VOLUME 19

PENNSYLVANIA-AMERICAN WATER COMPANY

2022 GENERAL BASE RATE CASE
R-2022-3031672 (WATER)
R-2022-3031673 (WASTEWATER)

DIRECT TESTIMONY AND EXHIBIT OF
ANN E. BULKLEY

STATEMENT NO. 13
EXHIBIT NO. 13-A

PAWC Statement No. 13

PENNSYLVANIA-AMERICAN WATER COMPANY

Direct Testimony

of

Ann E. Bulkley, Principal
The Brattle Group

Concerning
Fair Rate of Return and Capital Structure

Docket Nos.
R-2022-3031672 (Water)
R-2022-3031673 (Wastewater)

Date April 29, 2022

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I. WITNESS IDENTIFICATION AND QUALIFICATIONS

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

A. My name is Ann E. Bulkley. I am employed by The Brattle Group as a Principal. My business address is One Beacon Street, Suite 2600, Boston, Massachusetts 02108.

Q. On whose behalf are you submitting this testimony?

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

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

A. I hold a Bachelor's degree in Economics and Finance from Simmons College and a Master's degree in Economics from Boston University, with more than 25 years of experience consulting to the energy industry. I have advised numerous energy and utility clients on a wide range of financial and economic issues with primary concentrations in valuation and utility rate matters. Many of these assignments have included the determination of the cost of capital for valuation and ratemaking purposes. My qualifications and testimony listing are presented in more detail in Attachment A.

II. PURPOSE AND OVERVIEW OF TESTIMONY

Q. What is the purpose of your Direct Testimony?

A. The purpose of my Direct Testimony is to present evidence and provide a recommendation regarding PAWC's authorized return on equity ("ROE" or "cost of equity") and to assess the reasonableness of its proposed capital structure for ratemaking purposes.

Q. Are you sponsoring any exhibits in support of your Direct Testimony?

A. Yes. My analyses and recommendations are supported by the data presented in Schedules-1 through 16 of Exhibit No. 13-A.

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

A. Section III provides a summary of my analyses and conclusions. Section IV reviews the regulatory principles pertinent to the development of the cost of capital. Section V discusses the current and prospective capital market conditions and the effect of those conditions on PAWC's cost of equity. Section VI explains my selection of a proxy group of risk comparable utilities. Section VII describes my analyses and the analytical basis for the recommendation of the appropriate ROE for PAWC. Section VIII provides a discussion of specific business and financial risks that have a direct bearing on the Company's authorized ROE in this case. Section IX provides an assessment of the reasonableness of PAWC's proposed capital structure as compared to the capital structures of the proxy group companies. Section X presents my conclusions and recommendations on the cost of equity and capital structure.

III. SUMMARY OF ROE ANALYSES AND CONCLUSIONS

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

A. As discussed in more detail below, it is important to consider the results of several analytical approaches in determining a reasonable recommendation for the Company's ROE. To develop my ROE recommendation, I first developed a proxy group of utility companies. I did not limit the proxy group to water utilities but included a broader group of utilities that face similar risk as PAWC because a proxy group composed only of water utilities would result in a small group of companies for which data is limited. To that proxy group, I applied the Constant Growth form of the Discounted Cash Flow ("DCF") model, the Capital Asset Pricing Model ("CAPM"), and the Empirical Capital Asset Pricing Model ("ECAPM"). It is appropriate to rely on several analytical approaches because market conditions affect the assumptions used in each model differently. Therefore, the use of multiple ROE estimation models is beneficial to provide benchmarks and a range of results to consider.

Q. Please summarize the key factors considered in your analyses and upon which you base your recommended ROE.

A. In developing my recommended ROE for PAWC, I considered the following:

- The *Hope* and *Bluefield* decisions[1] that established the standards for determining a fair and reasonable allowed ROE, including consistency of the allowed return with the returns of other businesses having similar risk, adequacy of the return to provide access to capital and support credit quality, and the requirement that the end result lead to just and reasonable rates.

- The effect of current and projected capital market conditions on investors' return requirements.

- The results of several analytical approaches that provide estimates of the Company's cost of equity.

- The Company's regulatory, business and financial risks relative to the proxy group of comparable companies, and the implications of those risks.

Q. Please explain how you assessed these factors.

A. After considering these factors and the results of my analyses, I relied on the range of results produced by the Constant Growth DCF model, the CAPM, and the ECAPM. As shown in Figure 1, these ROE estimation models produce a wide range of results. My conclusion as to where, within that range of results, PAWC's cost of equity falls is based on my assessment of market conditions, and the Company's business and financial risk relative to the proxy group. Although the companies in my proxy group are generally comparable to PAWC, each company is unique, and no two companies have exactly the same business and financial

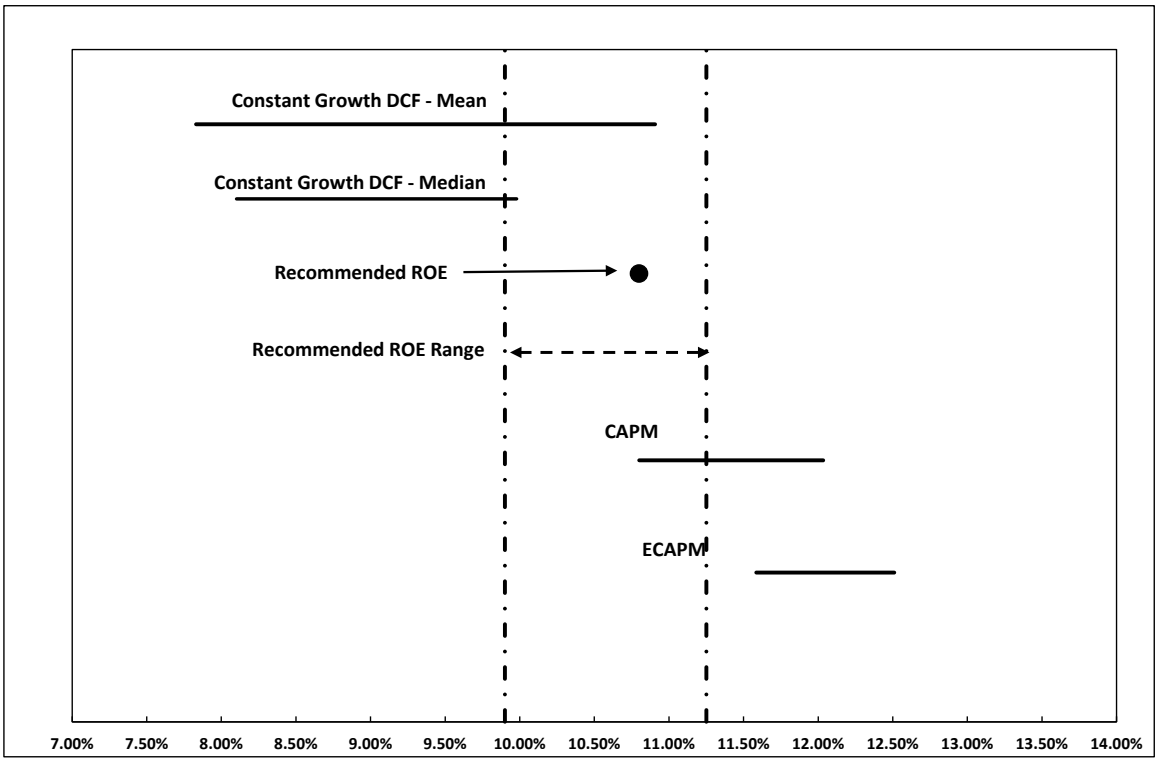
[1] Federal Power Commission v. *Hope Natural Gas Co.*, 320 U.S. 591 (1944); *Bluefield Waterworks & Improvement Co.*, v. Public Service Commission of West Virginia, 262 U.S. 679 (1923).

risk profiles. Accordingly, I considered the Company's business and financial risk in the aggregate in comparison to that of the proxy group companies when determining where PAWC's ROE falls within the reasonable range of analytical results to account for any residual differences in risk.

Q. Please summarize the results of the ROE estimation models that you considered to establish the range of ROEs for PAWC.

A. Figure 1 summarizes the range of results produced by the Constant Growth DCF, CAPM, and ECAPM.

Figure 1: Summary of Cost of Equity Results



As shown in Figure 1 (and in Schedule-1 of Exhibit No. 13-A), the range of results produced by the ROE estimation models is wide. While it is common to consider multiple models to estimate the cost of equity, it is particularly important when the range of results varies considerably across methodologies. As a result, my ROE recommendation considers the range of results of the Constant Growth DCF model, as well as the results of the CAPM and ECAPM. My ROE recommendation also considers PAWC's company-specific risk factors and current and prospective capital market conditions.

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

A. A reasonable range of ROE estimates for PAWC is from 9.90 percent to 11.25 percent. Considering management performance and the risk factors facing PAWC, I believe that an ROE of 10.80 percent is reasonable and appropriate. The required ROE should be a forward-looking estimate; therefore, the analyses supporting my recommendation rely on forward-looking inputs and assumptions (e.g., projected analyst growth rates in the DCF model, forecasted risk-free rate and Market Risk Premium in the CAPM analysis, etc.). I also take into consideration capital market conditions, including the expectation that interest rates will increase over the near-term as a result of the Federal Reserve normalizing monetary policy in response to increased inflation.

Q. Please summarize the analysis you conducted in determining that PAWC's requested capital structure is reasonable and appropriate.

A. Because there is specific debt that has been identified for the wastewater services, the capital structures for water and wastewater services were calculated separately. Therefore, I have considered the reasonableness of the capital structure for both PAWC's water and wastewater services. Based on the analysis presented in Section IX of my testimony, I conclude that PAWC's proposed water services equity ratio of 56.05 for the fully projected future test year (ending December 31, 2023) as well as PAWC's proposed wastewater services equity ratio of 52.08 for the fully projected future test year (ending December 31, 2023) are reasonable. To determine if PAWC's requested capital structures for both water and wastewater services were reasonable, I reviewed the capital structures of the utility subsidiaries of the proxy companies. As shown in Schedule-7 of Exhibit No. 13-A, the results of that analysis demonstrate that the average equity ratios for the utility operating companies of the proxy group range from 47.44 percent to 60.04 percent, with an average of 55.63 percent. Therefore, the Company's proposed equity ratios for both water and wastewater service are well within the range of equity ratios established by the proxy group companies.

IV. REGULATORY PRINCIPLES

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

A. The United States Supreme Court's *Hope* and *Bluefield* decisions established the standards for determining the fairness or reasonableness of a utility's authorized ROE. Among the standards established by the Court in those cases are:

(1) consistency with other businesses having similar or comparable risks; (2) adequacy of the return to support credit quality and access to capital; and (3) the principle that the specific means of arriving at a fair return are not important, only that the end result leads to just and reasonable rates.[2]

Q. Is fixing a fair rate of return just about protecting the utility's interests?

A. No. As the court noted in *Bluefield,* a proper rate of return not only assures "confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit [but also] enable[s the utility] to raise the money necessary for the proper discharge of its public duties." Bluefield Waterworks & Imp. Co. vs. Pub. Serv. Commn. of W. Va., 262 US 679, 693, 43 S Ct 675, 679, 67 L Ed 1176 (1923). As the Court went on to explain in *Hope*, "[t]the rate-making process … involves balancing of the investor and consumer interests." Fed Power Commn. v. Hope Nat. Gas Co., 320 US 591, 603 (1944).

Q. Has the Pennsylvania Public Utility Commission ("Commission") provided similar guidance in establishing the appropriate return on common equity?

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

[2] *Bluefield*, 262 U.S. at 692-93; *Hope*, 320 U.S., at 603.

In determining a fair rate of return, the Commission must adhere to the constitutional standards established by the United States Supreme Court in the seminal cases *Bluefield Water Works and Improvement Co. v. Public Service Comm'n of West Virginia*, 262 U.S. 679, 692-93 (1923) (Bluefield) and *Federal Power Commission v. Hope Natural Gas Co., 320 U.S. 591*, 603 (1944) (Hope Natural Gas). In Bluefield, the Supreme Court stated:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. A rate of return may be too high or too low by changes affecting opportunities for investment, the money market and business conditions generally.

Twenty years later in Hope Natural Gas, the Supreme Court reiterated:

> From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.[3]

[3] Pennsylvania Public Utility Commission, Opinion and Order, PECO Energy Company – Gas Division, Docket No. R-2020-3018929, June 17, 2021 at 8.

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

A. A return that is adequate to attract capital on reasonable terms enables PAWC to continue providing safe, reliable water and wastewater service while maintaining its financial integrity. That return should be commensurate with returns expected elsewhere in the market for investments of equivalent risk. If it is not, debt and equity investors will seek alternative investment opportunities for which the expected return reflects the perceived risks, thereby inhibiting PAWC's ability to attract capital at reasonable cost.

Q. Is a utility's ability to attract capital also affected by the ROEs that are authorized for other utilities?

A. Yes. Utilities compete directly for capital with other investments of similar risk, which include other water, natural gas and electric utilities. Therefore, the ROE awarded to a utility sends an important signal to investors regarding whether there is regulatory support for financial integrity, dividends, growth, and fair compensation for business and financial risk. The cost of capital represents an opportunity cost to investors. If higher returns are available elsewhere for other investments of comparable risk, investors have an incentive to direct their capital to those investments. Thus, an authorized ROE significantly below authorized ROEs for other water, natural gas and electric utilities can inhibit a utility's ability to attract capital for investment.

V. CAPITAL MARKET CONDITIONS

Q. Why is it important to consider capital market conditions in the estimation of the investor-required return on equity?

A. The ROE estimation models rely on market data that are either specific to the proxy group, in the case of the DCF model, or to the expectations of market risk, in the case of the CAPM. The results of the ROE estimation models can be affected by prevailing market conditions at the time the analysis is performed. While the ROE that is established in a rate proceeding is intended to be forward-looking, the analyst uses current and projected market data, specifically stock prices, dividends, growth rates and interest rates in the ROE estimation models to estimate the required return for the subject company.

As is discussed in the remainder of this section, analysts and regulatory commissions have concluded that current market conditions have affected the results of the ROE estimation models. As a result, it is important to consider the effect of these conditions on the ROE estimation models when determining the appropriate range and recommended ROE for a future period. If investors do not expect current market conditions to be sustained in the future, it is possible that the ROE estimation models will not provide an accurate estimate of investors' required return during that rate period. Therefore, it is important to consider projected market data to estimate the return for that forward-looking period.

Q. What factors are affecting the cost of equity for regulated utilities in the current and projected capital markets?

A. The cost of equity for regulated utility companies is being affected by several factors in the current and prospective capital markets, including: 1) changes in monetary policy, 2) currently high inflation and continued inflation in 2022, 3) increasing interest rates, and 4) volatile market conditions. These factors affect the assumptions used in the ROE estimation models. In this section, I discuss each of these factors and how it affects the models used to estimate the cost of equity for regulated utilities.

Q. What effect do current and prospective market conditions have on the cost of equity for the Company?

A. As is discussed in more detail in the remainder of this section, the combination of persistently high inflation, the Federal Reserve's changes in monetary policy, and the dramatic shifts in market conditions resulting from political influences all contribute to an expectation of increased market risk and an increase in the cost of the investor-required return on equity. It is essential that these factors be considered in setting a forward-looking cost of equity. Inflation is currently at its highest level seen in approximately 40 years. Interest rates, which have increased from the pandemic lows seen in 2020, are expected to continue to increase in direct response to the Federal Reserve's use of monetary policy. Further, utilities, which are a defensive sector, have historically underperformed the market during periods of economic expansion, such as is currently being experienced.

Therefore, investors are currently expecting utilities to underperform over the near-term, which means the share prices of utilities will likely decline. A decline in share prices will increase the dividend yields of utilities and thus the cost of equity for utilities is expected to increase over the near-term. This is important because the cost of equity in this proceeding is being estimated for the period that the Company's rates will be in effect. Since the cost of equity is expected to increase over the near-term for utilities, ROE estimates based on current market conditions will understate the ROE during the period that the Company's rates will be in effect. For example, the DCF model, which relies on historical averages of share prices, is likely to understate the cost of equity for the Company over the near term.

A. The Effect of Monetary Policy on Market Dynamics

Q. Please summarize the monetary policy actions of the Federal Reserve in response to the economic effects of COVID-19.

A. In response to the COVID-19 pandemic, the Federal Reserve:

- decreased the Federal Funds rate twice in March 2020, resulting in a target range of 0.00 percent to 0.25 percent;
- increased its holdings of both Treasury and mortgaged-back securities;
- started expansive programs to support credit to large employers – the Primary Market Corporate Credit Facility to provide liquidity for new issuances of corporate bonds; and the Secondary Market Corporate Credit Facility to provide liquidity for outstanding corporate debt issuances; and

- supported the flow of credit to consumers and businesses through the Term Asset-Backed Securities Loan Facility.

In addition, Congress also passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act in March 2020, the Consolidated Appropriations Act, 2021 in December 2020, and the American Rescue Plan Act in March 2021, which included $2.2. trillion, $900 billion, and $1.9 trillion, respectively, in fiscal stimulus aimed at also mitigating the economic effects of COVID-19. These expansive monetary and fiscal programs mitigated the economic effects of the COVID-19 pandemic and provided additional support as the economy recovers from the COVID-19 recession.

Q. How did the accommodative monetary and fiscal policy affect the U.S. economy?

A. The expansive monetary and fiscal policy programs resulted in a strong economic recovery in 2021 from the COVID-19 induced recessionary period in 2020. In fact, according to the Bureau of Economic Analysis, real GDP grew by 5.7 percent in 2021 driven primarily by a 7.9 percent increase in personal consumption expenditures.[4] Moreover, the unemployment rate decreased from a high of 14.7 percent in April 2020 to 3.9 percent as of December 2021.[5] Finally, as I will discuss in more detail below, the economic recovery has also included a substantial increase in inflation with the year-over-year ("YOY") change in the GDP Price Index

[4] Source: Bureau of Economic Analysis, News Release, February 24, 2022, at 8.
[5] Source: Bureau of Labor Statistics. https://data.bls.gov/timeseries/LNS14000000

("GDP-PI") at 5.90 percent in 2021 Q4. The strong economic recovery along with the increase in inflation has resulted in the Federal Reserve normalizing monetary policy and removing the accommodative policy programs that it used to mitigate the effect of COVID-19.

Q. How has the Federal Reserve recently normalized monetary policy?

A. The Federal Reserve began the process of policy normalization at the November 2, 2021 meeting when the Federal Reserve decided to reduce asset purchases of Treasuries by $10 billion and mortgage-backed securities by $5 billion on a monthly basis.[6] Given consistent continued high inflation, the Federal Reserve increased the pace of its taper of bond purchases at the December 15, 2021 meeting, reducing asset purchases of Treasuries by $20 billion and mortgage-backed securities by $10 billion on a monthly basis.[7] The Federal Reserve completed its taper of bond purchases in March 2022.[8]

At the March 16, 2022 meeting with the tapering of assets purchases complete, the Federal Reserve announced the next step in policy normalization which was an increase in the target federal funds rate from 0.00 – 0.25 percent to 0.25 – 0.50 percent.[9] Additionally, the Federal Reserve's FOMC forecasted an additional six rate increases in 2022 and four rate increases in 2023 which resulted a median

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6 Federal Reserve, Press Release, (Nov. 3, 2021).
7 Federal Reserve, Press Release, (Dec. 15, 2021).
8 Source: Federal Reserve Bank of New York, https://www.newyorkfed.org/markets/domestic-market-operations/monetary-policy-implementation/treasury-securities/treasury-securities-operational-details#monthly-details.
9 Federal Reserve, Press Release, (Mar. 16, 2022).

forecast of the federal funds rate of 1.9 percent and 2.8 percent, respectively.[10] Moreover, the Federal Reserve announced plans to reduce the size of its balance sheet at an upcoming meeting in 2020. Chairman Powell noted that substantial progress had been regarding developing a plan for the reduction in the Federal Reserve's balance sheet and thus the reduction could start as soon as the FOMC's next meeting in May.[11] According to Chairman Powell, the balance sheet reductions effect on the economy could be the equivalent of another rate increase.[12] Therefore, the combination of the balance sheet reduction and the projected interest rate increases would represent the equivalent of eight interest rates increases in 2022.

Q. Why has the Federal Reserve decided to normalize monetary policy?

A. The Federal Reserve has accelerated plans to normalize monetary policy in response to increasing inflation. While the Federal Reserve initially viewed inflation as transitory, it has been higher and more persistent than the target levels and is expected to continue in 2022. At the March 16, 2022 meeting, Federal Reserve Chairman Powell stated that:

[10] Federal Reserve, Summary of Economic Projections, March 16, 2022, at 2.
[11] Federal Reserve, Transcript of Chairman Powell's Press Conference, March 16, 2022, at 18.
[12] Federal Reserve, Transcript of Chairman Powell's Press Conference, March 16, 2022, at 10.

> Inflation remains well above our longer-run goal of 2 percent. Aggregate demand is strong, and bottlenecks and supply constraints are limiting how quickly production can respond. These supply disruptions have been larger and longer lasting than anticipated, exacerbated by waves of the virus here and abroad, and price pressures have spread to a broader range of goods and services. Additionally, higher energy prices are driving up overall inflation. The surge in prices of crude oil and other commodities that resulted from Russia's invasion of Ukraine will put additional upward pressure on near-term inflation here at home.
>
> We understand that high inflation imposes significant hardship, especially on those least able to meet the higher costs of essentials like food, housing, and transportation. We know that the best thing we can do to support a strong labor market is to promote a long expansion, and that is only possible in an environment of price stability. As we emphasize in our policy statement, with appropriate firming in the stance of monetary policy, we expect inflation to return to 2 percent while the labor market remains strong. That said, inflation is likely to take longer to return to our price stability goal than previously expected. The median inflation projection of FOMC participants is 4.3 percent this year and falls to 2.7 percent next year and 2.3 percent in 2024; this trajectory is notably higher than projected in December, and participants continue to see risks as weighted to the upside.[13]

Q. What is the market response to the FOMC meeting?

A. The market response is an expectation that interest rates will increase to address inflation. The CME Group calculates investors' views regarding the probability of the target federal funds rate range at upcoming Federal Reserve meetings based on federal funds rate futures contracts. Figure 2 below contains investors' expectations regarding the level of the federal funds rate at each of the next eleven meetings as of April 4, 2022. As shown in Figure 2, investors expect the Federal Reserve to increase the federal funds rate at a faster pace than what was indicated

[13] Federal Reserve, Transcript of Chairman Powell's Press Conference, March 16, 2022, at 2-3.

at the Federal Reserve's March 16, 2022 meeting. For example, according to the CME Group, there is a 74.7 percent probability[14] that the target federal funds rate range is 2.50 percent to 2.75 percent as of December 2022 which is greater than the Federal Reserve's median forecast of 1.90 percent. Thus, investors expect that the Federal Reserve will pursue more aggressive monetary policy than indicated to combat persistent high levels of inflation. Federal Reserve Chairman Powell recently provided support for investors' expectations when he indicated that the Federal Reserve could pursue more aggressive increases in interest rates at upcoming Federal Reserve meetings in order to reduce inflation and restore price stability. Specifically, on March 21, 2022 in prepared remarks before the National Association for Business Economics, Federal Reserve Chairman Powell noted the following:

> "We will take the necessary steps to ensure a return to price stability," he said. "In particular, if we conclude that it is appropriate to move more aggressively by raising the federal funds rate by more than 25 basis points at a meeting or meetings, we will do so. And if we determine that we need to tighten beyond common measures of neutral and into a more restrictive stance, we will do that as well."[15]

[14] The probability of a rate hike is calculated by adding the probabilities of all target rate levels above the current target rate.

[15] Cox, Jeff, "Powell says 'inflation is much too high' and the Fed will take 'necessary steps' to address," CNBC, March 21, 2022. https://www.cnbc.com/2022/03/21/powell-says-inflation-is-much-too-high-and-the-fed-will-take-necessary-steps-to-address.html.

Figure 2: Investor Expectation of Future Federal Funds Rate Increases[16]

MEETING PROBABILITIES																
MEETING DATE	50-75	75-100	100-125	125-150	150-175	175-200	200-225	225-250	250-275	275-300	300-325	325-350	350-375	375-400	400-425	425-450
5/4/2022	25.6%	74.4%	0.0%	0.0%	0.0%											
6/15/2022	0.0%	0.0%	19.8%	63.2%	17.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
7/27/2022	0.0%	0.0%	0.0%	8.0%	37.3%	44.6%	10.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
9/21/2022	0.0%	0.0%	0.0%	0.0%	5.9%	29.6%	42.7%	19.1%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
11/2/2022	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	28.3%	42.0%	20.4%	3.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
12/14/2022	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.4%	27.7%	41.6%	21.0%	4.0%	0.2%	0.0%	0.0%	0.0%	0.0%
2/1/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	12.1%	31.9%	35.4%	15.9%	2.9%	0.2%	0.0%	0.0%	0.0%
3/15/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	2.4%	13.5%	32.2%	34.1%	15.0%	2.7%	0.2%	0.0%	0.0%
5/3/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	1.3%	8.1%	23.2%	33.2%	24.2%	8.6%	1.4%	0.1%	0.0%
6/14/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	5.3%	16.9%	29.0%	27.9%	15.1%	4.4%	0.6%	0.0%
7/26/2023	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	4.3%	14.3%	26.3%	28.1%	17.9%	6.7%	1.4%	0.2%

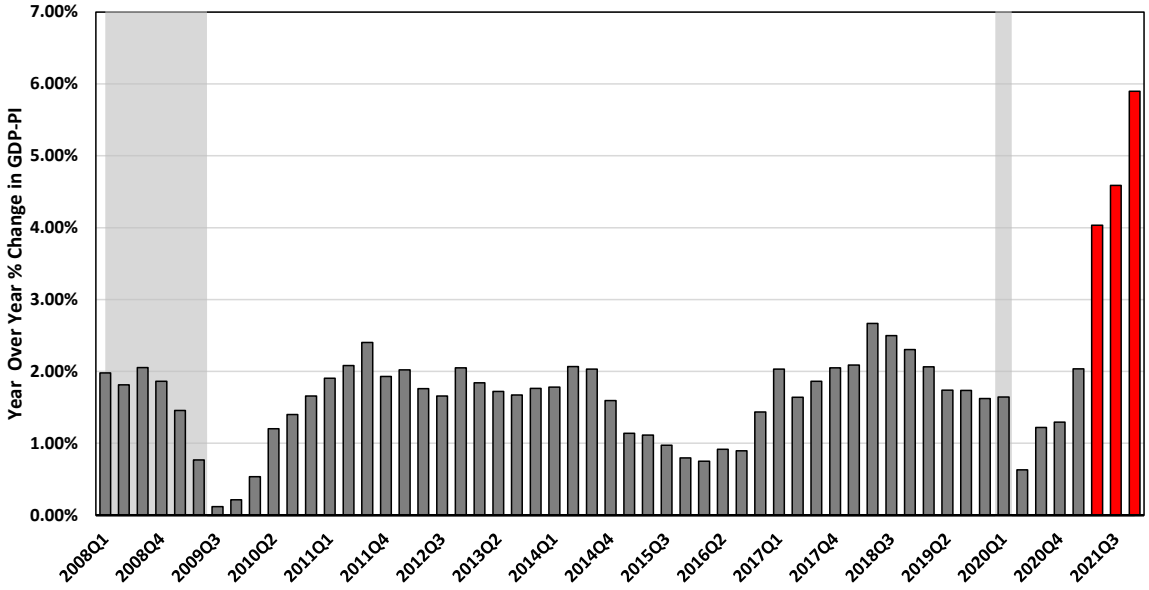
B. Inflationary Expectations in Current and Projected Market Conditions

Q. Is the increase in inflation significant?

A. Yes. As shown in Figure 3, the YOY change in the GDP-PI has increased steadily over the past year rising from 1.29 percent in 2020 Q4 to 5.90 percent in 2021 Q4. The 5.90 percent YOY in the GDP-PI in 2020 Q4 is the largest 12-month increase since 1982 and significantly greater than any level seen since 2008 Q1.

16 CME Group; FedWatch tool as of April 4, 2022.

Figure 3: GDP Price Index – YOY Percent Change – 2008 Q1 – 2021 Q4[17]



Q. What are the expectations for inflation over the near-term?

A. In prepared remarks to the National Association for Business Economics, Chairman Powell noted that inflation was "much too high" and that the Federal Reserve "widely underestimated" how long increased inflation would last and as a result, stated that the Federal Reserve is prepared to "more aggressively" normalize monetary policy to achieve price stability.[18] Therefore, investors expect inflation to remain elevated over the near-term. One measure of investors' expectations regarding inflation is the breakeven inflation rate calculated as the

[17] Source: U.S. Bureau of Economic Analysis, Gross Domestic Product: Implicit Price Deflator [GDPDEF], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/GDPDEF, April 7, 2022, shaded area indicates a recession.

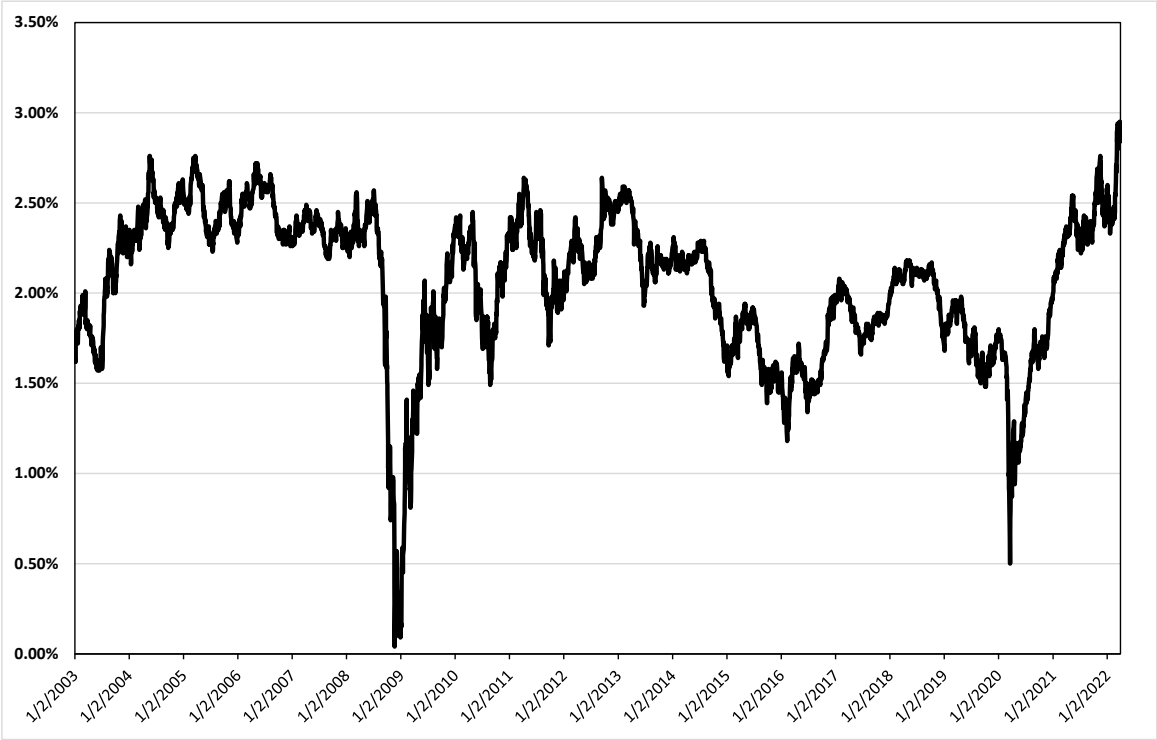
[18] Cox, Jeff, "Powell says 'inflation is much too high' and the Fed will take 'necessary steps' to address," CNBC, March 21, 2022. https://www.cnbc.com/2022/03/21/powell-says-inflation-is-much-too-high-and-the-fed-will-take-necessary-steps-to-address.html.

spread between the yield on a Treasury bond and the yield on a Treasury Inflation-Protected bond, since a Treasury Inflation-Protected bond would account for the effect of inflation. The maturity of the bond selected would then reflect investors' views of inflation during the holding period of the bond. For example, the 10-year breakeven inflation rate calculated as the spread between the 10-year Treasury bond yield and the 10-year Treasury Inflation-Protected bond yield would reflect investors' expectations of inflation over the next 10 years. As shown in Figure 4 below, the 10-year breakeven inflation rate is currently greater than any level seen since January 2003. Furthermore, the 10-year breakeven inflation rate as of March 31, 2022 was 2.84 percent indicating that investors expect inflation will remain well above the Federal Reserve's 2 percent target over the next 10 years. There are many factors as to why inflation is expected to remain elevated, Kiplinger recently noted a few factors including supply shortages due to COVID-19 and Russia's war in Ukraine which led them to forecast an inflation rate of 6.5 percent for 2022:

> The surge in gasoline prices this month will boost March inflation to near 10% when the figures are released next month. The inflation rate will likely remain high for the rest of the year, ending at 6.5% or so in December. Russia's war in Ukraine will keep gasoline prices elevated for much of the year. Even if the war ends, a Western embargo on Russian energy will likely continue for quite a while. Food prices are also likely to see a jump in next month's report, as wheat prices have surged 35%, given that Ukraine is a major producer. Plus, there are expectations of continued upward price pressures on rent, housing costs, and prices of many services, as the pandemic eases and demand rebounds.[19]

[19] Payne, David, "Inflation Will Spike Close to 10%," Kiplinger, March 10, 2022.

Figure 4: 10-year Breakeven Inflation Rate – Janaury 2003 – March 2022[20]



C. The Effect of Inflation on Interest Rates and the Investor-Required Return

Q. What effect will inflation have on long-term interest rates?

A. Inflation and the Federal Reserve's normalization of monetary policy will likely result in increases in long-term interest rates. Specifically, inflation reduces the purchasing power of the future interest payments an investor expects to receive over the duration of the bond. This risk increases the longer the duration of the

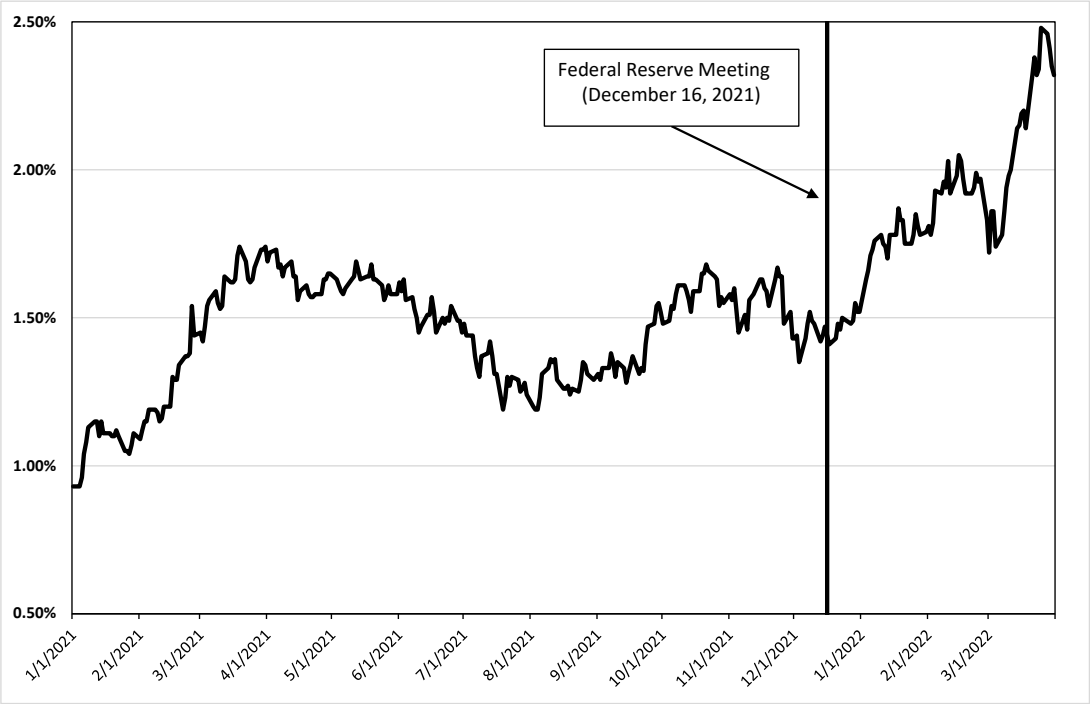
[20] Federal Reserve Bank of St. Louis, 10-Year Breakeven Inflation Rate [T10YIE], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/T10YIE, March 31, 2022.

bond. As a result, if investors expect increased levels of inflation, they will require higher yields to compensate for the increased risk of inflation, which means interest rates will increase.

Q. Have the yields on long-term government bonds increased in response to inflation and the Federal Reserve's normalization of monetary policy?

A. Yes, they have. As discussed above, at the December 2021, January 2022 and March 2022 meetings, the Federal Reserve has noted its continued concerns over the sustained increased levels of inflation. In addition, starting at the December 2021 meeting and continuing through the March 2022 meeting, the Federal Reserve accelerated the process of normalizing monetary policy to respond to inflation. As of the March 2022 meeting, the Federal Reserve has: 1) completed the tapering of bond purchases; 2) increased the federal funds rate once with six additional rate increases projected for the remainder of 2022; and 3) projecting a reduction in its balance sheet that could begin at the May 2022 meeting. As shown in Figure 5, since the Federal Reserve's December 2021, the yield on the 10-year Treasury bond has increased close to 85 basis points from 1.47 percent on December 15, 2021 to 2.32 percent on March 31, 2022. The increase is due to the Federal Reserve's announcements at the December 2021, January 2022 and March 2022 meetings and the continued increased levels of inflation that are now expected to persist much longer than the Federal Reserve and investors had originally projected.

Figure 5: 10-Year Treasury Bond Yield – Janaury 2021 – March 2022[21]



Q. What have equity analysts said about long-term government bond yields?

A. Several equity analysts have noted that they expect the yields on long-term government bonds to continue to increase through the end of 2022. As shown in Figure 6, according to four different equity analysts, the yield on the 10-year Treasury Bond is expected to range from 2.70 percent to 2.80 percent by the end of 2022, which is 62 to 72 basis points greater than the current 30-day average yield on the 10-year Treasury Bond as of March 31, 2022 of 2.08 percent.

[21] S&P Capital IQ Pro.

Figure 6: Equity Analysts Forecast of the 10-year Treasury Yield

Bank	10-year U.S. Treasury Yield	
	30-day Average as of March 31, 2022	2022 Forecast
Credit Suisse[22]	2.08%	2.70%
Goldman Sachs[23]	2.08%	2.70%
Blue Chip Financial Forecasts (Consensus Estimate)[24]	2.08%	2.80%
BMO Economics[25]	2.08%	2.70%

Q. Have you considered any additional indicators that may imply long-term interest rates are expected to increase?

A. Yes, I have. I considered the net position of commercials (i.e., banks) in U.S. Treasury Bond futures contracts as reported in the Commitment of Traders Report produced by the Commodity Futures Trading Commission ("CFTC"). A net position is defined as the total number of long positions in a futures contract minus the total number of short positions in a futures contract. A long position means that an investor agrees to purchase an asset in the future at a specified price today and therefore profits if the price of the underlying asset increases. Conversely, short position is when an investor agrees to sell an asset at a time in the future at a specified price today and profits if the price of the asset declines. Therefore, if

22 Reuters, "U.S. 10-year yield to hit 2.7% this year - Credit Suisse," February 16, 2022.

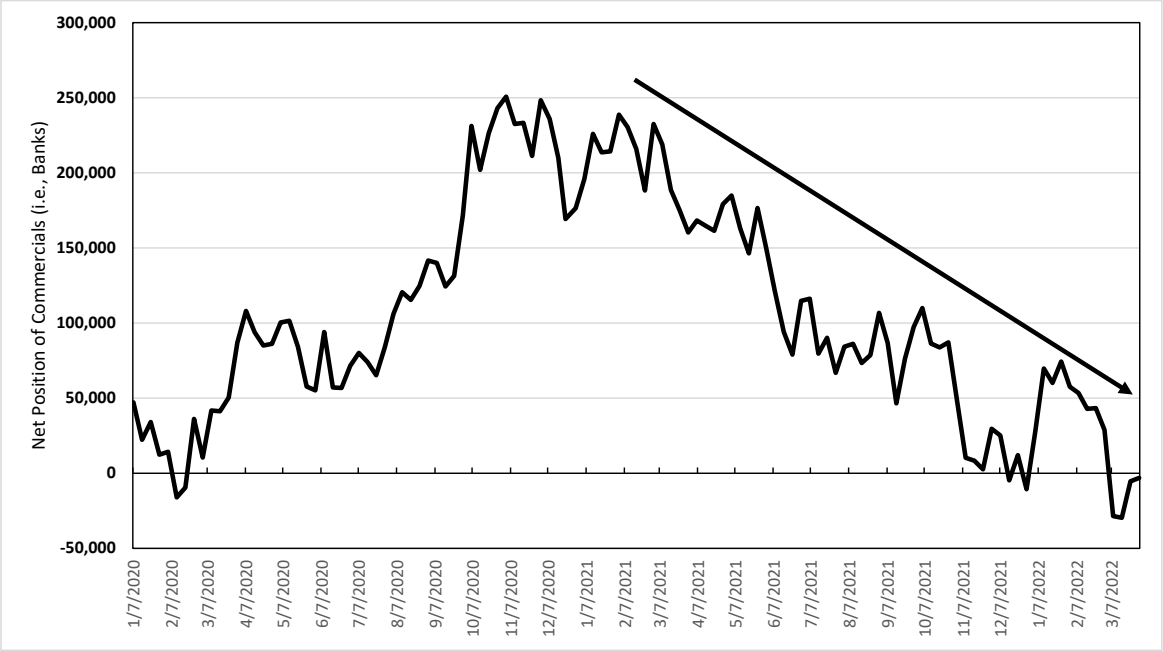
23 Worrachate, Anchalee. "Goldman Sees Higher U.S. Treasury Yields, Curve Inversion." Bloomberg.com, 25 Mar. 2022, https://www.bloomberg.com/news/articles/2022-03-25/goldman-sees-half-point-fed-hikes-in-may-and-june-higher-yields#:~:text=Its%202022%20forecast%20on%2010,yield%20was%20around%202.49%25%20Friday.

24 Blue Chip Financial Forecasts, Vol. 41, No. 4, April 1, 2022, at 2.

25 BMO Economics, "North American Outlook: Out of the Pandemic and Into the Fire," March 31, 2022.

banks are increasing the number of short positions and thus have a declining net position, the banks are assuming that the price of the asset will decline. As shown in Figure 7, the net position of banks in U.S. Treasury Bonds has been decreasing since the end of 2020. Therefore, banks are forecasting a decrease in the price of long-term government bonds and thus the yields (which are inversely related to the price) to increase over the near-term.

Figure 7: Commitment of Traders Report – Net Position of Commercials (i.e., Banks) in U.S. Treasury Bond Futures Contracts[26]



[26] Commitment of Traders Report, as of March 31, 2022 - https://www.cftc.gov/MarketReports/CommitmentsofTraders/HistoricalCompressed/index.htm

D. Expected Performance of Utility Stocks and the Investor-Required ROE on Utility Investments

Q. Are utility share prices correlated to changes in the yields on long-term government bonds?

A. Yes, interest rates and utility share prices are inversely correlated which means, for example, that an increase in interest rates will result in a decline in the share prices of utilities. For example, Goldman Sachs and Deutsche Bank recently examined the sensitivity of share prices of different industries to changes in interest rates over the past five years. Both Goldman Sachs and Deutsche Bank found that utilities had one of the strongest negative relationships with bond yields (i.e., increases in bond yields resulted in the decline of utility share prices).[27]

Q. How do equity analysts expect the utilities sector to perform in an increasing interest rate environment?

A. Equity analysts project that utilities are expected to continue to underperform the broader market as interest rates increase. For example, in a recent article, Barron's conducted its Big Money poll of professional investors regarding the outlook for the next twelve months. The professional investors surveyed by Barron's selected the utility sector as the sector that will perform the worst over the next twelve months,

[27] Lee, Justina. "Wall Street Is Rethinking the Treasury Threat to Big Tech Stocks." Bloomberg.com, 11 Mar. 2021, www.bloomberg.com/news/articles/2021-03-11/wall-street-is-rethinking-the-treasury-threat-to-big-tech-stocks.

indicating they are projecting that utilities will underperform the broader market in 2022.[28]

Other equity analysts concur with this conclusion. Fidelity recently recommended underweighting the utility sector and noted that "[a] combination of poor fundamentals and high valuations may continue to present headwinds for real estate and utilities, especially if interest rates rise."[29] In its 2022 Outlook, Wells Fargo classified the utility sector as "most unfavorable" as economic growth continues to rebound and interest rates increase.[30]

Q. What is the significance of the inverse relationship between interest rates and utility share prices in the current market?

A. As discussed above, the Federal Reserve is currently normalizing monetary policy in response to inflation which is expected to increase long-term government bond yields. If long-term government bond yields increase as expected, then the share prices of utilities will decline. If the prices of utility stocks decline, then the DCF model, which relies on historical averages of share prices, is likely to understate the cost of equity. For example, Figure 8, below summarizes the effect of price on the dividend yield in the Constant Growth DCF model.

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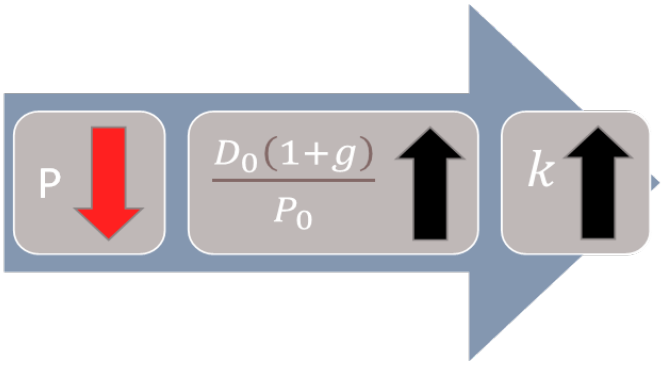
28 Jasinski, Nicholas. Stocks Are Still the Place to Be, Our Exclusive Big Money Poll Finds. Barron's, 16 Oct. 2021, https://www.barrons.com/articles/stock-market-covid-economy-outlook-51634312012?mod=hpsubnav&tesla=y.

29 Fidelity, "Which sectors may lead the pack this year?," January 28, 2022.

30 Wells Fargo Investment Institute, 2022 Outlook, December 2021.

Figure 8: The Effect of a Decline in Stock Prices on the Constant Growth DCF Model



A decline in stock prices will increase the dividend yields and thus the estimate of the ROE produced by the Constant Growth DCF model. Therefore, this expected change in market conditions supports consideration of the range of ROE results produced by the mean to mean-high DCF results since the mean DCF results would likely understate the cost of equity during the period that the Company's rates will be in effect. Moreover, prospective market conditions warrant consideration of other ROE estimation models such as the CAPM and ECAPM, which may better reflect expected market conditions. For example, two out of three inputs to the CAPM (i.e., the market risk premium and risk-free rate) are forward-looking.

E. Conclusion

Q. Have state regulatory commissions considered market events and the utility's ability to attract capital in determining the equity return?

A. Yes. In a recent rate case for Consumers Energy Company, the Michigan Public

Service Commission ("Michigan PSC") noted that it is important to consider how a utility's access to capital could be affected in the near-term as a result of market reactions to global events like those that have occurred in the recent past. Specifically, the Michigan PSC stated that:

> [i]n setting the ROE at 9.90%, the Commission believes there is an opportunity for the company to earn a fair return during this period of atypical market conditions. This decision also reinforces the belief, as stated in the Commission's March 29 order, "that customers do not benefit from a lower ROE if it means the utility has difficulty accessing capital at attractive terms and in a timely manner." These conditions still hold true based on the evidence in the instant case. The fact that other utilities have been able to access capital despite lower ROEs, as argued by many intervenors, is also a relevant consideration*. It is also important to consider how extreme market reactions to global events, as have occurred in the recent past, may impact how easily capital will be able to be accessed during the future test period should an unforeseen market shock occur. The Commission will continue to monitor a variety of market factors in future rate cases to gauge whether volatility and uncertainty continue to be prevalent issues that merit more consideration in setting the ROE.*[31]

The Michigan PSC references "global events" and the overall effect the events could have on the ability of a utility to access capital. Consistent with the Michigan PSC's views, it is important to consider current market conditions and the impact of those conditions on the access to and cost of capital, and to position utilities to be able to maintain access in rapidly changing market conditions.

[31] Michigan Public Service Commission Order, Cause No. U-20697, Consumers Energy Company, at 165 (Dec. 17, 2020).

Q. What are your conclusions regarding the effect of current market conditions on the cost of equity for the Company?

A. Over the near-term, investors expect long-term interest rates to increase in response to continued elevated levels of inflation and the Federal Reserve's normalization of monetary policy. Because the share prices of utilities are inversely correlated to interest rates, an increase in long-term government bond yields will likely result in a decline in utility share prices, which is the reason a number of equity analysts expect the utility sector to underperform over the near-term. The expected underperformance of utilities means that DCF models using recent historical data likely underestimate investors' required return over the period that rates will be in effect. This change in market conditions also supports the use of other ROE estimation models such as the CAPM and the ECAPM, which may better reflect expected market conditions.

VI. PROXY GROUP SELECTION

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

A. In this proceeding, I am estimating the cost of equity for PAWC, which is a rate-regulated subsidiary of AWK. Since the ROE is a market-based concept, and because PAWC's stock is not publicly traded, it is necessary to establish a group of companies that are both publicly traded and are comparable to the Company in certain fundamental business and financial respects to serve as its "proxy" for purposes of the ROE estimation process. The proxy companies used in my

analyses all possess a set of operating and financial risk characteristics that are substantially comparable to PAWC, and, therefore, provide a reasonable basis for deriving the appropriate ROE.

Q. Please provide a brief profile of PAWC.

A. PAWC is a wholly-owned subsidiary of AWK that provides water distribution service to approximately 677,000 customers and wastewater service to approximately 82,000 customers in Pennsylvania.[32] In 2021, the Company had total operating revenues of $770 million which for PAWC's parent company, AWK, represented 22.80 percent of total regulated operating revenues.[33] The Company can accesses debt markets through American Water Capital Corp. ("AWCC") or independently. The current credit ratings for PAWC are as follows: (1) S&P - A (Outlook: Stable);[34] and (2) Moody's – A3 (Outlook: Stable).[35] Additionally, the current credit ratings on senior unsecured debt for AWK and AWCC are as follows: (1) S&P - A (Outlook: Stable);[36] and (2) Moody's – Baa1 (Outlook: Stable).[37]

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

A. I began with the group of U.S. utilities that Value Line classifies as "Water Utilities" and "Natural Gas Distribution Companies". That combined group includes

[32] American Water Works Company, Inc., 2021 SEC Form 10-K, at 5.
[33] *Ibid*.
[34] S&P Capital IQ.
[35] Moody's Investors Service.
[36] S&P Capital IQ.
[37] Moody's Investors Service.

17 domestic U.S. utilities. I simultaneously applied the following screening criteria to select companies that:

- pay consistent quarterly cash dividends because companies that do not cannot be analyzed using the Constant Growth DCF model;
- have investment grade long-term issuer ratings from S&P and/or Moody's;
- are covered by at least two utility industry analysts;
- have positive long-term earnings growth forecasts from at least two utility industry equity analysts;
- derive more than 60.00 percent of their total operating income from regulated operations; and
- were not parties to a merger or transformative transaction during the analytical periods relied on.

Q. Did you consider any additional companies for inclusion in your proxy group?

A. Yes. I also considered the group of 36 companies that Value Line classifies as "Electric Utilities". In determining which electric utilities would qualify for inclusion in my proxy group, I started by relying on the criteria used to screen the water and natural gas utilities. I then applied two additional screening criteria to only include electric utilities that would be considered risk comparable to PAWC:

- have owned generation comprising less than 10 percent of the Company's MWh sales to ultimate customers to ensure that the electric utilities included did not own a substantial amount of generation and therefore had operations that were primarily transmission and distribution; and

- own water and wastewater operations.

Q. Did you include AWK in your proxy group?

A. No. Consistent with my general practice of excluding the subject company, or its parent holding company, from the proxy group, I have excluded AWK from my proxy group for PAWC.

Q. What is the composition of your proxy group?

A. The screening criteria discussed above resulted in a proxy group consisting of the companies in Figure 9.

Figure 9: Proxy Group

Company	Ticker
American States Water Company	AWR
Atmos Energy Corporation	ATO
California Water Service Group	CWT
Essential Utilities, Inc.	WTRG
Eversource Energy	ES
Middlesex Water Company	MSEX
New Jersey Resources Corporation	NJR
NiSource Inc.	NI
Northwest Natural Gas Company	NWN
ONE Gas, Inc.	OGS
SJW Group	SJW
Spire, Inc.	SR
York Water Company	YORW

Q. Why did you include electric utilities and natural gas distribution companies in the proxy group?

A. Value Line currently classifies only seven companies as water utilities. Therefore, the universe of water utilities is already small before a set of screening criteria are applied. Additionally, there is currently a trend towards consolidation in the utility industry, which reduces the number of available proxy companies.[38] Because there are a small number of companies that are available for inclusion in the proxy group, I also considered electric utilities and natural gas distribution companies that meet the screening criteria.

Q. Are electric utilities and natural gas distribution companies reasonably comparable to water utilities to be included in a proxy group used to estimate the cost of equity for a water utility?

A. Yes, I believe that it is reasonable to rely on a combined proxy group. As noted above, due to consolidation in the water utility industry, there is only a small group of water companies that can be included in the proxy group. In addition, the screening criteria relied on for my proxy group require that a company derive more than 60 percent of their operating income from regulated operations. Therefore, the electric utilities and natural gas distribution companies included in my proxy group generate a large portion of their operating income from regulated operations

[38] Chediak, Mark, et al. "Utility M&A Is So Hot Not Even Berkshire's Billions Won a Bid." Bloomberg.com, Bloomberg, 3 Jan. 2018, www.bloomberg.com/news/articles/2018-01-03/utility-m-a-is-so-hot-not-even-berkshire-s-billions-won-a-bid.

similar to PAWC and the water utilities that will be included in the proxy group. As a result, I believe that it is appropriate to include electric utilities and natural gas distribution companies in my proxy group.

Q. Have other regulators considered the inclusion of other utility industry segments in the proxy group used to estimate the cost of equity for a water utility?

A. Yes. The Massachusetts Department of Public Utilities ("MDPU"), the Florida Public Service Commission ("FPUC") and the Kentucky Public Service Commission ("KYPSC") have considered the results of a proxy group that includes natural gas companies when determining the authorized ROE for water and wastewater utilities. In Docket No. 17-90, the MDPU determined that the use of a natural gas utility proxy group was appropriate for the purpose of demonstrating the comparability of the investment risk of the proxy group to Aquarion Water Company.[39]

In Docket No. 20180006-WS, the FPUC modified the methodology used to estimate the ROE for water and wastewater utilities in Florida to include a combined proxy group of natural gas and water utilities.[40] The FPUC has previously relied on a natural gas only proxy group to estimate the ROE for water

[39] Massachusetts Department of Public Utilities, Docket No. 17-90, Petition of Aquarion Water Company of Massachusetts, Inc., pursuant to G.L. c. 164, § 94, and G.L. c. 165, § 2, for Approval of a General Rate Increase as set forth in M.D.P.U. No. 3., October 31, 2018, p. 286-287.

[40] Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 7.

and wastewater utilities[41]; however, to increase the size of the proxy group, the FPUC decided to rely on a combined proxy group. Specifically, the FPUC noted:

> The leverage formula methodology shall be modified to include a combined proxy group of natural gas and WAW utilities as proxy companies in calculating the leverage formula. We find that the selected natural gas utilities and WAW utilities that derive at least 50 percent of their revenue from regulated rates. These utilities have market power and are influenced significantly by economic regulation. In Attachment 1, the returns calculated using the proxy group are adjusted to reflect the risks faced by Florida WAW utilities. The updated index consists of five natural gas companies and seven WAW companies that derive at least 50 percent of their total revenue from regulated operations. These companies have a median Standard and Poor's bond rating of "A"[42]

In Case No. 2018-00358 for Kentucky-American Water Company ("Kentucky American"), the KYPSC noted that the authorized ROE for Kentucky-American was within the range of DCF and CAPM results produced by Kentucky-American and the Attorney General.[43] To develop the DCF and CAPM models, Kentucky American and the Attorney General relied on two proxy groups: (1) a water only proxy group; and (2) a combined proxy group which included natural gas utilities.[44] Therefore, the KYPSC has also considered, when determining the authorized ROE

[41] Docket No. 170006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-17-0249-PAA-WS, at 2.

[42] Docket No. 20180006-WS, In re. Water and wastewater industry annual reestablishment of authorized range of return on common equity for water and wastewater utilities pursuant to Section 367.081(4)(f),F.S., Order No. PSC-2018-0327-PAA-WS, at 8.

[43] Case No. 2018-00358, In the matter of: Electronic Application of Kentucky-American Water Company for an Adjustment of Rates, Order, June 27, 2019, at 66.

[44] *Id.*, at 55-56.

for a water company, ROE results based on a proxy group that includes both natural gas and water utilities.

VII. COST OF EQUITY ESTIMATION

Q. Please briefly discuss the ROE in the context of the regulated rate of return ("ROR").

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

Q. How is the required ROE determined?

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

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

A. I considered the results of the Constant Growth DCF model, the CAPM, and the ECAPM. As discussed in more detail below, a reasonable ROE estimate appropriately considers alternative methodologies and the reasonableness of their individual and collective results.

A. Importance of Multiple Analytical Approaches

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

A. Because the cost of equity is not directly observable, it must be estimated based on both quantitative and qualitative information. When faced with the task of estimating the cost of equity, analysts and investors are inclined to gather and evaluate as much relevant data as reasonably can be analyzed. Several models have been developed to estimate the cost of equity, and I use multiple approaches to estimate the cost of equity. As a practical matter, however, all of the models available for estimating the cost of equity are subject to limiting assumptions or other methodological constraints. Consequently, many well-regarded finance texts recommend using multiple approaches when estimating the cost of equity. For example, Copeland, Koller, and Murrin[45] suggest using the CAPM and Arbitrage Pricing Theory model.

[45] Tom Copeland, Tim Koller and Jack Murrin, Valuation: Measuring and Managing the Value of Companies, 3rd Ed. (New York: McKinsey & Company, Inc., 2000), at 214.

Q. Is it important given the current market conditions to use more than one analytical approach?

A. Yes. The effect of a low interest rate environment can be seen in the low dividend yields for utilities, which result in DCF cost of equity estimates that are understating the forward-looking cost of equity. The CAPM and ECAPM offer some balance to the sensitivity of the DCF model to low Treasury yields. Low interest rates also affect the CAPM in two ways: (1) the risk-free rate is lower, and (2) because the market risk premium is a function of interest rates, (i.e., it is the return on the broad stock market less the risk-free interest rate), the risk premium should move higher when interest rates are lower. Therefore, it is important to use multiple analytical approaches to moderate the impact that the current low interest rate environment is having on the ROE estimates for the proxy group and, where possible, consider using projected market data in the models to estimate the return for the forward-looking period.

Q. Has the Commission made similar findings regarding the reliance on multiple models?

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

> Sole reliance on one methodology without checking the validity of the results of that methodology with other cost of equity analyses does not always lend itself to responsible ratemaking. We conclude that methodologies other than the DCF can be used as a check upon the reasonableness of the DCF derived equity return calculation.[46]

The Commission ultimately concluded:

> As such, where evidence based on the CAPM and RP methods suggest that the DCF-only results may understate the utility's current cost of equity capital, we will give consideration to those other methods, to some degree, in determining the appropriate range of reasonableness for our equity return determination.[47]

Q. Are you aware of any other regulatory commissions that have recognized the importance of considering the results of multiple models?

A. Yes, several regulatory commissions consider the results of multiple ROE estimation methodologies such as the DCF, CAPM, and ECAPM in determining the authorized ROE, including the Minnesota Public Utilities Commission[48], the Michigan PSC[49], the Iowa Utilities Board ("IUB")[50], the Washington Utilities and Transportation Commission ("Washington UTC")[51] and the New Jersey Board of

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

[47] *Id.*, at 81.

[48] Docket No. G011/GR-17-563, Findings of Fact, Conclusions and Order, at 27; Docket No. E015/GR-16-664, Findings of Fact, Conclusions and Order, at 60-61.

[49] Michigan Public Service Commission Order, DTE Gas Company, Case No. U-18999, September 13, 2018, at 45-47.

[50] IUB, Iowa-American Water Company, RPU-2016-0002, Final Decision and Order issued February 27, 2017, at 35.

[51] *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-130043, Order 05, n. 89 (Dec. 4, 2013); *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-100749, Order 06, ¶ 91 (March 25, 2011).

Public Utilities ("NJBPU")[52]. For example, the Washington UTC has repeatedly emphasized that it "places value on each of the methodologies used to calculate the cost of equity and does not find it appropriate to select a single method as being the most accurate or instructive."[53] The Washington UTC has also explained that "[f]inancial circumstances are constantly shifting and changing, and we welcome a robust and diverse record of evidence based on a variety of analytics and cost of capital methodologies."[54]

Additionally, in its recent order for DTE Gas Company ("DTE Gas") in Case No. U-18999, the Michigan PSC considered the results of each of the models presented by the ROE witnesses, which included the DCF, CAPM, and ECAPM in the determination of the authorized ROE.[55] The Commission also considered authorized ROEs in other states, increased volatility in capital markets and the company-specific business risks of DTE Gas.

Q. What are your conclusions about the results of the DCF and CAPM models?

A. Recent market data that is used as the basis for the assumptions for both models have been affected by market conditions. As a result, relying exclusively on historical assumptions in these models, without considering whether these

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[52] NJBPU Docket No. ER12111052, OAL Docket No. PUC16310-12, Order Adopting Initial Decision with Modifications and Clarifications, March 18, 2015, at 71.

[53] *Wash. Utils. & Transp. Comm'n v. PacifiCorp*, Docket UE-130043, Order 05, n. 89 (Dec. 4, 2013).

[54] Wash. Utils. & Transp. Comm'n v. PacifiCorp, Docket UE-100749, Order 06, ¶ 91 (March 25, 2011).

[55] Michigan Public Service Commission Order, DTE Gas Company, Case No. U-18999, September 13, 2018, at 45-47.

assumptions are consistent with investors' future expectations, will underestimate the cost of equity that investors would require over the period that the rates in this case are to be in effect. In this instance, relying on the historically low dividend yields that are not expected to continue over the period that the new rates will be in effect will underestimate the ROE for PAWC.

Furthermore, as discussed in Section V above, long-term interest rates have increased since August 2020 and this trend is expected to continue as the Federal Reserve normalizes monetary policy in response to increased inflation. Therefore, the use of current averages of Treasury bond yields as the estimate of the risk-free rate in the CAPM is not appropriate since recent market conditions are not expected to continue over the long-term. Instead, analysts should rely on projected yields of Treasury Bonds in the CAPM. The projected Treasury Bond yields results in CAPM estimates that are more reflective of the market conditions that investors expect during the period that the Company's rates will be in effect.

B. Constant Growth DCF Model

Q. Please describe the DCF approach.

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

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

Where P_0 represents the current stock price, D1…D∞ are all expected future dividends, and k is the discount rate, or required ROE. Equation [1] is a standard present value calculation that can be simplified and rearranged into the following form:

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

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

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

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

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

A. The dividend yield in my Constant Growth DCF model is based on the proxy companies' current annual dividend and average closing stock prices over the 30-, 90-, and 180-trading days as of March 31, 2022.

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

A. In my Constant Growth DCF model, I use an average of recent trading days to calculate the price term (P_0) in the DCF model to ensure that the ROE is not skewed by anomalous events that may affect stock prices on any given trading day. The averaging period should also be reasonably representative of expected capital market conditions over the long-term. However, by necessity, analysts rely on historical prices which, have been volatile. Under these circumstances, where current market conditions cannot be expected to continue throughout the rate period, it is important to recognize that current average prices in the Constant Growth DCF model are not consistent with forward-looking market expectations. Therefore, the results of my Constant Growth DCF model using historical data may underestimate the forward-looking cost of equity. As a result, I place more weight on the median to median-high results produced by my Constant Growth DCF model.

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

A. Yes. Since utility companies tend to increase their quarterly dividends at different times throughout the year, it is reasonable to assume that dividend increases will be evenly distributed over calendar quarters. Given that assumption, it is reasonable to apply one-half of the expected annual dividend growth rate for purposes of calculating the expected dividend yield component of the DCF model. This adjustment ensures that the expected first year dividend yield is, on average,

representative of the coming twelve-month period, and does not overstate the aggregated dividends to be paid during that time.

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

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

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

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

Q. How did you calculate the expected dividend yield?

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

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

A. I calculated the low DCF result using the minimum growth rate (i.e., the lowest of the Thomson First Call, Zacks, and Value Line earnings growth rates) for each of the proxy group companies. Thus, the low result reflects the minimum DCF result for the proxy group. I used a similar approach to calculate the high results, using the highest growth rate for each proxy group company. The mean results were calculated using the average growth rates from all sources.

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

A. Figure 10 (see also Schedule-3 of Exhibit No. 13-A) presents the range of results produced by my proxy group. As shown in Figure 10, for the proxy group, the median and mean DCF results range from 9.32 percent to 9.64 percent, and the median high and mean high results are in the range of 9.84 percent to 10.96 percent. While I also summarize the median low and mean low DCF results, given the expected underperformance of utility stocks that I explained above and thus the likelihood that the DCF model is understating the cost of equity, I do not believe it is appropriate to consider the low DCF results at this time.

Figure 10: Summary of Constant Growth DCF Results

Constant Growth DCF – Mean			
	Mean Low	Mean	Mean High
30-Day Average	7.77%	9.32%	10.85%
90-Day Average	7.83%	9.38%	10.91%
180-Day Average	7.88%	9.43%	10.96%
Constant Growth DCF – Median			
	Median Low	Median	Median High
30-Day Average	7.92%	9.37%	9.84%
90-Day Average	8.12%	9.64%	10.05%
180-Day Average	8.27%	9.64%	10.05%

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

A. As discussed previously, one primary assumption of the DCF model is a constant P/E ratio. That assumption is heavily influenced by the market price of utility stocks. As discussed in Section V of my Direct Testimony, utility stocks are expected to underperform the broader market over the near-term as interest rates increase in response to inflationary pressures. Therefore, it is important to consider the results of the DCF models with caution because the DCF tends to understate the cost of equity in rising interest rate and higher inflationary environments, which currently exist. Therefore, while I have given weight to the results of the Constant Growth DCF model, my recommendation also gives weight to the results of other ROE estimation models.

C. CAPM Analysis

Q. Please briefly describe the Capital Asset Pricing Model ("CAPM").

A. The CAPM is a risk premium approach that estimates the cost of equity for a given

security as a function of a risk-free return plus a risk premium to compensate investors for the non-diversifiable or "systematic" risk of that security. Systematic risk is the risk inherent in the entire market or market segment. This form of risk cannot be diversified away using a portfolio of assets. Non-systematic risk is the risk of a specific company that can be mitigated through portfolio diversification.

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

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

Where:

K_e = the required market ROE;

β = Beta coefficient of an individual security;

r_f = the risk-free ROR; and

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

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

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

The variance of the market return (i.e., Variance (rm)) is a measure of the uncertainty of the general market. The covariance between the return on a specific security and the general market (i.e., Covariance (re, rm)) reflects the extent to

which the return on that security will respond to a given change in the general market return. Thus, Beta represents the risk of the security relative to the general market.

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

A. I relied on three sources for my estimate of the risk-free rate: (1) the current 30-day average yield on 30-year U.S. Treasury bonds (i.e., 2.37 percent);[56] (2) the projected 30-year U.S. Treasury bond yield for Q3 2022 through Q3 2023 (i.e., 3.12 percent);[57] and (3) the projected 30-year U.S. Treasury bond yield for 2023 through 2027 (i.e., 3.40 percent).[58]

Q. Would you place more weight on one of these scenarios?

A. Yes. Based on current market conditions, I place more weight on the results of the projected yields on the 30-year Treasury bonds. As discussed previously, the estimation of the cost of equity in this case should be forward-looking because it is the return that investors would receive over the future rate period. Therefore, the inputs and assumptions used in the CAPM analysis should reflect the expectations of the market at that time. While I have included the results of a CAPM analysis that relies on the current average risk-free rate, this analysis fails to take into consideration the effect of the market's expectations for interest rate increases on the cost of equity.

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[56] Bloomberg Professional, as of Mach 31, 2021.
[57] Blue Chip Financial Forecasts, Vol. 41, No. 4, April 1, 2022, at 2.
[58] Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14.

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

A. As shown in Schedule-4 of Exhibit No. 13-A, I used the Beta coefficients for the proxy group companies as reported by Bloomberg and Value Line. The Beta coefficients reported by Bloomberg were calculated using ten years of weekly returns relative to the S&P 500 Index. Value Line's calculation is based on five years of weekly returns relative to the New York Stock Exchange Composite Index.

Additionally, as shown in Schedule-4 of Exhibit No. 13-A, I also considered an additional CAPM analysis which relies on the long-term average utility Beta coefficient for the companies in my proxy group. The long-term average utility Beta coefficient was calculated as an average of the Value Line Beta coefficients for the companies in my proxy group from 2016 through 2021.

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

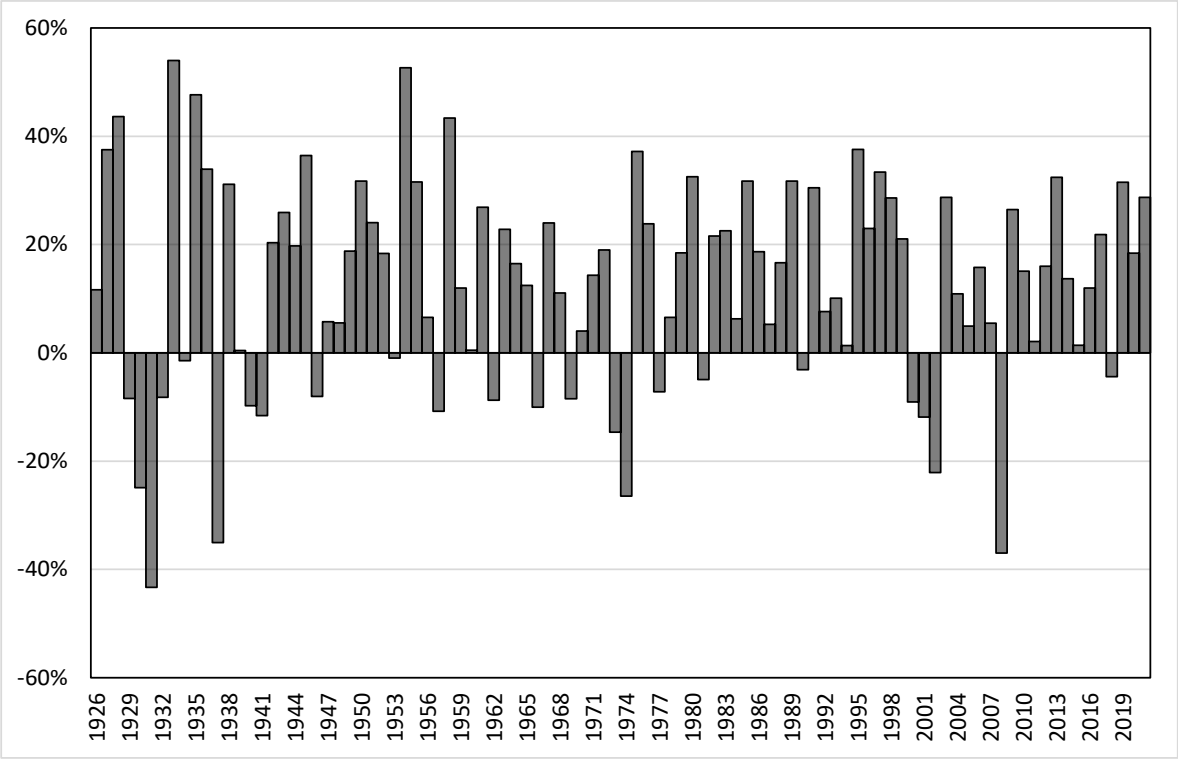
A. I estimated the Market Risk Premium as the difference between the implied expected equity market return and the risk-free rate. As shown in Schedule-5 of Exhibit No. 13-A, the expected return on the S&P 500 Index is calculated using the Constant Growth DCF model discussed earlier in my testimony for the companies in the S&P 500 Index. The estimated required market return for the S&P 500 Index is 13.94 percent.

Q. How does the current expected market return of 13.94 percent compare to observed historical market returns?

A. Given the range of annual equity returns that have been observed over the past 96 years (shown in Figure 11 below), a current expected return of 13.94 percent

is reasonable. In 49 of the past 96 years (i.e., in approximately half of all observations), the realized total equity return was at least 13.94 percent or greater.

Figure 11: Realized U.S. equity market returns (1926-2021)[59]



Q. Did you consider another form of the CAPM in your analysis?

A. Yes. I have also considered the results of an Empirical CAPM ("ECAPM" or alternatively referred to as the Zero-Beta CAPM)[60] in estimating the cost of equity for PAWC. The ECAPM calculates the product of the adjusted Beta coefficient and the market risk premium and applies a weight of 75.00 percent to that result.

[59] Depicts total annual returns on large company stocks, as reported in the 2022 Duff & Phelps SBBI Yearbook.

[60] *See e.g.*, Roger A. Morin, New Regulatory Finance, Public Utilities Reports, Inc., 2006, at 189.

The model then applies a 25.00 percent weight to the market risk premium, without any effect from the Beta coefficient. The results of the two calculations are summed, along with the risk-free rate, to produce the ECAPM result, as noted in Equation [5] below:

$$k_e = r_f + 0.75\beta(r_m - r_f) + 0.25(r_m - r_f) \quad [5]$$

Where:

k_e = the required market ROE
β = Adjusted Beta coefficient of an individual security
r_f = the risk-free rate of return
r_m = the required return on the market as a whole

In essence, the Empirical form of the CAPM addresses the tendency of the "traditional" CAPM to underestimate the cost of equity for companies with low Beta coefficients such as regulated utilities. In that regard, the ECAPM is not redundant to the use of adjusted Betas; rather, it recognizes the results of academic research indicating that the risk-return relationship is different (in essence, flatter) than estimated by the CAPM, and that the CAPM underestimates the "alpha," or the constant return term.[61]

As with the CAPM, my application of the ECAPM uses the forward-looking market risk premium estimates, the three yields on 30-year Treasury securities noted earlier as the risk-free rate, and the Bloomberg, Value Line and long-term average Beta coefficients.

[61] *Id.*, at 191.

Q. What are the results of your CAPM analyses?

A. As shown in Figure 12 (see also Schedule-4 of Exhibit No. 13-A), my traditional CAPM analysis produces a range of returns from 10.80 percent to 12.03 percent. The ECAPM analysis results range from 11.59 percent to 12.51 percent.

Figure 12: Forward-Looking CAPM Results

	Current Risk-Free Rate (2.37%)	Q3 2022 – Q3 2023 Projected Risk-Free Rate (3.12%)	2023-2027 Projected Risk-Free Rate (3.40%)
CAPM			
Bloomberg Beta	11.85%	11.98%	12.03%
Value Line Beta	11.35%	11.52%	11.58%
Long-term Avg. Beta	10.80%	11.00%	11.08%
ECAPM			
Bloomberg Beta	12.37%	12.47%	12.51%
Value Line Beta	12.00%	12.12%	12.17%
Long-term Avg. Beta	11.59%	11.74%	11.79%

Q. What are your conclusions as to the ROE derived from the DCF, CAPM and ECAPM analyses?

A. Based the results from these methodologies and the qualitative analyses presented in my Direct Testimony, a reasonable range of ROE results for PAWC is from 9.90 percent to 11.25 percent. I am specifically recommending, however, that the Commission set the Company's rate of return on common equity at 10.80 percent. The recommended return of 10.80 percent considers current and prospective capital market conditions, PAWC's company-specific risks relative to the proxy group and the Company's superior performance and service quality.

I discuss PAWC's company-specific risks and superior management performance below.

VIII. BUSINESS RISKS AND MANAGEMENT PERFORMANCE

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

A. No. These results provide only a range of the appropriate estimate of PAWC's cost of equity. Several additional factors must be considered when determining where the Company's cost of equity falls within the range of results. These factors, discussed below, should be considered with respect to their overall effect on PAWC's risk profile relative to the proxy group.

Q. What additional factors must be considered for PAWC?

A. There are at least two risk factors: the Company's substantial capital expenditure program and, related, its anticipated investments to ensure its water and wastewater systems comply with state and federal water standards. These factors, discussed below, should be considered with respect to their overall effect on PAWC's risk profile relative to the proxy group. Additionally, consistent with Section 523 of the Pennsylvania Code and the Commission's Policy Statement on Small Nonviable Water and Wastewater Systems at 52 Pa. Code § 69.711, the Company's superior management should also be considered in the determination of the ROE.

Q. How did you account for these additional factors in your assessment?

A. Although there are several positive aspects of Pennsylvania regulation that render PAWC somewhat less risky than the proxy group as a whole, the Company is not without unique risks as compared to the proxy group that suggest that the ROE should be within the range established by the average to the high end of the range of returns estimated for the proxy group companies. Furthermore, the Company's excellent management performance supports an ROE towards the high end of the range of returns estimated for the proxy group companies.

A. Risks Associated with Capital Expenditure Program

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

A. PAWC projects that the Company will spend approximately $2.66 billion on capital investments for the period from 2022-2026, including significant investment to replace aging infrastructure necessary to meet the needs of its customers and to comply with various regulations.

From a credit perspective, the additional pressure on cash flows associated with high levels of capital expenditures exerts corresponding pressure on credit metrics and, therefore, credit ratings. An S&P report explains:

> [T]here is little doubt that the U.S. electric industry needs to make record capital expenditures to comply with the proposed carbon pollution rules over the next several years, while maintaining safety standards and grid stability. We believe the higher capital spending and subsequent rise in debt levels could strain these companies' financial measures, resulting in an almost consistent negative discretionary cash flow throughout this higher construction period. To meet the higher capital spending requirements, companies will require ongoing and steady access to the capital markets, necessitating that the industry maintains its high credit quality. We expect that utilities will continue to effectively manage their regulatory risk by using various creative means to recover their costs and to finance their necessary higher spending.[62]

While this S&P report refers to electric utilities, the same applies to water utilities.

In an August 2016 report, S&P explains the importance of regulatory support for large capital projects:

> When applicable, a jurisdiction's willingness to support large capital projects with cash during construction is an important aspect of our analysis. This is especially true when the project represents a major addition to rate base and entails long lead times and technological risks that make it susceptible to construction delays. Broad support for all capital spending is the most credit-sustaining. Support for only specific types of capital spending, such as specific environmental projects or system integrity plans, is less so, but still favorable for creditors. Allowance of a cash return on construction work-in-progress or similar ratemaking methods historically were extraordinary measures for use in unusual circumstances, but when construction costs are rising, cash flow support could be crucial to maintain credit quality through the spending program. Even more favorable are those jurisdictions that present an opportunity for a higher return on capital projects as an incentive to investors.[63]

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

[63] S&P Global Ratings, "Assessing U.S. Investor-Owned Utility Regulatory Environments," August 10, 2016, at 7.

Q. Does PAWC have a capital tracking mechanism to recover some of the costs associated with its capital expenditures plan between rate cases?

A. Yes. PAWC has a Water and Wastewater Distribution System Improvement Charge ("DSIC") which allows PAWC to recover the costs associated with replacing and repairing aging water and wastewater infrastructure. The presence of these clauses is certainly a positive aspect of Pennsylvania regulation but, they have become quite commonplace in utility regulation. In fact, each of the proxy group companies have infrastructure and capital recovery mechanisms that address significant capital expenditure requirements. As shown in Schedule-6 of Exhibit No. 13-A, the companies in the proxy group have infrastructure replacement recovery mechanisms in approximately 82.76 percent of their operating jurisdictions. Consequently, the presence of the DSIC, while a positive regulatory mechanism, does not reduce the Company's risk vis-à-vis that of the proxy group.

Q. Why is it important that PAWC's capital tracking mechanism recover these costs?

A. As noted previously over the next five years, PAWC is proposing to invest $2.66 billion in infrastructure improvements. On an annual basis, PAWC's capital investment program is greater than its allowance for depreciation which results in negative Free Cash Flow. Therefore, the Company will need to seek financing for its capital investments beyond any internally generated cash flow. Similar to the credit rating agencies, discussed previously, investors consider on the stability and

supportiveness of the regulatory environment in the assessment of overall risk of investment. The use of tracking mechanisms for the recovery of capital investments has become a key component of the strategy to address regulatory lag that results from significant investments in supportive regulatory jurisdictions.[64]

Q. Has Pennsylvania been viewed as a supportive regulatory jurisdiction?

A. Yes. S&P conducts a ranking of regulatory jurisdictions, using a scale of 9 steps ranging from a low of Below Average to Above Average, which each ranking having three notches, "3" being the low end of the ranking and "1" being the high end of the ranking. These rankings are assigned from an investor perspective and are intended to indicate the relative regulatory risk associated with the ownership of securities issued by the utilities in the jurisdiction. The evaluation is intended to assess the level and quality of earnings realized by the state utilities as a result of regulatory, legislative and court actions. Pennsylvania has been ranked Above Average 2 since 2019. S&P indicates that this ranking is based on a constructive regulatory climate, relying on forward test years, year, end rate base and reducing regulatory lag.

Q. What is your conclusion regarding the regulatory environment in Pennsylvania as it relates to PAWC's capital investment plan?

A. The Company's capital plan demonstrates a need to access external capital for financing. Therefore, it is important that the constructive regulatory environment

[64] S&P Global Market Intelligence, RRA Regulatory Focus: Adjustment Mechanisms, November 12, 2019, p. 1.

that has been established by the Commission be maintained to ensure that the Company continues to be able to secure capital on favorable terms.

B. Revenue Stabilization Mechanism

Q. Are you aware that the Company is proposing to implement a Revenue Stabilization Mechanism ("RSM")?

A. Yes. As discussed in the Direct Testimony of Company witness Mr. Charles Rea, the Company's current rate design recovers approximately 75 percent of water and wastewater service revenues under volumetric rates whereas approximately 90 percent of the Company's costs are fixed costs, which do not vary with usage. Further, Mr. Rea's analysis demonstrates a trend of declining use per customer that is expected to continue. Therefore, if water usage going forward is less than the levels set in this rate proceeding, the Company's revenues will be less than what is authorized as a result of this case, making it difficult to earn the authorized ROE.

Q. Does the implementation of an RSM affect your recommended ROE?

A. No. The recommended ROE in this proceeding has been estimated using market data for a proxy group of companies. In order to determine the appropriate ROE from within the range of results, it is necessary to consider PAWC's overall risks as compared with the operating companies of the proxy group companies. That evaluation demonstrates whether or not the Company has greater or less risk and informs the decision regarding the estimated investor-required return on equity.

Therefore, it is necessary to review the proposed mechanism as compared with proxy group to determine if the Company's overall risk is greater or less than the proxy group companies.

Q. Have you conducted an analysis of the proxy group companies and whether or not they have implemented recovery mechanisms?

A. Yes. I have reviewed each of the operating companies of the proxy group to determine whether or not they have implemented a mechanism similar to the RSM proposed by PAWC. As shown on Schedule 6 of Exhibit No. 13-A, approximately 59 percent of the proxy group companies have implemented some form of revenue stabilization mechanism.

Q. What are your conclusions regarding the Company's proposed RSM?

A. Since a significant amount of the operating companies of the proxy group companies have implemented some form of RSM, the Company's proposed RSM makes PAWC more like the proxy group. Therefore, comparing PAWC to the proxy group, the Company would be more comparable to the proxy group with the RSM. If the RSM were not authorized, PAWC would have greater risk than the proxy group.

C. Risks Associated with Environmental and Water Quality Regulation

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

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

The testimony of Bruce Aiton at PAWC Statement No. 3 provides a detailed description of the environmental and regulatory risks facing water and wastewater utilities. In addition to the requirement to make significant investments to extend facilities to accommodate applicants for service, there are multiple levels of authorization and regulation that apply to a public water system that wants to add a new source of supply or increase its withdrawals from existing sources. These factors add to the costs and lead-time for obtaining new, or increasing existing, water sources to meet new demands that may arise in portions of the Company's system. These are additional risk factors that can directly affect PAWC's ability to furnish safe, adequate and reliable service, and increase the costs PAWC incurs to provide that service.

There are significant regulations that require the monitoring and treatment of water supplies to ensure the safety of and reliability of drinking water. Further, there is increased research and awareness of contaminants on an ongoing basis that, once identified, require investment to meet more stringent regulatory

standards related to new contaminants. While the Company intends to comply with all state and federal regulatory standards for safe and reliable drinking water, the upstream releases of chemicals that are then found in the Company's water supplies that must be remediated present an ongoing business risk.

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

A. As is the case with regard to drinking water system operations, the operation of wastewater collection and treatment systems face a range of environmental regulatory risks. These risks are discussed in detail in the testimony of Bruce Aiton at PAWC Statement No. 3. Wastewater operations are also regulated at both the federal and state levels pursuant to numerous statutes and regulations. At the federal level, wastewater systems are regulated pursuant to the Clean Water Act and numerous regulations adopted by the Environmental Protection Agency ("EPA") under that law. At the state level, the Pennsylvania Clean Streams Law, Sewage Facilities Act, Solid Waste Management Act, Storage Tank and Spill Prevention Act and other laws administered by the DEP, coupled with the regulations adopted under those statutes, set standards and requirements for virtually every aspect of wastewater system operations. Similar to water regulation meeting regulatory compliance requirements, including evolving permitting requirements, and more stringent limits can be challenging and can result in significant increases in operating costs. Furthermore wastewater systems face

significant regulatory and environmental liability risks enforceable by governmental agencies through penalties and through citizen lawsuits.

Finally, combined sewer systems present further risks, particularly in periods of storms during which times, water flows can exceed the treatment system capacity, resulting in excess untreated water discharging through combined sewer outfalls. These systems can present increased risk, as they often cannot be separated, however the EPA seeks to reduce the number of these systems that operate.

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

A. PAWC has significant risk and uncertainty associated with environmental and water quality regulations, and the recovery of costs to comply with those regulations. It is clear that the financial community recognizes the additional risks to credit quality associated with the capital investment required to meet environmental and water quality regulations. As discussed in Section VI of my testimony, in order to establish a proxy group of sufficient size, the group is composed of water utilities, electric utilities and natural gas utilities. All of these factors, including the issues faced by electric and natural gas utilities in the proxy group, these environmental risk factors, and the magnitude of the capital program that the Company has planned to ensure compliance, support an ROE above the proxy group mean and median.

D. Management Performance and Recognition

Q. Please summarize the Public Utility Code as it pertains to consideration of performance factors in the utility's revenue requirement.

A. Section 523 of the Pennsylvania Public Utility Code states that the Commission consider "the efficiency, effectiveness and adequacy of service of each utility when determining just and reasonable rates under this title". Additionally, the Commission's Policy Statement on Small Nonviable Water and Wastewater Systems at 52 Pa. Code § 69.711 states that the Commission will consider acquisition incentives including "rate of return premiums", "acquisition adjustments", "deferral of acquisition improvement costs" and "plant improvement surcharges" to encourage the acquisition of troubled water and wastewater systems by viable utilities.

Q. What are the specific performance factors that are to be considered by the Commission?

A. As discussed in more detail in the testimony of Company Witness Ms. Ashley Everette, Sections 523 (a) and (b) address the factors considered in evaluating the performance of water and wastewater utilities. These provisions include 1) the efficiency, effectiveness and adequacy of service, 2) management effectiveness and operating efficiency, 3) action or inaction to encourage cost-effective conservation by customers of water, and 4) other relevant evidence that relates to efficiency, effectiveness and adequacy of service.

Q. Please provide an overview of PAWC's programs and initiatives related to management performance.

A. Ms. Everette's testimony provides a detailed description of the programs and initiatives the Company has undertaken to demonstrate the excellent management performance of PAWC and support the Commission's implementation of Section 523 of the Pennsylvania Code and the Commission's Policy Statement. Ms. Everette's testimony provides a complete list of the programs that the Company has implemented for the benefit of its customers that demonstrate exemplary management performance. In particular, Ms. Everette discusses eight areas:

1) PAWC's dedication to assisting its customers during the COVID-19 pandemic;
2) PAWC's industry-leading programs to assist low-income and payment-troubled customers;
3) PAWC's environmental record and commitment to water quality;
4) PAWC's strong safety performance;
5) PAWC's dedication to continuous performance improvement;
6) PAWC's significant infrastructure investments;
7) PAWC's community engagement and consumer education initiatives; and

8) PAWC's efforts to meet the goals and objectives of the Commission and the Department of Environmental Protection through the acquisition of small, troubled, and non-viable water systems to insure safe and reliable service.

Q. How have you considered the management performance of PAWC in your recommendation?

A. As discussed above, a reasonable range of ROE estimates for PAWC is from 9.90 percent to 11.25 percent. I recommend an ROE of 10.80 percent for PAWC, which is at the high end of the reasonable range to reflect the Company's excellent management performance. However, as discussed in Ms. Everette's testimony, if the Commission were to authorize an ROE for PAWC that is less than my recommended ROE, the Commission should add to the authorized ROE a management performance adjustment of no less than 25 basis points.

IX. CAPITAL STRUCTURE AND COST OF DEBT

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

A. Because there is specific debt that has been identified for wastewater services, the capital structures for water and wastewater services were calculated separately. The capital structure for the total company was calculated first, including all debt issuances and all sources of capital. As shown in Schedule-10 of Exhibit No. 13-A, the total company projected permanent capital structure includes 44.79 percent

long-term debt, 0.01 percent preferred stock and 55.20 percent common equity for the fully projected future test year ending December 31, 2023. The total company capital structure includes three issuances that can be specifically assigned to the wastewater services: Pennvest Clarion; Pennvest Scranton; and $47 million of a PEDFA tax-exempt debt issuance for Coatesville. These issuances are shown on Schedule-11 of Exhibit No. 13-A. The capital structure for water service was calculated by removing the wastewater specific debt instruments from the total long-term debt of the company and recalculating the ratios of the remaining capital stock. The permanent ratemaking capital structure for the water service after removing the wastewater specific debt issuances from the total company capital structure was 43.94 percent long-term debt, 0.01 percent preferred stock and 56.05 percent common equity for the fully projected future test year ending December 31, 2023.

Q. How was the wastewater services capital structure calculated?

A. The wastewater specific capital structure was calculated by applying the total company debt ratio to the wastewater rate base, excluding the specific wastewater debt issuances. Preferred stock is also calculated by applying the total company percentage of preferred stock to the rate base less the wastewater specific debt issuances. The equity component of the capital structure is the rate base less long-term debt, wastewater specific debt issuances and preferred stock. As shown in Figure 13 and Schedule-10 of Exhibit No. 13-A, the wastewater specific capital structure includes 47.91 percent long-term debt, 0.01 percent preferred stock and

52.08 percent common equity for fully projected future test year ending December 31, 2023.

Figure 13: Ratemaking Capital Structures for the Fully Projected Future Test Year ending December 31, 2023

Total Company[65]	
Common Equity	55.20%
Preferred Stock	0.01%
Long-Term Debt	44.79%
Water Services[66]	
Common Equity	56.05%
Preferred Stock	0.01%
Long-Term Debt	43.94%
Wastewater Services[67]	
Common Equity	52.08%
Preferred Stock	0.01%
Long-Term Debt	42.26%
WW Specific Debt	5.65%

Q. Why does the ratemaking capital structure exclude short-term debt?

A. The ratemaking capital structure is intended to reflect the permanent financing of rate base assets. PAWC has relied on short-term debt as temporary financing; to finance Construction Work in Progress (CWIP), and the acquisitions of other water systems. As those assets are brought into rate base, the Company secures permanent financing including equity and long-term debt. PAWC has relied on short-term debt to finance a number of acquisitions since the Company's last rate proceeding. The combination of this short-term financing and CWIP equal the

65 *See* Exhibit No. 13-A, Schedule 10.
66 *Ibid.*, at Schedule 10.
67 *Ibid.*, at Schedule 10.

short-term debt balances as of year-end 2021 and 2022. As shown in Schedule 10 of Exhibit No. 13-A, following this rate proceeding, when the acquisitions are included in the Company's rate base, PAWC projects the short-term debt balances to approximate CWIP balances on a going forward basis.

Q. Did you conduct any analysis to determine if the requested equity ratio was reasonable?

A. Yes, I did. I reviewed the Company's proposed capital structure and the capital structures of the utility operating subsidiaries of the proxy companies.

Q. Why is it appropriate to consider the equity ratio for the proxy companies?

A. The determination of the ROE is based on the expected return for a proxy group of companies that are comparable in risk to PAWC. The equity ratio is a measure of the financial risk of the company, and the authorized ROE is the return to compensate investors for that risk. If the Commission is going to rely on the ROE estimates for the proxy companies to establish the authorized ROE for PAWC, it is important that the financial risk of PAWC be similar to the financial risk of the proxy group. This is accomplished when the equity ratio of the subject company (in this case PAWC) is within the range established by the proxy group.

Q. Please discuss your analysis of the capital structures of the proxy group companies.

A. I calculated the mean proportions of common equity, long-term debt and preferred equity for the most recent year for each of the companies in the proxy group at the

operating subsidiary level.[68] My analysis of the capital structures of the proxy group companies is provided in Schedule-7 of Exhibit No. 13-A. As shown in Schedule-7 of Exhibit No. 13-A, the mean common equity ratio for the proxy group at the operating subsidiary level was 55.63 percent, within a range from 47.44 percent to 60.04 percent. PAWC's proposed water services equity ratio is consistent with the mean equity ratio and well within the range of equity ratios established by the proxy group. The wastewater services equity ratio is well below the mean equity ratio for the proxy companies.

Q. Are there other factors to be considered in setting the Company's capital structure?

A. The credit rating agencies' response to the Tax Cuts and Jobs Act of 2017 ("TCJA") must also be considered when determining the equity ratio. All three rating agencies have noted that the TCJA has negative implications for utility cash flows. S&P and Fitch specifically identified increasing the equity ratio as one approach to ensure that utilities have sufficient cash flows following the federal income tax rate reductions and the loss of bonus depreciation. As S&P noted "[r]egulators must also recognize that tax reform is a strain on utility credit quality, and we expect companies to request stronger capital structures and other means to offset some of the negative impact".[69] Furthermore, Moody's downgraded the rating outlook

[68] Long-term debt includes the current portion of long-term debt, assuming that the current portion would be refinanced with debt at maturity.

[69] Standard & Poor's Ratings, "U.S. Tax Reform: For Utilities' Credit Quality, Challenges Abound," January 24, 2018, at 5.

for the entire utilities sector in June 2018 and has continued to downgrade the ratings of utilities based in part on the negative effects of the TCJA on cash flows. S&P continues to maintain a negative outlook for the utility industry in 2022 and noted that since downgrades outpaced upgrades for a second consecutive year in 2021 for the first time ever, the median investor-owned utility credit rating fell to the "BBB" category.[70] Further, S&P expects continued pressure on cash flows over the near-term as utilities continue to increase leverage to fund capital expenditure plans necessary to improve safety and reliability. Finally, S&P also highlighted inflation, higher interest rates and rising commodity prices as additional risks that could further constrain the credit metrics for utilities over the near-term. In regards to inflation S&P noted:

> Inflation recently spiked to its highest level in decades after rising for several consecutive months in 2021. Given the sustained increase to the U.S. consumer price index in 2021, inflation no longer appears to be just transitory and may have financial implications for the investor-owned North American regulated utility industry. Because of the regulatory lag within the industry, inflation, which causes prices to rise, typically leads to a weakening of financial performance. The regulatory lag is the timing difference between when costs are incurred and when regulators allow those costs to be fully recovered from ratepayers.[71]

The credit ratings agencies' continued concerns over the negative effects of the TCJA, inflation, and increased capital expenditures underscores the importance of

[70] S&P Global Ratings, "For The First Time Ever, The Median Investor-Owned Utility Ratings Falls To The 'BBB' Category," January 20, 2022.

[71] *Ibid.*

maintaining adequate cash flow metrics for the industry, as a whole, and PAWC, particularly, in the context of this proceeding.

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

A. Considering the actual capital structures of the proxy group operating companies, I believe that PAWC's proposed common equity ratio for water distribution service of 56.05 percent as of December 31, 2023 is reasonable. The proposed equity ratio is well within the range of equity ratios established by the capital structures of the utility operating subsidiaries of the proxy companies. In addition, based on the cash flow concerns raised by credit rating agencies as a result of the TCJA, inflation and increased capital expenditures, it is reasonable to rely on a higher equity ratio than the Company may have relied on in prior cases. The wastewater services capital structure as of December 31, 2023 has significantly less equity than the average for the proxy companies.

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

A. As shown in Schedule-8 of Exhibit No. 13-A, PAWC is proposing a long-term debt cost for water service of 4.31 percent for the fully projected future test year ending December 31, 2023. The wastewater services debt is projected in two components. The wastewater specific issuances, shown on Schedule-11 of Exhibit No. 13-A, have a projected debt cost of 2.57 for the fully projected future test year ending December 31, 2023. The remainder of the wastewater debt is projected to be financed at the total company rate of 4.31 percent for the fully projected future test year ending December 31, 2023.

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

A. Yes, I do. I have reviewed the underlying calculations supporting the cost of long-term debt for PAWC, and I find them to be methodologically correct. The embedded cost of long-term debt is based on the Company's actual debt issuances for 2021, and includes three new debt issuances in 2022 and 2023. The interest rates on the three proposed debt issuances were based on the projected yield on 30-year Treasury bonds plus the projected spread between the yield on Treasury bonds and the expected yield at issuance, verified in the market by PAWC's Treasury department. I conclude that PAWC's proposed long-term debt costs for the fully projected future test year ending December 31, 2023 are reasonable and should be approved by the Commission.

X. CONCLUSIONS AND RECOMMENDATION

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

A. Figure 14 below provides a summary of my analytical results. Based on the various quantitative analyses discussed in my Direct Testimony and the qualitative analyses presented in my Direct Testimony, a reasonable range of ROE results for PAWC is from 9.90 percent to 11.25 percent. I am recommending that the Commission set the Company's rate of return on common equity at 10.80 percent. A return at the high end of the range of results would recognize the Company's superior performance and service quality, as discussed in the testimony of Ms. Ashley Everette at PAWC Statement No. 1. In addition, the recommended ROE takes into consideration the current conditions in capital markets including

the expectation for rising interest rates, and increase in inflationary pressures, both of which increase the cost of capital. Finally, the recommendation takes into consideration the relative business and financial risk of PAWC as compared to the proxy group. This ROE would enable the company to attract capital at reasonable terms under a variety of economic and financial market conditions, while continuing to provide safe, reliable and affordable water and wastewater service to customers in Pennsylvania.

Figure 14: Summary of Analytical Results

Constant Growth DCF – Mean			
	Mean Low	Mean	Mean High
30-Day Average	7.77%	9.32%	10.85%
90-Day Average	7.83%	9.38%	10.91%
180-Day Average	7.88%	9.43%	10.96%
Constant Growth DCF - Median			
	Median Low	Median	Median High
30-Day Average	7.92%	9.37%	9.84%
90-Day Average	8.12%	9.64%	10.05%
180-Day Average	8.27%	9.64%	10.05%
CAPM			
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Value Line Beta	11.85%	11.98%	12.03%
Bloomberg Beta	11.35%	11.52%	11.58%
Long-term Avg. Beta	10.80%	11.00%	11.08%
ECAPM			
Value Line Beta	12.37%	12.47%	12.51%
Bloomberg Beta	12.00%	12.12%	12.17%
Long-term Avg. Beta	11.59%	11.74%	11.79%

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

A. My conclusion is that PAWC's proposed capital structure for the fully projected future test year ending December 31, 2023, summarized in Figure 15 for both water service and wastewater service, is reasonable compared to the mean and range established by the capital structures for the proxy group companies and taking into consideration the effect of the TCJA, increased capital expenditures and inflation on cash flows and therefore should be adopted.

Figure 15: Rate-Making Capital Structures for the Fully Projected Future Test Year ending December 31, 2023

Total Company[72]	
Common Equity	55.20%
Preferred Stock	0.01%
Long-Term Debt	44.79%
Water Services[73]	
Common Equity	56.05%
Preferred Stock	0.01%
Long-Term Debt	43.94%
Wastewater Services[74]	
Common Equity	52.08%
Preferred Stock	0.01%
Long-Term Debt	42.26%
WW Specific Debt	5.65%

Q. Does this conclude your Direct Testimony?

A. Yes.

[72] *See* Exhibit No. 13-A, Schedule 10.
[73] *Ibid.*, at Schedule 10.
[74] *Ibid.*, at Schedule 10.

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

PENNSYLVANIA PUBLIC UTILITY COMMISSION	:	
v.	:	**DOCKET NOS. R-2022-3031672 (WATER)**
	:	**R-2022-3031673 (WASTEWATER)**
PENNSYLVANIA-AMERICAN WATER COMPANY	:	

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 29, 2022

Ann E. Bulkley

SUMMARY OF ROE ANALYSES RESULTS

Constant Growth DCF - Mean			
	Mean Low	Mean	Mean High
30-Day Average	7.77%	9.32%	10.85%
90-Day Average	7.83%	9.38%	10.91%
180-Day Average	7.88%	9.43%	10.96%
Constant Growth Average	7.83%	9.37%	10.91%
	Median Low	Median	Median High
30-Day Average	7.92%	9.37%	9.84%
90-Day Average	8.12%	9.64%	10.05%
180-Day Average	8.27%	9.64%	10.05%
Constant Growth Average	8.10%	9.55%	9.98%
CAPM			
	Current 30-day Average Treasury Bond Yield	Near-Term Blue Chip Forecast Yield	Long-Term Blue Chip Forecast Yield
Value Line Beta	11.85%	11.98%	12.03%
Bloomberg Beta	11.35%	11.52%	11.58%
Long-term Avg. Beta	10.80%	11.00%	11.08%
ECAPM			
Value Line Beta	12.37%	12.47%	12.51%
Bloomberg Beta	12.00%	12.12%	12.17%
Long-term Avg. Beta	11.59%	11.74%	11.79%

PROXY GROUP SCREENING DATA AND RESULTS - FINAL PROXY GROUP

Company	Ticker	[1] Dividends	[2] S&P Credit Rating Between BBB- and AAA	[3] % Regulated Operating Income > 60%	[4] Announced Merger	[5] Covered by More Than 1 Analyst	[6] Positive Growth Rates from at least two sources (Value Line, Yahoo! First Call, and Zacks)	[7] Electric Companies with < 10% Generation	[8] Electric Companies with Water Operations
American States Water Company	AWR	Yes	A+	83.18%	No	Yes	Yes	n/a	n/a
Atmos Energy Corporation	ATO	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a
California Water Service Group	CWT	Yes	A+	96.28%	No	Yes	Yes	n/a	n/a
Essential Utilities, Inc.	WTRG	Yes	A	101.03%	No	Yes	Yes	n/a	n/a
Eversource Energy	ES	Yes	A-	92.02%	No	Yes	Yes	0.28%	Yes
Middlesex Water Company	MSEX	Yes	A	89.86%	No	Yes	Yes	n/a	n/a
NiSource Inc.	NI	Yes	BBB+	99.51%	No	Yes	Yes	n/a	n/a
New Jersey Resources Corporation	NJR	Yes	A+	67.22%	No	Yes	Yes	n/a	n/a
Northwest Natural Gas Company	NWN	Yes	A+	99.84%	No	Yes	Yes	n/a	n/a
ONE Gas, Inc.	OGS	Yes	BBB+	100.00%	No	Yes	Yes	n/a	n/a
SJW Group	SJW	Yes	A-	98.99%	No	Yes	Yes	n/a	n/a
Spire, Inc.	SR	Yes	A-	91.43%	No	Yes	Yes	n/a	n/a
York Water Company	YORW	Yes	A-	100.00%	No	Yes	Yes	n/a	n/a

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional
[3] Source: Form 10-K's for 2021, 2020, and 2019
[4] Source: S&P Capital IQ Pro Financial News Releases
[5] Source: Yahoo! Finance and Zacks
[6] Source: Yahoo! Finance, Value Line Investment Survey, and Zacks
[7] Source: S&P Capital IQ Pro
[8] Source: S&P Capital IQ Pro

30-DAY CONSTANT GROWTH DCF -- PAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$86.04	1.70%	1.75%	6.50%	4.90%	n/a	5.70%	6.64%	7.45%	8.25%
Atmos Energy Corporation	ATO	$2.72	$113.03	2.41%	2.50%	7.50%	7.30%	7.30%	7.37%	9.79%	9.86%	10.00%
California Water Service Group	CWT	$1.00	$58.01	1.72%	1.81%	8.50%	11.70%	n/a	10.10%	10.30%	11.91%	13.52%
Essential Utilities, Inc.	WTRG	$1.07	$47.81	2.24%	2.33%	10.00%	6.40%	6.10%	7.50%	8.41%	9.83%	12.36%
Eversource Energy	ES	$2.55	$84.05	3.03%	3.13%	5.50%	6.70%	6.20%	6.13%	8.62%	9.26%	9.84%
Middlesex Water Company	MSEX	$1.16	$101.40	1.14%	1.17%	5.00%	2.70%	n/a	3.85%	3.86%	5.02%	6.17%
New Jersey Resources Corporation	NJR	$1.45	$43.78	3.31%	3.40%	4.50%	6.00%	6.00%	5.50%	7.89%	8.90%	9.41%
NiSource Inc.	NI	$0.94	$29.84	3.15%	3.26%	10.50%	3.52%	7.20%	7.07%	6.73%	10.34%	13.82%
Northwest Natural Gas Company	NWN	$1.93	$52.60	3.67%	3.77%	6.00%	5.70%	5.10%	5.60%	8.86%	9.37%	9.78%
ONE Gas, Inc.	OGS	$2.48	$83.90	2.96%	3.02%	6.00%	2.90%	5.00%	4.63%	5.90%	7.66%	9.04%
SJW Group	SJW	$1.44	$66.75	2.16%	2.27%	15.00%	5.70%	n/a	10.35%	7.92%	12.62%	17.32%
Spire, Inc.	SR	$2.74	$67.67	4.05%	4.20%	9.00%	7.31%	5.30%	7.20%	9.46%	11.40%	13.23%
York Water Company	YORW	$0.78	$44.39	1.76%	1.81%	6.50%	4.90%	n/a	5.70%	6.70%	7.51%	8.31%
Mean				2.56%	2.65%	7.73%	5.83%	6.03%	6.67%	7.77%	9.32%	10.85%
Median				2.41%	2.50%	6.50%	5.70%	6.05%	6.13%	7.92%	9.37%	9.84%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 30-day average as of March 31, 2022
[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] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

90-DAY CONSTANT GROWTH DCF -- PAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$92.08	1.59%	1.63%	6.50%	4.90%	n/a	5.70%	6.52%	7.33%	8.14%
Atmos Energy Corporation	ATO	$2.72	$105.55	2.58%	2.67%	7.50%	7.30%	7.30%	7.37%	9.97%	10.04%	10.17%
California Water Service Group	CWT	$1.00	$62.65	1.60%	1.68%	8.50%	11.70%	n/a	10.10%	10.16%	11.78%	13.39%
Essential Utilities, Inc.	WTRG	$1.07	$48.95	2.19%	2.27%	10.00%	6.40%	6.10%	7.50%	8.36%	9.77%	12.30%
Eversource Energy	ES	$2.55	$86.17	2.96%	3.05%	5.50%	6.70%	6.20%	6.13%	8.54%	9.18%	9.76%
Middlesex Water Company	MSEX	$1.16	$103.60	1.12%	1.14%	5.00%	2.70%	n/a	3.85%	3.83%	4.99%	6.15%
New Jersey Resources Corporation	NJR	$1.45	$41.00	3.54%	3.63%	4.50%	6.00%	6.00%	5.50%	8.12%	9.13%	9.64%
NiSource Inc.	NI	$0.94	$28.13	3.34%	3.46%	10.50%	3.52%	7.20%	7.07%	6.92%	10.53%	14.02%
Northwest Natural Gas Company	NWN	$1.93	$49.06	3.93%	4.04%	6.00%	5.70%	5.10%	5.60%	9.13%	9.64%	10.05%
ONE Gas, Inc.	OGS	$2.48	$77.79	3.19%	3.26%	6.00%	2.90%	5.00%	4.63%	6.13%	7.90%	9.28%
SJW Group	SJW	$1.44	$68.11	2.11%	2.22%	15.00%	5.70%	n/a	10.35%	7.87%	12.57%	17.27%
Spire, Inc.	SR	$2.74	$65.30	4.20%	4.35%	9.00%	7.31%	5.30%	7.20%	9.61%	11.55%	13.39%
York Water Company	YORW	$0.78	$45.72	1.71%	1.75%	6.50%	4.90%	n/a	5.70%	6.65%	7.45%	8.26%
Mean				2.62%	2.71%	7.73%	5.83%	6.03%	6.67%	7.83%	9.38%	10.91%
Median				2.58%	2.67%	6.50%	5.70%	6.05%	6.13%	8.12%	9.64%	10.05%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 90-day average as of March 31, 2022
[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] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

180-DAY CONSTANT GROWTH DCF -- PAWC PROXY GROUP

Company	Ticker	[1] Annualized Dividend	[2] Stock Price	[3] Dividend Yield	[4] Expected Dividend Yield	[5] Value Line Earnings Growth	[6] Yahoo! Finance Earnings Growth	[7] Zacks Earnings Growth	[8] Average Growth Rate	[9] Low ROE	[10] Mean ROE	[11] High ROE
American States Water Company	AWR	$1.46	$90.90	1.61%	1.65%	6.50%	4.90%	n/a	5.70%	6.55%	7.35%	8.16%
Atmos Energy Corporation	ATO	$2.72	$100.24	2.71%	2.81%	7.50%	7.30%	7.30%	7.37%	10.11%	10.18%	10.32%
California Water Service Group	CWT	$1.00	$62.29	1.61%	1.69%	8.50%	11.70%	n/a	10.10%	10.17%	11.79%	13.40%
Essential Utilities, Inc.	WTRG	$1.07	$48.47	2.21%	2.30%	10.00%	6.40%	6.10%	7.50%	8.38%	9.80%	12.32%
Eversource Energy	ES	$2.55	$86.33	2.95%	3.04%	5.50%	6.70%	6.20%	6.13%	8.53%	9.18%	9.75%
Middlesex Water Company	MSEX	$1.16	$104.58	1.11%	1.13%	5.00%	2.70%	n/a	3.85%	3.82%	4.98%	6.14%
New Jersey Resources Corporation	NJR	$1.45	$39.32	3.69%	3.79%	4.50%	6.00%	6.00%	5.50%	8.27%	9.29%	9.80%
NiSource Inc.	NI	$0.94	$26.52	3.55%	3.67%	10.50%	3.52%	7.20%	7.07%	7.13%	10.74%	14.23%
Northwest Natural Gas Company	NWN	$1.93	$49.09	3.93%	4.04%	6.00%	5.70%	5.10%	5.60%	9.13%	9.64%	10.05%
ONE Gas, Inc.	OGS	$2.48	$73.74	3.36%	3.44%	6.00%	2.90%	5.00%	4.63%	6.31%	8.07%	9.46%
SJW Group	SJW	$1.44	$68.31	2.11%	2.22%	15.00%	5.70%	n/a	10.35%	7.87%	12.57%	17.27%
Spire, Inc.	SR	$2.74	$65.64	4.17%	4.32%	9.00%	7.31%	5.30%	7.20%	9.59%	11.53%	13.36%
York Water Company	YORW	$0.78	$46.88	1.66%	1.71%	6.50%	4.90%	n/a	5.70%	6.60%	7.41%	8.22%
Mean				2.67%	2.76%	7.73%	5.83%	6.03%	6.67%	7.88%	9.43%	10.96%
Median				2.71%	2.81%	6.50%	5.70%	6.05%	6.13%	8.27%	9.64%	10.05%

Notes:
[1] Source: Bloomberg Professional
[2] Source: Bloomberg Professional, equals 180-day average as of March 31, 2022.
[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] Equals Average ([5], [6], [7])
[9] Equals [3] x (1 + 0.50 x Minimum ([5], [6], [7]) + Minimum ([5], [6], [7])
[10] Equals [4] + [8]
[11] Equals [3] x (1 + 0.50 x Maximum ([5], [6], [7]) + Maximum ([5], [6], [7])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	2.37%	0.65	13.94%	11.57%	9.89%	10.90%
Atmos Energy Corporation	ATO	2.37%	0.80	13.94%	11.57%	11.63%	12.20%
California Water Service Group	CWT	2.37%	0.70	13.94%	11.57%	10.47%	11.34%
Essential Utilities, Inc.	WTRG	2.37%	0.95	13.94%	11.57%	13.36%	13.50%
Eversource Energy	ES	2.37%	0.90	13.94%	11.57%	12.78%	13.07%
Middlesex Water Company	MSEX	2.37%	0.70	13.94%	11.57%	10.47%	11.34%
NiSource Inc.	NI	2.37%	0.85	13.94%	11.57%	12.20%	12.64%
New Jersey Resources Corporation	NJR	2.37%	1.00	13.94%	11.57%	13.94%	13.94%
Northwest Natural Gas Company	NWN	2.37%	0.80	13.94%	11.57%	11.63%	12.20%
ONE Gas, Inc.	OGS	2.37%	0.80	13.94%	11.57%	11.63%	12.20%
SJW Group	SJW	2.37%	0.80	13.94%	11.57%	11.63%	12.20%
Spire, Inc.	SR	2.37%	0.85	13.94%	11.57%	12.20%	12.64%
York Water Company	YORW	2.37%	0.85	13.94%	11.57%	12.20%	12.64%
Mean						11.85%	12.37%
Median						11.63%	12.20%

Notes:
[1] Source: Bloomberg Professional 30-day average as of March 31, 2022
[2] Source: Value Line reports
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.12%	0.65	13.94%	10.82%	10.15%	11.10%
Atmos Energy Corporation	ATO	3.12%	0.80	13.94%	10.82%	11.77%	12.32%
California Water Service Group	CWT	3.12%	0.70	13.94%	10.82%	10.69%	11.50%
Essential Utilities, Inc.	WTRG	3.12%	0.95	13.94%	10.82%	13.40%	13.53%
Eversource Energy	ES	3.12%	0.90	13.94%	10.82%	12.86%	13.13%
Middlesex Water Company	MSEX	3.12%	0.70	13.94%	10.82%	10.69%	11.50%
NiSource Inc.	NI	3.12%	0.85	13.94%	10.82%	12.32%	12.72%
New Jersey Resources Corporation	NJR	3.12%	1.00	13.94%	10.82%	13.94%	13.94%
Northwest Natural Gas Company	NWN	3.12%	0.80	13.94%	10.82%	11.77%	12.32%
ONE Gas, Inc.	OGS	3.12%	0.80	13.94%	10.82%	11.77%	12.32%
SJW Group	SJW	3.12%	0.80	13.94%	10.82%	11.77%	12.32%
Spire, Inc.	SR	3.12%	0.85	13.94%	10.82%	12.32%	12.72%
York Water Company	YORW	3.12%	0.85	13.94%	10.82%	12.32%	12.72%
Mean						11.98%	12.47%
Median						11.77%	12.32%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 4. April 1, 2022, at 2
[2] Source: Value Line reports
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VL BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2023 - 2027)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.40%	0.65	13.94%	10.54%	10.25%	11.17%
Atmos Energy Corporation	ATO	3.40%	0.80	13.94%	10.54%	11.83%	12.36%
California Water Service Group	CWT	3.40%	0.70	13.94%	10.54%	10.78%	11.57%
Essential Utilities, Inc.	WTRG	3.40%	0.95	13.94%	10.54%	13.41%	13.54%
Eversource Energy	ES	3.40%	0.90	13.94%	10.54%	12.88%	13.15%
Middlesex Water Company	MSEX	3.40%	0.70	13.94%	10.54%	10.78%	11.57%
NiSource Inc.	NI	3.40%	0.85	13.94%	10.54%	12.36%	12.75%
New Jersey Resources Corporation	NJR	3.40%	1.00	13.94%	10.54%	13.94%	13.94%
Northwest Natural Gas Company	NWN	3.40%	0.80	13.94%	10.54%	11.83%	12.36%
ONE Gas, Inc.	OGS	3.40%	0.80	13.94%	10.54%	11.83%	12.36%
SJW Group	SJW	3.40%	0.80	13.94%	10.54%	11.83%	12.36%
Spire, Inc.	SR	3.40%	0.85	13.94%	10.54%	12.36%	12.75%
York Water Company	YORW	3.40%	0.85	13.94%	10.54%	12.36%	12.75%
Mean						12.03%	12.51%
Median						11.83%	12.36%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Value Line reports
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Current 30-day average of 30-year U.S. Treasury bond yield	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	2.37%	0.64	13.94%	11.57%	9.79%	10.83%
Atmos Energy Corporation	ATO	2.37%	0.74	13.94%	11.57%	10.98%	11.72%
California Water Service Group	CWT	2.37%	0.68	13.94%	11.57%	10.22%	11.15%
Essential Utilities, Inc.	WTRG	2.37%	0.85	13.94%	11.57%	12.15%	12.60%
Eversource Energy	ES	2.37%	0.81	13.94%	11.57%	11.75%	12.29%
Middlesex Water Company	MSEX	2.37%	0.78	13.94%	11.57%	11.35%	12.00%
NiSource Inc.	NI	2.37%	0.81	13.94%	11.57%	11.73%	12.29%
New Jersey Resources Corporation	NJR	2.37%	0.82	13.94%	11.57%	11.85%	12.38%
Northwest Natural Gas Company	NWN	2.37%	0.71	13.94%	11.57%	10.63%	11.45%
ONE Gas, Inc.	OGS	2.37%	0.81	13.94%	11.57%	11.77%	12.31%
SJW Group	SJW	2.37%	0.83	13.94%	11.57%	11.92%	12.42%
Spire, Inc.	SR	2.37%	0.76	13.94%	11.57%	11.16%	11.85%
York Water Company	YORW	2.37%	0.85	13.94%	11.57%	12.24%	12.67%
Mean						11.35%	12.00%
Median						11.73%	12.29%

Notes:
[1] Source: Bloomberg Professional 30-day average as of March 31, 2022
[2] Source: Bloomberg Professional
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.12%	0.64	13.94%	10.82%	10.06%	11.03%
Atmos Energy Corporation	ATO	3.12%	0.74	13.94%	10.82%	11.17%	11.86%
California Water Service Group	CWT	3.12%	0.68	13.94%	10.82%	10.46%	11.33%
Essential Utilities, Inc.	WTRG	3.12%	0.85	13.94%	10.82%	12.27%	12.69%
Eversource Energy	ES	3.12%	0.81	13.94%	10.82%	11.89%	12.40%
Middlesex Water Company	MSEX	3.12%	0.78	13.94%	10.82%	11.52%	12.12%
NiSource Inc.	NI	3.12%	0.81	13.94%	10.82%	11.88%	12.39%
New Jersey Resources Corporation	NJR	3.12%	0.82	13.94%	10.82%	11.99%	12.48%
Northwest Natural Gas Company	NWN	3.12%	0.71	13.94%	10.82%	10.84%	11.62%
ONE Gas, Inc.	OGS	3.12%	0.81	13.94%	10.82%	11.91%	12.42%
SJW Group	SJW	3.12%	0.83	13.94%	10.82%	12.05%	12.52%
Spire, Inc.	SR	3.12%	0.76	13.94%	10.82%	11.34%	11.99%
York Water Company	YORW	3.12%	0.85	13.94%	10.82%	12.35%	12.75%
Mean						11.52%	12.12%
Median						11.88%	12.39%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 4. April 1, 2022, at 2
[2] Source: Bloomberg Professional
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & BLOOMBERG BETA

$$K = Rf + \beta\ (Rm - Rf)$$
$$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$$

Company	Ticker	[1] Projected 30-year U.S. Treasury bond yield (2023 - 2027)	[2] Beta (β)	[3] Market Return (Rm)	[4] Market Risk Premium (Rm − Rf)	[5] CAPM ROE	[6] ECAPM ROE
American States Water Company	AWR	3.40%	0.64	13.94%	10.54%	10.16%	11.10%
Atmos Energy Corporation	ATO	3.40%	0.74	13.94%	10.54%	11.24%	11.91%
California Water Service Group	CWT	3.40%	0.68	13.94%	10.54%	10.55%	11.40%
Essential Utilities, Inc.	WTRG	3.40%	0.85	13.94%	10.54%	12.31%	12.72%
Eversource Energy	ES	3.40%	0.81	13.94%	10.54%	11.94%	12.44%
Middlesex Water Company	MSEX	3.40%	0.78	13.94%	10.54%	11.58%	12.17%
NiSource Inc.	NI	3.40%	0.81	13.94%	10.54%	11.93%	12.43%
New Jersey Resources Corporation	NJR	3.40%	0.82	13.94%	10.54%	12.04%	12.51%
Northwest Natural Gas Company	NWN	3.40%	0.71	13.94%	10.54%	10.92%	11.68%
ONE Gas, Inc.	OGS	3.40%	0.81	13.94%	10.54%	11.96%	12.46%
SJW Group	SJW	3.40%	0.83	13.94%	10.54%	12.10%	12.56%
Spire, Inc.	SR	3.40%	0.76	13.94%	10.54%	11.40%	12.04%
York Water Company	YORW	3.40%	0.85	13.94%	10.54%	12.39%	12.78%
Mean						11.58%	12.17%
Median						11.93%	12.43%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Bloomberg Professional
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- CURRENT RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Current 30-day average of 30-year U.S. Treasury bond yield	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
American States Water Company	AWR	2.37%	0.70	13.94%	11.57%	10.47%	11.34%
Atmos Energy Corporation	ATO	2.37%	0.70	13.94%	11.57%	10.47%	11.34%
California Water Service Group	CWT	2.37%	0.72	13.94%	11.57%	10.66%	11.48%
Essential Utilities, Inc.	WTRG	2.37%	0.78	13.94%	11.57%	11.34%	11.99%
Eversource Energy	ES	2.37%	0.72	13.94%	11.57%	10.66%	11.48%
Middlesex Water Company	MSEX	2.37%	0.73	13.94%	11.57%	10.76%	11.55%
NiSource Inc.	NI	2.37%	0.83	13.94%	11.57%	11.91%	12.42%
New Jersey Resources Corporation	NJR	2.37%	0.67	13.94%	11.57%	10.12%	11.08%
Northwest Natural Gas Company	NWN	2.37%	0.69	13.94%	11.57%	10.37%	11.26%
ONE Gas, Inc.	OGS	2.37%	0.72	13.94%	11.57%	10.70%	11.51%
SJW Group	SJW	2.37%	0.72	13.94%	11.57%	10.66%	11.48%
Spire, Inc.	SR	2.37%	0.73	13.94%	11.57%	10.85%	11.63%
York Water Company	YORW	2.37%	0.78	13.94%	11.57%	11.43%	12.06%
Mean						10.80%	11.59%
Median						10.66%	11.48%

Notes:
[1] Source: Bloomberg Professional 30-day average as of March 31, 2022
[2] Source: Schedule 4 p. 4
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- NEAR-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Near-term projected 30-year U.S. Treasury bond yield (Q3 2022 - Q3 2023)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
American States Water Company	AWR	3.12%	0.70	13.94%	10.82%	10.69%	11.50%
Atmos Energy Corporation	ATO	3.12%	0.70	13.94%	10.82%	10.69%	11.50%
California Water Service Group	CWT	3.12%	0.72	13.94%	10.82%	10.87%	11.64%
Essential Utilities, Inc.	WTRG	3.12%	0.78	13.94%	10.82%	11.50%	12.11%
Eversource Energy	ES	3.12%	0.72	13.94%	10.82%	10.87%	11.64%
Middlesex Water Company	MSEX	3.12%	0.73	13.94%	10.82%	10.96%	11.71%
NiSource Inc.	NI	3.12%	0.83	13.94%	10.82%	12.05%	12.52%
New Jersey Resources Corporation	NJR	3.12%	0.67	13.94%	10.82%	10.37%	11.26%
Northwest Natural Gas Company	NWN	3.12%	0.69	13.94%	10.82%	10.60%	11.44%
ONE Gas, Inc.	OGS	3.12%	0.72	13.94%	10.82%	10.91%	11.67%
SJW Group	SJW	3.12%	0.72	13.94%	10.82%	10.87%	11.64%
Spire, Inc.	SR	3.12%	0.73	13.94%	10.82%	11.05%	11.77%
York Water Company	YORW	3.12%	0.78	13.94%	10.82%	11.59%	12.18%
Mean						11.00%	11.74%
Median						10.87%	11.64%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 41, No. 4. April 1, 2022, at 2
[2] Source: Schedule 4 p. 4
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

CAPITAL ASSET PRICING MODEL -- LONG-TERM PROJECTED RISK-FREE RATE & VALUE LINE LT AVERAGE BETA

$K = Rf + \beta (Rm - Rf)$
$K = Rf + 0.25 \times (Rm - Rf) + 0.75 \times \beta \times (Rm - Rf)$

		[1]	[2]	[3]	[4]	[5]	[6]
Company	Ticker	Projected 30-year U.S. Treasury bond yield (2023 - 2027)	Beta (β)	Market Return (Rm)	Market Risk Premium (Rm − Rf)	CAPM ROE	ECAPM ROE
American States Water Company	AWR	3.40%	0.70	13.94%	10.54%	10.78%	11.57%
Atmos Energy Corporation	ATO	3.40%	0.70	13.94%	10.54%	10.78%	11.57%
California Water Service Group	CWT	3.40%	0.72	13.94%	10.54%	10.95%	11.70%
Essential Utilities, Inc.	WTRG	3.40%	0.78	13.94%	10.54%	11.57%	12.16%
Eversource Energy	ES	3.40%	0.72	13.94%	10.54%	10.95%	11.70%
Middlesex Water Company	MSEX	3.40%	0.73	13.94%	10.54%	11.04%	11.76%
NiSource Inc.	NI	3.40%	0.83	13.94%	10.54%	12.09%	12.56%
New Jersey Resources Corporation	NJR	3.40%	0.67	13.94%	10.54%	10.46%	11.33%
Northwest Natural Gas Company	NWN	3.40%	0.69	13.94%	10.54%	10.69%	11.50%
ONE Gas, Inc.	OGS	3.40%	0.72	13.94%	10.54%	10.99%	11.73%
SJW Group	SJW	3.40%	0.72	13.94%	10.54%	10.95%	11.70%
Spire, Inc.	SR	3.40%	0.73	13.94%	10.54%	11.13%	11.83%
York Water Company	YORW	3.40%	0.78	13.94%	10.54%	11.65%	12.23%
Mean						11.08%	11.79%
Median						10.95%	11.70%

Notes:
[1] Source: Blue Chip Financial Forecasts, Vol. 40, No. 12, December 1, 2021, at 14
[2] Source: Schedule 4 p. 4
[3] Source: Schedule 5
[4] Equals [3] - [1]
[5] Equals [1] + [2] x [4]
[6] Equals [1] + 0.25 x ([4]) + 0.75 x ([2] x [4])

HISTORICAL BETA - 2016 - 2020

Company	Ticker	[1] 12/31/2016	[2] 12/31/2017	[3] 12/31/2018	[4] 12/31/2019	[5] 12/31/2020	[6] 12/31/2021	[7] Average
American States Water Company	AWR	0.70	0.80	0.75	0.65	0.65	0.65	0.70
Atmos Energy Corporation	ATO	0.70	0.70	0.60	0.60	0.80	0.80	0.70
California Water Service Group	CWT	0.75	0.80	0.75	0.70	0.65	0.65	0.72
Essential Utilities, Inc.	WTRG	0.70	0.70	0.70	0.65	0.90	1.00	0.78
Eversource Energy	ES	0.70	0.65	0.60	0.55	0.90	0.90	0.72
Middlesex Water Company	MSEX	0.70	0.80	0.75	0.70	0.70	0.70	0.73
New Jersey Resources Corporation	NJR	NMF	0.60	0.50	0.55	0.85	0.85	0.67
NiSource Inc.	NI	0.80	0.80	0.70	0.70	0.95	1.00	0.83
Northwest Natural Gas Company	NWN	0.60	0.70	0.60	0.60	0.80	0.85	0.69
ONE Gas, Inc.	OGS	N/A	0.70	0.65	0.65	0.80	0.80	0.72
SJW Group	SJW	0.70	0.75	0.65	0.60	0.80	0.80	0.72
Spire, Inc.	SR	0.70	0.70	0.65	0.65	0.85	0.85	0.73
York Water Company	YORW	0.70	0.80	0.80	0.75	0.80	0.85	0.78
Mean		0.70	0.73	0.67	0.64	0.80	0.82	0.73

Notes:
[1] Value Line, dated October 16, 2016, November 18, 2016 and December 2, 2016.
[2] Value Line, dated October 13, 2017, November 17, 2017 and December 1, 2017.
[3] Value Line, dated October 12, 2018, November 16, 2018 and November 30, 2018.
[4] Value Line, dated October 11, 2019, November 15, 2019 and November 29, 2019.
[5] Value Line, dated October 9, 2020, November 13, 2020 and November 27, 2020.
[6] Value Line, dated October 21, 2021, November 12, 2021 and November 26, 2021.
[7] Average ([1] - [6])

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

[1] Estimated Weighted Average Dividend Yield	1.38%	[1]	1.61%
[2] Estimated Weighted Average Long-Term Growth Rate	13.72%	[2]	10.99%
[3] S&P 500 Estimated Required Market Return	15.20%	[3]	12.68%

Average Market Return [17] 13.94%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[12] Weight in Index	[13] Estimated Dividend Yield	[14] Cap-Weighted Dividend Yield	[15] Value Line Long-Term Growth Est.	[16] Cap-Weighted Long-Term Growth Est.
Agilent Technologies Inc	A	300.11	132.33	39,713.95	0.10%	0.63%	0.00%	11.50%	0.01%	0.14%	0.63%	0.00%	11.50%	0.02%
American Airlines Group Inc	AAL	649.16	18.25	11,847.17	0.03%									
Advance Auto Parts Inc	AAP	61.10	206.96	12,644.84	0.03%	2.90%	0.00%	11.00%	0.00%	0.04%	2.90%	0.00%	11.00%	0.00%
Apple Inc	AAPL	16,319.44	174.61	2,849,537.59	7.14%	0.50%	0.04%	14.00%	1.00%	9.70%	0.50%	0.05%	14.00%	1.36%
AbbVie Inc	ABBV	1,766.29	162.11	286,332.46	0.72%	3.48%	0.02%	4.50%	0.03%	0.97%	3.48%	0.03%	4.50%	0.04%
AmerisourceBergen Corp	ABC	209.14	154.71	32,355.59	0.08%	1.19%	0.00%	6.50%	0.01%	0.11%	1.19%	0.00%	6.50%	0.01%
ABIOMED Inc	ABMD	45.52	331.24	15,076.72	0.04%			7.50%	0.00%	0.05%			7.50%	0.00%
Abbott Laboratories	ABT	1,763.48	118.36	208,725.73	0.52%	1.59%	0.01%	10.00%	0.05%	0.71%	1.59%	0.01%	10.00%	0.07%
Accenture PLC	ACN	662.43	337.23	223,392.62	0.56%	1.15%	0.01%	12.00%	0.07%	0.76%	1.15%	0.01%	12.00%	0.09%
Adobe Inc	ADBE	472.50	455.62	215,280.45	0.54%			15.50%	0.08%	0.73%			15.50%	0.11%
Analog Devices Inc	ADI	523.32	165.18	86,441.17	0.22%	1.84%	0.00%	11.00%	0.02%	0.29%	1.84%	0.01%	11.00%	0.03%
Archer-Daniels-Midland Co	ADM	562.48	90.26	50,769.17	0.13%	1.77%	0.00%	12.50%	0.02%	0.17%	1.77%	0.00%	12.50%	0.02%
Automatic Data Processing Inc	ADP	420.05	227.54	95,577.04	0.24%	1.83%	0.00%	9.00%	0.02%	0.33%	1.83%	0.01%	9.00%	0.03%
Autodesk Inc	ADSK	217.31	214.35	46,579.97	0.12%			18.00%	0.02%	0.16%			18.00%	0.03%
Ameren Corp	AEE	258.09	93.76	24,198.71	0.06%	2.52%	0.00%	6.50%	0.00%	0.08%	2.52%	0.00%	6.50%	0.01%
American Electric Power Co Inc	AEP	504.55	99.77	50,338.65	0.13%	3.13%	0.00%	6.50%	0.01%	0.17%	3.13%	0.01%	6.50%	0.01%
AES Corp/The	AES	667.40	25.73	17,172.07	0.04%	2.46%	0.00%	14.00%	0.01%	0.06%	2.46%	0.00%	14.00%	0.01%
Aflac Inc	AFL	649.37	64.39	41,812.81	0.10%	2.48%	0.00%	9.00%	0.01%	0.14%	2.48%	0.00%	9.00%	0.01%
American International Group Inc	AIG	806.25	62.77	50,608.19	0.13%	2.04%	0.00%	31.50%	0.04%		2.04%		31.50%	
Assurant Inc	AIZ	57.71	181.83	10,493.05	0.03%	1.50%	0.00%	15.50%	0.00%	0.04%	1.50%	0.00%	15.50%	0.01%
Arthur J Gallagher & Co	AJG	209.61	174.60	36,598.60	0.09%	1.17%	0.00%	14.50%	0.01%	0.12%	1.17%	0.00%	14.50%	0.02%
Akamai Technologies Inc	AKAM	160.90	119.39	19,209.73	0.05%			9.50%	0.00%	0.07%			9.50%	0.01%
Albemarle Corp	ALB	117.11	221.15	25,899.32	0.06%	0.71%	0.00%	6.50%	0.00%	0.09%	0.71%	0.00%	6.50%	0.01%
Align Technology Inc	ALGN	78.80	436.00	34,354.62	0.09%			17.00%	0.01%	0.12%			17.00%	0.02%
Alaska Air Group Inc	ALK	126.09	58.01	7,314.31	0.02%									
Allstate Corp/The	ALL	278.35	138.51	38,553.70	0.10%	2.45%	0.00%	5.00%	0.00%	0.13%	2.45%	0.00%	5.00%	0.01%
Allegion plc	ALLE	88.23	109.78	9,685.89	0.02%	1.49%	0.00%	10.50%	0.00%	0.03%	1.49%	0.00%	10.50%	0.00%
Applied Materials Inc	AMAT	883.40	131.80	116,431.46	0.29%	0.79%	0.00%	14.50%	0.04%	0.40%	0.79%	0.00%	14.50%	0.06%
Amcor PLC	AMCR	1,513.73	11.33	17,150.53	0.04%	4.24%	0.00%	15.00%	0.01%	0.06%	4.24%	0.00%	15.00%	0.01%
Advanced Micro Devices Inc	AMD	1,627.37	109.34	177,936.09	0.45%			17.50%	0.08%	0.61%			17.50%	0.11%
AMETEK Inc	AME	231.17	133.18	30,787.35	0.08%	0.66%	0.00%	9.00%	0.01%	0.10%	0.66%	0.00%	9.00%	0.01%
Amgen Inc	AMGN	557.03	241.82	134,700.75	0.34%	3.21%	0.01%	5.50%	0.02%	0.46%	3.21%	0.01%	5.50%	0.03%
Ameriprise Financial Inc	AMP	110.58	300.36	33,212.91	0.08%	1.50%	0.00%	13.50%	0.01%	0.11%	1.50%	0.00%	13.50%	0.02%
American Tower Corp	AMT	455.89	251.22	114,527.43	0.29%	2.23%	0.01%	9.00%	0.03%	0.39%	2.23%	0.01%	9.00%	0.04%
Amazon.com Inc	AMZN	508.84	3,259.95	1,658,806.00	4.16%			26.50%	1.10%				26.50%	
Arista Networks Inc	ANET	307.77	138.98	42,773.46	0.11%			4.50%	0.00%	0.15%			4.50%	0.01%
ANSYS Inc	ANSS	87.03	317.65	27,643.81	0.07%			8.50%	0.01%	0.09%			8.50%	0.01%
Anthem Inc	ANTM	241.30	491.22	118,533.35	0.30%	1.04%	0.00%	12.50%	0.04%	0.40%	1.04%	0.00%	12.50%	0.05%
Aon PLC	AON	213.94	325.63	69,666.58	0.17%	0.63%	0.00%	7.00%	0.01%	0.24%	0.63%	0.00%	7.00%	0.02%
A O Smith Corp	AOS	131.05	63.89	8,372.72	0.02%	1.75%	0.00%	10.00%	0.00%	0.03%	1.75%	0.00%	10.00%	0.00%
APA Corp	APA	346.78	41.33	14,332.25	0.04%	1.21%	0.00%				1.21%			
Air Products and Chemicals Inc	APD	221.72	249.91	55,409.30	0.14%	2.59%	0.00%	12.00%	0.02%	0.19%	2.59%	0.00%	12.00%	0.02%
Amphenol Corp	APH	598.94	75.35	45,130.13	0.11%	1.06%	0.00%	12.00%	0.01%	0.15%	1.06%	0.00%	12.00%	0.02%
Aptiv PLC	APTV	270.92	119.71	32,431.23	0.08%			21.50%	0.02%				21.50%	
Alexandria Real Estate Equities Inc	ARE	159.94	201.25	32,188.53	0.08%	2.29%	0.00%	9.00%	0.01%	0.11%	2.29%	0.00%	9.00%	0.01%
Atmos Energy Corp	ATO	135.43	119.49	16,182.77	0.04%	2.28%	0.00%	7.50%	0.00%	0.06%	2.28%	0.00%	7.50%	0.00%
Activision Blizzard Inc	ATVI	780.92	80.11	62,559.74	0.16%	0.59%	0.00%	15.00%	0.02%	0.21%	0.59%	0.00%	15.00%	0.03%
AvalonBay Communities Inc	AVB	139.75	248.37	34,710.20	0.09%	2.56%	0.00%	6.50%	0.01%	0.12%	2.56%	0.00%	6.50%	0.01%
Broadcom Inc	AVGO	408.28	629.68	257,086.38	0.64%	2.60%	0.02%	23.00%	0.15%		2.60%		23.00%	
Avery Dennison Corp	AVY	82.36	173.97	14,327.30	0.04%	1.56%	0.00%	9.00%	0.00%	0.05%	1.56%	0.00%	9.00%	0.00%
American Water Works Co Inc	AWK	181.75	165.53	30,085.57	0.08%	1.46%	0.00%	8.50%	0.01%	0.10%	1.46%	0.00%	8.50%	0.01%
American Express Co	AXP	757.29	187.00	141,613.04	0.35%	1.11%	0.00%	12.00%	0.04%	0.48%	1.11%	0.01%	12.00%	0.06%
AutoZone Inc	AZO	19.85	2,044.58	40,582.87	0.10%			16.50%	0.02%	0.14%			16.50%	0.02%
Boeing Co/The	BA	590.39	191.50	113,058.73	0.28%									
Bank of America Corp	BAC	8,064.86	41.22	332,433.32	0.83%	2.04%	0.02%	7.50%	0.06%	1.13%	2.04%	0.02%	7.50%	0.08%
Baxter International Inc	BAX	503.20	77.54	39,017.90	0.10%	1.44%	0.00%	9.50%	0.01%	0.13%	1.44%	0.00%	9.50%	0.01%
Bath & Body Works Inc	BBWI	238.91	47.80	11,419.90	0.03%	1.67%	0.00%	26.00%	0.01%		1.67%		26.00%	
Best Buy Co Inc	BBY	225.23	90.90	20,473.23	0.05%	3.87%	0.00%	8.50%	0.00%	0.07%	3.87%	0.00%	8.50%	0.01%
Becton Dickinson and Co	BDX	284.77	259.33	73,850.80	0.19%	1.34%	0.00%	6.00%	0.01%	0.25%	1.34%	0.00%	6.00%	0.02%
Franklin Resources Inc	BEN	502.12	27.92	14,019.30	0.04%	4.15%	0.00%	11.00%	0.00%	0.05%	4.15%	0.00%	11.00%	0.01%
Brown-Forman Corp	BF/B	309.80	67.02	20,762.46	0.05%	1.13%	0.00%	13.00%	0.01%	0.07%	1.13%	0.00%	13.00%	0.01%
Biogen Inc	BIIB	146.96	210.60	30,950.41	0.08%			-10.50%	-0.01%				-10.50%	
Bio-Rad Laboratories Inc	BIO	24.86	563.23	14,003.59	0.04%			9.50%	0.00%	0.05%			9.50%	0.00%
Bank of New York Mellon Corp/The	BK	807.11	49.63	40,056.67	0.10%	2.74%	0.00%	5.00%	0.01%	0.14%	2.74%	0.00%	5.00%	0.01%
Booking Holdings Inc	BKNG	40.89	2,348.45	96,023.42	0.24%			14.00%	0.03%	0.33%			14.00%	0.05%
Baker Hughes Co	BKR	953.34	36.41	34,711.15	0.09%	1.98%	0.00%				1.98%			
BlackRock Inc	BLK	152.04	764.17	116,185.94	0.29%	2.55%	0.01%	11.00%	0.03%	0.40%	2.55%	0.01%	11.00%	0.04%
Ball Corp	BLL	321.21	90.00	28,909.08	0.07%	0.89%	0.00%	21.00%	0.02%		0.89%		21.00%	
Bristol-Myers Squibb Co	BMY	2,125.20	73.03	155,203.58	0.39%	2.96%	0.01%				2.96%			
Broadridge Financial Solutions Inc	BR	116.77	155.71	18,182.72	0.05%	1.64%	0.00%	9.00%	0.00%	0.06%	1.64%	0.00%	9.00%	0.01%
Berkshire Hathaway Inc	BRK/B	1,287.63	352.91	454,418.91	1.14%			6.00%	0.07%	1.55%			6.00%	0.09%
Brown & Brown Inc	BRO	282.22	72.27	20,395.75	0.05%	0.57%	0.00%	10.50%	0.01%	0.07%	0.57%	0.00%	10.50%	0.01%
Boston Scientific Corp	BSX	1,429.45	44.29	63,310.21	0.16%			16.00%	0.03%	0.22%			16.00%	0.03%
BorgWarner Inc	BWA	239.97	38.90	9,334.95	0.02%	1.75%	0.00%	9.50%	0.00%	0.03%	1.75%	0.00%	9.50%	0.00%
Boston Properties Inc	BXP	156.68	128.80	20,179.87	0.05%	3.04%	0.00%	-1.50%	0.00%		3.04%		-1.50%	
Citigroup Inc	C	1,972.47	53.40	105,330.11	0.26%	3.82%	0.01%	7.00%	0.02%	0.36%	3.82%	0.01%	7.00%	0.03%
Conagra Brands Inc	CAG	479.70	33.57	16,103.46	0.04%	3.72%	0.00%	4.50%	0.00%	0.05%	3.72%	0.00%	4.50%	0.00%
Cardinal Health Inc	CAH	277.06	56.70	15,709.36	0.04%	3.46%	0.00%	5.00%	0.00%	0.05%	3.46%	0.00%	5.00%	0.00%
Carrier Global Corp	CARR	853.01	45.87	39,127.43	0.10%	1.31%	0.00%				1.31%			
Caterpillar Inc	CAT	535.89	222.82	119,406.56	0.30%	1.99%	0.01%	8.00%	0.02%	0.41%	1.99%	0.01%	8.00%	0.03%
Chubb Ltd	CB	426.23	213.90	91,170.38	0.23%	1.50%	0.00%	12.50%	0.03%	0.31%	1.50%	0.00%	12.50%	0.04%
Cboe Global Markets Inc	CBOE	106.60	114.42	12,197.40	0.03%	1.68%	0.00%	12.00%	0.00%	0.04%	1.68%	0.00%	12.00%	0.00%
CBRE Group Inc	CBRE	332.32	91.52	30,414.20	0.08%			10.00%	0.01%	0.10%			10.00%	0.01%
Crown Castle International Corp	CCI	433.03	184.60	79,937.34	0.20%	3.19%	0.01%	12.00%	0.02%	0.27%	3.19%	0.01%	12.00%	0.03%
Carnival Corp	CCL	989.70	20.22	20,011.75	0.05%									
Ceridian HCM Holding Inc	CDAY	150.11	68.36	10,261.45	0.03%									
Cadence Design Systems Inc	CDNS	278.38	164.46	45,781.72	0.11%			12.00%	0.01%	0.16%			12.00%	0.02%
CDW Corp/DE	CDW	134.94	178.89	24,140.13	0.06%	1.12%	0.00%	11.00%	0.01%	0.08%	1.12%	0.00%	11.00%	0.01%
Celanese Corp	CE	108.03	142.87	15,434.10	0.04%	1.90%	0.00%	6.50%	0.00%	0.05%	1.90%	0.00%	6.50%	0.00%
Constellation Energy Corp	CEG	326.66	56.25	18,374.85	0.05%	1.00%	0.00%				1.00%			
Cerner Corp	CERN	293.85	93.56	27,492.23	0.07%	1.15%	0.00%	9.50%	0.01%	0.09%	1.15%	0.00%	9.50%	0.01%
CF Industries Holdings Inc	CF	209.11	103.06	21,551.29	0.05%	1.16%	0.00%	19.50%	0.01%	0.07%	1.16%	0.00%	19.50%	0.01%
Citizens Financial Group Inc	CFG	422.14	45.33	19,135.74	0.05%	3.44%	0.00%	8.50%	0.00%	0.07%	3.44%	0.00%	8.50%	0.01%
Church & Dwight Co Inc	CHD	242.70	99.38	24,119.13	0.06%	1.06%	0.00%	8.00%	0.00%	0.08%	1.06%	0.00%	8.00%	0.01%
CH Robinson Worldwide Inc	CHRW	128.64	107.71	13,855.81	0.03%	2.04%	0.00%	9.00%	0.00%	0.05%	2.04%	0.00%	9.00%	0.00%
Charter Communications Inc	CHTR	191.49	545.52	104,463.26	0.26%			21.50%	0.06%				21.50%	
Cigna Corp	CI	320.95	239.61	76,903.55	0.19%	1.87%	0.00%	10.00%	0.02%	0.26%	1.87%	0.00%	10.00%	0.03%
Cincinnati Financial Corp	CINF	160.44	135.96	21,813.29	0.05%	2.03%	0.00%	15.00%	0.01%	0.07%	2.03%	0.00%	15.00%	0.01%
Colgate-Palmolive Co	CL	840.59	75.83	63,742.17	0.16%	2.48%	0.00%	5.00%	0.01%	0.22%	2.48%	0.01%	5.00%	0.01%
Clorox Co/The	CLX	123.06	139.03	17,108.75	0.04%	3.34%	0.00%	5.00%	0.00%	0.06%	3.34%	0.00%	5.00%	0.00%
Comerica Inc	CMA	131.09	90.43	11,854.38	0.03%	3.01%	0.00%	6.00%	0.00%	0.04%	3.01%	0.00%	6.00%	0.00%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[12] Weight in Index	[13] Estimated Dividend Yield	[14] Cap-Weighted Dividend Yield	[15] Value Line Long-Term Growth Est.	[16] Cap-Weighted Long-Term Growth Est.
Comcast Corp	CMCSA	4,523.79	46.82	211,803.66	0.53%	2.31%	0.01%	10.50%	0.06%	0.72%	2.31%	0.02%	10.50%	0.08%
CME Group Inc	CME	359.42	237.86	85,491.40	0.21%	1.68%	0.00%	8.50%	0.02%	0.29%	1.68%	0.00%	8.50%	0.02%
Chipotle Mexican Grill Inc	CMG	28.03	1,582.03	44,347.46	0.11%			20.00%	0.02%	0.15%			20.00%	0.03%
Cummins Inc	CMI	142.08	205.11	29,141.00	0.07%	2.83%	0.00%	8.00%	0.01%	0.10%	2.83%	0.00%	8.00%	0.01%
CMS Energy Corp	CMS	290.14	69.94	20,292.18	0.05%	2.63%	0.00%	6.50%	0.00%	0.07%	2.63%	0.00%	6.50%	0.00%
Centene Corp	CNC	582.88	84.19	49,072.25	0.12%			10.00%	0.01%	0.17%			10.00%	0.02%
CenterPoint Energy Inc	CNP	629.43	30.64	19,285.80	0.05%	2.22%	0.00%	5.00%	0.00%	0.07%	2.22%	0.00%	5.00%	0.00%
Capital One Financial Corp	COF	405.67	131.29	53,260.41	0.13%	1.83%	0.00%				1.83%			
Cooper Cos Inc/The	COO	49.30	417.59	20,588.02	0.05%	0.01%	0.00%	19.00%	0.01%	0.07%	0.01%	0.00%	19.00%	0.01%
ConocoPhillips	COP	1,296.05	100.00	129,605.10	0.32%	1.84%	0.01%	16.50%	0.05%	0.44%	1.84%	0.01%	16.50%	0.07%
Costco Wholesale Corp	COST	443.22	575.85	255,230.54	0.64%	0.55%	0.00%	10.50%	0.07%	0.87%	0.55%	0.00%	10.50%	0.09%
Campbell Soup Co	CPB	301.70	44.57	13,446.95	0.03%	3.32%	0.00%	5.50%	0.00%	0.05%	3.32%	0.00%	5.50%	0.00%
Copart Inc	CPRT	237.50	125.47	29,798.75	0.07%			12.00%	0.01%	0.10%			12.00%	0.01%
Charles River Laboratories International Inc	CRL	50.80	283.97	14,425.39	0.04%			6.50%	0.00%	0.05%			6.50%	0.00%
salesforce.com Inc	CRM	990.00	212.32	210,196.80	0.53%			20.00%	0.11%	0.72%			20.00%	0.14%
Cisco Systems Inc	CSCO	4,154.17	55.76	231,636.41	0.58%	2.73%	0.02%	8.00%	0.05%	0.79%	2.73%	0.02%	8.00%	0.06%
CSX Corp	CSX	2,178.58	37.45	81,587.82	0.20%	1.07%	0.00%	10.00%	0.02%	0.28%	1.07%	0.00%	10.00%	0.03%
Cintas Corp	CTAS	102.42	425.39	43,566.74	0.11%	0.89%	0.00%	13.50%	0.01%	0.15%	0.89%	0.00%	13.50%	0.02%
Catalent Inc	CTLT	179.13	110.90	19,865.30	0.05%			21.00%	0.01%				21.00%	
Coterra Energy Inc	CTRA	810.98	26.97	21,872.10	0.05%	8.31%	0.00%				8.31%			
Cognizant Technology Solutions Corp	CTSH	524.54	89.67	47,035.05	0.12%	1.20%	0.00%	7.00%	0.01%	0.16%	1.20%	0.00%	7.00%	0.01%
Corteva Inc	CTVA	726.77	57.48	41,774.97	0.10%	0.97%	0.00%				0.97%			
Citrix Systems Inc	CTXS	125.91	100.90	12,704.62	0.03%			8.00%	0.00%	0.04%			8.00%	0.00%
CVS Health Corp	CVS	1,312.51	101.21	132,839.14	0.33%	2.17%	0.01%	6.00%	0.02%	0.45%	2.17%	0.01%	6.00%	0.03%
Chevron Corp	CVX	1,947.55	162.83	317,120.05	0.79%	3.49%	0.03%	25.00%	0.20%		3.49%		25.00%	
Caesars Entertainment Inc	CZR	214.12	77.36	16,564.56	0.04%									
Dominion Energy Inc	D	810.67	84.97	68,882.97	0.17%	3.14%	0.01%	11.50%	0.02%	0.23%	3.14%	0.01%	11.50%	0.03%
Delta Air Lines Inc	DAL	639.93	39.57	25,322.03	0.06%			49.00%	0.03%				49.00%	
DuPont de Nemours Inc	DD	512.91	73.58	37,739.70	0.09%	1.79%	0.00%				1.79%			
Deere & Co	DE	306.78	415.46	127,456.48	0.32%	1.01%	0.00%	21.50%	0.07%		1.01%		21.50%	
Discover Financial Services	DFS	282.03	110.19	31,076.67	0.08%	1.82%	0.00%	16.00%	0.01%	0.11%	1.82%	0.00%	16.00%	0.02%
Dollar General Corp	DG	228.87	222.63	50,952.88	0.13%	0.99%	0.00%	10.50%	0.01%	0.17%	0.99%	0.00%	10.50%	0.02%
Quest Diagnostics Inc	DGX	119.46	136.86	16,348.61	0.04%	1.93%	0.00%	7.50%	0.00%	0.06%	1.93%	0.00%	7.50%	0.00%
DR Horton Inc	DHI	354.36	74.51	26,403.21	0.07%	1.21%	0.00%	11.00%	0.01%	0.09%	1.21%	0.00%	11.00%	0.01%
Danaher Corp	DHR	715.90	293.33	209,993.48	0.53%	0.34%	0.00%	21.00%	0.11%		0.34%		21.00%	
Walt Disney Co/The	DIS	1,820.63	137.16	249,718.02	0.63%			37.50%	0.23%				37.50%	
Discovery Inc	DISCA	171.54	24.92	4,274.85	0.01%			13.50%	0.00%	0.01%			13.50%	0.00%
Discovery Inc	DISCK	330.15	24.97	8,243.95	0.02%									
DISH Network Corp	DISH	290.57	31.65	9,196.60	0.02%			2.00%	0.00%	0.03%			2.00%	0.00%
Digital Realty Trust Inc	DLR	284.47	141.80	40,337.70	0.10%	3.44%	0.00%	-3.50%	0.00%		3.44%		-3.50%	
Dollar Tree Inc	DLTR	225.11	160.15	36,051.37	0.09%			10.00%	0.01%	0.12%			10.00%	0.01%
Dover Corp	DOV	144.11	156.90	22,610.23	0.06%	1.27%	0.00%	9.00%	0.01%	0.08%	1.27%	0.00%	9.00%	0.01%
Dow Inc	DOW	735.09	63.72	46,839.68	0.12%	4.39%	0.01%				4.39%			
Domino's Pizza Inc	DPZ	36.03	407.01	14,665.79	0.04%	1.08%	0.00%	16.50%	0.01%	0.05%	1.08%	0.00%	16.50%	0.01%
Duke Realty Corp	DRE	382.77	58.06	22,223.51	0.06%	1.93%	0.00%	2.50%	0.00%	0.08%	1.93%	0.00%	2.50%	0.00%
Darden Restaurants Inc	DRI	127.72	132.95	16,980.91	0.04%	3.31%	0.00%	15.50%	0.01%	0.06%	3.31%	0.00%	15.50%	0.01%
DTE Energy Co	DTE	193.74	132.21	25,614.63	0.06%	2.68%	0.00%	4.50%	0.00%	0.09%	2.68%	0.00%	4.50%	0.00%
Duke Energy Corp	DUK	769.90	111.66	85,966.92	0.22%	3.53%	0.01%	7.00%	0.02%	0.29%	3.53%	0.01%	7.00%	0.02%
DaVita Inc	DVA	96.30	113.11	10,892.49	0.03%			16.00%	0.00%	0.04%			16.00%	0.01%
Devon Energy Corp	DVN	664.20	59.13	39,274.15	0.10%	6.76%	0.01%	29.50%	0.03%		6.76%		29.50%	
DXC Technology Co	DXC	244.48	32.63	7,977.32	0.02%			6.00%	0.00%	0.03%			6.00%	0.00%
Dexcom Inc	DXCM	97.39	511.60	49,824.72	0.12%			34.00%	0.04%				34.00%	
Electronic Arts Inc	EA	281.22	126.51	35,577.40	0.09%	0.54%	0.00%	10.50%	0.01%	0.12%	0.54%	0.00%	10.50%	0.01%
eBay Inc	EBAY	587.53	57.26	33,641.91	0.08%	1.54%	0.00%	16.50%	0.01%	0.11%	1.54%	0.00%	16.50%	0.02%
Ecolab Inc	ECL	286.30	176.56	50,548.42	0.13%	1.16%	0.00%	8.00%	0.01%	0.17%	1.16%	0.00%	8.00%	0.01%
Consolidated Edison Inc	ED	354.09	94.68	33,525.24	0.08%	3.34%	0.00%	3.50%	0.00%	0.11%	3.34%	0.00%	3.50%	0.00%
Equifax Inc	EFX	122.91	237.10	29,141.72	0.07%	0.66%	0.00%	10.50%	0.01%	0.10%	0.66%	0.00%	10.50%	0.01%
Edison International	EIX	380.80	70.10	26,693.80	0.07%	3.99%	0.00%				3.99%			
Estee Lauder Cos Inc/The	EL	232.42	272.32	63,293.70	0.16%	0.88%	0.00%	14.00%	0.02%	0.22%	0.88%	0.00%	14.00%	0.03%
Eastman Chemical Co	EMN	128.95	112.06	14,450.14	0.04%	2.71%	0.00%	8.00%	0.00%	0.05%	2.71%	0.00%	8.00%	0.00%
Emerson Electric Co	EMR	594.00	98.05	58,241.70	0.15%	2.10%	0.00%	11.50%	0.02%	0.20%	2.10%	0.00%	11.50%	0.02%
Enphase Energy Inc	ENPH	133.94	201.78	27,025.61	0.07%			30.00%	0.02%				30.00%	
EOG Resources Inc	EOG	585.39	119.23	69,795.93	0.17%	2.52%	0.00%	16.00%	0.03%	0.24%	2.52%	0.01%	16.00%	0.04%
EPAM Systems Inc	EPAM	56.88	296.61	16,870.88	0.04%			23.50%	0.01%				23.50%	
Equinix Inc	EQIX	90.72	741.62	67,280.51	0.17%	1.67%	0.00%	15.00%	0.03%	0.23%	1.67%	0.00%	15.00%	0.03%
Equity Residential	EQR	375.92	89.92	33,802.46	0.08%	2.78%	0.00%	-2.00%	0.00%		2.78%		-2.00%	
Eversource Energy	ES	344.75	88.19	30,403.15	0.08%	2.89%	0.00%	5.50%	0.00%	0.10%	2.89%	0.00%	5.50%	0.01%
Essex Property Trust Inc	ESS	65.28	345.48	22,552.59	0.06%	2.55%	0.00%	-2.50%	0.00%		2.55%		-2.50%	
Eaton Corp PLC	ETN	399.57	151.76	60,638.74	0.15%	2.13%	0.00%	11.50%	0.02%	0.21%	2.13%	0.00%	11.50%	0.02%
Entergy Corp	ETR	203.52	116.75	23,760.38	0.06%	3.46%	0.00%	3.00%	0.00%	0.08%	3.46%	0.00%	3.00%	0.00%
Etsy Inc	ETSY	127.03	124.28	15,787.66	0.04%			29.00%	0.01%				29.00%	
Evergy Inc	EVRG	226.99	68.34	15,512.70	0.04%	3.35%	0.00%	7.50%	0.00%	0.05%	3.35%	0.00%	7.50%	0.00%
Edwards Lifesciences Corp	EW	621.32	117.72	73,141.44	0.18%			12.50%	0.02%	0.25%			12.50%	0.03%
Exelon Corp	EXC	980.14	47.63	46,683.93	0.12%	2.83%	0.00%				2.83%			
Expeditors International of Washington Inc	EXPD	167.40	103.16	17,268.78	0.04%	1.12%	0.00%	11.50%	0.00%	0.06%	1.12%	0.00%	11.50%	0.01%
Expedia Group Inc	EXPE	150.23	195.67	29,395.70	0.07%									
Extra Space Storage Inc	EXR	134.15	205.60	27,581.86	0.07%	2.92%	0.00%	6.00%	0.00%	0.09%	2.92%	0.00%	6.00%	0.01%
Ford Motor Co	F	3,947.97	16.91	66,760.11	0.17%	2.37%	0.00%	29.00%	0.05%		2.37%		29.00%	
Diamondback Energy Inc	FANG	177.42	137.08	24,320.05	0.06%	1.75%	0.00%				1.75%			
Fastenal Co	FAST	575.55	59.40	34,187.91	0.09%	2.09%	0.00%	8.50%	0.01%	0.12%	2.09%	0.00%	8.50%	0.01%
Meta Platforms Inc	FB	2,309.08	222.36	513,447.03	1.29%			21.50%	0.28%				21.50%	
Fortune Brands Home & Security Inc	FBHS	132.35	74.28	9,830.74	0.02%	1.51%	0.00%	11.00%	0.00%	0.03%	1.51%	0.00%	11.00%	0.00%
Freeport-McMoRan Inc	FCX	1,454.78	49.74	72,360.81	0.18%	1.21%	0.00%	27.00%	0.05%		1.21%		27.00%	
FactSet Research Systems Inc	FDS	37.80	434.15	16,409.57	0.04%	0.76%	0.00%	9.50%	0.00%	0.06%	0.76%	0.00%	9.50%	0.01%
FedEx Corp	FDX	259.18	231.39	59,971.20	0.15%	1.30%	0.00%	13.00%	0.02%	0.20%	1.30%	0.00%	13.00%	0.03%
FirstEnergy Corp	FE	570.90	45.86	26,181.61	0.07%	3.40%	0.00%	10.00%	0.01%	0.09%	3.40%	0.00%	10.00%	0.01%
F5 Inc	FFIV	60.74	208.95	12,691.21	0.03%			7.00%	0.00%	0.04%			7.00%	0.00%
Fidelity National Information Services Inc	FIS	609.59	100.42	61,215.13	0.15%	1.87%	0.00%	28.00%	0.04%		1.87%		28.00%	
Fiserv Inc	FISV	652.20	101.40	66,132.78	0.17%			13.00%	0.02%	0.23%			13.00%	0.03%
Fifth Third Bancorp	FITB	683.67	43.04	29,425.20	0.07%	2.79%	0.00%	11.50%	0.01%	0.10%	2.79%	0.00%	11.50%	0.01%
FleetCor Technologies Inc	FLT	77.89	249.06	19,398.54	0.05%			11.00%	0.01%	0.07%			11.00%	0.01%
FMC Corp	FMC	125.89	131.57	16,563.74	0.04%	1.61%	0.00%	10.50%	0.00%	0.06%	1.61%	0.00%	10.50%	0.01%
Fox Corp	FOX	247.10	36.28	8,964.64	0.02%	1.32%	0.00%				1.32%			
Fox Corp	FOXA	315.81	39.45	12,458.55	0.03%	1.22%	0.00%	10.50%	0.00%	0.04%	1.22%	0.00%	10.50%	0.00%
First Republic Bank/CA	FRC	179.06	162.10	29,025.63	0.07%	0.54%	0.00%	13.50%	0.01%	0.10%	0.54%	0.00%	13.50%	0.01%
Federal Realty Investment Trust	FRT	78.69	122.07	9,605.44	0.02%	3.51%	0.00%	2.50%	0.00%	0.03%	3.51%	0.00%	2.50%	0.00%
Fortinet Inc	FTNT	160.82	341.74	54,956.92	0.14%			24.00%	0.03%				24.00%	
Fortive Corp	FTV	359.07	60.93	21,877.89	0.05%	0.46%	0.00%	12.00%	0.01%	0.07%	0.46%	0.00%	12.00%	0.01%
General Dynamics Corp	GD	278.14	241.18	67,080.84	0.17%	2.09%	0.00%	6.00%	0.01%	0.23%	2.09%	0.00%	6.00%	0.01%
General Electric Co	GE	1,101.75	91.50	100,810.22	0.25%	0.35%	0.00%	15.00%	0.04%	0.34%	0.35%	0.00%	15.00%	0.05%
Gilead Sciences Inc	GILD	1,253.89	59.45	74,543.58	0.19%	4.91%	0.01%	13.50%	0.03%	0.25%	4.91%	0.01%	13.50%	0.03%
General Mills Inc	GIS	602.21	67.72	40,781.80	0.10%	3.01%	0.00%	3.50%	0.00%	0.14%	3.01%	0.00%	3.50%	0.00%
Globe Life Inc	GL	99.18	100.60	9,977.31	0.03%	0.83%	0.00%	8.00%	0.00%	0.03%	0.83%	0.00%	8.00%	0.00%
Corning Inc	GLW	845.65	36.91	31,212.79	0.08%	2.93%	0.00%	20.00%	0.02%	0.11%	2.93%	0.00%	20.00%	0.02%
General Motors Co	GM	1,453.02	43.74	63,555.14	0.16%			12.00%	0.02%	0.22%			12.00%	0.03%
Generac Holdings Inc	GNRC	63.78	297.26	18,960.43	0.05%			23.50%	0.01%				23.50%	
Alphabet Inc	GOOG	315.64	2,792.99	881,576.57	2.21%			23.50%	0.52%				23.50%	
Alphabet Inc	GOOGL	300.76	2,781.35	836,504.92	2.10%									
Genuine Parts Co	GPC	141.95	126.02	17,888.16	0.04%	2.84%	0.00%	8.50%	0.00%	0.06%	2.84%	0.00%	8.50%	0.01%
Global Payments Inc	GPN	281.97	136.84	38,584.50	0.10%	0.73%	0.00%	16.50%	0.02%	0.13%	0.73%	0.00%	16.50%	0.02%
Garmin Ltd	GRMN	192.79	118.61	22,866.47	0.06%	2.46%	0.00%	10.00%	0.01%	0.08%	2.46%	0.00%	10.00%	0.01%
Goldman Sachs Group Inc/The	GS	341.86	330.10	112,847.66	0.28%	2.42%	0.01%	8.50%	0.02%	0.38%	2.42%	0.01%	8.50%	0.03%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[12] Weight in Index	[13] Estimated Dividend Yield	[14] Cap-Weighted Dividend Yield	[15] Value Line Long-Term Growth Est.	[16] Cap-Weighted Long-Term Growth Est.
WW Grainger Inc	GWW	51.10	515.79	26,357.90	0.07%	1.26%	0.00%	7.00%	0.00%	0.09%	1.26%	0.00%	7.00%	0.01%
Halliburton Co	HAL	898.57	37.87	34,028.92	0.09%	1.27%	0.00%	9.50%	0.01%	0.12%	1.27%	0.00%	9.50%	0.01%
Hasbro Inc	HAS	138.96	81.92	11,383.60	0.03%	3.42%	0.00%	11.50%	0.00%	0.04%	3.42%	0.00%	11.50%	0.00%
Huntington Bancshares Inc/OH	HBAN	1,444.83	14.62	21,123.37	0.05%	4.24%	0.00%	12.00%	0.01%	0.07%	4.24%	0.00%	12.00%	0.01%
HCA Healthcare Inc	HCA	302.02	250.62	75,691.75	0.19%	0.89%	0.00%	12.50%	0.02%	0.26%	0.89%	0.00%	12.50%	0.03%
Home Depot Inc/The	HD	1,033.35	299.33	309,312.66	0.78%	2.54%	0.02%	10.00%	0.08%	1.05%	2.54%	0.03%	10.00%	0.11%
Hess Corp	HES	309.75	107.04	33,155.21	0.08%	1.40%	0.00%				1.40%			
Hartford Financial Services Group Inc/The	HIG	331.65	71.81	23,815.57	0.06%	2.14%	0.00%	6.50%	0.00%	0.08%	2.14%	0.00%	6.50%	0.01%
Huntington Ingalls Industries Inc	HII	40.07	199.44	7,990.96	0.02%	2.37%	0.00%	10.00%	0.00%	0.03%	2.37%	0.00%	10.00%	0.00%
Hilton Worldwide Holdings Inc	HLT	279.14	151.74	42,356.55	0.11%									
Hologic Inc	HOLX	251.30	76.82	19,305.10	0.05%			25.00%	0.01%				25.00%	
Honeywell International Inc	HON	685.48	194.58	133,381.09	0.33%	2.01%	0.01%	11.00%	0.04%	0.45%	2.01%	0.01%	11.00%	0.05%
Hewlett Packard Enterprise Co	HPE	1,300.14	16.71	21,725.27	0.05%	2.87%	0.00%	6.50%	0.00%	0.07%	2.87%	0.00%	6.50%	0.00%
HP Inc	HPQ	1,053.37	36.30	38,237.19	0.10%	2.75%	0.00%	15.50%	0.01%	0.13%	2.75%	0.00%	15.50%	0.02%
Hormel Foods Corp	HRL	545.00	51.54	28,089.20	0.07%	2.02%	0.00%	6.50%	0.00%	0.10%	2.02%	0.00%	6.50%	0.01%
Henry Schein Inc	HSIC	137.17	87.19	11,960.11	0.03%			7.00%	0.00%	0.04%			7.00%	0.00%
Host Hotels & Resorts Inc	HST	714.15	19.43	13,875.93	0.03%	0.62%	0.00%	8.50%	0.00%	0.05%	0.62%	0.00%	8.50%	0.00%
Hershey Co/The	HSY	145.63	216.63	31,547.39	0.08%	1.66%	0.00%	6.00%	0.00%	0.11%	1.66%	0.00%	6.00%	0.01%
Humana Inc	HUM	126.74	435.17	55,154.75	0.14%	0.72%	0.00%	12.00%	0.02%	0.19%	0.72%	0.00%	12.00%	0.02%
Howmet Aerospace Inc	HWM	418.91	35.94	15,055.45	0.04%	0.22%	0.00%	12.50%	0.00%	0.05%	0.22%	0.00%	12.50%	0.01%
International Business Machines Corp	IBM	899.31	130.02	116,928.29	0.29%	5.05%	0.01%	0.50%	0.00%	0.40%	5.05%	0.02%	0.50%	0.00%
Intercontinental Exchange Inc	ICE	560.44	132.12	74,044.80	0.19%	1.15%	0.00%	8.00%	0.01%	0.25%	1.15%	0.00%	8.00%	0.02%
IDEXX Laboratories Inc	IDXX	84.25	547.06	46,089.26	0.12%			14.00%	0.02%	0.16%			14.00%	0.02%
IDEX Corp	IEX	76.11	191.73	14,591.61	0.04%	1.13%	0.00%	8.00%	0.00%	0.05%	1.13%	0.00%	8.00%	0.00%
International Flavors & Fragrances Inc	IFF	254.75	131.33	33,455.66	0.08%	2.41%	0.00%	7.00%	0.01%	0.11%	2.41%	0.00%	7.00%	0.01%
Illumina Inc	ILMN	157.08	349.40	54,882.01	0.14%			10.00%	0.01%	0.19%			10.00%	0.02%
Incyte Corp	INCY	221.33	79.42	17,577.63	0.04%			25.50%	0.01%				25.50%	
Intel Corp	INTC	4,088.70	49.56	202,635.77	0.51%	2.95%	0.01%	6.00%	0.03%	0.69%	2.95%	0.02%	6.00%	0.04%
Intuit Inc	INTU	282.81	480.84	135,987.32	0.34%	0.57%	0.00%	18.50%	0.06%	0.46%	0.57%	0.00%	18.50%	0.09%
International Paper Co	IP	374.89	46.15	17,301.08	0.04%	4.01%	0.00%	12.50%	0.01%	0.06%	4.01%	0.00%	12.50%	0.01%
Interpublic Group of Cos Inc/The	IPG	393.96	35.45	13,965.88	0.04%	3.27%	0.00%	12.00%	0.00%	0.05%	3.27%	0.00%	12.00%	0.01%
IPG Photonics Corp	IPGP	52.94	109.76	5,810.58	0.01%			17.00%	0.00%	0.02%			17.00%	0.00%
IQVIA Holdings Inc	IQV	190.91	231.21	44,140.76	0.11%			14.50%	0.02%	0.15%			14.50%	0.02%
Ingersoll Rand Inc	IR	407.97	50.35	20,541.19	0.05%	0.16%	0.00%				0.16%			
Iron Mountain Inc	IRM	289.83	55.41	16,059.48	0.04%	4.46%	0.00%	10.00%	0.00%	0.05%	4.46%	0.00%	10.00%	0.01%
Intuitive Surgical Inc	ISRG	359.20	301.68	108,361.95	0.27%			13.00%	0.04%	0.37%			13.00%	0.05%
Gartner Inc	IT	82.29	297.46	24,477.09	0.06%			20.50%	0.01%				20.50%	
Illinois Tool Works Inc	ITW	311.90	209.40	65,311.86	0.16%	2.33%	0.00%	11.00%	0.02%	0.22%	2.33%	0.01%	11.00%	0.02%
Invesco Ltd	IVZ	454.96	23.06	10,491.42	0.03%	2.95%	0.00%	15.50%	0.00%	0.04%	2.95%	0.00%	15.50%	0.01%
Jacobs Engineering Group Inc	J	129.22	137.81	17,807.39	0.04%	0.67%	0.00%	15.00%	0.01%	0.06%	0.67%	0.00%	15.00%	0.01%
JB Hunt Transport Services Inc	JBHT	104.85	200.79	21,052.83	0.05%	0.80%	0.00%	11.00%	0.01%	0.07%	0.80%	0.00%	11.00%	0.01%
Johnson Controls International plc	JCI	702.63	65.57	46,071.25	0.12%	2.14%	0.00%	14.00%	0.02%	0.16%	2.14%	0.00%	14.00%	0.02%
Jack Henry & Associates Inc	JKHY	72.83	197.05	14,350.17	0.04%	0.99%	0.00%	10.50%	0.00%	0.05%	0.99%	0.00%	10.50%	0.01%
Johnson & Johnson	JNJ	2,629.62	177.23	466,046.67	1.17%	2.39%	0.03%	8.00%	0.09%	1.59%	2.39%	0.04%	8.00%	0.13%
Juniper Networks Inc	JNPR	322.57	37.16	11,986.66	0.03%	2.26%	0.00%	9.00%	0.00%	0.04%	2.26%	0.00%	9.00%	0.00%
JPMorgan Chase & Co	JPM	2,952.81	136.32	402,526.92	1.01%	2.93%	0.03%	7.50%	0.08%	1.37%	2.93%	0.04%	7.50%	0.10%
Kellogg Co	K	340.16	64.49	21,936.66	0.05%	3.60%	0.00%	3.50%	0.00%	0.07%	3.60%	0.00%	3.50%	0.00%
KeyCorp	KEY	920.13	22.38	20,592.49	0.05%	3.49%	0.00%	9.50%	0.00%	0.07%	3.49%	0.00%	9.50%	0.01%
Keysight Technologies Inc	KEYS	181.98	157.97	28,746.59	0.07%			13.00%	0.01%	0.10%			13.00%	0.01%
Kraft Heinz Co/The	KHC	1,224.89	39.39	48,248.57	0.12%	4.06%	0.00%	4.00%	0.00%	0.16%	4.06%	0.01%	4.00%	0.01%
Kimco Realty Corp	KIM	617.92	24.70	15,262.50	0.04%	3.08%	0.00%	8.50%	0.00%	0.05%	3.08%	0.00%	8.50%	0.00%
KLA Corp	KLAC	150.72	366.06	55,170.73	0.14%	1.15%	0.00%	21.00%	0.03%		1.15%		21.00%	
Kimberly-Clark Corp	KMB	336.93	123.16	41,496.05	0.10%	3.77%	0.00%	5.50%	0.01%	0.14%	3.77%	0.01%	5.50%	0.01%
Kinder Morgan Inc	KMI	2,267.49	18.91	42,878.14	0.11%	5.71%	0.01%	19.00%	0.02%	0.15%	5.71%	0.01%	19.00%	0.03%
CarMax Inc	KMX	161.68	96.48	15,598.89	0.04%			13.50%	0.01%	0.05%			13.50%	0.01%
Coca-Cola Co/The	KO	4,335.00	62.00	268,769.69	0.67%	2.84%	0.02%	7.00%	0.05%	0.92%	2.84%	0.03%	7.00%	0.06%
Kroger Co/The	KR	723.31	57.37	41,496.18	0.10%	1.46%	0.00%	6.50%	0.01%	0.14%	1.46%	0.00%	6.50%	0.01%
Loews Corp	L	246.39	64.82	15,971.26	0.04%	0.39%	0.00%	12.50%	0.01%	0.05%	0.39%	0.00%	12.50%	0.01%
Leidos Holdings Inc	LDOS	136.34	108.02	14,727.66	0.04%	1.33%	0.00%	8.50%	0.00%	0.05%	1.33%	0.00%	8.50%	0.00%
Lennar Corp	LEN	257.31	81.17	20,885.53	0.05%	1.85%	0.00%	8.50%	0.00%	0.07%	1.85%	0.00%	8.50%	0.01%
Laboratory Corp of America Holdings	LH	93.40	263.66	24,625.84	0.06%			6.00%	0.00%	0.08%			6.00%	0.01%
L3Harris Technologies Inc	LHX	193.06	248.47	47,969.62	0.12%	1.80%	0.00%				1.80%			
Linde PLC	LIN	507.23	319.43	162,022.88	0.41%	1.47%	0.01%				1.47%			
LKQ Corp	LKQ	284.99	45.41	12,941.40	0.03%	2.20%	0.00%	14.00%	0.00%	0.04%	2.20%	0.00%	14.00%	0.01%
Eli Lilly & Co	LLY	952.35	286.37	272,723.61	0.68%	1.37%	0.01%	11.50%	0.08%	0.93%	1.37%	0.01%	11.50%	0.11%
Lockheed Martin Corp	LMT	266.53	441.40	117,648.11	0.29%	2.54%	0.01%	6.50%	0.02%	0.40%	2.54%	0.01%	6.50%	0.03%
Lincoln National Corp	LNC	172.46	65.36	11,271.66	0.03%	2.75%	0.00%	11.50%	0.00%	0.04%	2.75%	0.00%	11.50%	0.00%
Alliant Energy Corp	LNT	250.48	62.48	15,649.93	0.04%	2.74%	0.00%	4.50%	0.00%	0.05%	2.74%	0.00%	4.50%	0.00%
Lowe's Cos Inc	LOW	661.56	202.19	133,761.02	0.34%	1.58%	0.01%	15.50%	0.05%	0.46%	1.58%	0.01%	15.50%	0.07%
Lam Research Corp	LRCX	139.50	537.61	74,996.60	0.19%	1.12%	0.00%	17.00%	0.03%	0.26%	1.12%	0.00%	17.00%	0.04%
Lumen Technologies Inc	LUMN	1,023.37	11.27	11,533.40	0.03%	8.87%	0.00%	3.50%	0.00%	0.04%	8.87%	0.00%	3.50%	0.00%
Southwest Airlines Co	LUV	592.34	45.80	27,129.26	0.07%			29.50%	0.02%				29.50%	
Las Vegas Sands Corp	LVS	763.99	38.87	29,696.37	0.07%			17.00%	0.01%	0.10%			17.00%	0.02%
Lamb Weston Holdings Inc	LW	145.20	59.91	8,699.17	0.02%	1.64%	0.00%	6.00%	0.00%	0.03%	1.64%	0.00%	6.00%	0.00%
LyondellBasell Industries NV	LYB	328.01	102.82	33,725.99	0.08%	4.40%	0.00%	5.50%	0.00%	0.11%	4.40%	0.01%	5.50%	0.01%
Live Nation Entertainment Inc	LYV	224.63	117.64	26,425.00	0.07%									
Mastercard Inc	MA	969.73	357.38	346,561.75	0.87%	0.55%	0.00%	13.00%	0.11%	1.18%	0.55%	0.01%	13.00%	0.15%
Mid-America Apartment Communities Inc	MAA	115.34	209.45	24,158.17	0.06%	2.08%	0.00%	8.50%	0.01%	0.08%	2.08%	0.00%	8.50%	0.01%
Marriott International Inc/MD	MAR	327.25	175.75	57,514.89	0.14%			17.50%	0.03%	0.20%			17.50%	0.03%
Masco Corp	MAS	236.52	51.00	12,062.72	0.03%	2.20%	0.00%	9.00%	0.00%	0.04%	2.20%	0.00%	9.00%	0.00%
McDonald's Corp	MCD	743.59	247.28	183,873.70	0.46%	2.23%	0.01%	10.00%	0.05%	0.63%	2.23%	0.01%	10.00%	0.06%
Microchip Technology Inc	MCHP	555.99	75.14	41,777.16	0.10%	1.35%	0.00%	10.00%	0.01%	0.14%	1.35%	0.00%	10.00%	0.01%
McKesson Corp	MCK	149.80	306.13	45,857.66	0.11%	0.61%	0.00%	10.00%	0.01%	0.16%	0.61%	0.00%	10.00%	0.02%
Moody's Corp	MCO	185.38	337.41	62,548.05	0.16%	0.83%	0.00%	9.00%	0.01%	0.21%	0.83%	0.00%	9.00%	0.02%
Mondelez International Inc	MDLZ	1,388.33	62.78	87,159.23	0.22%	2.23%	0.00%	8.00%	0.02%	0.30%	2.23%	0.01%	8.00%	0.02%
Medtronic PLC	MDT	1,341.54	110.95	148,843.75	0.37%	2.27%	0.01%	8.50%	0.03%	0.51%	2.27%	0.01%	8.50%	0.04%
MetLife Inc	MET	825.08	70.28	57,986.48	0.15%	2.73%	0.00%	7.50%	0.01%	0.20%	2.73%	0.01%	7.50%	0.01%
MGM Resorts International	MGM	435.33	41.94	18,257.87	0.05%	0.02%	0.00%	25.00%	0.01%		0.02%		25.00%	
Mohawk Industries Inc	MHK	65.07	124.20	8,081.82	0.02%			10.50%	0.00%	0.03%			10.50%	0.00%
McCormick & Co Inc/MD	MKC	250.23	99.80	24,972.55	0.06%	1.48%	0.00%	6.00%	0.00%	0.09%	1.48%	0.00%	6.00%	0.01%
MarketAxess Holdings Inc	MKTX	37.84	340.20	12,871.47	0.03%	0.82%	0.00%	14.00%	0.00%	0.04%	0.82%	0.00%	14.00%	0.01%
Martin Marietta Materials Inc	MLM	62.40	384.89	24,015.21	0.06%	0.63%	0.00%	8.50%	0.01%	0.08%	0.63%	0.00%	8.50%	0.01%
Marsh & McLennan Cos Inc	MMC	502.77	170.42	85,681.38	0.21%	1.26%	0.00%	12.00%	0.03%	0.29%	1.26%	0.00%	12.00%	0.04%
3M Co	MMM	569.17	148.88	84,738.33	0.21%	4.00%	0.01%	6.00%	0.01%	0.29%	4.00%	0.01%	6.00%	0.02%
Monster Beverage Corp	MNST	529.36	79.90	42,295.78	0.11%			13.00%	0.01%	0.14%			13.00%	0.02%
Altria Group Inc	MO	1,817.26	52.25	94,951.68	0.24%	6.89%	0.02%	5.50%	0.01%	0.32%	6.89%	0.02%	5.50%	0.02%
Molina Healthcare Inc	MOH	58.67	333.59	19,573.06	0.05%			11.00%	0.01%	0.07%			11.00%	0.01%
Mosaic Co/The	MOS	368.31	66.50	24,492.55	0.06%	0.68%	0.00%	56.50%	0.03%		0.68%		56.50%	
Marathon Petroleum Corp	MPC	558.57	85.50	47,758.08	0.12%	2.71%	0.00%				2.71%			
Monolithic Power Systems Inc	MPWR	46.51	485.68	22,588.49	0.06%	0.62%	0.00%	18.00%	0.01%	0.08%	0.62%	0.00%	18.00%	0.01%
Merck & Co Inc	MRK	2,527.73	82.05	207,400.57	0.52%	3.36%	0.02%	8.00%	0.04%	0.71%	3.36%	0.02%	8.00%	0.06%
Moderna Inc	MRNA	403.02	172.26	69,424.23	0.17%									
Marathon Oil Corp	MRO	730.77	25.11	18,349.51	0.05%	1.12%	0.00%				1.12%			
Morgan Stanley	MS	1,781.30	87.40	155,685.53	0.39%	3.20%	0.01%	10.50%	0.04%	0.53%	3.20%	0.02%	10.50%	0.06%
MSCI Inc	MSCI	81.27	502.88	40,868.05	0.10%	0.83%	0.00%	15.50%	0.02%	0.14%	0.83%	0.00%	15.50%	0.02%
Microsoft Corp	MSFT	7,496.87	308.31	2,311,358.76	5.79%	0.80%	0.05%	17.50%	1.01%	7.87%	0.80%	0.06%	17.50%	1.38%
Motorola Solutions Inc	MSI	167.45	242.20	40,555.91	0.10%	1.30%	0.00%	8.00%	0.01%	0.14%	1.30%	0.00%	8.00%	0.01%
M&T Bank Corp	MTB	129.06	169.50	21,874.99	0.05%	2.83%	0.00%	8.00%	0.00%	0.07%	2.83%	0.00%	8.00%	0.01%
Match Group Inc	MTCH	285.15	108.74	31,006.99	0.08%			18.50%	0.01%	0.11%			18.50%	0.02%
Mettler-Toledo International Inc	MTD	22.74	1,373.19	31,220.85	0.08%			13.50%	0.01%	0.11%			13.50%	0.01%
Micron Technology Inc	MU	1,116.67	77.89	86,977.19	0.22%	0.51%	0.00%	24.00%	0.05%		0.51%		24.00%	
Norwegian Cruise Line Holdings Ltd	NCLH	417.09	21.88	9,125.84	0.02%									

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[12] Weight in Index	[13] Estimated Dividend Yield	[14] Cap-Weighted Dividend Yield	[15] Value Line Long-Term Growth Est.	[16] Cap-Weighted Long-Term Growth Est.
Nasdaq Inc	NDAQ	164.41	178.20	29,298.22	0.07%	1.21%	0.00%	6.50%	0.00%	0.10%	1.21%	0.00%	6.50%	0.01%
Nordson Corp	NDSN	57.94	227.08	13,157.24	0.03%	0.90%	0.00%	13.50%	0.00%	0.04%	0.90%	0.00%	13.50%	0.01%
NextEra Energy Inc	NEE	1,962.75	84.71	166,264.13	0.42%	2.01%	0.01%	11.00%	0.05%	0.57%	2.01%	0.01%	11.00%	0.06%
Newmont Corp	NEM	792.55	79.45	62,968.02	0.16%	2.77%	0.00%	9.50%	0.01%	0.21%	2.77%	0.01%	9.50%	0.02%
Netflix Inc	NFLX	443.96	374.59	166,304.10	0.42%			23.50%	0.10%				23.50%	
NiSource Inc	NI	405.39	31.80	12,891.24	0.03%	2.96%	0.00%	10.50%	0.00%	0.04%	2.96%	0.00%	10.50%	0.00%
NIKE Inc	NKE	1,276.29	134.56	171,737.31	0.43%	0.91%	0.00%	27.00%	0.12%		0.91%		27.00%	
NortonLifeLock Inc	NLOK	582.27	26.52	15,441.91	0.04%	1.89%	0.00%	11.00%	0.00%	0.05%	1.89%	0.00%	11.00%	0.01%
Nielsen Holdings PLC	NLSN	359.49	27.24	9,792.37	0.02%	0.88%	0.00%				0.88%			
Northrop Grumman Corp	NOC	156.10	447.22	69,811.94	0.17%	1.40%	0.00%	8.50%	0.01%	0.24%	1.40%	0.00%	8.50%	0.02%
ServiceNow Inc	NOW	200.00	556.89	111,378.00	0.28%			44.50%	0.12%				44.50%	
NRG Energy Inc	NRG	242.15	38.36	9,289.03	0.02%	3.65%	0.00%	-10.50%	0.00%		3.65%		-10.50%	
Norfolk Southern Corp	NSC	239.78	285.22	68,389.20	0.17%	1.74%	0.00%	10.00%	0.02%	0.23%	1.74%	0.00%	10.00%	0.02%
NetApp Inc	NTAP	222.54	83.00	18,470.49	0.05%	2.41%	0.00%	8.00%	0.00%	0.06%	2.41%	0.00%	8.00%	0.01%
Northern Trust Corp	NTRS	207.94	116.45	24,215.08	0.06%	2.40%	0.00%	8.00%	0.00%	0.08%	2.40%	0.00%	8.00%	0.01%
Nucor Corp	NUE	268.41	148.65	39,898.40	0.10%	1.35%	0.00%	12.00%	0.01%	0.14%	1.35%	0.00%	12.00%	0.02%
NVIDIA Corp	NVDA	2,510.00	272.86	684,878.60	1.72%	0.06%	0.00%	21.50%	0.37%		0.06%		21.50%	
NVR Inc	NVR	3.36	4,467.27	15,010.03	0.04%			5.50%	0.00%	0.05%			5.50%	0.00%
Newell Brands Inc	NWL	415.81	21.41	8,902.41	0.02%	4.30%	0.00%				4.30%			
News Corp	NWS	198.48	22.52	4,469.84	0.01%	0.89%	0.00%				0.89%			
News Corp	NWSA	390.87	22.15	8,657.86	0.02%	0.90%	0.00%				0.90%			
NXP Semiconductors NV	NXPI	262.54	185.08	48,590.53	0.12%	1.83%	0.00%	12.00%	0.01%	0.17%	1.83%	0.00%	12.00%	0.02%
Realty Income Corp	O	597.90	69.30	41,434.54	0.10%	4.28%	0.00%	3.50%	0.00%	0.14%	4.28%	0.01%	3.50%	0.00%
Old Dominion Freight Line Inc	ODFL	114.86	298.68	34,307.58	0.09%	0.40%	0.00%	12.00%	0.01%	0.12%	0.40%	0.00%	12.00%	0.01%
Organon & Co	OGN	253.64	34.93	8,859.54	0.02%	3.21%	0.00%				3.21%			
ONEOK Inc	OKE	446.21	70.63	31,516.02	0.08%	5.30%	0.00%	12.00%	0.01%	0.11%	5.30%	0.01%	12.00%	0.01%
Omnicom Group Inc	OMC	206.95	84.88	17,565.75	0.04%	3.30%	0.00%	6.00%	0.00%	0.06%	3.30%	0.00%	6.00%	0.00%
Oracle Corp	ORCL	2,668.16	82.73	220,736.63	0.55%	1.55%	0.01%	10.00%	0.06%	0.75%	1.55%	0.01%	10.00%	0.08%
O'Reilly Automotive Inc	ORLY	66.30	684.96	45,410.11	0.11%			13.00%	0.01%	0.15%			13.00%	0.02%
Otis Worldwide Corp	OTIS	424.96	76.95	32,700.83	0.08%	1.25%	0.00%				1.25%			
Occidental Petroleum Corp	OXY	936.91	56.74	53,160.22	0.13%	0.92%	0.00%	30.50%	0.04%		0.92%		30.50%	
Paramount Global	PARA	607.88	37.81	22,983.83	0.06%	2.54%	0.00%	7.00%	0.00%	0.08%	2.54%	0.00%	7.00%	0.01%
Paycom Software Inc	PAYC	60.21	346.38	20,856.93	0.05%			20.00%	0.01%	0.07%			20.00%	0.01%
Paychex Inc	PAYX	361.02	136.47	49,267.99	0.12%	1.93%	0.00%	9.00%	0.01%	0.17%	1.93%	0.00%	9.00%	0.02%
People's United Financial Inc	PBCT	429.67	19.99	8,589.12	0.02%	3.65%	0.00%	2.50%	0.00%	0.03%	3.65%	0.00%	2.50%	0.00%
PACCAR Inc	PCAR	347.68	88.07	30,619.74	0.08%	1.54%	0.00%	5.00%	0.00%	0.10%	1.54%	0.00%	5.00%	0.01%
Healthpeak Properties Inc	PEAK	539.50	34.33	18,521.04	0.05%	3.50%	0.00%	-7.50%	0.00%		3.50%		-7.50%	
Public Service Enterprise Group Inc	PEG	502.08	70.00	35,145.46	0.09%	3.09%	0.00%	4.00%	0.00%	0.12%	3.09%	0.00%	4.00%	0.00%
Penn National Gaming Inc	PENN	168.32	42.42	7,140.26	0.02%			28.00%	0.01%				28.00%	
PepsiCo Inc	PEP	1,383.25	167.38	231,528.22	0.58%	2.57%	0.01%	6.50%	0.04%	0.79%	2.57%	0.02%	6.50%	0.05%
Pfizer Inc	PFE	5,647.77	51.77	292,385.26	0.73%	3.09%	0.02%	6.50%	0.05%	1.00%	3.09%	0.03%	6.50%	0.06%
Principal Financial Group Inc	PFG	261.23	73.41	19,176.75	0.05%	3.49%	0.00%	6.00%	0.00%	0.07%	3.49%	0.00%	6.00%	0.00%
Procter & Gamble Co/The	PG	2,397.07	152.80	366,271.68	0.92%	2.28%	0.02%	6.50%	0.06%	1.25%	2.28%	0.03%	6.50%	0.08%
Progressive Corp/The	PGR	584.88	113.99	66,670.36	0.17%	0.35%	0.00%	4.50%	0.01%	0.23%	0.35%	0.00%	4.50%	0.01%
Parker-Hannifin Corp	PH	128.48	283.76	36,456.92	0.09%	1.45%	0.00%	13.50%	0.01%	0.12%	1.45%	0.00%	13.50%	0.02%
PulteGroup Inc	PHM	241.43	41.90	10,115.71	0.03%	1.43%	0.00%	9.50%	0.00%	0.03%	1.43%	0.00%	9.50%	0.00%
Packaging Corp of America	PKG	93.70	156.11	14,628.13	0.04%	2.56%	0.00%	9.00%	0.00%	0.05%	2.56%	0.00%	9.00%	0.00%
PerkinElmer Inc	PKI	126.16	174.46	22,009.35	0.06%	0.16%	0.00%	10.00%	0.01%	0.07%	0.16%	0.00%	10.00%	0.01%
Prologis Inc	PLD	739.75	161.48	119,454.02	0.30%	1.96%	0.01%	6.00%	0.02%	0.41%	1.96%	0.01%	6.00%	0.02%
Philip Morris International Inc	PM	1,550.08	93.94	145,614.70	0.36%	5.32%	0.02%	7.00%	0.03%	0.50%	5.32%	0.03%	7.00%	0.03%
PNC Financial Services Group Inc/The	PNC	418.56	184.45	77,203.39	0.19%	2.71%	0.01%	11.50%	0.02%	0.26%	2.71%	0.01%	11.50%	0.03%
Pentair PLC	PNR	165.10	54.21	8,950.02	0.02%	1.55%	0.00%	14.00%	0.00%	0.03%	1.55%	0.00%	14.00%	0.00%
Pinnacle West Capital Corp	PNW	112.93	78.10	8,819.99	0.02%	4.35%	0.00%	0.00%	0.00%		4.35%		0.00%	
Pool Corp	POOL	40.13	422.85	16,967.28	0.04%	0.76%	0.00%	17.00%	0.01%	0.06%	0.76%	0.00%	17.00%	0.01%
PPG Industries Inc	PPG	236.15	131.07	30,951.92	0.08%	1.80%	0.00%	10.00%	0.01%	0.11%	1.80%	0.00%	10.00%	0.01%
PPL Corp	PPL	735.36	28.56	21,001.94	0.05%	2.80%	0.00%				2.80%			
Prudential Financial Inc	PRU	376.43	118.17	44,482.26	0.11%	4.06%	0.00%	5.50%	0.01%	0.15%	4.06%	0.01%	5.50%	0.01%
Public Storage	PSA	175.36	390.28	68,438.33	0.17%	2.05%	0.00%	8.00%	0.01%	0.23%	2.05%	0.00%	8.00%	0.02%
Phillips 66	PSX	438.46	86.39	37,878.73	0.09%	4.26%	0.00%	17.00%	0.02%	0.13%	4.26%	0.01%	17.00%	0.02%
PTC Inc	PTC	116.95	107.72	12,598.07	0.03%									
PVH Corp	PVH	68.01	76.61	5,210.02	0.01%	0.20%	0.00%	14.00%	0.00%	0.02%	0.20%	0.00%	14.00%	0.00%
Quanta Services Inc	PWR	142.69	131.61	18,779.43	0.05%	0.21%	0.00%	16.50%	0.01%	0.06%	0.21%	0.00%	16.50%	0.01%
Pioneer Natural Resources Co	PXD	242.88	250.03	60,728.29	0.15%	6.05%	0.01%	23.00%	0.04%		6.05%		23.00%	
PayPal Holdings Inc	PYPL	1,165.01	115.65	134,732.83	0.34%			16.00%	0.05%	0.46%			16.00%	0.07%
QUALCOMM Inc	QCOM	1,127.00	152.82	172,228.14	0.43%	1.78%	0.01%	19.00%	0.08%	0.59%	1.78%	0.01%	19.00%	0.11%
Qorvo Inc	QRVO	108.43	124.10	13,456.41	0.03%			14.50%	0.00%	0.05%			14.50%	0.01%
Royal Caribbean Cruises Ltd	RCL	255.00	83.78	21,364.15	0.05%									
Everest Re Group Ltd	RE	39.27	301.38	11,835.80	0.03%	2.06%	0.00%	11.00%	0.00%	0.04%	2.06%	0.00%	11.00%	0.00%
Regency Centers Corp	REG	171.37	71.34	12,225.75	0.03%	3.50%	0.00%	12.50%	0.00%	0.04%	3.50%	0.00%	12.50%	0.01%
Regeneron Pharmaceuticals Inc	REGN	106.72	698.42	74,532.59	0.19%			12.50%	0.02%	0.25%			12.50%	0.03%
Regions Financial Corp	RF	937.15	22.26	20,860.87	0.05%	3.05%	0.00%	10.50%	0.01%	0.07%	3.05%	0.00%	10.50%	0.01%
Robert Half International Inc	RHI	110.69	114.18	12,638.13	0.03%	1.51%	0.00%	7.50%	0.00%	0.04%	1.51%	0.00%	7.50%	0.00%
Raymond James Financial Inc	RJF	207.60	109.91	22,817.54	0.06%	1.24%	0.00%	10.50%	0.01%	0.08%	1.24%	0.00%	10.50%	0.01%
Ralph Lauren Corp	RL	46.29	113.44	5,250.68	0.01%	2.42%	0.00%	12.50%	0.00%	0.02%	2.42%	0.00%	12.50%	0.00%
ResMed Inc	RMD	146.23	242.51	35,463.21	0.09%	0.69%	0.00%	8.50%	0.01%	0.12%	0.69%	0.00%	8.50%	0.01%
Rockwell Automation Inc	ROK	116.20	280.03	32,538.37	0.08%	1.60%	0.00%	10.00%	0.01%	0.11%	1.60%	0.00%	10.00%	0.01%
Rollins Inc	ROL	492.46	35.05	17,260.72	0.04%	1.14%	0.00%	10.50%	0.00%	0.06%	1.14%	0.00%	10.50%	0.01%
Roper Technologies Inc	ROP	105.60	472.23	49,868.90	0.12%	0.53%	0.00%	8.50%	0.01%	0.17%	0.53%	0.00%	8.50%	0.01%
Ross Stores Inc	ROST	350.89	90.46	31,741.69	0.08%	1.37%	0.00%	14.00%	0.01%	0.11%	1.37%	0.00%	14.00%	0.02%
Republic Services Inc	RSG	315.79	132.50	41,841.65	0.10%	1.39%	0.00%	10.50%	0.01%	0.14%	1.39%	0.00%	10.50%	0.01%
Raytheon Technologies Corp	RTX	1,490.27	99.07	147,640.85	0.37%	2.06%	0.01%	7.50%	0.03%	0.50%	2.06%	0.01%	7.50%	0.04%
SBA Communications Corp	SBAC	108.02	344.10	37,168.65	0.09%	0.83%	0.00%	42.50%	0.04%		0.83%		42.50%	
Signature Bank/New York NY	SBNY	62.57	293.49	18,363.38	0.05%	0.76%	0.00%	12.00%	0.01%	0.06%	0.76%	0.00%	12.00%	0.01%
Starbucks Corp	SBUX	1,150.30	90.97	104,642.79	0.26%	2.15%	0.01%	16.50%	0.04%	0.36%	2.15%	0.01%	16.50%	0.06%
Charles Schwab Corp/The	SCHW	1,814.62	84.31	152,990.70	0.38%	0.95%	0.00%	7.00%	0.03%	0.52%	0.95%	0.00%	7.00%	0.04%
SolarEdge Technologies Inc	SEDG	55.12	322.37	17,767.42	0.04%			19.50%	0.01%	0.06%			19.50%	0.01%
Sealed Air Corp	SEE	148.16	66.96	9,920.66	0.02%	1.19%	0.00%	13.50%	0.00%	0.03%	1.19%	0.00%	13.50%	0.00%
Sherwin-Williams Co/The	SHW	260.55	249.62	65,037.99	0.16%	0.96%	0.00%	11.50%	0.02%	0.22%	0.96%	0.00%	11.50%	0.03%
SVB Financial Group	SIVB	58.81	559.45	32,901.25	0.08%			5.00%	0.00%	0.11%			5.00%	0.01%
J M Smucker Co/The	SJM	108.46	135.41	14,686.30	0.04%	2.92%	0.00%	4.00%	0.00%	0.05%	2.92%	0.00%	4.00%	0.00%
Schlumberger NV	SLB	1,413.02	41.31	58,371.81	0.15%	1.21%	0.00%	11.50%	0.02%	0.20%	1.21%	0.00%	11.50%	0.02%
Snap-on Inc	SNA	53.42	205.48	10,976.13	0.03%	2.76%	0.00%	4.50%	0.00%	0.04%	2.76%	0.00%	4.50%	0.00%
Synopsys Inc	SNPS	153.10	333.27	51,023.30	0.13%			14.00%	0.02%	0.17%			14.00%	0.02%
Southern Co/The	SO	1,059.80	72.51	76,846.39	0.19%	3.64%	0.01%	5.50%	0.01%	0.26%	3.64%	0.01%	5.50%	0.01%
Simon Property Group Inc	SPG	328.34	131.56	43,196.67	0.11%	5.02%	0.01%	2.50%	0.00%	0.15%	5.02%	0.01%	2.50%	0.00%
S&P Global Inc	SPGI	347.03	410.18	142,343.53	0.36%	0.83%	0.00%	10.50%	0.04%	0.48%	0.83%	0.00%	10.50%	0.05%
Sempra Energy	SRE	315.77	168.12	53,087.59	0.13%	2.72%	0.00%	10.00%	0.01%	0.18%	2.72%	0.00%	10.00%	0.02%
STERIS PLC	STE	100.13	241.77	24,207.70	0.06%	0.71%	0.00%	11.50%	0.01%	0.08%	0.71%	0.00%	11.50%	0.01%
State Street Corp	STT	366.07	87.12	31,891.76	0.08%	2.62%	0.00%	8.00%	0.01%	0.11%	2.62%	0.00%	8.00%	0.01%
Seagate Technology Holdings PLC	STX	218.90	89.90	19,678.93	0.05%	3.11%	0.00%	16.00%	0.01%	0.07%	3.11%	0.00%	16.00%	0.01%
Constellation Brands Inc	STZ	164.34	230.32	37,850.56	0.09%	1.32%	0.00%	5.50%	0.01%	0.13%	1.32%	0.00%	5.50%	0.01%
Stanley Black & Decker Inc	SWK	163.41	139.79	22,843.22	0.06%	2.26%	0.00%	6.00%	0.00%	0.08%	2.26%	0.00%	6.00%	0.00%
Skyworks Solutions Inc	SWKS	161.67	133.28	21,547.51	0.05%	1.68%	0.00%	15.50%	0.01%	0.07%	1.68%	0.00%	15.50%	0.01%
Synchrony Financial	SYF	521.27	34.81	18,145.48	0.05%	2.53%	0.00%	9.50%	0.00%	0.06%	2.53%	0.00%	9.50%	0.01%
Stryker Corp	SYK	377.70	267.35	100,978.10	0.25%	1.04%	0.00%	8.50%	0.02%	0.34%	1.04%	0.00%	8.50%	0.03%
Sysco Corp	SYY	507.45	81.65	41,433.05	0.10%	2.30%	0.00%	17.50%	0.02%	0.14%	2.30%	0.00%	17.50%	0.02%
AT&T Inc	T	7,142.89	23.63	168,786.56	0.42%	4.70%	0.02%	3.00%	0.01%	0.57%	4.70%	0.03%	3.00%	0.02%
Molson Coors Beverage Co	TAP	200.60	53.38	10,707.97	0.03%	2.85%	0.00%	41.00%	0.01%		2.85%		41.00%	
TransDigm Group Inc	TDG	55.46	651.54	36,135.71	0.09%			16.50%	0.01%	0.12%			16.50%	0.02%
Teledyne Technologies Inc	TDY	46.77	472.63	22,103.01	0.06%			14.50%	0.01%	0.08%			14.50%	0.01%
Bio-Techne Corp	TECH	39.29	433.04	17,013.28	0.04%	0.30%	0.00%	17.50%	0.01%	0.06%	0.30%	0.00%	17.50%	0.01%
TE Connectivity Ltd	TEL	325.58	130.98	42,643.81	0.11%	1.71%	0.00%	10.50%	0.01%	0.15%	1.71%	0.00%	10.50%	0.02%

STANDARD AND POOR'S 500 INDEX

Name	Ticker	[4] Shares Outst'g	[5] Price	[6] Market Capitalization	[7] Weight in Index	[8] Estimated Dividend Yield	[9] Cap-Weighted Dividend Yield	[10] Value Line Long-Term Growth Est.	[11] Cap-Weighted Long-Term Growth Est.	[12] Weight in Index	[13] Estimated Dividend Yield	[14] Cap-Weighted Dividend Yield	[15] Value Line Long-Term Growth Est.	[16] Cap-Weighted Long-Term Growth Est.
Teradyne Inc	TER	162.42	118.23	19,202.56	0.05%	0.37%	0.00%	8.50%	0.00%	0.07%	0.37%	0.00%	8.50%	0.01%
Truist Financial Corp	TFC	1,328.99	56.70	75,353.90	0.19%	3.39%	0.01%	7.00%	0.01%	0.26%	3.39%	0.01%	7.00%	0.02%
Teleflex Inc	TFX	46.90	354.83	16,642.24	0.04%	0.38%	0.00%	15.00%	0.01%	0.06%	0.38%	0.00%	15.00%	0.01%
Target Corp	TGT	462.42	212.22	98,134.35	0.25%	1.70%	0.00%	15.00%	0.04%	0.33%	1.70%	0.01%	15.00%	0.05%
TJX Cos Inc/The	TJX	1,175.23	60.58	71,195.31	0.18%	1.95%	0.00%	20.00%	0.04%	0.24%	1.95%	0.00%	20.00%	0.05%
Thermo Fisher Scientific Inc	TMO	391.19	590.65	231,057.55	0.58%	0.20%	0.00%	15.50%	0.09%	0.79%	0.20%	0.00%	15.50%	0.12%
T-Mobile US Inc	TMUS	1,249.29	128.35	160,346.37	0.40%			7.50%	0.03%	0.55%			7.50%	0.04%
Tapestry Inc	TPR	263.99	37.15	9,807.23	0.02%	2.69%	0.00%	10.00%	0.00%	0.03%	2.69%	0.00%	10.00%	0.00%
Trimble Inc	TRMB	251.22	72.14	18,122.72	0.05%			10.00%	0.00%	0.06%			10.00%	0.01%
T Rowe Price Group Inc	TROW	227.81	151.19	34,442.59	0.09%	3.17%	0.00%	12.00%	0.01%	0.12%	3.17%	0.00%	12.00%	0.01%
Travelers Cos Inc/The	TRV	241.50	182.73	44,129.48	0.11%	1.93%	0.00%	8.00%	0.01%	0.15%	1.93%	0.00%	8.00%	0.01%
Tractor Supply Co	TSCO	112.15	233.37	26,171.51	0.07%	1.58%	0.00%	14.50%	0.01%	0.09%	1.58%	0.00%	14.50%	0.01%
Tesla Inc	TSLA	1,033.51	1,077.60	1,113,708.22	2.79%			51.50%	1.44%				51.50%	
Tyson Foods Inc	TSN	292.46	89.63	26,212.74	0.07%	2.05%	0.00%	6.00%	0.00%	0.09%	2.05%	0.00%	6.00%	0.01%
Trane Technologies PLC	TT	233.54	152.70	35,661.25	0.09%	1.76%	0.00%				1.76%			
Take-Two Interactive Software Inc	TTWO	115.42	153.74	17,744.06	0.04%			15.00%	0.01%	0.06%			15.00%	0.01%
Twitter Inc	TWTR	800.64	38.69	30,976.80	0.08%			39.00%	0.03%				39.00%	
Texas Instruments Inc	TXN	923.55	183.48	169,452.40	0.42%	2.51%	0.01%	8.50%	0.04%	0.58%	2.51%	0.01%	8.50%	0.05%
Textron Inc	TXT	216.33	74.38	16,090.55	0.04%	0.11%	0.00%	8.50%	0.00%	0.05%	0.11%	0.00%	8.50%	0.00%
Tyler Technologies Inc	TYL	41.43	444.89	18,432.24	0.05%			14.00%	0.01%	0.06%			14.00%	0.01%
Under Armour Inc	UA	253.22	15.56	3,940.07	0.01%									
Under Armour Inc	UAA	188.67	17.02	3,211.15	0.01%			33.00%	0.00%				33.00%	
United Airlines Holdings Inc	UAL	323.61	46.36	15,002.61	0.04%									
UDR Inc	UDR	325.40	57.37	18,668.31	0.05%	2.65%	0.00%	10.50%	0.00%	0.06%	2.65%	0.00%	10.50%	0.01%
Universal Health Services Inc	UHS	67.55	144.95	9,791.66	0.02%	0.55%	0.00%	11.00%	0.00%	0.03%	0.55%	0.00%	11.00%	0.00%
Ulta Beauty Inc	ULTA	52.33	398.22	20,837.66	0.05%			15.50%	0.01%	0.07%			15.50%	0.01%
UnitedHealth Group Inc	UNH	940.90	509.97	479,830.26	1.20%	1.14%	0.01%	12.00%	0.14%	1.63%	1.14%	0.02%	12.00%	0.20%
Union Pacific Corp	UNP	628.39	273.21	171,681.61	0.43%	1.73%	0.01%	9.00%	0.04%	0.58%	1.73%	0.01%	9.00%	0.05%
United Parcel Service Inc	UPS	733.44	214.46	157,293.33	0.39%	2.84%	0.01%	11.50%	0.05%	0.54%	2.84%	0.02%	11.50%	0.06%
United Rentals Inc	URI	72.19	355.21	25,643.32	0.06%			12.50%	0.01%	0.09%			12.50%	0.01%
US Bancorp	USB	1,485.04	53.15	78,929.82	0.20%	3.46%	0.01%	6.50%	0.01%	0.27%	3.46%	0.01%	6.50%	0.02%
Visa Inc	V	1,658.42	221.77	367,788.69	0.92%	0.68%	0.01%	12.00%	0.11%	1.25%	0.68%	0.01%	12.00%	0.15%
VF Corp	VFC	388.90	56.86	22,112.97	0.06%	3.52%	0.00%	9.50%	0.01%	0.08%	3.52%	0.00%	9.50%	0.01%
Valero Energy Corp	VLO	409.42	101.54	41,572.20	0.10%	3.86%	0.00%	11.00%	0.01%	0.14%	3.86%	0.01%	11.00%	0.02%
Vulcan Materials Co	VMC	132.89	183.70	24,412.63	0.06%	0.87%	0.00%	8.50%	0.01%	0.08%	0.87%	0.00%	8.50%	0.01%
Vornado Realty Trust	VNO	191.72	45.32	8,688.93	0.02%	4.68%	0.00%	-19.00%	0.00%		4.68%		-19.00%	
Verisk Analytics Inc	VRSK	161.28	214.63	34,616.17	0.09%	0.58%	0.00%	10.50%	0.01%	0.12%	0.58%	0.00%	10.50%	0.01%
VeriSign Inc	VRSN	110.17	222.46	24,507.75	0.06%			8.50%	0.01%	0.08%			8.50%	0.01%
Vertex Pharmaceuticals Inc	VRTX	254.58	260.97	66,436.96	0.17%			18.50%	0.03%	0.23%			18.50%	0.04%
Ventas Inc	VTR	399.55	61.76	24,676.15	0.06%	2.91%	0.00%	10.50%	0.01%	0.08%	2.91%	0.00%	10.50%	0.01%
Viatris Inc	VTRS	1,209.58	10.88	13,160.19	0.03%	4.41%	0.00%				4.41%			
Verizon Communications Inc	VZ	4,197.82	50.94	213,837.15	0.54%	5.03%	0.03%	2.50%	0.01%	0.73%	5.03%	0.04%	2.50%	0.02%
Westinghouse Air Brake Technologies Corp	WAB	185.29	96.17	17,819.34	0.04%	0.62%	0.00%	9.00%	0.00%	0.06%	0.62%	0.00%	9.00%	0.01%
Waters Corp	WAT	60.52	310.39	18,783.56	0.05%			6.00%	0.00%	0.06%			6.00%	0.00%
Walgreens Boots Alliance Inc	WBA	863.77	44.77	38,671.12	0.10%	4.27%	0.00%	7.50%	0.01%	0.13%	4.27%	0.01%	7.50%	0.01%
Western Digital Corp	WDC	312.92	49.65	15,536.38	0.04%			20.50%	0.01%				20.50%	
WEC Energy Group Inc	WEC	315.44	99.81	31,483.57	0.08%	2.92%	0.00%	6.00%	0.00%	0.11%	2.92%	0.00%	6.00%	0.01%
Welltower Inc	WELL	447.28	96.14	43,001.50	0.11%	2.54%	0.00%	3.50%	0.00%	0.15%	2.54%	0.00%	3.50%	0.01%
Wells Fargo & Co	WFC	3,801.59	48.46	184,225.00	0.46%	2.06%	0.01%	5.50%	0.03%	0.63%	2.06%	0.01%	5.50%	0.03%
Whirlpool Corp	WHR	58.46	172.78	10,101.06	0.03%	4.05%	0.00%	9.50%	0.00%	0.03%	4.05%	0.00%	9.50%	0.00%
Waste Management Inc	WM	415.16	158.50	65,802.86	0.16%	1.64%	0.00%	7.50%	0.01%	0.22%	1.64%	0.00%	7.50%	0.02%
Williams Cos Inc/The	WMB	1,217.31	33.41	40,670.43	0.10%	5.09%	0.01%	10.00%	0.01%	0.14%	5.09%	0.01%	10.00%	0.01%
Walmart Inc	WMT	2,751.78	148.92	409,795.08	1.03%	1.50%	0.02%	7.50%	0.08%	1.40%	1.50%	0.02%	7.50%	0.10%
W R Berkley Corp	WRB	265.19	66.59	17,658.74	0.04%	0.52%	0.00%	17.50%	0.01%	0.06%	0.52%	0.00%	17.50%	0.01%
Westrock Co	WRK	263.21	47.03	12,378.95	0.03%	2.13%	0.00%	17.00%	0.01%	0.04%	2.13%	0.00%	17.00%	0.01%
West Pharmaceutical Services Inc	WST	74.28	410.71	30,508.36	0.08%	0.18%	0.00%	17.00%	0.01%	0.10%	0.18%	0.00%	17.00%	0.02%
Willis Towers Watson PLC	WTW	117.75	236.22	27,813.96	0.07%	1.39%	0.00%	11.00%	0.01%	0.09%	1.39%	0.00%	11.00%	0.01%
Weyerhaeuser Co	WY	747.08	37.90	28,314.14	0.07%	1.90%	0.00%	22.00%	0.02%		1.90%		22.00%	
Wynn Resorts Ltd	WYNN	115.92	79.74	9,243.30	0.02%			27.00%	0.01%				27.00%	
Xcel Energy Inc	XEL	544.21	72.17	39,275.92	0.10%	2.70%	0.00%	6.00%	0.01%	0.13%	2.70%	0.00%	6.00%	0.01%
Exxon Mobil Corp	XOM	4,233.59	82.59	349,652.36	0.88%	4.26%	0.04%				4.26%			
DENTSPLY SIRONA Inc	XRAY	217.55	49.22	10,708.01	0.03%	1.02%	0.00%	12.00%	0.00%	0.04%	1.02%	0.00%	12.00%	0.00%
Xylem Inc/NY	XYL	180.09	85.26	15,354.73	0.04%	1.41%	0.00%	6.50%	0.00%	0.05%	1.41%	0.00%	6.50%	0.00%
Yum! Brands Inc	YUM	288.98	118.53	34,252.92	0.09%	1.92%	0.00%	10.50%	0.01%	0.12%	1.92%	0.00%	10.50%	0.01%
Zimmer Biomet Holdings Inc	ZBH	209.32	127.90	26,772.28	0.07%	0.75%	0.00%	7.00%	0.00%	0.09%	0.75%	0.00%	7.00%	0.01%
Zebra Technologies Corp	ZBRA	53.08	413.70	21,959.20	0.06%			10.50%	0.01%	0.07%			10.50%	0.01%
Zions Bancorp NA	ZION	151.90	65.56	9,958.24	0.02%	2.32%	0.00%	7.50%	0.00%	0.03%	2.32%	0.00%	7.50%	0.00%
Zoetis Inc	ZTS	471.80	188.59	88,976.76	0.22%	0.69%	0.00%	11.00%	0.02%	0.30%	0.69%	0.00%	11.00%	0.03%

Notes:
[1] Equals sum of Col. [9]
[2] Equals sum of Col. [11]
[3] Equals ([1] x (1 + (0.5 x [2]))) + [2]
[4] Source: Bloomberg Professional as of March 31, 2022
[5] Source: Bloomberg Professional as of March 31, 2022
[6] Equals [4] x [5]
[7] Equals weight in S&P 500
[8] Source: Bloomberg Professional, as of March 31, 2022
[9] Equals [7] x [8]
[10] Source: Value Line, as of March 31, 2022
[11] Equals [7] x [10]
[12] Equals weight in S&P 500 based on market capitalization [6] if Growth Rate >0% and ≤20%
[13] Equals [8]
[14] Equals [12] x [13]
[15] Equals [10]
[16] Equals [12] x [15]
[17] Equals the average of [3]

COMPARISON OF PAWC AND PROXY GROUP COMPANIES
CAPITAL COST RECOVERY MECHANISMS

Company	Ticker	State	Utility Type	Infrastructure Cost Recovery Mechanism	Revenue Stabilization or Decoupling	Citations
American States Water Co						2021 10-K,41 (Decoupling), 28-30 (capital tracker).
	AWR	California	Water	Yes	Full	
	AWR	California	Electric	Yes	Full	
Atmos Energy Corporation						
	ATO	Colorado	Gas	Yes	No	2021 10-K, p. 9-10.
	ATO	Kansas	Gas	Yes	Partial	
	ATO	Kentucky	Gas	Yes	Partial	
	ATO	Louisiana	Gas	Yes	FRP	
	ATO	Mississippi	Gas	Yes	FRP	Infrastructure Cost Recovery: 2021 10-K, p. 9
	ATO	Tennessee	Gas	Yes	FRP	Revenue Decoupling: 2021 10-K, p. 9; Tariffs (Colorado, Virginia).
	ATO	Texas	Gas	Yes	FRP	
	ATO	Virginia	Gas	Yes	Partial	
California Water Service Group						
	CWT	California	Water	Yes	Full	Infrastructure Cost Recovery:2021 10-K (California, p. 9), Tariffs (HI, WA, NM)
	CWT	Hawaii	Water	No	No	Revenue Decoupling: 2021 10-K, p. 8 (California); Tariffs (HI, WA, NM)
	CWT	New Mexico	Water	No	No	
	CWT	Washington	Water	Yes	No	
Essential Utilities, Inc.						
	WTRG	Pennsylvania	Water	Yes	No	Infrastructure Cost Recovery: 2021 10-K, p. 9
	WTRG	Pennsylvania	Gas	Yes	No	Revenue Decoupling: 2021 10-K, p. 11
	WTRG	Ohio	Water	Yes	No	
	WTRG	Illinois	Water	Yes	Full	
	WTRG	Texas	Water	Yes	No	
	WTRG	New Jersey	Water	Yes	No	
	WTRG	North Carolina	Water	Yes	No	
	WTRG	Indiana	Water	Yes	No	
	WTRG	Virginia	Water	Yes	No	
	WTRG	Kentucky	Gas	Yes	Partial	
	WTRG	West Virginia	Gas	No	No	
Eversource Energy						
				Yes	Full	Infrastructure Cost Recovery: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19 (CT - Gas and Electric, Mass - Gas and Electric, NH - Electric); 2021 10-K, p. 11 (water utilities)
	ES	Connecticut	Electric			
	ES	Connecticut	Gas	Yes	Full	
	ES	Connecticut	Water	Yes	Full	Revenue Decoupling: 2021 10-K, p. 3 (CT), p. 5 (Mass-Electric), p. 6 (NH-Electric), p. 8
	ES	Massachusetts	Electric	Yes	Full	(Mass and CT - Gas), p. 10 (CT - Water)
	ES	Massachusetts	Gas	Yes	Full	
	ES	Massachusetts	Water	Yes	No	
	ES	New Hampshire	Electric	Yes	Partial	
	ES	New Hampshire	Water	Yes	No	
Middlesex Water Company						
	MSEX	New Jersey	Water	Yes	No	Infrastructure Cost Recovery/ Revenue Decoupling: Tariffs (NJ, DE, PA)
	MSEX	Delaware	Water	Yes	No	
	MSEX	Pennsylvania	Water	No	No	
NiSource Inc.						
	NI	Indiana	Electric	Yes	Partial	Infrastructure Cost Recovery: S&P Global Market Intelligence, Regulatory Focus:
				Yes	No	Revenue Decoupling: S&P Global Market Intelligence, Regulatory Focus: Adjustment
	NI	Indiana	Gas			Clauses, dated 11/12/19
	NI	Kentucky	Gas	Yes	Partial	
	NI	Maryland	Gas	Yes	Partial	
	NI	Ohio	Gas	Yes	SFV	
	NI	Pennsylvania	Gas	Yes	Partial	
	NI	Virginia	Gas	Yes	Partial	
New Jersey Resources Corporation						
	NJR	New Jersey	Gas	Yes	Full	Infrastructure Cost / RDM: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
Northwest Natural Gas Company						
	NWN	Oregon	Gas	No	Partial	Infrastructure Cost / RDM: S&P Global Market Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
	NWN	Washington	Gas	No	No	
ONE Gas, Inc.						
	OGS	Kansas	Gas	Yes	Partial	
	OGS	Oklahoma	Gas	No	FRP	Infrastructure Cost Recovery / RDM : ONE Gas 2021 10-K, p. 6; S&P Global Market
	OGS	Texas	Gas	Yes	Partial	Intelligence, Regulatory Focus: Adjustment Clauses, dated 11/12/19
SJW Group						
	SJW	California	Water	Yes	No	Infrastructure Cost Recovery/Revenue Decoupling: 2021 10-K, pg. 5-8.
	SJW	Connecticut	Water	Yes	Full	
	SJW	Maine	Water	Yes	No	
	SJW	Texas	Water	No	No	
Spire, Inc.						
	SR	Alabama	Gas	No	FRP	Infrastructure Cost Recovery / RDM: S&P Global Market Intelligence, Regulatory Focus:
	SR	Mississippi	Gas	No	FRP	
	SR	Missouri - East	Gas	Yes	Partial	
	SR	Missouri - West	Gas	Yes	Partial	
York Water Company						
	YORW	Pennsylvania	Water	Yes	No	Infrastructure Cost / RDM: 2021 10-K (p. 29 & p. 41)

Proxy Group Totals				Yes	48	Full 11
				No	10	Partial 15
						FRP 7
						SFV 1
						No 24
				CCRM	82.76%	58.62%
PAWC		Pennsylvania	Water		Yes	Proposing

CAPITAL STRUCTURE ANALYSIS

COMMON EQUITY RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	56.76%	65.94%	56.76%
Atmos Energy Corporation	ATO	58.31%	58.43%	58.31%
California Water Service Group	CWT	52.23%	46.73%	52.23%
Essential Utilities, Inc.	WTRG	55.83%	54.82%	55.83%
Eversource Energy	ES	54.99%	54.39%	54.99%
Middlesex Water Company	MSEX	59.21%	62.71%	59.21%
NiSource Inc.	NI	54.43%	54.33%	54.43%
New Jersey Resources Corporation	NJR	55.45%	58.87%	55.45%
Northwest Natural Gas Company	NWN	47.44%	49.19%	47.44%
One Gas Inc.	OGS	60.04%	63.28%	60.04%
SJW Corporation	SJW	56.66%	55.13%	56.66%
Spire Inc.	SR	58.52%	60.85%	58.52%
York Water Company	YORW	53.27%	56.50%	53.27%
Proxy Group				
MEAN		55.63%	57.01%	55.63%
LOW		47.44%	46.73%	47.44%
HIGH		60.04%	65.94%	60.04%

COMMON EQUITY RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	56.76%	65.94%	56.76%
Atmos Energy Corporation	ATO	58.31%	58.43%	58.31%
California Water Service	CWT	51.34%	46.46%	51.34%
New Mexico Water Service Water Division	CWT	67.06%	65.26%	67.06%
New Mexico Water Service Sewer Division	CWT	59.47%	56.79%	59.47%
Washington Water Service	CWT	71.93%	52.53%	71.93%
Hawaii Water Service Kaanapali Division	CWT	48.93%	49.76%	48.93%
Hawaii Water Service Pukalani Division	CWT	64.56%	65.06%	64.56%
Aqua Pennsylvania Water	WTRG	51.14%	51.03%	51.14%
Aqua Pennsylvania Wastewater	WTRG	97.07%	95.39%	97.07%
Peoples Natural Gas Company	WTRG	61.48%	56.71%	61.48%
Peoples Gas Company	WTRG	79.59%	71.96%	79.59%
Aqua Ohio Water	WTRG	64.62%	61.27%	64.62%
Aqua Ohio Wastewater	WTRG	72.82%	60.35%	72.82%
Aqua Illinois	WTRG	54.57%	57.96%	54.57%
Aqua Texas	WTRG	50.17%	48.96%	50.17%
Aqua New Jersey, Inc. Water	WTRG	50.28%	59.64%	50.28%
Aqua New Jersey, Inc. Wastewater	WTRG	100.00%	100.00%	100.00%
Aqua North Carolina	WTRG	50.62%	50.65%	50.62%
Aqua Indiana Aboite Division	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Consumers Indiana Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Darlington Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Heir Division	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Sani Tech, Inc.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Southeastern Utilities	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wedgewood Park	WTRG	100.00%	100.00%	100.00%
Aqua Indiana White Oak Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wildwood Shores Div.	WTRG	100.00%	100.00%	100.00%
Aqua Indiana Wymberly Division	WTRG	100.00%	100.00%	100.00%
Aqua Virginia	WTRG	55.23%	49.44%	55.23%
Delta Gas	WTRG	56.93%	60.20%	56.93%
Peoples Gas of WV	WTRG	48.44%	48.10%	48.44%
Connecticut Light and Power Company	ES	55.42%	54.53%	55.42%
Yankee Gas Company	ES	61.97%	60.83%	61.97%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
NSTAR Electric Company	ES	54.95%	55.00%	54.95%
NSTAR Gas Company	ES	55.54%	55.53%	55.54%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
Public Service Company of NH	ES	48.66%	47.77%	48.66%
Aquarion Water Company	ES	58.76%	56.60%	58.76%
Middlesex Water Company	MSEX	59.03%	62.54%	59.03%
Pinelands Water	MSEX	100.00%	100.00%	100.00%
Pinelands WW	MSEX	100.00%	100.00%	100.00%
Twin Lakes Util.	MSEX		100.00%	100.00%
Northern Indiana Public Service Company LLC	NI	58.01%	56.43%	58.01%
Columbia Gas of Kentucky, Inc.	NI	54.68%	54.23%	54.68%
Columbia Gas of Maryland, Inc.	NI	54.95%	52.38%	54.95%
Columbia Gas of Ohio, Inc.	NI	50.45%	53.00%	50.45%
Columbia Gas of Pennsylvania, Inc.	NI	55.68%	55.59%	55.68%
Columbia Gas of Virginia, Inc.	NI	43.69%	42.53%	43.69%
New Jersey Natural Gas Company	NJR	55.45%	58.87%	55.45%
Northwest Natural Gas Company	NWN	47.44%	49.19%	47.44%
Kansas Gas Service Company, Inc.	OGS	60.33%	63.55%	60.33%
Oklahoma Natural Gas Company	OGS	59.85%	63.10%	59.85%
Texas Gas Service Company, Inc.	OGS	59.99%	63.23%	59.99%
San Jose Water	SJW	54.02%	51.46%	54.02%
CT Water	SJW	59.12%	56.58%	59.12%
Avon Water	SJW		92.15%	92.15%
Heritage Village Water	SJW		80.56%	80.56%
Maine Water Co.	SJW	58.39%	54.21%	58.39%
Canyon Lake Water Service Company	SJW	74.05%	71.88%	74.05%
Spire Alabama Inc.	SR	64.35%	66.82%	64.35%
Spire Gulf Inc.	SR	40.55%	37.18%	40.55%
Spire Mississippi Inc.	SR	100.00%	100.00%	100.00%
Spire Missouri Inc.	SR	56.68%	59.05%	56.68%
York Water Company	YORW	53.27%	56.50%	53.27%

Notes:

[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

LONG-TERM DEBT RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	43.24%	34.06%	43.24%
Atmos Energy Corporation	ATO	41.69%	41.57%	41.69%
California Water Service Group	CWT	47.77%	53.27%	47.77%
Essential Utilities, Inc.	WTRG	44.17%	45.18%	44.17%
Eversource Energy	ES	44.35%	44.88%	44.35%
Middlesex Water Company	MSEX	40.43%	36.89%	40.43%
NiSource Inc.	NI	45.57%	45.67%	45.57%
New Jersey Resources Corporation	NJR	44.55%	41.13%	44.55%
Northwest Natural Gas Company	NWN	52.56%	50.81%	52.56%
One Gas Inc.	OGS	39.96%	36.72%	39.96%
SJW Corporation	SJW	43.34%	44.87%	43.34%
Spire Inc.	SR	41.48%	39.15%	41.48%
York Water Company	YORW	46.73%	43.50%	46.73%
Proxy Group				
MEAN		44.30%	42.90%	44.30%
LOW		39.96%	34.06%	39.96%
HIGH		52.56%	53.27%	52.56%

LONG-TERM DEBT RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	43.24%	34.06%	43.24%
Atmos Energy Corporation	ATO	41.69%	41.57%	41.69%
California Water Service	CWT	48.66%	53.54%	48.66%
New Mexico Water Service Water Division	CWT	32.94%	34.74%	32.94%
New Mexico Water Service Sewer Division	CWT	40.53%	43.21%	40.53%
Washington Water Service	CWT	28.07%	47.47%	28.07%
Hawaii Water Service Kaanapali Division	CWT	51.07%	50.24%	51.07%
Hawaii Water Service Pukalani Division	CWT	35.44%	34.94%	35.44%
Aqua Pennsylvania Water	WTRG	48.86%	48.97%	48.86%
Aqua Pennsylvania Wastewater	WTRG	2.93%	4.61%	2.93%
Peoples Natural Gas Company	WTRG	38.52%	43.29%	38.52%
Peoples Gas Company	WTRG	20.41%	28.04%	20.41%
Aqua Ohio Water	WTRG	35.38%	38.73%	35.38%
Aqua Ohio Wastewater	WTRG	27.18%	39.65%	27.18%
Aqua Illinois	WTRG	45.43%	42.04%	45.43%
Aqua Texas	WTRG	49.83%	51.04%	49.83%
Aqua New Jersey, Inc. Water	WTRG	49.72%	40.36%	49.72%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	49.38%	49.35%	49.38%
Aqua Indiana Aboite Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Consumers Indiana Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Darlington Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Heir Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Sani Tech, Inc.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Southeastern Utilities	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wedgewood Park	WTRG	0.00%	0.00%	0.00%
Aqua Indiana White Oak Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wildwood Shores Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wymberly Division	WTRG	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	44.77%	50.56%	44.77%
Delta Gas	WTRG	43.07%	39.80%	43.07%
Peoples Gas of WV	WTRG	51.56%	51.90%	51.56%
Connecticut Light and Power Company	ES	43.30%	44.03%	43.30%
Yankee Gas Company	ES	38.03%	39.17%	38.03%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
NSTAR Electric Company	ES	44.52%	44.43%	44.52%
NSTAR Gas Company	ES	44.46%	44.47%	44.46%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
Public Service Company of NH	ES	51.34%	52.23%	51.34%
Aquarion Water Company	ES	41.24%	43.40%	41.24%
Middlesex Water Company	MSEX	40.62%	37.05%	40.62%
Pinelands Water	MSEX	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%
Twin Lakes Util.	MSEX		0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	41.99%	43.57%	41.99%
Columbia Gas of Kentucky, Inc.	NI	45.32%	45.77%	45.32%
Columbia Gas of Maryland, Inc.	NI	45.05%	47.62%	45.05%
Columbia Gas of Ohio, Inc.	NI	49.55%	47.00%	49.55%
Columbia Gas of Pennsylvania, Inc.	NI	44.32%	44.41%	44.32%
Columbia Gas of Virginia, Inc.	NI	56.31%	57.47%	56.31%
New Jersey Natural Gas Company	NJR	44.55%	41.13%	44.55%
Northwest Natural Gas Company	NWN	52.56%	50.81%	52.56%
Kansas Gas Service Company, Inc.	OGS	39.67%	36.45%	39.67%
Oklahoma Natural Gas Company	OGS	40.15%	36.90%	40.15%
Texas Gas Service Company, Inc.	OGS	40.01%	36.77%	40.01%
San Jose Water	SJW	45.98%	48.54%	45.98%
CT Water	SJW	40.88%	43.42%	40.88%
Avon Water	SJW		7.85%	7.85%
Heritage Village Water	SJW		19.44%	19.44%
Maine Water Co.	SJW	41.61%	45.79%	41.61%
Canyon Lake Water Service Company	SJW	25.95%	28.12%	25.95%
Spire Alabama Inc.	SR	35.65%	33.18%	35.65%
Spire Gulf Inc.	SR	59.45%	62.82%	59.45%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	43.32%	40.95%	43.32%
York Water Company	YORW	46.73%	43.50%	46.73%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.

CAPITAL STRUCTURE ANALYSIS

PREFERRED EQUITY RATIO [1]

Proxy Group Company	Ticker	2020	2019	MRY
American States Water Company	AWR	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%
California Water Service Group	CWT	0.00%	0.00%	0.00%
Essential Utilities, Inc.	WTRG	0.00%	0.00%	0.00%
Eversource Energy	ES	0.66%	0.72%	0.66%
Middlesex Water Company	MSEX	0.35%	0.40%	0.35%
NiSource Inc.	NI	0.00%	0.00%	0.00%
New Jersey Resources Corporation	NJR	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%
One Gas Inc.	OGS	0.00%	0.00%	0.00%
SJW Corporation	SJW	0.00%	0.00%	0.00%
Spire Inc.	SR	0.00%	0.00%	0.00%
York Water Company	YORW	0.00%	0.00%	0.00%
Proxy Group				
MEAN		0.08%	0.09%	0.08%
LOW		0.00%	0.00%	0.00%
HIGH		0.66%	0.72%	0.66%

PREFERRED EQUITY RATIO - UTILITY OPERATING COMPANIES [2]

Company Name	Ticker	2020	2019	MRY
Golden State Water / Bear Valley	AWR	0.00%	0.00%	0.00%
Atmos Energy Corporation	ATO	0.00%	0.00%	0.00%
California Water Service	CWT	0.00%	0.00%	0.00%
New Mexico Water Service Water Division	CWT	0.00%	0.00%	0.00%
New Mexico Water Service Sewer Division	CWT	0.00%	0.00%	0.00%
Washington Water Service	CWT	0.00%	0.00%	0.00%
Hawaii Water Service Kaanapali Division	CWT	0.00%	0.00%	0.00%
Hawaii Water Service Pukalani Division	CWT	0.00%	0.00%	0.00%
Aqua Pennsylvania Water	WTRG	0.00%	0.00%	0.00%
Aqua Pennsylvania Wastewater	WTRG	0.00%	0.00%	0.00%
Peoples Natural Gas Company	WTRG	0.00%	0.00%	0.00%
Peoples Gas Company	WTRG	0.00%	0.00%	0.00%
Aqua Ohio Water	WTRG	0.00%	0.00%	0.00%
Aqua Ohio Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua Illinois	WTRG	0.00%	0.00%	0.00%
Aqua Texas	WTRG	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Water	WTRG	0.00%	0.00%	0.00%
Aqua New Jersey, Inc. Wastewater	WTRG	0.00%	0.00%	0.00%
Aqua North Carolina	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Aboite Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Consumers Indiana Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Darlington Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Heir Division	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Sani Tech, Inc.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Southeastern Utilities	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wedgewood Park	WTRG	0.00%	0.00%	0.00%
Aqua Indiana White Oak Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wildwood Shores Div.	WTRG	0.00%	0.00%	0.00%
Aqua Indiana Wymberly Division	WTRG	0.00%	0.00%	0.00%
Aqua Virginia	WTRG	0.00%	0.00%	0.00%
Delta Gas	WTRG	0.00%	0.00%	0.00%
Peoples Gas of WV	WTRG	0.00%	0.00%	0.00%
Connecticut Light and Power Company	ES	1.28%	1.44%	1.28%
Yankee Gas Company	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
NSTAR Electric Company	ES	0.52%	0.57%	0.52%
NSTAR Gas Company	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
Public Service Company of NH	ES	0.00%	0.00%	0.00%
Aquarion Water Company	ES	0.00%	0.00%	0.00%
Middlesex Water Company	MSEX	0.36%	0.40%	0.36%
Pinelands Water	MSEX	0.00%	0.00%	0.00%
Pinelands WW	MSEX	0.00%	0.00%	0.00%
Twin Lakes Util.	MSEX		0.00%	0.00%
Northern Indiana Public Service Company LLC	NI	0.00%	0.00%	0.00%
Columbia Gas of Kentucky, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Maryland, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Ohio, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Pennsylvania, Inc.	NI	0.00%	0.00%	0.00%
Columbia Gas of Virginia, Inc.	NI	0.00%	0.00%	0.00%
New Jersey Natural Gas Company	NJR	0.00%	0.00%	0.00%
Northwest Natural Gas Company	NWN	0.00%	0.00%	0.00%
Kansas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%
Oklahoma Natural Gas Company	OGS	0.00%	0.00%	0.00%
Texas Gas Service Company, Inc.	OGS	0.00%	0.00%	0.00%
San Jose Water	SJW	0.00%	0.00%	0.00%
CT Water	SJW	0.00%	0.00%	0.00%
Avon Water	SJW		0.00%	0.00%
Heritage Village Water	SJW		0.00%	0.00%
Maine Water Co.	SJW	0.00%	0.00%	0.00%
Canyon Lake Water Service Company	SJW	0.00%	0.00%	0.00%
Spire Alabama Inc.	SR	0.00%	0.00%	0.00%
Spire Gulf Inc.	SR	0.00%	0.00%	0.00%
Spire Mississippi Inc.	SR	0.00%	0.00%	0.00%
Spire Missouri Inc.	SR	0.00%	0.00%	0.00%
York Water Company	YORW	0.00%	0.00%	0.00%

Notes:
[1] Ratios are weighted by actual common capital, preferred equity, and long-term debt of Operating Subsidiaries.

[2] Natural Gas and Water operating subsidiaries where data was unable to be obtained for 2020 and 2019 were removed from the analysis.

Pennsylvania-American Water Company
Water Services - Cost of Capital

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Proforma at December 31, 2022			
Long-Term Debt	43.68%	4.32%	1.89%
Preferred Stock	0.01%	9.70%	0.00%
Common Equity	56.31%	10.80%	6.08%
Total	100.00%		7.97%
Proforma at December 31, 2023			
Long-Term Debt	43.94%	4.31%	1.89%
Preferred Stock	0.01%	9.70%	0.00%
Common Equity	56.05%	10.80%	6.05%
Total	100.00%		7.94%

Pennsylvania-American Water Company
Wastewater - Cost of Capital

Type of Capital	Ratios	Cost Rate	Weighted Cost Rate
Proforma at December 31, 2022			
Long-Term Debt	41.88%	4.32%	1.81%
WW Financing	6.24%	2.59%	0.16%
Preferred Stock	0.01%	9.70%	0.00%
Common Equity	51.87%	10.80%	5.60%
Total	100.00%		7.57%
Proforma at December 31, 2023			
Long-Term Debt	42.26%	4.31%	1.82%
WW Financing	5.65%	2.57%	0.15%
Preferred Stock	0.01%	9.70%	0.00%
Common Equity	52.08%	10.80%	5.62%
Total	100.00%		7.59%

Pennsylvania American Water Company
Capitalization and Related Capital Structure Ratios
Actual at December 31, 2021 and Proforma at December 31, 2022, and December 31, 2023

Total Company

	Actual at December 31, 2021			Proforma at December 31, 2022			Proforma at December 31, 2023		
	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T
Long term debt	$ 1,810,537,202	44.63%	41.72%	$ 2,060,659,024	44.67%	41.62%	$ 2,328,239,723	44.79%	44.41%
Preferred Stock	$ 1,651,500	0.04%	0.04%	$ 451,500	0.01%	0.01%	$ 451,500	0.01%	0.01%
Common Equity									
Common Stock	21,506,887			21,506,887			21,506,887		
Paid in Capital	1,416,192,361			1,661,800,555			1,909,300,555		
Retained Earnings	806,548,954			868,842,068			938,185,356		
Total Common Equity	$ 2,244,248,201	55.33%	51.73%	$ 2,552,149,510	55.32%	51.56%	$ 2,868,992,798	55.20%	54.72%
Total Permanent Capital	$ 4,056,436,903	100.00%	93.49%	$ 4,613,260,035	100.00%	93.19%	$ 5,197,684,021	100.00%	99.14%
ST Debt	282,368,383		6.51%	337,057,758		6.81%	45,016,993		0.86%
Total Capital Employed	$ 4,338,805,286		100.00%	$ 4,950,317,792		100.00%	$ 5,242,701,014		100.00%
CWIP	96,767,642			67,510,218			47,103,854		
GENERAL LEDGER	4,338,805,287								

Water Service

	Actual at December 31, 2021			Proforma at December 31, 2022			Proforma at December 31, 2023		
	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T	Amount Outstanding	Ratios Excl. S-T	Ratios Incl. S-T
Long term debt	$ 1,452,629,157	43.55%	40.15%	$ 1,566,937,139	43.68%	39.93%	$ 1,795,801,017	43.94%	43.47%
Preferred Stock	$ 1,389,142	0.04%	0.04%	$ 355,301	0.01%	0.01%	$ 346,649	0.01%	0.01%
Common Equity									
Common Stock	18,029,110			17,022,296			17,168,181		
Paid in Capital	1,187,186,600			1,315,283,849			1,524,126,605		
Retained Earnings	676,125,742			687,672,138			748,919,942		
Total Common Equity	$ 1,881,341,452	56.41%	52.00%	$ 2,019,978,282	56.31%	51.47%	$ 2,290,214,728	56.05%	55.43%
Total Permanent Capital	$ 3,335,359,751	100.00%	92.19%	$ 3,587,270,723	100.00%	91.41%	$ 4,086,362,394	100.00%	98.91%
ST Debt	282,368,383		7.81%	337,057,758		8.59%	45,016,993		1.09%
Total Capital Employed	$ 3,617,728,134		100.00%	$ 3,924,328,480		100.00%	$ 4,131,379,387		100.00%
CWIP	96,767,642			67,510,218			47,103,854		

Wastewater Service

	Actual at December 31, 2021		Proforma at December 31, 2022		Proforma at December 31, 2023	
	Amount Outstanding	Ratios Excl. S-T	Amount Outstanding	Ratios Excl. S-T	Amount Outstanding	Ratios Excl. S-T
Long term debt	$ 292,725,976	40.59%	$ 429,719,609	41.88%	$ 469,628,075	42.26%
LTD WW Specific Financing	65,182,069	9.04%	64,002,276	6.24%	62,810,631	5.65%
Preferred Stock	$ 262,358	0.04%	$ 96,199	0.01%	$ 104,851	0.01%
Common Equity						
Common Stock	$ 3,477,777		$ 4,484,591		$ 4,338,705	
Paid in Capital	229,005,760		346,516,706		385,173,951	
Retained Earnings	130,423,212		181,169,931		189,265,414	
Total Common Equity	$ 362,906,749	50.33%	$ 532,171,228	51.87%	$ 578,778,070	52.08%
Total Permanent Capital	$ 721,077,152	100.00%	$ 1,025,989,312	100.00%	$ 1,111,321,627	100.00%
Rate Base	$ 721,077,152		$ 1,025,989,312		$ 1,111,321,627	
WW Specific LTD	65,182,069		64,002,276		62,810,631	
Amount financed by overall Company capital structure excluding WW Specific LTD financing.	$ 655,895,083		$ 961,987,036		$ 1,048,510,996	

Notes:

1 Equity Infusions

$ 245,000,000	2nd Quarter 2022	
156,000,000	1st Quarter 2023	
30,500,000	2nd Quarter 2023	
30,500,000	3rd Quarter 2023	
31,000,000	4th Quarter 2023	

2

2022 New LTD (AWCC)	$ 255,000,000	May-22
2023 New LTD (AWCC)	144,000,000	January-23
2023 New LTD (AWCC)	128,000,000	May-23

3

2022 Pennvest Sinking Fund Pymt Total	4,325,935	Various
2023 Pennvest Sinking Fund Pymt Total	4,419,301	Various

4 2009 PEDFA Loan (BD240082)

	12/31/21	12/31/22	Rate Year 12/31/23
Coatesville Wastewater Treatment Plant	$ 47,000,000	$ 47,000,000	$ 47,000,000
Chemical Improvements at Pittsburgh	16,000,000	16,000,000	16,000,000
New Beck's Run Pump Station	17,000,000	17,000,000	17,000,000
	$ 80,000,000	$ 80,000,000	$ 80,000,000

PENNVEST (Outstanding)

	12/31/21	12/31/22	12/31/23
Clarion Wastewater System (BD240101)	11,996,962	11,259,296	10,514,220
Scranton Wastewater Acquisition (BD240105)	6,185,107	5,742,980	5,296,411
Total Wastewater	$ 65,182,069	$ 64,002,276	$ 62,810,631

5 Preferred Stock — Series 8.49% — 1,200,000 — Sinking Fund Redemption 2022

For 2023, there are no Sinking Fund Redemptions.

6 Forecasted Capital Expenditures (Total Company)

	Gross	CIAC/CAC	Net
2022	502,369,374	4,500,000	497,869,374
2023	622,408,902	4,500,000	617,908,902
2024	478,630,157	4,500,000	474,130,157
2025	592,432,428	4,500,000	587,932,428
2026	489,166,862	4,500,000	484,666,862
Total			$ 2,662,507,723

Funding will be based on a combination of LTD issuances and equity infusions which allow for PAWC, on a total-company basis, to reach the targeted equity range.

7 PAWC's Total Company overall target capital structure goal is 55% Equity

8 2022-2023 Long-Term Debt Maturities

	Amount Issued	Amount Outstanding at Maturity	Issue Date	Maturity Date	Coupon Rate
PennVest Maturity 2022	$ 3,945,656	233,844	01/01/03	12/01/22	2.774%
PennVest Maturity 2022	3,366,155	54,851	04/01/00	03/01/22	3.237%
PennVest Maturity 2022	3,623,800	59,031	04/01/00	03/01/22	3.237%
PennVest Maturity 2022	4,322,665	204,517	08/30/00	09/01/22	3.237%
Total 2022 Maturities	$ 15,258,276	$ 552,243			

For 2023, there are no Long-term Debt maturities.

9 Cost Rates

	Total Company LTD	WW Specific LTD	Excl WW Specific LTD	Preferred Stock
2021	4.29%	2.56%	4.36%	8.87%
2022	4.27%	2.59%	4.32%	9.70%
2023	4.26%	2.57%	4.31%	9.70%

Pennsylvania American Water Company
Capital Structure - Wastewater Specific LTD

12/31/2021

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
PENNVEST- Clarion WW													
04/01/15	09/01/32	16,892,338	11,996,962	1.000%	119,970	24	0	16,892,338	100.00%	0	18.41%	1.00%	0.18%
PEDFA - Coatesville WW													
06/21/19	04/01/39	47,000,000	47,000,000	3.000%	1,410,000	5	1,173,060	45,826,940	97.50%	0	72.11%	3.17%	2.29%
PENNVEST- Scranton WW													
12/29/16	11/01/37	7,951,445	6,185,107	1.000%	61,851	28	0	7,951,445	100.00%	0	9.49%	1.00%	0.09%
		$71,843,783	**$65,182,069**		**$1,591,821**		**$1,173,060**	**$70,670,723**		**$0**	100.00%		2.56%

12/31/2022

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
PENNVEST- Clarion WW													
04/01/15	09/01/32	16,892,338	11,259,296	1.000%	112,593	24	0	16,892,338	100.00%	0	17.59%	1.00%	0.18%
PEDFA - Coatesville WW													
06/21/19	04/01/39	47,000,000	47,000,000	3.000%	1,410,000	5	1,173,060	45,826,940	97.50%	0	73.43%	3.17%	2.33%
PENNVEST- Scranton WW													
12/29/16	11/01/37	7,951,445	5,742,980	1.000%	57,430	28	0	7,951,445	100.00%	0	8.97%	1.00%	0.09%
		$71,843,783	**$64,002,276**		**$1,580,023**		**$1,173,060**	**$70,670,723**		**$0**	100.00%		2.59%

12/31/2023

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS Ratio	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
PENNVEST- Clarion WW													
04/01/15	09/01/32	16,892,338	10,514,220	1.000%	105,142	24	0	16,892,338	100.00%	0	16.43%	1.00%	0.16%
PEDFA - Coatesville WW													
06/21/19	04/01/39	47,000,000	47,000,000	3.000%	1,410,000	5	1,173,060	45,826,940	97.50%	0	73.43%	3.17%	2.33%
PENNVEST- Scranton WW													
12/29/16	11/01/37	7,951,445	5,296,411	1.000%	52,964	28	0	7,951,445	100.00%	0	8.28%	1.00%	0.08%
		$71,843,783	**$62,810,631**		**$1,568,106**		**$1,173,060**	**$70,670,723**		**$0**	98.14%		2.57%

PA AMERICAN WATER - WATER SERVICES
SCHEDULE OF DEBT AT December 31, 2021

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS RATIO	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
Bonds and Notes													
11/01/03	11/01/33	38,000,000	38,000,000	6.780%	2,576,400		174,946	37,825,054	99.54%		2.18%	6.82%	0.15%
09/01/06	09/01/26	150,000,000	150,000,000	7.800%	11,700,000		2,069,648	147,930,352	98.62%		8.59%	7.94%	0.68%
11/01/04	11/01/31	10,000,000	10,000,000	8.820%	882,000		88,352	9,911,648	99.12%		0.57%	8.91%	0.05%
08/01/04	08/01/25	10,000,000	10,000,000	8.150%	815,000		60,119	9,939,881	99.40%		0.57%	8.21%	0.05%
12/21/12	12/01/42	23,015,000	23,015,000	4.300%	989,645	1	895,945	22,119,055	96.11%		1.32%	4.54%	0.06%
12/17/12	12/01/42	45,000,000	45,000,000	4.300%	1,935,000	2	582,689	44,417,311	98.71%		2.58%	4.38%	0.11%
11/21/11	10/15/37	35,000,000	35,000,000	5.050%	1,767,500		0	35,000,000	100.00%		2.01%	5.05%	0.10%
11/21/11	10/15/37	15,500,000	15,500,000	5.050%	782,750		740,260	14,759,740	95.22%		0.89%	5.39%	0.05%
11/20/13	03/01/24	67,000,000	67,000,000	3.850%	2,579,500		791,901	66,208,099	98.82%		3.84%	3.99%	0.15%
08/14/14	03/01/25	36,200,000	36,200,000	3.400%	1,230,800		1,189,364	35,010,636	96.71%		2.07%	3.78%	0.08%
08/14/14	12/01/42	65,700,000	65,700,000	4.300%	2,825,100		4,432,879	61,267,121	93.25%		3.76%	4.74%	0.18%
08/10/17	09/01/47	240,000,000	240,000,000	3.750%	9,000,000		3,231,905	236,768,095	98.65%		13.75%	3.83%	0.53%
09/13/17	09/01/27	101,426,171	101,426,171	2.950%	2,992,072	3	11,291,519	90,134,652	88.87%		5.81%	4.34%	0.25%
08/09/18	09/01/28	74,739,360	74,739,360	3.750%	2,802,726		623,814	74,115,546	99.17%		4.28%	3.85%	0.16%
08/09/18	09/01/48	227,489,000	227,489,000	4.200%	9,554,538		2,490,214	224,998,786	98.91%		13.03%	4.26%	0.56%
09/11/18	09/01/28	124,719,875	124,719,875	3.750%	4,676,995	4	8,287,774	116,432,101	93.35%		7.15%	4.59%	0.33%
05/23/19	06/01/29	110,000,000	110,000,000	3.450%	3,795,000		1,141,559	108,858,441	98.96%		6.30%	3.57%	0.22%
06/21/19	04/01/39	33,000,000	33,000,000	3.000%	990,000	5	823,638	32,176,362	97.50%		1.89%	3.17%	0.06%
12/12/19	12/03/29	80,000,000	80,000,000	2.450%	1,960,000	6	1,907,647	78,092,353	97.62%		4.58%	2.72%	0.12%
12/12/19	12/03/29	13,165,000	13,165,000	2.450%	322,543	6	483,935	12,681,065	96.32%		0.75%	2.88%	0.02%
04/14/20	05/01/30	30,000,000	30,000,000	2.800%	840,000	30	373,996	29,626,004	98.75%		1.72%	2.94%	0.05%
04/14/20	05/01/50	90,000,000	90,000,000	3.450%	3,105,000	31	1,141,788	88,858,212	98.73%		5.16%	3.52%	0.18%
06/14/21	06/01/31	47,500,000	47,500,000	2.300%	1,092,500	32	1,798,391	45,701,609	96.21%		2.72%	2.74%	0.07%
05/14/21	06/01/51	47,500,000	47,500,000	3.250%	1,543,750	33	641,731	46,858,269	98.65%		2.72%	3.32%	0.09%
Pennvest Loans													
01/01/03	12/01/22	3,945,656	233,844	2.774%	6,487	7	8,480	3,937,176	99.79%		0.01%	2.79%	0.00%
04/01/00	03/01/22	3,366,155	54,851	3.237%	1,776	8	56,803	3,309,352	98.31%		0.00%	3.35%	0.00%
04/01/00	03/01/22	3,623,800	59,031	3.237%	1,911	9	56,803	3,566,997	98.43%		0.00%	3.34%	0.00%
08/30/00	09/01/22	4,322,665	204,517	3.237%	6,620	10	25,445	4,297,220	99.41%		0.01%	3.27%	0.00%
08/01/04	07/01/24	1,559,205	200,723	2.774%	5,568	11	13,749	1,545,456	99.12%		0.01%	2.83%	0.00%
06/01/05	11/01/24	5,721,348	878,607	1.156%	10,157	12	29,484	5,691,864	99.48%		0.05%	1.19%	0.00%
01/01/06	12/01/25	5,670,111	1,002,913	2.763%	27,710	13	34,130	5,635,981	99.40%		0.06%	2.80%	0.00%
09/01/04	08/01/24	5,240,631	833,630	2.774%	23,125	14	7,951	5,232,680	99.85%		0.05%	2.78%	0.00%
11/01/04	10/01/24	3,099,441	514,315	2.432%	12,508	15	5,660	3,093,781	99.82%		0.03%	2.44%	0.00%
10/01/09	09/01/29	2,359,891	1,021,010	2.547%	26,005	16	0	2,359,891	100.00%		0.06%	2.55%	0.00%
06/01/11	02/01/31	12,150,000	6,189,828	2.690%	166,506	17	0	12,150,000	100.00%		0.35%	2.69%	0.01%
01/05/12	12/01/31	9,936,500	6,065,081	3.117%	189,049	18	0	9,936,500	100.00%		0.35%	3.12%	0.01%
01/05/12	12/01/31	1,606,709	910,369	3.098%	28,203	19	0	1,606,709	100.00%		0.05%	3.10%	0.00%
03/23/12	03/01/41	1,724,610	1,205,579	1.000%	12,056	20	0	1,724,610	100.00%		0.07%	1.00%	0.00%
03/20/12	04/01/31	1,675,790	1,010,492	2.810%	28,395	21	0	1,675,790	100.00%		0.06%	2.81%	0.00%
03/26/12	03/01/32	1,273,465	641,470	2.690%	17,256	22	0	1,273,465	100.00%		0.04%	2.69%	0.00%
03/22/13	04/01/33	1,378,357	805,992	2.196%	17,700	23	0	1,378,357	100.00%		0.05%	2.20%	0.00%
10/15/15	07/01/40	123,663	95,651	1.000%	957	25	0	123,663	100.00%		0.01%	1.00%	0.00%
10/15/15	07/01/40	969,823	750,143	1.000%	7,501	26	0	969,823	100.00%		0.04%	1.00%	0.00%
04/21/16	05/01/37	4,152,000	3,196,793	1.356%	43,349	27	0	4,152,000	100.00%		0.18%	1.36%	0.00%
06/14/17	11/01/36	5,937,613	4,525,887	2.027%	91,740	29	0	5,937,613	100.00%		0.26%	2.03%	0.01%
		$1,794,791,840	**$1,745,355,133**		**$71,483,398**		**$45,502,519**	**$1,749,289,321**			**100.00%**		**4.36%**

Notes to Debt Schedule

(1) Re-issuance 12/21/12 from Parent at a coupon rate of 4.30% for 30 years
(2) New unsecured borrowing at a coupon rate of 4.30% for 30 years
(3) Issuances costs included make whole premium of $10M
(4) Issuances costs included make whole premium of $7.2M
(5) Refinanced June 2019 at a lower rate for the remaining term of the bond
(6) Refinanced Dec 2019 at a lower rate for the remaining term of the bond
(7) Eldersville, Jefferson, and Crosscreek, interest 1.387% for first 70 months and 2.774% (12/2007) for remainder
(8) Strattanville Pennvest Loan. Interest 1.619% from 2002 to 2007 and 3.237% starting March 2007
(9) Franklin Township. Interest 1.619% from 2002 to 2007 and 3.237% starting April 2007
(10) Jackson Township. Interest 1.619% from 2001 to 2006 and 3.237% starting Oct 2007
(11) Farmington Twp., Interest rate 1.387% for first 70 months and 2.774% (07/2009) for remainder
(12) Sandy Ridge, Interest rate 1.000% for first 60 months and 1.156% (07/2010) for remainder
(13) Sligo/Shippenville, Interest rate 1.385% for first 86 months and 2.763% (06/2013) for remainder
(14) Ellwood/Butler Interconnect, Interest rate 1.387% for first 74 months and 2.774% (08/2009) for remainder
(15) Mahoning & Union Twp, Interest rate 1.305% for first 82 months and 2.432% (10/2009) for remainder
(16) Hanover & Collier 1.274% first 2009 - 2014 and 2.547% starting Oct 2014
(17) Mount Pleasant Water System Extension 1.559% first 2011 - 2016 and 2.69% starting March 2016
(18) Rock Run WTP 2.414% first 2011 - 2016 and 3.117% starting Dec 2017
(19) Silver Spring Clearwell 2.376% first 2012 - 2016 and 3.098% starting Jan 2017
(20) Wallaceton Municipal Authority 1.00% for 30 years starting March 2012
(21) Pittsburgh Meter Improvements 1.799% first 2012 - 2017 and 2.81% starting April 2017
(22) Pittsburgh Meter Improvement Project Phase II 1.559% first 60 months and 2.69% starting May 2016
(23) Southwest PA Pipeline Exts Phase II - Interest 1.591% first 5 years - 2.196% starting April 2018
(25) Paint Twp #1 - Interest rate is 1% for the remaining life of the Bond
(26) Paint Twp #2 - Interest rate is 1% for the remaining life of the Bond
(27) Fairview Water Main Extension - Interest rate is 1.356% for the first 5 years, 1.985% June 2022 for remaining 5 years
(29) Washington County Main Extension Project - Interest rate is 1.439% until Oct 2021 - 2.027% for the remaining term
(30) New unsecured borrowing at a coupon rate of 2.80% for 10 years
(31) New unsecured borrowing at a coupon rate of 3.45% for 30 years
(32) Issuance costs include make whole premium of $1.2M
(33) New unsecured borrowing at a coupon rate of 3.25% for 30 years

PA AMERICAN WATER - WATER SERVICES
SCHEDULE OF DEBT AT December 31, 2022

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS RATIO	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
Bonds and Notes													
11/01/03	11/01/33	38,000,000	38,000,000	6.780%	2,576,400		174,946	37,825,054	99.54%		1.90%	6.82%	0.13%
09/01/06	09/01/26	150,000,000	150,000,000	7.800%	11,700,000		2,069,648	147,930,352	98.62%		7.51%	7.94%	0.60%
11/01/04	11/01/31	10,000,000	10,000,000	8.820%	882,000		88,352	9,911,648	99.12%		0.50%	8.91%	0.04%
08/01/04	08/01/25	10,000,000	10,000,000	8.150%	815,000		60,119	9,939,881	99.40%		0.50%	8.21%	0.04%
12/21/12	12/01/42	23,015,000	23,015,000	4.300%	989,645	1	895,945	22,119,055	96.11%		1.15%	4.54%	0.05%
12/17/12	12/01/42	45,000,000	45,000,000	4.300%	1,935,000	2	582,689	44,417,311	98.71%		2.25%	4.38%	0.10%
11/21/11	10/15/37	35,000,000	35,000,000	5.050%	1,767,500		0	35,000,000	100.00%		1.75%	5.05%	0.09%
11/21/11	10/15/37	15,500,000	15,500,000	5.050%	782,750		740,260	14,759,740	95.22%		0.78%	5.39%	0.04%
11/20/13	03/01/24	67,000,000	67,000,000	3.850%	2,579,500		791,901	66,208,099	98.82%		3.36%	3.99%	0.13%
08/14/14	03/01/25	36,200,000	36,200,000	3.400%	1,230,800		1,189,364	35,010,636	96.71%		1.81%	3.78%	0.07%
08/14/14	12/01/42	65,700,000	65,700,000	4.300%	2,825,100		4,432,879	61,267,121	93.25%		3.29%	4.74%	0.16%
08/10/17	09/01/47	240,000,000	240,000,000	3.750%	9,000,000		3,231,905	236,768,095	98.65%		12.02%	3.83%	0.46%
09/13/17	09/01/27	101,426,171	101,426,171	2.950%	2,992,072	3	11,291,519	90,134,652	88.87%		5.08%	4.34%	0.22%
08/09/18	09/01/28	74,739,360	74,739,360	3.750%	2,802,726		623,814	74,115,546	99.17%		3.74%	3.85%	0.14%
08/09/18	09/01/48	227,489,000	227,489,000	4.200%	9,554,538		2,490,214	224,998,786	98.91%		11.39%	4.26%	0.49%
09/11/18	09/01/28	124,719,875	124,719,875	3.750%	4,676,995	4	8,287,774	116,432,101	93.35%		6.25%	4.59%	0.29%
05/23/19	06/01/29	110,000,000	110,000,000	3.450%	3,795,000		1,141,559	108,858,441	98.96%		5.51%	3.57%	0.20%
06/21/19	04/01/39	33,000,000	33,000,000	3.000%	990,000	5	823,638	32,176,362	97.50%		1.65%	3.17%	0.05%
12/12/19	12/03/29	80,000,000	80,000,000	2.450%	1,960,000	6	1,907,647	78,092,353	97.62%		4.01%	2.72%	0.11%
12/12/19	12/03/29	13,165,000	13,165,000	2.450%	322,543	6	483,935	12,681,065	96.32%		0.66%	2.88%	0.02%
04/14/20	05/01/30	30,000,000	30,000,000	2.800%	840,000	30	373,996	29,626,004	98.75%		1.50%	2.94%	0.04%
04/14/20	05/01/50	90,000,000	90,000,000	3.450%	3,105,000	31	1,141,788	88,858,212	98.73%		4.51%	3.52%	0.16%
06/14/21	06/01/31	47,500,000	47,500,000	2.300%	1,092,500	32	1,798,391	45,701,609	96.21%		2.38%	2.74%	0.07%
05/14/21	06/01/51	47,500,000	47,500,000	3.250%	1,543,750	33	641,731	46,858,269	98.65%		2.38%	3.32%	0.08%
05/15/22	06/01/52	255,000,000	255,000,000	4.000%	10,200,000	34	2,550,000	252,450,000	99.00%		12.77%	4.06%	0.52%
Pennvest Loans													
08/01/04	07/01/24	1,559,205	124,723	2.774%	3,460	11	13,749	1,545,456	99.12%		0.01%	2.83%	0.00%
06/01/05	11/01/24	5,721,348	580,700	1.156%	6,713	12	29,484	5,691,864	99.48%		0.03%	1.19%	0.00%
01/01/06	12/01/25	5,670,111	762,467	2.763%	21,067	13	34,130	5,635,981	99.40%		0.04%	2.80%	0.00%
09/01/04	08/01/24	5,240,631	528,214	2.774%	14,653	14	7,951	5,232,680	99.85%		0.03%	2.78%	0.00%
11/01/04	10/01/24	3,099,441	336,821	2.432%	8,191	15	5,660	3,093,781	99.82%		0.02%	2.44%	0.00%
10/01/09	09/01/29	2,359,891	900,300	2.547%	22,931	16	0	2,359,891	100.00%		0.05%	2.55%	0.00%
06/01/11	02/01/31	12,150,000	5,586,251	2.690%	150,270	17	0	12,150,000	100.00%		0.28%	2.69%	0.01%
01/05/12	12/01/31	9,936,500	5,595,180	3.117%	174,402	18	0	9,936,500	100.00%		0.28%	3.12%	0.01%
01/05/12	12/01/31	1,606,709	831,477	3.098%	25,759	19	0	1,606,709	100.00%		0.04%	3.10%	0.00%
03/23/12	03/01/41	1,724,610	1,148,499	1.000%	11,485	20	0	1,724,610	100.00%		0.06%	1.00%	0.00%
03/20/12	04/01/31	1,675,790	914,446	2.810%	25,696	21	0	1,675,790	100.00%		0.05%	2.81%	0.00%
03/26/12	03/01/32	1,273,465	580,793	2.690%	15,623	22	0	1,273,465	100.00%		0.03%	2.69%	0.00%
03/22/13	04/01/33	1,378,357	742,128	2.196%	16,297	23	0	1,378,357	100.00%		0.04%	2.20%	0.00%
10/15/15	07/01/40	123,663	90,944	1.000%	909	25	0	123,663	100.00%		0.00%	1.00%	0.00%
10/15/15	07/01/40	969,823	713,225	1.000%	7,132	26	0	969,823	100.00%		0.04%	1.00%	0.00%
04/21/16	05/01/37	4,152,000	3,002,821	1.985%	59,606	27	0	4,152,000	100.00%		0.15%	1.98%	0.00%
06/14/17	11/01/36	5,937,613	4,263,353	2.027%	86,418	29	0	5,937,613	100.00%		0.21%	2.03%	0.00%
		$2,034,533,564	**$1,996,656,749**		**$81,609,431**		**$47,904,988**	**$1,986,628,576**			**100.00%**		**4.32%**

Notes to Debt Schedule

(1) Re-issuance 12/21/12 from Parent at a coupon rate of 4.30% for 30 years
(2) New unsecured borrowing at a coupon rate of 4.30% for 30 years
(3) Issuances costs included make whole premium of $10M
(4) Issuances costs included make whole premium of $7.2M
(5) Refinanced June 2019 at a lower rate for the remaining term of the bond
(6) Refinanced Dec 2019 at a lower rate for the remaining term of the bond
(11) Farmington Twp., Interest rate 1.387% for first 70 months and 2.774% (07/2009) for remainder
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(13) Sligo/Shippenville, Interest rate 1.385% for first 86 months and 2.763% (06/2013) for remainder
(14) Ellwood/Butler Interconnect, Interest rate 1.387% for first 74 months and 2.774% (08/2009) for remainder
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(19) Silver Spring Clearwell 2.376% first 2012 - 2016 and 3.098% starting Jan 2017
(20) Wallaceton Municipal Authority 1.00% for 30 years starting March 2012
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(22) Pittsburgh Meter Improvement Project Phase II 1.559% first 60 months and 2.69% starting May 2016
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(29) Washington County Main Extension Project - Interest rate is 1.439% until Oct 2021 - 2.027% for the remaining term
(30) New unsecured borrowing at a coupon rate of 2.80% for 10 years
(31) New unsecured borrowing at a coupon rate of 3.45% for 30 years
(32) Issuance costs include make whole premium of $1.2M
(33) New unsecured borrowing at a coupon rate of 3.25% for 30 years
(34) New projected unsecured borrowing at a coupon rate of 4.00% for 30 years

PA AMERICAN WATER - WATER SERVICES
SCHEDULE OF DEBT AT December 31, 2023

DATE OF ISSUE	DATE OF MATURITY	AMOUNT ISSUED	AMOUNT OUTSTANDING	COUPON RATE	ANNUAL INTEREST	NOTE #	ISSUANCE EXPENSE	NET PROCEEDS	NET PROCEEDS RATIO	SINKING REQUIR.	PERCENT TO TOTAL	EFFECTIVE COST RATE (1)	WEIGHTED COST RATE
Bonds and Notes													
11/01/03	11/01/33	38,000,000	38,000,000	6.780%	2,576,400		174,946	37,825,054	99.54%		1.68%	6.82%	0.11%
09/01/06	09/01/26	150,000,000	150,000,000	7.800%	11,700,000		2,069,648	147,930,352	98.62%		6.62%	7.94%	0.53%
11/01/04	11/01/31	10,000,000	10,000,000	8.820%	882,000		88,352	9,911,648	99.12%		0.44%	8.91%	0.04%
08/01/04	08/01/25	10,000,000	10,000,000	8.150%	815,000		60,119	9,939,881	99.40%		0.44%	8.21%	0.04%
12/21/12	12/01/42	23,015,000	23,015,000	4.300%	989,645	1	895,945	22,119,055	96.11%		1.02%	4.54%	0.05%
12/17/12	12/01/42	45,000,000	45,000,000	4.300%	1,935,000	2	582,689	44,417,311	98.71%		1.99%	4.38%	0.09%
11/21/11	10/15/37	35,000,000	35,000,000	5.050%	1,767,500		0	35,000,000	100.00%		1.54%	5.05%	0.08%
11/21/11	10/15/37	15,500,000	15,500,000	5.050%	782,750		740,260	14,759,740	95.22%		0.68%	5.39%	0.04%
11/20/13	03/01/24	67,000,000	67,000,000	3.850%	2,579,500		791,901	66,208,099	98.82%		2.96%	3.99%	0.12%
08/14/14	03/01/25	36,200,000	36,200,000	3.400%	1,230,800		1,189,364	35,010,636	96.71%		1.60%	3.78%	0.06%
08/14/14	12/01/42	65,700,000	65,700,000	4.300%	2,825,100		4,432,879	61,267,121	93.25%		2.90%	4.74%	0.14%
08/10/17	09/01/47	240,000,000	240,000,000	3.750%	9,000,000		3,231,905	236,768,095	98.65%		10.59%	3.83%	0.41%
09/13/17	09/01/27	101,426,171	101,426,171	2.950%	2,992,072	3	11,291,519	90,134,652	88.87%		4.48%	4.34%	0.19%
08/09/18	09/01/28	74,739,360	74,739,360	3.750%	2,802,726		623,814	74,115,546	99.17%		3.30%	3.85%	0.13%
08/09/18	09/01/48	227,489,000	227,489,000	4.200%	9,554,538		2,490,214	224,998,786	98.91%		10.04%	4.26%	0.43%
09/11/18	09/01/28	124,719,875	124,719,875	3.750%	4,676,995	4	8,287,774	116,432,101	93.35%		5.51%	4.59%	0.25%
05/23/19	06/01/29	110,000,000	110,000,000	3.450%	3,795,000		1,141,559	108,858,441	98.96%		4.86%	3.57%	0.17%
06/21/19	04/01/39	33,000,000	33,000,000	3.000%	990,000	5	823,638	32,176,362	97.50%		1.46%	3.17%	0.05%
12/12/19	12/03/29	80,000,000	80,000,000	2.450%	1,960,000	6	1,907,647	78,092,353	97.62%		3.53%	2.72%	0.10%
12/12/19	12/03/29	13,165,000	13,165,000	2.450%	322,543	6	483,935	12,681,065	96.32%		0.58%	2.88%	0.02%
04/14/20	05/01/30	30,000,000	30,000,000	2.800%	840,000	30	373,996	29,626,004	98.75%		1.32%	2.94%	0.04%
04/14/20	05/01/50	90,000,000	90,000,000	3.450%	3,105,000	31	1,141,788	88,858,212	98.73%		3.97%	3.52%	0.14%
06/14/21	06/01/31	47,500,000	47,500,000	2.300%	1,092,500	32	1,798,391	45,701,609	96.21%		2.10%	2.74%	0.06%
05/14/21	06/01/51	47,500,000	47,500,000	3.250%	1,543,750	33	641,731	46,858,269	98.65%		2.10%	3.32%	0.07%
05/15/22	06/01/52	255,000,000	255,000,000	4.000%	10,200,000	34	2,550,000	252,450,000	99.00%		11.26%	4.06%	0.46%
01/15/23	01/01/53	144,000,000	144,000,000	4.000%	5,760,000	35	1,440,000	142,560,000	99.00%		6.36%	4.06%	0.26%
05/15/23	06/01/53	128,000,000	128,000,000	4.250%	5,440,000	35	1,280,000	126,720,000	99.00%		5.65%	4.31%	0.24%
Pennvest Loans													
08/01/04	07/01/24	1,559,205	46,588	2.774%	1,292	11	13,749	1,545,456	99.12%		0.00%	2.83%	0.00%
06/01/05	11/01/24	5,721,348	279,331	1.156%	3,229	12	29,484	5,691,864	99.48%		0.01%	1.19%	0.00%
01/01/06	12/01/25	5,670,111	515,292	2.763%	14,238	13	34,130	5,635,981	99.40%		0.02%	2.80%	0.00%
09/01/04	08/01/24	5,240,631	214,218	2.774%	5,942	14	7,951	5,232,680	99.85%		0.01%	2.78%	0.00%
11/01/04	10/01/24	3,099,441	154,962	2.432%	3,769	15	5,660	3,093,781	99.82%		0.01%	2.44%	0.00%
10/01/09	09/01/29	2,359,891	776,479	2.547%	19,777	16	0	2,359,891	100.00%		0.03%	2.55%	0.00%
06/01/11	02/01/31	12,150,000	4,966,236	2.690%	133,592	17	0	12,150,000	100.00%		0.22%	2.69%	0.01%
01/05/12	12/01/31	9,936,500	5,110,212	3.117%	159,285	18	0	9,936,500	100.00%		0.23%	3.12%	0.01%
01/05/12	12/01/31	1,606,709	750,105	3.098%	23,238	19	0	1,606,709	100.00%		0.03%	3.10%	0.00%
03/23/12	03/01/41	1,724,610	1,090,845	1.000%	10,908	20	0	1,724,610	100.00%		0.05%	1.00%	0.00%
03/20/12	04/01/31	1,675,790	815,737	2.810%	22,922	21	0	1,675,790	100.00%		0.04%	2.81%	0.00%
03/26/12	03/01/32	1,273,465	518,506	2.690%	13,948	22	0	1,273,465	100.00%		0.02%	2.69%	0.00%
03/22/13	04/01/33	1,378,357	676,894	2.196%	14,865	23	0	1,378,357	100.00%		0.03%	2.20%	0.00%
10/15/15	07/01/40	123,663	86,189	1.000%	862	25	0	123,663	100.00%		0.00%	1.00%	0.00%
10/15/15	07/01/40	969,823	675,937	1.000%	6,759	26	0	969,823	100.00%		0.03%	1.00%	0.00%
04/21/16	05/01/37	4,152,000	2,801,707	1.985%	55,614	27	0	4,152,000	100.00%		0.12%	1.98%	0.00%
06/14/17	11/01/36	5,937,613	3,995,448	2.027%	80,988	29	0	5,937,613	100.00%		0.18%	2.03%	0.00%
		$2,306,533,564	**$2,265,429,093**		**$92,730,047**		**$50,624,988**	**$2,255,908,576**			**100.00%**		**4.31%**

Notes to Debt Schedule

(1) Re-issuance 12/21/12 from Parent at a coupon rate of 4.30% for 30 years
(2) New unsecured borrowing at a coupon rate of 4.30% for 30 years
(3) Issuances costs included make whole premium of $10M
(4) Issuances costs included make whole premium of $7.2M
(5) Refinanced June 2019 at a lower rate for the remaining term of the bond
(6) Refinanced Dec 2019 at a lower rate for the remaining term of the bond
(11) Farmington Twp., Interest rate 1.387% for first 70 months and 2.774% (07/2009) for remainder
(12) Sandy Ridge, Interest rate 1.000% for first 60 months and 1.156% (07/2010) for remainder
(13) Sligo/Shippenville, Interest rate 1.385% for first 86 months and 2.763% (06/2013) for remainder
(14) Ellwood/Butler Interconnect, Interest rate 1.387% for first 74 months and 2.774% (08/2009) for remainder
(15) Mahoning & Union Twp, Interest rate 1.305% for first 82 months and 2.432% (10/2009) for remainder
(16) Hanover & Collier 1.274% first 2009 - 2014 and 2.547% starting Oct 2014
(17) Mount Pleasant Water System Extension 1.559% first 2011 - 2016 and 2.69% starting March 2016
(18) Rock Run WTP 2.414% first 2011 - 2016 and 3.117% starting Dec 2017
(19) Silver Spring Clearwell 2.376% first 2012 - 2016 and 3.098% starting Jan 2017
(20) Wallaceton Municipal Authority 1.00% for 30 years starting March 2012
(21) Pittsburgh Meter Improvements 1.799% first 2012 - 2017 and 2.81% starting April 2017
(22) Pittsburgh Meter Improvement Project Phase II 1.559% first 60 months and 2.69% starting May 2016
(23) Southwest PA Pipeline Exts Phase II - Interest 1.591% first 5 years - 2.196% starting April 2018
(25) Paint Twp #1 - Interest rate is 1% for the remaining life of the Bond
(26) Paint Twp #2 - Interest rate is 1% for the remaining life of the Bond
(27) Fairview Water Main Extension - Interest rate is 1.356% for the first 5 years, 1.985% June 2022 for remaining 5 years
(29) Washington County Main Extension Project - Interest rate is 1.439% until Oct 2021 - 2.027% for the remaining term
(30) New unsecured borrowing at a coupon rate of 2.80% for 10 years
(31) New unsecured borrowing at a coupon rate of 3.45% for 30 years
(32) Issuance costs include make whole premium of $1.2M
(33) New unsecured borrowing at a coupon rate of 3.25% for 30 years
(34) New projected unsecured borrowing at a coupon rate of 4.00% for 30 years
(35) New projected unsecured borrowing at a coupon rate of 4.25% for 30 years

Pennsylvania-American Water Company
Calculation of the Embedded Cost of Preferred Stock
Actual at December 31, 2021
Proforma at December 31, 2022, and December 31, 2023

	Series	Principal Amount Outstanding	Percent to Total	Effective Cost Rate	Weighted Cost Rate
December 31, 2021					
	9.75%	$178,000	10.78%	9.96%	1.07%
	9.35%	273,500	16.56%	9.53%	1.58%
	8.49%	1,200,000	72.66%	8.56%	6.22%
		$1,651,500	100.00%		8.87%
December 31, 2022					
	9.75%	$178,000	39.42%	9.96%	3.93%
	9.35%	273,500	60.58%	9.53%	5.77%
		$451,500	100.00%		9.70%
December 31, 2023					
	9.75%	$178,000	39.42%	9.96%	3.93%
	9.35%	273,500	60.58%	9.53%	5.77%
		$451,500	100.00%		9.70%

PENNSYLVANIA AMERICAN WATER

Common Stock Stock as of December 31, 2021

Designation of Kind and Class (a)	Par Value Per Share (b)	Number of Shares Authorized (c)	Amount Authorized (d)	Number of Shares Issued & Outstanding (e)	Amount Outstanding (f)
Common Stock	5.50	10,000,000	$55,000,000	3,910,343	$21,506,887