

SANFORD LAW OFFICE, PLLC

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June 2, 2020

Ms. Kimberley A. Campbell, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4325

Via Electronic Delivery

Re: Aqua North Carolina, Inc.
Docket No. W-218, Sub 526
Application by Aqua North Carolina, Inc., 202 MacKenan Court,
Cary, North Carolina 27511, for Authority to Adjust and Increase
Rates for Water and Sewer Utility Service in all Service Areas in
North Carolina
Rebuttal Testimony and Exhibit: Dylan W. D'Ascendis

Dear Ms. Campbell:

Attached please find the Pre-filed Rebuttal Testimony (consisting of 45 pages) and Rebuttal Exhibit No. 1 (also consisting of 45 pages) of witness Dylan W. D'Ascendis, CRRA, CVA, submitted on behalf of Aqua North Carolina, Inc.

By this letter, I hereby certify that a copy of the attached D'Ascendis Rebuttal Testimony and Rebuttal Exhibit No. 1 has been served on all parties of record to this proceeding.

As always, we thank you and your staff for your assistance; please feel free to contact me if there are questions or if additional information is required.

Electronically Submitted

/s/Jo Anne Sanford
North Carolina State Bar No. 6831
Attorney for Aqua North Carolina, Inc.

c: Parties of Record

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JUN 02 2020

**STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH**

DOCKET NO. W-218, SUB 526

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

IN THE MATTER OF
APPLICATION BY AQUA NORTH CAROLINA, INC.,
202 MACKENAN COURT, CARY, NORTH CAROLINA 27511,
FOR AUTHORITY TO ADJUST AND INCREASE RATES FOR WATER
AND SEWER UTILITY SERVICE IN ALL SERVICE AREAS IN
NORTH CAROLINA

PREFILED REBUTTAL TESTIMONY OF
DYLAN W. D'ASCENDIS, CRRA, CVA
ON BEHALF OF
AQUA NORTH CAROLINA, INC.

June 2, 2020

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1 **I. INTRODUCTION**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Dylan W. D'Ascendis. My business address is 3000 Atrium
4 Way, Suite 241, Mount Laurel, NJ 08054.

5 **Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

6 A. I am a Director at ScottMadden, Inc. ("ScottMadden").

7 **Q. ARE YOU THE SAME DYLAN W. D'ASCENDIS THAT PROVIDED**
8 **DIRECT TESTIMONY IN THIS PROCEEDING?**

9 A. Yes, I am.

10 **II. PURPOSE OF TESTIMONY**

11 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY IN THIS**
12 **PROCEEDING?**

13 A. The purpose of my rebuttal testimony is two-fold. First, I will update my
14 recommended weighted average cost of capital ("WACC"), including my
15 recommended return on common equity ("ROE"). Second, I will respond to
16 the direct testimony of John R. Hinton, witness for the Public Staff of the
17 North Carolina Utilities Commission ("Public Staff") concerning the investor
18 required ROE of Aqua North Carolina, Inc. ("Aqua NC" or the "Company").

19 **Q. HAVE YOU PREPARED AN EXHIBIT IN SUPPORT OF YOUR**
20 **REBUTTAL TESTIMONY?**

21 A. Yes. I have prepared D'Ascendis Rebuttal Exhibit No. 1, which consists of
22 Schedules DWD-1R through DWD-11R.

1 **III. SUMMARY**

2 **Q. WHAT CONCLUSIONS DID YOU REACH?**

3 A. Based on my updated analysis I recommend the North Carolina Utilities
4 Commission ("Commission" or "NCUC") authorize the Company the
5 opportunity to earn a WACC of 7.61%, based on a ratemaking capital
6 structure as of March 31, 2020. The updated capital structure is based on
7 the Company's actual capital structure at March 31, 2020 which consists of
8 50.00% long-term debt at an embedded cost rate of 4.21% and 50.00%
9 common equity at my updated recommended ROE of 11.00%. My updated
10 recommended overall rate of return is summarized on page 1 of Schedule
11 DWD-1R and in Table 1, below:

12 **Table 1: Summary of Overall Rate of Return**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.21%	2.11%
Common Equity	<u>50.00%</u>	11.00%	<u>5.50%</u>
Total	<u>100.00%</u>		<u>7.61%</u>

13 **Q. PLEASE SUMMARIZE YOUR RESPONSE TO MR. HINTON.**

14 A. In my response to Mr. Hinton's estimation of the Company's ROE I explain
15 its shortcomings, including:

- 16 • His misapplication of the discounted cash flow ("DCF") model;
- 17 • His misapplication of the risk premium model ("RPM");
- 18 • His failure to account for size-specific risks;
- 19 • His failure to reflect flotation costs; and

- 1 • His opinion that the approval of the Company's requested
2 consumption adjustment mechanism ("CAM") in this proceeding
3 requires a downward adjustment to the estimated ROE.

4 Also, in my response, I address Mr. Hinton's opinions regarding
5 current capital markets. My corrections and adjustments to Mr. Hinton's
6 analysis result in an indicated ROE of 10.05% before any adjustments for
7 Aqua NC's small size and flotation costs.

8 **IV. UPDATED ANALYSIS**

9 **Q. PLEASE DISCUSS YOUR UPDATED ANALYSIS IN THIS PROCEEDING.**

10 A. My updated study, which reflects current investor expectations, is as of April
11 30, 2020 and is contained in Schedule DWD-1R.

12 **Q. DID YOU UPDATE YOUR PROXY GROUP BY APPLYING YOUR**
13 **SELECTION CRITERIA¹ TO 2019 ANNUAL DATA?**

14 A. Yes, I did. The screening of the *Value Line Investment Survey* ("*Value*
15 *Line*") water utility group through my selection criteria resulted in the same
16 proxy group used by Mr. Hinton in his analysis.²

17 **Q. HAVE YOU PROVIDED ADDITIONAL ANALYSES BASED ON THE**
18 **COMMISSION'S FINAL ORDER IN DOCKET NOS. W-354, SUBS 363,**

¹ D'Ascendis Direct Testimony, at 15.

² The resulting water utility proxy group consists of American States Water Co., American Water Works, Co., Inc., California Water Service Group, Essential Utilities, Inc., Middlesex Water Co., SJW Group, and York Water Co.

1 **364, AND 365 CONCERNING CAROLINA WATER SERVICE OF NORTH**
2 **CAROLINA, INC.?**

3 A. Yes. Even though I do not agree with using current interest rates in a rate
4 of return analysis, as will be discussed below, I have presented an ROE
5 analysis which exclusively uses current interest rates in addition to my
6 updated analysis.

7 **Q. ARE THERE ANY CHANGES TO YOUR ANALYSES BASED ON MR.**
8 **HINTON'S DIRECT TESTIMONY?**

9 A. Yes. Regarding Mr. Hinton's discussion of flotation costs,³ he points out
10 that the Commission has not accepted flotation costs for equity issuances
11 not issued during the test year or in the immediate future. While I do not
12 agree that only test year equity issuances should be included in a flotation
13 cost adjustment (as common equity is outstanding in perpetuity), as
14 discussed in my direct testimony⁴ and to limit the areas of disagreement, I
15 have only included share issuances of Essential Utilities, Inc. that occurred
16 during the test year in my updated calculation of flotation costs.

17 **Q. APART FROM THE ABOVE EXCEPTIONS, HAVE YOU APPLIED THE**
18 **ROE MODELS IN THE SAME MANNER AS YOU APPLIED THEM IN**
19 **YOUR DIRECT TESTIMONY?**

20 A. Yes.

³ Hinton Direct Testimony, at 44-45.

⁴ D'Ascendis Direct Testimony, at 52-54.

1 **V. RESPONSE TO MR. HINTON'S COMMENTS ON CURRENT CAPITAL**
2 **MARKET CONDITIONS**

3 **Q. PLEASE SUMMARIZE MR. HINTON'S OPINIONS OF CURRENT**
4 **CAPITAL MARKET CONDITIONS.**

5 A. First, Mr. Hinton reviews A-rated utility bond yields, which have declined by
6 approximately 90 basis points since the Company's last rate case (Docket
7 No. W-218, Sub 497, final order December 18, 2018).⁵ Second, Mr. Hinton
8 discusses the effect of the Coronavirus on water utility stocks, concluding
9 that water stocks survived the crash relatively well compared to the rest of
10 the market, partially attributing it to water utility stock's low betas.⁶ Third
11 and finally, due to decreasing interest rates and previous inaccuracies in
12 forecasted interest rates, Mr. Hinton relies on current interest rates in his
13 analyses.⁷

14 Specific to economic conditions in North Carolina, Mr. Hinton
15 reviewed the economic well-being of each county as measured by the North
16 Carolina Department of Commerce served by Aqua NC and determined that
17 the average well-being of Aqua NC's customers is above average for the
18 state.⁸ As to the impact of the Coronavirus on Aqua NC's customers, Mr.
19 Hinton concludes that it is too early to gauge the economic impact, but is

5 Hinton Direct Testimony, at 13.

6 *Ibid.*, at 14.

7 *Ibid.*, at 17-18.

8 *Ibid.*, at 35-36.

1 optimistic that the current economic slowdown will abate as the state
2 reopens in the third and fourth quarters of 2020.⁹

3 **Q. DO YOU HAVE ANY COMMENT ON MR. HINTON'S OPINIONS**
4 **REGARDING CURRENT MARKET CONDITIONS IN GENERAL?**

5 A. Yes, I do. I agree with Mr. Hinton that A-rated public utility bonds have
6 declined about 90 basis points since Docket No. W-218, Sub 497.¹⁰ This
7 reduction is reflected in the debt cost rates requested by the Company over
8 that period of time. As noted by Mr. Hinton, the Company's embedded long-
9 term debt cost rate has fallen by 40 basis points over that same timeframe.
10 This shows that the Company is securing low cost capital for the benefit of
11 their customers. It must also be noted that Mr. Hinton acknowledges that
12 declines in interest rates do not translate into like declines in the investor-
13 required return.¹¹

14 To that point, one should look at more than one market measure to
15 gauge whether the cost of equity has changed in a meaningful way. For
16 example, during Docket No. W-218, Sub 497, market data was considered
17 within the period of January 12, 2018 (my direct analysis) through
18 December 18, 2018 (the final order). The annualized volatilities¹² of the
19 Utility Proxy Group's prices and the S&P 500 price over this period were

9 *Ibid.*, at 36.

10 *Ibid.*, at 13.

11 *Ibid.*, at 30.

12 The annualized volatility of a stock is measured by taking the standard deviation of the price changes within the sample and multiplying by the square root of 252 (the assumed number of trading days in a year).

1 24.40% and 16.19%, respectively. The time frame of this proceeding so far
2 has encompassed the period from October 18, 2019 through April 30, 2020.
3 The annualized volatilities of the Utility Proxy Group prices and the S&P 500
4 price over this time period are 62.17% and 42.27%, respectively, a notable
5 increase in volatility (risk) in both the water utility industry and the market as
6 a whole, which would most certainly increase the investor required-return.
7 Also, note that during both periods, the average annualized volatility of the
8 Utility Proxy Group exceeded that of the S&P 500.

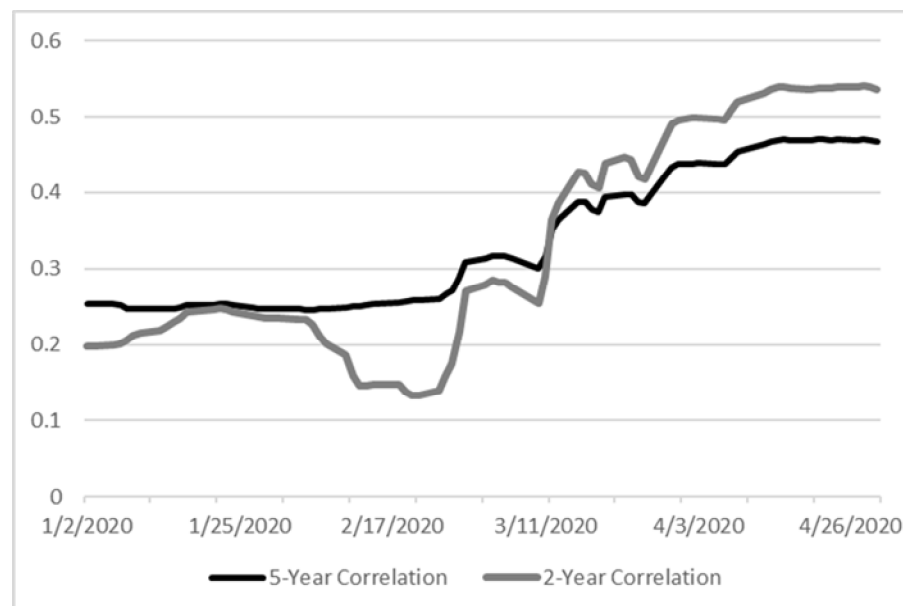
9 Regarding the water utility industry's relative performance to the
10 market during the Coronavirus, I respectfully disagree with Mr. Hinton that
11 "water utility stocks have survived the stock market crash relatively well."¹³
12 As shown on Schedule DWD-2R, the average year-to-date¹⁴ return for the
13 Utility Proxy Group is -9.59%, whereas the year-to-date return for the S&P
14 500 is -9.85%, which would indicate that the Coronavirus has had a similar
15 effect on both the water industry and the market as a whole. However,
16 absolute return levels are not an indication of the risk of these returns; the
17 volatility of these returns is a measure of risk. As shown on Schedule DWD-
18 2R, the average annualized volatility year-to-date for the Utility Proxy Group
19 is 78.03%, which is significantly higher than the 53.55% annualized volatility
20 of the S&P 500 over the same period.

¹³ Hinton Direct Testimony, at 14.

¹⁴ Period ending April 30, 2020.

1 Additionally, I assessed the correlation of the changes in prices in
2 the Utility Proxy Group with the changes in prices of the S&P 500 to
3 determine whether there was any relationship between the two during the
4 current crisis. As shown in Chart 1 below, as the Coronavirus threat
5 became apparent, the correlation between the price changes of the Utility
6 Proxy Group and the price changes of the S&P 500 increased from near 0.2
7 to near 0.55 (using a 2-year correlation, consistent with Bloomberg beta
8 calculations) and from 0.25 to 0.45 (using a 5-year correlation, consistent
9 with *Value Line* beta calculations) since January 2, 2020.

10 **Chart 1: Correlation Between Price Movements of the Utility Proxy**
11 **Group and S&P 500 Since January 1, 2020**



12 This increase in correlation between price changes for the Utility
13 Proxy Group and those for the S&P 500 will ultimately result in higher betas
14 over time for the members of the Utility Proxy Group. This is evidenced in
15

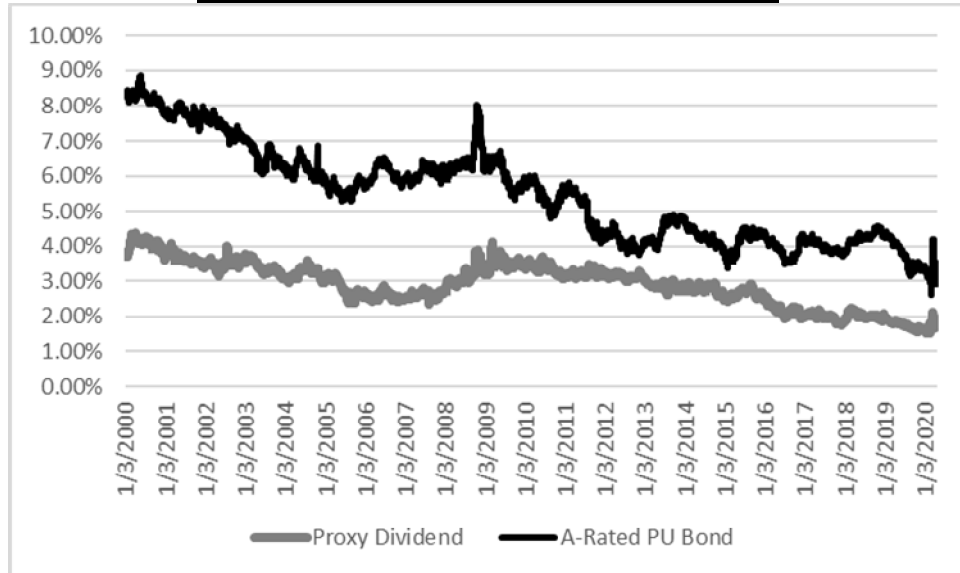
1 the difference between the Bloomberg and *Value Line* betas for the Utility
2 Proxy Group as shown on page 23 of Schedule DWD-1. Because of
3 Bloomberg's shorter calculation horizon (two years), it is more reactive to
4 current events than *Value Line* betas (five years) showing the current
5 increased correlation between members of the Utility Proxy Group and the
6 S&P 500.

7 **Q. MR. HINTON ASSERTS THAT PURCHASES OF COMMON STOCKS OF**
8 **UTILITIES ARE VIEWED AS FIXED INCOME INVESTMENTS BY**
9 **INVESTORS.¹⁵ DO YOU AGREE WITH HIS GENERALIZATION?**

10 A. No. Fixed income investments are investments without the volatility of stock
11 prices and produce income through the payment of coupon payments on
12 bonds or dividends on preferred stocks. The market data of the Utility Proxy
13 Group exhibits significant price volatility, as shown in Schedule DWD-2R,
14 and it does not produce significant income based on its dividend yield. As
15 shown on Chart 2, below, the dividend yield for the Utility Proxy Group is
16 steadily and significantly below the A-rated public utility bond yield.

¹⁵ Hinton Direct Testimony, at 16.

Chart 2: A-Rated Public Utility Bond Yields and Dividend Yields of the Utility Proxy Group 2000 – Present



Given the lower dividend yield and higher price volatility of water utility stocks, no rational income investor would consider a water utility stock an income investment.

Q. DO YOU HAVE ANY COMMENTS ON MR. HINTON'S DISCUSSION ABOUT ECONOMIC CONDITIONS SPECIFIC TO NORTH CAROLINA?

A. Yes. As to the current economic conditions and their effect on Aqua NC's customers, I generally agree with Mr. Hinton's conclusions that the full effect of the Coronavirus on Aqua NC's customers is yet to be determined, and that once the crisis passes, the economic slowdown will diminish.

1 **Q. DO YOU BELIEVE THAT CURRENT INTEREST RATES ARE**
2 **APPROPRIATE FOR THE ESTIMATION OF THE COST OF COMMON**
3 **EQUITY IN THIS PROCEEDING?**

4 A. No. Using current measures, like interest rates, are inappropriate for cost
5 of capital and ratemaking purposes because both cost of capital and
6 ratemaking are prospective in nature. The cost of capital, including the cost
7 rate of common equity, is expectational in that it reflects investors'
8 expectations of future capital markets, including an expectation of interest
9 rate levels, as well as future risks. Ratemaking is prospective in that the
10 rates set in this proceeding will be in effect for a period in the future.

11 Even though Mr. Hinton relies, in part, on projected growth rates in
12 his DCF analyses, noting that growth in the DCF is expected,¹⁶ he fails to
13 apply that logic to selecting an appropriate interest rate in his RPM analysis.
14 Whether Mr. Hinton believes those forecasts will prove to be accurate is
15 irrelevant to estimating the market-required cost of common equity.
16 Published industry forecasts, such as *Blue Chip Financial Forecasts*' ("*Blue*
17 *Chip*") consensus interest rate projections, reflect industry expectations.
18 Additionally, investors' expectations are not improper inputs to cost of
19 common equity estimation models simply because prior projections were
20 not proven correct in hindsight. As the Federal Energy Regulatory
21 Commission ("FERC") noted in Opinion No. 531, "the cost of common equity

¹⁶ *Ibid.*, at 24.

1 to a regulated enterprise depends upon what the market expects, not upon
2 what ultimately happens.”¹⁷ Because our analyses are predicated on
3 market expectations, the expected increase in bond yields is a measurable,
4 observable, and relevant data point that should be reflected in Mr. Hinton’s
5 analysis. Therefore, Mr. Hinton should have used forecasted interest rates
6 in his analysis.

7 **VI. RESPONSE TO MR. HINTON’S COST OF COMMON EQUITY CAPITAL**
8 **ANALYSIS**

9 **Q. WHAT ARE MR. HINTON’S RECOMMENDATIONS FOR THE**
10 **COMPANY’S WACC, INCLUDING HIS RECOMMENDED ROE?**

11 A. Mr. Hinton recommends that the Commission establish an overall rate of
12 return of 6.56%, based on a capital structure consisting of 50.00% long-
13 term debt at an embedded cost rate of 4.21%, and 50.00% common equity
14 at his recommended cost of common equity of 8.90%,¹⁸ which includes a
15 10 basis point downward adjustment for the Company’s requested CAM.
16 Mr. Hinton’s ROE recommendation is based on the average of his DCF
17 (8.60%) and RPM (9.40%) results less his 10-basis point downward
18 adjustment for the CAM.¹⁹

17 Opinion No. 531, 150 FERC ¶ 61,165 at P 88.

18 Hinton Direct Testimony, at 33.

19 *Ibid.*, at 31.

1 **Q. DO YOU HAVE ANY GENERAL COMMENTS ON MR. HINTON'S**
2 **RECOMMENDED ROE?**

3 A. Yes. Mr. Hinton relies exclusively on two models, the DCF and the RPM,
4 in his ROE analysis.²⁰ In Docket Nos. W-354, Subs 363, 364, and 365,
5 Mr. Hinton employed both the CAPM and the Comparable Earnings Model
6 ("CEM"), albeit as checks, in his ROE analysis.²¹ As discussed in my direct
7 testimony,²² the use of multiple models adds reliability to the estimation of
8 the common equity cost rate, and the prudence of using multiple cost of
9 common equity models is supported in both the financial literature and
10 regulatory precedent.

11 **Q. CAN YOU PLEASE PROVIDE SOME EXAMPLES FROM THE**
12 **FINANCIAL LITERATURE WHICH SUPPORT THE USE OF MULTIPLE**
13 **COST OF COMMON EQUITY MODELS IN DETERMINING THE**
14 **INVESTOR-REQUIRED RETURN?**

15 A. Yes. In one example, Morin states:

16 Each methodology requires the exercise of considerable
17 judgment on the reasonableness of the assumptions
18 underlying the methodology and on the reasonableness of the
19 proxies used to validate a theory. The inability of the DCF
20 model to account for changes in relative market valuation,
21 discussed below, is a vivid example of the potential
22 shortcomings of the DCF model when applied to a given
23 company. Similarly, the inability of the CAPM to account for
24 variables that affect security returns other than beta tarnishes
25 its use.

²⁰ *Ibid.*, at 23.

²¹ Docket Nos. W-354, Subs 363, 364, and 365, Hinton Direct Testimony, at 33-34.

²² D'Ascendis Direct Testimony, at 44.

1 **No one individual method provides the necessary level of**
2 **precision for determining a fair return, but each method**
3 **provides useful evidence to facilitate the exercise of an**
4 **informed judgment.** Reliance on any single method or
5 preset formula is inappropriate when dealing with investor
6 expectations because of possible measurement difficulties
7 and vagaries in individual companies' market data.
8 (emphasis added)

9 * * *

10 The financial literature supports the use of multiple methods.
11 Professor Eugene Brigham, a widely respected scholar and
12 finance academician, asserts (footnote omitted):

13 Three methods typically are used: (1) the Capital Asset
14 Pricing Model (CAPM), (2) the discounted cash flow (DCF)
15 method, and (3) the bond-yield-plus-risk-premium approach.
16 **These methods are not mutually exclusive – no method**
17 **dominates the others**, and all are subject to error when used
18 in practice. Therefore, when faced with the task of estimating
19 a company's cost of equity, we generally use all three
20 methods and then choose among them on the basis of our
21 confidence in the data used for each in the specific case at
22 hand. (emphasis added)

23 Another prominent finance scholar, Professor Stewart Myers, in an
24 early pioneering article on regulatory finance, stated^(footnote omitted):

25 Use more than one model when you can. Because estimating
26 the opportunity cost of capital is difficult, **only a fool throws**
27 **away useful information.** That means you should not use
28 any one model or measure mechanically and exclusively.
29 Beta is helpful as one tool in a kit, to be used in parallel with
30 DCF models or other techniques for interpreting capital
31 market data. (emphasis added)

32 Reliance on multiple tests recognizes that no single
33 methodology produces a precise definitive estimate of the
34 cost of equity. As stated in Bonbright, Danielsen, and
35 Kamerschen (1988), 'no single or group test or technique is
36 conclusive.' Only a fool discards relevant evidence. (italics in
37 original) (emphasis added)

* * *

While it is certainly appropriate to use the DCF methodology to estimate the cost of equity, there is no proof that the DCF produces a more accurate estimate of the cost of equity than other methodologies. Sole reliance on the DCF model ignores the capital market evidence and financial theory formalized in the CAPM and other risk premium methods. **The DCF model is one of many tools to be employed in conjunction with other methods to estimate the cost of equity.** It is not a superior methodology that supplants other financial theory and market evidence. The broad usage of the DCF methodology in regulatory proceedings in contrast to its virtual disappearance in academic textbooks does not make it superior to other methods. The same is true of the Risk Premium and CAPM methodologies. (emphasis added)²³

Finally, Brigham and Gapenski note:

In practical work, *it is often best to use all three methods – CAPM, bond yield plus risk premium, and DCF – and then apply judgment when the methods produce different results.* People experienced in estimating equity capital costs recognize that both careful analysis and some very fine judgments are required. It would be nice to pretend that these judgments are unnecessary and to specify an easy, precise way of determining the exact cost of equity capital. Unfortunately, this is not possible. Finance is in large part a matter of judgment, and we simply must face this fact. (italics in original)²⁴

In the academic literature cited above, three methods are consistently mentioned: the DCF, CAPM, and the RPM, all of which I used in my analyses.

²³ Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 428-431. ("Morin")

²⁴ Eugene F. Brigham and Louis C. Gapenski, Financial Management – Theory and Practice, 4th Ed. (The Dryden Press, 1985) at 256. ("Brigham and Gapenski")

1 **Q. CAN YOU ALSO PROVIDE SPECIFIC EXAMPLES WHERE THIS**
2 **COMMISSION HAS CONSIDERED MULTIPLE COST OF COMMON**
3 **EQUITY MODELS?**

4 **A.** Yes. The Commission in Docket Nos. W-354, Subs 363, 364, and 365,
5 concerning Carolina Water Service of North Carolina, stated:

6 The average of witness D'Ascendis' utility proxy group late-
7 filed exhibit DCF result of 8.81%, CAPM result of 9.29%, RPM
8 result of 10.00%, and witness Hinton's RPM of 9.57% is
9 9.42%. A return on common equity of 9.50% is thus
10 supported by the average of the results of the four above listed
11 cost of equity models which the Commission finds are
12 credible, probative, and entitled to consideration based on the
13 record in this proceeding.

14 Also, in Docket No. E-2, Sub 1142, concerning Duke Energy
15 Progress, LLC, the Commission stated:

16 Thus, the Commission finds and concludes that the
17 Stipulation, along with the expert testimony of witnesses
18 Hevert (risk premium analysis), O'Donnell (comparable
19 earnings), and Parcell (comparable earnings), are credible
20 and substantial evidence of the appropriate rate of return on
21 equity and are entitled to substantial weight in the
22 Commission's determination of this issue.

23 In the Commission Orders cited above, there is clear language that
24 the Commission considers multiple models in its determination of ROE. It
25 is also my interpretation of these Orders that the Commission correctly
26 observes the effect of capital market conditions on the model results in
27 determining an ROE for utility companies. This, in addition to the academic
28 literature cited above, justify the use of the DCF, CAPM, RPM, and CEM in
29 this proceeding.

1 **Q. HAVE YOU PERFORMED A CAPM AND CEM ANALYSIS FOR MR.**
2 **HINTON'S PROXY GROUP?**

3 A. Yes, I have. Since my updated proxy group and Mr. Hinton's proxy group
4 are the same, the CAPM provided in my update at page 23 of Schedule
5 DWD-1R would serve as Mr. Hinton's CAPM analysis, and my basis of
6 selection of the non-regulated proxy group similar in total risk to the Utility
7 Proxy Group is presented at pages 25 through 27 of Schedule DWD-1R.
8 The CAPM applied to the non-regulated proxy group is presented on page
9 33 of Schedule DWD-1R, and the DCF applied to the non-regulated proxy
10 group is presented on Schedule DWD-3R. The results of the CAPM applied
11 to the Utility Proxy Group is 10.90% and the results of the DCF and CAPM
12 applied to the non-regulated proxy group are 9.36% and 11.83%,
13 respectively, averaging 10.60%.

14 **Q. HAVE YOU APPLIED THE DCF DIFFERENTLY TO MR. HINTON'S NON-**
15 **REGULATED PROXY GROUP THAN HOW YOU APPLIED IT IN YOUR**
16 **UPDATE?**

17 A. Yes. In the application of the DCF to Mr. Hinton's non-regulated proxy
18 group, I calculated the expected dividend yield as Mr. Hinton described in
19 his direct testimony at page 27. I then added the prospective dividend yield
20 to the prospective earnings per share ("EPS") growth rate from *Value Line*
21 and Yahoo! Finance. I only include expected EPS growth rates for use in
22 the DCF model, as will be discussed in detail below.

1 **A. Discounted Cash Flow Model**

2 **Q. PLEASE SUMMARIZE MR. HINTON'S DCF ANALYSIS.**

3 A. Mr. Hinton calculated his dividend yield by using the Value Line estimate of
4 the 12-month projected dividend yield for each of his proxy companies as
5 reported in the Value Line Summary and Index for 13 weeks ended May 8,
6 2020.²⁵ He then added the average expected dividend yields of 1.7% to a
7 range of growth rates from 6.4% to 7.4% to arrive at indicated DCF cost
8 rates from 8.1% to 9.1%, which he averaged to arrive at his recommended
9 DCF cost rate of 8.60%.²⁶

10 **Q. PLEASE COMMENT ON MR. HINTON'S GROWTH RATE ANALYSIS IN**
11 **HIS APPLICATION OF THE DCF MODEL.**

12 A. Mr. Hinton states on page 27 of his direct testimony that he employed EPS,
13 dividends per share ("DPS"), and book value of equity per share growth
14 rates as reported in Value Line, both five- and ten-year historical and
15 forecasted, and the five-year projected EPS growth rate as reported by
16 Yahoo Finance. He includes both historical and forecasted growth rates,
17 "because it is reasonable to expect that investors consider both sets of data
18 in deriving their expectations".²⁷

19 Notwithstanding Mr. Hinton's inclusion of historical growth rates in
20 his DCF, there is a significant body of empirical evidence supporting the

²⁵ Hinton Direct Testimony, at 27.

²⁶ *Ibid.*, at 28.

²⁷ *Ibid.*, at 27.

1 superiority of analysts' EPS growth rates in a DCF analysis, indicating that
2 analysts' forecasts of earnings remain the best predictor of growth to use in
3 the DCF model. Such ample evidence of the proven reliability and
4 superiority of analysts' forecasts of EPS should not be dismissed by
5 Mr. Hinton.

6 **Q. PLEASE DESCRIBE SOME OF THE EMPIRICAL EVIDENCE**
7 **SUPPORTING THE RELIABILITY AND SUPERIORITY OF ANALYSTS'**
8 **EPS GROWTH RATES IN A DCF ANALYSIS.**

9 A. As discussed in my direct testimony,²⁸ over the long run, there can be no
10 growth in DPS without growth in EPS. Security analysts' earnings
11 expectations have a more significant, but not exclusive, influence on market
12 prices than dividend expectations. Thus, the use of projected earnings
13 growth rates in a DCF analysis provides a better match between investors'
14 market price appreciation expectations and the growth rate component of
15 the DCF, because they have a significant influence on market prices and
16 the appreciation or "growth" experienced by investors.²⁹ This should be
17 evident even to relatively unsophisticated investors just by listening to
18 financial news reports on radio, TV, or by reading newspapers.

19 In addition, Myron Gordon, the "father" of the standard regulatory
20 version of the DCF model widely utilized throughout the United States in
21 rate base/rate of return regulation, recognized the significance of analysts'

28 D'Ascendis Direct Testimony, at 19.
29 Morin, at 298-303.

1 forecasts of growth in EPS in a speech he gave in March 1990 before the
2 Institute for Quantitative Research and Finance³⁰, stating on page 12:

3 We have seen that earnings and growth estimates by security
4 analysts were found by Malkiel and Cragg to be superior to
5 data obtained from financial statements for the explanation of
6 variation in price among common stocks... estimates by
7 security analysts available from sources such as IBES are far
8 superior to the data available to Malkiel and Cragg.

9 * * *

10 Eq (7) is not as elegant as Eq (4), but it has a good deal more
11 intuitive appeal. It says that investors buy earnings, but what
12 they will pay for a dollar of earnings increases with the extent
13 to which the earnings are reflected in the dividend or in
14 appreciation through growth.

15 Professor Gordon recognized that the total return is largely affected
16 by the terminal price, which is mostly affected by earnings (hence
17 price/earnings multiples).

18 Studies performed by Cragg and Malkiel³¹ demonstrate that
19 analysts' forecasts are superior to historical growth rate extrapolations.
20 While some question the accuracy of analysts' forecasts of EPS growth, the
21 level of accuracy of those analysts' forecasts well after the fact does not
22 really matter. What is important is that forecasts reflect widely held
23 expectations influencing investors at the time they make their pricing
24 decisions, and hence, the market prices they pay.

³⁰ Gordon, Myron J., "*The Pricing of Common Stock*", presented before the Spring 1990 Seminar, March 27, 1990 of the Institute for Quantitative Research in Finance, Palm Beach, FL.

³¹ Cragg, John G. and Malkiel, Burton G., Expectations and the Structure of Share Prices (University of Chicago Press, 1982) Chapter 4.

1 In addition, Jeremy J. Siegel³² also supports the use of security
2 analysts' EPS growth forecasts when he states:

3 For the equity holder, the source of future cash flows is the
4 earnings of firms. (p. 90)

5 * * *

6 Some people argue that shareholders most value stocks'
7 cash dividends. But this is not necessarily true. (p. 91)

8 * * *

9 Since the price of a stock depends primarily on the present
10 discounted value of all expected future dividends, it appears
11 that dividend policy is crucial to determining the value of the
12 stock. However, this is not generally true. (p. 92)

13 * * *

14 Since stock prices are the present value of future dividends, it
15 would seem natural to assume that economic growth would
16 be an important factor influencing future dividends and hence
17 stock prices. However, this is not necessarily so. The
18 determinants of stock prices are earnings and dividends on a
19 *per-share* basis. Although economic growth may influence
20 *aggregate* earnings and dividends favorably, economic
21 growth does not necessarily increase the growth of per-share
22 earnings or dividends. It is earnings per share (EPS) that is
23 important to Wall Street because per-share data, not
24 aggregate earnings or dividends, are the basis of investor
25 returns. (*italics in original*) (pp. 93-94)

26 Therefore, given the overwhelming academic and empirical support
27 regarding the superiority of security analysts' EPS growth rate forecasts,
28 such EPS growth rate projections should have been relied on by Mr. Hinton
29 in his DCF analysis.

³² Jeremy J. Siegel, Stocks for the Long Run – The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies, McGraw-Hill 2002, at 90-94.

1 **Q. WHAT WOULD MR. HINTON'S DCF RESULT BE IF HE ONLY RELIED**
2 **ON EPS GROWTH FORECASTS?**

3 A. As shown on Schedule DWD-4R, the mean DCF derived cost rate based
4 on EPS growth forecasts is 9.07%. This result should be viewed with
5 caution, however, as the DCF model is currently understating the
6 investor-required return.

7 **Q. WHY IS IT YOUR OPINION THAT THE DCF MODEL IS CURRENTLY**
8 **UNDERSTATING THE INVESTOR-REQUIRED RETURN?**

9 A. Traditional rate base/rate of return regulation, where a market-based
10 common equity cost rate is applied to a book value rate base, presumes
11 that market-to-book ("M/B") ratios are at unity or 1.00. However, that is
12 rarely the case. Morin states:

13 The third and perhaps most important reason for caution and
14 skepticism is that application of the DCF model produces
15 estimates of common equity cost that are consistent with
16 investors' expected return only when stock price and book
17 value are reasonably similar, that is, when the M/B is close to
18 unity. As shown below, application of the standard DCF
19 model to utility stocks understates the investor's expected
20 return when the market-to-book (M/B) ratio of a given stock
21 exceeds unity. This was particularly relevant in the capital
22 market environment of the 1990s and 2000s where utility
23 stocks were trading at M/B ratios well above unity and have
24 been for nearly two decades. The converse is also true, that
25 is, the DCF model overstates that investor's return when the
26 stock's M/B ratio is less than unity. The reason for the
27 distortion is that the DCF market return is applied to a book
28 value rate base by the regulator, that is, a utility's earnings are
29 limited to earnings on a book value rate base.³³

33 Morin, at 434.

1 As Morin explains, a “simplified” DCF model, like that used by
2 Mr. Hinton, assumes an M/B ratio of 1.0 and therefore under- or over-states
3 investors’ required return when market value exceeds or is less than book
4 value, respectively. It does so because equity investors evaluate and
5 receive their returns on the market value of a utility’s common equity,
6 whereas regulators authorize returns on the book value of that common
7 equity. This means that the market-based DCF will produce the total annual
8 dollar return expected by investors only when market and book values of
9 common equity are equal, a very rare and unlikely situation.

10 **Q. WHY DO MARKET AND BOOK VALUES DIVERGE?**

11 A. Market values can diverge from book values for a myriad of reasons
12 including, but not limited to, EPS and DPS expectations, merger/acquisition
13 expectations, interest rates, etc. As noted by Phillips:

14 Many question the assumption that market price should equal
15 book value, believing that 'the earnings of utilities should be
16 sufficiently high to achieve market-to-book ratios which are
17 consistent with those prevailing for stocks of unregulated
18 companies.³⁴

19 In addition, Bonbright states:

20 In the first place, commissions cannot forecast, except within
21 wide limits, the effect their rate orders will have on the market
22 prices of the stocks of the companies they regulate. In the
23 second place, *whatever the initial market prices may be, they*
24 *are sure to change not only with the changing prospects for*
25 *earnings, but with the changing outlook of an inherently*
26 *volatile stock market.* In short, market prices are beyond the
27 control, though not beyond the influence of rate regulation.

³⁴ Charles F. Phillips, The Regulation of Public Utilities, Public Utilities Reports, Inc., 1993, at 395.

Moreover, even if a commission did possess the power of control, any attempt to exercise it ... would result in harmful, uneconomic shifts in public utility rate levels. (italics added)³⁵

Q. CAN THE UNDER- OR OVER-STATEMENT OF INVESTORS' REQUIRED RETURN BY THE DCF MODEL BE DEMONSTRATED MATHEMATICALLY?

A. Yes, it can. Schedule DWD-5R demonstrates how a market-based DCF cost rate of 8.60%,³⁶ when applied to a book value substantially below market value, will understate the investors' required return on market value. As shown, there is no realistic opportunity to earn the expected market-based rate of return on book value. In Column [A], investors expect an 8.60% return on an average market price of \$68.91 for Mr. Hinton's water proxy group. Column [B] shows that when Mr. Hinton's 8.60% return rate is applied to a book value of \$20.57,³⁷ the total annual return opportunity is \$1.769. After subtracting dividends of \$1.203, the investor only has the opportunity for \$0.566 in market appreciation, or 0.82%. The magnitude of the understatement of investors' required return on market value using Mr. Hinton's 8.60% cost rate is 6.03%, which is calculated by subtracting the market appreciation based on book value of 0.82% from Mr. Hinton's expected growth rate of 6.85%.

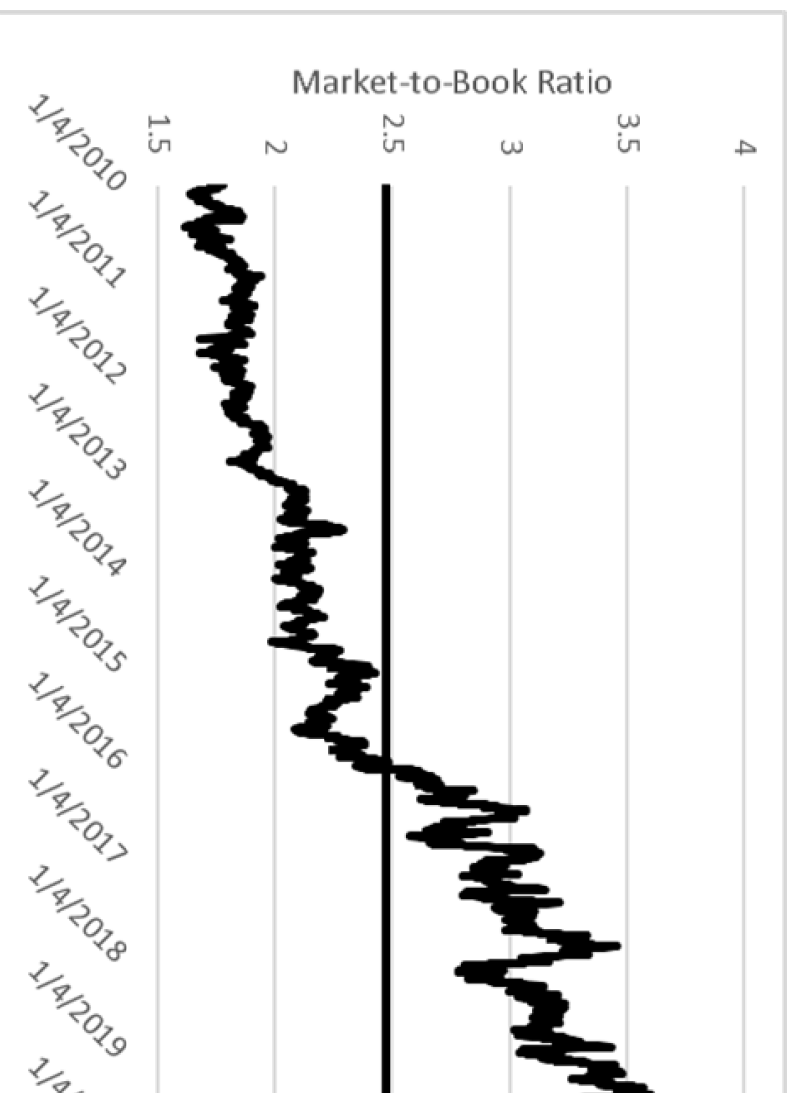
³⁵ James C. Bonbright, Albert L. Danielsen and David R. Kamerschen, Principles of Public Utility Rates (Public Utilities Reports, Inc., 1988), at 334.

³⁶ Hinton Direct Testimony, at 28.

³⁷ Representing an M/B ratio of 335.03%.

early 2016, the M/B ratios of the Utility Proxy Group have dramatically over their ten-year average M/B ratio of approximately 1.0x.

Chart 3: M/B Ratios Compared with Ten-Year Average



The significance of this is that even though the ten-year average M/B ratio has always been greater than 1.0x, the current M/B ratio is significantly higher than 1.0x, which further distorts DCF results.

38 Source: Bloomberg Financial Services.

1 **Q. HOW CAN THE INACCURACY OR MIS-SPECIFICATION OF THE DCF**
2 **MODEL BE QUANTIFIED WHEN THE M/B RATIOS ARE DIFFERENT**
3 **THAN UNITY?**

4 A. The inaccuracy of the DCF model, when market values diverge from book
5 values, can be measured by first calculating the market value of each proxy
6 company's capital structure, which consists of the market value of the
7 company's common equity (shares outstanding multiplied by price) and the
8 fair value of the company's long-term debt and preferred stock. All of these
9 measures, except for price, are available in each company's SEC Form 10-K.

10 Second, one must de-leverage the implied cost of common equity
11 based on the DCF. This is accomplished using the Modigliani / Miller
12 equation³⁹ as illustrated in Schedule DWD-6R and shown below:

13
$$k_u = k_e - (((k_u - i)(1 - t)) D/E) - (k_u - d) P/E \text{ [Equation 1]}$$

14 Where:

15 k_u = Unlevered (i.e., 100% equity) cost of common
16 equity;
17 k_e = Market determined cost of common equity;
18 i = Cost of debt;
19 t = Income tax rate;
20 D = Debt ratio;
21 E = Equity ratio;
22 d = Cost of preferred stock; and
23 P = Preferred equity ratio.

24 Using average proxy group-specific data, the equation becomes:

³⁹ The Modigliani / Miller theorem is an influential element of economic theory and forms the basis for modern theory on capital structure. See, Modigliani, F., and Miller, M. "The Cost of Capital, Corporation Finance and the Theory of Investment", The American Economic Review, Vol. 48, No. 3, (June 1958), at 261-297.

1
$$k_u = 8.60\% - (((k_u - 4.70\%)(1 - 21\%)) 25.92\% / 74.05\%) - (k_u - 7.58\%) 0.03\% / 74.05\%$$

2 Solving for k_u results in an unlevered cost of common equity of 7.76%.

3 Next, one must re-leverage those costs of common equity by relating
4 them to each proxy group's average book capital structure as shown below:

5
$$k_e = k_u + (((k_u - i)(1 - t)) D/E) + (k_u - d) P/E \text{ [Equation 2]}$$

6 Once again, using average proxy group-specific data, the equation becomes:

7
$$k_e = 7.76\% + (((7.76\% - 4.70\%)(1 - 21\%))47.11\%/52.83\%) + (7.76\% - 7.58\%)0.06\%/52.83\%$$

8 Solving for k_e results in a 9.91% indicated cost of common equity
9 relative to the book capital structure of the proxy group, which is an increase
10 of 131 basis points over Mr. Hinton's average indicated DCF result of
11 8.60%.

12 **Q. ARE YOU ADVOCATING A SPECIFIC ADJUSTMENT TO THE DCF**
13 **RESULTS TO CORRECT FOR ITS MIS-SPECIFICATION OF THE**
14 **INVESTOR-REQUIRED RETURN AS MR. HINTON ALLEGES?⁴⁰**

15 **A.** No. The purpose of this discussion is to demonstrate that, like all cost of
16 common equity models, the DCF has its limitations. The use of multiple cost
17 of common equity models, in conjunction with informed expert judgment,
18 provides a clearer picture of the investor-required ROE.

⁴⁰ Hinton Direct Testimony, at 47-48.

1 **B. Application of the Risk Premium Model**

2 **Q. PLEASE SUMMARIZE MR. HINTON'S RPM.**

3 A. Mr. Hinton's RPM explores the relationship between average allowed equity
4 returns for water utility companies published by Regulatory Research
5 Associates, Inc. and annual average Moody's A-rated utility bond yields.
6 Using data from the years 2006 through 2020, Mr. Hinton conducts a
7 regression analysis, which he then combines with recent monthly yields on
8 Moody's A-rated public utility bonds to develop his risk premium estimate of
9 6.05% and a corresponding cost of equity of 9.40%.

10 **Q. PLEASE COMMENT ON MR. HINTON'S APPLICATION OF THE RPM.**

11 A. As previously addressed, it is inappropriate to use current bond yields to
12 determine an expected ROE, so I will not repeat that discussion here. In
13 addition, instead of using yearly average authorized returns and prospective
14 Moody's A-rated public utility bond yields, it is preferable to use the
15 authorized returns and prospective Moody's A-rated public utility bond
16 yields on a case by case basis. One reason why one should use individual
17 cases instead of an annual average is that some years have more rate case
18 decisions than others, and years with less rate case decisions will garner
19 unnecessary weight. Another reason to use individual cases over an annual
20 average is that interest rates and market conditions change during the year
21 (e.g. the beginning and end of 2008), if one uses annual average authorized
22 returns and annual average interest rates, the fluctuation between the
23 interest rates and equity risk premiums during the year are lost.

1 Q. WHAT IS THE CORRECTED RESULT OF THE RPM AFTER
2 REFLECTING A PROSPECTIVE MOODY'S A-RATED PUBLIC UTILITY
3 BOND YIELD AND USING INDIVIDUAL RATE CASE DATA IN PLACE
4 OF AVERAGE ANNUAL RATE CASE DATA?

5 A. As shown on page 1 of Schedule DWD-7R, the analysis is based on a
6 regression of 187 rate cases for water utility companies from August 24,
7 2006 through April 30, 2020. It shows the implicit equity risk premium
8 relative to the yields on Moody's A-rated public utility bonds immediately
9 prior to the issuance of each regulatory decision.⁴¹

10 I determined the appropriate prospective Moody's A-rated public
11 utility yield by relying on a consensus forecast of about 50 economists of
12 the expected yield on Moody's Aaa-rated corporate bonds for the six
13 calendar quarters ending with the third calendar quarter of 2021, and *Blue*
14 *Chip's* long-term projections for 2021 to 2025, and 2026 to 2030.⁴² As
15 described on page 13 of Schedule DWD-1R, the average expected yield on
16 Moody's Aaa-rated corporate bonds is 3.21%. I then derived an expected
17 yield on Moody's A2-rated public utility bonds, by making an upward
18 adjustment of 0.53%, which represents a recent spread between Moody's
19 Aaa-rated corporate bonds and Moody's A2-rated public utility bonds.⁴³

⁴¹ If the Order was in the first half of the month, the Moody's A-rated utility bond from two months prior would be used. If the Order was in the second half of the month, the Moody's A-rated public utility bond from the last prior month was used.

⁴² *Blue Chip Financial Forecasts*, October 1, 2019, at 2, June 1, 2019, at 14.

⁴³ As explained on page 13 of Schedule DWD-1R.

1 Adding the recent 0.53% spread to the expected Moody's Aaa-rated
2 corporate bond yield of 3.21% results in an expected Moody's A2-rated
3 public utility bond yield of 3.74%.

4 I then used the regression results to estimate the equity risk premium
5 applicable to the projected yield on Moody's A2-rated public utility bonds of
6 3.74%. Given the expected Moody's A-rated utility bond yield of 3.74%, the
7 indicated equity risk premium is 5.88%, which results in an indicated ROE
8 of 9.62%, as shown on Schedule DWD-7R. Using a three-month average
9 A-rated utility bond yield of 3.27%, the indicated ROE is 9.51%, also shown
10 on Schedule DWD-7R.

11 **Q. WHAT ARE THE RESULTS OF MR. HINTON'S ROE MODELS AFTER**
12 **MAKING THE ADJUSTMENTS DESCRIBED ABOVE AND INCLUDING**
13 **THE CAPM AND CEM.**

14 As discussed above, my adjustments to Mr. Hinton's DCF and RPM result
15 in ROEs of 9.07% and 9.62%, respectively. After the inclusion of the
16 corrected CAPM (10.90%) and CEM (10.60%) results,⁴⁴ Mr. Hinton's
17 corrected average result is 10.05%. This average result of 10.05% still does
18 not reflect the cost of common equity for Aqua NC, as it has not been
19 adjusted for the Company's greater risk relative to the proxy group based
20 on its small size nor for flotation costs.

⁴⁴ Schedules DWD-1R and DWD-3R, respectively.

1 **Q. MR. HINTON JUSTIFIES HIS RECOMMENDED ROE OF 8.90% BY**
2 **REVIEWING THE INTEREST COVERAGE RATIO AND CONFIRMING**
3 **THAT HIS ROE WOULD ALLOW THE COMPANY A SINGLE “A”**
4 **RATING.⁴⁵ DOES ONE MEASURE OF FINANCIAL RISK SUCH AS PRE-**
5 **TAX INTEREST COVERAGE INDICATE A SPECIFIC CREDIT RATING?**

6 **A.** No. While I do not take issue with Mr. Hinton’s inputs or calculations in
7 determining Aqua NC’s pre-tax interest coverage ratio, I note that the ratios
8 of pre-tax coverage needed to qualify for a single “A” rating range from 3.0
9 to 6.0. As can be seen in Schedule DWD-8R, ROE’s ranging from 6.45% to
10 as high as 16.13%, all allow Aqua NC to qualify for a single “A” rating based
11 on its pre-tax coverage ratio. Clearly a significantly large range of results
12 indicates that simply relying on a single measure, out of a multitude of
13 qualitative and quantitative measures reviewed by the bond/credit ratings
14 agencies, to determine a company’s bond rating is misleading and without
15 significance.

⁴⁵ Hinton Direct Testimony, at 34.

1 **C. Failure to Reflect Aqua NC's Greater Relative Risk Due to its**
2 **Small Size**

3 **Q. DOES MR. HINTON MAKE A SPECIFIC ADJUSTMENT TO REFLECT**
4 **THE SMALLER SIZE OF AQUA NC RELATIVE TO THE PROXY**
5 **GROUP?**

6 A. No. As previously discussed in my direct testimony,⁴⁶ relative company size
7 is a significant element of business risk for which investors expect to be
8 compensated through greater returns. Smaller companies are simply less
9 able to cope with significant events which affect sales, revenues and
10 earnings. For example, smaller companies face more exposure to business
11 cycles and economic conditions, both nationally and locally. Additionally,
12 the loss of revenues from a few large customers would have a far greater
13 effect on a small company than on a larger company with a more diverse
14 customer base. Finally, smaller companies are generally less diverse in
15 their operations and have less financial flexibility. Consistent with the
16 financial principle of risk and return in my direct testimony,⁴⁷ such increased
17 risk due to small size must be taken into account in the allowed rate of return
18 on common equity.

⁴⁶ D'Ascendis Direct Testimony, at 45-52.

⁴⁷ *Ibid.*, at 8.

1 Q. IS THERE ANOTHER EMPIRICAL STUDY IN ADDITION TO THE
2 EMPIRICAL ANALYSIS YOU PERFORMED IN YOUR DIRECT
3 TESTIMONY THAT EVALUATES THE EFFECT OF SIZE ON THE COST
4 OF EQUITY?

5 A. Yes. Duff & Phelps' ("D&P") 2020 Valuation Handbook Guide to Cost of
6 Capital – Market Results through 2019 ("D&P 2020") presents a Size Study
7 based on the relationship of various measures of size and return. Relative
8 to the relationship between average annual return and the various
9 measures of size, D&P state:

10 **The size of a company is one of the most important risk**
11 **elements to consider when developing cost of equity**
12 **estimates for use in valuing** a firm. Traditionally,
13 researchers have used market value of equity (*i.e.*, "market
14 capitalization" or "market cap") as a measure of size in
15 conducting historical rate of return research. For example, the
16 Center for Research in Security Prices (CRSP) "deciles" are
17 developed by sorting U.S. companies by market
18 capitalization. Another example is the Fama-French "Small
19 Minus Big" (SMB) series, which is the difference in return of
20 "small" stocks minus "big" (*i.e.*, large) stocks, as defined by
21 market capitalization. (emphasis added) ⁴⁸

22 The Size Study uses the following eight measures of size, all of which
23 have empirically shown that, over the long-term, the smaller the company,
24 the higher the risk:

- 25 • Market Value of Common Equity (or total capital if no debt /
- 26 equity);
- 27 • Book Value of Common Equity;
- 28 • Net Income (five-year average);

⁴⁸ D&P 2019, at p. 10-1.

- Market Value of Invested Capital;
- Total Assets (Invested Capital);
- Earnings Before Interest, Taxes, Depreciation & Amortization (five-year average);
- Sales / Operating Revenues; and
- Number of Employees.

I used the D&P Size Study to determine the approximate magnitude of the necessary risk premium due to the size of Aqua NC relative to the Utility Proxy Group. Schedule DWD-9R shows the relative size of Aqua NC compared with the Utility Proxy Group. Indicated size adjustments based on these relative measures range from 1.13% to 2.38%, averaging 1.73%. From these results, it is clear that Aqua NC is riskier than the Utility Proxy Group due to its smaller relative size, and that my proposed size adjustment of 20 basis points for Aqua NC is conservative.

Q. MR. HINTON SAYS THAT SINCE AQUA NC IS A PART OF ESSENTIAL UTILITIES, INC., IT SHOULD NOT RECEIVE A SIZE ADJUSTMENT. PLEASE COMMENT.

A. The fact that Aqua NC is a subsidiary of Essential Utilities, Inc., is irrelevant for ratemaking purposes, because it is the rate base of Aqua NC to which the overall rate of return set in this proceeding will be applied, which is consistent with the stand-alone nature of ratemaking. To do otherwise would be discriminatory, confiscatory, and inaccurate. It is also a basic financial precept that the use of the funds invested give rise to the risk of the investment. As Brealey and Myers state:

1 The true cost of capital depends on the use to which the
2 capital is put.

3 ***

4 ***Each project should be evaluated at its own opportunity***
5 ***cost of capital; the true cost of capital depends on the use***
6 ***to which the capital is put.*** (italics and bold in original) ⁴⁹

7 Morin confirms Brealey and Myers when he states:

8 Financial theory clearly establishes that the cost of equity is
9 the risk-adjusted opportunity cost of the investors and not the
10 cost of the specific capital sources employed by the investors.
11 The true cost of capital depends on the use to which the
12 capital is put and not on its source. The *Hope* and *Bluefield*
13 doctrines have made clear that the relevant considerations in
14 calculating a company's cost of capital are the alternatives
15 available to investors and the returns and risks associated
16 with those alternatives. (italics in original) ⁵⁰

17 Additionally, Levy and Sarnat state:

18 The firm's cost of capital is the discount rate employed to
19 discount the firm's average cash flow, hence obtaining the
20 value of the firm. It is also the weighted average cost of
21 capital, as we shall see below. The weighted average cost of
22 capital should be employed for project evaluation...only in
23 cases where the risk profile of the new projects is a "carbon
24 copy" of the risk profile of the firm.⁵¹

25 Although Levy and Sarnat discuss a project's cost of capital relative
26 to a firm's cost of capital, these principles apply equally to the use of a proxy
27 group-based cost of capital. Each company must be viewed on its own

⁴⁹ Richard A. Brealey and Stewart C. Myers, Principles of Corporate Finance, McGraw-Hill, Inc., 1988, at pp. 173, 198.

⁵⁰ Morin, at p. 523.

⁵¹ Haim Levy & Marshall Sarnat, Capital Investment and Financial Decisions, Prentice/Hall International, 1986, p. 465.

1 merits, regardless of the source of its equity capital. As *Bluefield* clearly
2 states:

3 A public utility is entitled to such rates as will permit it to earn
4 a return on the value of the property which it employs for the
5 convenience of the public equal to that generally being made
6 at the same time and in the same general part of the country
7 on investments in other business undertakings which are
8 attended by corresponding risks and uncertainties.⁵²

9 In other words, it is the “risks and uncertainties” surrounding the
10 property employed for the “convenience of the public” which determines the
11 appropriate level of rates. In this proceeding, the property employed “for
12 the convenience of the public” is the rate base of Aqua NC. Thus, it is only
13 the risk of investment in Aqua NC’s rate base that is relevant to the
14 determination of the cost of common equity to be applied to the common
15 equity-financed portion of that rate base.

16 In addition, Fama and French proposed that their three-factor model
17 include the SMB (Small Minus Big) factor, which indicates that small
18 capitalization firms are more risky than large capitalization firms, confirming
19 that size is a risk factor which must be taken into account in estimating the
20 cost of common equity.⁵³

21 **Q. MR. HINTON CLAIMS THAT IF SIZE ADJUSTMENTS WERE ALLOWED**
22 **BY THE COMMISSION, UTILITIES WOULD BREAK APART THEIR**

⁵² Bluefield Water Works Improvement Co. v. Public Serv. Comm’n, 262 U.S. 679 (1922). (“Bluefield”)

⁵³ Eugene F. Fama and Kenneth R. French, “The Capital Asset Pricing Model: Theory and Evidence,” *Journal of Economic Perspectives*, Summer 2004, Vol. 18, Issue 3, pp. 25-46.

1 **OPERATIONS TO TAKE ADVANTAGE OF THE ADJUSTMENT. IS THIS**
2 **HAPPENING IN THE CURRENT ENVIRONMENT?**

3 A. No. In fact, the opposite is true. Water utilities have been methodically
4 merging operating subsidiaries across the country to take advantage of
5 synergies that benefit companies with larger size. Legislation in North
6 Carolina was just passed to allow regulated utilities to pay fair market value
7 for municipal water and wastewater systems in an effort to promote
8 regionalization of water and wastewater systems.

9 **Q. MR. HINTON CITES A STUDY BY DR. ANNIE WONG FOR THE**
10 **PROPOSITION THAT THERE IS NO SIZE PREMIUM FOR UTILITIES.**
11 **DOES THIS STUDY SUPPORT THAT PROPOSITION?**

12 A. No. Dr. Wong's study is flawed because she attempts to relate a change in
13 size to beta coefficients, which account for only a small percentage of
14 diversifiable company-specific risk. Size is company-specific and therefore
15 diversifiable. For example, the average R-squared, or coefficient of
16 determination for the Utility Proxy Group, is 0.0492 as shown on Schedule
17 DWD-10R. An R-squared of 0.0492 means that approximately 5% of total
18 risk is explained by beta, leaving 95% unexplained by beta.

19 **Q. IS THERE A PUBLISHED RESPONSE TO DR. WONG'S ARTICLE?**

20 A. Yes, there is. In response to Professor Wong's article, *The Quarterly*
21 *Review of Economics and Finance* published an article in 2003, authored
22 by Thomas M. Zepp, which commented on the Annie Wong article cited by

1 Mr. Hinton. Relative to Ms. Wong's results, Dr. Zepp concluded in the
2 Abstract on page 1 of his article: "Her weak results, however, do not rule
3 out the possibility of a small firm effect for utilities."⁵⁴ Dr. Zepp also noted on
4 page 582 that: "Two other studies discussed here support a conclusion that
5 smaller water utility stocks are more risky than larger ones. To the extent
6 that water utilities are representative of all utilities, there is support for
7 smaller utilities being more risky than larger ones."⁵⁵ Finally, I note that
8 Professor Wong's study, while relying on a large group of gas and electric
9 utilities, employed no water utilities.

10 **Q. ARE YOU AWARE OF ANY OTHER ACADEMIC ARTICLE RELATING**
11 **TO THE APPLICABILITY OF A SIZE PREMIUM?**

12 A. Yes. An article by Michael A. Paschall, ASA, CFA, and George B. Hawkins
13 ASA, CFA, "Do Smaller Companies Warrant a Higher Discount Rate for
14 Risk?" also supports the applicability of a size premium. As the article
15 makes clear, all else equal, size is a risk factor which must be taken into
16 account when setting the cost of capital or capitalization (discount) rate.
17 Paschall and Hawkins state in their conclusion as follows:

18 The current challenge to traditional thinking about a small
19 stock premium is a very real and potentially troublesome
20 issue. The challenge comes from bright and articulate people
21 and has already been incorporated into some court cases,
22 providing further ammunition for the IRS. Failing to consider
23 the additional risk associated with most smaller companies,
24 however, is to fail to acknowledge reality. Measured properly,

⁵⁴ Thomas M. Zepp, Thomas M. "Utility Stocks and the Size Effect --- Revisited", *The Quarterly Review of Economics and Finance*, 43 (2003) at 578-582.

⁵⁵ *Ibid*, at 582.

1 small company stocks have proven to be more risky over a
2 long period of time than have larger company stocks. This
3 makes sense due to the various advantages that larger
4 companies have over smaller companies. Investors looking
5 to purchase a riskier company will require a greater return on
6 investment to compensate for that risk. There are numerous
7 other risks affecting a particular company, yet the use of a size
8 premium is one way to quantify the risk associated with
9 smaller companies.⁵⁶

10 Hence, Paschall and Hawkins corroborate the need for a small size
11 adjustment, all else equal. Consistent with the financial principle of risk and
12 return discussed previously, and the stand-alone nature of ratemaking, an
13 upward adjustment must be applied to the indicated cost of common equity
14 derived from the cost of equity models of the Utility Proxy Group used in this
15 proceeding.

16 **Q. DOES MR. HINTON RESPOND TO YOUR UTILITY-BASED SIZE STUDY**
17 **PRESENTED IN YOUR DIRECT TESTIMONY?**⁵⁷

18 A. No. He simply states he is not persuaded that my analysis supports my
19 conclusion that small size does increase risk for utilities, but has no critiques
20 of my inputs (the coefficient of variation ("CoV") of net profit and market
21 capitalization from *Value Line*), nor does he refute that the CoV of net profit
22 is a measure of business risk.

⁵⁶ Michael A. Paschall, ASA, CFA and George B. Hawkins ASA, CFA, "Do Smaller Companies Warrant a Higher Discount Rate for Risk?", CCH Business Valuation Alert, Vol. 1, Issue No. 2, December 1999.

⁵⁷ D'Ascendis Direct Testimony, at 50-52.

1 **D. Flotation Costs**

2 **Q. DOES MR. HINTON PROPOSE A FLOTATION COST ADJUSTMENT**
3 **FOR AQUA NC?**

4 A. No, he does not. Mr. Hinton states that flotation costs associated with the
5 issuance of common equity outside of the test year or immediate future
6 should not be reflected in the ROE. I disagree. As discussed in my direct
7 testimony,⁵⁸ since common equity has an indefinite life, all flotation costs,
8 not just current flotation costs, should be recovered through an adjustment
9 to the ROE. As such, Mr. Hinton should have included this cost in his
10 recommended ROE.

11 **Q. IN AN EFFORT TO MINIMIZE POINTS OF CONTENTION BETWEEN**
12 **YOU AND MR. HINTON, DID YOU ELIMINATE EQUITY ISSUANCES**
13 **OUTSIDE OF THE TEST YEAR IN YOUR UPDATED ANALYSIS?**

14 A. Yes, I did. Using equity issuances during the test year, I calculated flotation
15 costs of 0.05% as shown on page 34 of Schedule DWD-1R.

16 **E. Consideration of Mechanisms in Place for Aqua NC**

17 **Q. MR. HINTON DISCUSSES THE COMPANY'S WATER AND SEWER**
18 **SYSTEM IMPROVEMENT CHARGE MECHANISMS AND THE**

⁵⁸ *Ibid.*, at 52-54.

1 **COMPANY’S REQUESTED CAM THAT HE CLAIMS IMPACT RISK FOR**
2 **AQUA NC.⁵⁹ IS HIS CLAIM VALID?**

3 A. No. The cost of capital is a comparative exercise, so if the mechanism is
4 common throughout the companies on which one bases their analyses on,
5 the comparative risk is zero, because any impact of the perceived reduced
6 risk of the mechanism(s) by investors would be reflected in the market data
7 of the proxy group, as noted by Mr. Hinton on page 33 of his direct testimony
8 regarding the gas utilities in North Carolina. To that point, as shown on
9 Schedule DWD-11R, every single one of the proxy companies has a
10 Distribution Service Improvement Charge and five of seven of the Utility
11 Proxy Group companies have a CAM-type mechanism in at least one of
12 their jurisdictions.

13 **Q. ARE YOU AWARE OF ANY STUDIES THAT HAVE ADDRESSED THE**
14 **RELATIONSHIP BETWEEN DECOUPLING MECHANISMS,**
15 **GENERALLY, AND ROE?**

16 A. Yes. I, along with Dr. Richard A. Michelfelder of Rutgers University, and my
17 colleague at ScottMadden, Pauline M. Ahern, CRRRA, examined the
18 relationship between decoupling and ROE among electric, gas, and water
19 utilities. Using the generalized consumption asset pricing model, also

⁵⁹ Hinton Direct Testimony, at 31-33.

1 known as the PRPM, we found decoupling to have no statistically significant
2 effect on investor perceived risk, and hence, ROE.⁶⁰

3 Also, in March 2014, The Brattle Group (“Brattle”) published a study
4 addressing the effect of revenue decoupling structures on the cost of capital
5 for electric utilities.⁶¹ In its report, which extended a prior analysis focused
6 on natural gas distribution utilities, Brattle pointed out that although
7 decoupling structures may affect revenues, net income still can vary.⁶²
8 Brattle further noted that the distinction between diversifiable and non-
9 diversifiable risk is important to equity investors, and the relationship
10 between decoupling and ROE should be examined in that context. Further
11 to that point, Brattle noted that although reductions in total risk may be
12 important to bondholders, only reductions in non-diversifiable business risk
13 would justify a reduction to the ROE.⁶³ In November 2016, the Brattle study
14 was updated based on data through the fourth quarter of 2015.⁶⁴

15 Brattle’s empirical analysis examined the relationship between
16 decoupling and the After-Tax WACC for a group of electric utilities that had
17 implemented decoupling structures in various jurisdictions throughout the

⁶⁰ Dr. Richard A. Michelfelder, Pauline M. Ahern, Dylan W. D’Ascendis, *The Impact of Decoupling on The Cost of Capital of Public Utilities*, Energy Policy 130 (2019), at 311-319.

⁶¹ The Brattle Group, *The Impact of Revenue Decoupling on the Cost of Capital for Electric Utilities: An Empirical Investigation*, Prepared for the Energy Foundation, March 20, 2014.

⁶² *Ibid.*, at 7.

⁶³ *Ibid.*, at 8.

⁶⁴ Michael J. Vilbert, Joseph B. Wharton, Shirley Zhang and James Hall, *Effect on the Cost of Capital of Innovative Ratemaking that Relaxes the Linkage between Revenue and kWh Sales – An Updated Empirical Investigation*, November 2016. Also available at http://files.brattle.com/files/5711_effect_on_the_cost_of_capital_of_ratemaking_that_relaxes_the_linkage_between_revenue_and_kwh_sales.pdf.

1 United States. As with Brattle's 2014 study, the updated study found no
2 statistically significant link between the cost of capital and revenue
3 decoupling structures.⁶⁵

4 In view of all of the above, Aqua NC's ROE should not be reduced if
5 the CAM is approved by the Commission in this Docket.

6 **VII. CONCLUSION**

7 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

8 A. Yes, it does.

9

⁶⁵ *Ibid.*

Aqua North Carolina, Inc.
Recommended Capital Structure and Cost Rates
for Ratemaking Purposes
at December 31, 2019

<u>Type Of Capital</u>	<u>Ratios (1)</u>	<u>Cost Rate</u>		<u>Weighted Cost Rate</u>
Long-Term Debt	50.00%	4.21%	(1)	2.11%
Common Equity	50.00%	11.00%	(2)	5.50%
Total	100.00%			7.61%

Notes:

- (1) Company-provided.
- (2) From page 2 of this Schedule.

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

<u>Line No.</u>	<u>Principal Methods</u>	<u>Proxy Group of Seven Water Companies</u>	<u>Results using Current Interest Rates</u>
1.	Discounted Cash Flow Model (DCF) (1)	9.07%	9.07%
2.	Risk Premium Model (RPM) (2)	10.91%	10.56%
3.	Capital Asset Pricing Model (CAPM) (3)	10.90%	10.67%
4.	Market Models Applied to Comparable Risk, Non-Price Regulated Companies (4)	<u>11.48%</u>	<u>11.28%</u>
5.	Indicated Common Equity Cost Rate before Adjustments	10.75%	10.50%
6.	Size Risk Adjustment (5)	0.20%	0.20%
7.	Flotation Cost Adjustment (6)	<u>0.05%</u>	<u>0.05%</u>
8.	Recommended Common Equity Cost Rate after Adjustment	<u><u>11.00%</u></u>	<u><u>10.75%</u></u>

- Notes:
- (1) From page 3 of this Schedule.
 - (2) From page 11 of this Schedule.
 - (3) From page 23 of this Schedule.
 - (4) From page 28 of this Schedule.
 - (5) Adjustment to reflect Aqua NC's greater business risk relative to the Utility Proxy Group as detailed in the direct testimony.
 - (6) From page 34 of this Schedule.

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

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven 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	Bloomberg 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.	1.45 %	6.50 %	NA %	6.00 %	6.00 %	6.17 %	1.49 %	7.66 %
American Water Works Company Inc	1.73	8.50	8.10	8.20	8.19	8.25	1.80	10.05
California Water Service Group	1.66	6.50	NA	9.80	9.00	8.43	1.73	10.16
Essential Utilities, Inc.	2.11	10.00	5.90	6.40	6.69	7.25	2.19	9.44
Middlesex Water Co.	1.66	6.00	NA	2.70	NA	4.35	1.70	6.05
SJW Group	2.04	6.00	4.00	14.00	7.00	7.75	2.12	9.87
York Water Co.	1.66	7.00	NA	4.90	NA	5.95	1.71	7.66
							Average	8.70 %
							Median	9.44 %
							Average of Mean and Median	9.07 %

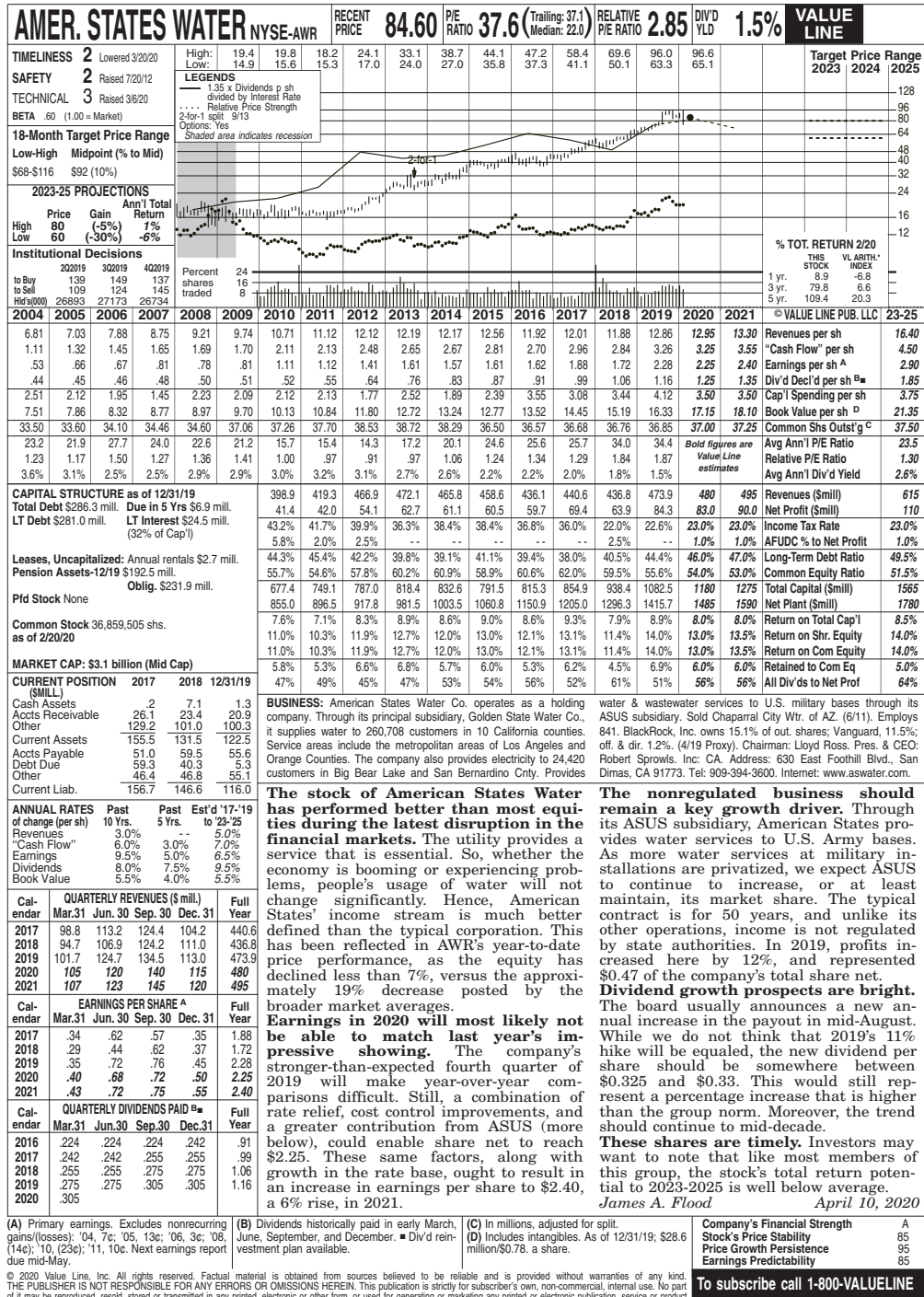
NA= Not Available

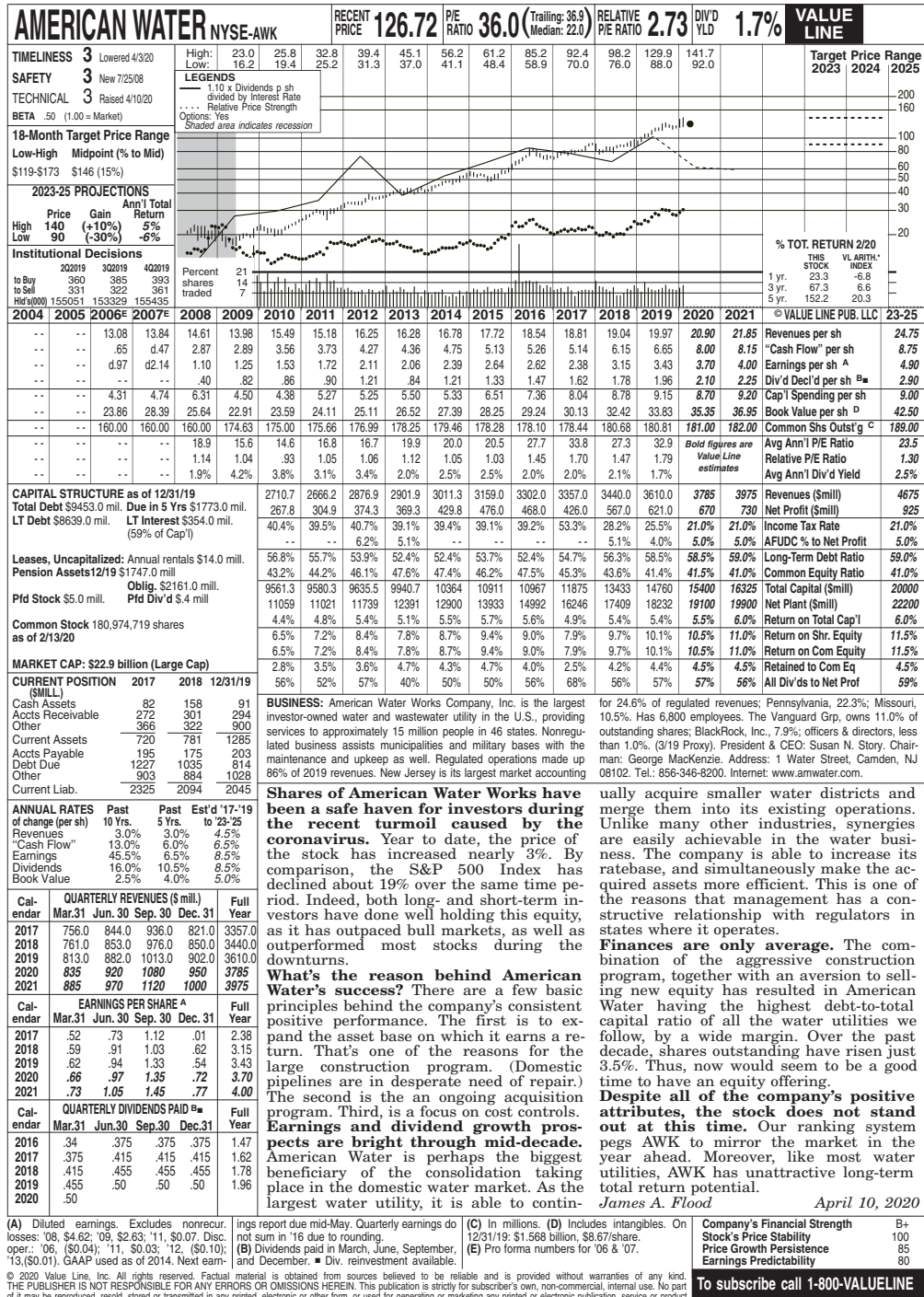
Notes:

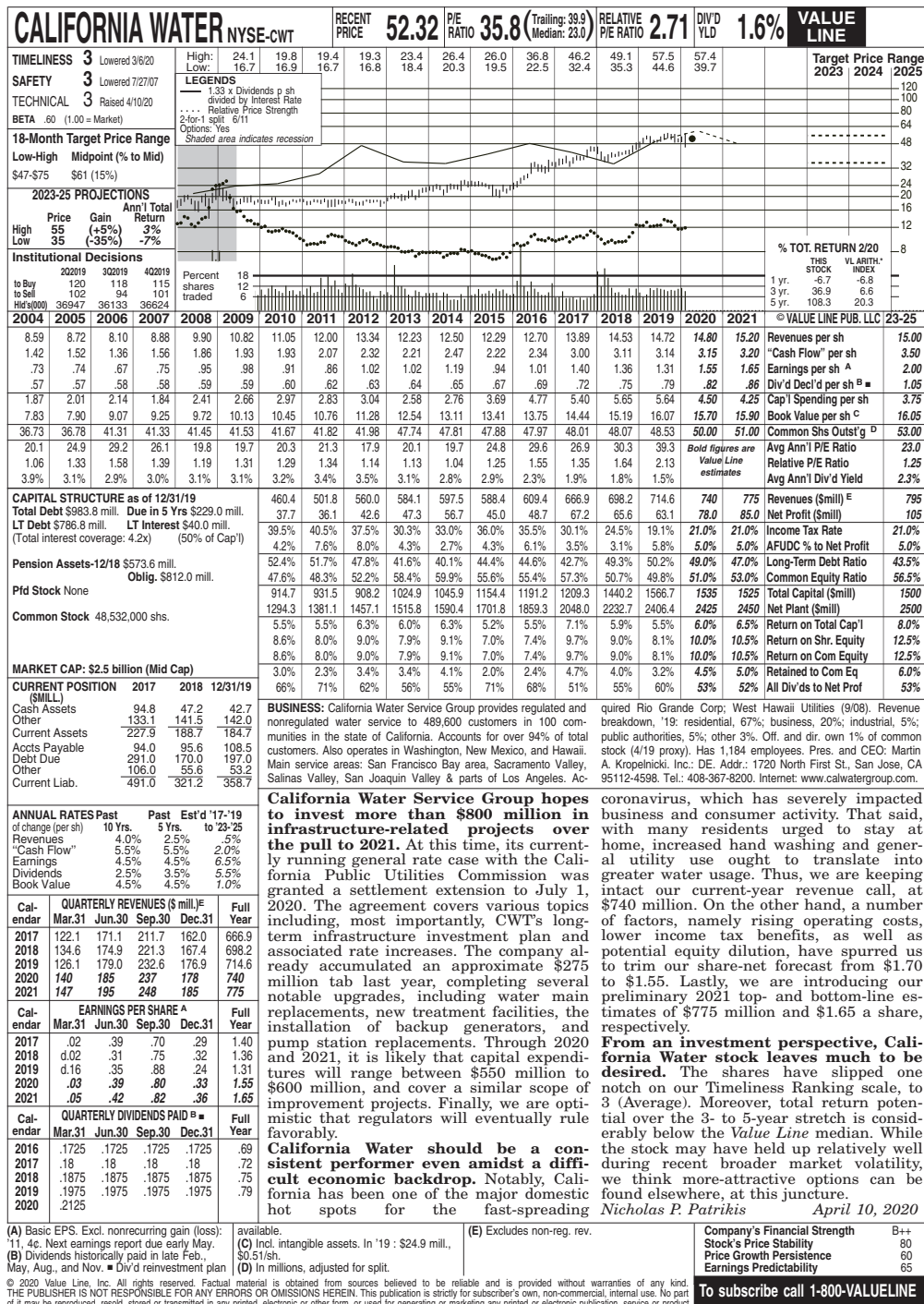
- (1) Indicated dividend at 04/30/2020 divided by the average closing price of the last 60 trading days ending 04/30/2020 for each company.
- (2) From pages 4 through 10 of this Schedule.
- (3) Average of columns 2 through 4 excluding negative growth rates.
- (4) This reflects a growth rate component equal to one-half the conclusion of growth rate (from column 5) x column 1 to reflect the periodic payment of dividends (Gordon Model) as opposed to the continuous payment. Thus, for American States Water Co., $1.45\% \times (1 + (1/2 \times 6.17\%)) = 1.49\%$.
- (5) Column 5 + column 6.

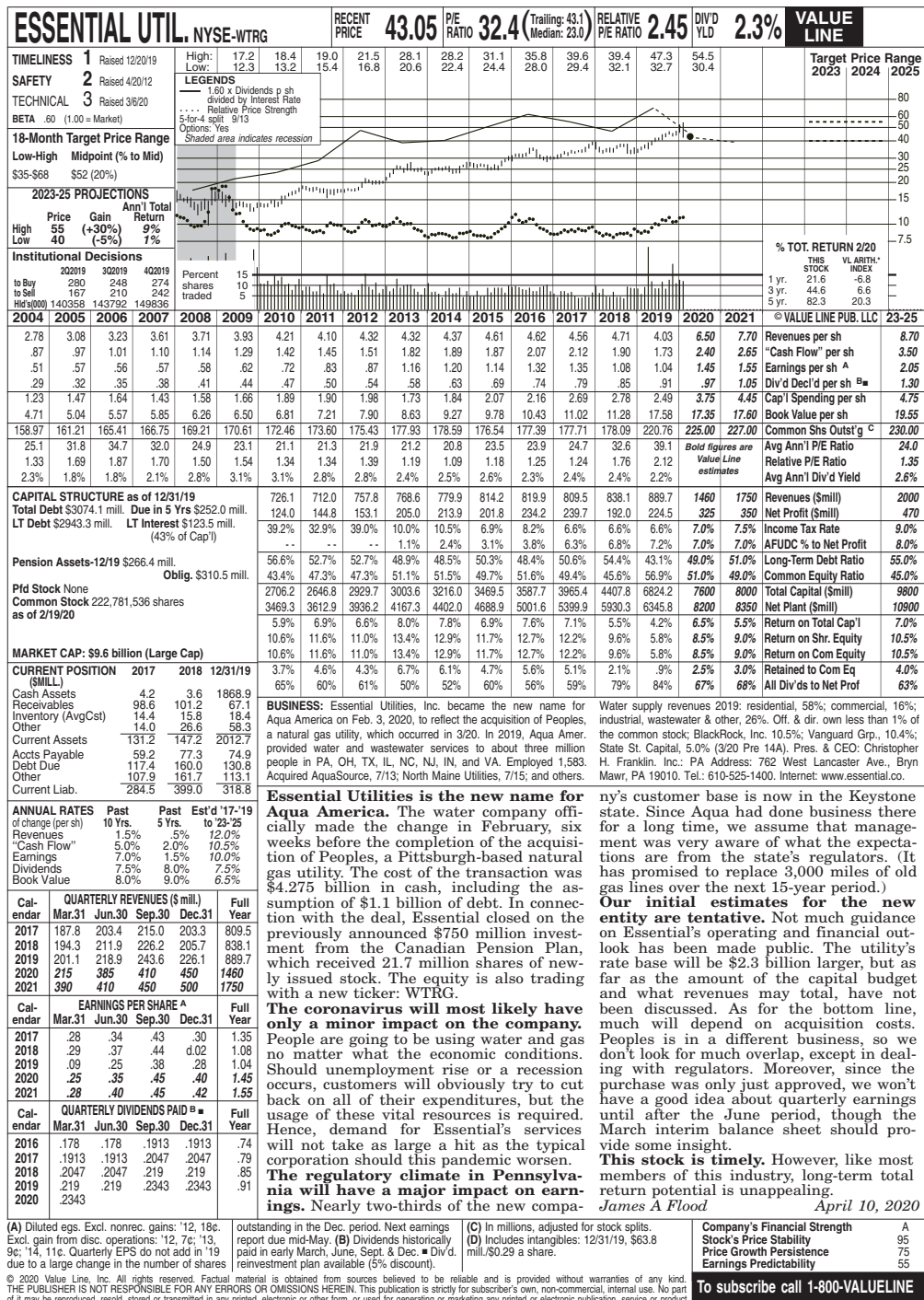
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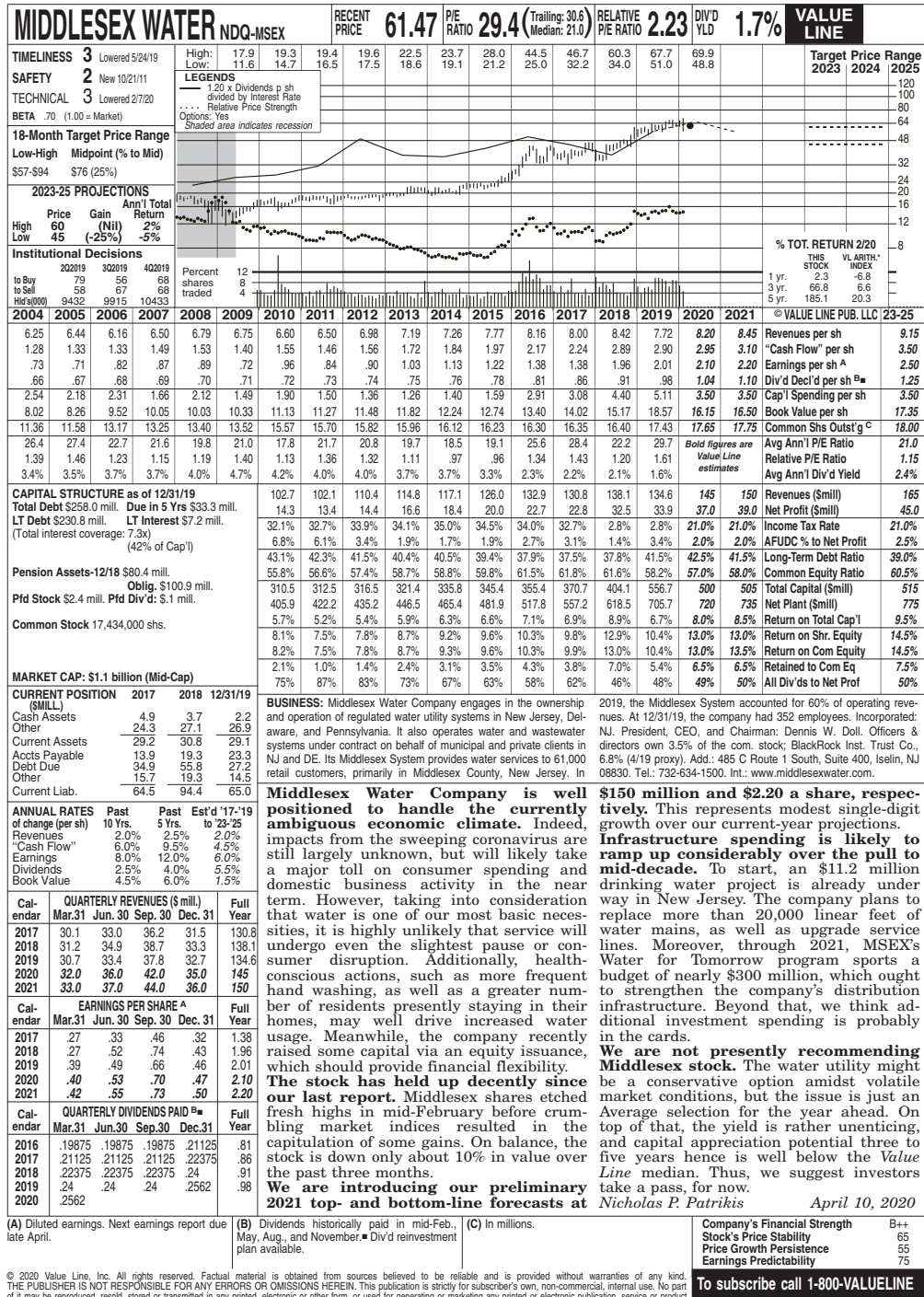
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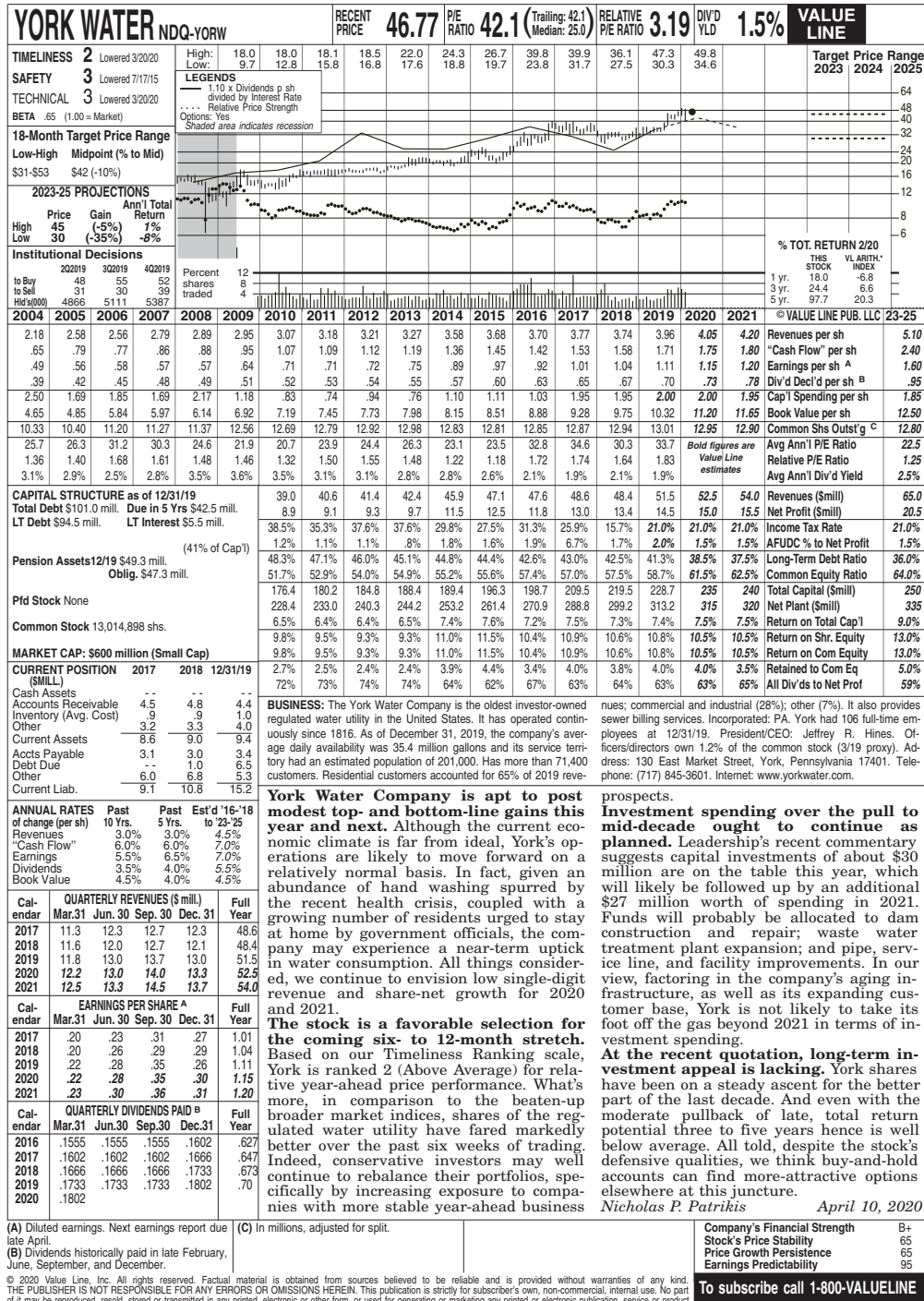




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Aqua North Carolina, Inc.
Summary of Risk Premium Models for the
Proxy Group of Seven Water Companies

	<u>Proxy Group of Seven Water Companies</u>	<u>Results using Current Interest Rates</u>
Predictive Risk Premium Model (PRPM) (1)	11.31 %	10.85 %
Risk Premium Using an Adjusted Total Market Approach (2)	<u>10.50 %</u>	<u>10.27 %</u>
Average	<u><u>10.91 %</u></u>	<u><u>10.56 %</u></u>

Notes:

(1) From page 12 of this Schedule.

(2) From page 13 of this Schedule.

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

Using Projected Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Proxy Group of Seven Water Companies	LT Average Predicted Variance	Spot Predicted Variance	Recommended Variance	GARCH Coefficient	Predicted Risk Premium (2)	Risk-Free Rate (3)	Indicated ROE (4)
American States Water Co.	0.38%	0.45%	0.41%	1.89033	9.83%	2.03%	11.86%
American Water Works Company Inc	NMF	NMF	NMF	5.52177	NMF	2.03%	NMF
California Water Service Group	0.32%	0.32%	0.32%	1.90111	7.55%	2.03%	9.58%
Essential Utilities, Inc.	0.44%	0.53%	0.49%	2.25364	14.02%	2.03%	16.05%
Middlesex Water Co.	0.30%	0.27%	0.29%	2.12256	7.52%	2.03%	9.55%
SJW Group	0.42%	0.44%	0.43%	1.51190	8.03%	2.03%	10.06%
York Water Co.	0.45%	0.37%	0.41%	2.09473	10.81%	2.03%	12.84%
						Average	<u>11.66%</u>
						Median	<u>10.96%</u>
						Average of Mean and Median	<u>11.31%</u>

Proxy Group of Seven Water Companies	LT Average Predicted Variance	Spot Predicted Variance	Recommended Variance	GARCH Coefficient	Predicted Risk Premium (2)	Risk-Free Rate (5)	Indicated ROE (4)
American States Water Co.	0.38%	0.45%	0.41%	1.89033	9.83%	1.57%	11.40%
American Water Works Company Inc	NMF	NMF	NMF	5.52177	NMF	1.57%	NMF
California Water Service Group	0.32%	0.32%	0.32%	1.90111	7.55%	1.57%	9.12%
Essential Utilities, Inc.	0.44%	0.53%	0.49%	2.25364	14.02%	1.57%	15.59%
Middlesex Water Co.	0.30%	0.27%	0.29%	2.12256	7.52%	1.57%	9.09%
SJW Group	0.42%	0.44%	0.43%	1.51190	8.03%	1.57%	9.60%
York Water Co.	0.45%	0.37%	0.41%	2.09473	10.81%	1.57%	12.38%
						Average	<u>11.20%</u>
						Median	<u>10.50%</u>
						Average of Mean and Median	<u>10.85%</u>

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) $(1 + (\text{Column [3]} * \text{Column [4]})^{12}) - 1$.
- (3) From note 2 on page 24 of this Schedule.
- (4) Column [5] + Column [6].
- (5) From note 3 on page 24 of this Schedule.

Aqua North Carolina, Inc.
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 Seven Water Companies</u>	<u>Results using Current Interest Rates</u>
1.	Prospective Yield on Aaa Rated Corporate Bonds (1)	3.21 %	
2.	Adjustment to Reflect Yield Spread Between Aaa Rated Corporate Bonds and A Rated Public Utility Bonds	<u>0.53</u> (2)	
3.	Adjusted Prospective Yield on A Rated Public Utility Bonds	3.74 %	
4.	Current Yield on A Rated Public Utility Bonds (3)		3.27 %
5.	Adjustment to Reflect Bond Rating Difference of Proxy Group (4)	<u>0.08</u>	<u>0.08</u>
6.	Adjusted Bond Yield	3.82 %	3.35 %
7.	Equity Risk Premium (5)	<u>6.68</u>	<u>6.92</u>
8.	Risk Premium Derived Common Equity Cost Rate	<u>10.50</u> %	<u>10.27</u> %

- Notes: (1) Consensus forecast of Moody's Aaa Rated Corporate bonds from Blue Chip Financial Forecasts (see pages 20-21 of this Schedule).
- (2) The average yield spread of A rated public utility bonds over Aaa rated corporate bonds of 0.53% from page 14 of this Schedule.
- (3) Three-month average A rated public utility bond yield ending April 2020.
- (4) Adjustment to reflect the A2/A3 Moody's LT issuer rating of the Utility Proxy Group as shown on page 15 of this Schedule. The 0.08% upward adjustment is derived by taking 1/6 of the spread between A2 and Baa2 Public Utility Bonds ($1/6 * 0.46\% = 0.08\%$) as derived from page 14 of this Schedule.
- (5) From page 17 of this Schedule.

Aqua North Carolina, Inc.
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>
Apr-2020	2.43 %	3.19 %	3.82 %
Mar-2020	3.02	3.50	3.96
Feb-2020	<u>2.78</u>	<u>3.11</u>	<u>3.42</u>
Average	<u><u>2.74 %</u></u>	<u><u>3.27 %</u></u>	<u><u>3.73 %</u></u>

Selected Bond Spreads

A Rated Public Utility Bonds Over Aaa Rated Corporate Bonds:

0.53 % (1)

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

0.46 % (2)

Notes:

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

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

Source of Information:

Bloomberg Professional Service

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

	Moody's		Standard & Poor's	
	Long-Term Issuer Rating		Long-Term Issuer Rating	
	April 2020		April 2020	
<u>Proxy Group of Seven 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
California Water Service Group (4)	NR	- -	A+	5.0
Essential Utilities, Inc. (5)	NR	- -	A	6.0
Middlesex Water Co.	NR	- -	A	6.0
SJW Corp. (6)	NR	- -	A/A-	6.5
York Water Co.	NR	- -	A-	7.0
Average	<u>A2/A3</u>	<u>6.5</u>	<u>A</u>	<u>5.9</u>

Notes:

- (1) From page 16 of this Schedule.
- (2) Ratings that of Golden State Water Company.
- (3) Ratings that of New Jersey and Pennsylvania American Water Companies.
- (4) Ratings that of California Water Service Company.
- (5) Ratings that of Aqua Pennsylvania, Inc.
- (6) Ratings that of San Jose Water Company and The Connecticut Water Company

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

Numerical Assignment for
Moody's and Standard & Poor's Bond Ratings

Moody's Bond Rating	Numerical Bond Weighting	Standard & Poor's Bond Rating
Aaa	1	AAA
Aa1	2	AA+
Aa2	3	AA
Aa3	4	AA-
A1	5	A+
A2	6	A
A3	7	A-
Baa1	8	BBB+
Baa2	9	BBB
Baa3	10	BBB-
Ba1	11	BB+
Ba2	12	BB
Ba3	13	BB-
B1	14	B+
B2	15	B
B3	16	B-

Aqua North Carolina, Inc.
Judgment of Equity Risk Premium for
Proxy Group of Seven Water Companies

<u>Line No.</u>		<u>Proxy Group of Seven Water Companies</u>	<u>Results using Current Interest Rates</u>
1.	Calculated equity risk premium based on the total market using the beta approach (1)	7.60 %	7.80 %
2.	Mean equity risk premium based on a study using the holding period returns of public utilities with A rated bonds (2)	<u>5.76</u>	<u>6.04</u>
3.	Average equity risk premium	<u><u>6.68</u></u> %	<u><u>6.92</u></u> %

Notes: (1) From page 18 of this Schedule.
(2) From page 22 of this Schedule.

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

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Seven Water Companies</u>	<u>Results using Current Interest Rates</u>
<u>Ibbotson-Based Equity Risk Premiums:</u>			
1.	Ibbotson Equity Risk Premium (1)	5.78 %	5.78 %
2.	Regression on Ibbotson Risk Premium Data	9.12 (2)	9.59 (3)
3.	Ibbotson Equity Risk Premium based on PRPM (4)	11.95	11.95
4.	Equity Risk Premium Based on Value Line Summary and Index	15.50 (5)	15.90 (6)
5.	Equity Risk Premium Based on Value Line S&P 500 Companies	11.58 (7)	11.98 (8)
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies	<u>10.32 (9)</u>	<u>10.71 (10)</u>
7.	Conclusion of Equity Risk Premium	10.71 %	10.98 %
8.	Adjusted Beta (11)	<u>0.71</u>	<u>0.71</u>
9.	Forecasted Equity Risk Premium	<u><u>7.60 %</u></u>	<u><u>7.80 %</u></u>

Notes provided on page 19 of this Schedule.

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

Notes:

- (1) Based on the arithmetic mean historical monthly returns on large company common stocks from Ibbotson® SBBI® 2020 Market Report minus the arithmetic mean monthly yield of Moody's average Aaa and Aa corporate bonds from 1926-2019.
- (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 1928-2019 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the average consensus forecast of Aaa corporate bonds of 3.21% (from page 13 of this Schedule).
- (3) 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 1928-2019 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the three-month average Aaa and Aa rated corporate bond of 2.82%.
- (4) 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 April 2020.
- (5) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the average consensus forecast of Aaa corporate bond yields of 3.21% (from page 13 of this Schedule) from the projected 3-5 year total annual market return of 18.71% (described fully in note 1 on page 24 of this Schedule).
- (6) The equity risk premium based on the Value Line Summary and Index is derived by subtracting the current 3-month average of Aaa and Aa corporate bond yields of 2.82% from the projected 3-5 year total annual market return of 18.71% (described fully in note 1 on page 24 of this Schedule).
- (7) Using data from Value Line for the S&P 500, an expected total return of 14.79% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 3.21% results in an expected equity risk premium of 11.58%.
- (8) Using data from Value Line for the S&P 500, an expected total return of 14.79% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the current 3-month average of Aaa and Aa corporate bond yields of 2.82% results in an expected equity risk premium of 11.98%.
- (9) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 13.53% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the average consensus forecast of Aaa corporate bonds of 3.21% results in an expected equity risk premium of 10.32%.
- (10) Using data from the Bloomberg Professional Service for the S&P 500, an expected total return of 13.53% was derived based upon expected dividend yields and long-term earnings growth estimates as a proxy for capital appreciation. Subtracting the current 3-month average of Aaa and Aa corporate bond yields of 2.82% results in an expected equity risk premium of 10.71%.
- (11) Average of mean and median beta from page 23 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2020 SBBI Yearbook, John Wiley & Sons, Inc.
Industrial Manual and Mergent Bond Record Monthly Update.
Value Line Summary and Index
Blue Chip Financial Forecasts, May 1, 2020 and December 1, 2019
Bloomberg Professional Service

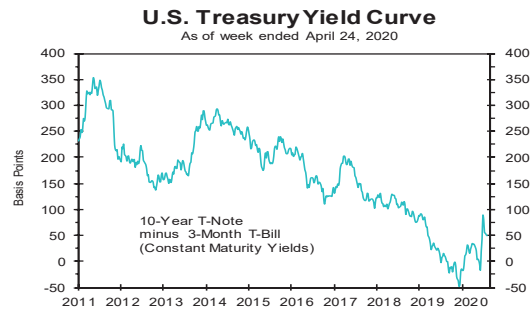
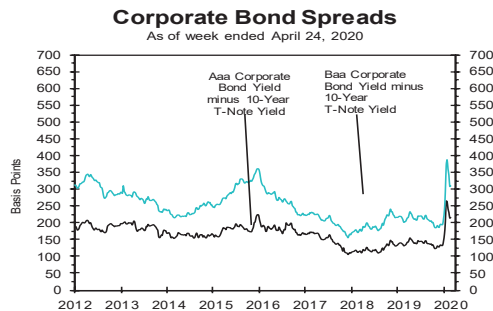
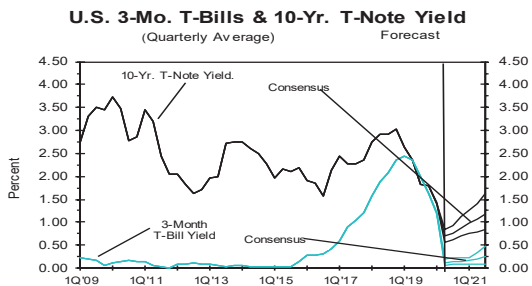
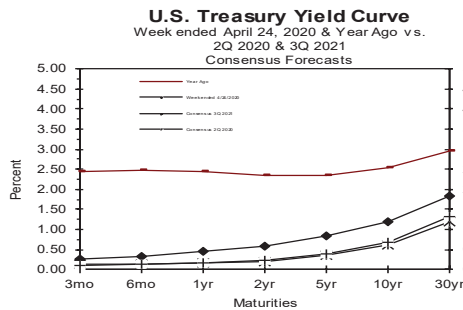
2 ■ BLUE CHIP FINANCIAL FORECASTS ■ MAY 1, 2020

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

Interest Rates	History								Consensus Forecasts-Quarterly Avg.					
	Average For Week Ending				Average For Month				2Q	3Q	4Q	1Q	2Q	3Q
	Apr 24	Apr 17	Apr 10	Apr 3	Mar	Feb	Jan	1Q 2020	2020	2020	2020	2021	2021	2021
Federal Funds Rate	0.05	0.05	0.05	0.09	0.65	1.58	1.55	1.26	0.1	0.1	0.1	0.1	0.2	0.2
Prime Rate	3.25	3.25	3.25	3.25	3.81	4.75	4.75	4.44	3.3	3.3	3.3	3.3	3.3	3.4
LIBOR, 3-mo.	1.01	1.14	1.30	1.42	1.10	1.68	1.82	1.53	0.9	0.7	0.6	0.6	0.6	0.7
Commercial Paper, 1-mo.	0.38	0.37	0.37	1.42	1.36	1.55	1.56	1.49	0.4	0.4	0.4	0.4	0.5	0.6
Treasury bill, 3-mo.	0.12	0.17	0.19	0.10	0.30	1.54	1.55	1.13	0.1	0.1	0.1	0.2	0.2	0.3
Treasury bill, 6-mo.	0.14	0.21	0.21	0.14	0.30	1.51	1.56	1.12	0.1	0.2	0.2	0.2	0.3	0.3
Treasury bill, 1 yr.	0.17	0.21	0.22	0.15	0.33	1.41	1.53	1.09	0.2	0.2	0.3	0.3	0.4	0.4
Treasury note, 2 yr.	0.21	0.22	0.26	0.23	0.45	1.33	1.52	1.10	0.2	0.3	0.4	0.4	0.5	0.6
Treasury note, 5 yr.	0.36	0.38	0.45	0.38	0.59	1.32	1.56	1.16	0.4	0.5	0.6	0.7	0.7	0.8
Treasury note, 10 yr.	0.61	0.68	0.73	0.65	0.87	1.50	1.76	1.38	0.7	0.8	0.9	1.0	1.1	1.2
Treasury note, 30 yr.	1.19	1.31	1.33	1.29	1.46	1.97	2.22	1.88	1.3	1.4	1.5	1.6	1.7	1.8
Corporate Aaa bond	2.75	2.81	3.03	3.05	3.11	2.85	3.04	3.00	2.6	2.7	2.8	2.8	2.9	3.0
Corporate Baa bond	3.70	3.75	4.13	4.23	4.11	3.50	3.66	3.76	4.3	4.3	4.2	4.3	4.2	4.3
State & Local bonds	3.37	3.29	3.42	3.45	3.29	2.93	3.00	3.07	2.6	2.6	2.6	2.6	2.6	2.6
Home mortgage rate	3.33	3.31	3.33	3.33	3.45	3.47	3.62	3.51	3.3	3.3	3.2	3.2	3.3	3.3

Key Assumptions	History								Consensus Forecasts-Quarterly					
	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q
	2018	2018	2018	2019	2019	2019	2019	2020	2020	2020	2020	2021	2021	2021
Fed's AFE \$ Index	105.5	107.8	109.4	109.4	110.3	110.5	110.3	111.2	113.5	113.5	113.2	112.9	112.5	112.2
Real GDP	3.5	2.9	1.1	3.1	2.0	2.1	2.1	-4.8	-27.8	7.4	9.2	6.6	4.8	3.6
GDP Price Index	3.2	2.0	1.6	1.1	2.4	1.8	1.3	1.3	0.1	1.1	1.3	1.7	1.9	1.8
Consumer Price Index	2.2	2.1	1.3	0.9	3.0	1.8	2.4	1.2	-2.4	1.1	1.7	2.1	2.1	2.1

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).



14 ■ BLUE CHIP FINANCIAL FORECASTS ■ DECEMBER 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	1.5	1.9	2.1	2.3	2.4	2.1	2.4
	Top 10 Average	2.1	2.6	2.7	2.9	3.0	2.6	3.0
	Bottom 10 Average	1.0	1.2	1.5	1.8	1.9	1.5	1.9
2. Prime Rate	CONSENSUS	4.5	4.9	5.1	5.4	5.5	5.1	5.5
	Top 10 Average	5.0	5.5	5.7	6.0	6.0	5.6	6.0
	Bottom 10 Average	4.0	4.3	4.6	4.9	5.0	4.5	5.0
3. LIBOR, 3-Mo.	CONSENSUS	1.9	2.2	2.4	2.6	2.7	2.3	2.7
	Top 10 Average	2.4	2.7	2.9	3.1	3.2	2.9	3.2
	Bottom 10 Average	1.4	1.6	1.8	2.0	2.2	1.8	2.2
4. Commercial Paper, 1-Mo.	CONSENSUS	1.7	2.1	2.3	2.5	2.7	2.3	2.7
	Top 10 Average	2.2	2.5	2.8	3.0	3.1	2.7	3.1
	Bottom 10 Average	1.3	1.6	1.8	2.1	2.2	1.8	2.2
5. Treasury Bill Yield, 3-Mo.	CONSENSUS	1.5	1.8	2.0	2.3	2.4	2.0	2.4
	Top 10 Average	2.1	2.6	2.7	2.9	3.0	2.6	3.0
	Bottom 10 Average	1.0	1.2	1.4	1.7	1.8	1.4	1.8
6. Treasury Bill Yield, 6-Mo.	CONSENSUS	1.6	1.9	2.2	2.4	2.5	2.1	2.5
	Top 10 Average	2.2	2.6	2.8	3.0	3.1	2.7	3.1
	Bottom 10 Average	1.1	1.3	1.5	1.8	2.0	1.5	2.0
7. Treasury Bill Yield, 1-Yr.	CONSENSUS	1.7	2.0	2.2	2.5	2.6	2.2	2.7
	Top 10 Average	2.3	2.7	2.9	3.2	3.2	2.8	3.2
	Bottom 10 Average	1.2	1.3	1.6	1.9	2.1	1.6	2.1
8. Treasury Note Yield, 2-Yr.	CONSENSUS	1.8	2.1	2.4	2.6	2.7	2.3	2.8
	Top 10 Average	2.4	2.8	3.1	3.3	3.4	3.0	3.4
	Bottom 10 Average	1.2	1.5	1.7	2.0	2.2	1.7	2.2
10. Treasury Note Yield, 5-Yr.	CONSENSUS	2.0	2.3	2.6	2.8	2.9	2.5	3.0
	Top 10 Average	2.6	3.0	3.2	3.5	3.5	3.2	3.6
	Bottom 10 Average	1.5	1.7	1.9	2.1	2.3	1.9	2.3
11. Treasury Note Yield, 10-Yr.	CONSENSUS	2.3	2.5	2.8	3.0	3.1	2.8	3.2
	Top 10 Average	2.9	3.3	3.6	3.8	3.9	3.5	4.0
	Bottom 10 Average	1.8	1.9	2.1	2.3	2.4	2.1	2.5
12. Treasury Bond Yield, 30-Yr.	CONSENSUS	2.8	3.0	3.2	3.5	3.6	3.2	3.7
	Top 10 Average	3.3	3.6	4.0	4.2	4.3	3.9	4.4
	Bottom 10 Average	2.2	2.4	2.5	2.7	2.9	2.6	2.9
13. Corporate Aaa Bond Yield	CONSENSUS	3.7	4.0	4.3	4.5	4.6	4.2	4.7
	Top 10 Average	4.3	4.6	4.9	5.2	5.3	4.9	5.4
	Bottom 10 Average	3.2	3.4	3.6	3.7	3.9	3.6	4.0
13. Corporate Baa Bond Yield	CONSENSUS	4.7	4.9	5.2	5.4	5.6	5.2	5.6
	Top 10 Average	5.3	5.6	5.9	6.2	6.3	5.9	6.4
	Bottom 10 Average	4.2	4.3	4.4	4.6	4.8	4.5	4.8
14. State & Local Bonds Yield	CONSENSUS	3.6	3.7	3.9	4.1	4.2	3.9	4.2
	Top 10 Average	4.0	4.3	4.5	4.6	4.7	4.4	4.7
	Bottom 10 Average	3.2	3.2	3.3	3.5	3.7	3.4	3.8
15. Home Mortgage Rate	CONSENSUS	4.1	4.2	4.5	4.7	4.8	4.5	4.9
	Top 10 Average	4.5	4.8	5.1	5.4	5.4	5.0	5.5
	Bottom 10 Average	3.7	3.7	3.9	4.1	4.2	3.9	4.2
A. Fed's AFE Nominal \$ Index	CONSENSUS	108.8	108.8	109.1	109.2	108.8	108.9	108.3
	Top 10 Average	110.6	110.7	111.1	111.5	111.6	111.1	111.8
	Bottom 10 Average	107.0	107.0	107.1	107.1	106.5	106.9	105.7
		Year-Over-Year, % Change					Five-Year Averages	
		2021	2022	2023	2024	2025	2021-2025	2026-2030
B. Real GDP	CONSENSUS	1.9	2.0	2.0	1.9	2.0	1.9	2.0
	Top 10 Average	2.4	2.4	2.3	2.2	2.2	2.3	2.3
	Bottom 10 Average	1.4	1.6	1.6	1.7	1.7	1.6	1.7
C. GDP Chained Price Index	CONSENSUS	2.2	2.3	2.3	2.2	2.2	2.2	2.2
	Top 10 Average	2.6	2.8	2.7	2.6	2.6	2.7	2.6
	Bottom 10 Average	1.8	1.8	1.9	1.9	1.9	1.9	1.9
D. Consumer Price Index	CONSENSUS	2.1	2.2	2.2	2.2	2.1	2.2	2.1
	Top 10 Average	2.4	2.4	2.5	2.4	2.3	2.4	2.3
	Bottom 10 Average	1.8	1.9	2.0	2.0	1.9	1.9	2.0

Aqua North Carolina, Inc.
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>Results using Current Interest Rates</u>
	<u>Equity Risk Premium based on S&P Utility Index Holding Period Returns (1):</u>		
1.	Historical Equity Risk Premium	4.21 %	4.21 %
2.	Regression of Historical Equity Risk Premium	6.68 (2)	7.08 (3)
3.	Forecasted Equity Risk Premium Based on PRPM (4)	5.95	5.95
4.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Value Line Data)	6.76 (5)	7.24 (6)
5.	Forecasted Equity Risk Premium based on Projected Total Return on the S&P Utilities Index (Bloomberg Data)	<u>5.23 (7)</u>	<u>5.71 (8)</u>
6.	Average Equity Risk Premium (9)	<u>5.76 %</u>	<u>6.04 %</u>

- Notes: (1) Based on S&P Public Utility Index monthly total returns and Moody's Public Utility Bond average monthly yields from 1928-2019. 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 - 2019 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the prospective A rated public utility bond yield of 3.74% (from line 3, page 13 of this Schedule).
- (3) 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 - 2019 referenced in note 1 above. Using the equation generated from the regression, an expected equity risk premium is calculated using the current A rated public utility bond yield of 3.27% (from line 4, page 13 of this Schedule).
- (4) 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 - April 2020.
- (5) Using data from Value Line for the S&P Utilities Index, an expected return of 10.50% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A rated public utility bond yield of 3.74%, calculated on line 3 of page 13 of this Schedule results in an equity risk premium of 7.47%. (10.50% - 3.74% = 6.76%)
- (6) Using data from Value Line for the S&P Utilities Index, an expected return of 10.50% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the current A rated public utility bond yield of 3.27%, shown on line 4 of page 13 of this Schedule results in an equity risk premium of 6.76%. (10.50% - 3.27% = 7.24%)
- (7) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 8.97% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the expected A rated public utility bond yield of 3.74%, calculated on line 3 of page 13 of this Schedule results in an equity risk premium of 5.23%. (8.97% - 3.74% = 5.23%)
- (8) Using data from Bloomberg Professional Service for the S&P Utilities Index, an expected return of 8.97% was derived based on expected dividend yields and long-term growth estimates as a proxy for market appreciation. Subtracting the current A rated public utility bond yield of 3.27%, shown on line 4 of page 13 of this Schedule results in an equity risk premium of 6.16%. (8.97% - 3.27% = 5.71%)
- (9) Average of lines 1 through 5.

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

Using Prospective Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Water Companies	Value Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (2)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (4)
American States Water Co.	0.60	0.52	0.56	11.94 %	2.03 %	8.72 %	10.03 %	9.37 %
American Water Works Company Inc	0.50	1.00	0.75	11.94	2.03	10.99	11.73	11.36
California Water Service Group	0.60	0.51	0.55	11.94	2.03	8.60	9.94	9.27
Essential Utilities, Inc.	0.60	0.96	0.78	11.94	2.03	11.34	12.00	11.67
Middlesex Water Co.	0.70	0.73	0.72	11.94	2.03	10.63	11.46	11.05
SJW Group	0.60	0.83	0.71	11.94	2.03	10.51	11.37	10.94
York Water Co.	0.65	0.89	0.77	11.94	2.03	11.22	11.91	11.57
Mean			0.69			10.29 %	11.21 %	10.75 %
Median			0.72			10.63 %	11.46 %	11.05 %
Average of Mean and Median			0.71			10.46 %	11.34 %	10.90 %

Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Seven Water Companies	Value Line Adjusted Beta	Bloomberg Adjusted Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (3)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (4)
American States Water Co.	0.60	0.52	0.56	12.25 %	1.57 %	8.43 %	9.78 %	9.10 %
American Water Works Company Inc	0.50	1.00	0.75	12.25	1.57	10.76	11.52	11.14
California Water Service Group	0.60	0.51	0.55	12.25	1.57	8.31	9.68	9.00
Essential Utilities, Inc.	0.60	0.96	0.78	12.25	1.57	11.12	11.80	11.46
Middlesex Water Co.	0.70	0.73	0.72	12.25	1.57	10.39	11.25	10.82
SJW Group	0.60	0.83	0.71	12.25	1.57	10.27	11.15	10.71
York Water Co.	0.65	0.89	0.77	12.25	1.57	11.00	11.71	11.35
Mean			0.69			10.04 %	10.98 %	10.51 %
Median			0.72			10.39 %	11.25 %	10.82 %
Average of Mean and Median			0.71			10.22 %	11.12 %	10.67 %

Notes on page 24 of this Schedule.

Aqua North Carolina, Inc.
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:

	Using Prospective Interest Rates	Using Current Interest Rates
<u>Historical Data MRP Estimates:</u>		
Measure 1: Ibbotson Arithmetic Mean MRP (1926-2019)		
Arithmetic Mean Monthly Returns for Large Stocks 1926-2019:	12.10 %	12.10 %
Arithmetic Mean Income Returns on Long-Term Government Bonds:	5.09	5.09
MRP based on Ibbotson Historical Data:	<u>7.01 %</u>	<u>7.01 %</u>
Measure 2: Application of a Regression Analysis to Ibbotson Historical Data (1926-2019)		
	<u>10.26 %</u>	<u>10.72 %</u>
Measure 3: Application of the PRPM to Ibbotson Historical Data: (January 1926 - April 2020)		
	<u>13.44 %</u>	<u>13.44 %</u>
<u>Value Line MRP Estimates:</u>		
Measure 4: Value Line Projected MRP (Thirteen weeks ending May 01, 2020)		
Total projected return on the market 3-5 years hence*:	18.71 %	18.71 %
Projected Risk-Free Rate (see note 2):	2.03	1.57
MRP based on Value Line Summary & Index:	<u>16.68 %</u>	<u>17.14 %</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:	14.79 %	14.79 %
Projected Risk-Free Rate (see note 2):	2.03	1.57
MRP based on Value Line data	<u>12.76 %</u>	<u>13.22 %</u>
Measure 6: Bloomberg Projected MRP		
Total return on the Market based on the S&P 500:	13.53 %	13.53 %
Projected Risk-Free Rate (see note 2):	2.03	1.57
MRP based on Bloomberg data	<u>11.50 %</u>	<u>11.96 %</u>
Average of Value Line, Ibbotson, and Bloomberg MRP:	<u>11.94 %</u>	<u>12.25 %</u>

- (2) For reasons explained in the direct testimony, the appropriate risk-free rate for cost of capital purposes is the average forecast of 30 year Treasury Bonds per the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts. (See pages 20-21 of this Schedule.) The projection of the

Second Quarter 2020	1.30 %
Third Quarter 2020	1.40
Fourth Quarter 2020	1.50
First Quarter 2021	1.60
Second Quarter 2021	1.70
Third Quarter 2021	1.80
2021-2025	3.20
2026-2030	3.70
	<u>2.03 %</u>

- (3) Three-month average on 30-year Treasury bond yield ended April, 2020 as shown below:

Feb-20	1.97 %
Mar-20	1.46
Apr-20	1.27
	<u>1.57 %</u>

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

Sources of Information:

Value Line Summary and Index
Blue Chip Financial Forecasts, May 1, 2020 and December 1, 2019
Stocks, Bonds, Bills, and Inflation - 2020 SBBI Yearbook, John Wiley & Sons, Inc.
Bloomberg Professional Services

Aqua North Carolina, Inc.
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 0.17 – 0.61 and residual standard error of the regression range of 2.6429 – 3.1521 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 0.1273. 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

$$\text{Thus, } 0.1273 = \frac{2.8975}{\sqrt{518}} = \frac{2.8975}{22.7596}$$

Source of Information: Value Line, Inc., March 2020
Value Line Investment Survey (Standard Edition)

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

	[1]	[2]	[3]	[4]
Proxy Group of Seven Water Companies	Value Line Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
American States Water Co.	0.60	0.36	2.6563	0.0986
American Water Works Company Inc	0.50	0.23	2.2596	0.0839
California Water Service Group	0.60	0.38	2.3220	0.0862
Essential Utilities, Inc.	0.60	0.39	2.9281	0.1087
Middlesex Water Co.	0.70	0.54	3.4080	0.1265
SJW Group	0.60	0.38	3.2407	0.1203
York Water Co.	0.65	0.46	3.4676	0.1287
Average	<u>0.61</u>	<u>0.39</u>	<u>2.8975</u>	<u>0.1076</u>
Beta Range (+/- 2 std. Devs. of Beta)	0.17	0.61		
2 std. Devs. of Beta	0.22			
Residual Std. Err. Range (+/- 2 std. Devs. of the Residual Std. Err.)	2.6429	3.1521		
Std. dev. of the Res. Std. Err.	0.1273			
2 std. devs. of the Res. Std. Err.	0.2546			

Source of Information: Valueline Proprietary Database, March 2020

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

	[1]	[2]	[3]	[4]
Proxy Group of Twelve Non-Price Regulated Companies	VL Adjusted Beta	Unadjusted Beta	Residual Standard Error of the Regression	Standard Deviation of Beta
Casey's Gen'l Stores	0.70	0.53	2.9602	0.1099
Cboe Global Markets	0.65	0.46	2.7206	0.1010
Cracker Barrel	0.70	0.54	3.0507	0.1132
Campbell Soup	0.65	0.40	2.9785	0.1105
Dunkin' Brands Group	0.70	0.51	2.7046	0.1004
Darden Restaurants	0.75	0.60	2.9890	0.1109
Hormel Foods	0.60	0.34	2.6862	0.0997
Lancaster Colony	0.70	0.48	2.6628	0.0988
Lilly (Eli)	0.75	0.54	2.6484	0.0983
Lamb Weston Holdings	0.65	0.43	2.8592	0.1543
Altria Group	0.70	0.50	2.6455	0.0982
Valvoline Inc.	0.75	0.57	3.1081	0.1659
Average	0.69	0.49	2.8300	0.1100
Proxy Group of Seven Water Companies	0.61	0.39	2.8975	0.1076

Source of Information:

Valueline Proprietary Database, March 2020

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

<u>Principal Methods</u>	<u>Proxy Group of Twelve Non-Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
Discounted Cash Flow Model (DCF) (1)	8.41 %	8.41 %
Risk Premium Model (RPM) (2)	13.12	12.79
Capital Asset Pricing Model (CAPM) (3)	<u>11.83</u>	<u>11.62</u>
	Mean <u>11.12 %</u>	<u>10.94 %</u>
	Median <u>11.83 %</u>	<u>11.62 %</u>
	Average of Mean and Median <u>11.48 %</u>	<u>11.28 %</u>

Notes:

- (1) From page 29 of this Schedule.
- (2) From page 30 of this Schedule.
- (3) From page 33 of this Schedule.

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

Proxy Group of Twelve Non-Price Regulated Companies	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	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	Bloomberg Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS	Adjusted Dividend Yield	Indicated Common Equity Cost Rate (1)
Casey's Gen'l Stores	0.83	%	8.30	%	11.53	%	0.87	%
Cboe Global Markets	1.39		2.30		6.15		1.43	
Cracker Barrel	-		NA		(4.99)		-	
Campbell Soup	2.89		7.20		7.48		2.96	
Dunkin' Brands Group	-		9.90		6.14		-	
Darden Restaurants	-		10.00		5.82		-	
Hormel Foods	2.02		6.00		4.63		2.08	
Lancaster Colony	1.96		NA		NA		2.00	
Lilly (Eli)	2.09		12.30		11.31		2.21	
Lamb Weston Holdings	1.31		3.40		(1.85)		1.35	
Altria Group	8.29		5.00		5.25		8.52	
Valvoline Inc.	2.71		2.60		4.84		2.77	
							Mean	8.99
							Median	7.82
							Average of Mean and Median	8.41

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 April 30, 2020. 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.reuters.com, 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 04/30/2020
www.zacks.com Downloaded on 04/30/2020
www.yahoo.com Downloaded on 04/30/2020
Bloomberg Professional Services

Aqua North Carolina, Inc.
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 Twelve Non-Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
1.	Prospective Yield on Baa Rated Corporate Bonds (1)	4.55 % (1)	
2.	Current Yield on Baa Rated Corporate Bonds (2)		4.01 % (2)
3.	Equity Risk Premium (3)	<u>8.57</u>	<u>8.78</u>
4.	Risk Premium Derived Common Equity Cost Rate	<u><u>13.12</u> %</u>	<u><u>12.79</u> %</u>

Notes: (1) Average forecast of Baa corporate bonds based upon the consensus of nearly 50 economists reported in Blue Chip Financial Forecasts dated May 1, 2020 and December 1, 2019 (see pages 20-21 of this Schedule). The estimates are detailed below.

Second Quarter 2020	4.30 %
Third Quarter 2020	4.30
Fourth Quarter 2020	4.20
First Quarter 2021	4.30
Second Quarter 2021	4.20
Third Quarter 2021	4.30
2021-2025	5.20
2026-2030	<u>5.60</u>
Average	<u><u>4.55</u> %</u>

(2) Three-month average Baa corporate bond yield ended April, 2020 as reported by Bloomberg Professional Services shown below:

Feb-20	3.61 %
Mar-20	4.29
Apr-20	<u>4.13</u>
Average	<u><u>4.01</u> %</u>

(3) From page 32 of this Schedule.

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

	Moody's Long-Term Issuer Rating April 2020		Standard & Poor's Long-Term Issuer Rating April 2020	
<u>Proxy Group of Twelve 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>
Casey's Gen'l Stores	NA	--	NA	--
Cboe Global Markets	A3	7.0	A-	7.0
Cracker Barrel	WR	--	NR	--
Campbell Soup	Baa2	9.0	BBB-	10.0
Dunkin' Brands Group	NA	--	NA	--
Darden Restaurants	Baa3	10.0	BBB-	10.0
Hormel Foods	A1	5.0	A	6.0
Lancaster Colony	NA	--	NA	--
Lilly (Eli)	A2	6.0	A+	5.0
Lamb Weston Holdings	Ba2	12.0	BB+	11.0
Altria Group	A3	7.0	BBB	9.0
Valvoline Inc.	Ba3	13.0	BB	12.0
Average	<u>Baa2</u>	<u>8.6</u>	<u>BBB+</u>	<u>8.8</u>

Notes:

(1) From page 16 of this Schedule.

Source of Information:
Bloomberg Professional Services

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

<u>Line No.</u>	<u>Equity Risk Premium Measure</u>	<u>Proxy Group of Twelve Non-Price Regulated Companies</u>	<u>Results using Current Interest Rates</u>
<u>Ibbotson-Based Equity Risk Premiums:</u>			
1.	Ibbotson Equity Risk Premium (1)	5.78 %	5.78 %
2.	Regression on Ibbotson Risk Premium Data	9.12 (2)	9.59 (3)
3.	Ibbotson Equity Risk Premium based on PRPM (4)	11.95	11.95
4.	Equity Risk Premium Based on <u>Value Line</u> Summary and Index	15.50 (5)	15.90 (6)
5	Equity Risk Premium Based on <u>Value Line</u> S&P 500 Companies	11.58 (7)	11.98 (8)
6.	Equity Risk Premium Based on Bloomberg S&P 500 Companies	<u>10.32 (9)</u>	<u>10.71 (10)</u>
7.	Conclusion of Equity Risk Premium	10.71 %	10.98 %
8.	Adjusted Beta (11)	<u>0.80</u>	<u>0.80</u>
9.	Forecasted Equity Risk Premium	<u>8.57 %</u>	<u>8.78 %</u>

Notes:

- (1) From note 1 of page 19 of this Schedule.
- (2) From note 2 of page 19 of this Schedule.
- (3) From note 3 of page 19 of this Schedule.
- (4) From note 4 of page 19 of this Schedule.
- (5) From note 5 of page 19 of this Schedule.
- (6) From note 6 of page 19 of this Schedule.
- (7) From note 7 of page 19 of this Schedule.
- (8) From note 8 of page 19 of this Schedule.
- (9) From note 9 of page 19 of this Schedule.
- (10) From note 10 of page 19 of this Schedule.
- (11) Average of mean and median beta from page 33 of this Schedule.

Sources of Information:

Stocks, Bonds, Bills, and Inflation - 2020 SBBI Yearbook, John Wiley & Sons, Inc.
Value Line Summary and Index
Blue Chip Financial Forecasts, May 1, 2020 and December 1, 2019
Bloomberg Professional Services

Aqua North Carolina, Inc.

Traditional CAPM and ECAPM Results for the Proxy Group of Non-Price-Regulated Companies Comparable in Total Risk to the
Proxy Group of Seven Water Companies

Using Prospective Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twelve Non-Price Regulated Companies	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 (4)
Casey's Gen'l Stores	0.70	0.81	0.75	11.94 %	2.03 %	10.99 %	11.73 %	11.36 %
Choe Global Markets	0.65	0.83	0.74	11.94	2.03	10.87	11.64	11.25
Cracker Barrel	0.70	1.31	1.01	11.94	2.03	14.09	14.06	14.08
Campbell Soup	0.65	0.55	0.60	11.94	2.03	9.19	10.39	9.79
Dunkin' Brands Group	0.70	1.36	1.03	11.94	2.03	14.33	14.24	14.28
Darden Restaurants	0.75	1.72	1.23	11.94	2.03	16.72	16.03	16.37
Hormel Foods	0.60	0.41	0.51	11.94	2.03	8.12	9.58	8.85
Lancaster Colony	0.70	0.57	0.64	11.94	2.03	9.67	10.75	10.21
Lilly (Eli)	0.75	0.79	0.77	11.94	2.03	11.22	11.91	11.57
Lamb Weston Holdings	0.65	1.09	0.87	11.94	2.03	12.42	12.81	12.61
Altria Group	0.70	0.82	0.76	11.94	2.03	11.11	11.82	11.46
Valvoline Inc.	0.75	1.22	0.99	11.94	2.03	13.85	13.88	13.87
Mean			0.83			11.88 %	12.40 %	12.14 %
Median			0.77			11.17 %	11.87 %	11.52 %
Average of Mean and Median			0.80			11.53 %	12.14 %	11.83 %

Using Current Interest Rates

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Proxy Group of Twelve Non-Price Regulated Companies	Value Line Adjusted Beta	Bloomberg Beta	Average Beta	Market Risk Premium (1)	Risk-Free Rate (3)	Traditional CAPM Cost Rate	ECAPM Cost Rate	Indicated Common Equity Cost Rate (4)
Casey's Gen'l Stores	0.70	0.81	0.75	12.25 %	1.57 %	10.76 %	11.52 %	11.14 %
Choe Global Markets	0.65	0.83	0.74	12.25	1.57	10.63	11.43	11.03
Cracker Barrel	0.70	1.31	1.01	12.25	1.57	13.94	13.91	13.93
Campbell Soup	0.65	0.55	0.60	12.25	1.57	8.92	10.14	9.53
Dunkin' Brands Group	0.70	1.36	1.03	12.25	1.57	14.19	14.09	14.14
Darden Restaurants	0.75	1.72	1.23	12.25	1.57	16.64	15.93	16.28
Hormel Foods	0.60	0.41	0.51	12.25	1.57	7.82	9.32	8.57
Lancaster Colony	0.70	0.57	0.64	12.25	1.57	9.41	10.51	9.96
Lilly (Eli)	0.75	0.79	0.77	12.25	1.57	11.00	11.71	11.35
Lamb Weston Holdings	0.65	1.09	0.87	12.25	1.57	12.23	12.62	12.43
Altria Group	0.70	0.82	0.76	12.25	1.57	10.88	11.61	11.25
Valvoline Inc.	0.75	1.22	0.99	12.25	1.57	13.70	13.73	13.71
Mean			0.83			11.67 %	12.21 %	11.94 %
Median			0.77			10.94 %	11.66 %	11.30 %
Average of Mean and Median			0.80			11.31 %	11.94 %	11.62 %

Notes:

- (1) From note 1 of page 24 of this Schedule
- (2) From note 2 of page 24 of this Schedule
- (3) From note 3 of page 24 of this Schedule
- (4) Average of CAPM and ECAPM cost rates.

Aqua North Carolina, Inc.
Derivation of the Flotation Cost Adjustment to the Cost of Common Equity

Equity Issuances and Flotation Costs of the Parent In the Test Year

		[Column 1]	[Column 2]	[Column 3]	[Column 4]	[Column 5]
Date	Transaction	Shares Issued	Gross Equity Issue before Costs	Total Flotation Costs	Total Net Proceeds (1)	Flotation Cost Percentage (2)
03/16/20	Equity Offering	21,661,095	\$ 749,907,000	\$ 23,772,000	\$ 726,135,000	3.17%
04/23/19	Equity Offering	2,335,654	\$ 80,860,341	\$ 2,763,842	\$ 78,096,500	3.42%
04/23/19	Equity Offering	32,495,667	\$ 1,324,401,000	\$ 30,651,000	\$ 1,293,750,000	2.31%
			<u>\$ 2,155,168,341</u>	<u>\$ 57,186,842</u>	<u>\$ 2,097,981,500</u>	<u>2.65%</u>

Flotation Cost Adjustment

	Average Dividend Yield	Average Projected EPS Growth Rate (3)	Adjusted Dividend Yield	Average DCF Cost Rate Unadjusted for Flotation (8)	DCF Cost Rate Adjusted for Flotation (4)	Flotation Cost Adjustment (5)
Proxy Group of Seven Water Companies	<u>1.76 %</u>	<u>6.88 %</u>	<u>1.82 %</u>	<u>8.70 %</u>	<u>8.75 %</u>	<u>0.05 %</u>

See page 35 of this Schedule for notes.

Aqua North Carolina, Inc.
Notes to Accompany the
Derivation of the Flotation Cost Adjustment to the Cost of Common Equity

- (1) Column 2 – Column 3.
- (2) (Column 2 – Column 4) divided by Column 2.
- (3) Using the average growth rate from page 3 of this Schedule.
- (4) Adjustment for flotation costs based on adjusting the average DCF constant growth cost rate in accordance with the following:

$$K = \frac{D(1 + 0.5g)}{P(1 - F)} + g,$$

where g is the growth factor and F is the percentage of flotation costs.

- (5) Flotation cost adjustment of 0.05% equals the difference between the flotation adjusted average DCF cost rate of 8.75% and the unadjusted average DCF cost rate of 8.70% of the Utility Proxy Group.

Source of Information:

Company provided information

Aqua North Carolina, Inc.
Calculation of Daily Returns, YTD Returns, and Annual Volatility
for the Utility Proxy Group and the S&P 500

	American States Water				American Water				California Water				Essential Utilities				Middlesex Water Co.				SIW Group				York Water Co.				Average	S&P 500	
	Co.		Works Company Inc		Service Group		Inc.		Middlesex Water Co.		SIW Group		York Water Co.		Average		S&P 500														
	Price	Return	Price	Return	Price	Return	Price	Return	Price	Return	Price	Return	Price	Return	Price	Return	Price	Return													
12/31/2019	86.64	-0.79%	122.85	-0.16%	51.56	0.08%	46.94	-0.30%	63.57	0.02%	71.06	-1.02%	46.11	-0.58%			3,230.78	0.29%													
1/2/2020	85.83	-0.93%	120.20	-2.16%	50.63	-1.80%	45.88	-2.26%	62.22	-2.12%	69.63	-2.01%	44.89	-2.65%			3,257.85	0.84%													
1/3/2020	86.51	0.79%	120.98	0.65%	51.00	0.73%	46.21	0.72%	62.25	0.05%	69.84	0.30%	44.95	0.13%			3,234.85	-0.71%													
1/6/2020	84.90	-1.86%	120.75	-0.19%	50.48	-1.02%	46.05	-0.35%	61.34	-1.46%	69.46	-0.54%	44.81	-0.31%			3,246.28	0.35%													
1/7/2020	84.21	-0.81%	120.00	-0.62%	49.93	-1.09%	46.32	0.59%	60.95	-0.64%	68.45	-1.45%	44.61	-0.45%			3,237.18	-0.28%													
1/8/2020	83.59	-0.74%	120.49	0.41%	49.42	-1.02%	46.51	0.41%	61.30	0.57%	68.10	-0.51%	44.16	-1.01%			3,253.05	0.49%													
1/9/2020	83.91	0.38%	122.13	1.36%	49.73	0.63%	46.73	0.47%	61.43	0.21%	68.59	0.72%	44.41	0.57%			3,274.70	0.67%													
1/10/2020	84.03	0.14%	122.56	0.35%	49.74	0.02%	46.82	0.19%	61.34	-0.15%	69.16	0.83%	44.54	0.29%			3,265.55	-0.29%													
1/13/2020	84.84	0.96%	123.74	0.96%	50.22	0.97%	47.60	1.67%	62.66	2.15%	69.92	1.10%	45.47	2.09%			3,288.13	0.70%													
1/14/2020	84.34	-0.59%	124.57	0.67%	49.50	-1.43%	47.97	0.78%	62.21	-0.72%	69.44	-0.69%	45.30	-0.37%			3,283.15	-0.15%													
1/15/2020	85.38	1.23%	126.88	1.85%	50.31	1.64%	48.89	1.92%	63.28	1.72%	70.64	1.73%	46.11	1.79%			3,289.29	0.19%													
1/16/2020	86.73	1.58%	128.57	1.33%	51.01	1.39%	49.73	1.72%	64.77	2.35%	71.36	1.02%	47.34	2.67%			3,316.81	0.84%													
1/17/2020	87.21	0.55%	130.44	1.45%	51.72	1.39%	50.57	1.69%	66.13	2.10%	72.86	2.10%	47.89	1.16%			3,329.62	0.39%													
1/21/2020	88.66	1.66%	133.22	2.13%	52.33	1.18%	50.97	0.79%	66.54	0.62%	73.23	0.51%	48.90	2.11%			3,320.79	-0.27%													
1/22/2020	89.27	0.69%	134.05	0.62%	53.03	1.34%	51.44	0.92%	66.74	0.30%	73.58	0.48%	49.08	0.37%			3,321.75	0.03%													
1/23/2020	89.87	0.67%	135.29	0.93%	53.54	0.96%	52.10	1.28%	66.70	-0.06%	74.61	1.40%	49.60	1.06%			3,325.54	0.11%													
1/24/2020	90.09	0.24%	135.78	0.36%	53.55	0.02%	51.86	-0.46%	65.89	-1.21%	74.73	0.16%	48.65	-1.92%			3,295.47	-0.90%													
1/27/2020	89.58	-0.57%	135.25	-0.39%	52.86	-1.29%	51.71	-0.29%	65.97	0.12%	74.53	-0.27%	48.78	0.27%			3,243.63	-1.57%													
1/28/2020	89.97	0.44%	135.80	0.41%	53.19	0.62%	52.15	0.85%	66.30	0.50%	74.16	-0.50%	48.75	-0.06%			3,276.24	1.01%													
1/29/2020	90.41	0.49%	136.04	0.18%	53.46	0.51%	52.32	0.33%	66.87	0.86%	74.45	0.39%	48.66	-0.18%			3,273.40	-0.09%													
1/30/2020	90.72	0.34%	136.77	0.54%	53.89	0.80%	52.34	0.04%	66.91	0.06%	74.35	-0.13%	48.63	-0.06%			3,283.46	0.31%													
1/31/2020	88.56	-2.38%	136.20	-0.42%	52.56	-2.47%	51.94	-0.76%	65.26	-2.47%	73.35	-1.34%	47.36	-2.61%			3,225.52	-1.77%													
2/3/2020	89.32	0.86%	136.52	0.23%	53.49	1.77%	53.73	3.45%	66.44	1.81%	73.73	0.52%	48.20	1.77%			3,248.92	0.73%													
2/4/2020	88.47	-0.95%	134.84	-1.23%	53.50	0.02%	52.99	-1.38%	66.57	0.20%	72.62	-1.51%	47.80	-0.83%			3,297.59	1.50%													
2/5/2020	89.18	0.80%	135.07	0.17%	53.86	0.67%	53.34	0.66%	67.46	1.34%	73.48	1.18%	48.44	1.34%			3,334.69	1.13%													
2/6/2020	89.83	0.73%	135.00	-0.05%	54.02	0.30%	53.20	-0.26%	67.97	0.76%	72.89	-0.80%	48.10	-0.70%			3,345.78	0.33%													
2/7/2020	90.28	0.50%	134.45	-0.41%	54.29	0.50%	53.22	0.04%	68.15	0.26%	72.49	-0.55%	48.25	0.31%			3,327.71	-0.54%													
2/10/2020	91.08	0.89%	135.21	0.57%	54.97	1.25%	53.73	0.96%	68.72	0.84%	72.79	0.41%	48.85	1.24%			3,352.09	0.73%													
2/11/2020	91.05	-0.03%	135.34	0.10%	55.05	0.15%	53.27	-0.86%	67.71	-1.47%	72.27	-0.71%	48.11	-1.51%			3,357.75	0.17%													
2/12/2020	91.51	0.51%	135.70	0.27%	55.07	0.04%	53.17	-0.19%	68.14	0.64%	72.42	0.21%	48.59	1.00%			3,379.45	0.65%													
2/13/2020	92.53	1.11%	136.95	0.92%	55.91	1.53%	53.18	0.02%	69.44	1.91%	73.31	1.23%	48.77	0.37%			3,373.94	-0.16%													
2/14/2020	93.85	1.43%	139.32	1.73%	56.77	1.54%	53.72	1.02%	69.26	-0.26%	73.55	0.33%	48.50	-0.55%			3,380.16	0.18%													
2/18/2020	93.64	-0.22%	139.26	-0.04%	56.80	0.05%	54.07	0.65%	69.45	0.27%	73.40	-0.20%	48.68	0.37%			3,370.29	-0.29%													
2/19/2020	91.50	-2.29%	138.70	-0.40%	55.52	-2.25%	53.62	-0.83%	67.88	-2.26%	71.81	-2.17%	48.60	-0.16%			3,386.15	0.47%													
2/20/2020	90.23	-1.39%	137.30	-1.01%	54.48	-1.87%	53.50	-0.22%	67.61	-0.40%	71.54	-0.38%	48.70	0.21%			3,373.23	-0.38%													
2/21/2020	90.16	-0.08%	137.77	0.34%	54.50	0.04%	53.06	-0.82%	68.26	0.96%	71.74	0.28%	48.72	0.04%			3,337.75	-1.05%													
2/24/2020	89.32	-0.93%	136.53	-0.90%	54.27	-0.42%	51.67	-2.62%	66.84	-2.08%	71.46	-0.39%	47.05	-3.43%			3,225.89	-3.35%													
2/25/2020	87.67	-1.85%	133.09	-2.52%	52.89	-2.54%	50.43	-2.40%	64.84	-2.99%	69.16	-3.22%	46.22	-1.76%			3,128.21	-3.03%													
2/26/2020	87.31	-0.41%	133.04	-0.04%	52.67	-0.42%	50.31	-0.24%	65.53	1.06%	69.20	0.06%	47.18	2.08%			3,116.39	-0.38%													
2/27/2020	81.99	-6.09%	127.78	-3.95%	49.92	-5.22%	46.34	-7.89%	61.90	-5.54%	64.36	-6.99%	43.18	-8.48%			2,978.76	-4.42%													
2/28/2020	76.59	-6.59%	123.66	-3.22%	47.96	-3.93%	43.01	-7.19%	59.47	-3.93%	61.18	-4.94%	42.29	-2.06%			2,954.22	-0.82%													
3/2/2020	80.49	5.09%	130.84	5.81%	50.34	4.96%	45.44	5.65%	64.43	8.34%	63.10	3.14%	45.68	8.02%			3,090.23	4.60%													
3/3/2020	81.16	0.83%	131.42	0.44%	51.41	2.13%	45.31	-0.29%	63.26	-1.82%	63.75	1.03%	44.44	-2.71%			3,003.37	-2.81%													
3/4/2020	87.34	7.61%	140.31	6.76%	54.55	6.11%	48.45	6.93%	66.47	5.07%	67.67	6.15%	46.79	5.29%			3,130.12	4.22%													
3/5/2020	87.13	-0.24%	139.36	-0.68%	53.99	-1.03%	47.57	-1.82%	65.67	-1.20%	66.27	-2.07%	46.80	0.02%			3,023.94	-3.39%													
3/6/2020	87.78	0.75%	141.00	1.18%	54.37	0.70%	46.67	-1.89%	67.61	2.95%	69.33	4.62%	48.78	4.23%			2,972.37	-1.71%													
3/9/2020	82.36	-6.17%	137.19	-2.70%	52.15	-4.08%	44.05	-5.61%	64.08	-2.22%	65.49	-5.54%	45.92	-5.86%			2,746.56	-7.60%													
3/10/2020	83.47	1.35%	137.71	0.38%	52.38	0.44%	44.41	0.82%	65.08	1.56%	66.10	0.93%	45.55	-0.81%			2,882.23	4.94%													
3/11/2020	79.80	-4.40%	129.67	-5.84%	48.41	-7.58%	40.03	-9.86%	58.52	-10.08%	61.08	-7.59%	40.62	-10.82%			2,741.38	-4.89%													
3/12/2020	71.88	-9.92%	117.97	-9.02%	44.62	-7.83%	36.70	-8.32%	53.61	-8.39%	58.33	-4.50%	36.19	-10.91%			2,480.64	-9.51%													
3/13/2020	76.76	6.79%	128.29	8.75%	45.79	2.62%	38.43	4.71%	55.54	3.60%	62.21	6.65%	40.41	11.66%			2,771.02	9.29%													
3/16/2020	65.41	-14.79%	118.81	-7.39%	42.85	-6.42%	33.47	-12.91%	49.45	-10.97%	50.96	-18.08%	35.60	-11.90%			2,386.13	-11.98%													
3/17/2020	78.43	19.91%	138.50	16.57%	55.43	29.36%	40.04	19.63%	61.35	24.06%	64.37	26.31%	44.13	23.96%			2,899.69	6.00%													
3/18/2020	93.03	18.62%	130.08	-6.08%	54.12	-2.36%	40.59	1.37%	56.31	-8.22%	57.40	-10.83%	40.20	-8.91%			2,398.10	-5.18%													
3/19/2020	92.40	-0.68%	115.12	-11.50%	55.45	2.46%	39.52	-2.64%	57.39	1.92%	58.42	1.78%	39.35	-2.11%			2,409.39	0.47%													
3/20/2020	86.00	-6.93%	100.69	-12.53%	53.00	-4.42%	34.92	-11.64%	56.86	-0.92%	52.67	-9.84%	36.93	-6.15%			2,304.92	-4.34%													
3/23/2020	74.90	-12.91%	97.07	-3.60%	47.33	-10.70%	32.65	-6.50%	54.88	-3.48%	49.48	-6.06%	37.00	0.19%			2,237.40	-2.93%													
3/24/2020	79.61	6.29%	103.95	7.09%	48.03	1.48%	36.59	12.07%	56.3																						

Aqua North Carolina, Inc.
DCF Results for the Non-Regulated Proxy Group Comparable in Total Risk to the
Mr. Hinton's Water Proxy Group

	[1]	[2]	[3]	[4]
Company Name	Yield (1)	Value Line Projected Five Year Growth in EPS	Yahoo! Finance Projected Five Year Growth in EPS	Average Projected Five Year Growth Rate in EPS
Casey's Gen'l Stores	0.85 %	6.50 %	9.27 %	7.89 %
Cboe Global Markets	1.40	12.50	3.24	7.87
Cracker Barrel	4.45	7.50	0.30	3.90
Campbell Soup	2.87	2.00	2.75	2.38
Dunkin' Brands Group	2.68	9.50	4.76	7.13
Darden Restaurants	1.55	11.00	NA	11.00
Hormel Foods	2.05	8.50	4.00	6.25
Lancaster Colony	1.95	5.00	3.00	4.00
Lilly (Eli)	2.11	10.00	12.52	11.26
Lamb Weston Holdings	1.41	9.50	3.40	6.45
Altria Group	8.34	8.50	3.53	6.02
Valvoline Inc.	2.99	8.50	2.60	5.55
Average	2.72 %	8.25 %	4.49 %	6.64 %
Estimated Cost of Equity		10.97 %	7.21 %	9.36 %

NA= Not Available
NMF= Not Meaningful Figure

- (1) 13-week average estimated yield next 12 months ending 05/08/2020 from the Value Line Summary & Index.
(2) Column 1 plus Column 4.

Source of Information: Value Line Investment Survey
www.yahoo.com Downloaded on 04/30/2020

Aqua North Carolina, Inc.
Hinton DCF Analysis using only Projected Growth in EPS

DCF ANALYSIS

Group of Water Utility Companies

		Value Line ² Forecast		Yahoo Forecast ³			
		EPS		EPS			
Company Name	Yield ¹	5-Yr		5-Yr		Average	
1 Amer. States Water	1.50 %	6.50	%	6.00	%	6.25	%
2 Amer. Water Works	1.63	8.50		8.20		8.35	
3 Essential Utilities	1.62	6.50		9.80		8.15	
4 California Water	2.18	10.00		6.40		8.20	
5 Middlesex Water	1.65	6.00		2.70		4.35	
6 SJW Group	2.02	6.00		14.00		10.00	
7 York Water Co.	1.62	7.00		4.90		5.95	
Average		1.75 %	7.21 %	7.43 %		7.32	%
Estimated Cost of Equity			8.96 %	9.17 %		9.07	%

Sources:

¹ Value Line Investment Survey, Summary and Index from February 14, 2020 to May 8, 2020.

² Value Line Investment Survey, Standard Edition, April 10, 2020.

³ Yahoo Earnings Forecast as of May 13, 2020.

Aqua North Carolina, Inc.
Demonstration of the Inadequacy of
a DCF Return Rate Related to Book Value
When Market Value is Greater than Book Value

		[A]	[B]
		Based on Mr. Hinton's Water Proxy Group	
<u>Line No.</u>		<u>Market Value</u>	<u>Book Value</u>
1.	Per Share	\$ 68.91 (1)	\$ 20.57 (2)
2.	DCF Cost Rate (3)	8.60%	8.60%
3.	Return in Dollars (4)	\$ 5.926	\$ 1.769
4.	Dividends (5)	\$ 1.203	\$ 1.203
5.	Growth in Dollars (6)	\$ 4.723	\$ 0.566
6.	Return on Market Value (7)	8.60%	2.57%
7.	Rate of Growth on Market Value (8)	6.85%	0.82%

Notes:

(1) Average of the 13-week ending May 8, 2020 prices from Value Line Summary & Index.

(2) Average book value dividing total common equity at year-end 2019 by common shares outstanding at year-end 2019 for each proxy group company.

(3) Mr. Hinton's Recommended DCF cost rate.

(4) Line 1 x Line 2.

(5) Dividends are based on the average 1.75% dividend yield for Mr. Hinton's water proxy group from Public Staff Hinton Exhibit 3.

(6) Line 3 - Line 4.

(7) Line 3 / Line 1.

(8) Line 5 / Line 1.

Aqua North Carolina, Inc.
Calculation of Indicated DCF Applied to Book Value Capital Structure
of Mr. Hinton's Proxy Group

Un-lever Indicated Market Capital Structure DCF

$$\begin{aligned}
 K_u &= K_e - (((K_u - i) 1 - t) D / E) - (K_u - d) P / E \\
 K_u &= 8.60\% - (((K_u - 4.70\%) 1 - 21\%) 25.92\% / 74.05\%) - (K_u - 7.58\%) 0.03\% / 74.05\% \\
 K_u &= 8.60\% - (((K_u - 4.70\%) 79.00\%) 35.01\%) - (K_u - 7.58\%) 0.04\% \\
 K_u &= 8.60\% - ((79.00\% * K_u - 3.7133\%) 35.01\%) - (0.04\% * K_u - 0.00\%) \\
 K_u &= 8.60\% - (27.65\% * K_u - 1.30\%) -0.04\% * K_u + 0.00\% \\
 K_u &= 8.60\% -27.65\% * K_u + 1.30\% -0.04\% * K_u + 0.00\% \\
 K_u &= 9.90\% -27.69\% * K_u \\
 127.69\% * K_u &= 9.90\% \\
 K_u &= \mathbf{7.76\%}
 \end{aligned}$$

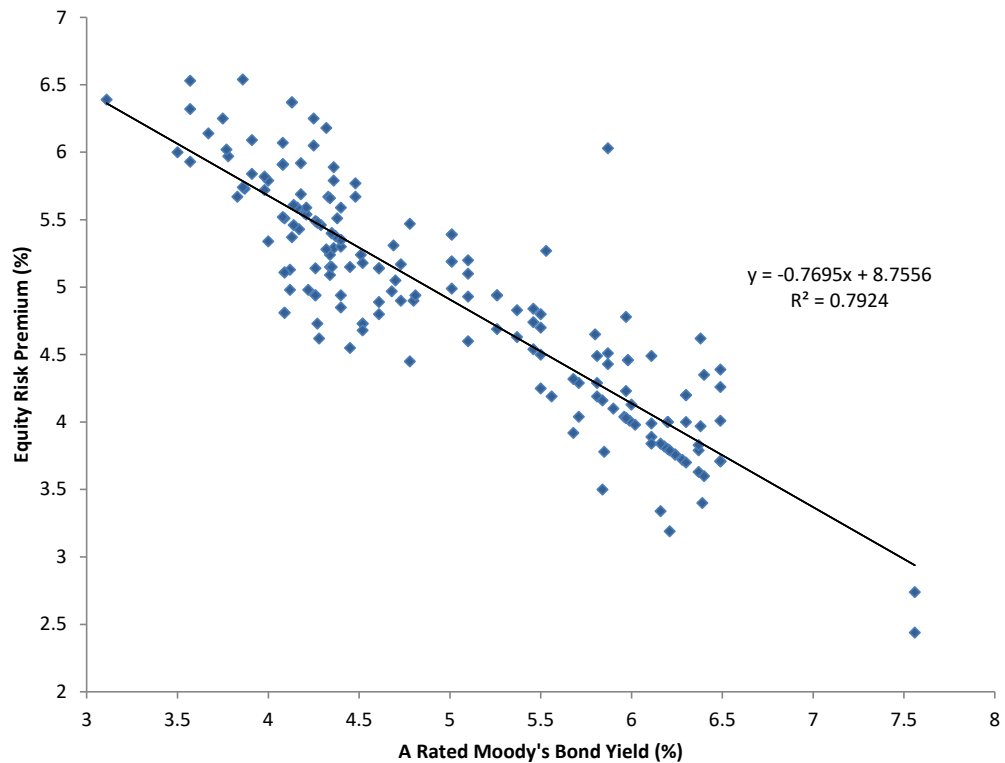
Re-lever to Indicated Book Value Capital Structure DCF

$$\begin{aligned}
 K_e &= K_u + (((K_u - i) 1 - t) D / E) + (K_u - d) P / E \\
 K_e &= 7.76\% + (((7.76\% - 4.70\%) 1 - 21\%) 47.11\% / 52.83\%) + (7.76\% - 7.58\%) 0.06\% / 52.83\% \\
 K_e &= 7.76\% + (((3.05\%) 79\%) 89.18\%) + (0.17\%) 0.11\% \\
 K_e &= 7.76\% + ((2.41\%) 89.18\%) + (0.00\%) \\
 K_e &= 7.76\% + (2.15\%) + 0.00\% \\
 K_e &= \mathbf{9.91\%}
 \end{aligned}$$

Where:

K_u = Un-levered (i.e., 100% equity) cost of common equity
 K_e = Market determined cost of common equity
 i = Cost of debt
 t = Income tax rate
 D = Debt ratio
 E = Equity ratio
 d = Cost of preferred stock
 P = Preferred equity ratio

Aqua North Carolina, Inc.
Prediction of Equity Risk Premiums Relative to
Moody's A Rated Utility Bond Yields



Constant	Slope	Prospective A Rated Utility Bond (1)	Prospective Equity Risk Premium	Indicated ROE
8.755596 %	-0.769458	3.74 %	5.88 %	9.62 %
Constant	Slope	Current A Rated Utility Bond (2)	Prospective Equity Risk Premium	Indicated ROE
8.755596 %	-0.769458	3.27 %	6.24	9.51 %

Notes:

- (1) From line 3 of page 13 of Schedule DWD-1R.
- (2) From line 4 of page 13 of Schedule DWD-1R.

Sources of Information:

Blue Chip Financial Forecasts May 1, 2020 and December 1, 2019
Regulatory Research Associates
Bloomberg Professional Services

Aqua North Carolina, Inc.
Calculation of Range of ROEs needed
to Obtain a Single "A" Rating

	Capitalization Ratio (1) (a)	Embedded Cost (b)	Overall Cost Rate (2) (c)	Pre-Tax Cost of Capital (d)
<u>Company Proposed Rates</u>				
Debt	50.00%	4.21% (1)	2.11%	2.11%
Equity	50.00%	11.00% (3)	5.50%	7.18% (4)
Total	<u>100.00%</u>		<u>7.60%</u>	<u>9.28%</u>
Pre-Tax Interest Coverage				4.41
<u>Public Staff Proposed Rates</u>				
Debt	50.00%	4.21% (1)	2.11%	2.11%
Equity	50.00%	8.90% (5)	4.45%	5.81% (4)
Total	<u>100.00%</u>		<u>6.56%</u>	<u>7.91%</u>
Pre-Tax Interest Coverage				3.76
<u>Highest Rate Scenario</u>				
Debt	50.00%	4.21% (1)	2.11%	2.11%
Equity	50.00%	16.13%	8.07%	10.53% (4)
Total	<u>100.00%</u>		<u>10.17%</u>	<u>12.63%</u>
Pre-Tax Interest Coverage				6.00
<u>Lowest Rate Scenario</u>				
Debt	50.00%	4.21% (1)	2.11%	2.11%
Equity	50.00%	6.45%	3.23%	4.21% (4)
Total	<u>100.00%</u>		<u>5.33%</u>	<u>6.32%</u>
Pre-Tax Interest Coverage				3.00

Notes

- (1) From Schedule DWD-1R, page 1.
- (2) Column (a) x Column (b)
- (3) Updated recommended ROE as shown on Schedule DWD-1R, page 1.
- (4) Overall Equity Cost Rate x Tax Conversion Factor
- (5) Hinton Direct Testimony

Aqua North Carolina, Inc.
Portfolio Ranks by Size and Risk Premiums over CAPM Results
as Compiled by Duff & Phelps 2020 Guide to Cost of Capital

Portfolio Rank by Size	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8	
	Market Val. of Equity (in \$millions)	RP	Average Book Val. (in \$millions)	RP	5-yr Net Income (in \$millions)	RP	Market Value of Invested Capital (in \$millions)	RP	Total Assets (in \$millions)	RP	5-yr EBITDA (in \$millions)	RP	Sales (in \$millions)	RP	Average Number of Employees	RP
1	\$105,926 and Up	-0.84%	\$41,550 and Up	1.38%	\$6,822 and Up	1.01%	\$29,194 and Up	-0.32%	\$114,076 and Up	1.09%	\$14,971 and Up	1.13%	\$90,302 and Up	1.28%	729,840 and Up	0.89%
2	\$85,509 - \$105,926	0.89%	\$35,112 - \$41,550	2.18%	\$4,839 - \$6,822	1.83%	\$20,491 - \$29,194	1.25%	\$85,509 - \$114,076	1.19%	\$9,656 - \$14,971	1.13%	\$72,325 - \$90,302	1.28%	699,840 and Up	1.70%
3	\$34,809 - \$85,509	0.89%	\$11,115 - \$35,112	2.26%	\$1,439 - \$4,839	2.13%	\$17,251 - \$20,491	1.25%	\$23,709 - \$85,509	1.98%	\$2,644 - \$9,656	2.18%	\$52,665 - \$72,325	2.05%	489,958 - 69,648	2.70%
4	\$24,895 - \$34,809	1.34%	\$6,887 - \$11,115	2.41%	\$970 - \$1,439	2.41%	\$3,818 - \$4,251	1.55%	\$23,107 - \$23,793	2.22%	\$2,644 - \$3,665	2.41%	\$15,623 - \$20,465	2.61%	45,827 - 60,958	2.32%
5	\$18,821 - \$24,895	1.61%	\$5,248 - \$6,887	2.64%	\$753 - \$970	2.60%	\$2,668 - \$3,818	1.79%	\$16,907 - \$23,107	2.45%	\$1,996 - \$2,644	2.59%	\$11,773 - \$15,263	2.78%	35,414 - 45,827	2.52%
6	\$14,297 - \$18,821	1.87%	\$4,392 - \$5,248	2.74%	\$615 - \$753	2.71%	\$1,728 - \$2,668	2.01%	\$13,508 - \$16,907	2.59%	\$1,559 - \$1,996	2.76%	\$9,610 - \$11,773	2.94%	28,157 - 35,414	2.70%
7	\$11,416 - \$14,297	2.10%	\$3,712 - \$4,392	2.89%	\$483 - \$615	2.71%	\$1,391 - \$1,728	2.23%	\$10,972 - \$13,508	2.73%	\$1,270 - \$1,559	2.89%	\$8,275 - \$9,610	3.03%	23,063 - 28,157	2.86%
8	\$9,274 - \$11,416	2.29%	\$3,122 - \$3,712	2.91%	\$388 - \$483	3.01%	\$1,436 - \$1,391	2.42%	\$9,164 - \$10,972	2.85%	\$1,044 - \$1,270	3.01%	\$7,157 - \$8,275	3.13%	18,965 - 23,063	3.00%
9	\$7,759 - \$9,274	2.48%	\$2,596 - \$3,122	3.01%	\$328 - \$388	3.12%	\$1,361 - \$1,436	2.58%	\$7,673 - \$9,164	2.95%	\$852 - \$1,044	3.14%	\$6,098 - \$7,157	3.22%	15,846 - 18,965	3.15%
10	\$6,535 - \$7,759	2.61%	\$2,201 - \$2,596	3.11%	\$289 - \$328	3.22%	\$870 - \$1,361	2.73%	\$6,462 - \$7,673	3.07%	\$721 - \$852	3.27%	\$4,991 - \$6,098	3.32%	13,921 - 15,846	3.26%
11	\$5,502 - \$6,535	2.77%	\$1,911 - \$2,201	3.18%	\$256 - \$289	3.28%	\$748 - \$870	2.88%	\$5,629 - \$6,462	3.17%	\$636 - \$721	3.35%	\$4,127 - \$4,991	3.47%	12,271 - 13,921	3.35%
12	\$4,624 - \$5,502	2.96%	\$1,687 - \$1,911	3.25%	\$218 - \$256	3.37%	\$659 - \$748	2.99%	\$4,934 - \$5,629	3.25%	\$555 - \$636	3.43%	\$3,550 - \$4,127	3.57%	10,760 - 12,271	3.45%
13	\$3,983 - \$4,624	3.09%	\$1,499 - \$1,687	3.31%	\$183 - \$218	3.48%	\$571 - \$659	3.08%	\$4,236 - \$4,934	3.33%	\$485 - \$555	3.52%	\$3,093 - \$3,550	3.66%	9,489 - 10,760	3.54%
14	\$3,413 - \$3,983	3.23%	\$1,312 - \$1,499	3.38%	\$155 - \$183	3.58%	\$497 - \$571	3.21%	\$3,576 - \$4,236	3.44%	\$427 - \$485	3.60%	\$2,723 - \$3,093	3.75%	8,303 - 9,489	3.64%
15	\$2,975 - \$3,413	3.38%	\$1,143 - \$1,312	3.45%	\$132 - \$155	3.69%	\$428 - \$497	3.34%	\$3,062 - \$3,576	3.54%	\$374 - \$427	3.73%	\$2,404 - \$2,723	3.82%	7,138 - 8,303	3.74%
16	\$2,644 - \$2,975	3.48%	\$996 - \$1,143	3.52%	\$111 - \$132	3.79%	\$368 - \$428	3.46%	\$2,642 - \$3,062	3.63%	\$323 - \$374	3.76%	\$2,137 - \$2,404	3.90%	6,000 - 7,138	3.86%
17	\$2,313 - \$2,644	3.59%	\$857 - \$996	3.59%	\$93 - \$111	3.90%	\$318 - \$368	3.59%	\$2,249 - \$2,642	3.73%	\$274 - \$323	3.86%	\$1,916 - \$2,137	3.97%	5,130 - 6,000	3.99%
18	\$1,932 - \$2,313	3.73%	\$739 - \$857	3.68%	\$79 - \$93	4.00%	\$272 - \$318	3.70%	\$1,898 - \$2,249	3.83%	\$227 - \$274	3.97%	\$1,602 - \$1,916	4.04%	4,330 - 5,130	4.11%
19	\$1,578 - \$1,932	3.93%	\$649 - \$739	3.75%	\$67 - \$79	4.10%	\$229 - \$272	3.86%	\$1,591 - \$1,898	3.94%	\$187 - \$227	4.10%	\$1,446 - \$1,602	4.13%	3,605 - 4,330	4.24%
20	\$1,320 - \$1,578	4.11%	\$562 - \$649	3.82%	\$55 - \$67	4.21%	\$179 - \$229	4.04%	\$1,310 - \$1,591	4.05%	\$155 - \$187	4.22%	\$1,171 - \$1,446	4.24%	2,894 - 3,605	4.39%
21	\$1,080 - \$1,320	4.26%	\$464 - \$562	3.90%	\$44 - \$55	4.33%	\$147 - \$179	4.23%	\$1,074 - \$1,310	4.18%	\$127 - \$155	4.33%	\$926 - \$1,171	4.40%	2,297 - 2,894	4.57%
22	\$850 - \$1,080	4.49%	\$384 - \$464	4.03%	\$37 - \$44	4.43%	\$119 - \$147	4.23%	\$854 - \$1,074	4.35%	\$97 - \$127	4.33%	\$726 - \$926	4.43%	1,727 - 2,297	4.70%
23	\$591 - \$850	4.90%	\$292 - \$384	4.12%	\$24 - \$37	4.76%	\$82 - \$119	4.01%	\$594 - \$854	4.49%	\$70 - \$97	4.60%	\$525 - \$726	4.72%	1,203 - 1,727	5.01%
24	\$306 - \$591	5.15%	\$168 - \$292	4.28%	\$12 - \$24	4.95%	\$42 - \$82	5.01%	\$320 - \$594	4.76%	\$38 - \$70	4.90%	\$284 - \$525	4.95%	649 - 1,203	5.28%
25	Up to \$306	6.20%	Up to \$168	4.82%	Up to \$12	5.69%	Up to \$42	5.99%	Up to \$320	5.38%	Up to \$38	5.60%	Up to \$284	5.67%	Up to 649	6.14%

Proxy Group or Seven Water Companies	B-1		B-2		B-3		B-4		B-5		B-6		B-7		B-8					
	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP	Portfolio Rank	RP				
Aqua North Carolina, Inc	\$	5,963	11	\$	1,819	12	\$	8,265	11	\$	5,886	11	\$	384	15	\$	899	22	1,650	23
	\$	385.41	24	\$	108	25	\$	495.14	24	\$	385.66	24	\$	22.90	25	\$	54.32	25	181	25
Indicated Risk Premium	2.38%		1.57%		2.00%		2.13%		1.59%		1.92%		1.13%		1.13%				1.13%	

Sources of Information:
Duff & Phelps 2020 Cost of Capital Navigator
S&P Financial
Company Form 10-K

Aqua North Carolina, Inc.
R-Squareds of Mr. Hinton's Proxy Group

<u>Mr. Hinton's Water Proxy Group</u>	<u>R-Squared</u>
American States Water Co.	0.0481
American Water Works Company Inc	0.0287
California Water Service Group	0.0701
Essential Utilities, Inc.	0.0477
Middlesex Water Co.	0.0652
SJW Group	0.0364
York Water Co.	0.0482
Average	<u>0.0492</u>

Source of Information: Value Line Proprietary Database, March 2020

Aqua North Carolina, Inc.
Rate Mechanisms In Place at Proxy Group Operating Subsidiaries

Ticker	Company (bold if parent)	State	Decoupling?	Mechanism Name	Type of Mechanism	Source
AWR	American States Water Company					
	Golden State Water Company	CA	Yes	Water Revenue Adjustment Mechanism (WRAM)	Full Decoupling (Actual to Target Revenues)	Annual Report, tariff
AWK	American Water					
	California American Water	CA	Yes	Water Revenue Adjustment Mechanism (WRAM); Modified Cost Balancing Adjustment (MCBA)	Full Decoupling (Actual to Target Revenues)	Annual Report, tariff
	Hawaii American Water	HI	No			Annual Report
	Illinois American Water	IL	Yes	Volume Balancing Adjustment Rider (VBA); Qualifying Infrastructure Plant (QIP) Surcharge	Full Decoupling (Actual to Target Revenues); Capital Recovery	Commission Order dated December 13, 2016, Docket No. 16-0093
	Indiana American Water	IN	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report, tariff
	Iowa American Water	IA	No			Annual Report, tariff
	Kentucky American Water	KY	No			Annual Report, tariff
	Maryland American Water	MD	No			Annual Report, tariff
	Michigan American Water	MI	No			Annual Report
	Missouri American Water	MO	No	Infrastructure System Replacement Surcharge	Capital Recovery	Annual Report, tariff
	New Jersey American Water	NJ	No			Annual Report, tariff
	New York American Water	NY	Yes	Revenue And Production Cost Reconciliation Adjustment Clause and Property Tax Clause (RAC/PTC)	Full Decoupling (Actual to Target Revenues)	Annual Report; tariff; Commission Order in Case 07-W-0508 and Case 16-W-0259
	Pennsylvania American Water	PA	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report, tariff
	Tennessee American Water	TN	No			Annual Report, tariff
	Virginia American Water	VA	No	Water & Wastewater Infrastructure Service Charge "WWISC" Rider	Capital Recovery	Annual Report, tariff
	West Virginia American Water	WV	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report, tariff
CWT	California Water Service Group					
	California Water Service Co.	CA	Yes	Water Revenue Adjustment Mechanism (WRAM); Modified Cost Balancing Adjustment (MCBA); and Sales Reconciliation Mechanism (SRM)	Full Decoupling (Actual to Target Revenues)	Annual Report, tariff
	New Mexico Water Service Co.	NM	No			Annual Report
	Washington Water Service Co.	WA	No			Annual Report, tariff
	Hawaii Water Service Co.	HI	No			Annual Report, tariff
WTRG	Essential Utilities, Inc.					
	Aqua Illinois, Inc.	IL	Yes	Volume Balancing Adjustment Rider (VBA)	Full Decoupling (Actual to Target Revenues)	Order in Docket No. 17-0259
	Aqua Indiana, Inc.	IN	No			Annual Report, tariff
	Aqua New Jersey, Inc.	NJ	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report, tariff
	Aqua North Carolina, Inc.	NC	No			Annual Report
	Aqua Ohio, Inc.	OH	No			Annual Report
	Aqua Pennsylvania, Inc.	PA	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report; tariff
	Aqua Texas, Inc.	TX	No			Annual Report
	Aqua Virginia, Inc.	VA	No			Annual Report
MSEX	Middlesex Water Company					
	Middlesex Water Company (NJ)	NJ	No			Annual Report; tariff
	Southern Shores Water Company (DE)	DE	No			Annual Report
	Tidewater Utilities, Inc. (DE)	DE	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	Annual Report; tariff
	Pinelands Water Company (NJ)	NJ	No			Annual Report; tariff
	Twin Lakes Utilities, Inc. (PA)	PA	No			Annual Report; tariff
SJW	SJW Group					
	San Jose Water Company (CA)	CA	No			
	SJWTX, Inc.	TX	No			
	The Connecticut Water Company	CT	Yes	Water Revenue Adjustment (WRA); Water Infrastructure and Conservation Adjustment (WICA)	Full Decoupling (Actual to Target Revenues); Capital Recovery	Annual Report ; tariff
	The Heritage Village Water Company	CT	Yes	Water Revenue Adjustment (WRA); Water Infrastructure and Conservation Adjustment (WICA)	Full Decoupling (Actual to Target Revenues); Capital Recovery	Annual Report ; tariff
	The Avon Water Company	CT	Yes	Water Revenue Adjustment (WRA); Water Infrastructure and Conservation Adjustment (WICA)	Full Decoupling (Actual to Target Revenues); Capital Recovery	Annual Report ; tariff
	The Maine Water Company	ME	No	Water Infrastructure Charge (WISC)	Capital Recovery	Annual Report ; tariff
YORW	York Water Company	PA	No	Distribution System Improvement Charge (DSIC)	Capital Recovery	