

ROE and ROR Analysis for New Jersey-American Water
 Comparison Group
 Value Line Water Utilities
 January 12, 2018 Edition

Docket No. WR17090985
 Exhibit MFG-5

| Company | Ticker | Exchange where Publicly Traded | U.S. Based | Record of Paying Dividend | Value Line EPS Estimate (Positive) Available |
|--------------------------------|--------|---|------------|------------------------------|--|
| American States Water | AWR | NYSE | Yes | Yes | Yes |
| American Water Works | AWK | NYSE | Yes | Yes | Yes |
| Aqua America | WTR | NYSE | Yes | Yes | Yes |
| Artesian Resources Corporation | ARTNA | NYSE | Yes | Yes | No |
| California Water | CWT | NYSE | Yes | Yes | Yes |
| Connecticut Water Services | CTWS | NASDAQ | Yes | Yes | Yes |
| Consolidated Water | CWCO | NYSE | No | Yes | No |
| Global Water Resources | GWRS | NASDAQ | Yes | Yes* | No |
| Middlesex Water | MSEX | NASDAQ | Yes | Yes | Yes |
| SJW Group | SJW | NYSE | Yes | Yes | Yes |
| York Water | YORW | NASDAQ | Yes | Yes | Yes |

*-Global Water Resources has been paying dividends only since the second quarter of 2016.

From SJW Group SEC 8-K Filing, March 14, 2018

Item 1.01 Entry into a Material Definitive Agreement.

Merger Agreement

On March 14, 2018, SJW Group, a Delaware corporation (the “ Company ”), Hydro Sub, Inc., a Connecticut corporation and a direct wholly owned subsidiary of the Company (“ Merger Sub ”), and Connecticut Water Service, Inc., a Connecticut corporation (“ CTWS ”), entered into an Agreement and Plan of Merger (the “ Merger Agreement ”).

The Merger.

The Merger Agreement provides that, upon the terms and subject to the conditions set forth in the Merger Agreement, Merger Sub will merge with and into CTWS (the “ Merger ”), with CTWS surviving the Merger as a wholly owned subsidiary of the Company. Subject to the terms and conditions of the Merger Agreement, at the time at which the Merger becomes effective (the “ Effective Time ”), each share of common stock, without par value, of CTWS (each, a “ CTWS Common Share ”), other than CTWS Common Shares directly or indirectly owned by the Company, Merger Sub, CTWS or any of their respective subsidiaries (in each case, other than any CTWS Common Shares held on behalf of third parties), issued and outstanding immediately prior to the Effective Time will be converted into the right to receive 1.1375 shares of common stock of the Company, par value \$0.001 (“ Company Common Shares ”) (such number of Company Common Shares, the “ Merger Consideration ”).

**ROE and ROR Analysis for New Jersey-American Water
Comparison Group Screening
S&P Global Ratings, March 18, 2018**

**Docket No. WR17090985
Exhibit MFG-7**

| Company | Ticker | Exchange | Merger or Acquisition | S&P Credit Rating | 70 percent of operating revenue/net income from regulated operations (Companies' 2017 10Ks) |
|--------------------------------|---------------|-----------------|------------------------------|------------------------------|--|
| American States Water | AWR | NYSE | No | A+ | Yes |
| American Water Works | AWK | NYSE | No | A | Yes |
| Aqua America | WTR | NYSE | No | A+* | Yes |
| Artesian Resources Corporation | ARTNA | NYSE | No | None | NA |
| California Water** | CWT | NYSE | No | A+** | Yes |
| Connecticut Water Services | CTWS | NASDAQ | Yes**** | A | Yes |
| Consolidated Water | CWCO | NYSE | No | None | NA |
| Global Water Resources | GWRS | NASDAQ | No | None | NA |
| Middlesex Water | MSEX | NASDAQ | No | A | Yes |
| SJW Group | SJW | NYSE | Yes**** | A*** | Yes |
| York Water | YORW | NASDAQ | No | A- | Yes |

*-Aqua Pennsylvania

** -California Water Service Company

***-San Jose Water Company

****-SJW Group and Connecticut Water Services announced on March 14, 2018 that they will merge.

**ROE and ROR Analysis for New Jersey-American Water
Comparison Group, Regulated Percentage Screen
Company 10Ks**

**Docket No. WR17090985
Exhibit MFG-8
Amounts in thousands of dollars (000)**

| Name | For years ending December 31 | | | Company | Regulated Water as % of Company | | | Average % Water | 10K Sources | | |
|------------------------------|------------------------------|-----------|-----------|-----------|---------------------------------|-----------|--------|--------------------|-------------|-------|-------------------------|
| | 2017 | 2016 | 2015 | | 2017 | 2016 | 2015 | | | | |
| American States Water* | 306,332 | 302,931 | 328,511 | 440,603 | 436,087 | 458,641 | 69.5% | 69.5% | 71.6% | 70.2% | Page 30, Page 37 |
| American Water Works* | 2,958,000 | 2,871,000 | 2,743,000 | 3,357,000 | 3,302,000 | 3,159,000 | 88.1% | 86.9% | 86.8% | 87.3% | Page 53, Page 81 |
| Aqua America* | 804,905 | 800,107 | 779,613 | 809,525 | 819,875 | 814,204 | 99.4% | 97.6% | 95.8% | 97.6% | Page 96 |
| California Water* | 626,381 | 570,514 | 588,368 | 666,890 | 609,370 | 588,368 | 93.9% | 93.6% | 100.0% | 95.8% | Page 45, Pages 75-77 |
| Connecticut Water Services** | 23,854 | 22,222 | 21,018 | 25,054 | 23,387 | 22,761 | 95.2% | 95.0% | 92.3% | 94.2% | Page 36, Page 39 |
| Middlesex Water** | 21,500 | 22,300 | 18,900 | 22,800 | 22,700 | 20,000 | 94.3% | 98.2% | 94.5% | 95.7% | Page 23, Page 25 |
| SJW Group* | 376,104 | 326,547 | 291,949 | 389,225 | 339,706 | 305,082 | 96.6% | 96.1% | 95.7% | 96.2% | Page 70, Page 71 |
| York Water* | 12,974 | 11,846 | 12,489 | 12,974 | 11,846 | 12,589 | 100.0% | 100.0% | 99.2% | 99.7% | Page 18 |

*-Percentage of Operating Revenue

**-Percentage of Net Income

**ROE and ROR Analysis for New Jersey-American Water
Comparison Group
Common Equity Share Prices
Yahoo Finance, March 30, 2018**

**Docket No. WR17090985
Exhibit MFG-9, page 1 of 2**

American States Water (AWR)

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 52.06 |
| 3/6/2018 | \$ 50.44 |
| 3/7/2018 | \$ 51.51 |
| 3/8/2018 | \$ 51.28 |
| 3/9/2018 | \$ 52.01 |
| 3/12/2018 | \$ 53.58 |
| 3/13/2018 | \$ 53.02 |
| 3/14/2018 | \$ 53.00 |
| 3/15/2018 | \$ 53.07 |
| 3/16/2018 | \$ 54.06 |
| 3/19/2018 | \$ 54.48 |
| 3/20/2018 | \$ 55.23 |
| 3/21/2018 | \$ 54.80 |
| 3/22/2018 | \$ 54.45 |
| 3/23/2018 | \$ 52.30 |
| 3/26/2018 | \$ 52.86 |
| 3/27/2018 | \$ 52.01 |
| 3/28/2018 | \$ 52.52 |
| 3/29/2018 | \$ 53.06 |

Mean \$ 52.93

American Water Works (AWK)

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 80.19 |
| 3/6/2018 | \$ 79.69 |
| 3/7/2018 | \$ 80.18 |
| 3/8/2018 | \$ 80.80 |
| 3/9/2018 | \$ 81.36 |
| 3/12/2018 | \$ 82.20 |
| 3/13/2018 | \$ 80.75 |
| 3/14/2018 | \$ 81.20 |
| 3/15/2018 | \$ 81.47 |
| 3/16/2018 | \$ 82.16 |
| 3/19/2018 | \$ 81.52 |
| 3/20/2018 | \$ 81.42 |
| 3/21/2018 | \$ 80.85 |
| 3/22/2018 | \$ 80.15 |
| 3/23/2018 | \$ 79.23 |
| 3/26/2018 | \$ 79.87 |
| 3/27/2018 | \$ 80.69 |
| 3/28/2018 | \$ 81.19 |
| 3/29/2018 | \$ 82.13 |

Mean \$ 80.90

Aqua America (WTR)

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 33.57 |
| 3/6/2018 | \$ 33.20 |
| 3/7/2018 | \$ 33.43 |
| 3/8/2018 | \$ 33.52 |
| 3/9/2018 | \$ 33.61 |
| 3/12/2018 | \$ 34.08 |
| 3/13/2018 | \$ 33.61 |
| 3/14/2018 | \$ 33.71 |
| 3/15/2018 | \$ 33.47 |
| 3/16/2018 | \$ 33.91 |
| 3/19/2018 | \$ 33.75 |
| 3/20/2018 | \$ 33.84 |
| 3/21/2018 | \$ 33.62 |
| 3/22/2018 | \$ 33.26 |
| 3/23/2018 | \$ 32.59 |
| 3/26/2018 | \$ 33.02 |
| 3/27/2018 | \$ 33.34 |
| 3/28/2018 | \$ 33.59 |
| 3/29/2018 | \$ 34.06 |

Mean \$ 33.54

California Water (CWT)

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 36.70 |
| 3/6/2018 | \$ 35.40 |
| 3/7/2018 | \$ 37.30 |
| 3/8/2018 | \$ 37.00 |
| 3/9/2018 | \$ 37.75 |
| 3/12/2018 | \$ 38.50 |
| 3/13/2018 | \$ 37.60 |
| 3/14/2018 | \$ 37.10 |
| 3/15/2018 | \$ 37.10 |
| 3/16/2018 | \$ 37.40 |
| 3/19/2018 | \$ 37.60 |
| 3/20/2018 | \$ 38.50 |
| 3/21/2018 | \$ 38.10 |
| 3/22/2018 | \$ 37.70 |
| 3/23/2018 | \$ 35.95 |
| 3/26/2018 | \$ 36.90 |
| 3/27/2018 | \$ 36.80 |
| 3/28/2018 | \$ 36.90 |
| 3/29/2018 | \$ 37.25 |

Mean \$ 37.24

**ROE and ROR Analysis for New Jersey-American Water
Comparison Group
Common Equity Share Prices
Yahoo Finance, March 30, 2018**

**Docket No. WR17090985
Exhibit MFG-9, page 2 of 2**

Connecticut Water Service (CTWS)

Middlesex Water (MSEX)

SJW Corp.(SJW)

York Water Co. (YORW)

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 50.27 |
| 3/6/2018 | \$ 49.11 |
| 3/7/2018 | \$ 50.34 |
| 3/8/2018 | \$ 50.20 |
| 3/9/2018 | \$ 51.18 |
| 3/12/2018 | \$ 52.08 |
| 3/13/2018 | \$ 52.19 |
| 3/14/2018 | \$ 52.57 |
| 3/15/2018 | \$ 57.68 |
| 3/16/2018 | \$ 60.15 |
| 3/19/2018 | \$ 61.59 |
| 3/20/2018 | \$ 60.04 |
| 3/21/2018 | \$ 61.37 |
| 3/22/2018 | \$ 60.82 |
| 3/23/2018 | \$ 59.74 |
| 3/26/2018 | \$ 61.12 |
| 3/27/2018 | \$ 61.44 |
| 3/28/2018 | \$ 60.60 |
| 3/29/2018 | \$ 60.53 |

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 34.82 |
| 3/6/2018 | \$ 34.52 |
| 3/7/2018 | \$ 36.30 |
| 3/8/2018 | \$ 36.11 |
| 3/9/2018 | \$ 36.62 |
| 3/12/2018 | \$ 36.77 |
| 3/13/2018 | \$ 36.10 |
| 3/14/2018 | \$ 35.70 |
| 3/15/2018 | \$ 36.39 |
| 3/16/2018 | \$ 37.49 |
| 3/19/2018 | \$ 37.24 |
| 3/20/2018 | \$ 36.61 |
| 3/21/2018 | \$ 36.70 |
| 3/22/2018 | \$ 36.91 |
| 3/23/2018 | \$ 35.50 |
| 3/26/2018 | \$ 36.11 |
| 3/27/2018 | \$ 36.25 |
| 3/28/2018 | \$ 36.53 |
| 3/29/2018 | \$ 36.70 |

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 52.80 |
| 3/6/2018 | \$ 52.35 |
| 3/7/2018 | \$ 53.41 |
| 3/8/2018 | \$ 53.27 |
| 3/9/2018 | \$ 53.94 |
| 3/12/2018 | \$ 54.58 |
| 3/13/2018 | \$ 54.17 |
| 3/14/2018 | \$ 54.38 |
| 3/15/2018 | \$ 52.16 |
| 3/16/2018 | \$ 53.96 |
| 3/19/2018 | \$ 55.22 |
| 3/20/2018 | \$ 54.15 |
| 3/21/2018 | \$ 53.64 |
| 3/22/2018 | \$ 53.21 |
| 3/23/2018 | \$ 51.96 |
| 3/26/2018 | \$ 53.10 |
| 3/27/2018 | \$ 52.69 |
| 3/28/2018 | \$ 52.71 |
| 3/29/2018 | \$ 52.71 |

| Date | Close |
|-----------|----------|
| 3/5/2018 | \$ 28.25 |
| 3/6/2018 | \$ 28.50 |
| 3/7/2018 | \$ 29.70 |
| 3/8/2018 | \$ 30.10 |
| 3/9/2018 | \$ 30.95 |
| 3/12/2018 | \$ 30.80 |
| 3/13/2018 | \$ 30.50 |
| 3/14/2018 | \$ 30.25 |
| 3/15/2018 | \$ 31.40 |
| 3/16/2018 | \$ 31.60 |
| 3/19/2018 | \$ 32.35 |
| 3/20/2018 | \$ 31.75 |
| 3/21/2018 | \$ 31.25 |
| 3/22/2018 | \$ 31.25 |
| 3/23/2018 | \$ 30.15 |
| 3/26/2018 | \$ 30.75 |
| 3/27/2018 | \$ 30.80 |
| 3/28/2018 | \$ 31.35 |
| 3/29/2018 | \$ 31.00 |

Mean \$ 56.47

Mean \$ 36.28

Mean \$ 53.39

Mean \$ 30.67

ROE and ROR Analysis for New Jersey-American Water
Comparison Group
Dividends

Docket No. WR17090985
Exhibit MFG-10

| Name | Value Line | Zacks | Highest |
|-----------------------------|-------------------|--------------|----------------|
| American States Water | \$ 1.02 | \$ 1.02 | \$ 1.02 |
| American Water Works | \$ 1.66 | \$ 1.66 | \$ 1.66 |
| Aqua America | \$ 0.82 | \$ 0.82 | \$ 0.82 |
| California Water | \$ 0.72 | \$ 0.75 | \$ 0.75 |
| Connecticut Water Services* | \$ 1.19 | \$ 1.19 | \$ 1.19 |
| Middlesex Water | \$ 0.90 | \$ 0.89 | \$ 0.90 |
| SJW Group* | \$ 1.04 | \$ 1.12 | \$ 1.12 |
| York Water | \$ 0.67 | \$ 0.67 | \$ 0.67 |

*-Merging

Value Line dividends taken from January 12, 2018 survey reports.

Zacks dividends taken from website on March 14, 2018.

2. June 2017 Baseline Forecast—Data Release (Calendar Year), Updated October 2017

| Units | | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------------------------------|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Output | | | | | | | | | | | | | | |
| Gross Domestic Product (GDP) | Billions of dollars | 18,037 | 18,569 | 19,310 | 20,118 | 20,847 | 21,566 | 22,378 | 23,262 | 24,186 | 25,150 | 26,150 | 27,191 | 28,273 |
| | Percentage change, annual rate | 3.7 | 3.0 | 4.0 | 4.2 | 3.6 | 3.4 | 3.8 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Gross National Product (GNP) | Billions of dollars | 18,242 | 18,776 | 19,529 | 20,316 | 21,036 | 21,753 | 22,566 | 23,442 | 24,367 | 25,333 | 26,332 | 27,372 | 28,456 |
| | Percentage change, annual rate | 3.4 | 2.9 | 4.0 | 4.0 | 3.5 | 3.4 | 3.7 | 3.9 | 3.9 | 4.0 | 3.9 | 4.0 | 4.0 |
| Potential GDP | Billions of dollars | 18,231 | 18,761 | 19,394 | 20,104 | 20,849 | 21,645 | 22,490 | 23,379 | 24,307 | 25,276 | 26,281 | 27,328 | 28,415 |
| | Percentage change, annual rate | 2.7 | 2.9 | 3.4 | 3.7 | 3.7 | 3.8 | 3.9 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Real GDP | Billions of 2009 dollars | 16,397 | 16,662 | 17,019 | 17,389 | 17,681 | 17,936 | 18,241 | 18,584 | 18,935 | 19,295 | 19,658 | 20,026 | 20,400 |
| | Percentage change, annual rate | 2.6 | 1.6 | 2.1 | 2.2 | 1.7 | 1.4 | 1.7 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| Real GNP | Billions of 2009 dollars | 16,570 | 16,835 | 17,198 | 17,544 | 17,824 | 18,071 | 18,373 | 18,703 | 19,050 | 19,406 | 19,763 | 20,124 | 20,495 |
| | Percentage change, annual rate | 2.3 | 1.6 | 2.2 | 2.0 | 1.6 | 1.4 | 1.7 | 1.8 | 1.9 | 1.9 | 1.8 | 1.8 | 1.8 |
| Real Potential GDP | Billions of 2009 dollars | 16,573 | 16,833 | 17,093 | 17,376 | 17,682 | 18,001 | 18,333 | 18,677 | 19,031 | 19,392 | 19,757 | 20,127 | 20,503 |
| | Percentage change, annual rate | 1.6 | 1.6 | 1.5 | 1.7 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |

Source: Congressional Budget Office.

ROE and ROR Analysis for New Jersey-American Water
 Comparison Group
 Common Equity Share Prices: December 11, 2017-January 12, 2018
 DCF with Zacks, Yahoo! Finance, and Value Line EPS Growth-Rate
 Estimates: January 2018

Docket No. WR17090985
 Exhibit MFG-11, Schedule 4

| | A | B | C | D | E | F | G | H |
|----------------------------|---------------------------------|---|---------------------------------------|---------------------------------|------------------------------|------------------------|--------------------------------|-------------------------------|
| | Zacks-Yahoo! Finance-Value | | | | | | | |
| Company Name | Zacks EPS Growth Rate (%) | Yahoo! Finance EPS Growth Rates (%) | Value Line EPS Growth Rates (%) | Line Mean Growth Rate (%) | Average of Closing Prices | Annualized Dividend | Dividend Yield (Rate/Price) | Expected Dividend Yield |
| American States Water | 5.00% | 4.00% | 6.50% | 5.17% | \$ 52.93 | \$ 1.02 | 1.93% | 2.03% |
| American Water Works | 7.47% | 8.20% | 8.50% | 8.06% | \$ 80.90 | \$ 1.66 | 2.05% | 2.22% |
| Aqua America | 6.00% | 5.00% | 7.00% | 6.00% | \$ 33.54 | \$ 0.82 | 2.45% | 2.59% |
| California Water | 6.00% | 9.80% | 10.00% | 8.60% | \$ 37.24 | \$ 0.75 | 2.01% | 2.19% |
| Connecticut Water Services | 6.00% | 6.00% | 6.50% | 6.17% | \$ 56.47 | \$ 1.19 | 2.11% | 2.24% |
| Middlesex Water | NA | 2.70% | 9.00% | 5.85% | \$ 36.28 | \$ 0.90 | 2.47% | 2.61% |
| SJW | NA | 14.00% | 7.00% | 10.50% | \$ 53.39 | \$ 1.12 | 2.10% | 2.32% |
| York Water | NA | 4.90% | 9.50% | 7.20% | \$ 30.67 | \$ 0.67 | 2.18% | 2.34% |
| Mean | 6.09% | 6.83% | 8.00% | 7.19% | | | 2.16% | 2.32% |

| | I | J | K | L | M | N | O |
|----------------------------|--|--|---------------------------------------|---|--|---------------------------------------|---|
| Company Name | Flotation- Adjusted Expected Dividend Yield | Long-Run Projected EPS Growth Rate = | Weighted Projected Growth Rate, | Weighted Cost of Equity, Long- Run Rate = | Long-Run Projected EPS Growth Rate = | Weighted Projected Growth Rate, | Weighted Cost of Equity, Long- Run Rate = |
| American States Water | 2.13% | 4.0% | 4.0% | 4.0% | 4.3% | 4.3% | 4.3% |
| American Water Works | 2.33% | 4.00% | 4.78% | 6.91% | 4.30% | 4.88% | 7.01% |
| Aqua America | 2.73% | 4.00% | 5.33% | 8.06% | 4.30% | 5.43% | 8.16% |
| California Water | 2.30% | 4.00% | 7.07% | 9.37% | 4.30% | 7.17% | 9.47% |
| Connecticut Water Services | 2.35% | 4.00% | 5.44% | 7.80% | 4.30% | 5.54% | 7.90% |
| Middlesex Water | 2.75% | 4.00% | 5.23% | 7.98% | 4.30% | 5.33% | 8.08% |
| SJW | 2.44% | 4.00% | 8.33% | 10.77% | 4.30% | 8.43% | 10.87% |
| York Water | 2.47% | 4.00% | 6.13% | 8.60% | 4.30% | 6.23% | 8.70% |
| Mean | 2.44% | 4.00% | 6.13% | 8.57% | 4.30% | 6.23% | 8.67% |

A: Zacks website, February 2, 2018.

B: Yahoo! Finance website; March 14, 2018.

C: Value Line Investment Survey: January 12, 2018.

E: Yahoo! Finance website; February 1-28, 2018.

F: Higher of Value Line Investment Survey: January 12, 2018 and Zacks report, March 14, 2018. See Exhibit MFG-6.

J: Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2017 to 2027*, June 2017, www.cbo.gov/publication/52801

M: Energy Information Administration, *Annual Energy Outlook 2018, Macroeconomic Indicators* (Real GDP Growth + GDP Chain-Type Index Increase 2018-2050), <https://www.eia.gov/analysis/projection-data.php#annualproj>

D: = (A + B + C)/3

H: = G*(1+(0.5*J))

K: = 2/3*D + 1/3*J

N: = 2/3*D + 1/3*M

G: = F/E

I: H/(1 - 0.05)

L: = I + K

O: = I + N

ROE and ROR Analysis for New Jersey-American Water
Comparison Group
Discounted Cash Flow Model Analysis w/ Moul Flotation Equation
Common Equity Share Prices--March 5-30, 2018
Zacks, Yahoo! Finance, and Value Line EPS Growth-Rate
Estimates--January-March 2018

Docket No. WR17090985
Exhibit MFG-11, Schedule 5

| | A | B | C | D | E | F |
|------------------------------|--------------------------|---|---------------------------------------|---|------------------------------|------------------------|
| | Zacks EPS Growth Rate | Yahoo! Finance EPS Growth Rates (%) | Value Line EPS Growth Rates (%) | Zacks-Yahoo! Finance- Value Line Mean Growth Rate (%) | Average of Closing Prices | Annualized Dividend |
| Company Name | (%) | (%) | (%) | (%) | | |
| American States Water | 5.00% | 4.00% | 6.50% | 5.17% | \$ 52.93 | \$ 1.02 |
| American Water Works | 7.47% | 8.20% | 8.50% | 8.06% | \$ 80.90 | \$ 1.66 |
| Aqua America | 6.00% | 5.00% | 7.00% | 6.00% | \$ 33.54 | \$ 0.82 |
| California Water | 6.00% | 9.80% | 10.00% | 8.60% | \$ 37.24 | \$ 0.75 |
| Connecticut Water Services | 6.00% | 6.00% | 6.50% | 6.17% | \$ 56.47 | \$ 1.19 |
| Middlesex Water | NA | 2.70% | 9.00% | 5.85% | \$ 36.28 | \$ 0.90 |
| SJW | NA | 14.00% | 7.00% | 10.50% | \$ 53.39 | \$ 1.12 |
| York Water | NA | 4.90% | 9.50% | 7.20% | \$ 30.67 | \$ 0.67 |
| Mean | 6.09% | 6.83% | 8.00% | 7.19% | | |
| CTWS and SJW excluded | 6.12% | 5.77% | 8.42% | 6.81% | | |
| AWW excluded | 5.75% | 6.63% | 7.93% | 7.07% | | |

| | G | H | I | J | K | L | M |
|----------------------------|-----------------------------------|-------------------------------|---|---|--|------------------------|---|
| | Dividend Yield (Rate/Price) | Expected Dividend Yield | Flotation- Adjusted Expected Dividend Yield | Required Rate of Return on Equity w/ Griffing Flo | Required Rate of Return on Equity w/Moul Flotation | Leverage Adjustment | Required Rate of Return on Equity w/Moul Leverage and Flotation |
| Company Name | | | | | | | |
| American States Water | 1.93% | 2.03% | 2.13% | 7.30% | 7.37% | 1.33% | 8.74% |
| American Water Works | 2.05% | 2.22% | 2.33% | 10.39% | 10.53% | 1.33% | 11.89% |
| Aqua America | 2.45% | 2.59% | 2.73% | 8.73% | 8.81% | 1.33% | 10.17% |
| California Water | 2.01% | 2.19% | 2.30% | 10.90% | 11.06% | 1.33% | 12.42% |
| Connecticut Water Services | 2.11% | 2.24% | 2.35% | 8.52% | 8.61% | 1.33% | 9.98% |
| Middlesex Water | 2.47% | 2.61% | 2.75% | 8.60% | 8.67% | 1.33% | 10.04% |
| SJW | 2.10% | 2.32% | 2.44% | 12.94% | 13.14% | 1.33% | 14.50% |
| York Water | 2.18% | 2.34% | 2.47% | 9.67% | 9.78% | 1.33% | 11.14% |
| Mean | 2.16% | 2.32% | 2.44% | 9.63% | 9.75% | 1.33% | 11.11% |
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| | | w/ Moul 0.025 factor | 2.38% | | 9.78% | | |

Griffing flotation adjustment 2 - 1 12 basis points
Moul flotation adjustment w/o leverage 2 - 1 + 4-3 24 basis points
Moul flotation adjustment due to leverage 6 - 4 - 5 3 basis points
Moul flotation adjustment 24 + 3 27 basis points
Moul - Griffing flotation overstatement 27 - 12 15 basis points

A: Zacks website, March 14, 2018.

B: Yahoo! Finance website; March 14, 2018.

C: Value Line Investment Survey: January 12, 2018.

E: Yahoo! Finance website; March 5-30, 2018.

F: Higher of Value Line Investment Survey: January 12, 2018 and Zacks report, March 14, 2018. See Exhibit MFG-10.

D: (A + B + C)/3

G: F/E

H: G*(1+D)

I: H/(1-.05)

J: D + I

K: (H+D)*(1.025)

L: Moul DCF Leverage Adjustment

M: (H+D+L)*(1.025)

ry Finance

costs of bond/stock issues in order to finance capital projects designed to serve future as well as current generations. Moreover, expensing flotation costs requires an estimate of the market pressure effect for each individual issue, which is likely to prove unreliable. A more reliable approach is to estimate market pressure for a large sample of stock offerings rather than for one individual issue.

An alternative regulatory treatment is to incorporate flotation costs into the rate base as an intangible asset. While this solves the intergenerational problem and compensates investors fairly for their investment, the method clashes with the "used and useful" principle of rate base inclusions. An intangible asset related to flotation costs is unlikely to be viewed as a used and useful asset in public service by regulators.

The conventional approach to flotation cost adjustment can be derived as follows. From the standard DCF model, the investor's required return on equity capital is expressed as:

$$K = D_1/P_0 + g \quad (10-1)$$

If P_0 is regarded as the proceeds per share actually received by the company from which dividends and earnings will be generated, that is, P_0 equals B_0 , the book value per share, then the company's required return is:

$$r = D_1/B_0 + g \quad (10-2)$$

Denoting the percentage flotation costs f , the proceeds per share B_0 are related to market price P_0 as follows:

$$\begin{aligned} P - fP &= B_0 \\ P(1 - f) &= B_0 \end{aligned} \quad (10-3)$$

Substituting Equation 10-3 into 10-2, we obtain:

$$r = D_1/P(1 - f) + g \quad (10-4)$$

which is the utility's required return adjusted for flotation cost.³

³ Another way to look at it is that in order to prevent dilution of book value per share, the market-to-book ratio must be at least $1/(1 - f)$. The Target Market-to-Book method discussed in Chapter 12 can be used to translate the DCF cost of equity figure into an appropriate allowed return on book equity. As shown in Chapter 12, the allowed return consistent with a target M/B ratio that allows for the recapture of flotation costs is:

$$r = M/B (K - g) + g$$

New Regulatory Finance by Roger Morin, Page 328

growth than to insert a constant growth rate into the plain vanilla DCF equation. The practical challenge is to establish a reasonable growth path for future dividends. As previously discussed, an excellent starting point is security analysts' earnings growth forecasts (available from IBES, Zacks, Reuters, First Call) as a proxy for dividend forecasts. These forecasts are typically for the next five years. From the standpoint of the DCF model that extends into perpetuity, this forecasting horizon may be too short. For example, it is quite possible that a company's dividends can grow faster than the general economy for five years, but it is quite implausible for such growth to continue into perpetuity. The two-stage DCF model is based on the premise that investors expect the growth rate for the utilities to be equal to the company-specific growth rates for the next 5 years, let us say, (Stage 1 Growth), and to converge to an expected steady-state long-run rate of growth from year 6 onward (Stage 2 Growth). For example, it is quite plausible that near-term DCF growth estimates for a given company are unduly high and unsustainable over long periods, and that such growth rates are expected to decline toward a lower long-run level over time. Another example of this situation is that of companies that operate in a relatively undeveloped industry (e.g. wholesale power generation) or companies that are experiencing very high growth rates. Here again, the assumption of a constant perpetual growth rate may not be reasonable.

Blended Growth Approach

One way to account for the two stages of growth is to modify the single-stage DCF model by specifying the growth rate as a weighted average of short-term and long-term growth rates. The blended growth rate is calculated as a weighted average giving two-thirds weight to the analysts' five-year growth projections (Zacks, IBES, etc.) and one-third to historical long-term growth of the economy as a whole and/or the long-range projections of growth in Gross Domestic Product (GDP) projected for the very long term. FERC has adopted such a method in the past for determining the return on equity for gas and oil utilities.

To illustrate, two-stage DCF estimates for a group of widely traded dividend-paying diversified natural gas producers are shown on Table 9-5. Column 1 shows the spot dividend yield for each company, Column 2 shows the analyst consensus growth forecast for the next five years for each company, and column 3 shows the long-range GDP forecast of 6.5% for the U.S. economy at that time. Column 4 computes the weighed average growth, giving 2/3 weight to column 1 and 1/3 weight to column 2. Averages are shown at the bottom of the table. Adding the average blended growth rate of 9.02% to the average expected dividend yield of 2.83% shown at the bottom of Column 6 produces an estimate of equity costs of 11.85% for the group, unadjusted for flotation costs. Allowance for flotation costs to the results of Column 7 brings the return on equity estimate to 12.00%, shown in Column 7. Note

ROE and ROR Analysis for New Jersey-American Water
 CAPM Analysis
 Risk-Free Rate Analysis

Docket No. WR17090985
 Exhibit MFG-14, Schedule 1

Daily Treasury Yield Curve Rates

March 5-29, 2018

| Date | 1 mo | 3 mo | 6 mo | 1 yr | 2 yr | 3 yr | 5 yr | 7 yr | 10 yr | 20 yr | 30 yr |
|-----------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 3/5/2018 | 1.53 | 1.70 | 1.86 | 2.06 | 2.24 | 2.41 | 2.65 | 2.81 | 2.88 | 3.04 | 3.16 |
| 3/6/2018 | 1.56 | 1.68 | 1.87 | 2.06 | 2.25 | 2.42 | 2.65 | 2.81 | 2.88 | 3.03 | 3.14 |
| 3/7/2018 | 1.57 | 1.68 | 1.87 | 2.05 | 2.25 | 2.42 | 2.65 | 2.81 | 2.89 | 3.04 | 3.15 |
| 3/8/2018 | 1.57 | 1.67 | 1.89 | 2.05 | 2.25 | 2.42 | 2.63 | 2.79 | 2.86 | 3.01 | 3.13 |
| 3/9/2018 | 1.57 | 1.67 | 1.89 | 2.03 | 2.27 | 2.45 | 2.65 | 2.82 | 2.90 | 3.04 | 3.16 |
| 3/12/2018 | 1.60 | 1.71 | 1.89 | 2.05 | 2.27 | 2.43 | 2.64 | 2.79 | 2.87 | 3.00 | 3.13 |
| 3/13/2018 | 1.64 | 1.73 | 1.90 | 2.03 | 2.26 | 2.41 | 2.62 | 2.77 | 2.84 | 2.98 | 3.10 |
| 3/14/2018 | 1.71 | 1.76 | 1.94 | 2.05 | 2.26 | 2.41 | 2.61 | 2.75 | 2.81 | 2.94 | 3.05 |
| 3/15/2018 | 1.70 | 1.77 | 1.95 | 2.07 | 2.29 | 2.42 | 2.62 | 2.76 | 2.82 | 2.94 | 3.05 |
| 3/16/2018 | 1.71 | 1.78 | 1.96 | 2.08 | 2.31 | 2.44 | 2.65 | 2.78 | 2.85 | 2.96 | 3.08 |
| 3/19/2018 | 1.70 | 1.80 | 1.99 | 2.08 | 2.31 | 2.45 | 2.65 | 2.78 | 2.85 | 2.97 | 3.09 |
| 3/20/2018 | 1.76 | 1.81 | 1.97 | 2.08 | 2.34 | 2.49 | 2.69 | 2.82 | 2.89 | 3.01 | 3.12 |
| 3/21/2018 | 1.71 | 1.74 | 1.95 | 2.06 | 2.31 | 2.46 | 2.69 | 2.82 | 2.89 | 3.01 | 3.12 |
| 3/22/2018 | 1.67 | 1.72 | 1.95 | 2.05 | 2.29 | 2.43 | 2.63 | 2.76 | 2.83 | 2.94 | 3.06 |
| 3/23/2018 | 1.69 | 1.74 | 1.92 | 2.04 | 2.28 | 2.41 | 2.61 | 2.74 | 2.82 | 2.94 | 3.06 |
| 3/26/2018 | 1.71 | 1.79 | 1.94 | 2.06 | 2.33 | 2.44 | 2.64 | 2.78 | 2.85 | 2.96 | 3.08 |
| 3/27/2018 | 1.69 | 1.77 | 1.93 | 2.10 | 2.26 | 2.39 | 2.58 | 2.70 | 2.78 | 2.90 | 3.03 |
| 3/28/2018 | 1.65 | 1.73 | 1.95 | 2.12 | 2.28 | 2.41 | 2.59 | 2.72 | 2.77 | 2.89 | 3.01 |
| 3/29/2018 | 1.63 | 1.73 | 1.93 | 2.09 | 2.27 | 2.39 | 2.56 | 2.68 | 2.74 | 2.85 | 2.97 |
| | | | | | | Mean | 2.63 | | | | 3.09 |

Source: <https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldAll>

| Company Name | Value Line Betas-- Comparison Group | Value Line Betas-- Connecticut Water Services and SJW Group excluded | Value Line Betas-- American Water Works excluded |
|----------------------------|--|--|--|
| American States Water | 0.80 | 0.80 | 0.80 |
| American Water Works | 0.65 | 0.65 | |
| Aqua America | 0.75 | 0.75 | 0.75 |
| California Water | 0.80 | 0.80 | 0.80 |
| Connecticut Water Services | 0.65 | | 0.65 |
| Middlesex Water | 0.80 | 0.80 | 0.80 |
| SJW Group | 0.70 | | 0.70 |
| York Water | 0.80 | 0.80 | 0.80 |
| Mean | 0.74 | 0.77 | 0.76 |

Value Line Betas taken from January 12, 2018 Investment Survey reports.

| Company Name | Value Line Betas-- Most Comparison Group |
|----------------------------|--|
| American States Water | 0.75 |
| American Water Works | 0.60 |
| Aqua America | 0.70 |
| Artesian Resources | 0.60 |
| California Water | 0.75 |
| Connecticut Water Services | 0.65 |
| Middlesex Water | 0.75 |
| SJW Group | 0.70 |
| York Water | 0.80 |
| Mean | 0.70 |

**ROE and ROR Analysis for New Jersey-American Water
CAPM/ECAPM Analysis
Calculation of ROE**

**Docket No. WR17090985
Exhibit MFG-14, Schedule 5**

CAPM calculations

$$k = r + \beta (k_m - r)$$

Where: k = required rate of return for the specific stock

β = beta, the systematic or stock-specific risk

r = rate of return on a riskless asset

k_m = required rate of return in the market portfolio

4-Year Annualized Growth Rate for Value Line Data

| | |
|---|--------|
| Value Line March 30, 2018 forecast data* | |
| Dividend yield | 2.00% |
| Market appreciation potential, 3-5 years | 40% |
| 4-year growth rate $(1.4^{0.25} - 1.00)$ | 8.78% |
| Value Line forecast result (2.0% + 8.78%) | 10.78% |
| Market risk premium (10.78% - 3.09%) | 7.69% |

*-Exhibit MFG-14, Schedule 3

| | | |
|---------------|-------|---|
| $r =$ | 3.09% | 30-Year Treasury Bill March 5-30, 2018 average, Exhibit MFG-14, Schedule 1 |
| $(k_m - r) =$ | 7.69% | Market risk premium |
| $\beta =$ | 0.74 | Value Line mean beta for Comparison Group, Exhibit MFG-14, Schedule 2 |
| $\beta =$ | 0.77 | Value Line mean beta, Connecticut Water Services and SJW Group excluded, Exhibit MFG-14, Schedule 2 |
| $\beta =$ | 0.76 | Value Line mean beta, American Water Works excluded, Exhibit MFG-14, Schedule 2 |

| | Comparison Group | CTWS and SJW Excluded | AWW Excluded |
|----------|-------------------------|------------------------------|---------------------|
| CAPM ROE | $k =$ 8.81% | $k =$ 8.98% | $k =$ 8.91% |
| | Flotation 0.12% | Flotation 0.12% | Flotation 0.12% |
| | $k =$ 8.93% | $k =$ 9.10% | $k =$ 9.03% |

Empirical CAPM (ECAPM) calculations**

$$k = r + x * (k_m - r) + (1 - x) * \beta * (k_m - r)$$

Where: $x =$ 0.25

| | | | |
|-----------|-----------------|-----------------|-----------------|
| ECAPM ROE | $k =$ 9.30% | $k =$ 9.43% | $k =$ 9.38% |
| | Flotation 0.12% | Flotation 0.12% | Flotation 0.12% |
| | $k =$ 9.42% | $k =$ 9.55% | $k =$ 9.50% |

**--See Pages 190-191, Morin, Roger, *New Regulatory Finance* (2006), Public Utilities Reports, Inc., Vienna, Virginia, Exhibit MFG-14, Schedule 4

**ROE and ROR Analysis for New Jersey-American Water
ROR with Recommended ROE**

Docket No. WR17090985

Exhibit MFG-15

RRA Water Major Rate Case Decisions 2017, RRA Water Advisory , March 26, 2018

| Date | Company | ROR | ROE | Equity Ratio | Rate Base (\$M) | Test Year |
|-------------|---|------------|--------------------------------------|---------------------|------------------------|------------------|
| 1/27/2017 | SUEZ Water New York NY | 6.92 | 9.00 | 46.00 | 332 | 1/18 |
| 2/24/2017 | SUEZ Water Delaware DE | NA | 9.75 | NA | NA | 6/16 |
| 2/27/2017 | Iowa American Water IA | 8.28 | 9.60 | 52.04 | 108 | 12/15 |
| 3/22/2017 | Aqua Ohio, Inc. OH | 7.47 | 9.87 | NA | 69 | 12/16 |
| 5/18/2017 | New York American Water Co. NY | 6.56 | 9.10 | 46.00 | 276 | 3/18 |
| 5/24/2017 | Virginia-American Water VA | 7.13 | 9.25 | 46.09 | 148 | 6/15 |
| 8/21/2017 | Monarch Utilities | NA | NA | NA | NA | NA |
| 9/25/2017 | Utilities Inc. of Florida Different awards for different systems | 7.09 | 10.40 9.40 9.90 | NA | NA | 7/7 |
| 11/8/2017 | Carolina Water Service, Inc. of North Carolina | 7.84 | 9.60 | 52 | 98 | 12/16 |
| 12/18/2017 | Pennsylvania American Water Co. | NA | NA | NA | NA | 12/18 |
| 12/18/2017 | The Maine Water Co. | NA | 9.50 | MA | MA | 12/16 |
| | | | Mean 9.56 | | | |
| | | | Utilities Inc. of Fla. excluded 9.46 | | | |

RRA Water Utilities Average Authorized ROEs

RRA Water Advisory, March 26, 2018

| Year | Mean ROE | Number of Cases | Range |
|-------------|-----------------|------------------------|--------------|
| 2006 | 10.23% | 7 | NA |
| 2007 | 10.07% | 15 | NA |
| 2008 | 10.24% | 15 | NA |
| 2009 | 10.18% | 17 | NA |
| 2010 | 10.18% | 25 | NA |
| 2011 | 10.04% | 8 | NA |
| 2012 | 9.90% | 23 | NA |
| 2013 | 9.73% | 11 | NA |
| 2014 | 9.60% | 16 | 9.20%-9.99% |
| 2015 | 9.78% | 12 | 9.34%-10.10% |
| 2016 | 9.68% | 12 | 9.25%-10.10% |
| 2017 | 9.56% | 9 | 9.00%-10.40% |

**ROE and ROR Analysis for New Jersey-American Water
ROR for Comparison Group**

**Docket No. WR17090985
Exhibit MFG-16**

| | Constant-Growth DCF Analysis | | | Other ROE Analysis Results | | | | | |
|-------------------------------------|-------------------------------------|-------------|-------------|-----------------------------------|-------------|-----------------------|-------------|--------------|-------------|
| | Comparison Group | | | Multi-Stage CBO | | CAPM | | ECAPM | |
| | Ratio | DCF | | GDP 4.0% | WACC | CAPM | WACC | ECAPM | WACC |
| | | Cost | WACC | DCF Cost | | Cost | | Cost | |
| Long-Term Debt | 48.50% | 4.87% | 2.36% | 4.87% | 2.36% | 4.87% | 2.362% | 4.87% | 2.36% |
| Common Equity | 51.50% | 9.63% | 4.96% | 8.57% | 4.41% | 8.93% | 4.60% | 9.42% | 4.85% |
| Overall Rate of Return | 100% | | 7.32% | | 6.77% | | 6.96% | | 7.21% |
| | | | | | | | | | |
| | CTWS and SJW Excluded | | | Multi-Stage EIA | | | | ECAPM | |
| | Ratio | DCF | | GDP 4.3% | WACC | CAPM | WACC | ECAPM | WACC |
| | | Cost | WACC | DCF Cost | | Cost | | Cost | |
| Long-Term Debt | 48.50% | 4.87% | 2.36% | 4.87% | 2.36% | 4.87% | 2.36% | 4.87% | 2.36% |
| Common Equity | 51.50% | 9.26% | 4.77% | 8.67% | 4.46% | 9.10% | 4.69% | 9.55% | 4.92% |
| Overall Rate of Return | 100% | | 7.13% | | 6.83% | | 7.05% | | 7.28% |
| | | | | | | | | | |
| | AWW Excluded | | | | | CAPM | | ECAPM | |
| | Ratio | DCF | | | | Cost | WACC | Cost | WACC |
| | | Cost | WACC | | | | | | |
| Long-Term Debt | 48.50% | 4.87% | 2.36% | | | 4.87% | 2.36% | 4.87% | 2.36% |
| Common Equity | 51.50% | 9.52% | 4.90% | | | 9.03% | 4.65% | 9.50% | 4.89% |
| Overall Rate of Return | 100% | | 7.27% | | | | 7.01% | | 7.25% |
| Mean DCF constant-growth ROE | 9.47% | | | | | Mean ECAPM ROE | 9.49% | | |

The recommended common equity cost of 9.50 percent is the result of considering all the results above. The various outcomes support an ROE range of 9.40 percent to 9.60 percent.

Recommended ROE and ROR

| | Ratio | DCF | |
|-------------------------------|--------------|-------------|-------------|
| | | Cost | WACC |
| Long-Term Debt | 48.50% | 4.87% | 2.36% |
| Common Equity | 51.50% | 9.50% | 4.89% |
| Overall Rate of Return | 100% | | 7.25% |

The capital structure ratios for New Jersey-American Water are those presented by Company witness Paul Moul in Exhibit PT-16, Schedule 2 [1 of 2] The long-term debt cost is presented by Company witness Frank X. Simpson in Exhibit PT-2, Schedule 60, Page 1 of 1.

**ROE and ROR Analysis for New Jersey-American Water
Blue Chip Financial Forecasts
Forecasted Interest Rates vs. Actual Interest Rates
Pauline Ahern Testimony except where noted**

**Docket No. WR17090985
Exhibit MFG-17**

| Forecasts Sources | <i>Blue Chip</i> 30- Year Treasury | 30-Year Treasury | 30-Year Treasury Actual Averages | | | | | |
|---|--|---------------------|----------------------------------|---------------|---------------|---------------|---------------|---------------|
| | Forecast 2009Q3-2010Q4 | Actual 2009Q3 | 2009Q3 | 2009Q4 | 2010Q1 | 2010Q2 | 2010Q3 | 2010Q4 |
| Blue Chip September 1, 2009 South Carolina PSC, Docket No. 2009-479-W/S, United Utility Companies, Direct Testimony, Pages 41-42, February 2010 | 4.67% | 4.28% | 4.32% | 4.34% | 4.62% | 4.37% | 3.86% | 4.17% |
| | Difference | -0.39% | | | | | | |
| | 20112Q-2012Q3 | | 2011Q2 | 2011Q3 | 2011Q4 | 2012Q1 | 2012Q2 | 2012Q3 |
| Blue Chip June 1, 2011 Missouri PSC, Case Nos. WR-2011-0337, SR-2011-0338, Direct Testimony, Page 52 and Schedule PMA-10, Page 7 of 8, June 30, 2011 | 4.78% | 3.32% | 4.34% | 3.69% | 3.04% | 3.14% | 2.94% | 2.74% |
| | Difference | -1.46% | | | | | | |
| | 2013Q2-2014Q3 | | 2013Q2 | 2013Q3 | 2013Q4 | 2014Q1 | 2014Q2 | 2014Q3 |
| Blue Chip January 1, 2013 New Hampshire PUC, DOCKET NO. DW 12-085, Rebuttal Testimony, Page 23, March 6, 2013 | 3.60% | 3.51% | 3.14% | 3.71% | 3.79% | 3.68% | 3.44% | 3.27% |
| | Difference | -0.09% | | | | | | |
| | 2014Q2-2015Q3, 2016-2020, and 2021-2025 | | 2014Q2 | 2014Q3 | 2014Q4 | 2015Q1 | 2015Q2 | 2015Q3 |
| Blue Chip June 1, 2014 Delaware PSC, PSC Docket No. 13-466, Rebuttal Testimony, Page 9, Pages 19-20, Exhibit No. T-6R, Schedule 9, Pages 20, 21, and 24 of 37, June 25, 2014. | 4.33% | 2.88% | 3.44% | 3.27% | 2.97% | 2.55% | 2.88% | 2.96% |
| | Difference | -1.45% | 2016 | 2017 | | | | |
| | | | 2.60% | 2.89% | | | | |
| | 2015Q1-2016Q2, 2016-2020, and 2021-2025 | | 2015Q1 | 2015Q2 | 2015Q3 | 2015Q4 | 2016Q1 | 2016Q2 |
| Blue Chip January 1, 2015 New Jersey Board of Public Utilities, Docket No. WR15020269, Prepared Testimony, Page 27, February 27, | 3.94% | 2.76% | 2.55% | 2.88% | 2.96% | 2.96% | 2.72% | 2.57% |
| | Difference | -1.18% | 2016 | 2017 | | | | |
| | | | 2.60% | 2.89% | | | | |
| | 2015Q4-2017Q1, 2017-2021, and 2022-2026 | | 2015Q4 | 2016Q1 | 2016Q2 | 2016Q3 | 2016Q4 | 2017Q1 |
| Blue Chip December 1, 2015 Delaware PSC, PSC Docket No. 16-0163, Prepared Testimony, Page 28, February 5, 2016. | 3.70% | 2.81% | 2.96% | 2.72% | 2.57% | 2.28% | 2.83% | 3.05% |
| | Difference | -0.89% | 2017 | | | | | |
| | | | 2.89% | | | | | |
| | 2016Q1-2017Q2, 2017-2021, and 2022-2026 | | 2016Q1 | 2016Q2 | 2016Q3 | 2016Q4 | 2017Q1 | 2017Q2 |
| Blue Chip February 1, 2016 New York PSC, Case No. 16-W-0130, Testimony, Page 7, Page 34, February 26, 2016. | 3.75% | 2.81% | 2.72% | 2.57% | 2.28% | 2.83% | 3.05% | 2.90% |
| | Difference | -0.94% | 2017 | | | | | |
| | | | 2.89% | | | | | |
| | 2017Q1-2018Q2, 2018-2022, and 2023-2027 | | 2017Q1 | 2017Q2 | 2017Q3 | 2017Q4 | 2018Q1 | 2018Q2 |
| Blue Chip February 1, 2017 New Jersey Board of Public Utilities, Case No. 16W16060510, Rebuttal Testimony, PRT-2, Page 32, February 26, 2016. | 3.65% | 2.92% | 3.05% | 2.90% | 2.82% | 2.82% | 3.03% | |
| | Difference | -0.73% | 2018 | | | | | |
| | | | 3.03% | | | | | |
| | 2017Q2-2018Q3 | | 2017Q2 | 2017Q3 | 2017Q4 | 2018Q1 | 2018Q2 | 2018Q3 |
| Blue Chip April 1, 2017 North Dakota PSC, Docket No. PU-17-295, Gaske Direct Testimony, Schedule 8, page 1 of 2, July 21, | 3.52% | 2.89% | 2.90% | 2.82% | 2.82% | 3.03% | - | - |
| | Difference | -0.63% | | | | | | |
| | 2017Q3-2018Q4 | | 2017Q3 | 2017Q4 | 2018Q1 | 2018Q2 | 2018Q3 | 2018Q4 |
| Blue Chip August 1, 2017 New Jersey BPU, Docket No. WR-17090785, Moul Direct Testimony, PT016, Schedule 12, [2 of 3] | 3.35% | 2.89% | 2.82% | 2.82% | 3.03% | - | - | |
| | Difference | -0.46% | | | | | | |

ROE and ROR Analysis for New Jersey-American Water
 30-Year Treasury Interest Rates, January 1, 2017-March 29, 2018

Docket No. WR17090985
 Exhibit MFG-18

Sources: 30-year Treasuries-<http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yieldYear&year=2014>
 Federal funds rate-<https://www.federalreserve.gov/monetarypolicy/openmarket.htm>
<https://www.federalreserve.gov/monetarypolicy/openmarket.htm>

Bold type indicates days the Federal Reserve's Open Market Committee met or the federal funds target rate changed.

| Date | 30-year Treasury rate | Federal Funds rate | Date | 30-year Treasury rate | Federal Funds rate |
|--------------------|-----------------------|--------------------|--------------------|-----------------------|--------------------|
| 1/3/2017 | 3.04 | 0.50-0.75 | 4/3/2017 | 2.98 | 0.75-1.00 |
| 1/4/2017 | 3.05 | 0.50-0.75 | 4/4/2017 | 2.99 | 0.75-1.00 |
| 1/5/2017 | 2.96 | 0.50-0.75 | 4/5/2017 | 2.98 | 0.75-1.00 |
| 1/6/2017 | 3.00 | 0.50-0.75 | 4/6/2017 | 2.99 | 0.75-1.00 |
| 1/9/2017 | 2.97 | 0.50-0.75 | 4/7/2017 | 3.00 | 0.75-1.00 |
| 1/10/2017 | 2.97 | 0.50-0.75 | 4/10/2017 | 2.99 | 0.75-1.00 |
| 1/11/2017 | 2.96 | 0.50-0.75 | 4/11/2017 | 2.93 | 0.75-1.00 |
| 1/12/2017 | 3.01 | 0.50-0.75 | 4/12/2017 | 2.92 | 0.75-1.00 |
| 1/13/2017 | 2.99 | 0.50-0.75 | 4/13/2017 | 2.89 | 0.75-1.00 |
| 1/17/2017 | 2.93 | 0.50-0.75 | 4/17/2017 | 2.92 | 0.75-1.00 |
| 1/18/2017 | 3.00 | 0.50-0.75 | 4/18/2017 | 2.84 | 0.75-1.00 |
| 1/19/2017 | 3.04 | 0.50-0.75 | 4/19/2017 | 2.87 | 0.75-1.00 |
| 1/20/2017 | 3.05 | 0.50-0.75 | 4/20/2017 | 2.89 | 0.75-1.00 |
| 1/23/2017 | 2.99 | 0.50-0.75 | 4/21/2017 | 2.89 | 0.75-1.00 |
| 1/24/2017 | 3.05 | 0.50-0.75 | 4/24/2017 | 2.93 | 0.75-1.00 |
| 1/25/2017 | 3.10 | 0.50-0.75 | 4/25/2017 | 2.99 | 0.75-1.00 |
| 1/26/2017 | 3.08 | 0.50-0.75 | 4/26/2017 | 2.97 | 0.75-1.00 |
| 1/27/2017 | 3.06 | 0.50-0.75 | 4/27/2017 | 2.96 | 0.75-1.00 |
| 1/30/2017 | 3.08 | 0.50-0.75 | 4/28/2017 | 2.96 | 0.75-1.00 |
| 1/31/2017 | 3.05 | FOMC | 5/1/2017 | 3.00 | 0.75-1.00 |
| 2/1/2017 | 3.08 | Hold | 5/2/2017 | 2.97 | FOMC |
| 2/2/2017 | 3.09 | 0.50-0.75 | 5/3/2017 | 2.97 | Hold |
| 2/3/2017 | 3.11 | 0.50-0.75 | 5/4/2017 | 3.00 | 0.75-1.00 |
| 2/6/2017 | 3.05 | 0.50-0.75 | 5/5/2017 | 2.99 | 0.75-1.00 |
| 2/7/2017 | 3.02 | 0.50-0.75 | 5/8/2017 | 3.02 | 0.75-1.00 |
| 2/8/2017 | 2.96 | 0.50-0.75 | 5/9/2017 | 3.04 | 0.75-1.00 |
| 2/9/2017 | 3.02 | 0.50-0.75 | 5/10/2017 | 3.03 | 0.75-1.00 |
| 2/10/2017 | 3.01 | 0.50-0.75 | 5/11/2017 | 3.03 | 0.75-1.00 |
| 2/13/2017 | 3.03 | 0.50-0.75 | 5/12/2017 | 2.98 | 0.75-1.00 |
| 2/14/2017 | 3.07 | 0.50-0.75 | 5/15/2017 | 3.00 | 0.75-1.00 |
| 2/15/2017 | 3.09 | 0.50-0.75 | 5/16/2017 | 2.99 | 0.75-1.00 |
| 2/16/2017 | 3.05 | 0.50-0.75 | 5/17/2017 | 2.91 | 0.75-1.00 |
| 2/17/2017 | 3.03 | 0.50-0.75 | 5/18/2017 | 2.90 | 0.75-1.00 |
| 2/21/2017 | 3.04 | 0.50-0.75 | 5/19/2017 | 2.90 | 0.75-1.00 |
| 2/22/2017 | 3.04 | 0.50-0.75 | 5/22/2017 | 2.91 | 0.75-1.00 |
| 2/23/2017 | 3.02 | 0.50-0.75 | 5/23/2017 | 2.95 | 0.75-1.00 |
| 2/24/2017 | 2.95 | 0.50-0.75 | 5/24/2017 | 2.92 | 0.75-1.00 |
| 2/27/2017 | 2.98 | 0.50-0.75 | 5/25/2017 | 2.92 | 0.75-1.00 |
| 2/28/2017 | 2.97 | 0.50-0.75 | 5/26/2017 | 2.92 | 0.75-1.00 |
| 3/1/2017 | 3.06 | 0.50-0.75 | 5/30/2017 | 2.88 | 0.75-1.00 |
| 3/2/2017 | 3.09 | 0.50-0.75 | 5/31/2017 | 2.87 | 0.75-1.00 |
| 3/3/2017 | 3.08 | 0.50-0.75 | 6/1/2017 | 2.87 | 0.75-1.00 |
| 3/6/2017 | 3.10 | 0.50-0.75 | 6/2/2017 | 2.80 | 0.75-1.00 |
| 3/7/2017 | 3.11 | 0.50-0.75 | 6/5/2017 | 2.84 | 0.75-1.00 |
| 3/8/2017 | 3.15 | 0.50-0.75 | 6/6/2017 | 2.81 | 0.75-1.00 |
| 3/9/2017 | 3.19 | 0.50-0.75 | 6/7/2017 | 2.84 | 0.75-1.00 |
| 3/10/2017 | 3.16 | 0.50-0.75 | 6/8/2017 | 2.85 | 0.75-1.00 |
| 3/13/2017 | 3.20 | 0.50-0.75 | 6/9/2017 | 2.86 | 0.75-1.00 |
| 3/14/2017 | 3.17 | FOMC | 6/12/2017 | 2.86 | 0.75-1.00 |
| 3/15/2017 | 3.11 | Raise | 6/13/2017 | 2.87 | FOMC |
| 3/16/2017 | 3.14 | 0.75-1.00 | 6/14/2017 | 2.79 | Raise |
| 3/17/2017 | 3.11 | 0.75-1.00 | 6/15/2017 | 2.78 | 1.00-1.25 |
| 3/20/2017 | 3.08 | 0.75-1.00 | 6/16/2017 | 2.78 | 1.00-1.25 |
| 3/21/2017 | 3.04 | 0.75-1.00 | 6/19/2017 | 2.79 | 1.00-1.25 |
| 3/22/2017 | 3.02 | 0.75-1.00 | 6/20/2017 | 2.74 | 1.00-1.25 |
| 3/23/2017 | 3.02 | 0.75-1.00 | 6/21/2017 | 2.73 | 1.00-1.25 |
| 3/24/2017 | 3.00 | 0.75-1.00 | 6/22/2017 | 2.72 | 1.00-1.25 |
| 3/27/2017 | 2.98 | 0.75-1.00 | 6/23/2017 | 2.71 | 1.00-1.25 |
| 3/28/2017 | 3.02 | 0.75-1.00 | 6/26/2017 | 2.70 | 1.00-1.25 |
| 3/29/2017 | 2.99 | 0.75-1.00 | 6/27/2017 | 2.75 | 1.00-1.25 |
| 3/30/2017 | 3.03 | 0.75-1.00 | 6/28/2017 | 2.77 | 1.00-1.25 |
| 3/31/2017 | 3.02 | 0.75-1.00 | 6/29/2017 | 2.82 | 1.00-1.25 |
| | | | 6/30/2017 | 2.84 | 1.00-1.25 |
| 2017Q1 Mean | 3.05 | | 2017Q2 Mean | 2.90 | |

| Date | 30-year Treasury rate | Federal Funds rate | Date | 30-year Treasury rate | Federal Funds rate |
|------------------|-----------------------|--------------------|-------------------|-----------------------|--------------------|
| 7/3/2017 | 2.86 | 1.00-1.25 | 10/2/2017 | 2.87 | 1.00-1.25 |
| 7/5/2017 | 2.85 | 1.00-1.25 | 10/3/2017 | 2.87 | 1.00-1.25 |
| 7/6/2017 | 2.90 | 1.00-1.25 | 10/4/2017 | 2.87 | 1.00-1.25 |
| 7/7/2017 | 2.93 | 1.00-1.25 | 10/5/2017 | 2.89 | 1.00-1.25 |
| 7/10/2017 | 2.93 | 1.00-1.25 | 10/6/2017 | 2.91 | 1.00-1.25 |
| 7/11/2017 | 2.92 | 1.00-1.25 | 10/10/2017 | 2.88 | 1.00-1.25 |
| 7/12/2017 | 2.89 | 1.00-1.25 | 10/11/2017 | 2.88 | 1.00-1.25 |
| 7/13/2017 | 2.92 | 1.00-1.25 | 10/12/2017 | 2.86 | 1.00-1.25 |
| 7/14/2017 | 2.91 | 1.00-1.25 | 10/13/2017 | 2.81 | 1.00-1.25 |
| 7/17/2017 | 2.89 | 1.00-1.25 | 10/16/2017 | 2.82 | 1.00-1.25 |
| 7/18/2017 | 2.85 | 1.00-1.25 | 10/17/2017 | 2.80 | 1.00-1.25 |
| 7/19/2017 | 2.85 | 1.00-1.25 | 10/18/2017 | 2.85 | 1.00-1.25 |
| 7/20/2017 | 2.83 | 1.00-1.25 | 10/19/2017 | 2.83 | 1.00-1.25 |
| 7/21/2017 | 2.81 | 1.00-1.25 | 10/20/2017 | 2.89 | 1.00-1.25 |
| 7/24/2017 | 2.83 | 1.00-1.25 | 10/23/2017 | 2.89 | 1.00-1.25 |
| 7/25/2017 | 2.91 | FOMC | 10/24/2017 | 2.92 | 1.00-1.25 |
| 7/26/2017 | 2.89 | Hold | 10/25/2017 | 2.95 | 1.00-1.25 |
| 7/27/2017 | 2.93 | 1.00-1.25 | 10/26/2017 | 2.96 | 1.00-1.25 |
| 7/28/2017 | 2.89 | 1.00-1.25 | 10/27/2017 | 2.93 | 1.00-1.25 |
| 7/31/2017 | 2.89 | 1.00-1.25 | 10/30/2017 | 2.88 | 1.00-1.25 |
| 8/1/2017 | 2.86 | 1.00-1.25 | 10/31/2017 | 2.88 | FOMC |
| 8/2/2017 | 2.85 | 1.00-1.25 | 11/1/2017 | 2.85 | Hold |
| 8/3/2017 | 2.81 | 1.00-1.25 | 11/2/2017 | 2.83 | 1.00-1.25 |
| 8/4/2017 | 2.84 | 1.00-1.25 | 11/3/2017 | 2.82 | 1.00-1.25 |
| 8/7/2017 | 2.84 | 1.00-1.25 | 11/6/2017 | 2.80 | 1.00-1.25 |
| 8/8/2017 | 2.86 | 1.00-1.25 | 11/7/2017 | 2.77 | 1.00-1.25 |
| 8/9/2017 | 2.82 | 1.00-1.25 | 11/8/2017 | 2.79 | 1.00-1.25 |
| 8/10/2017 | 2.79 | 1.00-1.25 | 11/9/2017 | 2.81 | 1.00-1.25 |
| 8/11/2017 | 2.79 | 1.00-1.25 | 11/10/2017 | 2.88 | 1.00-1.25 |

