

PENNSYLVANIA-AMERICAN WATER COMPANY

2017 GENERAL BASE RATE CASE

R-2017-2595853

DIRECT TESTIMONY AND EXHIBIT OF

ANN E. BULKLEY

STATEMENT NO. 13

EXHIBIT NO. 13-A

PENNSYLVANIA-AMERICAN WATER COMPANY

Direct Testimony

of

**Ann E. Bulkley, Senior Vice President
Concentric Energy Advisors, Inc.**

**Concerning
Fair Rate of Return and Capital Structure
Docket No. R-2017-2595853**

Date April 28, 2017

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1 **I. WITNESS IDENTIFICATION AND QUALIFICATIONS**

2 **Q. Please state your name, occupation and business address.**

3 A. My name is Ann E. Bulkley. I am employed by Concentric Energy Advisors, Inc.
4 ("Concentric") as a Senior Vice President. My business address is 293 Boston
5 Post Road West, Suite 500, Marlborough, Massachusetts 01752.

6 **Q. On whose behalf are you submitting this testimony?**

7 A. I am submitting this testimony on behalf of Pennsylvania-American Water
8 Company ("PAWC" or the "Company"), a wholly-owned subsidiary of American
9 Water Works Company, Inc. ("AWW").

10 **Q. Please describe your background and professional experience in the**
11 **energy and utility industries.**

12 A. I hold a Bachelor's degree in Economics and Finance from Simmons College and
13 a Master's degree in Economics from Boston University, with more than 20 years
14 of experience consulting to the energy industry. I have advised numerous energy
15 and utility clients on a wide range of financial and economic issues with primary
16 concentrations in valuation and utility rate matters. Many of these assignments
17 have included the determination of the cost of capital for valuation and ratemaking
18 purposes. My qualifications and testimony listing are presented in more detail in
19 Attachment A.

20 **Q. Please describe Concentric's activities in energy and utility**
21 **engagements.**

22 A. Concentric provides financial and economic advisory services to many and various
23 energy and utility clients across North America. Our regulatory, economic, and

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1 market analysis services include utility ratemaking and regulatory advisory
2 services; energy market assessments; market entry and exit analysis; corporate
3 and business unit strategy development; demand forecasting; resource planning;
4 and energy contract negotiations. Our financial advisory activities include buy- and
5 sell-side merger, acquisition, and divestiture assignments; due diligence and
6 valuation assignments; project and corporate finance services; and transaction
7 support services. In addition, we provide litigation support services on a wide
8 range of financial and economic issues on behalf of clients throughout North
9 America.

10 **II. PURPOSE AND OVERVIEW OF TESTIMONY**

11 **Q. What is the purpose of your Direct Testimony?**

12 A. The purpose of my Direct Testimony is to present evidence and provide a
13 recommendation regarding PAWC's authorized return on equity ("ROE" or "cost of
14 equity") and to assess the reasonableness of its proposed capital structure for
15 ratemaking purposes. My analyses and recommendations are supported by the
16 data presented in Schedules-1 through 21 of Exhibit 13-A.

17 **Q. Please provide a brief overview of the analysis that led to your ROE 18 recommendation.**

19 A. In developing my ROE recommendation, I applied the Capital Asset Pricing Model
20 ("CAPM") and the Constant Growth Discounted Cash Flow ("DCF") model to data
21 for a proxy group of comparable water companies. In addition to these analyses,
22 I also considered the Value Line projected ROEs for the proxy group companies,
23 and the results of a Constant Growth DCF analysis based on projected dividend

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1 yields and share prices. My ROE recommendation also considers the following
 2 factors: (1) the risk associated with PAWC’s capital expenditure program; (2) the
 3 effect of environmental regulations on water and wastewater utilities and the costs
 4 associated with compliance; and (3) the superior management performance of
 5 PAWC. Although I did not make any specific adjustments to my ROE estimates
 6 for the foregoing factors, I considered each of them when determining where the
 7 Company’s ROE should fall within the range of analytical results. Finally, I
 8 compared PAWC’s proposed capital structure to the actual capital structures of the
 9 utility operating company subsidiaries of the proxy companies.

10 **Q. Please summarize your analytical results.**

11 A. My analytical results are summarized in Table 1.

Table 1: Summary of Cost of Equity Results

Forward-Looking CAPM Results				
	Current Risk-Free Rate (3.06%)	2017-2018 Projected Risk-Free Rate (3.40%)	2018-2022 Projected Risk-Free Rate (4.20%)	Mean Result
Including AWW				
Bloomberg Beta	10.54%	10.63%	10.83%	10.67%
Value Line Beta	10.26%	10.36%	10.59%	10.4%
Excluding AWW				
Bloomberg Beta	10.78%	10.85%	11.04%	10.89%
Value Line Beta	10.37%	10.46%	10.68%	10.50%

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	Mean Low	Mean	Mean High
Constant Growth DCF – 90-Day Average¹			
Including AWW	6.92%	8.72%	11.41%
Excluding AWW	6.60%	8.54%	10.87%
Constant Growth DCF – Projected DCF Model 2019-2021²			
	Mean Low	Mean	Mean High
Including AWW	7.44%	9.24%	11.94%
Excluding AWW	7.09%	9.04%	11.37%
Projected Equity Returns 2019-2021³			
	Low	Mean	High
Including AWW	10.00%	11.63%	13.50%
Excluding AWW	10.00%	11.79%	13.50%

1

2 As discussed in more detail in Section IV of my Direct Testimony, there are
3 concerns that the DCF model is not producing reasonable results at this time due
4 to anomalous conditions in capital markets. For these reasons, my ROE
5 recommendation places greater weight on the results of a forward-looking CAPM
6 analysis and the projected ROEs for the water utilities in the proxy group, as
7 published by Value Line.

8 **Q. What is your conclusion regarding the appropriate authorized ROE for**
9 **PAWC in this proceeding?**

10 A. A reasonable range of ROE estimates for PAWC is from 10.00 percent to 10.80
11 percent. Considering management performance and the risk factors facing
12 PAWC, I believe that an ROE of 10.80 percent is reasonable and appropriate. The
13 required ROE should be a forward-looking estimate; therefore, the analyses

¹ See Exhibit 13-A, Schedule 2.

² *Ibid.*, at Schedule 3.

³ Source: Value Line Investment Survey, Water Industry, January 13, 2017, at 1781-1789.

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1 supporting my recommendation rely on forward-looking inputs and assumptions
2 (e.g., projected analyst growth rates in the DCF model, forecasted risk-free rate
3 and Market Risk Premium in the CAPM analysis, etc.). I also take into
4 consideration capital market conditions, including the effect of the current low
5 interest rate environment on utility stock valuations and dividend yields, and the
6 market's expectation for higher interest rates.

7 **Q. How is the remainder of your Direct Testimony organized?**

8 A. The remainder of my Direct Testimony is organized in seven sections. Section III
9 reviews the regulatory principles pertinent to the development of the cost of capital.
10 Section IV discusses the current and prospective capital market conditions and the
11 effect of those conditions on PAWC's cost of equity. Section V explains my
12 selection of a proxy group of water utilities. Section VI describes my analyses and
13 the analytical basis for the recommendation of the appropriate ROE for PAWC.
14 Section VII provides a discussion of specific business and financial risks that have
15 a direct bearing on the Company's authorized ROE in this case. Section VIII
16 discusses the proposed capital structure of PAWC relative to the capital structures
17 of the utility operating company subsidiaries of the proxy group companies. Section
18 IX presents my conclusions and recommendations.

19 **III. REGULATORY PRINCIPLES**

20 **Q. Please describe the principles that guide the establishment of the cost of**
21 **capital for a regulated utility.**

22 A. The United States Supreme Court's *Hope* and *Bluefield* decisions established the
23 standards for determining the fairness or reasonableness of a utility's authorized

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1 ROE. Among the standards established by the Court in those cases are: (1)
2 consistency with other businesses having similar or comparable risks; (2)
3 adequacy of the return to support credit quality and access to capital; and (3) the
4 principle that the specific means of arriving at a fair return are not important, only
5 that the end result leads to just and reasonable rates.⁴

6 **Q. Has the Commission provided similar guidance in establishing the**
7 **appropriate return on common equity?**

8 A. Yes. The Commission follows the precedents of the *Hope* and *Bluefield* cases and
9 acknowledges that utility investors are entitled to a fair and reasonable return. This
10 position was set forth by the Commission as follows:

11 In deciding this or any other general rate increase case brought
12 under Section 1308(d) of the Public Utility Code (Code), 66 Pa. C.S.
13 § 1308(d), certain general principles always apply. A public utility is
14 entitled to an opportunity to earn a fair rate of return on the value of
15 the property dedicated to public service. *Pa. PUC v. Pennsylvania*
16 *Gas and Water Co.* 341 A.2d 239, 251 (Pa. Cmwlth. 1975). In
17 determining a fair rate of return, the Commission is guided by the
18 criteria provided by the United States Supreme Court in the
19 landmark cases of *Bluefield Water Works and Improvement Co. v.*
20 *Public Service Comm'n of West Virginia*, 262 U.S. 679 (1923) and
21 *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591
22 (1944).⁵

23 **Q. Why is it important for a utility to be allowed the opportunity to earn a**
24 **return that is adequate to attract equity capital on reasonable terms?**

25 A. A return that is adequate to attract capital on reasonable terms enables PAWC to
26 continue providing safe, reliable water and wastewater service while maintaining

⁴ *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S., at 603.

⁵ Pennsylvania Public Utility Commission, PPL Electric Utilities Corporation, R-2012-2290597, Opinion and Order adopted December 5, 2012, at 5.

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1 its financial integrity. That return should be commensurate with returns expected
2 elsewhere in the market for investments of equivalent risk. If it is not, debt and
3 equity investors will seek alternative investment opportunities for which the
4 expected return reflects the perceived risks, thereby inhibiting PAWC's ability to
5 attract capital at reasonable cost.

6 **Q. What are your conclusions regarding regulatory guidelines and financial**
7 **considerations?**

8 A. The ratemaking process is premised on the principle that, in order for investors
9 and companies to commit the capital needed to provide safe and reliable utility
10 services, a utility must have the opportunity to recover the return of, and the
11 market-required return on, its invested capital. Because utility operations are
12 capital-intensive, regulatory decisions should enable the utility to attract capital on
13 reasonable terms; doing so balances the long-term interests of the utility and its
14 customers.

15 The financial community carefully monitors the current and expected financial
16 condition of utility companies, and the regulatory framework in which they operate.
17 In that respect, the regulatory framework is one of the most important factors in
18 both debt and equity investors' assessments of risk. The Commission's order in
19 this case, therefore, should establish rates that provide PAWC with the opportunity
20 to earn a ROE that is: (1) adequate to attract capital on reasonable terms; (2)
21 sufficient to ensure its financial integrity; and (3) commensurate with returns on
22 investments in enterprises with similar risk. To the extent the Company has the

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1 opportunity to earn its market-based cost of capital, the proper balance is achieved
2 between customers' and shareholders' interests.

3 **IV. CAPITAL MARKET CONDITIONS**

4 **Q. Why is it important to analyze capital market conditions?**

5 A. The ROE estimation models rely on market data that are either specific to the proxy
6 group, in the case of the DCF model, or the expectations of market risk, in the case
7 of the CAPM. The results of the ROE estimation models can be affected by
8 prevailing market conditions at the time the analysis is performed. While the ROE
9 that is established in a rate proceeding is intended to be forward-looking, the
10 practitioner uses current and projected market data, specifically stock prices,
11 dividends, growth rates and interest rates in the ROE estimation models to
12 estimate the required return for the subject company. As discussed in the
13 remainder of this section, analysts and regulatory commissions have concluded
14 that current market conditions are anomalous and that these conditions have
15 affected the results of the ROE estimation models. As a result, it is important to
16 consider the effect of these conditions on the ROE estimation models when
17 determining the appropriate range and recommended ROE to be determined for a
18 future period. In this case, the test year is December 31, 2018, which is more than
19 a year in the future. Therefore, it is also important to also consider projected market
20 data to estimate the return for that forward-looking period.

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1 **Q. What factors are affecting the cost of equity for regulated utilities in the**
2 **current and prospective capital markets?**

3 A. The cost of equity for regulated utility companies is being affected by several
4 factors in the current and prospective capital markets, including: (1) the current low
5 interest rate environment and the corresponding effect on valuations and dividend
6 yields of utility stocks relative to historical levels; and (2) the market's expectation
7 for higher interest rates. In this section, I discuss each of these factors and how it
8 affects the models used to estimate the cost of equity for regulated utilities.

9 **Q. How has the Federal Reserve's monetary policy affected capital markets in**
10 **recent years?**

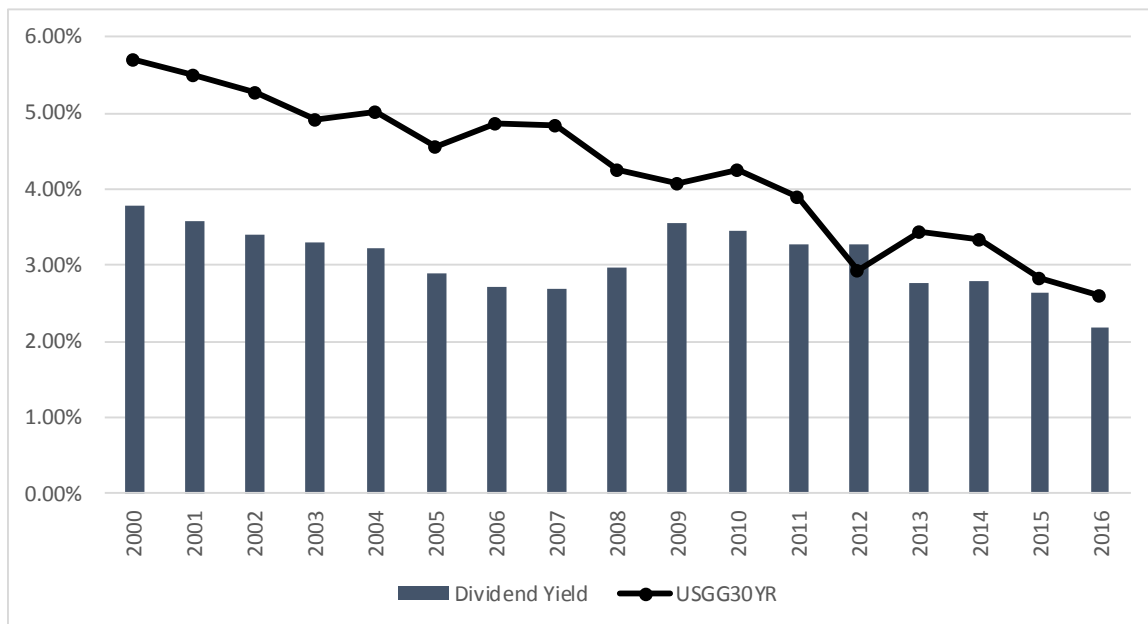
11 A. Extraordinary and persistent federal intervention in capital markets artificially
12 lowered government bond yields after the Great Recession of 2008-09, as the
13 Federal Reserve Open Market Committee ("FOMC") used monetary policy (both
14 reductions in short-term interest rates and purchases of Treasury bonds and
15 mortgage-backed securities) to stimulate the U.S. economy. As a result of very
16 low or zero returns on short-term government bonds, yield-seeking investors have
17 been forced into longer-term instruments, bidding up prices and reducing yields on
18 those investments. As investors have moved along the risk spectrum in search of
19 yields that meet their return requirements, there has been increased demand for
20 dividend-paying equities, such as water utility stocks.

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1 Q. How has the period of abnormally low interest rates affected the valuations
2 and dividend yields of water utility shares?

3 A. The Federal Reserve's accommodative monetary policy has caused investors to
4 seek alternatives to the historically low interest rates available on Treasury bonds.
5 As a result of this search for higher yield, the share prices for many common
6 stocks, especially dividend-paying stocks such as utilities, have been driven higher
7 while the dividend yields (which are computed by dividing the dividend payment by
8 the stock price) have decreased to levels well below the historical average. As a
9 result, as shown in Chart 1, dividend yields for water utilities have declined since
10 2000 and are at their lowest point since 2000. Furthermore, dividend yields are
11 currently at the lowest point since the Federal Reserve has actively managed
12 interest rates as a result of the Great Recession.

13 **Chart 1: Dividend Yields for Water Utility Stocks**



14

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1 **Q. How are higher stock valuations and lower dividend yields for utility**
2 **companies affecting the results of the DCF model?**

3 A. During periods of general economic and capital market stability, the DCF model
4 adequately reflects market conditions and investor expectations. However, in the
5 current market environment, the DCF model results are distorted by the historically
6 low level of interest rates and the higher valuation of utility stocks. Value Line
7 recently commented on the low dividend yields and high valuations for water
8 utilities:

9 The average dividend yield on the eight regulated water utilities we
10 follow is currently 2.1%, or exactly the same as the median for all
11 stocks in the Value Line universe. Historically, the yield on these
12 stocks has been much higher. An as example, the typical yield on
13 an electric utility equity is about 3.6%, or 150 basis points higher
14 than the water utility industry. Why is this? One reason is that when
15 taken as a whole, the market capitalization of the group is very
16 modest. Thus, it doesn't take a large shift into the sector by
17 institutional investors to drive the price of these stocks higher and
18 their yields lower.⁶

19 In order to assess how low interest rates are affecting the dividend yields for utility
20 stocks, I compared the Standard & Poor's ("S&P") Utilities index (which includes
21 American Water Works, the parent company of PAWC) to the yield on the 30-year
22 Treasury bond since 2007. As shown in Chart 2, the S&P Utilities index has
23 increased steadily as yields on 30-year Treasury bonds have declined in response
24 to federal monetary policy.

⁶ Source: Value Line Investment Survey, Water Industry, January 13, 2017, at 1780.

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1 **Chart 2: S&P Utilities Return and U.S. Treasury Bond Yields - 2007 – 2017**



2

3

4 **Q. Have regulators in other jurisdictions recently responded to the historically**
5 **low dividend yields for utility companies and the corresponding effect on**
6 **the DCF model?**

7 A. Yes. Understanding the important role that dividend yields play in the DCF model,
8 the Federal Energy Regulatory Commission (“FERC”) recently determined that
9 anomalous capital market conditions have caused the DCF model to understate
10 equity costs for regulated utilities at this time. In Opinion No. 531, the FERC noted:

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1 As the Commission found in Opinion No. 531, under these
2 circumstances, we have less confidence that the midpoint of the
3 zone of reasonableness in this proceeding accurately reflects the
4 equity returns necessary to meet the *Hope* and *Bluefield* capital
5 attraction standards. We therefore find it necessary and reasonable
6 to consider additional record evidence, including evidence of
7 alternative methodologies...¹⁰

8 Yields on 10-year Treasury bonds are currently well below 3.00 percent, which is
9 the level that FERC has determined represents “anomalous” capital market
10 conditions. In summary, the results of the DCF model are understating the cost of
11 equity under current market conditions due to the low interest rate environment
12 that has reduced dividend yields and raised valuations on utility shares to
13 unsustainable levels. Consequently, it is necessary to consider the results of other
14 Risk Premium models, such as the CAPM, in order to determine where to set the
15 appropriate return.

16 **Q. Has the Pennsylvania Commission recognized the benefit of using more**
17 **than one method to estimate the cost of equity for a regulated utility?**

18 A. Yes, it has. In a 2012 decision for PPL Electric Utilities, while noting that the
19 Commission has traditionally relied primarily on the DCF method to estimate the
20 cost of equity for regulated utilities, the Commission recognized that market
21 conditions were causing the DCF model to produce results that were much lower
22 than other models such as the CAPM and Risk Premium. The Commission’s Order
23 explained:

¹⁰ *Id.*

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1 Sole reliance on one methodology without checking the validity of
2 the results of that methodology with other cost of equity analyses
3 does not always lend itself to responsible ratemaking. We conclude
4 that methodologies other than the DCF can be used as a check
5 upon the reasonableness of the DCF derived equity return
6 calculation.¹¹

7 The Commission ultimately concluded:

8 As such, where evidence based on the CAPM and RP methods
9 suggest that the DCF-only results may understate the utility's
10 current cost of equity capital, we will give consideration to those
11 other methods, to some degree, in determining the appropriate
12 range of reasonableness for our equity return determination.¹²

13 **Q. Is there evidence that the interest rate environment is shifting?**

14 A. Yes. In mid-December 2016, the Federal Reserve announced a 25 basis point
15 increase in the target Federal Funds rate, which was the second increase in short-
16 term interest rates by the Federal Reserve since the financial market collapse in
17 2008. In its March 2017 statement, the Federal Reserve announced another 25
18 basis point increase, and noted that they expect two more increases in 2017 and
19 three more in 2018.¹³

20 **Q. What is the financial market's perspective on the future path of interest
21 rates?**

22 A. According to the April 2017 issue of Blue Chip Financial Forecasts, in response to
23 the question about how much they expect the Federal Reserve will raise interest
24 rates in 2017, 71.1 percent of those surveyed expect an increase of 50 basis

¹¹ Pennsylvania Public Utility Commission, PPL Electric Utilities, R-2012-2290597, meeting held December 5, 2012, at 80.

¹² *Ibid.*, at 81.

¹³ Federal Open Market Committee Statement, Press Release, March 15, 2017.

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1 points, 22.2 percent expect an increase of 75 basis points, and 6.7 percent expect
2 an increase of 100 basis points.¹⁴

3 **Q. What effect do rising interest rates have on the cost of equity?**

4 A. As interest rates continue to increase, the calculated cost of equity for the proxy
5 companies using the Constant Growth DCF model is likely to be a conservative
6 estimate of investors' required return because the dividend yield is calculated
7 based on stock prices when interest rates were substantially lower. As such, rising
8 interest rates support the selection of a return toward the upper end of a
9 reasonable range of ROE estimates that are based on current market data.
10 Alternatively, my CAPM analyses include estimated returns based on near-term
11 projected interest rates.

12 **Q. What conclusions do you draw from your analysis of capital market
13 conditions?**

14 A. My main conclusion is that the accommodative monetary policy of the Federal
15 Reserve has driven dividend yields to historically and unsustainably low levels and
16 that the DCF model, is, therefore, currently understating the forward-looking cost
17 of equity.¹⁵ Accordingly, it is important to consider other alternative financial
18 models, such as the CAPM, to provide a check on the reasonableness of the DCF
19 results. I further note that the FOMC increased short-term interest rates in
20 December 2016 and March 2017 and has indicated its intention to continue
21 gradually raising interest rates in 2017 and 2018. Higher interest rates indicate

¹⁴ Blue Chip Financial Forecasts, Vol. 36, Issue No. 4, April 1, 2017.

¹⁵ As the FOMC tightens monetary policy and increases interest rates, it is likely utility dividend yields will increase.

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1 that it is reasonable to believe that the cost of capital for utilities such as PAWC is
2 increasing. Therefore, consistent with the FERC's approach, it is appropriate for
3 the Commission to also consider the results of alternative models such as the
4 CAPM in establishing the authorized ROE in this proceeding.

V. PROXY GROUP SELECTION

6 **Q. Why have you used a group of proxy companies to estimate the cost of
7 equity for PAWC?**

8 A. In this proceeding, I am estimating the cost of equity for PAWC, which is a
9 rate-regulated subsidiary of AWW. Since the ROE is a market-based concept, and
10 because PAWC's stock is not publicly traded, it is necessary to establish a group
11 of companies that are both publicly traded and are comparable to the Company in
12 certain fundamental business and financial respects to serve as its "proxy" for
13 purposes of the ROE estimation process. The proxy companies used in my
14 analyses all possess a set of operating and financial risk characteristics that are
15 substantially comparable to PAWC, and, therefore, provide a reasonable basis for
16 deriving the appropriate ROE.

17 **Q. Please provide a brief profile of PAWC.**

18 A. PAWC is a wholly-owned subsidiary of AWW that provides water distribution
19 service to approximately 709,000 customers¹⁶ and wastewater service to
20 approximately 24,500 customers in Pennsylvania.¹⁷ The Company generally
21 accesses debt markets through an affiliate, the American Water Capital Corp.

¹⁶ Source: American Water Works Company, Inc., 2016 SEC Form 10-K, issued February 2017, at 3.

¹⁷ Company provided data.

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1 (“AWCC”). The current credit ratings on senior unsecured debt for AWW and
2 AWCC are as follows: (1) S&P - A (Outlook: Stable); and (2) Moody’s - A3
3 (Outlook: Stable).¹⁸

4 **Q. How did you select the companies in your proxy group?**

5 A. I began with the group of nine U.S. utilities that Value Line classifies as Water
6 Utilities, and I simultaneously applied the following screening criteria to select
7 companies that:

- 8 • pay consistent quarterly cash dividends because companies that do not
9 cannot be analyzed using the Constant Growth DCF model;
- 10 • have positive long-term earnings growth forecasts from at least two sources;
- 11 • have investment grade long-term issuer ratings from either S&P or Moody’s;
- 12 and
- 13 • derive more than 80.00 percent of their total operating income from
14 regulated water operations.

15 **Q. Did you include American Water Works in your proxy group?**

16 A. Yes. While my general practice is to exclude the subject company, or its parent
17 holding company, from the proxy group, given the small number of companies
18 classified by Value Line as Water Utilities and given the fact that Pennsylvania is
19 one of sixteen states served by AWW, I have presented my ROE results both
20 including and excluding AWW.¹⁹

¹⁸ Source: American Water Works Company, Inc., 2016 SEC Form 10-K, issued February 2017, at 57.

¹⁹ *Ibid.*, at 3.

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1 **Q. What is the composition of your proxy group?**

2 A. The screening criteria discussed above resulted in a proxy group consisting of the
3 companies in Table 2.

4 **Table 2: Proxy Group**

Company	Ticker
American States Water Company	AWR
American Water Works Company, Inc.	AWK
Aqua America, Inc.	WTR
California Water Service Group	CWT
Connecticut Water Service Inc.	CTWS
Middlesex Water Company	MSEX
SJW Corporation	SJW
York Water Company	YORW

5

6 **Q. Why is it appropriate to rely on a water proxy group for the water and**
7 **wastewater operations of PAWC?**

8 A. PAWC's business operations are predominantly water distribution service.
9 Therefore, it is appropriate to rely on a proxy group of publicly traded water
10 companies to establish the ROE for the Company's water distribution service. I
11 have also relied on that same proxy group to establish the ROE for the wastewater
12 distribution service. There is an insufficient number of publicly traded wastewater
13 utilities to develop a proxy group from that universe. The business operations and
14 overall risk factors of the water utilities are more similar to wastewater operations
15 than any other regulated utility. Therefore, I believe that the water utility proxy

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1 group is the most comparable to the wastewater operations from a risk
2 perspective.

3 **VI. COST OF EQUITY ESTIMATION**

4 **Q. Please briefly discuss the ROE in the context of the regulated ROR.**

5 A. The overall ROR for a regulated utility is based on its weighted average cost of
6 capital, in which the costs of the individual sources of capital are weighted by their
7 respective book values. While the costs of debt and preferred stock can be directly
8 observed, the cost of equity is market-based and, therefore, must be estimated
9 based on observable market data.

10 **Q. How is the required ROE determined?**

11 A. The required ROE is estimated by using multiple analytical techniques that rely on
12 market-based data to quantify investor expectations regarding required equity
13 returns, adjusted for certain incremental costs and risks. Quantitative models
14 produce a range of reasonable results from which the market-required ROE is
15 selected. That selection must be based on a comprehensive review of relevant
16 data and information, and does not necessarily lend itself to a strict mathematical
17 solution. The key consideration in determining the cost of equity is to ensure that
18 the methodologies employed reasonably reflect investors' views of the financial
19 markets in general and of the subject company (in the context of the proxy group)
20 in particular.

21 **Q. What methods did you use to determine PAWC's cost of equity?**

22 A. I considered the results of the Constant Growth DCF model and the CAPM
23 analysis. I also considered the Value Line projected ROEs for the proxy group

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1 companies, and the results of a forward-looking DCF analysis using projected
2 dividend yields and projected share prices published by Value Line. I believe that
3 a reasonable ROE estimate considers alternative methodologies, observable
4 market data, and the reasonableness of their individual and collective results.

5 **Q. Why is it important to use more than one analytical approach?**

6 A. It is important to use more than one analytical approach because the cost of equity
7 is not directly observable and, therefore, must be estimated based on both
8 quantitative and qualitative information. In estimating the cost of equity, analysts
9 and investors are inclined to gather and evaluate as much relevant data as can be
10 reasonably analyzed. A number of models have been developed to estimate the
11 cost of equity. Analysts and academics understand that ROE models are tools to
12 be used in the ROE estimation process and that strict adherence to any single
13 approach, or the results of any single approach, can lead to flawed or irrelevant
14 conclusions. Consistent with the *Hope* finding, it is the analytical result, not the
15 methodology, which is the controlling factor in arriving at ROE determinations.

16 **A. Constant Growth DCF Model**

17 **Q. Are DCF models widely used to estimate the ROE for regulated utilities?**

18 A. Yes. DCF models are widely used in regulatory proceedings and have sound
19 theoretical bases, although neither the DCF model nor any other model can be
20 applied without considerable judgment in the selection of data and the
21 interpretation of results. As discussed in Section IV of my Direct Testimony,
22 analysts are projecting that the currently high stock market valuations and low
23 dividend yields for utility companies are not sustainable. This is raising concerns

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1 among analysts and regulators that the DCF model is understating the cost of
2 equity at this time.

3 **Q. Please describe the DCF approach.**

4 A. The DCF approach is based on the theory that a stock's current price represents
5 the present value of all expected future cash flows. In its most general form, the
6 DCF model is expressed as follows:

$$7 \quad P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_\infty}{(1+k)^\infty} \quad [1]$$

8 Where P_0 represents the current stock price, $D_1 \dots D_\infty$ are all expected future
9 dividends, and k is the discount rate, or required ROE. Equation [1] is a standard
10 present value calculation that can be simplified and rearranged into the following
11 form:

$$12 \quad k = \frac{D_0(1+g)}{P_0} + g \quad [2]$$

13 Equation [2] is often referred to as the Constant Growth DCF model in which the
14 first term is the expected dividend yield and the second term is the expected long-
15 term growth rate.

16 **Q. What assumptions are required for the Constant Growth DCF model?**

17 A. The Constant Growth DCF model requires the following assumptions: (1) a
18 constant growth rate for earnings and dividends; (2) a stable dividend payout ratio;
19 (3) a constant price-to-earnings ("P/E") ratio; and (4) a discount rate greater than
20 the expected growth rate. To the extent any of these assumptions is violated,
21 considered judgment and/or specific adjustments should be applied to the results.

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1 **Q. What market data did you use to calculate the dividend yield in your**
2 **Constant Growth DCF model?**

3 A. The dividend yield in my Constant Growth DCF model is based on the proxy
4 companies' current annual dividend and average closing stock prices over the 30-
5 , 90-, and 180-trading days as of March 31, 2017.

6 **Q. Why did you use three averaging periods for stock prices?**

7 A. It is important to use an average of trading days to calculate the price term in the
8 DCF model to ensure that the calculated ROE is not skewed by anomalous events
9 that may affect stock prices on any given trading day. The averaging period should
10 be reasonably representative of expected capital market conditions over the long
11 term. In my view, the use of the 30-, 90-, and 180-day averaging periods
12 reasonably balances those considerations.

13 **Q. Did you make any adjustments to the dividend yield to account for periodic**
14 **growth in dividends?**

15 A. Yes. Since utility companies tend to increase their quarterly dividends at different
16 times throughout the year, it is reasonable to assume that dividend increases will
17 be evenly distributed over calendar quarters. Given that assumption, it is
18 reasonable to apply one-half of the expected annual dividend growth rate for
19 purposes of calculating the expected dividend yield component of the DCF model.
20 This adjustment ensures that the expected first year dividend yield is, on average,
21 representative of the coming twelve-month period, and does not overstate the
22 aggregated dividends to be paid during that time.

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1 **Q. Why is it important to select appropriate measures of long-term growth in**
2 **applying the DCF model?**

3 A. In its Constant Growth form, the DCF model (i.e., Equation [2]) assumes a single
4 long-term growth rate in perpetuity. In order to reduce the long-term growth rate
5 to a single measure, one must assume that the dividend payout ratio remains
6 constant and that earnings per share, dividends per share, and book value per
7 share all grow at the same constant rate. Over the long run, however, dividend
8 growth can only be sustained by earnings growth. For example, earnings growth
9 rates tend to be least influenced by capital allocation decisions that companies
10 may make in response to near-term changes in the business environment. Since
11 such decisions may directly affect near-term dividend payout ratios, estimates of
12 earnings growth are more indicative of long-term investor expectations than are
13 dividend or book value growth estimates.

14 **Q. What sources of long-term growth rates did you rely on in your Constant**
15 **Growth DCF model?**

16 A. My Constant Growth DCF model incorporates the following sources of long-term
17 growth rates: (1) consensus long-term earnings growth estimates from Zacks
18 Investment Research; (2) consensus long-term earnings growth estimates from
19 Thomson First Call (provided by Yahoo! Finance); (3) consensus long-term
20 earnings growth estimates from Thomson Reuters; and (4) long-term earnings
21 growth estimates from Value Line.

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1 **Q. How did you calculate the expected dividend yield?**

2 A. I adjusted the dividend yield to reflect the growth rate that was being used in that
3 particular scenario. This ensures that the growth rate used in the dividend yield
4 calculation and the growth rate used as the “g” term of the DCF model are internally
5 consistent.

6 **Q. Please summarize the results of your Constant Growth DCF analyses.**

7 A. The results of the Constant Growth DCF analysis are shown in Schedules 1-2 of
8 Exhibit 13-A, and summarized in Table 3.

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1

Table 3: Summary of DCF Results

	Mean Low	Mean	Mean High
Constant Growth DCF – EPS Growth Including AWW²⁰			
30-Day Average	6.93%	8.74%	11.43%
90-Day Average	6.92%	8.72%	11.41%
180-Day Average	6.99%	8.80%	11.49%
Constant Growth DCF – EPS Growth Excluding AWW²¹			
30-Day Average	6.63%	8.58%	10.91%
90-Day Average	6.60%	8.54%	10.87%
180-Day Average	6.69%	8.63%	10.97%
Constant Growth DCF – Projected DCF Model 2019-2021²²			
	Mean Low	Mean	Mean High
Including AWW	7.44%	9.24%	11.94%
Excluding AWW	7.09%	9.04%	11.37%
Projected Equity Returns 2019-2021²³			
	Low	Mean	High
Including AWW	10.00%	11.63%	13.50%
Excluding AWW	10.00%	11.79%	13.50%

2

3 **Q. How did you calculate the range of results for the Constant Growth DCF**
 4 **model?**

5 A. I calculated the low DCF result using the minimum growth rate (i.e., the lowest of
 6 the Thomson First Call, Thomson Reuters, Zacks, and Value Line earnings growth
 7 rates) for each of the proxy group companies. Thus, the low result reflects the
 8 minimum DCF result for the proxy group. I used a similar approach to calculate

²⁰ See Exhibit 13-A, Schedule 2.

²¹ *Ibid.*

²² *Ibid.*, at Schedule 3.

²³ Source: Value Line Investment Survey, Water Industry, January 13, 2017, at 1781-1789.

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1 the high results, using the highest growth rate for each proxy group company. The
2 mean results were calculated using the average growth rates from all sources.

3 **Q. Please comment on the reasonableness of the mean low DCF results.**

4 As shown in Schedule-1 of Exhibit 13-A, the DCF model is producing individual
5 company results as low as 4.91 percent, or 83 basis points lower than PAWC's
6 embedded cost of long-term debt during 2016 of 5.74 percent.²⁴ There is,
7 however, more risk associated with owning common equity than debt because
8 shareholders are the residual claimants on the firm's earnings and assets. As
9 such, the return to equity holders must be higher than the return to bond holders
10 to compensate for that additional risk. The mean low DCF results produce an
11 insufficient equity risk premium over the embedded cost of long-term debt.
12 Therefore, I have not considered the mean low DCF results as meaningful
13 indicators of the cost of equity for the proxy group companies.

14 **Q. What are your conclusions about the results of the Constant Growth DCF
15 model?**

16 A. As discussed previously, one primary assumption of the DCF model is a constant
17 P/E ratio. That assumption is heavily influenced by the market price of utility
18 stocks. To the extent that utility valuations are high and may not be sustainable, it
19 is important to consider the results of the DCF model with caution. As shown in
20 Chart 1 above, the average dividend yield for the proxy group has declined from
21 3.56 percent to 2.17 percent since 2009 due primarily to the low interest rate
22 environment for government bonds. By comparison, the dividend yield on the 30-

²⁴ See Exhibit 13-A, Schedule 16.

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1 day average DCF analysis is 2.03 percent, which is at the bottom of the range of
2 dividend yields for water utilities since 2009. While I have given weight to the range
3 of reasonable results established using the DCF methodology, my
4 recommendation also gives weight to the results of other ROE estimation models.

5 **Q. Have you considered the results of any other DCF analyses?**

6 A. Yes, I have considered two additional DCF analyses: 1) a projected Constant
7 Growth DCF model; and 2) the expected returns on equity for the proxy group
8 companies. Because analysts have indicated that utility stocks may currently be
9 at unsustainably high prices due to current market conditions, I considered the
10 results of a projected Constant Growth DCF model. This DCF analysis relies on
11 Value Line's projected average prices and dividends for the period from 2019-2021
12 and the five-year projected EPS growth rates. As shown in Schedule-2 of Exhibit
13 13-A, the use of Value Line projected assumptions in the DCF model results in a
14 mean DCF result of 9.24 percent and a mean high result of 11.94 percent
15 (including AWW) and 9.04 percent and 11.37 percent (excluding AWW). Relying
16 on Value Line's projected dividend yields and share prices in 2019-2021, the mean
17 results of the Constant Growth DCF model increase by 50 basis points (i.e., 9.24
18 percent vs. 8.74 percent shown in Schedule-1 of Exhibit 13-A).²⁵
19 I have also considered the expected returns on equity as reported by Value Line
20 for each of the proxy group companies in 2017 and for the period from 2019-2021.
21 As shown in Table 4 (also see Schedule-3 of Exhibit 13-A), the proxy group
22 companies are expected to earn average returns on equity of 11.06 percent in

²⁵ This comparison includes the results of American Water Works.

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1 2017 and 11.63 percent from 2019-2021 (including AWW) and 11.36 percent in
2 2017 and 11.79 percent from 2019-2021 (excluding AWW). This suggests that
3 investors are expecting substantially higher returns on equity for the water utilities
4 than what is suggested by the DCF model.

5 **Table 4: Value Line Projected Returns on Equity²⁶**

Company	Ticker	2017	2019-2021
American States Water Co	AWR	12.00%	13.50%
American Water Works Co. Inc.	AWK	9.00%	10.50%
Aqua America, Inc.	WTR	13.00%	12.50%
California Water Service, Inc.	CWT	9.50%	10.00%
Connecticut Water Service, Inc.	CTWS	10.50%	11.00%
Middlesex Water Company	MSEX	11.00%	12.00%
SJW Corporation	SJW	12.50%	11.00%
York Water Company	YORW	11.00%	12.50%
Mean		11.06%	11.63%
Mean excl. AWK		11.36%	11.79%

6
7 **B. CAPM Analysis**

8 **Q. Please briefly describe the Capital Asset Pricing Model (“CAPM”).**

9 A. The CAPM is a risk premium approach that estimates the cost of equity for a given
10 security as a function of a risk-free return plus a risk premium to compensate
11 investors for the non-diversifiable or “systematic” risk of that security. Systematic
12 risk is the risk inherent in the entire market or market segment. This form of risk

²⁶ Source: Value Line Investment Survey, Water Utilities, January 13, 2017, at 1781-1789.

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1 cannot be diversified away using a portfolio of assets. Non-systematic risk is the
2 risk of a specific company that can be mitigated through portfolio diversification.

3 The CAPM is defined by four components, each of which must theoretically be a
4 forward-looking estimate:

$$K_e = r_f + \beta(r_m - r_f) \quad [3]$$

5
6
7 Where:

8 K_e = the required market ROE;

9 β = Beta coefficient of an individual security;

10 r_f = the risk-free ROR; and

11 r_m = the required return on the market as a whole.

12
13 In this specification, the term $(r_m - r_f)$ represents the Market Risk Premium.
14 According to the theory underlying the CAPM, since unsystematic risk can be
15 diversified away, investors should only be concerned with systematic risk.
16 Systematic risk is measured by Beta. Beta is a measure of the volatility of a
17 security as compared to the market as a whole. Beta is defined as:

$$\beta = \frac{\text{Covariance}(r_e, r_m)}{\text{Variance}(r_m)} \quad [4]$$

18 The variance of the market return (i.e., Variance (r_m)) is a measure of the
19 uncertainty of the general market. The covariance between the return on a specific
20 security and the general market (i.e., Covariance (r_e, r_m)) reflects the extent to
21 which the return on that security will respond to a given change in the general
22 market return. Thus, Beta represents the risk of the security relative to the general
23 market.

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1 **Q. What risk-free rate did you use in your CAPM analysis?**

2 A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day
3 average yield on 30-year U.S. Treasury bonds (i.e., 3.04 percent);²⁷ (2) the
4 projected 30-year U.S. Treasury bond yield for Q1 2017 through Q2 2018 (i.e.,
5 3.40 percent);²⁸ and (3) the projected 30-year U.S. Treasury bond yield for 2018
6 through 2022 (i.e., 4.20 percent).²⁹

7 **Q. What Beta coefficients did you use in your CAPM analysis?**

8 A. As shown in Schedule-4 of Exhibit 13-A, I used the average Beta coefficients for
9 the proxy group companies as reported by Value Line and Bloomberg. Value
10 Line's calculation is based on five years of weekly returns relative to the New York
11 Stock Exchange Composite Index. The Bloomberg Betas are calculated based on
12 two years of weekly returns relative to the New York Stock Exchange Composite
13 Index.

14 **Q. How did you estimate the Market Risk Premium in the CAPM?**

15 A. I estimated the Market Risk Premium based on the expected return on the S&P
16 500 Index less the 30-year Treasury bond yield. The expected return on the S&P
17 500 Index is calculated using the Constant Growth DCF model for the companies
18 in the S&P 500 Index. As shown in Schedule-5 of Exhibit 13-A, based on an
19 estimated dividend yield of 2.08 percent and a long-term earnings growth rate of
20 10.95 percent, the estimated required market return for the S&P 500 Index is 13.09

²⁷ Bloomberg Professional, as of March 31, 2017.

²⁸ Blue Chip Financial Forecasts, Vol. 36, No. 1, March 1, 2017, at 2.

²⁹ Blue Chip Financial Forecasts, Vol. 35, No. 12, December 1, 2016, at 14.

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1 percent. The implied Market Risk Premia over the current and projected yields on
2 the 30-year U.S. Treasury bond range from 8.89 percent to 10.02 percent.

3 **Q. What are the results of your CAPM analyses?**

4 A. As shown in Table 5 (see also Schedule-6 and Schedule-7 of Exhibit 13-A), my
5 CAPM analyses produces a range of returns from 10.27 percent to 10.83 percent
6 (including AWW) and from 10.37 percent to 11.04 percent (excluding AWW).

7 **Table 5: Forward-Looking CAPM Results**

Forward-Looking CAPM Results				
	Current Risk-Free Rate (3.06%)	Q1 2017-2018 Projected Risk-Free Rate (3.40%)	2018-2022 Projected Risk-Free Rate (4.20%)	Mean Result
Including AWW				
Bloomberg Beta	10.54%	10.63%	10.83%	10.67%
Value Line Beta	10.27%	10.36%	10.59%	10.41%
Excluding AWW				
Bloomberg Beta	10.78%	10.85%	11.04%	10.89%
Value Line Beta	10.37%	10.46%	10.68%	10.50%

8

9 **VII. BUSINESS RISKS AND MANAGEMENT PERFORMANCE**

10 **Q. Do the mean DCF and CAPM results for the proxy group, taken alone,
11 provide an appropriate estimate of the cost of equity for PAWC?**

12 A. No. These mean results provide only a range of the appropriate estimate of
13 PAWC's cost of equity. Several additional factors must be considered when
14 determining where PAWC's cost of equity falls within the range of results. These

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1 factors, discussed below, should be considered with respect to their overall effect
2 on PAWC's risk profile relative to the proxy group.

3 **A. Risks Associated with Capital Expenditure Program**

4 **Q. Please summarize PAWC's capital expenditure program.**

5 A. PAWC projects that the Company will spend approximately \$1.487 billion on
6 capital investments for the period from 2017-2021, including significant investment
7 to replace aging infrastructure necessary to meet the needs of its customers and
8 to comply with various regulations.

9 **Q. How is PAWC's risk profile affected by its substantial capital expenditure
10 program?**

11 A. As with any utility faced with substantial capital expenditures, PAWC's risk profile
12 is adversely affected in two significant and related ways: (1) the heightened level
13 of investment increases the risk of under-recovery, or delayed recovery, of the
14 invested capital; and (2) an inadequate return would put downward pressure on
15 key credit metrics.

16 **Q. Do credit rating agencies recognize the risks associated with elevated
17 capital expenditures?**

18 A. Yes. From a credit perspective, the additional pressure on cash flows associated
19 with high levels of capital expenditures exerts corresponding pressure on credit
20 metrics and, therefore, credit ratings. A July 2014 report from S&P explains:

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1 [T]here is little doubt that the U.S. electric industry needs to make
2 record capital expenditures to comply with the proposed carbon
3 pollution rules over the next several years, while maintaining safety
4 standards and grid stability. We believe the higher capital spending
5 and subsequent rise in debt levels could strain these companies'
6 financial measures, resulting in an almost consistent negative
7 discretionary cash flow throughout this higher construction period.
8 To meet the higher capital spending requirements, companies will
9 require ongoing and steady access to the capital markets,
10 necessitating that the industry maintains its high credit quality. We
11 expect that utilities will continue to effectively manage their
12 regulatory risk by using various creative means to recover their
13 costs and to finance their necessary higher spending.³⁰

14 While this S&P report refers to electric utilities, the same applies to water utilities.
15 To the extent that PAWC's rates do not permit it to recover its full cost of doing
16 business, the Company will face increased recovery risk and thus increased
17 pressure on its credit metrics. In an August 2016 report, S&P explains the
18 importance of regulatory support for large capital projects:

³⁰ S&P, Ratings Direct, "U.S. Regulated Electric Utilities' Annual Capital Spending is Poised to Eclipse \$100 Billion," July 2014.

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1 When applicable, a jurisdiction’s willingness to support large capital
2 projects with cash during construction is an important aspect of our
3 analysis. This is especially true when the project represents a
4 major addition to rate base and entails long lead times and
5 technological risks that make it susceptible to construction delays.
6 Broad support for all capital spending is the most credit-sustaining.
7 Support for only specific types of capital spending, such as specific
8 environmental projects or system integrity plans, is less so, but still
9 favorable for creditors. Allowance of a cash return on construction
10 work-in-progress or similar ratemaking methods historically were
11 extraordinary measures for use in unusual circumstances, but when
12 construction costs are rising, cash flow support could be crucial to
13 maintain credit quality through the spending program. Even more
14 favorable are those jurisdictions that present an opportunity for a
15 higher return on capital projects as an incentive to investors.³¹

16 **Q. Have credit rating agencies commented specifically on AWK’s capital**
17 **spending program?**

18 A. Yes, both S&P and Moody’s have observed that AWK has significant capital
19 spending requirements. S&P states: “The Company’s geographic diversity,
20 reliability, and efficiency further support its business risk profile. AWK’s elevated
21 capital spending requirements for infrastructure replacement, increased
22 compliance costs to meet water quality standards, and reliance on acquisitions to
23 provide growth partially offset these strengths.”³² Similarly, Moody’s comments
24 that one credit challenge for AWK is that it operates in a “highly capital intensive
25 industry with an old asset base.”³³

³¹ S&P Global Ratings, “Assessing U.S. Investor-Owned Utility Regulatory Environments,” August 10, 2016, at 7.

³² S&P Global Ratings, “Summary: American Water Works Company, Inc.,” August 10, 2016, at 3.

³³ Moody’s Investors Service, Credit Opinion “American Water Works, Company, Inc.,” August 10, 2016, at 2.

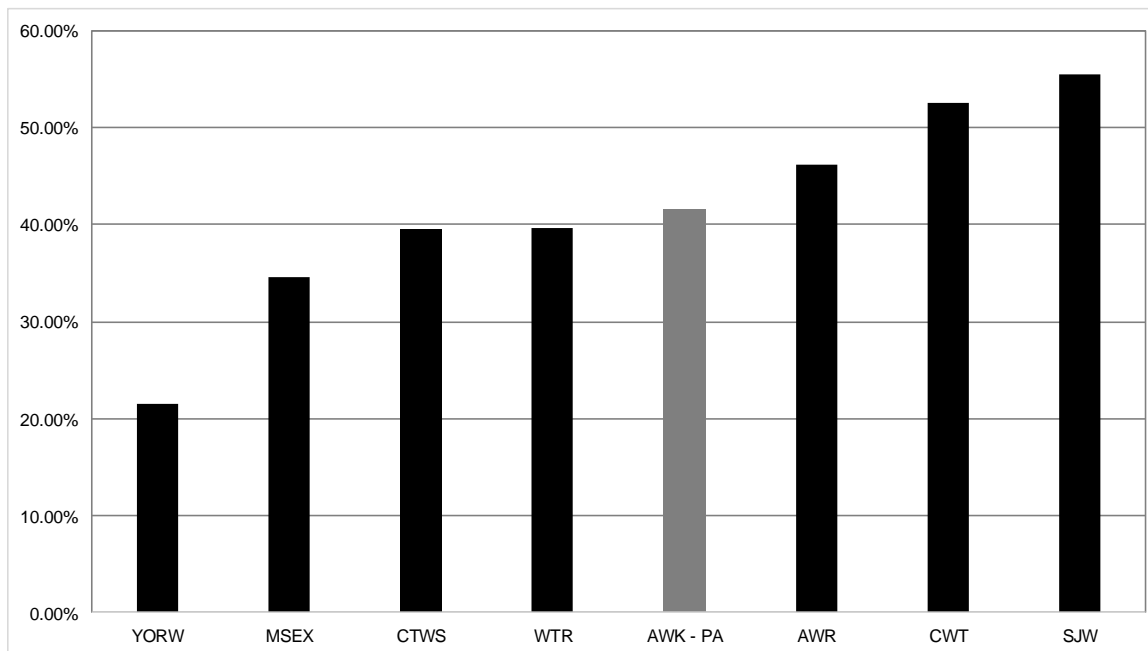
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1 **Q. Have you conducted any analysis of the Company's projected capital**
2 **expenditures for water and wastewater services relative to the proxy**
3 **companies?**

4 A. Yes. I compared the ratio of projected capital expenditures from 2017 through
5 2021 to net utility plant as of December 31, 2015, for PAWC with each of the proxy
6 group companies. Chart 4 demonstrates that PAWC's ratio of projected capital
7 expenditures to net plant is higher than four of the seven proxy group companies
8 (excluding AWK). Furthermore, as shown in Schedule-8 of Exhibit 13-A, PAWC's
9 ratio of capital spending to net plant of 41.7 percent is above the proxy group
10 median of 39.6 percent, which suggests that the Company faces slightly greater
11 risk due to the magnitude of its capital program compared to the typical proxy group
12 member. In addition to the water services capital investment, PAWC projects
13 \$47.2 million of investments in the wastewater systems in 2017 and an additional
14 \$30.7 million in 2018.

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1 **Chart 4: Projected Capital Expenditures (2017-2021)/2015 Net Plant**



2

3

4 **Q. Are you aware that PAWC has a Distribution System Infrastructure Charge**
5 **to recover capital investments?**

6 A. Yes, I am.

7 **Q. Do the proxy group companies have the ability to recover capital**
8 **investments through a distribution system infrastructure surcharge?**

9 A. Yes. As shown on Schedule 9 of Exhibit 13-A, the proxy companies, excluding
10 AWK, have a distribution system infrastructure charge ("DSIC") in 60.00 percent
11 of their operating jurisdictions.

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1 **Q. What are your conclusions regarding the effect of PAWC's capital spending**
2 **program on its risk profile?**

3 A. PAWC's capital expenditures are significant relative to the Company's current level
4 of rate base investment. Furthermore, PAWC's recovery mechanism for capital
5 investments is similar to that of the proxy group companies. The financial
6 community recognizes the additional risks associated with substantial capital
7 expenditures and notes that timely cost recovery is needed in order to maintain
8 credit metrics at a level consistent with the current credit ratings. Therefore, the
9 capital recovery mechanisms are essential to meet the investment requirements
10 of the industry and PAWC. Furthermore, because the proxy companies have DSIC
11 mechanisms implemented in the majority of their operating jurisdictions, PAWC's
12 risk related to capital investment is not lower than that of the proxy group as a
13 result of its DSIC mechanism.

14 **B. Risks Associated with Environmental and Water Quality** 15 **Regulation**

16 **Q. Please provide an overview of the risks associated with water quantity,**
17 **water quality and other environmental regulations applicable to PAWC's**
18 **water supply facilities and operations.**

19 A. Water supply utilities are subject to a complex array of regulations at the federal,
20 state and river basin commission levels with respect to water quantity, water quality
21 and other environmental aspects of their facilities and operations.

22 The testimony of David Kaufman at PAWC Statement No. 3 provides a detailed
23 description of the environmental and regulatory risks facing water and wastewater

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1 utilities. As discussed in Mr. Kaufman’s testimony PAWC faces risks related to the
2 following:

- 3 1) In September, 2016, the Susquehanna River Basin Commission (“SRBC”)
4 proposed changes to its project review regulations which would significantly
5 affect “grandfathered” surface and groundwater withdrawals of the type
6 currently operated by PAWC.³⁴ A likely result of these regulations would be to
7 require PAWC to apply for project approvals for increased withdrawal amounts
8 to meet growing system demands.

- 9 2) In December 2012, SRBC finalized a new Low Flow Protection Policy (“SRBC
10 Low Flow Policy”).³⁵ The net impact of the SRBC Low Flow Policy will be to
11 require investment in development and operation of additional ground and
12 surface water sources.

- 13 3) As the result of conditions that arose in Flint, Michigan and other jurisdictions
14 across the country, increasing scrutiny is being placed at all levels concerning
15 lead concentrations in water systems and potential adoption of more stringent
16 requirements under the federal “Lead and Copper Rule.” PAWC’s service
17 territory includes the type of copper and galvanized pipes with solder joints
18 where lead contamination is an increased risk.

³⁴ 81 Fed. Reg. 64812 (September 21, 2016).

³⁵ Available at: <http://www.srbc.net/policies/lowflowpolicy.htm>.

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1 4) In October 2016, the EPA released a whitepaper containing proposed revisions
2 to the federal Lead and Copper Rule. The EPA's Lead and Copper Rule
3 Revisions White Paper contains a series of proposals, including mandates that
4 water systems establish lead service line replacement programs.³⁶ The white
5 paper's proposals, if adopted, could impose significant capital investment and
6 operating expenses on all water systems.

7 5) PADEP has proposed more intensive period "point of entry" monitoring for all
8 public water systems sources, including those sources that are utilized only
9 intermittently as backups in the event of emergencies. If implemented as
10 proposed, the point of entry monitoring requirements would significantly
11 increase PAWC's monitoring requirements.

12 **Q. Provide an overview of the risks associated with environmental regulation**
13 **with respect to PAWC's wastewater system operations.**

14 A. As is the case with regard to drinking water system operations, the operation of
15 wastewater collection and treatment systems face a range of environmental
16 regulatory risks. These risks are discussed in detail in the testimony of David
17 Kaufman at PAWC Statement No. 3. The following is a summary of these risk
18 factors.

19 (1) The Clean Water Act requires wastewater systems to obtain and maintain
20 compliance with National Pollutant Discharge Elimination System ("NPDES")

³⁶ EPA Lead and Copper Rule Revisions, White Paper, October 2016, p. 9.

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1 permits, which in Pennsylvania are issued by PADEP. Those NPDES permits
2 include the establishment of stringent effluent limits which are set based upon the
3 stricter of technology-based effluent limits and water quality based effluent limits.

4 Technology based limits are set by EPA at levels that reflect some measure of best
5 practice that can, become more stringent as technology evolves. As discussed by
6 Mr. Kaufman, the NPDES permit issued in late 2016 for PAWC's Scranton system
7 sets more stringent limits, some of which go into effect immediately, and some
8 phased in over time.

9 More stringent effluent limits may be imposed when technology evolves or stream
10 conditions change, engendering requirements for significant capital improvements
11 and/or increased operating costs for enhanced treatment performance.

12 (2) Certain Pennsylvania streams in PAWC's system are parts of watersheds
13 which are classified as "impaired" (meaning below state standards). Such
14 impaired waters are subject to the development and imposition of Total Maximum
15 Daily Loads ("TMDLs") for parameters that contribute to the instream conditions.
16 As discussed by Mr. Kaufman, the all wastewater systems in the Susquehanna
17 River Basin, a watershed relied on by PAWC, have been accorded an annual "cap
18 load" for certain sediments exceeding these limits can lead to penalties and other
19 enforcement actions.

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1 (3) EPA's Combined Sewer Overflow (CSO) Control Policy³⁷ ("CSO Policy"),
2 seeks to reduce, but not eliminate, CSOs. PAWC's recently acquired Scranton
3 system has a combined sewer outflow that exceed the system conveyance and/or
4 treatment capacity, after storms with excess untreated wastewaters discharged to
5 receiving streams via combined sewer overflow ("CSO") outfalls. In many cases,
6 separation of CSS into separate sanitary and storm systems is logistically and
7 economically infeasible.

8 Under the CSO Policy and NPDES permits, operators of CSS systems must
9 develop and implement a Long-Term Control Plan ("LTCP"), consisting of a
10 collection system and treatment plant improvement projects designed to reduce
11 CSOs. These LTCP requirements often involve very substantial multi-year CapEx
12 programs. The Scranton system LTCP, for example, involves a 35-year program
13 costing well in excess of \$200 million.

14 **Q. What is your conclusion with respect to the effect of the risk associated**
15 **with environmental regulations and water quality regulations on PAWC's**
16 **cost of equity?**

17 A. PAWC has significant risk and uncertainty associated with environmental and
18 water quality regulations, and the recovery of costs to comply with those
19 regulations. It is clear that the financial community recognizes the additional risks
20 to credit quality associated with the capital investment required to meet

³⁷ 59 Fed. Reg. 18687 (April 19, 1994), available at:
<https://www.epa.gov/sites/production/files/2015-10/documents/owm0111.pdf>

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1 environmental and water quality regulations. In my view, those factors in addition
2 to the magnitude of the capital program that the Company has planned to ensure
3 compliance, support an ROE above the proxy group mean.

4
5 **VIII. CAPITAL STRUCTURE AND COST OF DEBT**

6 **Q. Please explain how the water services capital structure was calculated for**
7 **PAWC.**

8 A. Because there is specific debt that has been identified for the wastewater services,
9 the capital structures for water and wastewater services were calculated
10 separately. The capital structure for the total company was calculated first,
11 including all debt issuances and all sources of capital. The total company 2018
12 projected capital structure includes 46.09 percent long-term debt, 0.16 percent
13 preferred stock and 53.75 percent common equity, as shown in Schedule -13 of
14 Exhibit 13-A. The total company capital structure includes four issuances that can
15 be specifically assigned to the wastewater services: Pennvest Clarion; Pennvest
16 Pocono; Pennvest Scranton; and \$47 million of a PEDFA tax-exempt debt
17 issuance for Coatsville. These issuances are shown on Schedule 16 of Exhibit 13-
18 A. The capital structure for water service was calculated by removing the
19 wastewater specific debt instruments from the total long-term debt of the company
20 and recalculating the ratios of the remaining capital stock. The 2018 projected
21 ratemaking capital structure for the water service after removing the wastewater
22 specific debt issuances from the total company capital structure was 44.89 percent
23 debt, 0.17 percent preferred stock and 54.94 percent common equity.

DIRECT TESTIMONY OF ANN E. BULKLEY

1 **Q. How was the wastewater services capital structure calculated?**

2 A. The wastewater specific capital structure was calculated by applying the total
3 company debt ratio to the wastewater ratebase, excluding the specific wastewater
4 debt issuances. Preferred stock is also calculated by applying the total company
5 percentage of preferred stock to the ratebase less the wastewater specific debt
6 issuances. The equity component of the capital structure is the ratebase less long-
7 term debt, wastewater specific debt issuances and preferred stock. As show in
8 Table 6 and Schedule 15 of Exhibit 13-A, the 2018 projected wastewater specific
9 capital structure includes 35.24 percent long-term debt, 21.51 percent wastewater
10 specific long-term debt, 0.13 percent preferred stock and 43.21 percent common
11 equity.

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1

Table 6: 2018 Projected Rate-Making Capital Structures

	Forecast 2018
Total Company ³⁸	
Common Equity	53.75%
Preferred Stock	0.16%
Long-Term Debt	46.09%
Water Services ³⁹	
Common Equity	54.94%
Preferred Stock	0.17%
Long-Term Debt	44.89%
Wastewater Services ⁴⁰	
Common Equity	43.12%
Preferred Stock	0.13%
Long-Term Debt	35.24%
WW Specific Debt	21.51%

2

3 **Q. Have you analyzed the capital structures of the proxy group companies?**

4 A. Yes. I calculated the mean and median proportions of common equity and long-
5 term debt over the past five years (2011-2015) for each of the proxy group
6 companies. As shown in Schedule-10 of Exhibit 13-A, the mean and median
7 common equity ratios for the proxy group (excluding AWW) at December 31, 2015
8 were 54.95 percent and 55.57 percent, respectively, within a range from 49.24
9 percent to 59.85 percent. PAWC's 2018 projected common equity ratio for water
10 distribution service of 54.94 percent is consistent with the mean and median

³⁸ See Exhibit 13-A, Schedule 13.

³⁹ *Ibid.*, at Schedule 11.

⁴⁰ *Ibid.*, at Schedule 12.

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1 common equity ratios for the proxy group. The 2018 projected equity ratio for
2 PAWC's wastewater services of 43.12 percent is substantially below the equity
3 ratios of the proxy companies.

4 **Q. What is your conclusion with regard to PAWC's proposed capital**
5 **structures?**

6 A. The Company's proposed equity ratios for water distribution service as of
7 December 31, 2018 are similar to the mean and median equity ratios at the
8 operating utilities held within the proxy group. The wastewater services capital
9 structure has significantly less equity than the proxy companies.

10 **Q. What is PAWC's proposed cost of long-term debt?**

11 A. As shown in Schedule-19 of Exhibit 13-A, PAWC is proposing a long-term debt
12 cost for the wastewater service of 5.25 percent for the 2018 fully forecast test year.
13 This long-term debt cost applies to the total long-term debt for water services. The
14 wastewater services debt is projected in two components, the wastewater specific
15 issuances, shown on Schedule 16 of Exhibit 13-A, have a projected debt cost of
16 4.59 percent for the 2018 fully forecast test year. The remainder of the wastewater
17 debt is projected to be financed at the total company rate of 5.25 percent.

18 **Q. Do you believe PAWC's proposed cost of long-term debt is reasonable?**

19 A. Yes, I do. I have reviewed the underlying calculations supporting the cost of long-
20 term debt for PAWC, and I find them to be methodologically correct. The
21 embedded cost of long-term debt is based on the Company's actual debt
22 issuances for 2016 and 2017, and includes two new debt issuances in 2018 with
23 interest rates based on the average historical spread between 30-year Treasury

DIRECT TESTIMONY OF ANN E. BULKLEY

1 bonds and PAWC's long-term debt issuances. I conclude that PAWC's proposed
2 long-term debt costs for 2016, 2017 and 2018 are reasonable and should be
3 approved by the Commission.

4 IX. CONCLUSIONS AND RECOMMENDATION

5 **Q. What is your conclusion regarding a fair ROE for PAWC?**

6 A. Based on the various quantitative analyses summarized in **Error! Reference**
7 **source not found.** and the qualitative analyses presented in my Direct Testimony,
8 a reasonable range of ROE results for PAWC is from 10.00 percent to 10.80
9 percent. I am recommending that the Commission set the Company's rate of
10 return on common equity at 10.80 percent. A return at the high end of the range
11 of results would recognize the Company's superior performance and service
12 quality, as discussed in the testimony of Mr. Rod Nevirauskas at PAWC Statement
13 No. 1. In addition, the recommended ROE takes into consideration the anomalous
14 conditions in capital markets that are causing the DCF model to understate the
15 cost of equity, including the effect of the current low interest rate environment on
16 utility stock valuations and dividend yields, and the market's expectation for higher
17 interest rates during the period in which the rates established in this proceeding
18 would be in effect.

19 **Q. What is your conclusion with respect to PAWC's proposed capital**
20 **structures for water distribution service and wastewater service?**

21 A. My conclusion is that PAWC's proposed capital structures for the historical and
22 projected test years, summarized in Table 7 for both the water distribution service

DIRECT TESTIMONY OF ANN E. BULKLEY

1 and wastewater service, are reasonable compared to the mean, median and range
2 established by the capital structures for the proxy group companies.

3 **Table 7: Summary of Projected Capital Structure**

	12/31/2016	12/31/2017	12/31/2018
Water Distribution			
Equity:	56.82%	55.25%	54.94%
LT Debt:	42.88%	44.53%	44.89%
Preferred:	0.30%	0.22%	0.17%
Wastewater Service			
Equity:	41.48%	43.12%	43.12%
LT Debt:	31.30%	34.75%	35.24%
Wastewater Specific Debt:	27.00%	21.96%	21.51%
Preferred:	0.22%	0.17%	0.13%

4

5 **Q. Does this conclude your Direct Testimony?**

6 A. Yes.

**BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**PENNSYLVANIA PUBLIC UTILITY
COMMISSION**

v.

**PENNSYLVANIA-AMERICAN WATER
COMPANY**

:
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DOCKET NO. R-2017-2595853

VERIFICATION

I, **Ann E. Bulkley**, hereby state that the facts set forth in the pre-marked Statement No. 13 and accompanying exhibits, if any, are true and correct to the best of my knowledge information and belief. I understand that this verification is made subject to the provisions and penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Date: April 28, 2017



Ann E. Bulkley

PENNSYLVANIA-AMERICAN WATER COMPANY

**Schedules to Accompany the
Direct Testimony
of**

**Ann E. Bulkley, Senior Vice President
Concentric Energy Advisors, Inc.**

**Concerning
Fair Rate of Return and Capital Structure
Docket No. R-2017-2595853**

Date April 28, 2017

PENNSYLVANIA-AMERICAN WATER COMPANY

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30-DAY CONSTANT GROWTH DCF

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Reuters High	Reuters Low	Reuters Mean	Average Growth Rate	Low ROE	Mean ROE	High ROE
American States Water Co	AWR	\$0.97	\$43.75	2.21%	2.27%	6.00%	5.05%	4.00%	4.70%	4.00%	4.35%	4.85%	6.26%	7.12%	8.28%
American Water	AWK	\$1.50	\$76.45	1.96%	2.04%	8.00%	7.40%	7.40%	13.00%	7.00%	8.56%	7.84%	9.03%	9.88%	15.09%
Aqua America, Inc.	WTR	\$0.77	\$31.42	2.44%	2.51%	7.00%	5.25%	5.50%	9.00%	5.00%	6.33%	6.02%	7.50%	8.53%	11.54%
California Water Service Group	CWT	\$0.72	\$35.42	2.03%	2.11%	7.50%	9.70%	6.00%	10.50%	5.00%	7.75%	7.74%	7.08%	9.85%	12.64%
Connecticut Water Service, Inc.	CTWS	\$1.13	\$54.35	2.08%	2.14%	5.00%	5.15%	6.00%	7.00%	4.30%	5.65%	5.45%	6.42%	7.59%	9.15%
Middlesex Water Company	MSEX	\$0.85	\$36.60	2.31%	2.37%	8.50%	2.70%	n/a	n/a	n/a	n/a	5.60%	5.04%	7.97%	10.91%
SJW Corporation	SJW	\$0.87	\$47.93	1.82%	1.90%	5.50%	14.00%	n/a	n/a	n/a	n/a	9.75%	7.37%	11.65%	15.94%
York Water Company	YORW	\$0.64	\$35.02	1.83%	1.88%	6.00%	4.90%	n/a	n/a	n/a	n/a	5.45%	6.77%	7.33%	7.88%
Mean				2.08%	2.15%	6.69%	6.77%	5.78%	8.84%	5.06%	6.53%	6.59%	6.93%	8.74%	11.43%
Mean excluding AWK				2.10%	2.17%	6.50%	6.68%	5.38%	7.80%	4.58%	6.02%	6.41%	6.63%	8.58%	10.91%

Notes:

- [1] Source: Bloomberg Professional
- [2] Source: Bloomberg Professional, equals 30-day average as of March 31, 2017
- [3] Equals [1] / [2]
- [4] Equals [3] x (1 + 0.50 x [8])
- [5] Source: Value Line
- [6] Source: Yahoo! Finance
- [7] Source: Zacks
- [8] Source: Reuters
- [9] Source: Reuters
- [10] Source: Reuters
- [11] Equals Average ([5], [6], [7], [10])
- [12] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7], [8], [9]) + Minimum ([5], [6], [7],[8], [9])
- [13] Equals [4] + [11]
- [14] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7], [8], [9]) + Maximum ([5], [6], [7], [8], [9])

90-DAY CONSTANT GROWTH DCF

Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Reuters High	Reuters Low	Reuters Mean	Average Growth Rate	Low ROE	Mean ROE	High ROE
American States Water Co	AWR	\$0.97	\$44.05	2.20%	2.25%	6.00%	5.05%	4.00%	4.70%	4.00%	4.35%	4.85%	6.24%	7.10%	8.26%
American Water	AWK	\$1.50	\$73.88	2.03%	2.11%	8.00%	7.40%	7.40%	13.00%	7.00%	8.56%	7.84%	9.10%	9.95%	15.16%
Aqua America, Inc.	WTR	\$0.77	\$30.53	2.51%	2.58%	7.00%	5.25%	5.50%	9.00%	5.00%	6.33%	6.02%	7.57%	8.60%	11.62%
California Water Service Group	CWT	\$0.72	\$34.61	2.08%	2.16%	7.50%	9.70%	6.00%	10.50%	5.00%	7.75%	7.74%	7.13%	9.90%	12.69%
Connecticut Water Service, Inc.	CTWS	\$1.13	\$54.67	2.07%	2.12%	5.00%	5.15%	6.00%	7.00%	4.30%	5.65%	5.45%	6.41%	7.57%	9.14%
Middlesex Water Company	MSEX	\$0.85	\$38.84	2.18%	2.24%	8.50%	2.70%	n/a	n/a	n/a	n/a	5.60%	4.91%	7.84%	10.77%
SJW Corporation	SJW	\$0.87	\$51.17	1.70%	1.78%	5.50%	14.00%	n/a	n/a	n/a	n/a	9.75%	7.25%	11.53%	15.82%
York Water Company	YORW	\$0.64	\$36.20	1.77%	1.82%	6.00%	4.90%	n/a	n/a	n/a	n/a	5.45%	6.71%	7.27%	7.82%
Mean				2.07%	2.13%	6.69%	6.77%	5.78%	8.84%	5.06%	6.53%	6.59%	6.92%	8.72%	11.41%
Mean excluding AWK				2.07%	2.14%	6.50%	6.68%	5.38%	7.80%	4.58%	6.02%	6.41%	6.60%	8.54%	10.87%

Notes:

- [1] Source: Bloomberg Professional
- [2] Source: Bloomberg Professional, equals 90-day average as of March 31, 2017
- [3] Equals [1] / [2]
- [4] Equals [3] x (1 + 0.50 x [8])
- [5] Source: Value Line
- [6] Source: Yahoo! Finance
- [7] Source: Zacks
- [8] Source: Reuters
- [9] Source: Reuters
- [10] Source: Reuters
- [11] Equals Average ([5], [6], [7], [10])
- [12] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7], [8], [9]) + Minimum ([5], [6], [7],[8], [9])
- [13] Equals [4] + [11]
- [14] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7], [8], [9]) + Maximum ([5], [6], [7], [8], [9])

180-DAY CONSTANT GROWTH DCF

Company		Annualized Dividend	Stock Price	Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Reuters High	Reuters Low	Reuters Mean	Average Growth Rate	Low ROE	Mean ROE	High ROE
American States Water Co	AWR	\$0.97	\$42.20	2.29%	2.35%	6.00%	5.05%	4.00%	4.70%	4.00%	4.35%	4.85%	6.34%	7.20%	8.36%
American Water	AWK	\$1.50	\$74.57	2.01%	2.09%	8.00%	7.40%	7.40%	13.00%	7.00%	8.56%	7.84%	9.08%	9.93%	15.14%
Aqua America, Inc.	WTR	\$0.77	\$30.81	2.48%	2.56%	7.00%	5.25%	5.50%	9.00%	5.00%	6.33%	6.02%	7.55%	8.58%	11.60%
California Water Service Group	CWT	\$0.72	\$33.29	2.16%	2.25%	7.50%	9.70%	6.00%	10.50%	5.00%	7.75%	7.74%	7.22%	9.98%	12.78%
Connecticut Water Service, Inc.	CTWS	\$1.13	\$52.46	2.15%	2.21%	5.00%	5.15%	6.00%	7.00%	4.30%	5.65%	5.45%	6.50%	7.66%	9.23%
Middlesex Water Company	MSEX	\$0.85	\$37.60	2.25%	2.31%	8.50%	2.70%	n/a	n/a	n/a	n/a	5.60%	4.98%	7.91%	10.84%
SJW Corporation	SJW	\$0.87	\$47.49	1.83%	1.92%	5.50%	14.00%	n/a	n/a	n/a	n/a	9.75%	7.38%	11.67%	15.96%
York Water Company	YORW	\$0.64	\$33.14	1.93%	1.99%	6.00%	4.90%	n/a	n/a	n/a	n/a	5.45%	6.88%	7.44%	7.99%
Mean				2.14%	2.21%	6.69%	6.77%	5.78%	8.84%	5.06%	6.53%	6.59%	6.99%	8.80%	11.49%
Mean excluding AWK				2.16%	2.23%	6.50%	6.68%	5.38%	7.80%	4.58%	6.02%	6.41%	6.69%	8.63%	10.97%

Notes:

- [1] Source: Bloomberg Professional
- [2] Source: Bloomberg Professional, equals 180-day average as of March 31, 2017
- [3] Equals [1] / [2]
- [4] Equals [3] x (1 + 0.50 x [8])
- [5] Source: Value Line
- [6] Source: Yahoo! Finance
- [7] Source: Zacks
- [8] Source: Reuters
- [9] Source: Reuters
- [10] Source: Reuters
- [11] Equals Average ([5], [6], [7], [10])
- [12] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7], [8], [9]) + Minimum ([5], [6], [7],[8], [9])
- [13] Equals [4] + [11]
- [14] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7], [8], [9]) + Maximum ([5], [6], [7], [8], [9])

PROJECTED CONSTANT GROWTH DCF - ALL WATER COMPANIES

Company	Annualized Dividend (2019 - 2021)	Stock Price (2019 - 2021)			Dividend Yield	Expected Dividend Yield	Value Line Earnings Growth	Yahoo! Finance Earnings Growth	Zacks Earnings Growth	Reuters			Average Growth Rate	Low ROE	Mean ROE	High ROE	
		High	Low	Mean						High	Low	Mean					
American States Water Co	AWR	\$1.25	\$55.00	\$40.00	\$47.50	2.63%	2.70%	6.00%	5.05%	4.00%	4.70%	4.00%	4.35%	4.85%	6.68%	7.55%	8.71%
American Water	AWK	\$2.05	\$90.00	\$60.00	\$75.00	2.73%	2.84%	8.00%	7.40%	7.40%	13.00%	7.00%	8.56%	7.84%	9.83%	10.68%	15.91%
Aqua America, Inc.	WTR	\$1.05	\$45.00	\$35.00	\$40.00	2.63%	2.70%	7.00%	5.25%	5.50%	9.00%	5.00%	6.33%	6.02%	7.69%	8.72%	11.74%
California Water Service Group	CWT	\$0.99	\$45.00	\$30.00	\$37.50	2.64%	2.74%	7.50%	9.70%	6.00%	10.50%	5.00%	7.75%	7.74%	7.71%	10.48%	13.28%
Connecticut Water Service, Inc.	CTWS	\$1.35	\$55.00	\$40.00	\$47.50	2.84%	2.92%	5.00%	5.15%	6.00%	7.00%	4.30%	5.65%	5.45%	7.20%	8.37%	9.94%
Middlesex Water Company	MSEX	\$0.95	\$45.00	\$35.00	\$40.00	2.38%	2.44%	8.50%	2.70%	n/a	n/a	n/a	n/a	5.60%	5.11%	8.04%	10.98%
SJW Corporation	SJW	\$1.05	\$65.00	\$45.00	\$55.00	1.91%	2.00%	5.50%	14.00%	n/a	n/a	n/a	n/a	9.75%	7.46%	11.75%	16.04%
York Water Company	YORW	\$0.85	\$35.00	\$25.00	\$30.00	2.83%	2.91%	6.00%	4.90%	n/a	n/a	n/a	n/a	5.45%	7.80%	8.36%	8.92%
Mean						2.57%	2.66%	6.69%	6.77%	5.78%	8.84%	5.06%	6.53%	6.59%	7.44%	9.24%	11.94%
Mean excl AWK						2.55%	2.63%	6.50%	6.68%	5.38%	7.80%	4.58%	6.02%	6.41%	7.09%	9.04%	11.37%

Value Line ROE Projections

Company	Ticker	2017	2019-2021
American States Water Co	AWR	12.00%	13.50%
American Water Works Co, Inc.	AWK	9.00%	10.50%
Aqua America, Inc.	WTR	13.00%	12.50%
California Water Service Group	CWT	9.50%	10.00%
Connecticut Water Service, Inc.	CTWS	10.50%	11.00%
Middlesex Water Company	MSEX	11.00%	12.00%
SJW Corporation	SJW	12.50%	11.00%
York Water Company	YORW	11.00%	12.50%
	Mean	11.06%	11.63%
	Mean excl AWK	11.36%	11.79%

Source: Value Line Reports January 2017

PROXY COMPANY
BETAS

		[1]	[2]
		Bloomberg	Value Line
American States Water Co	AWR	0.74	0.75
American Water	AWK	0.58	0.65
Aqua America, Inc.	WTR	0.62	0.70
California Water Service Group	CWT	0.76	0.75
Connecticut Water Service, Inc.	CTWS	0.65	0.65
Middlesex Water Company	MSEX	0.86	0.75
SJW Corporation	SJW	0.83	0.75
York Water Company	YORW	0.92	0.75
Average		0.746	0.719
Average excl AWK		0.769	0.729

Notes:

[1] Source: Bloomberg Professional, January 31, 2017

[2] Source: Value Line; dated January 13, 2017

MARKET RISK PREMIUM DERIVED FROM ANALYSTS' LONG-TERM GROWTH ESTIMATES

[1] Estimated Weighted Average Dividend Yield	2.03%
[2] Estimated Weighted Average Long-Term Growth Rate	10.95%
[3] S&P 500 Estimated Required Market Return	13.09%

Schedule 5 (1 of 6)

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Weight in Index	[5] Current Dividend Yield	[6] Cap-Weighted Dividend Yield	[7] Long-Term Growth Est.	[8] Cap-Weighted Long-Term Growth Est.
LyondellBasell Industries NV	LYB	0.17%	3.73%	0.01%	6.50%	0.0113%
American Express Co	AXP	0.34%	1.62%	0.01%	10.27%	0.0347%
Verizon Communications Inc	VZ	0.94%	4.74%	0.04%	4.84%	0.0456%
Broadcom Ltd	AVGO	0.42%	1.86%	0.01%	15.57%	0.0649%
Boeing Co/The	BA	0.51%	3.21%	0.02%	13.80%	0.0704%
Caterpillar Inc	CAT	0.26%	3.32%	0.01%	7.64%	0.0197%
JPMorgan Chase & Co	JPM	1.49%	2.28%	0.03%	7.20%	0.1071%
Chevron Corp	CVX	0.96%	4.02%	0.04%	29.90%	0.2881%
Coca-Cola Co/The	KO	0.86%	3.49%	0.03%	4.46%	0.0385%
AbbVie Inc	ABBV	0.49%	3.93%	0.02%	11.37%	0.0560%
Walt Disney Co/The	DIS	0.85%	1.38%	0.01%	8.10%	0.0689%
Extra Space Storage Inc	EXR	0.04%	4.19%	0.00%	7.62%	0.0034%
El du Pont de Nemours & Co	DD	0.33%	1.89%	0.01%	6.93%	0.0228%
Exxon Mobil Corp	XOM	1.61%	3.66%	0.06%	13.80%	0.2225%
Phillips 66	PSX	0.19%	3.18%	0.01%	-12.61%	-0.0245%
General Electric Co	GE	1.23%	3.22%	0.04%	10.24%	0.1260%
HP Inc	HPQ	0.14%	2.97%	0.00%	1.56%	0.0022%
Home Depot Inc/The	HD	0.84%	2.42%	0.02%	12.56%	0.1052%
International Business Machines Corp	IBM	0.78%	3.22%	0.03%	6.15%	0.0479%
Concho Resources Inc	CXO	0.09%	n/a	n/a	3.32%	0.0030%
Johnson & Johnson	JNJ	1.60%	2.57%	0.04%	6.88%	0.1101%
McDonald's Corp	MCD	0.50%	2.90%	0.01%	9.69%	0.0488%
Merck & Co Inc	MRK	0.83%	2.96%	0.02%	6.00%	0.0496%
3M Co	MMM	0.54%	2.46%	0.01%	8.08%	0.0438%
American Water Works Co Inc	AWK	0.07%	1.93%	0.00%	7.58%	0.0050%
Bank of America Corp	BAC	1.12%	1.27%	0.01%	11.78%	0.1319%
CSRA Inc	CSRA	0.02%	1.37%	0.00%	6.20%	0.0014%
Pfizer Inc	PFE	0.97%	3.74%	0.04%	5.77%	0.0557%
Procter & Gamble Co/The	PG	1.09%	2.98%	0.03%	7.92%	0.0863%
AT&T Inc	T	1.21%	4.72%	0.06%	4.60%	0.0558%
Travelers Cos Inc/The	TRV	0.16%	2.22%	0.00%	7.02%	0.0112%
United Technologies Corp	UTX	0.43%	2.35%	0.01%	7.64%	0.0326%
Analog Devices Inc	ADI	0.14%	2.20%	0.00%	11.12%	0.0158%
Wal-Mart Stores Inc	WMT	1.04%	2.83%	0.03%	4.82%	0.0500%
Cisco Systems Inc	CSCO	0.80%	3.43%	0.03%	7.48%	0.0600%
Intel Corp	INTC	0.81%	3.02%	0.02%	7.70%	0.0623%
General Motors Co	GM	0.25%	4.30%	0.01%	9.67%	0.0243%
Microsoft Corp	MSFT	2.41%	2.37%	0.06%	8.84%	0.2133%
Dollar General Corp	DG	0.09%	1.49%	0.00%	9.98%	0.0091%
Kinder Morgan Inc/DE	KMI	0.23%	2.30%	0.01%	10.00%	0.0230%
Citigroup Inc	C	0.78%	1.07%	0.01%	5.54%	0.0434%
American International Group Inc	AIG	0.29%	2.05%	0.01%	11.00%	0.0319%
Honeywell International Inc	HON	0.45%	2.13%	0.01%	8.72%	0.0393%
Altria Group Inc	MO	0.66%	3.42%	0.02%	7.91%	0.0520%
HCA Holdings Inc	HCA	0.16%	n/a	n/a	11.18%	0.0175%
Under Armour Inc	UAA	0.02%	n/a	n/a	17.73%	0.0031%
International Paper Co	IP	0.10%	3.64%	0.00%	6.79%	0.0067%
Hewlett Packard Enterprise Co	HPE	0.14%	1.46%	0.00%	2.82%	0.0039%
Abbott Laboratories	ABT	0.36%	2.39%	0.01%	10.56%	0.0384%
Aflac Inc	AFL	0.14%	2.38%	0.00%	5.00%	0.0069%
Air Products & Chemicals Inc	APD	0.14%	2.81%	0.00%	8.22%	0.0115%
Royal Caribbean Cruises Ltd	RCL	0.10%	1.96%	0.00%	18.18%	0.0182%
American Electric Power Co Inc	AEP	0.16%	3.52%	0.01%	8.02%	0.0126%
Hess Corp	HES	0.07%	2.07%	0.00%	-11.36%	-0.0082%
Anadarko Petroleum Corp	APC	0.16%	0.32%	0.00%	9.00%	0.0148%
Aon PLC	AON	0.15%	1.11%	0.00%	9.77%	0.0144%
Apache Corp	APA	0.09%	1.95%	0.00%	-14.61%	-0.0135%
Archer-Daniels-Midland Co	ADM	0.12%	2.78%	0.00%	11.63%	0.0145%
Automatic Data Processing Inc	ADP	0.22%	2.23%	0.00%	10.87%	0.0237%
Verisk Analytics Inc	VRSK	0.06%	n/a	n/a	10.55%	0.0068%
AutoZone Inc	AZO	0.10%	n/a	n/a	13.68%	0.0133%
Avery Dennison Corp	AVY	0.03%	2.03%	0.00%	7.10%	0.0024%
Baker Hughes Inc	BHI	0.12%	1.14%	0.00%	47.00%	0.0567%
Ball Corp	BLL	0.06%	0.70%	0.00%	5.50%	0.0034%
Bank of New York Mellon Corp/The	BK	0.23%	1.61%	0.00%	16.15%	0.0375%
CR Bard Inc	BCR	0.09%	0.42%	0.00%	9.45%	0.0081%
Baxter International Inc	BAX	0.13%	1.00%	0.00%	12.84%	0.0171%
Becton Dickinson and Co	BDX	0.19%	1.59%	0.00%	10.19%	0.0189%
Berkshire Hathaway Inc	BRK/B	1.04%	n/a	n/a	n/a	n/a
Best Buy Co Inc	BBY	0.07%	2.77%	0.00%	11.18%	0.0081%
H&R Block Inc	HRB	0.02%	3.78%	0.00%	11.00%	0.0025%
Boston Scientific Corp	BSX	0.16%	n/a	n/a	11.80%	0.0190%
Bristol-Myers Squibb Co	BMJ	0.42%	2.87%	0.01%	14.50%	0.0616%
Fortune Brands Home & Security Inc	FBHS	0.04%	1.18%	0.00%	12.40%	0.0055%
Brown-Forman Corp	BF/B	0.05%	1.58%	0.00%	1.53%	0.0007%
Cabot Oil & Gas Corp	COG	0.05%	0.33%	0.00%	41.31%	0.0218%
Campbell Soup Co	CPB	0.08%	2.45%	0.00%	4.98%	0.0041%
Kansas City Southern	KSU	0.04%	1.54%	0.00%	12.50%	0.0054%
Advanced Micro Devices Inc	AMD	0.06%	n/a	n/a	8.33%	0.0054%

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Name	Ticker	[4] Weight in Index	[5] Current Dividend Yield	[6] Cap-Weighted Dividend Yield	[7] Long-Term Growth Est.	[8] Cap-Weighted Long-Term Growth Est.
Carnival Corp	CCL	0.15%	2.38%	0.00%	13.64%	0.0204%
Qorvo Inc	QRVO	0.04%	n/a	n/a	14.17%	0.0058%
CenturyLink Inc	CTL	0.06%	9.16%	0.01%	-4.08%	-0.0025%
Cigna Corp	CI	0.18%	0.03%	0.00%	10.80%	0.0193%
UDR Inc	UDR	0.05%	3.42%	0.00%	6.41%	0.0029%
Clorox Co/The	CLX	0.08%	2.37%	0.00%	6.99%	0.0057%
CMS Energy Corp	CMS	0.06%	2.97%	0.00%	6.33%	0.0038%
Colgate-Palmolive Co	CL	0.31%	2.19%	0.01%	9.46%	0.0290%
Comerica Inc	CMA	0.06%	1.34%	0.00%	10.60%	0.0061%
CA Inc	CA	0.06%	3.22%	0.00%	6.03%	0.0038%
Conagra Brands Inc	CAG	0.08%	1.98%	0.00%	8.65%	0.0072%
Consolidated Edison Inc	ED	0.11%	3.55%	0.00%	3.00%	0.0034%
SL Green Realty Corp	SLG	0.05%	2.91%	0.00%	0.76%	0.0004%
Corning Inc	GLW	0.12%	2.30%	0.00%	6.26%	0.0074%
Cummins Inc	CMI	0.12%	2.71%	0.00%	6.00%	0.0072%
Danaher Corp	DHR	0.28%	0.65%	0.00%	9.93%	0.0279%
Target Corp	TGT	0.14%	4.35%	0.01%	1.59%	0.0023%
Deere & Co	DE	0.16%	2.20%	0.00%	9.02%	0.0148%
Dominion Resources Inc/VA	D	0.23%	3.89%	0.01%	6.15%	0.0142%
Dover Corp	DOV	0.06%	2.19%	0.00%	11.83%	0.0070%
CBOE Holdings Inc	CBOE	0.04%	1.23%	0.00%	6.66%	0.0029%
Dow Chemical Co/The	DOW	0.37%	2.90%	0.01%	6.58%	0.0242%
Duke Energy Corp	DUK	0.27%	4.17%	0.01%	5.05%	0.0137%
Eaton Corp PLC	ETN	0.16%	3.24%	0.01%	9.20%	0.0145%
Ecobal Inc	ECL	0.17%	1.18%	0.00%	13.00%	0.0224%
PerkinElmer Inc	PKI	0.03%	0.48%	0.00%	2.50%	0.0008%
Emerson Electric Co	EMR	0.18%	3.21%	0.01%	7.06%	0.0129%
EOG Resources Inc	EOG	0.27%	0.69%	0.00%	-6.31%	-0.0168%
Entergy Corp	ETR	0.06%	4.58%	0.00%	0.33%	0.0002%
Equifax Inc	EFX	0.08%	1.14%	0.00%	8.90%	0.0070%
EQT Corp	EQT	0.05%	0.20%	0.00%	15.00%	0.0075%
XL Group Ltd	XL	0.05%	2.21%	0.00%	13.25%	0.0066%
FedEx Corp	FDX	0.25%	0.82%	0.00%	12.94%	0.0320%
Macy's Inc	M	0.04%	5.09%	0.00%	2.63%	0.0011%
FMC Corp	FMC	0.04%	0.95%	0.00%	9.53%	0.0042%
Ford Motor Co	F	0.22%	5.15%	0.01%	0.09%	0.0002%
NextEra Energy Inc	NEE	0.28%	3.06%	0.01%	6.94%	0.0198%
Franklin Resources Inc	BEN	0.11%	1.90%	0.00%	10.00%	0.0113%
Freeport-McMoRan Inc	FCX	0.09%	n/a	n/a	9.93%	0.0091%
TEGNA Inc	TGNA	0.03%	2.19%	0.00%	5.50%	0.0014%
Gap Inc/The	GPS	0.05%	3.79%	0.00%	5.63%	0.0026%
General Dynamics Corp	GD	0.27%	1.79%	0.00%	8.59%	0.0231%
General Mills Inc	GIS	0.16%	3.25%	0.01%	8.10%	0.0131%
Genuine Parts Co	GPC	0.07%	2.92%	0.00%	8.86%	0.0058%
WW Grainger Inc	GWW	0.06%	2.10%	0.00%	12.58%	0.0081%
Halliburton Co	HAL	0.20%	1.46%	0.00%	27.00%	0.0546%
Harley-Davidson Inc	HOG	0.05%	2.41%	0.00%	9.75%	0.0049%
Harris Corp	HRS	0.07%	1.91%	0.00%	n/a	n/a
HCP Inc	HCP	0.07%	4.73%	0.00%	1.18%	0.0008%
Helmerich & Payne Inc	HP	0.03%	4.21%	0.00%	4.10%	0.0014%
Fortive Corp	FTV	0.10%	0.47%	0.00%	9.10%	0.0090%
Hershey Co/The	HSY	0.08%	2.26%	0.00%	9.00%	0.0071%
Synchrony Financial	SYF	0.13%	1.52%	0.00%	9.11%	0.0120%
Hormel Foods Corp	HRL	0.09%	1.96%	0.00%	4.17%	0.0036%
Arthur J Gallagher & Co	AJG	0.05%	2.76%	0.00%	9.95%	0.0048%
Mondelez International Inc	MDLZ	0.31%	1.76%	0.01%	10.90%	0.0339%
CenterPoint Energy Inc	CNP	0.06%	3.88%	0.00%	6.35%	0.0036%
Humana Inc	HUM	0.14%	0.78%	0.00%	12.50%	0.0176%
Willis Towers Watson PLC	WLTW	0.08%	1.62%	0.00%	11.90%	0.0100%
Illinois Tool Works Inc	ITW	0.22%	1.96%	0.00%	8.13%	0.0177%
Ingersoll-Rand PLC	IR	0.10%	1.97%	0.00%	10.22%	0.0102%
Foot Locker Inc	FL	0.05%	1.66%	0.00%	10.20%	0.0047%
Interpublic Group of Cos Inc/The	IPG	0.05%	2.93%	0.00%	10.17%	0.0047%
International Flavors & Fragrances Inc	IFF	0.05%	1.93%	0.00%	7.80%	0.0039%
Jacobs Engineering Group Inc	JEC	0.03%	1.09%	0.00%	8.49%	0.0027%
Hanesbrands Inc	HBI	0.04%	2.89%	0.00%	13.88%	0.0051%
Kellogg Co	K	0.12%	2.86%	0.00%	7.02%	0.0085%
Perrigo Co PLC	PRGO	0.05%	0.96%	0.00%	5.20%	0.0023%
Kimberly-Clark Corp	KMB	0.22%	2.95%	0.01%	7.37%	0.0164%
Kimco Realty Corp	KIM	0.04%	4.89%	0.00%	10.35%	0.0046%
Kohl's Corp	KSS	0.03%	5.53%	0.00%	5.42%	0.0018%
Oracle Corp	ORCL	0.87%	1.70%	0.01%	9.22%	0.0802%
Kroger Co/The	KR	0.13%	1.63%	0.00%	6.26%	0.0080%
Leggett & Platt Inc	LEG	0.03%	2.70%	0.00%	19.00%	0.0060%
Lennar Corp	LEN	0.05%	0.31%	0.00%	10.82%	0.0053%
Leucadia National Corp	LUK	0.04%	0.96%	0.00%	18.00%	0.0080%
Eli Lilly & Co	LLY	0.44%	2.47%	0.01%	12.32%	0.0542%
L Brands Inc	LB	0.06%	5.10%	0.00%	8.30%	0.0053%
Charter Communications Inc	CHTR	0.42%	n/a	n/a	22.70%	0.0947%
Lincoln National Corp	LNC	0.07%	1.77%	0.00%	8.00%	0.0056%
Loews Corp	L	0.07%	0.53%	0.00%	n/a	n/a
Lowe's Cos Inc	LOW	0.34%	1.70%	0.01%	14.79%	0.0502%
Host Hotels & Resorts Inc	HST	0.07%	4.29%	0.00%	4.30%	0.0028%
Marsh & McLennan Cos Inc	MMC	0.18%	1.84%	0.00%	11.78%	0.0212%
Masco Corp	MAS	0.05%	1.18%	0.00%	12.64%	0.0065%
Mattel Inc	MAT	0.04%	5.94%	0.00%	23.75%	0.0099%
S&P Global Inc	SPGI	0.16%	1.25%	0.00%	11.00%	0.0176%
Medtronic PLC	MDT	0.52%	2.14%	0.01%	6.98%	0.0365%
CVS Health Corp	CVS	0.39%	2.55%	0.01%	11.19%	0.0431%

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Name	Ticker	[4] Weight in Index	[5] Current Dividend Yield	[6] Cap-Weighted Dividend Yield	[7] Long-Term Growth Est.	[8] Cap-Weighted Long-Term Growth Est.
Micron Technology Inc	MU	0.15%	n/a	n/a	10.00%	0.0152%
Motorola Solutions Inc	MSI	0.07%	2.18%	0.00%	4.30%	0.0029%
Murphy Oil Corp	MUR	0.02%	3.50%	0.00%	n/a	n/a
Mylan NV	MYL	0.10%	n/a	n/a	6.47%	0.0064%
Laboratory Corp of America Holdings	LH	0.07%	n/a	n/a	10.41%	0.0072%
Newell Brands Inc	NWL	0.11%	1.61%	0.00%	11.80%	0.0128%
Newmont Mining Corp	NEM	0.08%	0.61%	0.00%	-13.85%	-0.0115%
Twenty-First Century Fox Inc	FOXA	0.16%	1.11%	0.00%	9.87%	0.0160%
NIKE Inc	NKE	0.35%	1.29%	0.00%	11.54%	0.0404%
NiSource Inc	NI	0.04%	2.94%	0.00%	6.55%	0.0024%
Noble Energy Inc	NBL	0.07%	1.16%	0.00%	10.61%	0.0075%
Norfolk Southern Corp	NSC	0.15%	2.18%	0.00%	11.12%	0.0171%
Eversource Energy	ES	0.09%	3.23%	0.00%	6.00%	0.0053%
Northrop Grumman Corp	NOC	0.20%	1.51%	0.00%	5.96%	0.0117%
Wells Fargo & Co	WFC	1.32%	2.73%	0.04%	8.99%	0.1187%
Nucor Corp	NUE	0.09%	2.53%	0.00%	6.30%	0.0057%
PVH Corp	PVH	0.04%	0.15%	0.00%	7.94%	0.0030%
Occidental Petroleum Corp	OXY	0.23%	4.80%	0.01%	-1.48%	-0.0034%
Omnicom Group Inc	OMC	0.10%	2.55%	0.00%	7.48%	0.0072%
ONEOK Inc	OKE	0.06%	4.44%	0.00%	n/a	n/a
Raymond James Financial Inc	RJF	0.05%	1.15%	0.00%	13.50%	0.0070%
PG&E Corp	PCG	0.16%	2.95%	0.00%	6.50%	0.0104%
Parker-Hannifin Corp	PH	0.10%	1.65%	0.00%	9.61%	0.0097%
PPL Corp	PPL	0.12%	4.23%	0.01%	1.70%	0.0020%
PepsiCo Inc	PEP	0.76%	2.69%	0.02%	6.20%	0.0469%
Exelon Corp	EXC	0.16%	3.64%	0.01%	3.28%	0.0052%
ConocoPhillips	COP	0.29%	2.13%	0.01%	7.00%	0.0205%
PulteGroup Inc	PHM	0.04%	1.53%	0.00%	16.33%	0.0058%
Pinnacle West Capital Corp	PNW	0.04%	3.14%	0.00%	5.49%	0.0024%
PNC Financial Services Group Inc/The	PNC	0.28%	1.83%	0.01%	15.94%	0.0442%
PPG Industries Inc	PPG	0.13%	1.52%	0.00%	7.25%	0.0093%
Praxair Inc	PX	0.16%	2.66%	0.00%	9.97%	0.0160%
Progressive Corp/The	PGR	0.11%	1.74%	0.00%	10.26%	0.0111%
Public Service Enterprise Group Inc	PEG	0.11%	3.88%	0.00%	2.06%	0.0022%
Raytheon Co	RTN	0.21%	2.09%	0.00%	7.82%	0.0166%
Robert Half International Inc	RHI	0.03%	1.97%	0.00%	9.71%	0.0029%
Ryder System Inc	R	0.02%	2.33%	0.00%	15.00%	0.0028%
SCANA Corp	SCG	0.04%	3.75%	0.00%	5.30%	0.0023%
Edison International	EIX	0.12%	2.73%	0.00%	4.76%	0.0059%
Schlumberger Ltd	SLB	0.52%	2.56%	0.01%	13.72%	0.0708%
Charles Schwab Corp/The	SCHW	0.26%	0.78%	0.00%	17.90%	0.0463%
Sherwin-Williams Co/The	SHW	0.14%	1.10%	0.00%	13.65%	0.0187%
JM Smucker Co/The	SJM	0.07%	2.29%	0.00%	5.90%	0.0043%
Snap-on Inc	SNA	0.05%	1.68%	0.00%	4.60%	0.0021%
AMETEK Inc	AME	0.06%	0.67%	0.00%	10.29%	0.0061%
Southern Co/The	SO	0.23%	4.50%	0.01%	4.33%	0.0101%
BB&T Corp	BBT	0.17%	2.68%	0.00%	7.77%	0.0133%
Southwest Airlines Co	LUV	0.16%	0.74%	0.00%	9.48%	0.0149%
Southwestern Energy Co	SWN	0.02%	n/a	n/a	-10.43%	-0.0020%
Stanley Black & Decker Inc	SWK	0.10%	1.75%	0.00%	11.00%	0.0106%
Public Storage	PSA	0.18%	3.65%	0.01%	6.14%	0.0111%
SunTrust Banks Inc	STI	0.13%	1.88%	0.00%	8.34%	0.0107%
Sysco Corp	SYU	0.13%	2.54%	0.00%	9.11%	0.0121%
Tesoro Corp	TSO	0.05%	2.71%	0.00%	10.00%	0.0045%
Texas Instruments Inc	TXN	0.38%	2.48%	0.01%	9.38%	0.0358%
Textron Inc	TXT	0.06%	0.17%	0.00%	8.92%	0.0054%
Thermo Fisher Scientific Inc	TMO	0.28%	0.39%	0.00%	11.78%	0.0335%
Tiffany & Co	TIF	0.06%	1.89%	0.00%	8.40%	0.0047%
TJX Cos Inc/The	TJX	0.24%	1.58%	0.00%	11.51%	0.0279%
Torchmark Corp	TMK	0.04%	0.78%	0.00%	6.77%	0.0029%
Total System Services Inc	TSS	0.05%	0.75%	0.00%	11.00%	0.0051%
Johnson Controls International plc	JCI	0.19%	2.37%	0.00%	8.50%	0.0159%
Ulta Beauty Inc	ULTA	0.08%	n/a	n/a	21.73%	0.0183%
Union Pacific Corp	UNP	0.41%	2.28%	0.01%	9.70%	0.0395%
UnitedHealth Group Inc	UNH	0.75%	1.52%	0.01%	14.15%	0.1058%
Unum Group	UNM	0.05%	1.71%	0.00%	7.00%	0.0036%
Marathon Oil Corp	MRO	0.06%	1.27%	0.00%	8.60%	0.0055%
Varian Medical Systems Inc	VAR	0.04%	n/a	n/a	10.00%	0.0040%
Ventas Inc	VTR	0.11%	4.77%	0.01%	5.64%	0.0062%
VF Corp	VFC	0.11%	3.06%	0.00%	7.84%	0.0085%
Vornado Realty Trust	VNO	0.09%	2.83%	0.00%	4.23%	0.0038%
Vulcan Materials Co	VMC	0.08%	0.83%	0.00%	27.91%	0.0211%
Weyerhaeuser Co	WY	0.12%	3.65%	0.00%	7.50%	0.0091%
Whirlpool Corp	WHR	0.06%	2.33%	0.00%	16.36%	0.0099%
Williams Cos Inc/The	WMB	0.12%	4.06%	0.00%	10.00%	0.0116%
WEC Energy Group Inc	WEC	0.09%	3.43%	0.00%	5.98%	0.0054%
Xerox Corp	XRX	0.04%	3.41%	0.00%	-0.80%	-0.0003%
Adobe Systems Inc	ADBE	0.31%	n/a	n/a	14.98%	0.0457%
AES Corp/VA	AES	0.03%	4.29%	0.00%	5.82%	0.0020%
Amgen Inc	AMGN	0.57%	2.80%	0.02%	6.79%	0.0389%
Apple Inc	AAPL	3.57%	1.59%	0.06%	10.64%	0.3802%
Autodesk Inc	ADSK	0.09%	n/a	n/a	24.33%	0.0220%
Cintas Corp	CTAS	0.06%	1.05%	0.00%	11.15%	0.0070%
Comcast Corp	CMCSA	0.84%	1.68%	0.01%	11.10%	0.0937%
Molson Coors Brewing Co	TAP	0.09%	1.71%	0.00%	17.88%	0.0158%
KLA-Tencor Corp	KLAC	0.07%	2.27%	0.00%	6.00%	0.0042%
Marriott International Inc/MD	MAR	0.17%	1.27%	0.00%	13.26%	0.0227%
McCormick & Co Inc/MD	MKC	0.05%	1.93%	0.00%	7.91%	0.0041%
Nordstrom Inc	JWN	0.04%	3.18%	0.00%	7.63%	0.0028%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Weight in Index	[5] Current Dividend Yield	[6] Cap-Weighted Dividend Yield	[7] Long-Term Growth Est.	[8] Cap-Weighted Long-Term Growth Est.
PACCAR Inc	PCAR	0.11%	1.43%	0.00%	5.17%	0.0058%
Costco Wholesale Corp	COST	0.35%	1.07%	0.00%	10.40%	0.0363%
Stryker Corp	SYK	0.23%	1.29%	0.00%	8.25%	0.0192%
Tyson Foods Inc	TSN	0.08%	1.46%	0.00%	6.30%	0.0053%
Applied Materials Inc	AMAT	0.20%	1.03%	0.00%	15.55%	0.0310%
Time Warner Inc	TWX	0.36%	1.65%	0.01%	10.00%	0.0359%
Bed Bath & Beyond Inc	BBBY	0.03%	1.27%	0.00%	5.21%	0.0015%
American Airlines Group Inc	AAL	0.10%	0.95%	0.00%	-3.79%	-0.0038%
Cardinal Health Inc	CAH	0.12%	2.20%	0.00%	10.40%	0.0127%
Celgene Corp	CELG	0.46%	n/a	n/a	20.79%	0.0954%
Cerner Corp	CERN	0.09%	n/a	n/a	12.67%	0.0117%
Cincinnati Financial Corp	CINF	0.06%	2.77%	0.00%	n/a	n/a
DR Horton Inc	DHI	0.06%	1.20%	0.00%	11.36%	0.0067%
Flowserve Corp	FLS	0.03%	1.57%	0.00%	12.56%	0.0038%
Electronic Arts Inc	EA	0.13%	n/a	n/a	15.00%	0.0196%
Express Scripts Holding Co	ESRX	0.19%	n/a	n/a	13.34%	0.0250%
Expeditors International of Washington Inc	EXPD	0.05%	1.42%	0.00%	7.85%	0.0038%
Fastenal Co	FAST	0.07%	2.49%	0.00%	15.78%	0.0111%
M&T Bank Corp	MTB	0.11%	1.94%	0.00%	5.00%	0.0056%
Fiserv Inc	FISV	0.12%	n/a	n/a	11.00%	0.0129%
Fifth Third Bancorp	FITB	0.09%	2.20%	0.00%	3.63%	0.0033%
Gilead Sciences Inc	GILD	0.42%	3.06%	0.01%	0.34%	0.0014%
Hasbro Inc	HAS	0.06%	2.28%	0.00%	8.80%	0.0052%
Huntington Bancshares Inc/OH	HBAN	0.07%	2.39%	0.00%	9.69%	0.0067%
Welltower Inc	HCN	0.12%	4.91%	0.01%	4.59%	0.0056%
Biogen Inc	BIIB	0.28%	n/a	n/a	8.02%	0.0225%
Range Resources Corp	RRC	0.03%	0.27%	0.00%	-13.83%	-0.0047%
Northern Trust Corp	NTRS	0.09%	1.76%	0.00%	13.15%	0.0124%
Paychex Inc	PAYX	0.10%	3.12%	0.00%	8.50%	0.0085%
People's United Financial Inc	PBCT	0.03%	3.74%	0.00%	2.00%	0.0005%
Patterson Cos Inc	PDCO	0.02%	2.30%	0.00%	4.01%	0.0008%
QUALCOMM Inc	QCOM	0.40%	3.98%	0.02%	8.44%	0.0339%
Roper Technologies Inc	ROP	0.10%	0.68%	0.00%	12.53%	0.0125%
Ross Stores Inc	ROST	0.12%	0.97%	0.00%	12.88%	0.0158%
IDEXX Laboratories Inc	IDXX	0.06%	n/a	n/a	11.50%	0.0074%
AutoNation Inc	AN	0.02%	n/a	n/a	8.31%	0.0017%
Starbucks Corp	SBUX	0.40%	1.71%	0.01%	17.30%	0.0698%
KeyCorp	KEY	0.09%	1.91%	0.00%	7.42%	0.0068%
Staples Inc	SPLS	0.03%	5.47%	0.00%	0.31%	0.0001%
State Street Corp	STT	0.14%	1.91%	0.00%	8.93%	0.0129%
US Bancorp	USB	0.41%	2.17%	0.01%	6.60%	0.0273%
Symantec Corp	SYMC	0.09%	0.98%	0.00%	12.12%	0.0109%
T Rowe Price Group Inc	TROW	0.08%	3.35%	0.00%	9.03%	0.0071%
Waste Management Inc	WM	0.15%	2.33%	0.00%	9.74%	0.0149%
CBS Corp	CBS	0.12%	1.04%	0.00%	12.62%	0.0154%
Allergan PLC	AGN	0.38%	1.17%	0.00%	12.73%	0.0484%
Whole Foods Market Inc	WFM	0.04%	1.88%	0.00%	3.17%	0.0014%
Constellation Brands Inc	STZ	0.13%	0.99%	0.00%	17.32%	0.0230%
Xilinx Inc	XLNX	0.07%	2.28%	0.00%	9.10%	0.0062%
DENTSPLY SIRONA Inc	XRAY	0.07%	0.56%	0.00%	9.47%	0.0064%
Zions Bancorporation	ZION	0.04%	0.76%	0.00%	9.00%	0.0036%
Alaska Air Group Inc	ALK	0.05%	1.30%	0.00%	11.37%	0.0061%
Invesco Ltd	IVZ	0.06%	3.66%	0.00%	8.65%	0.0051%
Intuit Inc	INTU	0.14%	1.17%	0.00%	14.76%	0.0208%
Morgan Stanley	MS	0.38%	1.87%	0.01%	14.42%	0.0547%
Microchip Technology Inc	MCHP	0.08%	1.96%	0.00%	17.42%	0.0132%
Chubb Ltd	CB	0.30%	2.03%	0.01%	8.65%	0.0260%
Hologic Inc	HOLX	0.06%	n/a	n/a	10.10%	0.0057%
Chesapeake Energy Corp	CHK	0.03%	n/a	n/a	-1.58%	-0.0004%
Citizens Financial Group Inc	CFG	0.08%	1.62%	0.00%	17.59%	0.0147%
O'Reilly Automotive Inc	ORLY	0.12%	n/a	n/a	15.27%	0.0179%
Allstate Corp/The	ALL	0.14%	1.82%	0.00%	9.70%	0.0137%
FLIR Systems Inc	FLIR	0.02%	1.65%	0.00%	15.00%	0.0035%
Equity Residential	EQR	0.11%	3.24%	0.00%	9.01%	0.0098%
BorgWarner Inc	BWA	0.04%	1.34%	0.00%	6.38%	0.0027%
Newfield Exploration Co	NFX	0.03%	n/a	n/a	20.03%	0.0070%
Incyte Corp	INCY	0.13%	n/a	n/a	32.93%	0.0425%
Simon Property Group Inc	SPG	0.26%	4.07%	0.01%	7.26%	0.0189%
Eastman Chemical Co	EMN	0.06%	2.52%	0.00%	6.40%	0.0036%
AvalonBay Communities Inc	AVB	0.12%	3.09%	0.00%	6.96%	0.0083%
Prudential Financial Inc	PRU	0.22%	2.81%	0.01%	9.80%	0.0213%
United Parcel Service Inc	UPS	0.35%	3.09%	0.01%	8.70%	0.0305%
Apartment Investment & Management Co	AIV	0.03%	3.25%	0.00%	25.40%	0.0084%
Walgreens Boots Alliance Inc	WBA	0.43%	1.81%	0.01%	10.55%	0.0448%
McKesson Corp	MCK	0.15%	0.76%	0.00%	9.69%	0.0144%
Lockheed Martin Corp	LMT	0.37%	2.72%	0.01%	6.82%	0.0251%
AmerisourceBergen Corp	ABC	0.09%	1.65%	0.00%	10.12%	0.0092%
Capital One Financial Corp	COF	0.20%	1.85%	0.00%	5.93%	0.0118%
Waters Corp	WAT	0.06%	n/a	n/a	8.29%	0.0049%
Dollar Tree Inc	DLTR	0.09%	n/a	n/a	15.33%	0.0135%
Darden Restaurants Inc	DRI	0.05%	2.68%	0.00%	9.88%	0.0049%
NetApp Inc	NTAP	0.05%	1.82%	0.00%	10.18%	0.0055%
Citrix Systems Inc	CTXS	0.06%	n/a	n/a	11.00%	0.0068%
Goodyear Tire & Rubber Co/The	GT	0.04%	1.11%	0.00%	n/a	n/a
DaVita Inc	DVA	0.06%	n/a	n/a	8.84%	0.0055%
Hartford Financial Services Group Inc/The	HIG	0.08%	1.91%	0.00%	9.50%	0.0080%
Iron Mountain Inc	IRM	0.04%	6.17%	0.00%	12.90%	0.0058%
Estee Lauder Cos Inc/The	EL	0.09%	1.60%	0.00%	10.82%	0.0097%
Yahoo! Inc	YHOO	0.21%	n/a	n/a	8.38%	0.0176%

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Principal Financial Group Inc	PFGB	0.09%	2.85%	0.00%	8.71%	0.0075%
Stericycle Inc	SRCL	0.03%	n/a	n/a	10.24%	0.0034%
Universal Health Services Inc	UHS	0.05%	0.32%	0.00%	9.43%	0.0050%
E*TRADE Financial Corp	ETFC	0.05%	n/a	n/a	15.65%	0.0071%
Skyworks Solutions Inc	SWKS	0.09%	1.14%	0.00%	13.95%	0.0120%
National Oilwell Varco Inc	NOV	0.07%	0.50%	0.00%	n/a	n/a
Quest Diagnostics Inc	DGX	0.06%	1.83%	0.00%	8.42%	0.0054%
Activision Blizzard Inc	ATVI	0.18%	0.60%	0.00%	12.54%	0.0223%
Rockwell Automation Inc	ROK	0.09%	1.95%	0.00%	8.45%	0.0080%
Kraft Heinz Co/The	KHC	0.52%	2.64%	0.01%	14.66%	0.0768%
American Tower Corp	AMT	0.25%	2.04%	0.01%	16.91%	0.0416%
Regeneron Pharmaceuticals Inc	REGN	0.19%	n/a	n/a	19.27%	0.0369%
Amazon.com Inc	AMZN	2.01%	n/a	n/a	37.51%	0.7524%
Ralph Lauren Corp	RL	0.02%	2.45%	0.00%	1.46%	0.0003%
Boston Properties Inc	BXP	0.10%	2.27%	0.00%	5.33%	0.0052%
Amphenol Corp	APH	0.10%	0.90%	0.00%	6.42%	0.0067%
Arconic Inc	ARNC	0.06%	0.91%	0.00%	14.70%	0.0081%
Pioneer Natural Resources Co	PXD	0.15%	0.04%	0.00%	20.00%	0.0300%
Valero Energy Corp	VLO	0.14%	4.22%	0.01%	11.13%	0.0157%
Synopsys Inc	SNPS	0.05%	n/a	n/a	9.36%	0.0048%
L3 Technologies Inc	LLL	0.06%	1.82%	0.00%	8.17%	0.0050%
Western Union Co/The	WU	0.05%	3.44%	0.00%	5.59%	0.0026%
CH Robinson Worldwide Inc	CHRW	0.05%	2.33%	0.00%	8.78%	0.0046%
Accenture PLC	ACN	0.35%	2.02%	0.01%	10.03%	0.0354%
TransDigm Group Inc	TDG	0.06%	n/a	n/a	8.79%	0.0048%
Yum! Brands Inc	YUM	0.11%	1.88%	0.00%	12.56%	0.0135%
Prologis Inc	PLD	0.13%	3.39%	0.00%	4.96%	0.0065%
FirstEnergy Corp	FE	0.07%	4.53%	0.00%	-1.37%	-0.0009%
VeriSign Inc	VRSN	0.04%	n/a	n/a	8.90%	0.0038%
Quanta Services Inc	PWR	0.03%	n/a	n/a	16.80%	0.0043%
Henry Schein Inc	HSIC	0.06%	n/a	n/a	10.39%	0.0066%
Ameren Corp	AEE	0.06%	3.22%	0.00%	6.00%	0.0038%
Scripps Networks Interactive Inc	SNI	0.04%	1.53%	0.00%	9.29%	0.0033%
NVIDIA Corp	NVDA	0.30%	0.51%	0.00%	9.44%	0.0287%
Sealed Air Corp	SEE	0.04%	1.47%	0.00%	3.66%	0.0015%
Cognizant Technology Solutions Corp	CTSH	0.17%	1.01%	0.00%	13.78%	0.0237%
Intuitive Surgical Inc	ISRG	0.13%	n/a	n/a	10.61%	0.0142%
Aetna Inc	AET	0.21%	1.57%	0.00%	10.78%	0.0229%
Affiliated Managers Group Inc	AMG	0.04%	0.49%	0.00%	13.95%	0.0061%
Republic Services Inc	RSRG	0.10%	2.04%	0.00%	9.23%	0.0093%
eBay Inc	EBAY	0.17%	n/a	n/a	9.38%	0.0161%
Goldman Sachs Group Inc/The	GS	0.43%	1.13%	0.00%	12.68%	0.0549%
Sempra Energy	SRE	0.13%	2.98%	0.00%	8.21%	0.0108%
Moody's Corp	MCO	0.10%	1.36%	0.00%	10.00%	0.0101%
Priceline Group Inc/The	PCLN	0.41%	n/a	n/a	16.67%	0.0692%
F5 Networks Inc	FFIV	0.04%	n/a	n/a	12.00%	0.0053%
Akamai Technologies Inc	AKAM	0.05%	n/a	n/a	14.32%	0.0070%
Reynolds American Inc	RAI	0.43%	3.24%	0.01%	8.17%	0.0348%
Devon Energy Corp	DVN	0.10%	0.58%	0.00%	19.30%	0.0200%
Alphabet Inc	GOOGL	1.19%	n/a	n/a	16.95%	0.2024%
Red Hat Inc	RHT	0.07%	n/a	n/a	14.90%	0.0109%
Netflix Inc	NFLX	0.30%	n/a	n/a	37.09%	0.1119%
Allegion PLC	ALLE	0.03%	0.85%	0.00%	13.02%	0.0045%
Agilent Technologies Inc	A	0.08%	1.00%	0.00%	8.88%	0.0072%
Anthem Inc	ANTM	0.21%	1.57%	0.00%	8.66%	0.0180%
CME Group Inc	CME	0.19%	2.22%	0.00%	10.23%	0.0196%
Juniper Networks Inc	JNPR	0.05%	1.44%	0.00%	9.62%	0.0048%
BlackRock Inc	BLK	0.30%	2.61%	0.01%	11.58%	0.0342%
DTE Energy Co	DTE	0.09%	3.23%	0.00%	5.67%	0.0049%
Nasdaq Inc	NDAQ	0.05%	1.84%	0.00%	9.12%	0.0050%
Philip Morris International Inc	PM	0.83%	3.68%	0.03%	10.80%	0.0898%
salesforce.com Inc	CRM	0.28%	n/a	n/a	24.29%	0.0672%
MetLife Inc	MET	0.27%	3.03%	0.01%	10.71%	0.0292%
Monsanto Co	MON	0.24%	1.91%	0.00%	13.25%	0.0312%
Under Armour Inc	UA	0.02%	n/a	n/a	6.09%	0.0012%
Coach Inc	COH	0.05%	3.27%	0.00%	10.89%	0.0060%
Fluor Corp	FLR	0.03%	1.60%	0.00%	13.31%	0.0046%
Dun & Bradstreet Corp/The	DNB	0.02%	1.86%	0.00%	8.53%	0.0016%
CSX Corp	CSX	0.20%	1.55%	0.00%	8.80%	0.0180%
Edwards Lifesciences Corp	EW	0.09%	n/a	n/a	18.07%	0.0170%
Ameriprise Financial Inc	AMP	0.09%	2.31%	0.00%	n/a	n/a
Xcel Energy Inc	XEL	0.11%	3.24%	0.00%	6.00%	0.0064%
Rockwell Collins Inc	COL	0.06%	1.36%	0.00%	9.15%	0.0055%
TechnipFMC PLC	FTI	0.07%	n/a	n/a	-8.75%	-0.0063%
Zimmer Biomet Holdings Inc	ZBH	0.12%	0.79%	0.00%	9.05%	0.0105%
CBRE Group Inc	CBG	0.06%	n/a	n/a	10.23%	0.0057%
Signet Jewelers Ltd	SIG	0.02%	1.79%	0.00%	5.63%	0.0013%
Mastercard Inc	MA	0.56%	0.78%	0.00%	15.87%	0.0896%
CarMax Inc	KMX	0.05%	n/a	n/a	12.59%	0.0066%
Intercontinental Exchange Inc	ICE	0.17%	1.34%	0.00%	11.30%	0.0190%
Fidelity National Information Services Inc	FIS	0.12%	1.46%	0.00%	12.00%	0.0149%
Chipotle Mexican Grill Inc	CMG	0.06%	n/a	n/a	23.67%	0.0143%
Wynn Resorts Ltd	WYNN	0.06%	1.75%	0.00%	23.53%	0.0130%
Assurant Inc	AIZ	0.03%	2.22%	0.00%	26.91%	0.0068%
NRG Energy Inc	NRG	0.03%	0.64%	0.00%	0.90%	0.0003%
Monster Beverage Corp	MNST	0.12%	n/a	n/a	20.20%	0.0251%
Regions Financial Corp	RF	0.08%	1.79%	0.00%	9.17%	0.0076%
Teradata Corp	TDC	0.02%	n/a	n/a	4.76%	0.0009%
Mosaic Co/The	MOS	0.05%	3.77%	0.00%	20.10%	0.0097%

STANDARD AND POOR'S 500 INDEX

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Expedia Inc	EXPE	0.08%	0.89%	0.00%	19.18%	0.0157%
Discovery Communications Inc	DISCA	0.02%	n/a	n/a	14.07%	0.0030%
CF Industries Holdings Inc	CF	0.03%	4.09%	0.00%	-0.05%	0.0000%
Viacom Inc	VIAB	0.08%	1.72%	0.00%	1.59%	0.0012%
Alphabet Inc	GOOG	1.36%	n/a	n/a	16.95%	0.2313%
Wyndham Worldwide Corp	WYN	0.04%	2.75%	0.00%	9.60%	0.0040%
Mead Johnson Nutrition Co	MJN	0.08%	1.85%	0.00%	6.27%	0.0049%
TE Connectivity Ltd	TEL	0.13%	1.99%	0.00%	6.35%	0.0080%
Cooper Cos Inc/The	COO	0.05%	0.03%	0.00%	11.64%	0.0054%
Discover Financial Services	DFS	0.12%	1.75%	0.00%	7.87%	0.0098%
TripAdvisor Inc	TRIP	0.03%	n/a	n/a	15.53%	0.0042%
Dr Pepper Snapple Group Inc	DPS	0.09%	2.37%	0.00%	8.58%	0.0073%
Visa Inc	V	0.78%	0.74%	0.01%	17.25%	0.1350%
Mid-America Apartment Communities Inc	MAA	0.05%	3.42%	0.00%	n/a	n/a
Xylem Inc/NY	XYL	0.04%	1.43%	0.00%	11.00%	0.0047%
Marathon Petroleum Corp	MPC	0.13%	2.85%	0.00%	4.44%	0.0056%
Tractor Supply Co	TSCO	0.04%	1.39%	0.00%	13.54%	0.0058%
Level 3 Communications Inc	LVT	0.10%	n/a	n/a	7.50%	0.0073%
Mettler-Toledo International Inc	MTD	0.06%	n/a	n/a	11.73%	0.0069%
Albemarle Corp	ALB	0.06%	1.21%	0.00%	11.60%	0.0064%
Transocean Ltd	RIG	0.02%	n/a	n/a	-25.60%	-0.0059%
Essex Property Trust Inc	ESS	0.07%	3.02%	0.00%	6.94%	0.0050%
GGP Inc	GGP	0.10%	3.80%	0.00%	8.08%	0.0078%
Realty Income Corp	O	0.08%	4.25%	0.00%	4.91%	0.0038%
Seagate Technology PLC	STX	0.06%	5.49%	0.00%	11.38%	0.0073%
WestRock Co	WRK	0.06%	3.08%	0.00%	7.08%	0.0044%
Western Digital Corp	WDC	0.11%	2.42%	0.00%	9.87%	0.0111%
Church & Dwight Co Inc	CHD	0.06%	1.52%	0.00%	8.88%	0.0053%
Federal Realty Investment Trust	FRT	0.05%	2.94%	0.00%	6.26%	0.0029%
Twenty-First Century Fox Inc	FOX	0.12%	1.13%	0.00%	9.87%	0.0119%
Alliant Energy Corp	LNT	0.04%	3.18%	0.00%	6.40%	0.0027%
JB Hunt Transport Services Inc	JBHT	0.05%	1.00%	0.00%	13.53%	0.0065%
Lam Research Corp	LRCX	0.10%	1.40%	0.00%	7.64%	0.0076%
Mohawk Industries Inc	MHK	0.08%	n/a	n/a	7.01%	0.0057%
Pentair PLC	PNR	0.05%	2.20%	0.00%	8.76%	0.0047%
Vertex Pharmaceuticals Inc	VRTX	0.13%	n/a	n/a	73.13%	0.0942%
Facebook Inc	FB	1.59%	n/a	n/a	25.58%	0.4057%
United Rentals Inc	URI	0.05%	n/a	n/a	15.17%	0.0076%
Alexandria Real Estate Equities Inc	ARE	0.05%	3.00%	0.00%	6.95%	0.0033%
United Continental Holdings Inc	UAL	0.11%	n/a	n/a	-2.19%	-0.0023%
Navient Corp	NAVI	0.02%	4.34%	0.00%	8.00%	0.0016%
Delta Air Lines Inc	DAL	0.16%	1.76%	0.00%	11.11%	0.0177%
Mallinckrodt PLC	MNK	0.02%	n/a	n/a	6.33%	0.0014%
News Corp	NWS	0.01%	1.48%	0.00%	10.73%	0.0014%
Centene Corp	CNC	0.06%	n/a	n/a	13.17%	0.0077%
Regency Centers Corp	REG	0.05%	3.07%	0.00%	8.57%	0.0046%
Macerich Co/The	MAC	0.04%	4.41%	0.00%	5.76%	0.0025%
Martin Marietta Materials Inc	MLM	0.07%	0.77%	0.00%	22.96%	0.0150%
Envision Healthcare Corp	EVHC	0.03%	n/a	n/a	9.99%	0.0034%
PayPal Holdings Inc	PYPL	0.25%	n/a	n/a	17.25%	0.0425%
Coty Inc	COTY	0.06%	2.76%	0.00%	1.47%	0.0009%
DISH Network Corp	DISH	0.07%	n/a	n/a	10.33%	0.0071%
Alexion Pharmaceuticals Inc	ALXN	0.13%	n/a	n/a	21.92%	0.0284%
News Corp	NWSA	0.02%	1.54%	0.00%	10.73%	0.0025%
Global Payments Inc	GPN	0.06%	0.05%	0.00%	12.00%	0.0070%
Crown Castle International Corp	CCI	0.16%	4.02%	0.01%	23.17%	0.0374%
Delphi Automotive PLC	DLPH	0.10%	1.44%	0.00%	12.21%	0.0125%
Advance Auto Parts Inc	AAP	0.05%	0.16%	0.00%	13.28%	0.0069%
Michael Kors Holdings Ltd	KORS	0.03%	n/a	n/a	0.74%	0.0002%
Illumina Inc	ILMN	0.12%	n/a	n/a	13.00%	0.0154%
Acuity Brands Inc	AYI	0.04%	0.25%	0.00%	23.50%	0.0100%
Alliance Data Systems Corp	ADS	0.07%	0.84%	0.00%	12.24%	0.0081%
LKQ Corp	LKQ	0.04%	n/a	n/a	15.00%	0.0064%
Nielsen Holdings PLC	NLSN	0.07%	3.00%	0.00%	10.67%	0.0075%
Garmin Ltd	GRMN	0.05%	3.99%	0.00%	4.97%	0.0023%
Cimarex Energy Co	XEC	0.05%	0.27%	0.00%	77.99%	0.0420%
Zoetis Inc	ZTS	0.12%	0.79%	0.00%	14.12%	0.0176%
Equinix Inc	EQIX	0.15%	2.00%	0.00%	26.91%	0.0392%
Digital Realty Trust Inc	DLR	0.08%	3.50%	0.00%	5.10%	0.0041%
Discovery Communications Inc	DISCK	0.03%	n/a	n/a	14.07%	0.0043%

Notes:

- [1] Equals Sum ([6])
- [2] Equals Sum ([8])
- [3] Equals (([1] x (1 + (0.5 x [2]))) + [2])
- [4] Equals weight in S&P 500 based on market capitalization
- [5] Source: Bloomberg Professional
- [6] Equals [4] x [5]
- [7] Source: Bloomberg Professional
- [8] Equals [4] x [7]

CAPITAL ASSET PRICING MODEL

$$K = R_f + \beta (R_m - R_f)$$

	[4]	[5]	[6]	[7]	[8]
	Risk-Free Rate (R_f)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	ROE (K)
Proxy Group Average Bloomberg Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.06%	0.746	13.09%	10.02%	10.54%
Near-term projected 30-year U.S. Treasury bond yield (Q1 2017 - Q2 2018) [2]	3.40%	0.746	13.09%	9.69%	10.63%
Projected 30-year U.S. Treasury bond yield (2018 - 2022) [3]	4.20%	0.746	13.09%	8.89%	10.83%
Average					10.67%
Proxy Group Average Value Line Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.06%	0.719	13.09%	10.02%	10.27%
Near-term projected 30-year U.S. Treasury bond yield (Q1 2017 - Q2 2018) [2]	3.40%	0.719	13.09%	9.69%	10.36%
Projected 30-year U.S. Treasury bond yield (2018 - 2022) [3]	4.20%	0.719	13.09%	8.89%	10.59%
Average					10.41%
Overall Average					10.54%

Notes:

- [1] Source: Bloomberg Professional as of January 31, 2017
[2] Source: Blue Chip Financial Forecasts, Vol. 36, No. 1, January 1, 2017, at 2
[3] Source: Blue Chip Financial Forecasts, Vol. 35, No. 6, December 1, 2016, at 14
[4] See Notes [1], [2], and [3]
[5] Source: Exhibit AEB-4
[6] Source: Exhibit AEB-5
[7] Equals [6] - [4]
[8] Equals [4] + [5] x [7]

CAPITAL ASSET PRICING MODEL

Excluding AWK

$$K = R_f + \beta (R_m - R_f)$$

	[4]	[5]	[6]	[7]	[8]
	Risk-Free Rate (R_f)	Beta (β)	Market Return (R_m)	Market Risk Premium ($R_m - R_f$)	ROE (K)
Proxy Group Average Bloomberg Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.06%	0.769	13.09%	10.02%	10.78%
Near-term projected 30-year U.S. Treasury bond yield (Q1 2017 - Q2 2018) [2]	3.40%	0.769	13.09%	9.69%	10.85%
Projected 30-year U.S. Treasury bond yield (2018 - 2022) [3]	4.20%	0.769	13.09%	8.89%	11.04%
Average					10.89%
Proxy Group Average Value Line Beta					
Current 30-day average of 30-year U.S. Treasury bond yield [1]	3.06%	0.729	13.09%	10.02%	10.37%
Near-term projected 30-year U.S. Treasury bond yield (Q1 2017 - Q2 2018) [2]	3.40%	0.729	13.09%	9.69%	10.46%
Projected 30-year U.S. Treasury bond yield (2018 - 2022) [3]	4.20%	0.729	13.09%	8.89%	10.68%
Average					10.50%
Overall Average					10.69%

Notes:

- [1] Source: Bloomberg Professional as of January 31, 2017
[2] Source: Blue Chip Financial Forecasts, Vol. 36, No. 1, January 1, 2017, at 2
[3] Source: Blue Chip Financial Forecasts, Vol. 35, No. 6, December 1, 2016, at 14
[4] See Notes [1], [2], and [3]
[5] Source: Exhibit AEB-4
[6] Source: Exhibit AEB-5
[7] Equals [6] - [4]
[8] Equals [4] + [5] x [7]

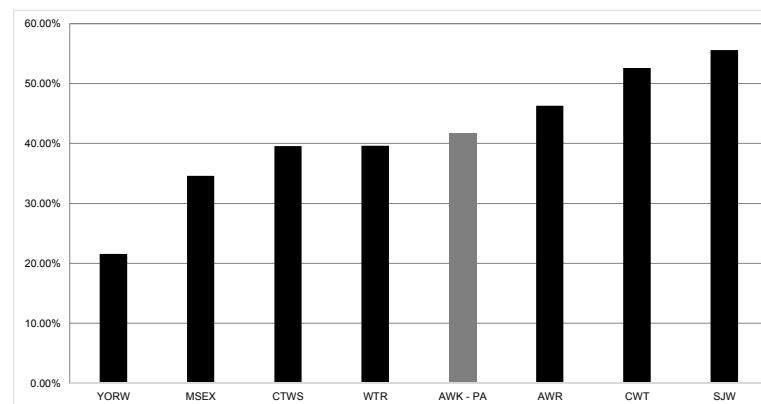
2017-2021 CAPITAL EXPENDITURES AS A PERCENT OF 2015 NET PLANT
(\$ Millions)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	2015	2017	2018	2019	2020	2021	
American States Water AWR							
Capital Spending per Share		2.45	2.60	2.75	2.75	2.75	
Common Shares Outstanding		36.60	36.80	37.00	37.00	37.00	
Capital Expenditures		89.67	95.68	101.75	101.75	101.75	
Net Plant	1,060.80						
2017-21 Capital Spending / 2015 Net Plant							46.25%
Connecticut Water CTWS							
Capital Spending per Share		4.35	3.85	3.35	3.35	3.35	
Common Shares Outstanding		11.50	11.75	12.00	12.00	12.00	
Capital Expenditures		50.03	45.24	40.20	40.20	40.20	
Net Plant	546.30						
2017-21 Capital Spending / 2015 Net Plant							39.51%
California Water CWT							
Capital Spending per Share		3.55	3.60	3.65	3.65	3.65	
Common Shares Outstanding		48.00	49.00	50.00	50.00	50.00	
Capital Expenditures		170.40	176.40	182.50	182.50	182.50	
Net Plant	1,701.80						
2017-21 Capital Spending / 2015 Net Plant							52.55%
Middlesex Water MSEX							
Capital Spending per Share		1.80	1.93	2.05	2.05	2.05	
Common Shares Outstanding		16.50	16.75	17.00	17.00	17.00	
Capital Expenditures		29.70	32.24	34.85	34.85	34.85	
Net Plant	481.90						
2017-21 Capital Spending / 2015 Net Plant							34.55%
SJW Corp SJW							
Capital Spending per Share		5.50	5.25	5.00	5.00	5.00	
Common Shares Outstanding		21.00	22.00	23.00	23.00	23.00	
Capital Expenditures		115.50	115.50	115.00	115.00	115.00	
Net Plant	1,036.80						
2017-21 Capital Spending / 2015 Net Plant							55.56%
Aqua America WTR							
Capital Spending per Share		2.00	2.05	2.10	2.10	2.10	
Common Shares Outstanding		178.00	179.00	180.00	180.00	180.00	
Capital Expenditures		356.00	366.95	378.00	378.00	378.00	
Net Plant	4,688.90						
2017-21 Capital Spending / 2015 Net Plant							39.60%
York Water YORW							
Capital Spending per Share		1.10	0.98	0.85	0.85	0.85	
Common Shares Outstanding		12.50	12.25	12.00	12.00	12.00	
Capital Expenditures		13.75	11.94	10.20	10.20	10.20	
Net Plant	261.40						
2017-21 Capital Spending / 2015 Net Plant							21.54%
American Water - PA AWK - PA							
Capital Expenditures [8]		296.91	346.13	294.48	278.78	270.32	
Net Plant [8]	3,568.25						
2017-21 Capital Spending / 2016 Net Plant							41.66%

Notes:

- [1] Source: Value Line; dated January 13, 2017
- [2] Source: Value Line; dated January 13, 2017
- [3] Source: Value Line; dated January 13, 2017
- [4] Source: Value Line; dated January 13, 2017
- [5] Source: Value Line; dated January 13, 2017
- [6] Source: Value Line; dated January 13, 2017
- [7] Equals Sum ([2], [3], [4], [5], [6]) / [1]
- [8] Source: Company provided data

2017-2021 CAPITAL EXPENDITURES AS A PERCENT OF 2015 NET PLANT
(\$ Millions)



	2017-2021 Capital Spending / 2015 Net Plant
York Water	YORW 21.54%
Middlesex Water	MSEX 34.55%
Connecticut Water	CTWS 39.51%
Aqua America	WTR 39.60%
American Water - PA	AWK - PA 41.66%
American States Water	AWR 46.25%
California Water	CWT 52.55%
SJW Corp	SJW 55.56%
Proxy Group Median	39.60%

Company	Ticker	State	Infrastructure Replacement Surchage	Citation
American States Water Co	AWR	California		2015 Annual Report, page 2, and [1]
American Water	AWK	New Jersey	Yes	2015 10-K, pages 3 and 36
		Pennsylvania	Yes	
		Illinois	Yes	
		Missouri	Yes	
		Indiana	Yes	
		California		
		West Virginia		
		Georgia		
		Hawaii		
		Iowa		
		Kentucky		
		Maryland		
		Michigan		
		New York	Yes	
		Tennessee	Yes	
		Virginia		
Aqua America, Inc.	WTR			2015 10-K, pages 5 and 9
		Pennsylvania	Yes	
		Ohio	Yes	
		Texas		
		Illinois	Yes	
		North Carolina	Yes	
		New Jersey	Yes	
		Indiana	Yes	
		Virginia		
California Water Service Group	CWT			2015 10-K, page 5, and [1]
		California		
		New Mexico		
		Washington		
		Hawaii		
Connecticut Water Service, Inc.	CTWS			2015 10-K, pages 7-9, and [1]
		Connecticut	Yes	
		Maine	Yes	
Middlesex Water Company	MSEX			2015 10-K, page 6, and [1]
		New Jersey	Yes	
		Delaware	Yes	
		Pennsylvania	Yes	
SJW Corporation	SJW			2015 10-K, page 3 and [1]
		California		
		Texas		
York Water Company	YORW			2015 10-K page 4 and 53
		Pennsylvania	Yes	
Total Number of Jurisdictions (Y)				19
Total Number of Jurisdictions				37
Percent of Jurisdictions				51.35%
Total Number of Jurisdictions (excl AWK) (Y)				12
Total Number of Jurisdictions (excl AWK)				20
Percent of Jurisdictions (excl. AWK)				60.00%

[1] "Alternative Regulation and Ratemaking Approaches for Water Companies," September 23, 2013, The Brattle Group

Capital Structure of Proxy Group Companies

Company Name	Ticker	2015	2014	2013	2012	2011
<u>American States Water Co.</u>						
	AWR					
Common Equity		58.87%	60.87%	60.16%	57.76%	54.56%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		41.13%	39.13%	39.84%	42.24%	45.44%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>Aqua America Inc.</u>						
	WTR					
Common Equity		49.24%	50.55%	49.68%	46.58%	45.88%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		50.76%	49.45%	50.32%	53.42%	54.12%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>California Water Service Group</u>						
	CWT					
Common Equity		55.30%	59.54%	57.97%	49.60%	47.96%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		44.70%	40.46%	42.03%	50.40%	52.04%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>Connecticut Water Service Inc.</u>						
	CTWS					
Common Equity		55.66%	54.15%	52.94%	50.84%	46.49%
Preferred Stock		0.19%	0.20%	0.21%	0.21%	0.30%
Long-Term Debt		44.15%	45.65%	46.86%	48.95%	53.20%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>Middlesex Water Co.</u>						
	MSEX					
Common Equity		59.85%	58.76%	58.72%	57.40%	56.33%
Preferred Stock		0.71%	0.73%	0.90%	1.06%	1.07%
Long-Term Debt		39.45%	40.52%	40.38%	41.54%	42.60%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>SJW Corp.</u>						
	SJW					
Common Equity		50.19%	48.37%	48.95%	45.00%	43.43%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		49.81%	51.63%	51.05%	55.00%	56.57%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>York Water Co.</u>						
	YORK					
Common Equity		55.57%	55.29%	54.85%	53.89%	52.74%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		44.43%	44.71%	45.15%	46.11%	47.26%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>Proxy Group Mean excluding AWW</u>						
Common Equity		54.95%	55.36%	54.75%	51.58%	49.63%
Preferred Stock		0.13%	0.13%	0.16%	0.18%	0.20%
Long-Term Debt		44.92%	44.51%	45.09%	48.24%	50.18%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%
<u>Proxy Group Median excluding AWW</u>						
Common Equity		55.57%	55.29%	54.85%	50.84%	47.96%
Preferred Stock		0.00%	0.00%	0.00%	0.00%	0.00%
Long-Term Debt		44.43%	44.71%	45.15%	48.95%	52.04%
Total Capital		100.00%	100.00%	100.00%	99.79%	100.00%
<u>American Water</u>						
	AWK					
Common Equity		46.22%	47.46%	47.48%	46.04%	44.14%
Preferred Stock		0.11%	0.14%	0.17%	0.20%	0.22%
Long-Term Debt		53.67%	52.40%	52.35%	53.77%	55.64%
Total Capital		100.00%	100.00%	100.00%	100.00%	100.00%

**Pennsylvania-American Water Company
Summary Water Services Cost of Capital
Estimated at December 31, 2018**

<u>Type of Capital</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	44.89%	5.25%	2.36%
Preferred Stock	0.17%	8.66%	0.01%
Common Equity	54.94%	10.80%	5.93%
Total	<u>100.00%</u>		<u>8.30%</u>

**Pennsylvania-American Water Company
Summary Wastewater Cost of Capital
Estimated at December 31, 2018**

<u>Type of Capital</u>	<u>12/31/2018</u>	<u>Ratios</u>	<u>Cost Rate</u>	<u>Weighted Cost Rate</u>
Long-Term Debt	\$ 113,586,625	35.24%	5.25%	1.85%
WW Financing	\$ 69,324,555	21.51%	4.59%	0.99%
Preferred Stock	\$ 430,157	0.13%	8.66%	0.01%
Common Equity	\$ 139,016,467	43.12%	10.80%	4.66%
Total	<u>\$ 322,357,804</u>	<u>100.00%</u>		<u>7.51%</u>

Pennsylvania-American Water Company
Capitalization and Related Capital Structure Ratios
Actual at December 31, 2016 and Estimated at December 31, 2017 and December 31, 2018

Schedule 13 [1 of 2]

	Actual at December 31, 2016			Proforma at December 31, 2017			Proforma at December 31, 2018		
	Amount Outstanding	Ratios Excl. S-T Debt	Incl. S-T Debt	Amount Outstanding	Ratios Excl. S-T Debt	Incl. S-T Debt	Amount Outstanding	Ratios Excl. S-T Debt	Incl. S-T Debt
Long-Term Debt	\$ 1,150,896,220	44.38%	38.61%	\$ 1,356,001,140	45.86%	43.32%	\$ 1,474,738,023	46.09%	44.92%
Preferred Stock	7,651,500	0.30%	0.26%	6,451,500	0.22%	0.21%	5,251,500	0.16%	0.16%
Common Equity									
Common Stock	21,506,887			21,506,887			21,506,887		
Paid in Capital	870,246,287			998,246,287			1,078,246,287		
Retained Earnings	542,942,074			574,807,074			619,931,074		
Total Common Equity	1,434,695,247	55.32%	48.13%	1,594,560,247	53.92%	50.95%	1,719,684,247	53.75%	52.39%
Total Permanent Capital	\$ 2,593,242,966	100.00%	87.00%	\$ 2,957,012,887	100.00%	94.48%	\$ 3,199,673,770	100.00%	97.47%
ST Debt	387,470,103		13.00%	172,917,103		5.52%	82,985,103		2.53%
Total Capital Employed	\$ 2,980,713,069		100.00%	\$ 3,129,929,990		100.00%	\$ 3,282,658,873		100.00%

Notes:

1	Equity Infusion		\$ 128,000,000	4th Quarter 2017		
			\$ 80,000,000	4th Quarter 2018		
2	2017 New LTD (AWCC)		\$ 240,000,000	November-17		
	Pennvest Funding (BD240101)		\$ 3,166,300	October-17		
	2018 New LTD (AWCC)		271,000,000	November-18		
3	2017 Pennvest Sinking Fund Pmt Total		\$ 5,061,380	Various		
	2018 Pennvest Sinking Fund Pmt Total		5,363,117	Various		
4	2009 PEDFA Loan (BD240082) Coatesville Wastewater Treatment Plant Chemical Improvements at Pittsburgh New Beck's Run Pump Station			12/31/16	12/31/17	12/31/18
			\$ 47,000,000	\$ 47,000,000	\$ 47,000,000	
			16,000,000	16,000,000	16,000,000	
			17,000,000	17,000,000	17,000,000	
			<u>\$ 80,000,000</u>	<u>\$ 80,000,000</u>	<u>\$ 80,000,000</u>	
	PENNVEST (Outstanding)			12/31/16	12/31/17	12/31/18
	Pocono Wastewater System (BD240052)		\$ 658,547	453,245	245,498	
	Clarion Wastewater System (BD240101)		\$ 14,536,319	16,990,464	16,271,154	
	Scranton Wastewater Acquisition (BD240105)		\$ 6,285,976	6,249,384	5,807,903	
	Total (included in wastewater specific only)		<u>\$ 68,480,841</u>	<u>\$ 70,693,092</u>	<u>\$ 69,324,555</u>	
5	Preferred Stock	Series	8.49%	\$ 1,200,000	Sinking Fund Redemption 2017	
		Series	8.49%	\$ 1,200,000	Sinking Fund Redemption 2018	
6	Forecasted Capital Expenditures (Total Company)					
		<u>Gross</u>	<u>CIAC/CAC</u>	<u>Net</u>		
	2017	\$ 304,254,220	\$ 7,340,000	\$ 296,914,220		
	2018	353,956,673	7,825,000	346,131,673		
	2019	301,976,044	7,500,000	294,476,044		
	2020	286,276,719	7,500,000	278,776,719		
	2021	277,815,072	7,500,000	270,315,072		
	Funding will be based on a combination of LTD issuances and equity infusions which allow for PAWC, on a total-company basis, to reach targeted equity range.					
7	PAWC's total-company overall target capital structure goal = 54% to 55% equity					
8	2017-2018 Long-Term Debt Maturities					
		Amount	Amount	Issue	Maturity	Coupon
		<u>Issued</u>	<u>Outstanding</u>	<u>Date</u>	<u>Date</u>	<u>Rate</u>
	BD240029 (GMB)	\$ 33,000,000	\$ 33,000,000	11/01/97	11/01/17	7.080%
	BD240081 (AWCC Note)	81,000,000	81,000,000	05/15/08	05/15/18	6.250%
	BD240078 (AWCC Note)	65,900,000	65,900,000	01/31/07	12/21/18	5.620%
	Total	<u>\$ 179,900,000</u>	<u>\$ 179,900,000</u>			

Pennsylvania-American Water Company
Capitalization and Related Capital Structure Ratios- Water Service
Actual at December 31, 2016 and Estimated at December 31, 2017 and December 31, 2018

	Actual at December 31, 2016			Proforma at December 31, 2017			Proforma at December 31, 2018		
	Amount Outstanding	Ratios		Amount Outstanding	Ratios		Amount Outstanding	Ratios	
		Excl. S-T Debt	Incl. S-T Debt		Excl. S-T Debt	Incl. S-T Debt		Excl. S-T Debt	Incl. S-T Debt
Long-Term Debt	\$ 1,082,415,378	42.88%	37.18%	\$ 1,285,308,047	44.53%	42.02%	\$ 1,405,413,468	44.89%	43.73%
Preferred Stock	7,651,500	0.30%	0.26%	6,451,500	0.22%	0.21%	5,251,500	0.17%	0.16%
Common Equity									
Common Stock	21,506,887			21,506,887			21,506,887		
Paid in Capital	870,246,287			998,246,287			1,078,246,287		
Retained Earnings	542,942,074			574,807,074			619,931,074		
Total Common Equity	<u>1,434,695,247</u>	<u>56.82%</u>	<u>49.26%</u>	<u>1,594,560,247</u>	<u>55.25%</u>	<u>52.12%</u>	<u>1,719,684,247</u>	<u>54.94%</u>	<u>53.52%</u>
Total Permanent Capital	\$ 2,524,762,125	<u>100.00%</u>	86.70%	\$ 2,886,319,794	<u>100.00%</u>	94.35%	\$ 3,130,349,215	<u>100.00%</u>	97.41%
ST Debt	387,470,103		<u>13.30%</u>	172,917,103		<u>5.65%</u>	82,985,103		<u>2.59%</u>
Total Capital Employed	\$ 2,912,232,228		<u>100.00%</u>	\$ 3,059,236,897		<u>100.00%</u>	\$ 3,213,334,318		<u>100.00%</u>

Pennsylvania-American Water Company
Capitalization and Related Capital Structure Ratios- Wastewater Service
Actual at December 31, 2016 and Estimated at December 31, 2017 and December 31, 2018

	<u>Actual at December 31, 2016</u>		<u>Proforma at December 31, 2017</u>		<u>Proforma at December 31, 2018</u>	
	<u>Amount Outstanding</u>	<u>Ratios</u>	<u>Amount Outstanding</u>	<u>Ratios</u>	<u>Amount Outstanding</u>	<u>Ratios</u>
Long-Term Debt	\$ 79,380,599	31.30%	\$ 111,910,063	34.76%	\$ 113,586,625	35.24%
LTD WW Specific Financing	68,480,841	27.00%	70,693,092	21.95%	69,324,555	21.51%
Preferred Stock	555,368	0.22%	552,890	0.17%	430,157	0.13%
Total Common Equity	105,186,698	41.48%	138,850,910	43.12%	139,016,467	43.12%
Total Permanent Capital	\$ 253,603,506	100.00%	\$ 322,006,956	100.00%	\$ 322,357,804	100.00%
Rate Base	\$ 253,603,506		\$ 322,006,956		\$ 322,357,804	

Pennsylvania-American Water Company
Wastewater Specific Debt

As of December 31, 2016

12/31/2016														
COUPON RATE	NOTE #	DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
1.184%	9	PENNVEST- Pocono WW 10/01/01	02/01/20	3,470,505	658,547	1.184%	7,797	17,155	3,453,350	99.51%	0	0.96%	1.21%	0.01%
1.000%	34	PENNVEST- Clarion WW 04/01/15	09/01/32	15,833,700	14,536,319	1.000%	145,363	0	15,833,700	100.00%	0	21.23%	1.00%	0.21%
6.200%	38	PEDFA - Coatesville WW 04/01/09	04/01/39	47,000,000	47,000,000	6.200%	2,914,000	607,386	46,392,614	98.71%	0	68.63%	6.30%	4.32%
1.000%	37	PENNVEST- Scranton WW 12/29/16	11/01/37	6,285,976	6,285,976	1.0000%	62,860	0	6,285,976	100.00%	0	9.18%	1.00%	0.09%
				\$72,590,180	\$68,480,841		\$3,130,020	\$624,541	\$71,965,640		\$0	100.00%		4.64%

As of December 31, 2017

12/31/2017														
COUPON RATE	NOTE #	DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
1.184%	9	PENNVEST- Pocono WW 10/01/01	02/01/20	3,470,505	453,245	1.184%	5,366	17,155	3,453,350	99.51%	0	0.64%	1.21%	0.01%
1.000%	34	PENNVEST- Clarion WW 04/01/15	09/01/32	19,000,000	16,990,464	1.000%	169,905	0	19,000,000	100.00%	0	24.03%	1.00%	0.24%
6.200%	38	PEDFA - Coatesville WW 04/01/09	04/01/39	47,000,000	47,000,000	6.200%	2,914,000	607,386	46,392,614	98.71%	0	66.48%	6.30%	4.19%
1.000%	37	PENNVEST- Scranton WW 12/29/16	11/01/37	6,285,976	6,249,384	1.000%	62,494	0	6,285,976	100.00%	0	8.84%	1.00%	0.09%
				\$75,756,481	\$70,693,092		\$3,151,765	\$624,541	\$75,131,940		0	100.00%	9.51%	4.53%

As of December 31, 2018

12/31/2018														
COUPON RATE	NOTE #	DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
1.184%	9	PENNVEST- Pocono WW 10/01/01	02/01/20	3,470,505	245,498	1.184%	2,907	17,155	3,453,350	99.51%	0	0.35%	1.21%	0.00%
1.000%	34	PENNVEST- Clarion WW 04/01/15	09/01/32	19,000,000	16,271,154	1.000%	162,712	0	19,000,000	100.00%	0	23.47%	1.00%	0.23%
6.200%	38	PEDFA - Coatesville WW 04/01/09	04/01/39	47,000,000	47,000,000	6.200%	2,914,000	607,386	46,392,614	98.71%	0	67.80%	6.30%	4.27%
1.000%	37	PENNVEST- Scranton WW 12/29/16	11/01/37	6,285,976	5,807,903	1.000%	58,079	0	6,285,976	100.00%	0	8.38%	1.00%	0.08%
				\$75,756,481	\$69,324,555		\$3,137,698	\$624,541	\$75,131,940		0	100.00%	9.51%	4.59%

Notes to Debt Schedule

- (4) Clarion Township Pennvest Loan. Interest rate increases to 2.566% in 2003.
- (5) Pocono Regionalization Pennvest Loan. Interest 1.00% from 1998 to 2003 and 1.384 from 2004 to 2018.
- (6) Independence Twp Municipal Authority and Cedar Grove Water Assoc. Interest 1.453% from 1999 thru 2004 and 2.905% from 2005 thru 2019.
- (7) Clark Summit Regionalization (Abington). Interest 1.409% from 1999 to 2004 and 2.795% from 2005 to 2019.
- (8) Strattanville Pennvest Loan. Interest 1.619% from 2002 to 2007 and 3.237% starting March 2007.
- (9) Pocono Country Place. Interest 1.00% from 2000 to 2005 and 1.184% from 2006 to 2020.
- (10) Franklin Township. Interest 1.619% from 2002 to 2007 and 3.237% starting April 2007.
- (11) Jackson Township. Interest 1.619% from 2001 to 2006 and 3.237% starting Oct 2007
- (12) Eldersville, Jefferson, and Crosscreek, interest 1.387% for first 70 months and 2.774% (12/2007) for remainder.
- (13) Eilwood/Butler Interconnect, Interest rate 1.387% for first 74 months and 2.774% (08/2009) for remainder
- (14) Mahoning & Union Twp, Interest rate 1.305% for first 82 months and 2.432% (10/2009) for remainder
- (15) Farmington Twp., Interest rate 1.387% for first 70 months and 2.774% (07/2009) for remainder
- (16) Sandy Ridge, Interest rate 1.000% for first 60 months and 1.156% (07/2010) for remainder
- (17) Sligo/Shippenville, Interest rate 1.385% for first 86 months and 2.763% (06/2013) for remainder
- (18) Rate was 4.75% rate until March 1, 2014. Has been reset to 5.77%.
- (19) Hanover & Collier 1.274% first 2009 - 2014 and 2.547% starting Oct 2014..
- (21) Remarketed Dec 09 with a 30 year term.
- (24) Mount Pleasant Water System Extension 1.559% first 2011 - 2016 and 2.69% starting March 2016.
- (25) Rock Run WTP 2.414% first 2011 - 2016 and 3.117% starting Dec 2017
- (26) Silver Spring Clearwell 2.376% first 2012 - 2016 and 3.098% starting Jan 2017.
- (27) Wallaceton Municipal Authority 1.00% for 30 years starting March 2012.
- (28) Pittsburgh Meter Improvements 1.799% first 2012 - 2017 and 2.81% starting April 2017.
- (29) Pittsburgh Meter Improvement Project Phase II 1.559% first 60 months and 2.69% starting May 2016.
- (30) Refinancing for 6.3 years at a coupon rate of 2.20% - Interest paid twice a year on 29th of March & October
- (31) Re-issuance 12/21/12 from Parent at a coupon rate of 4.30% for 30 years
- (32) New unsecured borrowing at a coupon rate of 4.30% for 30 years
- (33) Southwest PA Pipeline Exts Phase II - Interest 1.591% first 5 years - 2.196% starting April 2018
- (34) Clarion WW Act 537 Implementation Project - Interest rate is 1.0% for the life of the loan
- (35) Paint Twp #1 - Interest rate is 1% for the remaining life of the Bond
- (35) Paint Twp #2 - Interest rate is 1% for the remaining life of the Bond
- (36) Fairview Water Main Extension - Interest rate is 1.356% for the first 5 years, 1.985% April 2021 for remaining 15 years
- (37) Debt assumed as part of Scranton Sewer acquisition
- (38) Excludes \$47 million portion of PEDFA loan allocated to wastewater treatment plant in Coatsville

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Pennsylvania-American Water Company
Calculation of the Embedded Cost of Preferred Stock
Actual at December 31, 2016
Estimated at December 31, 2017, and December 31, 2018

<u>Series</u>	<u>Principal Amount Outstanding</u>	<u>Percent to Total</u>	<u>Effective Cost Rate</u>	<u>Weighted Cost Rate</u>
<u>December 31, 2016</u>				
9.75%	\$178,000	2.33%	9.96%	0.23%
9.35%	273,500	3.57%	9.53%	0.34%
8.49%	7,200,000	94.10%	8.56%	8.05%
Total	<u>\$7,651,500</u>	<u>100.00%</u>		<u>8.62%</u>
<u>December 31, 2017</u>				
9.75%	\$178,000	2.76%	9.96%	0.27%
9.35%	273,500	4.24%	9.53%	0.40%
8.49%	6,000,000	93.00%	8.56%	7.96%
Total	<u>\$6,451,500</u>	<u>100.00%</u>		<u>8.63%</u>
<u>December 31, 2018</u>				
9.75%	\$178,000	3.39%	9.96%	0.34%
9.35%	273,500	5.21%	9.53%	0.50%
8.49%	4,800,000	91.40%	8.56%	7.82%
Total	<u>\$5,251,500</u>	<u>100.00%</u>		<u>8.66%</u>

Pennsylvania-American Water Company
Capitalization and Financial Statistics
2011-2015

	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>
Amount of Capital Employed					
Permanent Capital	\$2,561,224,000	\$2,440,407,000	\$2,332,429,000	\$2,235,447,000	\$2,077,482,000
Long-Term Debt	1,159,585,000	1,148,064,000	1,151,787,000	1,086,134,000	1,030,816,000
Short-Term Debt	74,383,000	73,766,000	66,728,000	37,675,000	80,276,000
Preferred Stock	8,852,000	10,052,000	11,252,000	14,172,000	14,171,000
Common Equity	<u>1,392,787,000</u>	<u>1,282,291,000</u>	<u>1,169,390,000</u>	<u>1,135,141,000</u>	<u>1,032,495,000</u>
Total Capital	\$2,635,607,000	\$2,514,173,000	\$2,399,157,000	\$2,273,122,000	\$2,157,758,000
Capital Structure Ratios					
Based on Permanent Capital					
Long-Term Debt	45.32%	47.09%	49.43%	48.64%	49.62%
Preferred Stock	0.30%	0.36%	0.43%	0.58%	0.68%
Common Equity	54.38%	52.54%	50.14%	50.78%	49.70%
	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>
Capital Structure Ratios					
Based on Total Capital					
Long-Term Debt	46.86%	48.65%	50.84%	49.49%	51.49%
Preferred Stock	0.29%	0.35%	0.42%	0.57%	0.66%
Common Equity	52.85%	51.00%	48.74%	49.94%	47.85%
	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>	<u>100.00%</u>
Rate of Return on Book Equity	10.29%	10.93%	10.44%	9.93%	9.36%
Operating Ratio	48.43%	48.45%	51.09%	52.98%	57.63%
Coverage incl. AFUDC					
Times interest earned- pre-tax	4.63	4.50	4.16	3.96	3.58
Times Interest earned- post-tax	3.19	3.11	2.89	2.77	2.63
Overall Coverage: All interest & Preferred Dividend	3.19	3.11	2.89	2.77	2.63
Coverage excl. AFUDC					
Times interest earned- pre-tax	4.61	4.48	4.12	3.94	3.52
Times Interest earned- post-tax	3.16	3.09	2.84	2.75	2.56
Overall Coverage: All interest & Preferred Dividend	3.16	3.09	2.84	2.75	2.56
Quality of Earnings & Cash Flow					
AFUDC/Income Available for Common Equity	0.9%	0.7%	2.3%	1.0%	3.9%
Effective Income Tax Rate	40.7%	40.7%	41.3%	41.0%	37.9%
Gross Cash Flow/ Total Debt	32.44%	28.58%	28.55%	26.78%	23.04%
Gross Cash Flow Interest Coverage	6.01	5.17	5.29	4.66	4.24
Dividend payout ratio	0.75	0.73	0.72	0.71	0.73
CWIP/Net Plant	0.02	0.01	0.01	0.02	0.06