

Carolina Water Service, Inc. of North Carolina
Recommended Capital Structure and Cost Rates
for Ratemaking Purposes
at September 30, 2019

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.90%	5.36% (1)	2.73%
Common Equity	<u>49.10%</u>	10.15% (2)	<u>4.98%</u>
Total	<u><u>100.00%</u></u>		<u><u>7.71%</u></u>

Notes:

(1) Company-Provided.

(2) From page 2 of this Schedule.

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Dec 13 2019

Carolina Water Service, Inc. of North Carolina
Brief Summary of Common Equity Cost Rate

<u>Line No.</u>	<u>Principal Methods</u>	<u>Proxy Group of Six Water Companies</u>
1.	Discounted Cash Flow Model (DCF) (1)	8.81%
2.	Risk Premium Model (RPM) (2)	10.00%
3.	Capital Asset Pricing Model (CAPM) (3)	9.29%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	<u>11.16%</u>
5.	Indicated Common Equity Cost Rate before Adjustment for Size Risk	9.75%
6.	Size Risk Adjustment (5)	<u>0.40%</u>
7.	Recommended Common Equity Cost Rate after Adjustment for Size Risk	<u><u>10.15%</u></u>

Notes: (1) From page 3 of this Schedule.
(2) From page 10 of this Schedule.
(3) From page 21 of this Schedule.
(4) From page 26 of this Schedule.
(5) From Schedule DWD-8 (direct testimony).

Carolina Water Service, Inc. of North Carolina
Indicated Common Equity Cost Rate Using the Discounted Cash Flow Model for the
Proxy Group of Six Water Companies

	[1]	[2]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Six Water Companies	Average Dividend Yield (1)	Value Line Projected Five Year Growth in EPS (2)	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth in EPS (3)	Adjusted Dividend Yield (4)	Indicated Common Equity Cost Rate (5)
American States Water Co.	1.38 %	8.00 %	8.00 %	6.00 %	7.33 %	1.43 %	8.76 %
American Water Works Company Inc	1.63	9.50	8.10	8.20	8.60	1.70	10.30
Artesian Resources Corporation	2.76	NA	NA	4.00	4.00	2.82	6.82
California Water Service Group	1.46	8.00	10.00	9.80	9.27	1.53	10.80
Middlesex Water Co.	1.55	7.50	NA	2.70	5.10	1.59	6.69
York Water Co.	1.74	9.50	NA	4.90	7.20	1.80	9.00
						Average	8.73 %
						Median	8.88 %
						Average of Mean and Median	8.81 %

NA= Not Available

Notes:

- (1) Indicated dividend at 10/18/2019 divided by the average closing price of the last 60 trading days ending 10/18/2019 for each company.
- (2) From pages 4 through 9 of this Schedule.
- (3) Average of columns 2 through 5 excluding negative growth rates.
- (4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 6) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Co., $1.38\% \times (1 + (1/2 \times 7.33\%)) = 1.43\%$.
- (5) Column 6 + column 7.

Source of Information:

Value Line Investment Survey
www.reuters.com Downloaded on 10/18/2019
www.zacks.com Downloaded on 10/18/2019
www.yahoo.com Downloaded on 10/18/2019

<p>(A) Primary earnings. Excludes nonrecurring gains/(losses): '04, 7¢; '05, 13¢; '06, 3¢; '08, (14¢); '10, (23¢); '11, 10¢. Next earnings report due mid-November.</p>	<p>(B) Dividends historically paid in early March, June, September, and December. ■ Div'd reinvestment plan available.</p>	<p>(C) In millions, adjusted for split. (D) Includes intangibles. As of 6/30/19; \$1.1 million/\$0.03 a share.</p>	<p>Company's Financial Strength A Stock's Price Stability 85 Price Growth Persistence 95 Earnings Predictability 90</p>
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AMERICAN WATER NYSE-AWK										RECENT PRICE	123.86	P/E RATIO	34.1	(Trailing: 38.6 Median: 19.0)	RELATIVE P/E RATIO	2.05	DIV'D YLD	1.7%	VALUE LINE															
TIMELINESS	1	Raised 4/5/19	High: 23.7 Low: 16.5	23.0 16.2	25.8 19.4	32.8 25.2	39.4 31.3	45.1 37.0	56.2 41.1	61.2 48.4	85.2 58.9	92.4 70.0	98.2 76.0	129.9 88.0	Target Price Range 2022 2023 2024																			
SAFETY	3	New 7/25/08	LEGENDS 1.10 x Dividends p sh divided by Interest Rate ... Relative Price Strength Options: Yes Shaded area indicates recession																															
TECHNICAL	3	Lowered 10/4/19																																
BETA	.60	(1.00 = Market)																																
18-Month Target Price Range																																		
Low-High Midpoint (% to Mid)																																		
\$102-\$142 \$122 (0%)																																		
2022-24 PROJECTIONS																																		
High	Price	Gain	Ann'l Total																															
120	120	(-5%)	Return																															
Low	80	(-35%)	-8%																															
Institutional Decisions																																		
to Buy 402818 102819 302819																																		
to Sell 362 364 360																																		
Held(000) 155716 155942 155051																																		
Percent 21																																		
shares 14																																		
traded 7																																		
2003 2004 2005 2006E 2007E 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020																																		
Revenues per sh										20.90																								
"Cash Flow" per sh										8.30																								
Earnings per sh										3.90																								
Div'd Decl'd per sh										2.75																								
Cap'l Spending per sh										9.00																								
Book Value per sh										41.25																								
Common Shs Outst'g										189.00																								
Avg Ann'l P/E Ratio										21.5																								
Relative P/E Ratio										1.20																								
Avg Ann'l Div'd Yield										2.8%																								
CAPITAL STRUCTURE as of 6/30/19																																		
Total Debt \$9064.0 mil. Due in 5 Yrs \$1555.0 mil.										2440.7 2710.7 2666.2 2876.9 2901.9 3011.3 3159.0 3302.0 3357.0 3440.0 3600 3800																								
LT Debt \$8642.0 mil. LT Interest \$370.0 mil. (59% of Cap'l)										209.9 267.8 304.9 374.3 369.3 429.8 476.0 468.0 426.0 567.0 650 700																								
Leases, Uncapitalized: Annual rentals \$17.0 mil.										56.9% 56.8% 55.7% 53.9% 52.4% 52.4% 53.7% 52.4% 54.7% 56.3% 58.5% 58.0%																								
Pension Assets 12/18 \$1499.0 mil.										43.1% 43.2% 44.2% 46.1% 47.6% 47.4% 46.2% 47.5% 45.3% 43.6% 41.5% 42.0%																								
Oblig. \$1892.0 mil.										9289.0 9561.3 9580.3 9635.5 9940.7 10364 10911 10967 11875 13433 15000 15700																								
Pfd Stock \$7.0 mil. Pfd Div'd \$.4 mil										10524 11059 11021 11739 12391 12900 13933 14992 16246 17409 18500 19500																								
Common Stock 180,652,681 shares as of 7/25/19										3.8% 4.4% 4.8% 5.4% 5.1% 5.5% 5.7% 5.6% 4.9% 5.4% 5.5% 5.5%																								
MARKET CAP: \$22.4 billion (Large Cap)										5.2% 6.5% 7.2% 8.4% 7.8% 8.7% 9.4% 9.0% 7.9% 9.7% 10.5% 10.5%																								
CURRENT POSITION (SMILL)										1.8% 2.8% 3.5% 3.6% 4.7% 4.3% 4.7% 4.0% 2.5% 4.2% 5.0% 5.0%																								
Cash Assets										65% 56% 52% 57% 40% 50% 50% 56%																								
Accts Receivable										82 158 86																								
Other										272 301 337																								
Current Assets										366 322 318																								
Accts Payable										720 781 741																								
Debt Due										195 175 140																								
Other										1227 1035 422																								
Current Liab.										903 884 755																								
ANNUAL RATES of change (per sh)										2325 2094 1317																								
Past 10 Yrs. 5 Yrs. to '22-'24																																		
Revenues										3.0% 3.5% 4.0%																								
"Cash Flow"										18.5% 6.0% 7.0%																								
Earnings										- - 6.5% 9.5%																								
Dividends										- - 10.5% 9.0%																								
Book Value										1.5% 4.0% 5.0%																								
QUARTERLY REVENUES (\$ mil.)																																		
Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year																													
2016	743.0	827.0	930.0	802.0	3302.0																													
2017	756.0	844.0	936.0	810.0	3357.0																													
2018	761.0	853.0	976.0	850.0	3440.0																													
2019	813.0	882.0	1025.0	880.0	3600.0																													
2020	850.0	930.0	1080.0	940.0	3800.0																													
EARNINGS PER SHARE																																		
Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year																													
2016	46.77	57.83	57.83	57.83	2.62																													
2017	52.73	1.12	0.1	2.38	1.35																													
2018	59.91	1.03	62.31	315	2.18																													
2019	62.94	1.28	76.36	3.90	2.62																													
2020	65.10	1.45	80.30	3.60	3.00																													
QUARTERLY DIVIDENDS Paid																																		
Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year																													
2015	.31	.34	.34	.34	1.33																													
2016	.34	.375	.375	.375	1.47																													
2017	.375	.415	.415	.415	1.62																													
2018	.415	.455	.455	.455	1.78																													
2019	.455	.50	.50																															

(A) Diluted earnings. Excludes nonrecurring losses: \$8.46; '09, \$2.63; '11, \$0.07. Disc. op'ts: '06, \$0.04; '11, \$0.03; '12, \$0.10; '13, \$0.01. GAAP used as of 2014. Next earnings report due late October. Quarterly earnings do not sum in '16 due to rounding.

(B) Dividends paid in March, June, September, and December. * Div. reinvestment available.

(C) In millions. (D) Includes intangibles. On 6/30/19: \$1,653 billion. (E) 9.5/share.

(E) Pro forma numbers for '06 & '07.

Company's Financial Strength
Stock's Price Stability
Price Growth Persistence
Earnings Reliability

B+
100
85
85

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ARTESIAN RES. CORP. NDQ-ARTNA

RECENT PRICE36.31

TRAILING P/E RATIO23.6

RELATIVE P/E RATIO1.41

DIV'D YLD2.7%

VALUE LINE

RANKS

19.9915.1624.4318.2024.2721.5223.8219.8529.1620.0035.0025.1743.2229.3741.9232.0040.9733.14

PERFORMANCE3Average

Technical3Average

SAFETY3Average

BETA .65(1.00 = Market)

Financial StrengthB

Price Stability65

Price Growth Persistence50

Earnings Predictability85

LEGENDS

12 Mos Mov Avg

Rel Price Strength

Shaded area indicates recession

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2011201220132014201520162017201820192020/2021

SALES PER SH7.568.107.828.138.508.678.928.69--

"CASH FLOW" PER SH1.642.041.872.042.222.432.552.66--

EARNINGS PER SH.831.13.941.071.261.411.511.54NA

DIV'DS DECL'D PER SH.76.79.82.85.87.90.93.96--

CAP'L SPENDING PER SH1.832.362.402.662.283.104.465.30--

BOOK VALUE PER SH13.1213.5713.8014.0914.6115.2315.9116.57--

COMMON SHS OUTST'G (MILL)8.618.718.838.919.069.139.229.25--

AVG ANNUAL P/E RATIO22.518.323.920.518.020.924.223.9NA

RELATIVE P/E RATIO1.411.171.341.08.931.141.211.35--

AVG ANNUAL DIV'D YIELD4.1%3.8%3.7%3.9%3.8%3.1%2.5%2.6%--

SALES (\$MILL)65.170.669.172.577.079.182.280.4--

OPERATING MARGIN45.5%48.7%47.0%48.8%43.0%44.4%44.6%46.1%--

DEPRECIATION (\$MILL)7.47.98.38.78.89.29.610.3--

NET PROFIT (\$MILL)6.79.88.39.511.313.014.014.3--

INCOME TAX RATE40.8%40.2%40.2%40.1%-- -- -- --

NET PROFIT MARGIN10.4%14.0%12.0%13.1%14.7%16.4%17.0%17.8%--

WORKING CAP'L (\$MILL)d11.4d11.4d12.3d13.5d8.8d4.7d9.5d21.6--

LONG-TERM DEBT (\$MILL)106.5106.3105.5105.0103.6102.3105.6115.9--

SHR. EQUITY (\$MILL)113.0118.2121.8125.6132.3139.0146.6153.3--

RETURN ON TOTAL CAP'L4.6%5.9%5.1%5.5%6.3%6.7%6.8%6.5%--

RETURN ON SHR. EQUITY6.0%8.3%6.8%7.6%8.5%9.3%9.5%9.3%--

RETAINED TO COM EQ.5%2.5%.9%1.6%2.6%3.4%3.7%3.6%--

ALL DIV'DS TO NET PROF92%70%87%79%69%63%61%62%--

Note: No analyst estimates available.

ANNUAL RATES

of change (per share)5 Yrs.1 Yr.

Sales2.5%-2.5%

"Cash Flow"6.5%4.0%

Earnings9.0%2.0%

Dividends3.0%3.0%

Book Value3.5%4.0%

ASSETS (\$mill.)201720186/30/19

Cash Assets1.03.2

Receivables8.98.4

Inventory1.51.3

Other7.66.1

Current Assets19.016.110.7

Property, Plant & Equip., at cost582.0629.4--

Accum Depreciation117.6126.9--

Net Property464.4502.5516.0

Other11.211.211.8

Total Assets494.6529.8538.5

LIABILITIES (\$mill.)

Accts Payable9.28.35.2

Debt Due11.017.727.5

Other8.311.711.0

Current Liab28.537.743.7

LONG-TERM DEBT AND EQUITY as of 6/30/19

Total Debt \$142.5 mill. Due in 5 Yrs. NA

LT Debt \$115.0 mill.

Including Cap. Leases NA(43% of Cap'l)

Leases, Uncapitalized Annual rentals NA

Pension Liability None in '18 vs. None in '17

Pfd Stock NonePfd Div'd Paid None

Common Stock 9,279,000 shares(57% of Cap'l)

INDUSTRY: Water Utility

BUSINESS: Artesian Resources Corp. operates as the holding company of nine wholly-owned subsidiaries offering water, wastewater and other services in Delaware, Maryland and Pennsylvania. Artesian Water, its principal subsidiary, distributes and sells water to residential, commercial, industrial, governmental, municipal, and utility customers throughout Delaware. In addition, Artesian Water provides services to other water utilities, including operations and billing functions, and has contract operation agreements with private and municipal water providers. It also provides water for public and private fire protection to customers in service territories. Artesian supplies 7.9 billion gallons of water per year through 1,311 miles of main to nearly a third of Delaware residents. Artesian Wastewater Management, Inc. is a regulated entity that owns wastewater collection and treatment infrastructure and provides wastewater services to customers in Delaware. Has 241 employees. Chairman, C.E.O. & President: Dian C. Taylor Address: 664 Churchmans Rd., Newark, DE 19702. Tel.: (302) 453-6900. Internet: www.artesianresources.com.

October 11, 2019

TOTAL SHAREHOLDER RETURN

Dividends plus appreciation as of 9/30/2019

3 Mos.6 Mos.1 Yr.3 Yrs.5 Yrs.

0.22%0.63%3.33%40.53%113.93%

INSTITUTIONAL DECISIONS

4Q'181Q'192Q'19

to Buy383938

to Sell273235

Hld's(000)384638963949

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Dec 13 2019

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YORK WATER NDQ:YORW										RECENT PRICE	42.83	P/E RATIO	38.2	Trailing: 39.7 Median: 25.0	RELATIVE P/E RATIO	2.30	DIV'D YLD	1.6%	VALUE LINE																												
TIMELINESS	1	Raised 10/11/19	High: 16.5 Low: 6.2	18.0 9.7	18.0 12.8	18.1 15.8	18.5 16.8	22.0 17.6	24.3 18.8	26.7 19.7	39.8 23.8	39.9 31.7	36.1 27.5	45.7 30.3	Target Price Range 2022 2023 2024																																
SAFETY	3	Lowered 7/17/15	LEGENDS 1.10 x Dividends p sh divided by Interest Rate Relative Price Strength 3-for-2 split 9/06 Options: Yes Shaded area indicates recession																																												
TECHNICAL	3	Lowered 8/30/19																																													
BETA	.75	(1.00 = Market)																																													
18-Month Target Price Range																																															
Low-High Midpoint (% to Mid)																																															
\$32-\$49 \$41 (-5%)																																															
2022-24 PROJECTIONS																																															
High	45	Price	Ann'l Total																																												
Low	30	Gain	Return																																												
		(+5%)	3%																																												
		(-30%)	-6%																																												
Institutional Decisions																																															
to Buy 402818 102819 202819																																															
to Sell 41 40 31																																															
Held(000) 4765 4794 4866																																															
Percent shares traded 12 8 4																																															
© VALUE LINE PUB. LLC 22-24																																															
2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020																														
2.17	2.18	2.58	2.56	2.79	2.89	2.95	3.07	3.18	3.21	3.27	3.58	3.68	3.70	3.77	3.74	3.90	4.00	Revenues per sh	5.10																												
.65	.65	.79	.77	.86	.88	.95	1.07	1.09	1.12	1.19	1.36	1.45	1.42	1.53	1.58	1.70	1.80	"Cash Flow" per sh	2.50																												
.47	.49	.56	.58	.57	.57	.64	.71	.71	.72	.75	.89	.97	.92	1.01	1.04	1.10	1.20	Earnings per sh A	1.70																												
.37	.39	.42	.45	.48	.49	.51	.52	.53	.54	.55	.57	.60	.63	.65	.67	.70	.73	Div'd Decl'd per sh B	.95																												
1.07	2.50	1.69	1.85	1.69	2.17	1.18	.83	.74	.94	.76	1.10	1.11	1.03	1.95	1.95	2.00	2.00	Cap'l Spending per sh	1.85																												
4.06	4.65	4.85	5.84	5.97	6.14	6.92	7.19	7.45	7.73	7.98	8.15	8.51	8.88	9.28	9.75	10.40	11.25	Book Value per sh	12.10																												
9.63	10.33	10.40	11.20	11.27	11.37	12.56	12.69	12.79	12.92	12.98	12.83	12.81	12.85	12.87	12.94	13.00	12.90	Common Shs Outst'g C	12.80																												
24.5	25.7	26.3	31.2	30.3	24.6	21.9	20.7	23.9	24.4	26.3	23.1	23.5	32.8	34.6	30.3	30.3	30.3	Avg Ann'l P/E Ratio	22.5																												
1.40	1.36	1.40	1.68	1.61	1.48	1.46	1.32	1.50	1.55	1.48	1.22	1.18	1.72	1.74	1.63	1.63	1.63	Relative P/E Ratio	1.25																												
3.2%	3.1%	2.9%	2.5%	2.8%	3.5%	3.6%	3.5%	3.1%	3.1%	2.8%	2.8%	2.6%	2.1%	1.9%	2.1%	1.9%	2.1%	Avg Ann'l Div'd Yield	2.5%																												
CAPITAL STRUCTURE as of 6/30/19										37.0	39.0	40.6	41.4	42.4	45.9	47.1	47.6	48.6	48.4																												
Total Debt \$96.1 mill.										7.5	8.9	9.1	9.3	9.7	11.5	12.5	11.8	13.0	13.4																												
LT Debt \$96.1 mill.										37.9%	38.5%	35.3%	37.6%	37.6%	29.8%	27.5%	31.3%	25.9%	15.7%																												
(43% of Cap'l)										--	1.2%	1.1%	1.1%	.8%	1.8%	1.6%	1.9%	6.7%	1.7%																												
Pension Assets 12/18 \$40.6 mill.										45.7%	48.3%	47.1%	46.0%	45.1%	44.8%	44.4%	42.6%	43.0%	42.5%																												
Oblig. \$41.5 mill.										54.3%	51.7%	52.9%	54.0%	54.9%	55.2%	55.6%	57.4%	57.0%	57.5%																												
Pfd Stock None										160.1	176.4	180.2	184.8	188.4	189.4	196.3	198.7	209.5	219.5																												
Common Stock 12,974,287 shs.										222.0	228.4	233.0	240.3	244.2	253.2	261.4	270.9	288.8	299.2																												
MARKET CAP: \$550 million (Small Cap)										6.2%	6.5%	6.4%	6.4%	6.5%	7.4%	7.6%	7.2%	7.5%	7.3%																												
CURRENT POSITION 2017 2018 6/30/19										8.6%	9.8%	9.5%	9.3%	9.3%	11.0%	11.5%	10.4%	10.9%	10.6%																												
(SMILL)										1.9%	2.7%	2.5%	2.4%	2.4%	3.9%	4.4%	3.4%	4.0%	3.8%																												
Cash Assets										78%	72%	73%	74%	74%	64%	62%	67%	63%	64%																												
Accounts Receivable										BUSINESS: The York Water Company is the oldest investor-owned regulated water utility in the United States. It has operated continuously since 1816. As of December 31, 2018, the company's average daily availability was 35.4 million gallons and its service territory had an estimated population of 199,000. Has more than 69,000 customers. Residential customers accounted for 65% of 2018 revenues; commercial and industrial (28%); other (7%). It also provides sewer billing services. Incorporated: PA. York had 109 full-time employees at 12/31/18. President/CEO: Jeffrey R. Hines. Officers/directors own 1.2% of the common stock (3/19 proxy). Address: 130 East Market Street, York, Pennsylvania 17401. Telephone: (717) 845-3601. Internet: www.yorkwater.com.																																					
Inventory (Avg. Cost)										York Water Company's stock price has risen sharply since the start of September. Shares of the regulated water utility broke through a \$35-\$36 resistance level and are now trading above \$42 a share (around fresh all-time highs). In our opinion, there aren't any obvious catalysts behind the recent move, as second-quarter financial results came in basically in line with expectations. That said, with broader market indices making a return to all-time-high territory, it is likely that the investment community may be starting to accumulate stock of relatively recession-proof companies.																																					
Other										June-period earnings of 0.28 a share hit our mark, while revenues of 13.0 million modestly beat our 12.5 million call. Indeed, the top line is benefiting from a rate hike that took effect on March 1st of this year, as well as an increasing customer base. Meanwhile, the bottom line advanced merely two pennies, year over year, as higher operating costs and income taxes remain in the picture.																																					
Current Assets										York's capital spending program is in full swing. Over the past three months, the company invested \$4.7 million on specific dam improvements and various infrastructure upgrades. This was in addition to a \$3.3 million bill in the first quarter. According to top brass, another \$9.5 million in investment is on tap for the back half of 2019. Target upgrades include main extensions, dam and spillway overhauls, wastewater treatment plant expansion, and routine pipe and service line repairs. Looking forward, we expect spending for these necessary improvements to spill over well into next decade, given the vast amount of infrastructure that needs to be replaced.																																					
Accts Payable										York stock has been upgraded two notches on our Timeliness Ranking Scale, to 1, and is now slated as a year-ahead market outperformer. Thus, subscribers with a six- to 12-month holding period are best suited here. On the other hand, the recent quotation leaves much to be desired. Based on our system, the issue offers subpar price appreciation potential over both the intermediate (18 months) and long term (3 to 5 years) investment horizons. The dividend yield is nothing to write home about, either.																																					
Debt Due										Nicholas P. Patrikis October 11, 2019																																					
Other																																															
Current Liab.																																															
ANNUAL RATES																																															
of change (per sh)																																															
Revenues																																															
"Cash Flow"																																															
Earnings																																															
Dividends																																															
Book Value																																															
QUARTERLY REVENUES (\$mill.)																																															
Cal- Mar.31 Jun.30 Sep.30 Dec.31																																															
2016																																															
2017																																															
2018																																															

Carolina Water Service, Inc. of North Carolina
Summary of Risk Premium Models for the
Proxy Group of Six Water Companies

	<u>Proxy Group of Six Water Companies</u>
Predictive Risk Premium Model (PRPM) (1)	10.73 %
Risk Premium Using an Adjusted Total Market Approach (2)	<u>9.27 %</u>
Average	<u><u>10.00 %</u></u>

Notes:

- (1) From page 11 of this Schedule.
- (2) From page 12 of this Schedule.

Carolina Water Service, Inc. of North Carolina
Indicated ROE
Derived by the Predictive Risk Premium Model (1)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Six Water Companies	LT Average Predicted Variance	Spot Predicted Variance	Recommended Variance (2)	GARCH Coefficient	Predicted Risk Premium (3)	Risk-Free Rate (4)	Indicated ROE (5)
American States Water Co.	0.38%	0.44%	0.41%	1.98126	10.16%	2.53%	12.69%
American Water Works Company Inc	NMF	NMF	NMF	6.51236	NMF	2.53%	NMF
Artesian Resources Corporation	0.32%	0.27%	0.29%	2.11410	7.74%	2.53%	10.27%
California Water Service Group	0.32%	0.27%	0.29%	2.02252	7.39%	2.53%	9.92%
Middlesex Water Co.	0.30%	0.24%	0.27%	2.18875	7.39%	2.53%	9.92%
York Water Co.	0.45%	0.31%	0.38%	2.20343	10.61%	2.53%	13.14%
						Average	11.19%
						Median	10.27%
						Average of Mean and Median	10.73%

NMF = Not Meaningful Figure

Notes:

(1) The Predictive Risk Premium Model uses historical data to generate a predicted variance and a GARCH coefficient. The historical data used are the equity risk premiums for the first available trading month as reported by Bloomberg Professional Service.

(2) Average of columns [1] and [2].

(3) $(1 + (\text{Column [3]} * \text{Column [4]})^{1/2}) - 1$.

(4) Six-month average yield on 30-year Treasury bonds.

(5) Column [5] + Column [6].

Carolina Water Service, Inc. of North Carolina
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Six Water Companies</u>
1.	Yield on A Rated Public Utility Bonds (1)	3.71 %
2.	Adjustment to Reflect Bond Rating Difference of Proxy Group	<u>0.07 (2)</u>
3.	Adjusted Bond Yield	3.78 %
4.	Equity Risk Premium (3)	<u>5.49</u>
5.	Risk Premium Derived Common Equity Cost Rate	<u><u>9.27 %</u></u>

- Notes: (1) Six-month average A rated public utility bond yield ended September 2019.
- (2) Adjustment to reflect the A2 / A3 Moody's LT issuer rating of the proxy group of six water companies as shown on page 14 of this Schedule. The 0.07% upward adjustment is derived by taking 1/6 of the spread between A2 and A3 Public Utility Bonds ($1/6 * 0.42\% = 0.07\%$) as derived from page 13 of this Schedule.
- (3) From page 15 of this Schedule.

Carolina Water Service, Inc. of North Carolina
Interest Rates and Bond Spreads for
Moody's Corporate and Public Utility Bonds

Selected Bond Yields

	[1]	[2]	[3]
	<u>Aaa Rated Corporate Bond</u>	<u>A Rated Public Utility Bond</u>	<u>Baa Rated Public Utility Bond</u>
Sep-2019	3.03 %	3.37 %	3.71 %
Aug-2019	2.98	3.29	3.63
Jul-2019	3.29	3.69	4.13
Jun-2019	3.42	3.82	4.31
May-2019	3.67	3.98	4.47
Apr-2019	<u>3.69</u>	<u>4.08</u>	<u>4.55</u>
Average	<u>3.35 %</u>	<u>3.71 %</u>	<u>4.13 %</u>

Selected Bond Spreads

A Rated Public Utility Bonds Over Aaa Rated Corporate Bonds:

0.36 % (1)

Baa Rated Public Utility Bonds Over A Rated Public Utility Bonds:

0.42 % (2)

Notes:

(1) Column [2] - Column [1].

(2) Column [3] - Column [2].

Source of Information:

Bloomberg Professional Service

Carolina Water Service, Inc. of North Carolina
Comparison of Long-Term Issuer Ratings for
Proxy Group of Six Water Companies

	Moody's		Standard & Poor's	
	Long-Term Issuer Rating		Long-Term Issuer Rating	
	October 2019		October 2019	
<u>Proxy Group of Six Water Companies</u>	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>	<u>Long-Term Issuer Rating</u>	<u>Numerical Weighting(1)</u>
American States Water Co. (2)	A2	6.0	A+	5.0
American Water Works Company Inc (3)	A3	7.0	A	6.0
Artesian Resources Corporation	NR	--	NR	--
California Water Service Group (4)	NR	--	A+	5.0
Middlesex Water Co.	NR	--	A	6.0
York Water Co.	NR	--	A-	7.0
Average	<u>A2/A3</u>	<u>6.5</u>	<u>A</u>	<u>5.8</u>

Notes:

- (1) From page 6 of Schedule DWD-4 (direct testimony).
- (2) Ratings that of Golden State Water Company.
- (3) Ratings that of New Jersey and Pennsylvania American Water Companies.
- (4) Ratings that of Aqua Pennsylvania, Inc.
- (5) Ratings that of California Water Service Company.

Source Information: Moody's Investors Service
Standard & Poor's Global Utilities Rating Service

Carolina Water Service, Inc. of North Carolina
Judgment of Equity Risk Premium for
Proxy Group of Six Water Companies

<u>Line No.</u>		<u>Proxy Group of Six Water Companies</u>
1.	Calculated equity risk premium based on the total market using the beta approach (1)	5.74 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A rated bonds (2)	<u>5.24</u>
3.	Average equity risk premium	<u><u>5.49 %</u></u>

Notes: (1) From page 16 of this Schedule.
(2) From page 20 of this Schedule.

Carolina Water Service, Inc. of North Carolina
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for the
Proxy Group of Six Water Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Six Water Companies</u>
<u>Ibbotson-Based Equity Risk Premiums:</u>		
1.	Ibbotson Equity Risk Premium (1)	5.54 %
2.	Regression on Ibbotson Risk Premium Data (2)	8.92
3.	Ibbotson Equity Risk Premium based on PRPM (3)	8.12
4.	Equity Risk Premium Based on Value Line Summary and Index (4)	10.41
5.	Equity Risk Premium Based on Value Line S&P 500 Companies (5)	11.10
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	<u>9.74</u>
7.	Conclusion of Equity Risk Premium	8.97 %
8.	Adjusted Beta (7)	<u>0.64</u>
9.	Forecasted Equity Risk Premium	<u><u>5.74</u></u> %

Notes provided on page 17 of this Schedule.

Carolina Water Service, Inc. of North Carolina
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for the
Proxy Group of Six Water Companies

Notes:

- (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2018 Market Report minus the arithmetic mean monthly yield of Moody's average Aaa and Aa corporate bonds from 1926-2018.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of large company common stocks relative to Moody's average Aaa and Aa rated corporate bond yields from 1928-2018 referenced in Note 1 above.
- (3) The Predictive Risk Premium Model (PRPM) is discussed in the accompanying direct testimony. The Ibbotson equity risk premium based on the PRPM is derived by applying the PRPM to the monthly risk premiums between Ibbotson large company common stock monthly returns and average Aaa and Aa corporate monthly bond yields, from January 1928 through September 2019.
- (4) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the six-month average of Aaa and Aa corporate bonds of 3.42% from the projected 3-5 year total annual market return of 13.83% (described fully in note 1 on page 22 of this Schedule).
- (5) Using data from Value Line for the S&P 500, an expected total return of 14.52% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the six-month average Aaa and Aa corporate bonds of 3.42% results in an expected equity risk premium of 11.10%.
- (6) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 13.16% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the six-month average of Aaa and Aa corporate bonds of 3.42% results in an expected equity risk premium of 9.74%.
- (7) Average of mean and median beta from page 21 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2019 SBBI Yearbook, John Wiley & Sons, Inc.
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Bloomberg Professional Service

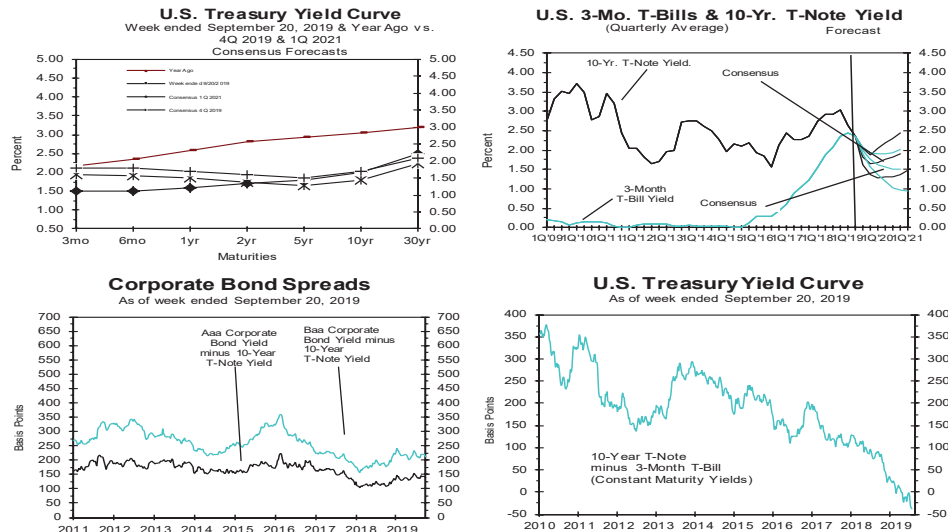
2 ■ BLUE CHIP FINANCIAL FORECASTS ■ OCTOBER 1, 2019

Consensus Forecasts of U.S. Interest Rates and Key Assumptions

Interest Rates	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month				4Q	1Q	2Q	3Q	4Q	1Q
	Sep 20	Sep 13	Sep 6	Aug 30	Aug	Jul	Jun	3Q 2019*	2019	2020	2020	2020	2020	2021
Federal Funds Rate	2.19	2.13	2.13	2.12	2.13	2.40	2.38	2.25	1.8	1.6	1.5	1.5	1.5	1.4
Prime Rate	5.25	5.25	5.25	5.25	5.25	5.50	5.50	5.35	4.9	4.8	4.7	4.7	4.6	4.6
LIBOR, 3-mo.	2.15	2.13	2.12	2.13	2.16	2.29	2.40	2.21	2.0	1.9	1.8	1.8	1.8	1.8
Commercial Paper, 1-mo.	2.07	2.04	2.03	2.06	2.08	2.25	2.35	2.14	1.9	1.7	1.6	1.6	1.6	1.5
Treasury bill, 3-mo.	1.95	1.96	1.97	1.99	1.99	2.15	2.22	2.04	1.8	1.6	1.6	1.5	1.5	1.5
Treasury bill, 6-mo.	1.92	1.89	1.88	1.90	1.93	2.08	2.17	1.98	1.8	1.7	1.6	1.5	1.6	1.5
Treasury bill, 1 yr.	1.86	1.81	1.72	1.75	1.77	1.96	2.00	1.85	1.7	1.6	1.6	1.6	1.6	1.6
Treasury note, 2 yr.	1.73	1.69	1.50	1.52	1.57	1.84	1.81	1.69	1.6	1.6	1.6	1.6	1.6	1.7
Treasury note, 5 yr.	1.66	1.61	1.38	1.40	1.49	1.83	1.83	1.63	1.5	1.6	1.6	1.7	1.7	1.8
Treasury note, 10 yr.	1.80	1.76	1.52	1.50	1.63	2.06	2.07	1.81	1.7	1.7	1.8	1.8	1.9	2.0
Treasury note, 30 yr.	2.24	2.22	2.00	1.98	2.12	2.57	2.57	2.30	2.1	2.2	2.2	2.3	2.4	2.5
Corporate Aaa bond	3.18	3.18	2.96	2.93	3.06	3.43	3.56	3.21	3.0	3.0	3.2	3.3	3.4	3.5
Corporate Baa bond	3.92	3.92	3.72	3.70	3.82	4.16	4.33	3.96	4.0	4.1	4.2	4.3	4.4	4.4
State & Local bonds	3.21	3.14	3.06	3.05	3.08	3.24	3.29	3.15	2.9	2.9	3.0	3.1	3.1	3.2
Home mortgage rate	3.73	3.56	3.49	3.58	3.62	3.77	3.80	3.66	3.6	3.6	3.7	3.7	3.8	3.8

Key Assumptions	History								Consensus Forecasts-Quarterly					
	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
	2017	2018	2018	2018	2018	2019	2019	2019**	2019	2020	2020	2020	2020	2021
Fed's AFE \$ Index	106.2	102.9	105.5	107.8	109.4	109.4	110.2	110.4	110.3	110.0	109.2	108.9	108.6	108.9
Real GDP	3.5	2.5	3.5	2.9	1.1	3.1	2.0	2.0	1.8	1.7	1.7	1.6	1.8	1.9
GDP Price Index	2.6	2.3	3.2	2.0	1.6	1.1	2.4	2.1	2.0	2.0	2.0	2.1	2.0	2.0
Consumer Price Index	3.1	3.2	2.1	2.0	1.5	0.9	2.9	2.0	2.0	2.1	2.0	2.0	2.0	2.0

Forecasts for interest rates and the Federal Reserve's Major Currency Index represent averages for the quarter. Forecasts for Real GDP, GDP Price Index and Consumer Price Index are seasonally-adjusted annual rates of change (saar). Individual panel members' forecasts are on pages 4 through 9. Historical data: Treasury rates from the Federal Reserve Board's H.15; AAA-AA and A-BBB corporate bond yields from Bank of America-Merrill Lynch and are 15+ years, yield to maturity; State and local bond yields from Bank of America-Merrill Lynch, A-rated, yield to maturity; Mortgage rates from Freddie Mac, 30-year, fixed; LIBOR quotes from Intercontinental Exchange. All interest rate data are sourced from Haver Analytics. Historical data for Fed's Major Currency Index are from FRSR H.10. Historical data for Real GDP and GDP Chained Price Index are from the Bureau of Economic Analysis (BEA). Consumer Price Index (CPI) history is from the Department of Labor's Bureau of Labor Statistics (BLS). *Interest rate data for 3Q 2019 are based on historical data through the week ended September 20. **Data for 3Q 2019 for the Fed's AFE \$ Index based on data through week ended September 20. Figures for 3Q 2019 Real GDP, GDP Chained Price Index and Consumer Price Index are consensus forecasts based on a special question asked of the panelists this month.



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14 ■ BLUE CHIP FINANCIAL FORECASTS ■ JUNE 1, 2019

Long-Range Survey:

The table below contains the results of our twice-annual long-range CONSENSUS survey. There are also Top 10 and Bottom 10 averages for each variable. Shown are consensus estimates for the years 2021 through 2025 and averages for the five-year periods 2021-2025 and 2026-2030. Apply these projections cautiously. Few if any economic, demographic and political forces can be evaluated accurately over such long time spans.

		Average For The Year					Five-Year Averages	
		2021	2022	2023	2024	2025	2021-2025	2026-2030
1. Federal Funds Rate	CONSENSUS	2.4	2.4	2.6	2.7	2.8	2.6	2.8
	Top 10 Average	3.1	3.2	3.4	3.4	3.4	3.3	3.4
	Bottom 10 Average	1.5	1.6	1.7	2.1	2.2	1.8	2.1
2. Prime Rate	CONSENSUS	5.4	5.5	5.6	5.8	5.8	5.6	5.7
	Top 10 Average	6.1	6.2	6.4	6.4	6.4	6.3	6.2
	Bottom 10 Average	4.6	4.7	4.8	5.1	5.3	4.9	5.1
3. LIBOR, 3-Mo.	CONSENSUS	2.7	2.8	2.8	3.0	3.0	2.9	3.0
	Top 10 Average	3.3	3.4	3.6	3.6	3.6	3.5	3.6
	Bottom 10 Average	2.1	2.1	2.0	2.4	2.5	2.2	2.5
4. Commercial Paper, 1-Mo.	CONSENSUS	2.5	2.6	2.7	2.9	2.9	2.7	2.9
	Top 10 Average	3.1	3.2	3.4	3.4	3.5	3.3	3.4
	Bottom 10 Average	2.0	2.0	2.0	2.4	2.4	2.2	2.4
5. Treasury Bill Yield, 3-Mo.	CONSENSUS	2.4	2.4	2.5	2.7	2.8	2.6	2.8
	Top 10 Average	3.1	3.2	3.4	3.4	3.4	3.3	3.4
	Bottom 10 Average	1.5	1.6	1.7	2.0	2.2	1.8	2.1
6. Treasury Bill Yield, 6-Mo.	CONSENSUS	2.4	2.5	2.7	2.9	2.9	2.7	2.9
	Top 10 Average	3.1	3.3	3.5	3.5	3.5	3.4	3.5
	Bottom 10 Average	1.7	1.7	1.8	2.2	2.4	2.0	2.3
7. Treasury Bill Yield, 1-Yr.	CONSENSUS	2.5	2.6	2.8	3.0	3.0	2.8	3.0
	Top 10 Average	3.3	3.4	3.6	3.6	3.7	3.5	3.7
	Bottom 10 Average	1.8	1.8	2.0	2.3	2.4	2.0	2.3
8. Treasury Note Yield, 2-Yr.	CONSENSUS	2.6	2.7	2.9	3.0	3.1	2.9	3.1
	Top 10 Average	3.3	3.5	3.7	3.8	3.8	3.6	3.8
	Bottom 10 Average	1.8	1.9	2.0	2.3	2.4	2.1	2.3
10. Treasury Note Yield, 5-Yr.	CONSENSUS	2.8	2.9	3.1	3.2	3.3	3.0	3.3
	Top 10 Average	3.5	3.7	4.0	4.0	4.0	3.8	4.1
	Bottom 10 Average	2.0	2.1	2.2	2.3	2.5	2.2	2.4
11. Treasury Note Yield, 10-Yr.	CONSENSUS	3.0	3.1	3.3	3.3	3.4	3.2	3.4
	Top 10 Average	3.6	3.9	4.2	4.2	4.2	4.0	4.4
	Bottom 10 Average	2.3	2.4	2.4	2.5	2.6	2.4	2.6
12. Treasury Bond Yield, 30-Yr.	CONSENSUS	3.3	3.5	3.6	3.7	3.8	3.6	3.8
	Top 10 Average	4.0	4.3	4.5	4.6	4.6	4.4	4.8
	Bottom 10 Average	2.7	2.7	2.8	2.9	2.9	2.8	2.9
13. Corporate Aaa Bond Yield	CONSENSUS	4.4	4.6	4.7	4.7	4.8	4.6	4.8
	Top 10 Average	5.0	5.2	5.5	5.5	5.5	5.3	5.6
	Bottom 10 Average	3.8	3.9	3.9	4.0	4.0	3.9	4.0
13. Corporate Baa Bond Yield	CONSENSUS	5.3	5.6	5.7	5.7	5.7	5.6	5.8
	Top 10 Average	6.0	6.3	6.6	6.6	6.7	6.5	6.8
	Bottom 10 Average	4.7	4.8	4.7	4.8	4.8	4.7	4.8
14. State & Local Bonds Yield	CONSENSUS	4.1	4.2	4.3	4.3	4.3	4.2	4.4
	Top 10 Average	4.6	4.9	5.0	5.0	5.0	4.9	5.1
	Bottom 10 Average	3.5	3.6	3.6	3.6	3.6	3.6	3.6
15. Home Mortgage Rate	CONSENSUS	4.7	4.8	4.9	5.0	5.0	4.9	5.0
	Top 10 Average	5.3	5.5	5.8	5.8	5.8	5.6	5.9
	Bottom 10 Average	4.0	4.0	4.0	4.2	4.2	4.1	4.2
A. Fed's AFE Nominal \$ Index	CONSENSUS	108.5	108.2	108.0	107.6	106.9	107.8	106.7
	Top 10 Average	110.8	110.5	110.9	110.8	110.6	110.7	111.2
	Bottom 10 Average	106.6	105.8	104.9	104.6	103.6	105.1	102.9
		Year-Over-Year, % Change					Five-Year Averages	
		2021	2022	2023	2024	2025	2021-2025	2026-2030
B. Real GDP	CONSENSUS	1.9	1.9	2.0	2.1	2.1	2.0	2.1
	Top 10 Average	2.3	2.4	2.4	2.5	2.5	2.4	2.6
	Bottom 10 Average	1.5	1.4	1.6	1.8	1.8	1.6	1.8
C. GDP Chained Price Index	CONSENSUS	2.1	2.1	2.0	2.0	2.0	2.1	2.0
	Top 10 Average	2.4	2.4	2.2	2.2	2.2	2.3	2.2
	Bottom 10 Average	1.8	1.8	1.8	1.9	1.9	1.9	1.8
D. Consumer Price Index	CONSENSUS	2.1	2.2	2.2	2.1	2.1	2.1	2.1
	Top 10 Average	2.5	2.4	2.4	2.4	2.4	2.4	2.4
	Bottom 10 Average	1.7	1.8	1.9	1.9	1.9	1.8	1.8

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Carolina Water Service, Inc. of North Carolina
Derivation of Mean Equity Risk Premium Based Studies
Using Holding Period Returns and
Projected Market Appreciation of the S&P Utility Index

<u>Line No.</u>		<u>Implied Equity Risk Premium</u>
	<u>Equity Risk Premium based on S&P Utility Index Holding Period Returns (1):</u>	
1.	Historical Equity Risk Premium	4.00 %
2.	Regression of Historical Equity Risk Premium (2)	6.49
3.	Forecasted Equity Risk Premium Based on PRPM (3)	3.92
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data) (4)	6.54
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data) (5)	<u>5.23</u>
6.	Average Equity Risk Premium (6)	<u><u>5.24 %</u></u>

- Notes: (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1928-2018. Holding period returns are calculated based upon income received (dividends and interest) plus the relative change in the market value of a security over a one-year holding period.
- (2) This equity risk premium is based on a regression of the monthly equity risk premiums of the S&P Utility Index relative to Moody's A rated public utility bond yields from 1928 - 2018 referenced in note 1 above.
- (3) The Predictive Risk Premium Model (PRPM) is applied to the risk premium of the monthly total returns of the S&P Utility Index and the monthly yields on Moody's A rated public utility bonds from January 1928 - September 2019.
- (4) Using data from Value Line for the S&P Utilities Index, an expected return of 10.25% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the six-month average A rated public utility bond yield of 3.71%, shown on line 1 of page 12 of this Schedule results in an equity risk premium of 6.54%. (10.25% - 3.71% = 6.54%)
- (5) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 8.94% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the six-month average A rated public utility bond yield of 3.71%, shown on line 1 of page 12 of this Schedule results in an equity risk premium of 5.23%. (8.94% - 3.71% = 5.23%)
- (6) Average of lines 1 through 5.

Carolina Water Service, Inc. of North Carolina
Indicated Common Equity Cost Rate Through Use
of the Traditional Capital Asset Pricing Model (CAPM) and Empirical Capital Asset Pricing Model (ECAPM)

Proxy Group of Six Water Companies	[1] Value Line Adjusted Beta	[2] Bloomberg Adjusted Beta	[3] Average Beta	[4] Market Risk Premium (1)	[5] Risk-Free Rate (2)	[6] Traditional CAPM Cost Rate	[7] ECAPM Cost Rate	[8] Indicated Common Equity Cost Rate (3)
American States Water Co.	0.65	0.53	0.59	9.94 %	2.53 %	8.40 %	9.41 %	8.90 %
American Water Works Company Inc	0.60	0.57	0.59	9.94	2.53	8.40	9.41	8.90
Artesian Resources Corporation	0.65	0.55	0.60	9.94	2.53	8.49	9.49	8.99
California Water Service Group	0.70	0.61	0.66	9.94	2.53	9.09	9.94	9.51
Middlesex Water Co.	0.70	0.70	0.70	9.94	2.53	9.49	10.23	9.86
York Water Co.	0.75	0.62	0.69	9.94	2.53	9.39	10.16	9.77
Mean			<u>0.64</u>			<u>8.88 %</u>	<u>9.77 %</u>	<u>9.32 %</u>
Median			<u>0.63</u>			<u>8.79 %</u>	<u>9.71 %</u>	<u>9.25 %</u>
Average of Mean and Median			<u>0.64</u>			<u>8.84</u>	<u>9.74</u>	<u>9.29 %</u>

Notes on page 22 of this Schedule.

Carolina Water Service, Inc. of North Carolina
Notes to Accompany the Application of the CAPM and ECAPM

Notes:

- (1) The market risk premium (MRP) is derived by using six different measures from three sources: Ibbotson, Value Line, and Bloomberg as illustrated below:

Historical Data MRP Estimates:

Measure 1: Ibbotson Arithmetic Mean MRP (1926-2018)

Arithmetic Mean Monthly Returns for Large Stocks 1926-2018:	11.89 %
Arithmetic Mean Income Returns on Long-Term Government Bonds:	5.12
MRP based on Ibbotson Historical Data:	<u>6.77 %</u>

Measure 2: Application of a Regression Analysis to Ibbotson Historical Data (1926-2018)

9.81 %

Measure 3: Application of the PRPM to Ibbotson Historical Data: (January 1926 - September 2019)

9.14 %

Value Line MRP Estimates:

Measure 4: Value Line Projected MRP (Thirteen weeks ending October 18, 2019)

Total projected return on the market 3-5 years hence*:	13.83 %
Risk-Free Rate (see note 2):	2.53
MRP based on Value Line Summary & Index:	<u>11.30 %</u>
*Forecasted 3-5 year capital appreciation plus expected dividend yield	

Measure 5: Value Line Projected Return on the Market based on the S&P 500

Total return on the Market based on the S&P 500:	14.52 %
Risk-Free Rate (see note 2):	2.53
MRP based on Value Line data	<u>11.99 %</u>

Measure 6: Bloomberg Projected MRP

Total return on the Market based on the S&P 500:	13.16 %
Risk-Free Rate (see note 2):	2.53
MRP based on Bloomberg data	<u>10.63 %</u>
Average of Value Line, Ibbotson, and Bloomberg MRP:	<u>9.94 %</u>

- (2) The six-month average yield on 30-year Treasury bonds ending September 2019 as shown below:

Apr-19	2.94 %
May-19	2.82
Jun-19	2.57
Jul-19	2.57
Aug-19	2.12
Sep-19	2.16
	<u>2.53 %</u>

- (3) Average of Column 6 and Column 7.

Sources of Information:

Value Line Summary and Index
Stocks, Bonds, Bills, and Inflation - 2019 SBBI Yearbook, John Wiley & Sons, Inc.
Bloomberg Professional Services

Carolina Water Service, Inc. of North Carolina
Basis of Selection of the Group of Non-Price Regulated Companies
Comparable in Total Risk to the Utility Proxy Group

The criteria for selection of the Non-Price Regulated Proxy Group was that the non-price regulated companies be domestic and reported in Value Line Investment Survey (Standard Edition).

The Non-Price Regulated Proxy Group was then selected based on the unadjusted beta range of 0.24 – 0.68 and residual standard error of the regression range of 2.7385 – 3.2661 of the Utility Proxy Group.

These ranges are based upon plus or minus two standard deviations of the unadjusted beta and standard error of the regression. Plus or minus two standard deviations captures 95.50% of the distribution of unadjusted betas and residual standard errors of the regression.

The standard deviation of the Utility Proxy Group's residual standard error of the regression is 0.1319. The standard deviation of the standard error of the regression is calculated as follows:

$$\text{Standard Deviation of the Std. Err. of the Regr.} = \frac{\text{Standard Error of the Regression}}{\sqrt{2N}}$$

where: N = number of observations. Since Value Line betas are derived from weekly price change observations over a period of five years, N = 259

$$\text{Thus, } 0.1070 = \frac{3.0023}{\sqrt{518}} = \frac{3.0023}{22.7596}$$

Source of Information: Value Line, Inc., September 2019
Value Line Investment Survey (Standard Edition)

Carolina Water Service, Inc. of North Carolina
Basis of Selection of Comparable Risk
Domestic Non-Price Regulated Companies

	[1]	[2]	[3]	[4]
	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
<u>Proxy Group of Six Water Companies</u>				
American States Water Co.	0.65	0.45	2.6675	0.0960
American Water Works Company Inc	0.60	0.34	2.1751	0.0783
Artesian Resources Corporation	0.65	0.41	3.4253	0.1233
California Water Service Group	0.70	0.48	2.9094	0.1047
Middlesex Water Co.	0.70	0.54	3.3409	0.1202
York Water Co.	0.75	0.55	3.4957	0.1258
Average	0.68	0.46	3.0023	0.1081
Beta Range (+/- 2 std. Devs. of Beta)	0.24	0.68		
2 std. Devs. of Beta	0.22			
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.7385	3.2661		
Std. dev. of the Res. Std. Err.	0.1319			
2 std. devs. of the Res. Std. Err.	0.2638			

Source of Information: Valueline Proprietary Database, September 2019

Carolina Water Service, Inc. of North Carolina
Proxy Group of Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

	[1]	[2]	[3]	[4]
Proxy Group of Ten Non-Price Regulated Companies	VL Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
AutoZone Inc.	0.80	0.64	2.8861	0.1039
Cheesecake Factory	0.75	0.55	2.8814	0.1037
Casey's Gen'l Stores	0.75	0.56	3.0241	0.1088
Cracker Barrel	0.70	0.54	3.0683	0.1104
Campbell Soup	0.65	0.46	2.9384	0.1057
Dunkin' Brands Group	0.70	0.47	2.8395	0.1022
Darden Restaurants	0.80	0.63	2.9091	0.1047
Tyson Foods 'A'	0.75	0.59	3.2539	0.1171
Texas Roadhouse	0.80	0.67	3.1481	0.1133
Viad Corp.	0.80	0.64	3.0017	0.1080
Average	0.75	0.58	3.0000	0.1100
Proxy Group of Six Water Companies	0.68	0.46	3.0023	0.1081

Source of Information:

Valueline Proprietary Database, September 2019

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Dec 13 2019

Carolina Water Service, Inc. of North Carolina
Summary of Cost of Equity Models Applied to
Proxy Group of Ten Non-Price Regulated Companies
Comparable in Total Risk to the
Proxy Group of Six Water Companies

<u>Principal Methods</u>	<u>Proxy Group of Ten Non-Price Regulated Companies</u>
Discounted Cash Flow Model (DCF) (1)	11.63 %
Risk Premium Model (RPM) (2)	11.23
Capital Asset Pricing Model (CAPM) (3)	<u>10.39</u>
Mean	<u>11.08 %</u>
Median	<u>11.23 %</u>
Average of Mean and Median	<u>11.16 %</u>

Notes:

- (1) From page 27 of this Schedule.
- (2) From page 28 of this Schedule.
- (3) From page 31 of this Schedule.

Carolina Water Service, Inc. of North Carolina
DCF Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

[1]	[2]	[4]	[5]	[6]	[7]	[8]	
Proxy Group of Ten Non-Price Regulated Companies	Average Dividend Yield	Value Line Projected Five Year Growth in EPS	Zack's Five Year Projected Growth Rate in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate (1)
	-	13.50 %	12.20 %	10.25 %	11.98 %	-	NA %
	3.60	7.50	11.80	6.98	8.76	3.76	12.52
	0.77	5.50	9.10	7.88	7.49	0.80	8.29
	3.16	10.00	10.00	(0.40)	10.00	3.32	13.32
	3.13	1.00	6.00	(4.00)	3.50	3.18	6.68
	1.87	10.00	9.80	7.58	9.13	1.96	11.09
	2.95	11.00	8.90	8.63	9.51	3.09	12.60
	0.75	7.50	NA	6.25	6.88	0.78	7.66
	2.30	12.50	11.30	8.55	10.78	2.42	13.20
Viad Corp.	0.60	9.50	NA	14.00	11.75	0.64	12.39
					Mean	10.86 %	
					Median	12.39 %	
					Average of Mean and Median	11.63 %	

NA= Not Available
NMF= Not Meaningful Figure

(1) The application of the DCF model to the domestic, non-price regulated comparable risk companies is identical to the application of the DCF to the utility proxy group. The dividend yield is derived by using the 60 day average price and the spot indicated dividend as of October 18, 2019. The dividend yield is then adjusted by 1/2 the average projected growth rate in EPS, which is calculated by averaging the 5 year projected growth in EPS provided by Value Line, www.zacks.com, and www.yahoo.com (excluding any negative growth rates) and then adding that growth rate to the adjusted dividend yield.

Source of Information:
Value Line Investment Survey
www.reuters.com Downloaded on 10/18/2019
www.zacks.com Downloaded on 10/18/2019
www.yahoo.com Downloaded on 10/18/2019

Carolina Water Service, Inc. of North Carolina
Indicated Common Equity Cost Rate
Through Use of a Risk Premium Model
Using an Adjusted Total Market Approach

<u>Line No.</u>		<u>Proxy Group of Ten Non-Price Regulated Companies</u>
1.	Yield on Baa Rated Corporate Bonds (1)	4.31 %
2.	Equity Risk Premium (2)	<u>6.92</u>
3.	Risk Premium Derived Common Equity Cost Rate	<u><u>11.23</u> %</u>

Notes: (1) Six-month average Baa corporate bond yield ended September 2019 as shown below:

Apr-19	4.70 %
May-19	4.63
Jun-19	4.46
Jul-19	4.28
Aug-19	3.87
Sep-19	<u>3.91</u>
Average	<u><u>4.31</u> %</u>

(2) From page 30 of this Schedule.

Source of Information: Bloomberg Investment Services

Carolina Water Service, Inc. of North Carolina
Comparison of Long-Term Issuer Ratings for the
Proxy Group of Ten Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

	Moody's Long-Term Issuer Rating October 2019		Standard & Poor's Long-Term Issuer Rating October 2019	
<u>Proxy Group of Ten Non- Price Regulated Companies</u>	<u>Long- Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>	<u>Long- Term Issuer Rating</u>	<u>Numerical Weighting (1)</u>
AutoZone Inc.	Baa1	8.0	BBB	9.0
Cheesecake Factory	NR	--	NR	--
Casey's Gen'l Stores	NR	--	NR	--
Cracker Barrel	WR	--	NR	--
Campbell Soup	Baa2	9.0	BBB-	10.0
Dunkin' Brands Group	NR	--	NR	--
Darden Restaurants	Baa2	9.0	BBB	9.0
Tyson Foods 'A'	Baa2	9.0	BBB	9.0
Texas Roadhouse	NR	--	NR	--
Viad Corp.	WR	--	NR	--
Average	<u>Baa2</u>	<u>8.8</u>	<u>BBB</u>	<u>9.3</u>

Notes:

(1) From page 6 of Schedule DWD-4 (direct testimony).

Source of Information:

Bloomberg Professional Services

Carolina Water Service, Inc. of North Carolina
Derivation of Equity Risk Premium Based on the Total Market Approach
Using the Beta for
Proxy Group of Ten Non-Price Regulated Companies of Comparable risk to the
Proxy Group of Six Water Companies

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Ten Non-Price Regulated Companies</u>
<u>Ibbotson-Based Equity Risk Premiums:</u>		
1.	Ibbotson Equity Risk Premium (1)	5.54 %
2.	Regression on Ibbotson Risk Premium Data (2)	8.92
3.	Ibbotson Equity Risk Premium based on PRPM (3)	8.12
5.	Equity Risk Premium Based on <u>Value Line</u> Summary and Index (4)	10.48
6.	Equity Risk Premium Based on <u>Value Line</u> S&P 500 Companies (5)	11.10
7.	Equity Risk Premium Based on Bloomberg S&P 500 Companies (6)	<u>9.74</u>
8.	Conclusion of Equity Risk Premium	8.99 %
9.	Adjusted Beta (7)	<u>0.77</u>
10.	Forecasted Equity Risk Premium	<u><u>6.92</u></u> %

Notes:

- (1) From note 1 of page 16 of this Schedule.
- (2) From note 2 of page 16 of this Schedule.
- (3) From note 3 of page 16 of this Schedule.
- (4) From note 4 of page 16 of this Schedule.
- (5) From note 5 of page 16 of this Schedule.
- (6) From note 6 of page 16 of this Schedule.
- (7) Average of mean and median beta from page 31 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2019 SBBI Yearbook, John Wiley & Sons, Inc.
Value Line Summary and Index
Bloomberg Professional Services

Carolina Water Service, Inc. of North Carolina
Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Six Water Companies

Proxy Group of Ten Non-Price Regulated Companies	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (3)
AutoZone Inc.	0.75	0.67	0.71	9.94 %	2.53 %	9.59 %	10.31 %	9.95 %
Cheesecake Factory	0.75	0.76	0.76	9.94	2.53	10.09	10.68	10.38
Casey's Gen'l Stores	0.75	0.78	0.77	9.94	2.53	10.18	10.76	10.47
Cracker Barrel	0.70	0.72	0.71	9.94	2.53	9.59	10.31	9.95
Campbell Soup	0.65	0.64	0.65	9.94	2.53	8.99	9.86	9.43
Dunkin' Brands Group	0.70	0.83	0.77	9.94	2.53	10.18	10.76	10.47
Darden Restaurants	0.80	0.78	0.79	9.94	2.53	10.38	10.91	10.64
Tyson Foods 'A'	0.75	0.77	0.76	9.94	2.53	10.09	10.68	10.38
Texas Roadhouse	0.80	0.86	0.83	9.94	2.53	10.78	11.20	10.99
Viad Corp.	0.80	0.82	0.81	9.94	2.53	10.58	11.05	10.82
Mean			<u>0.76</u>			<u>10.05 %</u>	<u>10.65 %</u>	<u>10.35 %</u>
Median			<u>0.77</u>			<u>10.14 %</u>	<u>10.72 %</u>	<u>10.43 %</u>
Average of Mean and Median			<u>0.77</u>			<u>10.10 %</u>	<u>10.69 %</u>	<u>10.39 %</u>

Notes:

- (1) From note 1, page 22 of this Schedule.
- (2) From note 2, page 22 of this Schedule.
- (3) Average of CAPM and ECAPM cost rates.