules but rather provide examples and guidance of when a specific Drought Response Level declaration might be appropriate. Other indicators and information will be assessed and factored when making a Drought Response Level declaration.

Drought Response Level I:

Drought Response Level I will be initiated when Water Supply Viability, as calculated above, drops to 300 days or less at the Estimated Daily Withdrawal Rate. At an 8 MGD permitted withdrawal rate, approximately 75% - 80% of reservoir capacity at full pool will remain available for use when Drought Response Level I is declared.

Drought Response Level II:

Drought Response Level II will be initiated when Water Supply Viability drops to 240 days or less at the Estimated Daily Withdrawal Rate. At an 8 MGD permitted withdrawal rate, nearly 65% of reservoir capacity at full pool will remain available for use when Drought Response Level II is declared.

Drought Response Level III:

Drought Response Level III will be initiated when Water Supply Viability drops to 180 days or less at the Estimated Daily Withdrawal Rate. At an 8 MGD permitted withdrawal rate, approximately 50% of reservoir capacity at full pool will remain available for use when Drought Response Level III is declared.

Drought Response Triggers

In addition to Water Supply Viability, CCWA has established the following additional conditions or events as triggers that could result in the implementation of drought response strategies designed to conserve potable water use, lessen raw water demand and ultimately maximize water supply sustainability:

- The 7-day running average potable water demand exceeds 90% of water treatment or withdrawal capacity;
- Raw water from the Snake Creek Reservoir cannot be treated to regulatory standards (e.g., contaminated water supply, etc.);
- Mechanical problems at the water treatment plant cause one or more treatment units to be disabled for more than 24-hours;
- Mechanical equipment or chemical supply problems cause disinfection capacity at the water treatment plant to fall below treatment plant capacity;
- Two or more water treatment plant high service pumps are disabled;
- Two or more raw water pumps at the Snake Creek Reservoir are disabled; or
- Critical components of the potable water distribution system (e.g., pump stations, transmission lines, water storage tanks, etc.) are disabled or taken out of service.

Section 5: Drought Response Strategies

Outdoor water restrictions are developed uniformly and unless otherwise noted, applied to all customers in all customer classes. In the event of an extreme water shortage, priority will be given to those facilities used to protect public safety, health and welfare. Priorities are as follows:

(1) Emergency facilities for essential life support measures;

(2) Essential domestic and personal use, including drinking, cooking, washing, sanitary purposes, and health-related activities;

(3) Essential Farm Uses as defined n Rule 391-3-6-.07;

(4) Essential industrial uses (including those industries on public water systems);

(5) Other uses such as lawn sprinkling, non-commercial car washing, garden watering, etc.; and

(6) Outdoor recreational uses.

Rationing and other emergency measures may be developed as deemed necessary based on the specific circumstances encountered and available alternatives.
The State of Georgia has implemented a drought management policy for a statewide drought declaration process, including measures or actions to be implemented during various stages of drought. The State policy also enables public water utilities to implement more stringent or less stringent measures than State recommendations. CCWA management will apply for variances in an effort to implement more or less stringent drought response based on the actual local conditions and Drought Response Triggers cited above.

The following is a list of responses in accordance with the various drought levels that CCWA will implement in the event of drought or other factor that could restrict potable water supply in Carroll County:

Level I Drought Response:

(1) Public Information Campaign

a. Public notices and public service messages will be released to inform the public of drought conditions. Media options include postings to the CCWA website and advertisements in the local newspaper and radio station.

(2) Voluntary water use restrictions are encouraged.

Level II Drought Response:

(1) Continued implementation of the Level I Drought response.

(2) Outdoor irrigation for purposes of planting, growing, managing, or maintaining ground cover, trees, shrubs, or other plants shall be limited to two days a week and as follows:

a. Even numbered addresses or sites without a numbered address may irrigate on Wednesday and Saturday between the hours of 4:00 p.m. and 10:00 a.m.

b. Odd numbered addresses may irrigate on Thursday and Sunday between the hours of 4:00 p.m. and 10:00 a.m.;

(3) All exempted outdoor water uses cited in Section 3 shall be permitted.

(4) The following outdoor water uses shall not be allowed, except as provided below:

a. Washing hard surfaces such as streets, gutters, sidewalks and driveways, except when necessary for public health and safety;

b. Using water for ornamental purposes, such as fountains, reflecting pools and waterfalls;

c. Use of fire hydrants, except for the purposes of firefighting, public health, safety or flushing;

d. Washing vehicles, such as cars, boats, trailers, motorbikes, airplanes or golf carts;

e. Non-commercial washing or pressure washing of buildings or structures, except for immediate fire protection; and

f. Charity or non-commercial fund-raisers (e.g., car washes, etc.).

(5) CCWA will implement four or more of the following practices or as required by the Rule 391-3-30:

a. Public information campaign that goes significantly beyond the minimum notice and public service messages associated with Drought Response Level 1;

b. Glasses of water provided to restaurant customers only upon request;

c. Distribute retrofit kits and water saving devices to customers. These kits and devices may include, but not be limited to, shower heads, leak dye tabs, toilet tank displacement devices, and hose shut off nozzles;

d. Technical assistance outreach program to target high users to identify and/or recommend opportunities to reduce water usage

e. Reduce system pressure, unless such reduction would create unsafe water supply conditions;

f. Pool cover requirements;

g. Implement a drought surcharge program, or tiered conservation rates, that satisfy the criteria of the Rule;

h. Suspension of street cleaning program;

i. Implement, or accelerate, leak detection and repair programs;

j. Impose monetary penalties or terminate water services to customers to reduce outdoor water waste due to excessive application, outdoor leaks, improper irrigation, or other similar reasons.

Level III Drought Response:

(1) Continued implementation of all Level I and Level II Drought Response requirements.

(2) Outdoor irrigation for purposes of planting, growing, managing or maintaining ground cover, trees, shrubs or other plants is not permitted.

(3) Exempted outdoor water uses cited in Section 3 shall be permitted subject to the following requirements:

a. Irrigation of personal food gardens with the exception of drip irrigation or soaker hoses shall be conducted between the hours of 4:00 p.m. and 10:00 a.m. only. Irrigation of personal food gardens using drip irrigation or soaker hoses may be conducted at any time;

b. Hand watering with a handheld container from a hose with an automatic shutoff valve may be conducted between the hours of 4:00 p.m. and 10:00 a.m.;

c. Irrigation of athletic fields or public turf grass recreational areas may be conducted between the hours of 4:00 p.m. and 10:00 a.m., subject to the two days a week odd-even schedule described in Drought Response Level 2;

d. Irrigation of golf courses shall be conducted in accordance with the Golf Irrigation Prediction and Estimation Worksheet and only between the hours of 4:00 p.m. and 10:00 a.m., provided, however, irrigation of golf course greens may occur at any time of day;

e. Use of reclaimed wastewater by a designated user from a system permitted by EPD to provide reclaimed wastewater shall not be allowed

for general outdoor watering as described in Rule 391-3-30-.03(1)(a) . It shall be allowed for any use described in Rule 391-3-30-.03(1)(b) subject to the limitations in Rule 391-3-30-.07(4)(b); and

f. Installation, maintenance or calibration of irrigation systems by qualified professional landscapers or golf course superintendents only is permitted.

(4) CCWA will implement all of the following practices or as required by the Rule 391-3-30:

a. Public information campaign that goes significantly beyond the minimum notice and public service messages associated with Drought Response Level 1;

b. Glasses of water provided to restaurant customers only upon request;

c. Distribute retrofit kits and water saving devices to customers. These kits and devices may include, but not be limited to, shower heads, leak dye tabs, toilet tank displacement devices, and hose shut off nozzles;

d. Technical assistance outreach program to target high users to identify and/or recommend opportunities to reduce water usage

e. Reduce system pressure, unless such reduction would create unsafe water supply conditions;

f. Pool cover requirements;

g. Implement a drought surcharge program, or tiered conservation rates, that satisfy the criteria of the Rule;

h. Suspension of street cleaning program;

i. Implement, or accelerate, leak detection and repair programs;

j. Impose monetary penalties or terminate water services to customers to reduce outdoor water waste due to excessive application, outdoor leaks, improper irrigation, or other similar reasons.

(5) The following professional/commercial outdoor water uses are exempt from the Drought Response Level III outdoor watering restrictions except as provided below:

a. Pressure washing;

b. Permanent car wash facility, provided that it is connected to a sanitary sewer system of a political subdivision or local government authority or recycles used wash water;

c. Construction sites;

d. Watering-in of pesticides and herbicides on turf; and

e. Other activities essential to daily business.

Section 6: Reservoir Discharge Control and Withdrawals

Method of Low-Flow Protection

The Snake Creek Reservoir's Surface Water Withdrawal Permit (022-1217-01) requires the Authority to release a minimum flow rate equal to the 7Q10 or the natural stream flow, whichever is less, and defines the 7Q10 flow as 8.42 CFS (5.44 MGD). 7Q10 flow is the lowest average stream flow expected to occur for seven consecutive days with an average frequency of once in ten years (Rule 391-3-6-.07 j).

Flow from the Snake Creek Reservoir discharges through two 8-inch PVC pipes cored through the reservoir outlet structure and located at centerline elevation 899 feet above MSL. Connected in series to each of these pipes are an 8-inch x 10-inch reducer, a 10-inch gate valve and approximately 50 feet of flexible non-collapsible 10-inch pipe with a debris screen on the open pipe end. Stainless steel cables and adjustable reels attached to floating structures are used to support the ends of each flexible pipe. Typically, the open ends of both flexible pipes are positioned approximately 10 feet beneath the reservoir's water surface elevation, but operators have the ability to lower the cables to a depth of 25 feet. The reservoir discharge flow rate is normally controlled by opening and closing the 10-inch gate valves. This reservoir discharge system was designed to offer low flow protection by being fully capable of releasing at least 8.42 CFS with both valves fully open, provided the reservoir water surface elevation is at or above 906.88 feet above MSL.

Section 7: Alternate Water Sources

The Authority currently has active municipal interconnections to six water suppliers which may be utilized to supplement the Authority's own water

production during times of drought or an emergency situation. The interconnections with other water suppliers are as follows:

- *City of Bowdon*.
- *City of Carrollton*
- *Douglasville-Douglas County Water and Sewer Authority*.
- *Haralson County Water Authority*
- *Heard County Water Authority*
- *Paulding County Water Authority*

Appendix D

Water Cost of Service Study
12 Months Ending 6/30/2014

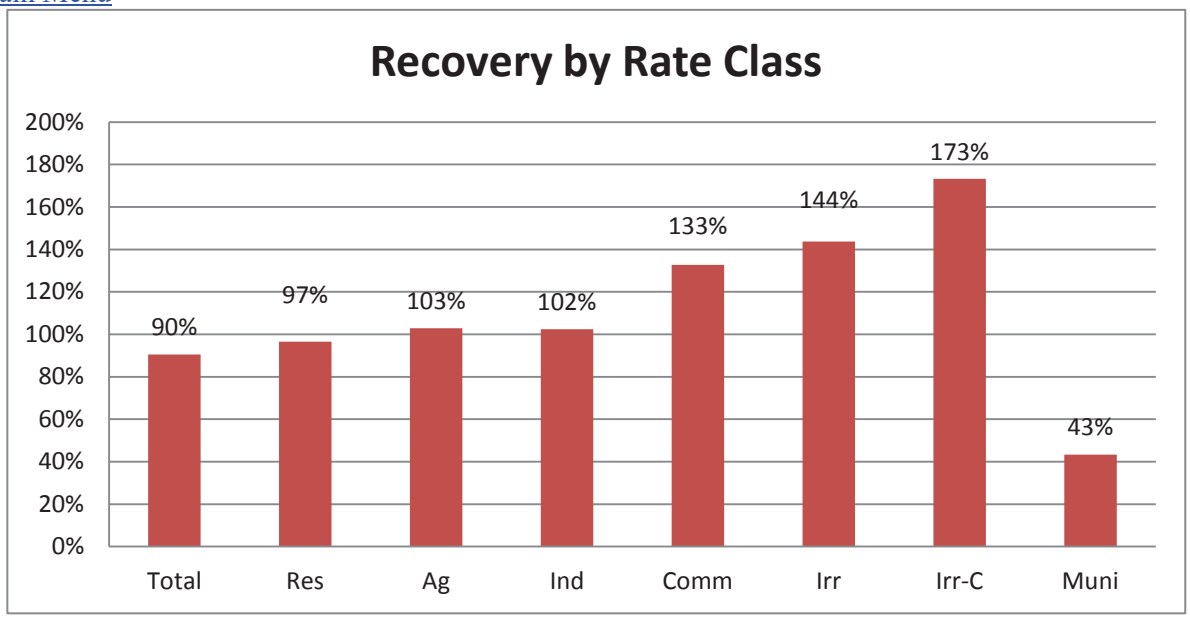
Carroll County Water Authority

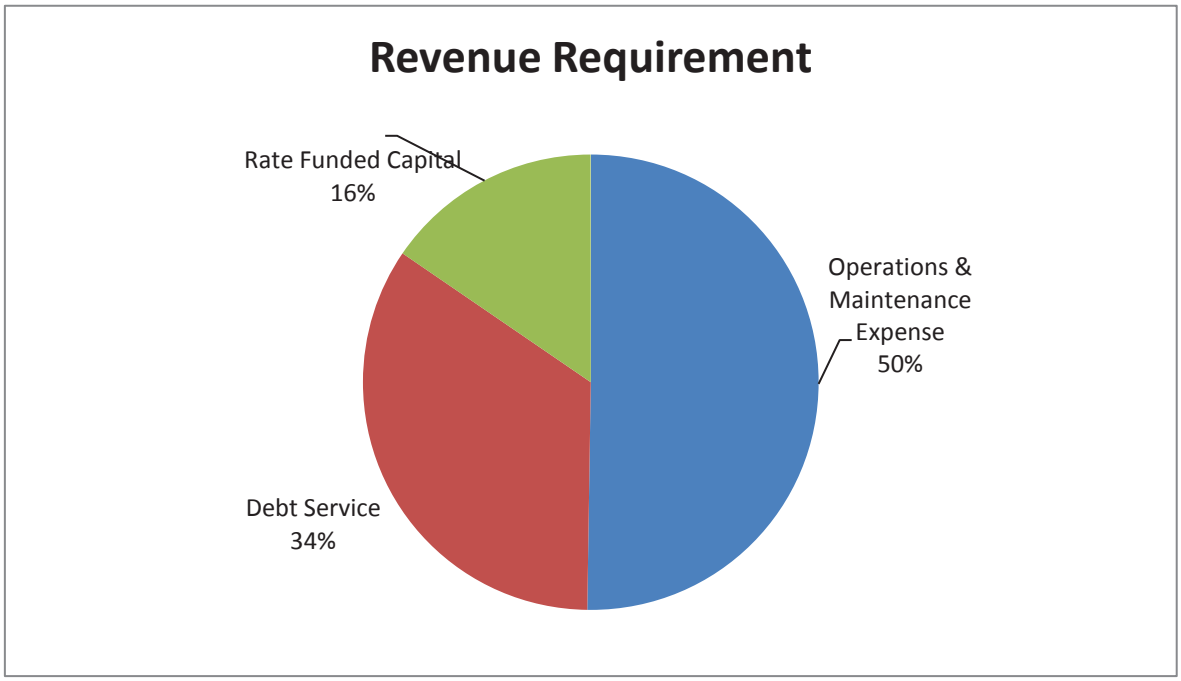
Summary

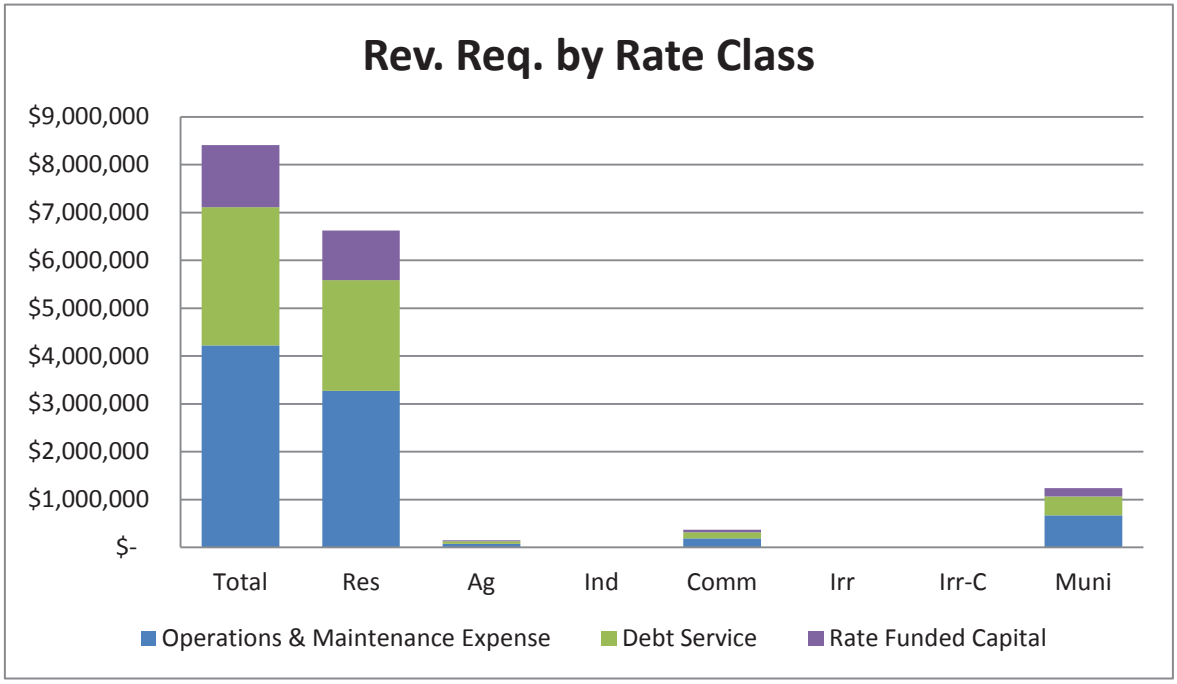
Carroll County Water Authority
Water Cost of Service-12-Months Ending June 2014
Summary of Cost of Service Allocation
Main Menu

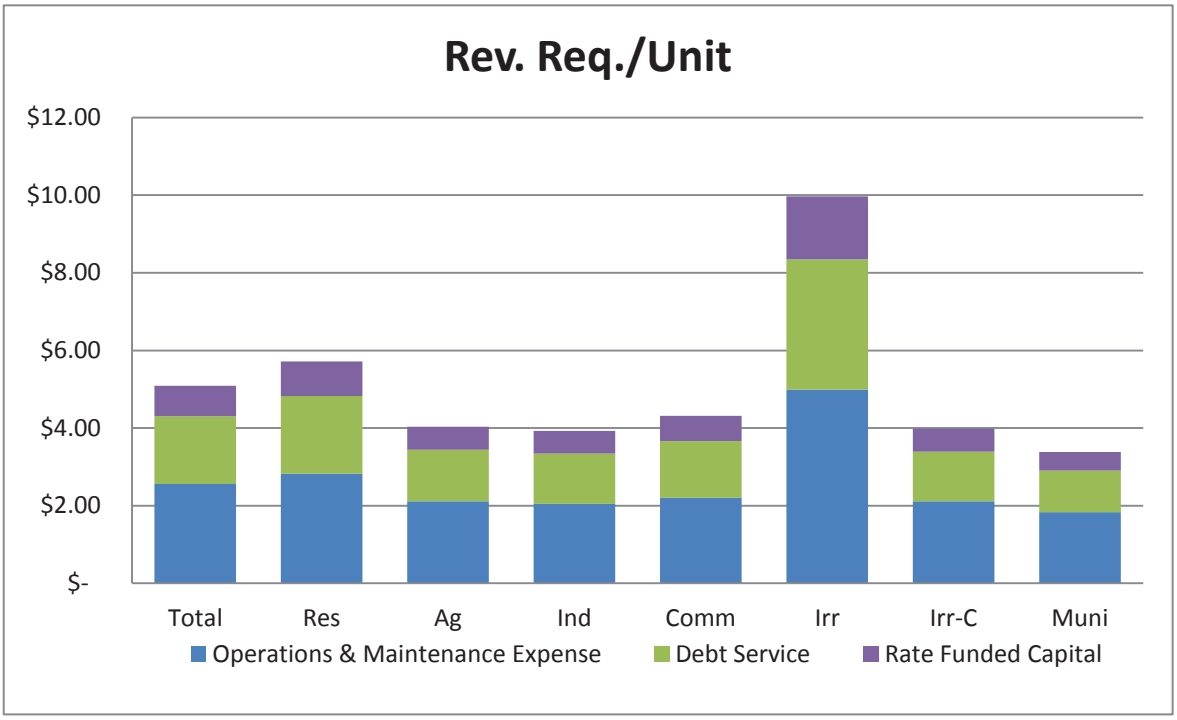
TOTAL REV. REQ.	Total	1 Retail Residential	2 Retail Agricultural	3 Retail Industrial	4 Retail Commercial	5 Retail Res. Irr	6 Retail Comm Irr	15 Wholesale Municipal	Total
Operations & Maintenance Expense	$ 4,223,453	$ 3,271,767	$ 79,120	$ 3,751	$ 189,748	$ 3,078	$ 2,439	$ 673,550	$ 4,223,453
Plus: Debt Service	$ 2,885,423	$ 2,312,873	$ 49,552	$ 2,379	$ 125,616	$ 2,074	$ 1,470	$ 391,460	$ 2,885,423
Plus: Rate Funded Capital	$ 1,297,890	$ 1,038,931	$ 22,395	$ 1,068	$ 56,126	$ 1,003	$ 678	$ 177,690	$ 1,297,890
Total Revenue Requirement	$ 8,406,767	$ 6,623,571	$ 151,067	$ 7,199	$ 371,490	$ 6,154	$ 4,587	$ 1,242,699	$ 8,406,767
Less: Other Revenue	$ 473,269	$ 445,210	$ 2,875	$ 121	$ 24,277	$ 663	$ 122	$ -	$ 473,269
Rate Requirement	$ 7,933,498	$ 6,178,361	$ 148,192	$ 7,078	$ 347,213	$ 5,491	$ 4,465	$ 1,242,699	$ 7,933,498
Annual Sales (750 gallon units)	1,652,088	1,158,038	37,422	1,833	86,050	617	1,152	366,976	1,652,088
Rate Rev. Req./Unit	**$ 4.80**	**$ 5.34**	**$ 3.96**	**$ 3.86**	**$ 4.04**	**$ 8.90**	**$ 3.88**	**$ 3.39**	**$ 4.80**
Rate Rev. Req./Customer	**$ 38.67**	**$ 31.34**	**$ 86.36**	**$ 98.31**	**$ 62.63**	**$ 13.87**	**$ 61.16**	**$ 5,177.91**	**$ 38.67**
CUSTOMER	Total	Residential	Agricultural	Industrial	Commercial	Res. Irr	Comm Irr	Municipal	Total
Operations & Maintenance Expense	$ 986,916	$ 948,234	$ 8,255	$ 346	$ 26,670	$ 1,905	$ 351	$ 1,155	$ 986,916
Plus: Debt Service	$ 2,885,423	$ 2,312,873	$ 49,552	$ 2,379	$ 125,616	$ 2,074	$ 1,470	$ 391,460	$ 2,885,423
Plus: Rate Funded Capital	$ 517,164	$ 496,894	$ 4,326	$ 182	$ 13,976	$ 998	$ 184	$ 605	$ 517,164
Total Revenue Requirement	$ 4,389,504	$ 3,758,001	$ 62,133	$ 2,907	$ 166,262	$ 4,977	$ 2,005	$ 393,219	$ 4,389,504
Less: Other Revenue	$ 473,269	$ 445,210	$ 2,875	$ 121	$ 24,277	$ 663	$ 122	$ -	$ 473,269
Rate Requirement	$ 3,916,235	$ 3,312,791	$ 59,258	$ 2,786	$ 141,985	$ 4,314	$ 1,883	$ 393,219	$ 3,916,235
Annual Billings	205,155	197,114	1,716	72	5,544	396	73	240	205,155
Calculated Customer Charge		**$ 16.81**	**$ 34.53**	**$ 38.70**	**$ 25.61**	**$ 10.89**	**$ 25.79**	**$ 1,638.41**	
CONSUMPTION	Total	Residential	Agricultural	Industrial	Commercial	Res. Irr	Comm Irr	Municipal	Total
Operations & Maintenance Expense	$ 3,236,537	$ 2,323,533	$ 70,865	$ 3,405	$ 163,078	$ 1,173	$ 2,088	$ 672,395	$ 3,236,537
Plus: Debt Service	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plus: Rate Funded Capital	$ 780,726	$ 542,037	$ 18,069	$ 887	$ 42,150	$ 4	$ 494	$ 177,085	$ 780,726
Total Revenue Requirement	$ 4,017,263	$ 2,865,570	$ 88,934	$ 4,292	$ 205,228	$ 1,177	$ 2,582	$ 849,480	$ 4,017,263
Less: Other Revenue	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Rate Requirement	$ 4,017,263	$ 2,865,570	$ 88,934	$ 4,292	$ 205,228	$ 1,177	$ 2,582	$ 849,480	$ 4,017,263
Calculated Water Rate (Unit)		**$ 2.47**	**$ 2.38**	**$ 2.34**	**$ 2.38**	**$ 1.91**	**$ 2.24**	**$ 2.31**	
	Total	Residential	Agricultural	Industrial	Commercial	Res. Irr	Comm Irr	Municipal	
Current Rate Revenue	$ 7,130,541	$ 5,948,423	$ 152,549	$ 7,249	$ 468,814	$ 8,181	$ 7,827	$ 537,498	$ 7,130,541
Over/(Under) Recovery	$ (802,957)	$ (229,937)	$ 4,357	$ 171	$ 121,601	$ 2,691	$ 3,362	$ (705,201)	$ (802,957)
Total Revenue	$ 7,603,810	$ 6,393,634	$ 155,423	$ 7,370	$ 493,091	$ 8,845	$ 7,949	$ 537,498	$ 7,603,810
Over/(Under) Recovery	$ (802,957)	$ (229,937)	$ 4,357	$ 171	$ 121,601	$ 2,691	$ 3,362	$ (705,201)	$ (802,957)

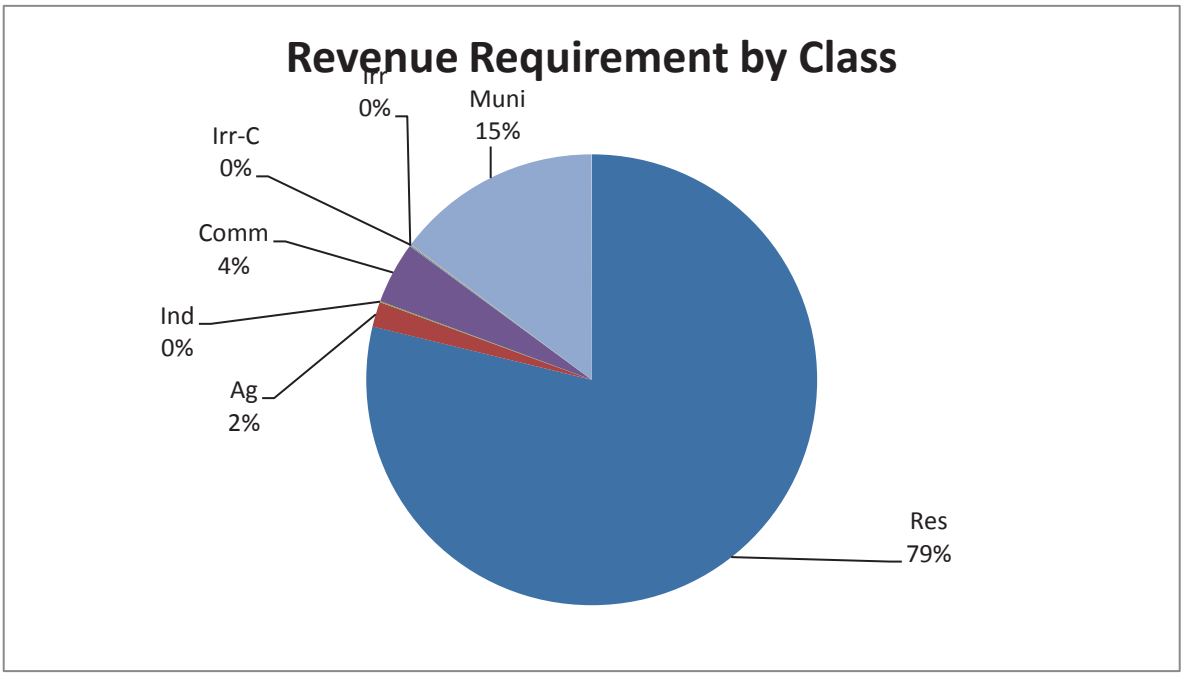
Carroll County Water Authority
Water Cost of Service-12-Months Ending June 2014
Summary of Results
Main Menu

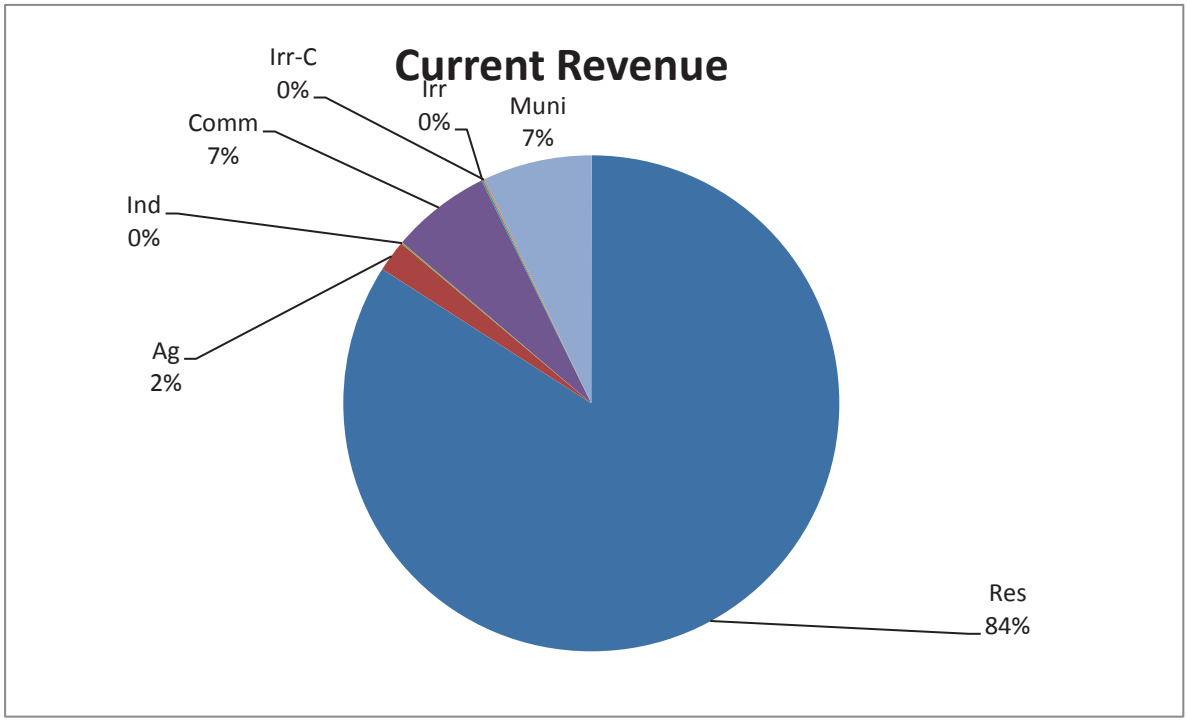


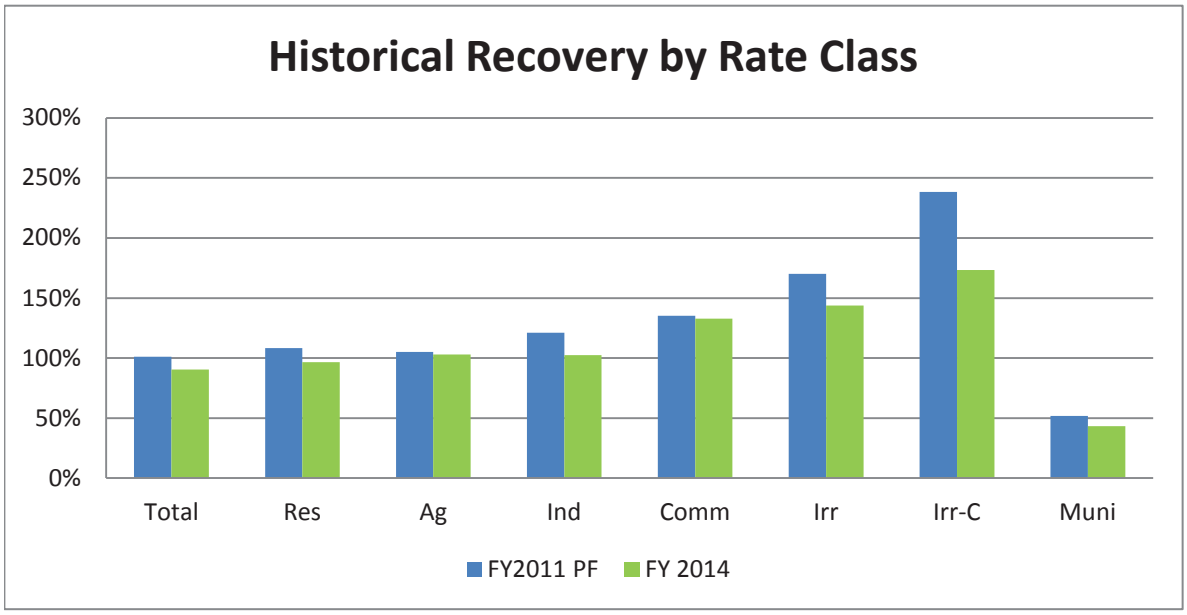


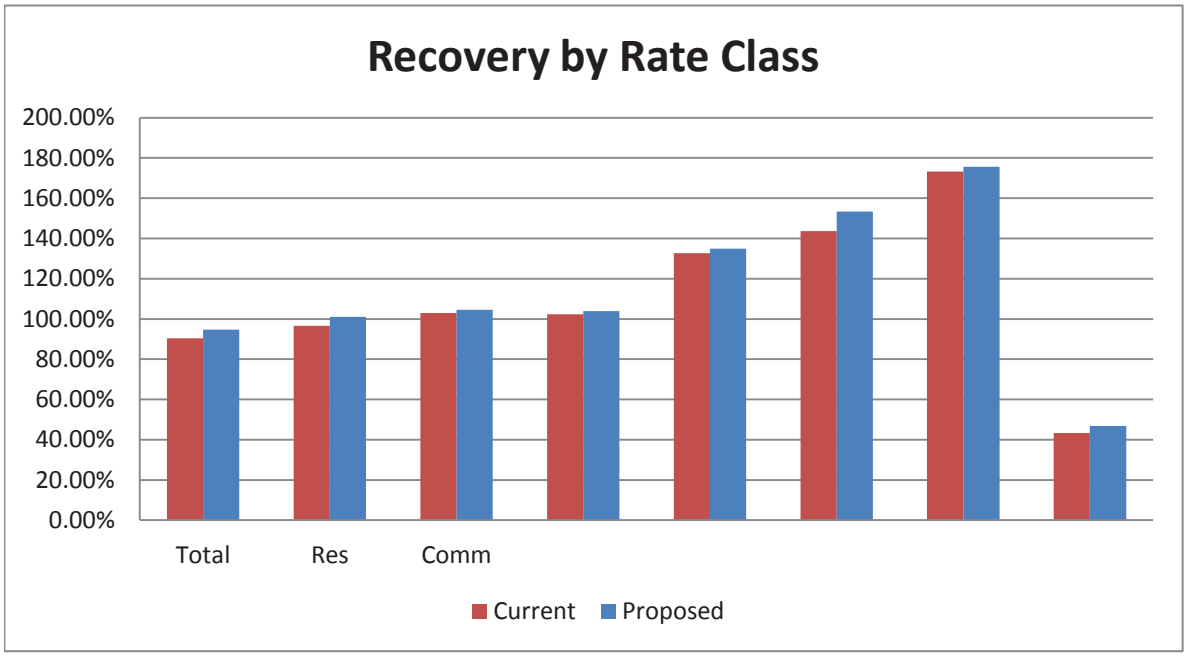

Rev. Req. by Rate Class
$9,000,000
$8,000,000
$7,000,000
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$-
Total
Res
Ag
Ind
Comm
Irr
Irr-C
Muni
Operations & Maintenance Expense
Debt Service
Rate Funded Capital


Rev. Req./Unit
$12.00
$10.00
$8.00
$6.00
$4.00
$2.00
$-
Total
Res
Ag
Ind
Comm
Irr
Irr-C
Muni
Operations & Maintenance Expense
Debt Service
Rate Funded Capital


Revenue Requirement by Class
Irr
0%
Muni
15%
Irr-C
0%
Comm
4%
Ind
0%
Ag
2%
Res
79%

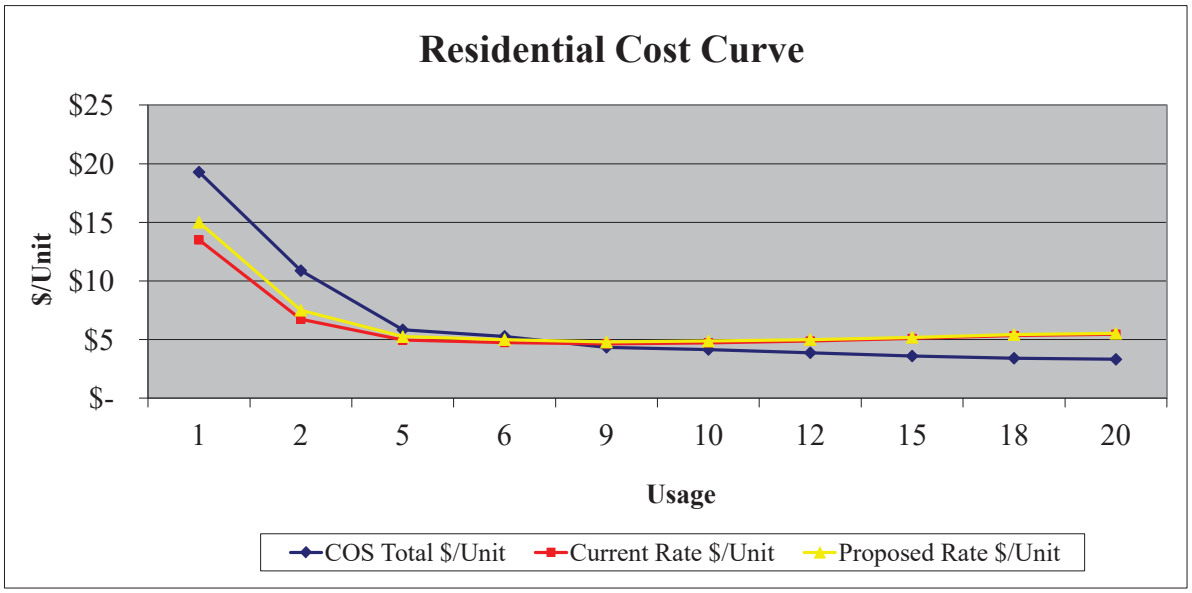

Current Revenue
Irr-C
0%
Irr
0%
Muni
7%
Comm
7%
Ind
0%
Ag
2%
Res
84%


Historical Recovery by Rate Class
300%
250%
200%
150%
100%
50%
0%
Total
Res
Ag
Ind
Comm
Irr
Irr-C
Muni
FY2011 PF
FY 2014


Recovery by Rate Class
200.00%
180.00%
160.00%
140.00%
120.00%
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
Total
Res
Comm
Current
Proposed

Carroll County Water Authority
Water Cost of Service-12-Months Ending June 2014
Retail
Residential Cost Curve
Main Menu

	Cost of Service	Current Rate	Proposed Rate	Difference
Customer Charge (2 Units)	**$ 16.81**	$ 13.50	$ 15.00	$ 1.50
Next 6 Units (3-8)	**$ 2.47**	$ 3.75	$ 3.75	$ -
Next 6 Units (9-14)		$ 5.63	$ 5.63	$ -
Next 6 Units (15-20)		$ 6.56	$ 6.56	$ -
All Additional Usage		$ 7.50	$ 7.50	$ -



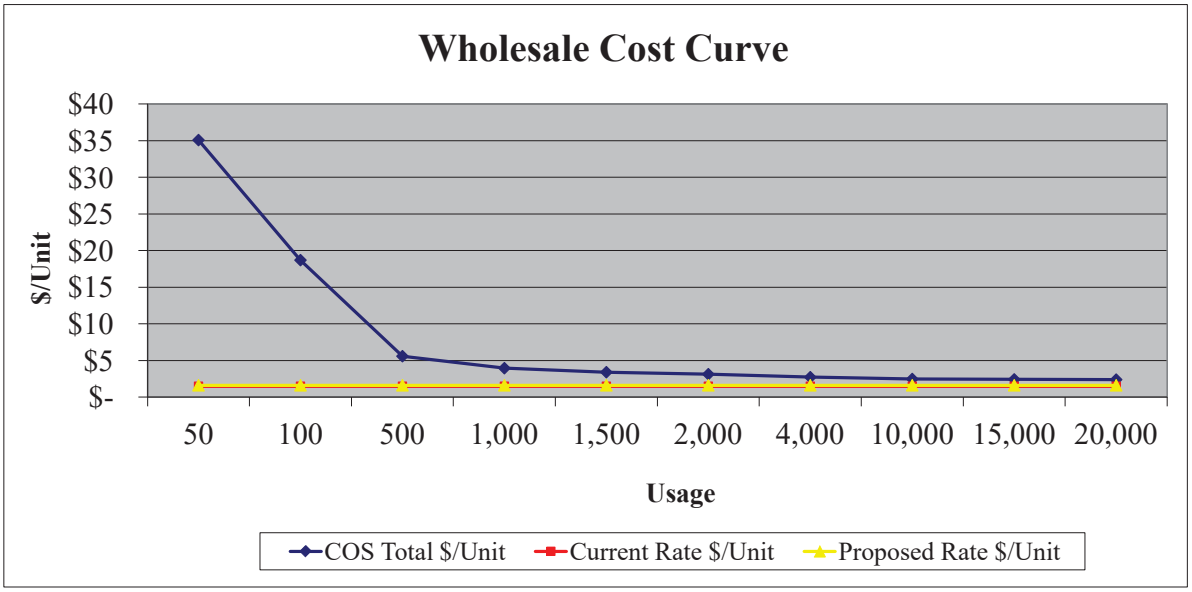
Usage	COS Rates	Current Rates	Proposed Rates	Monthly Change	Daily Change	Current $/Unit	Proposed $/Unit
1	$ 19.28	$ 13.50	$ 15.00	$ 1.50	$ 0.05	$ 13.50	$ 15.00
2	$ 21.76	$ 13.50	$ 15.00	$ 1.50	$ 0.05	$ 6.75	$ 7.50
5	$ 29.18	$ 24.75	$ 26.25	$ 1.50	$ 0.05	$ 4.95	$ 5.25
6	**$ 31.65**	**$ 28.50**	**$ 30.00**	**$ 1.50**	**$ 0.05**	**$ 4.75**	**$ 5.00**
9	$ 39.08	$ 41.63	$ 43.13	$ 1.50	$ 0.05	$ 4.63	$ 4.79
10	$ 41.55	$ 47.26	$ 48.76	$ 1.50	$ 0.05	$ 4.73	$ 4.88
12	$ 46.50	$ 58.52	$ 60.02	$ 1.50	$ 0.05	$ 4.88	$ 5.00
15	$ 53.92	$ 76.34	$ 77.84	$ 1.50	$ 0.05	$ 5.09	$ 5.19
18	$ 61.35	$ 96.02	$ 97.52	$ 1.50	$ 0.05	$ 5.33	$ 5.42
20	$ 66.30	$ 109.14	$ 110.64	$ 1.50	$ 0.05	$ 5.46	$ 5.53
Average Usage		6					

Estimated Increase in Revenue $ 295,671

Current Recovery $ (229,937)

Carroll County Water Authority
Water Cost of Service-12-Months Ending June 2014
Wholesale
Municipal Cost Curve
Main Menu

	Cost of Service	Current Rate	Proposed Rate	Difference
Customer Charge (2 Units)	**$ 1,638.41**	$ -	$ -	$ -
All Usage	**$ 2.31**	$ 1.50	$ 1.62	$ 0.12



Usage	COS Rates	Current Rates	Proposed Rates	Monthly Change	Daily Change	Current $/Unit	Proposed $/Unit
50	$ 1,754.15	$ 75.00	$ 81.00	$ 6.00	$ 0.20	$ 1.50	$ 1.62
100	$ 1,869.89	$ 150.00	$ 162.00	$ 12.00	$ 0.40	$ 1.50	$ 1.62
500	$ 2,795.82	$ 750.00	$ 810.00	$ 60.00	$ 2.00	$ 1.50	$ 1.62
1,000	$ 3,953.22	$ 1,500.00	$ 1,620.00	$ 120.00	$ 4.00	$ 1.50	$ 1.62
1,500	$ 5,110.63	$ 2,250.00	$ 2,430.00	$ 180.00	$ 6.00	$ 1.50	$ 1.62
2,000	**$ 6,268.04**	**$ 3,000.00**	**$ 3,240.00**	**$ 240.00**	**$ 8.00**	**$ 1.50**	**$ 1.62**
4,000	$ 10,897.66	$ 6,000.00	$ 6,480.00	$ 480.00	$ 16.00	$ 1.50	$ 1.62
10,000	$ 24,786.52	$ 15,000.00	$ 16,200.00	$ 1,200.00	$ 40.00	$ 1.50	$ 1.62
15,000	$ 36,360.58	$ 22,500.00	$ 24,300.00	$ 1,800.00	$ 60.00	$ 1.50	$ 1.62
20,000	$ 47,934.64	$ 30,000.00	$ 32,400.00	$ 2,400.00	$ 80.00	$ 1.50	$ 1.62
Average Usage		1,529					

Estimated Increase in Revenue $ 44,037

Current Recovery $ (705,201)

Carroll County Water Authority
Water Cost of Service-12-Months Ending June 2014
Two Year Comparison
Main Menu

TOTAL REV. REQ.	2011 PF	2014	Difference $	Difference %
Operations & Maintenance Expense	$ 4,369,598	$ 4,223,453	$ (146,145)	-3.3%
Plus: Debt Service	$ 2,275,051	$ 2,885,423	$ 610,372	26.8%
Plus: Rate Funded Capital	$ 1,058,120	$ 1,297,890	$ 239,771	22.7%
Total Revenue Requirement	$ 7,702,769	$ 8,406,767	$ 703,998	9.1%
Less: Other Revenue	$ 329,179	$ 473,269	$ 144,089	43.8%
Rate Requirement	$ 7,373,590	$ 7,933,498	$ 559,908	7.6%
Annual Sales (750 gallon units)	1,766,106	1,652,088	(114,018)	-6.5%

TOTAL REV. REQ.	2011 PF	2014	Difference $	Difference %
Operations & Maintenance Expense	$ 2.47	$ 2.56	$ 0.08	3.3%
Plus: Debt Service	$ 1.29	$ 1.75	$ 0.46	35.6%
Plus: Rate Funded Capital	$ 0.60	$ 0.79	$ 0.19	31.1%
Total Revenue Requirement	$ 4.36	$ 5.09	$ 0.73	16.7%
Less: Other Revenue	$ 0.19	$ 0.29	$ 0.10	53.7%
Rate Requirement	$ 4.18	$ 4.80	$ 0.63	15.0%

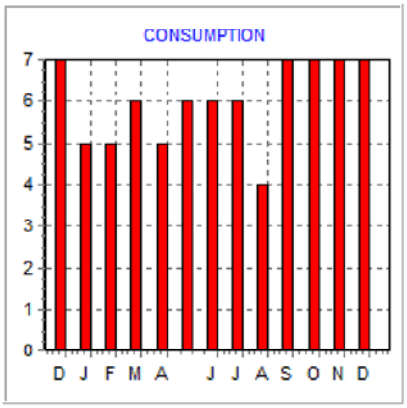
Appendix E

CARROLL COUNTY WATER AUTHORITY - P.O. Box 739 - Carrollton, GA 30112 - (770) 832-1277

Name	Service Address	Account Number
[redacted]	[redacted]	[redacted]

Status	Service Dates From	Service Dates To	Number of Days	Bill Date	Penalty Date	Due Date
ACTIVE	10/30/2017	12/01/2017	32	12/12/2017	01/10/2018	**01/10/2018**

SERVICE	PREVIOUS READING	CURRENT READING	USAGE	AMOUNT
PREVIOUS BALANCE				33.75
PAYMENTS				33.75-
WATER	419	426	7	34.75
CURRENT BILL				**$34.75**
AMOUNT DUE				**$34.75**
AMOUNT DUE AFTER 01/10/2018				$38.23



* * * * * * * * * * * * * * * MESSAGES * * * * * * * * * * * * * * * *

As previously notified, this bill includes an adjustment to water and sewer rates. For more information on the rate adjustment, please go to www.ccwageorgia.com/2017faq.pdf.

CUSTOMER ACCOUNT INFORMATION - RETAIN FOR YOUR RECORDS

There will be a charge on all returned checks.
Please return this portion with your payment.
When paying in person please bring both portions of this bill.

CCWA

CARROLL COUNTY WATER AUTHORITY
P.O. Box 739
556 Old Bremen Rd.
Carrollton, Georgia 30112
(770) 832-1277

Account Number	Amount Due
[redacted]	**$34.75**
Due Date	**After Due Date Pay**
01/10/2018	$38.23
Service Address	
[redacted]	

[redacted]
CARROLLTON GA 30117

CARROLL COUNTY WATER AUTHORITY
PO BOX 739
CARROLLTON GA 30112-0014

Appendix F

Exhibit F:
Water Efficiency Evaluation Checklist

Sustainable Water Management Practice	Strategy	Strategy Minimums	Strategy Met (Yes / No)	Estimated Demand Reductions
(1) Better Management	(a) Develop Water Consumption Reduction Goals	Goals will be based on the summary of the estimated demand reductions in the last column. All items in the guidelines will be incorporated.		NA
	(b) Increase public understanding	Current public awareness program consists of inserts, school education, website, field trips and site visits, newspaper ads, monthly public meetings		NA
	(c) Involve water users in decisions	Monthly public meetings are held, three public meetings were held regarding the Alternatives Analysis in 2017, meetings are recorded and shown on the local cable station		NA
(2) Pricing for Efficiency	(a) Full Price costing	In 2015 CCWA commissioned a rate study. Based on the results of the study, CCWA began adjusting wholesale and retail water rates to achieve full cost pricing.		10% (1 mgd)
	(b) Conservation pricing	CCWA encourages water conservation by increasing the unit cost of water as consumption surpasses predetermined levels or tiers. See Water Conservation Plan page 8.		20% (2 mgd)
(3) Efficient Water Use	(a) Stop leaks	CCWA implements both a reactive leak detection program and a proactive leak detection program as detailed in the Water Conservation Plan page 4.		10% (1 mgd)
	(b) Meter all water users	All water usage is metered except for water used for firefighting, sanitary use and sampling at the water plant and wastewater plant. See Water Conservation Plan page 6.		<1

Sustainable Water Management Practice	Strategy	Strategy Minimums	Strategy Met (Yes / No)	Estimated Demand Reductions
	(c) Build smart for the future	High efficiency water fixtures are required for new construction and renovations per state law. CCWA requires all new multi-family developments to have water meters for each unit. See Water Conservation Plan pages 9-10.		<1
	(d) Harvest rainwater for nonpotable use	CCWA does not currently have a rainwater harvest program		<1
	(e) Retrofit all buildings	CCWA recommends retrofitting all buildings with efficiency water fixtures but limits requirements to those imposed by state law.		<1
	(f) Landscape to minimize water waste	CCWA's Drought Contingency Plan incentivizes low-maintenance landscaping through restricting water usage for irrigation under its water shortage response plan.		<1
(4) Watershed Approaches	(a) Develop Water Budget/ Instream Flow Study	In 2015, CCWA partnered with Paulding County & Etowah Water & Sewer Authority to conduct a downstream flow study of the ACT basin which was ultimately approved by the USACE		NA
	(b) Seek opportunities for wetland restoration	CCWA will restore wetlands as a part of its mitigation plan for the Indian Creek Reservoir		0
	(c) Seek opportunities for ground water recharge	CCWA will continue to look for opportunities		0

Sustainable Water Management Practice	Strategy	Strategy Minimums	Strategy Met (Yes / No)	Estimated Demand Reductions
	(d) Evaluate opportunities for use of treated waste water	CCWA's only wastewater system is a land application system. Since the waste is not directly treated, there are no current opportunities for potable reuse, but as treatment technology and CCWA infrastructure increase in the future, CCWA will look for such opportunities.		0
	(e) Evaluate opportunities for use of treated graywater	See Response to (d) above.		0
	(f) Ensure the source water is protected	Carroll County has a Watershed Protection Plan aimed at protecting source water.		NA
Summary	Total estimated demand reduction			40% (4 mgd)
	Total 2065 Demand			10 mgd
	2065 Demand with implementation of Water Efficiency Measures			6 mgd