

Major Pennsylvania Gas Utilities - Actual Equity Returns by Quarter



**WATER UTILITIES  
EQUITY RETURNS BY QUARTER**

<b>QTR</b>	<b>END</b>	<b>PAWC</b>		<b>AQUA</b>		<b>SUEZ</b>		<b>York</b>		<b>Superior</b>	
		<u>ACT</u>	<u>ADJ</u>	<u>ACT</u>	<u>ADJ</u>	<u>ACT</u>	<u>ADJ</u>	<u>ACT</u>	<u>ADJ</u>	<u>ACT</u>	<u>ADJ</u>
2012	4	9.54	9.04	12.41	12.56	8.33	8.49	10.4	9.1		
2013	1			13.24	11.96	8.53	8.71				
	2			14.26	12.52	8.99	9.15			8.57	7.85
	3			15.49	12.21	8.83	9.01			7.46	6.85
	4			13.77	11.97	8.43	9.05	10.2	10.8	10.71	10.01
2014	1	10.52	9.98	13.29	11.56	8.45	9.02	10.2	10.2	13.12	9.97
	2	10.51	10.02	13.01	11.42	8.81	9.32	10.7	10.7	17.09	9.61
	3	11.11	10.57	12.82	11.29	8.57	9.06	10.9	10.9	34.68	9.88
	4	10.49	9.38	12.62	11.49	8.90	9.44	12.3	11.6	16.74	7.96
2015	1	10.33	9.14	12.46	11.11	9.11	9.83	12.7	12.7	15.92	8.37
	2	10.51	9.31	12.66	11.62	8.36	9.25	12.7	12.7	14.65	8.93
	3	10.06	8.81	12.41	11.95	8.39	9.37	13.6	13.6	12.54	9.37
	4	9.80	8.48	12.61	12.16	8.54	8.77	12.50	11.10	12.73	9.50
2016	1	10.12	8.68	12.31	11.71	9.27	10.19	12.40	10.90	11.91	8.17
	2	9.99	8.47	11.71	11.21	11.00	12.37	12.20	10.80	12.07	7.90
	3	9.82	8.47	11.55	10.32	8.23	9.99	12.20	11.00	14.99	7.25
	4	9.37	8.51	11.70	10.57	9.13	9.90	11.50	10.40	8.24	5.04
2017	1			11.34	10.04	9.22	9.60	11.61	9.50	10.29	9.13
	2			10.99	9.22	9.03	9.07	11.60	9.10	10.74	8.61
	3			10.99	9.23	8.57	8.57	11.60	8.70	8.82	8.25
	4			11.05	8.63	8.75	8.73	11.30	8.40	8.56	8.69
2018	1	9.55	8.97	10.94	8.41					5.64	7.39
	2	10.27	9.65								
	3	11.03	9.48								

Major Pennsylvania Water Companies - Actual Equity Returns by Quarter



Attachment B includes:

A. Overall Returns on rate base

1. Actual
2. Company proposed pro forma and ratemaking adjustments

and

B. Equity Returns

1. Actual
2. Company proposed pro forma and ratemaking adjustments

Summary of Returns  
For the Year Ended September 30, 2018

COMPANY NAME	<u>OVERALL RETURN</u>		<u>EQUITY RETURN</u>		ROE	YEAR
	ACTUAL	ADJ	ACTUAL	ADJ	AUTH	AUTH
<b>ELECTRIC</b>						
<b><u>\$10,000,000 Revenues</u></b>						
PECO Energy - Electric Operations*					Settled	2015
PPL Electric Utilities Corp.	8.18	7.44	11.19	9.83	Settled	2015
Duquesne Light Company*					Settled	2014
West Penn Power Company	8.05	5.48	11.41	6.74	Settled	2017
Pennsylvania Power Company	8.38	5.71	10.30	5.80	Settled	2017
UGI Utilities, Inc. - Electric Division*					9.85	2018
Pennsylvania Electric Company	9.89	6.83	13.97	8.44	Settled	2017
Metropolitan Edison Company	10.30	7.59	14.46	9.62	Settled	2017
<b>GAS</b>						
<b><u>\$10,000,000 Revenues</u></b>						
Columbia Gas of PA, Inc.*					Settled	2016
Peoples Natural Gas Company LLC	7.48	5.93	10.21	7.43	Settled	2012
PECO Energy - Gas Operations	8.49	6.15	12.54	8.36	Settled	2010
UGI Utilities, Inc. - South	9.45	6.51	18.69	8.04	Settled	2016
Peoples Nat'l - Equitable Division	7.91	6.97	10.99	9.44	Settled	2008
National Fuel Gas Distribution Co.	8.54	7.21	12.52	10.12	Settled	2006
UGI Utilities, Inc. - North	11.65	7.08	20.60	9.16	Settled	2017
Peoples Gas Company, LLC	8.78	7.27	13.03	10.20	Settled	2013
UGI Utilities, Inc. - Central	11.42	5.86	20.69	6.93	Settled	2009
<b>WATER</b>						
<b><u>\$10,000,000 Revenues</u></b>						
PA American Water Company	8.26	7.37	11.03	9.48	Settled	2018
Aqua Pennsylvania*					Settled	2012
York Water Company*					Settled	2014
SUEZ Water Pennsylvania, Inc.*					Settled	2015

\* UGI Utilities, Inc. – Electric Division, Duquesne Light Company, PECO Energy – Electric, Columbia Gas, York Water, SUEZ water, and Aqua Pennsylvania have pending rate filings at Docket Nos. R-2017-2640058, R-2018-3000124, R-2018-3000164, R-2018-2647577, R-2018-3000019, R-2018-3000834, and R-2018-3003068 respectively, and filed a letter with the Secretary in place of a report in accordance with 52 Pa. Code § 71.4.

**ALLOWED RATES OF RETURN ON COMMON EQUITY**

This is a historical chart that shows the most recent fully litigated rate cases for select companies in electric, gas, and water. A docket number followed by their final return on equity and year is also given.

**ELECTRIC**

**Docket Number**      **ROE (%)**      **Year**

## Recent PA PUC Allowed

PPL Electric Utilities Corp.	R-2015-2469275	Settled	2015
PECO Energy Company	R-2015-2468981	Settled	2015
UGI - Electric	R-2017-2640058	9.85	2018
Pennsylvania Electric Company	R-2016-2537352	Settled	2017
Metropolitan Edison Company	R-2016-2537349	Settled	2017
Pennsylvania Power Company	R-2016-2537359	Settled	2017
West Penn Power Company	R-2016-2537355	Settled	2017

Current Market Indicated ROE as calculated by the  
Bureau of Technical Utility Services.

**8.51-9.51****GAS**

## Recent PA PUC Allowed

Columbia Gas of Pa.	R-2016-2529660	Settled	2016
UGI Utilities, Inc. - South	R-2015-2518438	Settled	2016
Peoples Natural Gas	R-2012-2285985	Settled	2012
UGI Utilities, Inc. - North	R-2016-2580030	Settled	2017
UGI Utilities, Inc. - Central	R-2008-2079675	Settled	2009
PECO Energy	R-2010-2161592	Settled	2010
Peoples TWP	R-2013-2355886	Settled	2013

Current Market Indicated ROE as calculated by the  
Bureau of Technical Utility Services.

**7.17-12.75****WATER**

## Recent PA PUC Allowed

Aqua Pennsylvania	R-2011-2267958	Settled	2012
PA American Water	R-2017-2595853	Settled	2017
Columbia Water	R-2017-2598203	Settled	2015
York Water	R-2012-2336379	Settled	2014

Current Market Indicated ROE as calculated by the  
Bureau of Technical Utility Services.

**8.57-10.76**

**Distribution System Improvement Charge (DSIC) Eligible Utilities**  
**Return on Equity (ROE) Summary**

	Utility Adjusted ROE <sup>2</sup> (%)	Commission Approved ROE <sup>3</sup> (%)
<b>ELECTRIC</b>		
PECO Energy – Electric Operations*		9.65
PPL Electric Utilities Corp.	9.83	9.65
Duquesne Light Company*		9.65
West Penn Power Company	6.74	9.65
Pennsylvania Power Company	5.80	9.65
Pennsylvania Electric Company	8.44	9.65
Metropolitan Edison Company	9.62	9.65
<b>GAS</b>		
Columbia Gas of PA, Inc.*		10.15
Peoples Natural Gas Company LLC	7.43	10.15
PECO Energy – Gas Operations	8.36	10.15
UGI Utilities, Inc. – South	8.04	10.15
Peoples-Equitable Division	9.44	10.15
UGI Utilities, Inc. – North	9.16	10.15
Peoples Gas Company, LLC	10.20	10.15
UGI Utilities, Inc. – Central	6.93	10.15
<b>WATER</b>		
PA American Water Company	9.48	9.95
PA American – Wastewater	9.48	9.95
AQUA Pennsylvania*		9.95
AQUA Pennsylvania – Wastewater*		9.95
York Water Company*		9.95
SUEZ Water Pennsylvania Inc.*		9.95
Columbia Water Company	5.17	9.95
Newtown Artesian Water	3.97	9.95
Superior Water*		9.95

\* UGI Utilities, Inc. – Electric Division, Duquesne Light Company, PECO Energy - Electric, Columbia Gas, York Water, SUEZ Water, and Aqua Pennsylvania, Aqua Pennsylvania-Wastewater and Superior Water have pending rate filings at Docket Nos. R-2017-2640058, R-2018-3000124, R-2018-3000164, R-2018-2647577, R-2018-3000019, R-2018-3000834, and R-2018-3003068 respectively, and filed a letter with the Secretary in place of a report in accordance with 52 Pa. Code § 71.4.

<sup>2</sup> Each utility lists adjustments on Schedule B of their quarterly financial report.

<sup>3</sup> The ROE is approved in a utility's most recent fully litigated base rate proceeding for which a final order was entered not more than two years prior to the effective date of the DSIC. If more than two years have elapsed between the entry of a final order and the DSIC effective date, the ROE is from this report. If the base rate proceeding is settled, without a stipulated ROE, the ROE is from this report.

## Explanation of Discounted Cash Flow (DCF) and Capital Asset Pricing Model (CAPM)

### Barometer Group Criteria

The criteria used for determining the industry barometer groups used to calculate ROEs in this report are as follows:

- 50% or more of the company's assets must be related to the jurisdictional utility industry;
- The company's stock must be publicly traded;
- Companies involved in merger & acquisition activity will be excluded;
- Investment information for the company must be available to the Commission from more than one source; and
- Geographic Regions:
  - EDCs: *Value Line* East, Central, and West Group Electric Utility companies;
  - NGDCs: *Value Line* Investment Survey's Natural Gas Utility industry group companies;
  - Water/Waste water: *Value Line* Investment Survey's Water Utility industry group companies.

The barometer group companies are reviewed by staff on a quarterly basis and make any changes to these companies based upon the criteria above.

### ROE Calculations

The Commission consistently uses the DCF model to determine the appropriate cost of equity for utilities. In this report, the DSIC ROE is calculated using two DCF models.

JS uses the following formula to calculate the current dividend DCF:  $K = D_1/P_0 + G$

TUS uses the following formula to calculate the 52-week average dividend DCF:  $K = D_0/P_a + G$

#### Definitions:

K	=	Cost of equity
D <sub>1</sub>	=	Dividend expected during the year
	=	$D_0 + \frac{1}{2}g$
D <sub>0</sub>	=	Latest indicated dividend, obtained from Yahoo! Finance
g	=	Expected 5-year dividend growth rate of barometer group obtained from Value Line Investment Survey.
P <sub>0</sub>	=	Current price of the stock, obtained from Yahoo! Finance
P <sub>a</sub>	=	Average of high and low stock price over the latest 52-week period, obtained from Yahoo! Finance
G	=	Average of 5-year expected earnings growth rate forecasts obtained from Value Line Investment Survey, Zacks Investment Survey, Yahoo! Finance, Morningstar and/or Reuters.



The CAPM uses the yield of a risk-free interest bearing obligation plus a rate of return premium that is proportional to the systematic risk of an investment.

TUS uses the following formula to calculate CAPM:  $K = \beta(R_m - R_f)$

Three components are necessary to calculate the CAPM cost of equity:

- $\beta$  = Beta, a measure of systematic risk for each stock
- $R_f$  = The risk-free rate of return, 10-year U.S. Treasury yields are used for  $R_f$ .  
Yields are taken from the previous two quarters and forecasted next four quarters.
- $R_m$  = Total return of the equity market as determined by the SBBI Yearbook

*The Commission determines the ROE used for DSIC purposes based on the range of reasonableness from the DCF barometer group data, CAPM data, recent ROEs adjudicated by the Commission, and informed judgment.*

The market indicated common equity cost rate range consists of data used from the barometer groups and is based on a series of calculations to average the DCF methods.

### Market Based Returns on Common Equity<sup>1</sup>

December 17, 2018

#### Electric Company Barometer Group

	Cost Rates %
(1) Current DCF:	8.90
(2) 52-Week Average DCF:	<u>9.12</u>
(3) Overall DCF ((1) + (2)) / 2 :	<u>9.01</u>
(4) Market Indicated Common Equity Cost Rate Range: @ 1 standard deviation around the mean. <sup>2</sup>	<u>8.51-9.51</u>
(5) CAPM Check of DCF Reasonableness:	8.29
(6) Recent Commission Approved ROEs <sup>3</sup> : *UGI Utilities, Inc. - Electric, R-2017-2640058, does not include 0.05% management effectiveness adjustment	9.80*
(7) Distribution System Improvement Charge (DSIC) Return <sup>4</sup> :	<u>9.65%</u>

#### Barometer Group Companies

Consolidated Edison

Exelon Corp.

PPL Corporation

Public Service Enterprise Group

American Electric Power

Eversource Energy

<sup>1</sup> As calculated by the Bureau of Technical Utility Services

<sup>2</sup> Standard Deviation of 12 DCF observations

<sup>3</sup> Base rate case ROEs within last two years, fully litigated or stipulated for DSIC purposes

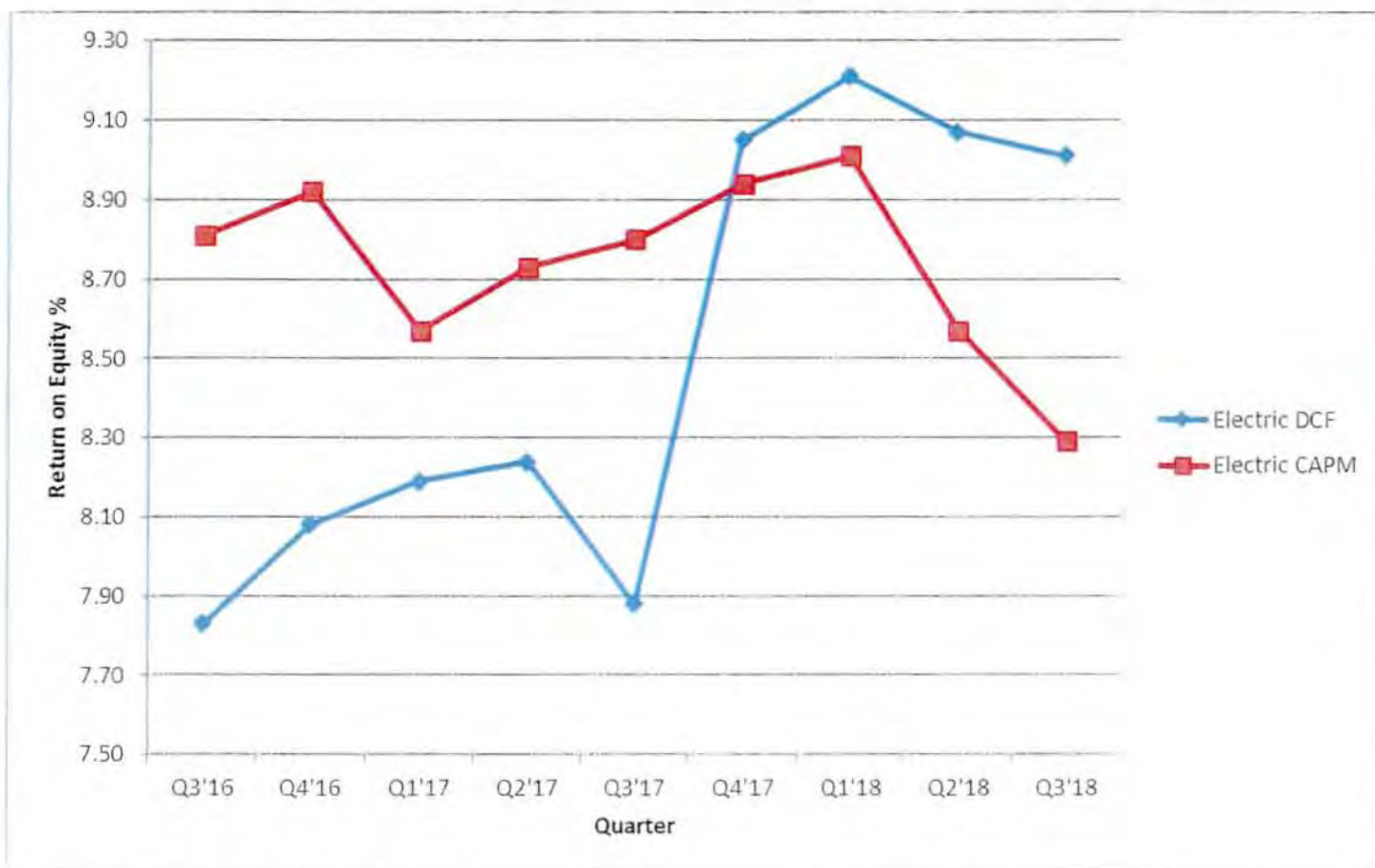
<sup>4</sup> Commission authorized Return on Equity (ROE) for DSIC purposes

Any questions concerning DSIC should be directed to Andrew Herster of the Bureau of Technical Utility Services at (717) 783-5392.

Historic Electric Industry Barometer Group DCF and CAPM Average ROEs

	Electric	
	DCF	CAPM
Q3'16	7.83	8.81
Q4'16	8.08	8.92
Q1'17	8.19	8.57
Q2'17	8.24	8.73
Q3'17	7.88	8.80
Q4'17	9.05	8.94
Q1'18	9.21	9.01
Q2'18	9.07	8.57
Q3'18	9.01	8.29

Chart of Historic Electric Industry DCF and CAPM Average ROEs



Barometer electric companies are used to calculate a current DCF in the first chart. The second chart demonstrates the companies 52 week average DCF. A final average of the two calculations is also shown at the bottom.

**Electric Company Barometer Group  
Calculation of a Current Dividend Yield**

	Closing Market Price (Po) 12/14/2018 (\$)	Latest Indicated Dividend (Do) (\$)	Ind. Div. Plus 1-2 Div. Growth Rate (DI) (\$)	Current Dividend Yield (DI/Po) (%)	DCF (%)
Consolidated Edison	83.93	2.86	2.91	3.47	8.32
Exelon Corp.	46.95	1.38	1.41	3.01	7.93
PPL Corporation	30.83	1.64	1.66	5.39	10.04
Public Service Enterprise Group	55.80	1.80	1.85	3.31	9.29
American Electric Power	80.36	2.68	2.76	3.44	8.77
Eversource Energy	70.23	2.02	2.08	2.96	8.70
Group Average (DI/Po)				3.60	
Group Average (G)				5.30	
<b>DCF</b>				<b>8.90</b>	

**Electric Company Barometer Group  
52-week Average Dividend Yield Calculation**

	High (\$)	Low (\$)	Average (Pa) (\$)	Latest Indicated Dividend (Do) (\$)	Average Dividend Yield (Do/Pa) (%)	DCF (%)
Consolidated Edison	88.27	71.12	79.70	2.86	3.59	8.44
Exelon Corp.	47.40	35.57	41.49	1.38	3.33	8.24
PPL Corporation	34.15	25.30	29.73	1.64	5.52	10.17
Public Service Enterprise Group	56.68	46.19	51.44	1.80	3.50	9.49
American Electric Power	81.05	62.71	71.88	2.68	3.73	9.06
Eversource Energy	70.53	52.76	61.65	2.02	3.28	9.01
Group Average (Do/Pa)					3.82	
Group Average (G)					5.30	
<b>DCF</b>					<b>9.12</b>	
Average of Current and 52-Week					<b>9.01</b>	

Multiple sources of the Barometer companies projected 5 year Earnings Per Share are used to calculate the Group Average Dividend Growth Estimate.

**Development of a Representative Dividend Growth Rate  
for the Barometer Group of Six Electric Companies**

	<u>5 Year Forecast</u>					Average	
	Value Line	Value Line	Zack's	Yahoo	Morningstar	Earnings	Growth
	<u>DPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>Growth</u> (%)	<u>Estimate</u> (%)
Consolidated Edison	3.50	3.00	4.00	2.87	5.70	3.89	4.85
Exelon Corp.	5.00	8.00	4.60	5.23	8.30	6.53	4.92
PPL Corporation	2.50	2.00	5.00	4.31	11.20	5.63	4.66
Public Service Enterprise Group	5.00	4.00	6.70	7.26	10.00	6.99	5.99
American Electric Power	6.00	4.50	5.70	5.83	5.30	5.33	5.33
Eversource Energy	6.00	5.00	5.90	5.83	6.20	5.73	5.73
Group Average	4.67	4.42	5.32	5.22	7.78	5.68	5.25
USE						<u>5.30</u>	

Sources: Morningstar, December 17, 2018 (<http://financials.morningstar.com>)  
Value Line Investment Survey, December 17, 2018  
Zacks, December 17, 2018 ([www.zacks.com](http://www.zacks.com))  
Yahoo!, December 17, 2018 (<http://finance.yahoo.com>)

The market indicated common equity cost rate range consists of data used from the barometer groups and is based on a series of calculations to average the DCF methods.

### Market Based Returns on Common Equity<sup>1</sup>

December 17, 2018

#### Gas Distribution Company Barometer Group

	Cost Rates %
(1) Current DCF:	9.85
(2) 52-Week Average DCF:	<u>10.07</u>
(3) Overall DCF ((1) + (2)) / 2 :	<u>9.96</u>
(4) Market Indicated Common Equity Cost Rate Range: @ 1 standard deviation around the mean. <sup>2</sup>	<u>7.17-12.75</u>
(5) CAPM Check of DCF Reasonableness:	8.88
(6) Recent Commission Approved ROEs <sup>3</sup> : *None within last two years	*
(7) Distribution System Improvement Charge (DSIC) Return <sup>4</sup> :	<u>10.15%</u>

#### Barometer Group Companies

Atmos Energy

New Jersey Resources

Northwest Natural Gas Company

Chesapeake Utilities Corporation

South Jersey Industries

NiSource Inc.

<sup>1</sup> As calculated by the Bureau of Technical Utility Services

<sup>2</sup> Standard Deviation of 12 DCF observations

<sup>3</sup> Base rate case ROEs within last two years, fully litigated or stipulated for DSIC

<sup>4</sup> Commission authorized Return on Equity (ROE) for DSIC purposes

Any questions concerning DSIC should be directed to Andrew Herster of the Bureau of Technical Utility Services at (717) 783-5392.

### Historic Gas Industry DCF and CAPM Average ROEs

	Gas	
	DCF	CAPM
Q3'16	9.39	9.39
Q4'16	8.89	9.52
Q1'17	9.37	9.37
Q2'17	9.42	9.53
Q3'17	9.27	9.44
Q4'17	9.51	9.32
Q1'18	9.65	9.61
Q2'18	9.93	9.02
Q3'18	9.96	8.88

Graph of Historic Gas Industry DCF and CAPM Average ROEs



Barometer gas companies are used to calculate a current DCF in the first chart. The second chart demonstrates the companies 52 week average DCF. A final average of the two calculations is also shown at the bottom.

**Gas Company Barometer Group  
Calculation of a Current Dividend Yield**

	Closing Market Price (Po) <u>12/14/2018</u> (\$)	Latest Indicated Dividend (Do) (\$)	Ind. Div Plus 1/2 Div. Growth Rate (DI) (\$)	Current Dividend Yield (DI/Po) (%)	DCF (%)
Atmos Energy	99.50	2.10	2.17	2.18	9.62
New Jersey Resources	50.21	1.17	1.19	2.38	9.70
Northwest Natural Gas	67.56	1.90	1.92	2.85	7.00
Chesapeake Utilities Corporation	93.12	1.48	1.55	1.66	8.81
South Jersey Industries	30.23	1.15	1.17	3.88	15.66
NiSource Inc.	27.49	0.78	0.82	2.97	8.44
Group Average DI / Po				2.65	
Group Average G				7.20	
<b>DCF</b>				<u><u>9.85</u></u>	

**Gas Company Barometer Group  
52-week Average Dividend Yield Calculation**

	High (\$)	Low (\$)	Average (Pa) (\$)	Latest Indicated Dividend (Do) (\$)	Average Dividend Yield (Do/Pa) (%)	DCF (%)
Atmos Energy	100.76	76.46	88.61	2.17	2.45	9.89
New Jersey Resources	51.83	35.55	43.69	1.19	2.73	10.06
Northwest Natural Gas	71.81	51.50	61.66	1.92	3.12	7.27
Chesapeake Utilities Corporation	93.40	66.35	79.88	1.55	1.94	9.09
South Jersey Industries	36.72	25.96	31.34	1.17	3.74	15.52
NiSource Inc.	28.11	22.44	25.28	0.82	3.22	8.70
Group Average Do / Pa					2.87	
Group Average G					7.20	
<b>DCF</b>					<u><u>10.07</u></u>	
Average of Current and 52-Week					<u><u>9.96</u></u>	



Multiple sources of the Barometer companies projected 5 year Earnings Per Share are used to calculate the Group Average Dividend Growth Estimate.

**Development of a Representative Dividend Growth Rate  
for the Barometer Group of Gas Companies**

	<u>5 Yr Forecast</u>					Average Earnings Growth	Growth Estimate
	Value Line	Value Line	Zack's	Yahoo	Morningstar		
	<u>DPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)		
Atmos Energy	7.00	7.50	8.80	6.45	7.00	7.44	7.44
New Jersey Resources	4.00	9.50	7.00	6.00	6.80	7.33	7.33
Northwest Natural Gas	2.50	30.50	4.30	4.00		12.93	4.15
Chesapeake Utilities Corporation	9.00	8.50	6.00	6.00	8.10	7.15	7.15
South Jersey Industries	4.00	9.50	12.50	12.70	12.40	11.78	11.78
NiSource Inc.	9.00	18.00	5.50	5.92	5.00	8.61	5.47
Group Average USE	5.92	13.92	7.35	6.85	7.86	9.20	7.22
						<u>9.20</u>	<u>7.20</u>

Sources: Morningstar, December 17, 2018 (<http://financials.morningstar.com>)  
Value Line Investment Survey, December 17, 2018  
Zacks, December 17, 2018 ([www.zacks.com](http://www.zacks.com))  
Yahoo!, December 17, 2018 (<http://finance.yahoo.com/>)

The market indicated common equity cost rate range consists of data used from the barometer groups and is based on a series of calculations to average the DCF methods.

### Market Based Returns on Common Equity <sup>1</sup>

December 17, 2018

#### Water Company Barometer Group

	Cost Rates %
(1) Current DCF	9.59
(2) 52-Week Average DCF	9.74
(3) Average DCF	<u>9.67</u>
(4) Market Indicated Common Equity Cost Rate Range @ 1 standard deviation around the mean. <sup>2</sup>	<u>8.57-10.76</u>
(5) CAPM Check of DCF Reasonableness	9.50
(6) Recent Commission Approved ROEs <sup>3</sup> : *None within last two years	*
(7) Distribution System Improvement Charge (DSIC) Return <sup>4</sup> :	<u>9.95%</u>

#### Barometer Group Companies

American States Water Company

Middlesex Water Company

California Water Service Group

Aqua America, Inc.

American Water Works Co., Inc.

<sup>1</sup> As calculated by the Bureau of Technical Utility Services

<sup>2</sup> Standard Deviation of 14 DCF observations

<sup>3</sup> ROEs from base rate cases within last two years, fully litigated or stipulated for DSIC purposes

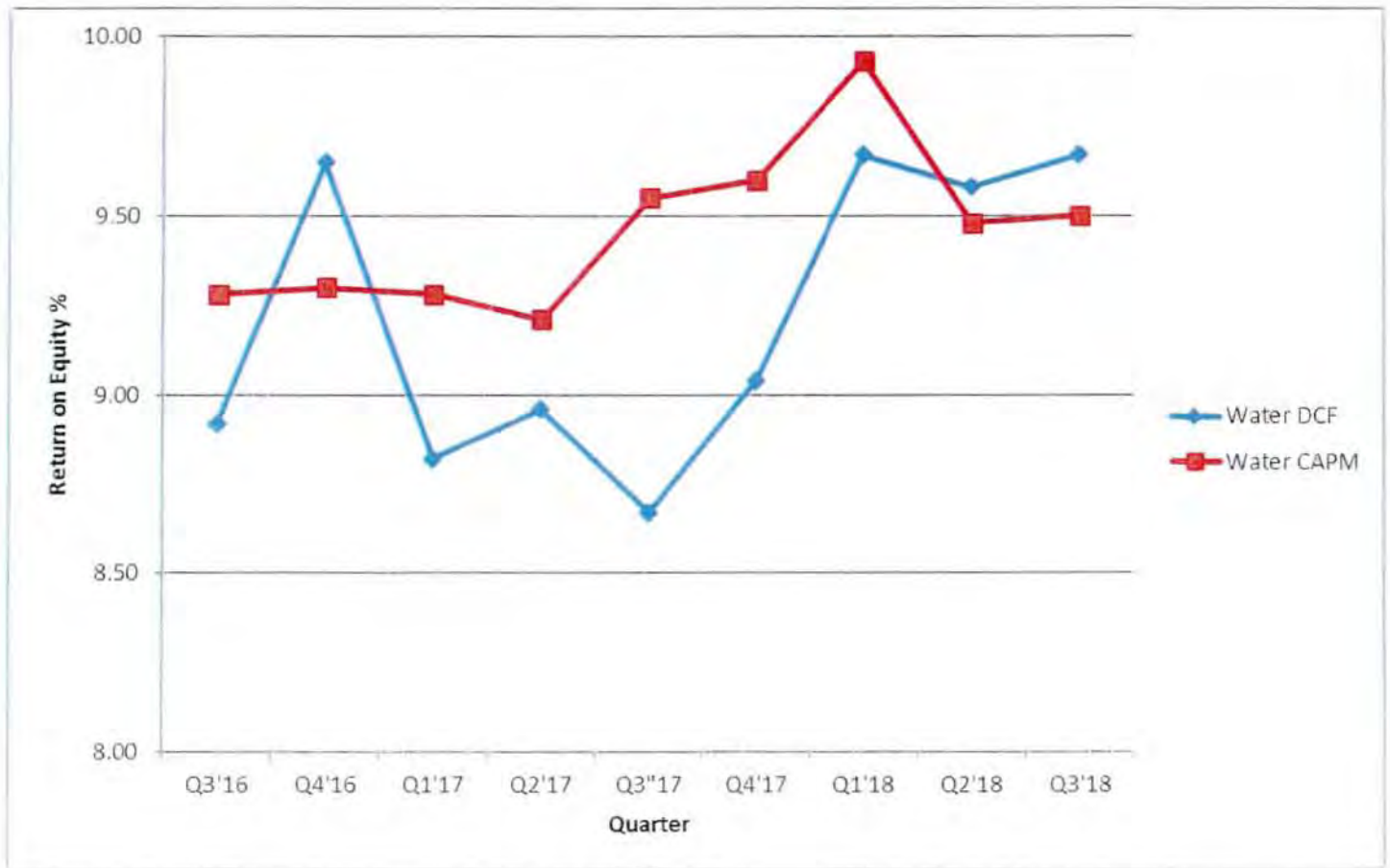
<sup>4</sup> Commission authorized Return on Equity (ROE) for DSIC purposes

Any questions concerning DSIC should be directed to Andrew Herster of the Bureau of Technical Utility Services at (717) 783-5392.

### Historic Water Industry DCF and CAPM Average ROEs

	Water	
	DCF	CAPM
Q3'16	8.92	9.28
Q4'16	9.65	9.30
Q1'17	8.82	9.28
Q2'17	8.96	9.21
Q3'17	8.67	9.55
Q4'17	9.04	9.60
Q1'18	9.67	9.93
Q2'18	9.58	9.48
Q3'18	9.67	9.50

Chart of Historic Water Industry DCF and CAPM Average ROEs



Barometer water companies are used to calculate a current DCF in the first chart. The second chart demonstrates the companies 52 week average DCF. A final average of the two calculations is also shown at the bottom.

**Water Company Barometer Group  
Calculation of a Current Dividend Yield**

	Closing Market Price (Po) 12/14/2018 (\$)	Latest Indicated Dividend Do (\$)	Ind. Div Plus 1-2 Div Growth Rate (DI) (\$)	Current Dividend Yield (DI/Po) (\$)	Growth (%)	DCF (%)
American States Water Company	69.19	1.10	1.14	1.65	6.00	7.65
Middlesex Water Company	58.56	0.96	0.99	1.68	9.00	10.68
California Water Service Group	48.77	0.75	0.77	1.59	8.25	9.84
Aqua America, Inc.	35.78	0.88	0.92	2.57	7.27	9.84
American Water Works Co., Inc.	97.14	1.82	1.91	1.97	8.00	9.97
Group Average DI/Po				1.89		
Group Average G				7.70		
<b>DCF</b>				<b>9.59</b>		

**52-week High-Low Dividend Yield Calculation**

	High (\$)	Low (\$)	Average (Pa) (\$)	Latest Indicated Dividend (Do) (\$)	Average Dividend Yield (Do/Pa) (%)	Growth (%)	DCF (%)
American States Water Company	69.61	50.16	59.89	1.10	1.84	6.00	7.84
Middlesex Water Company	60.31	33.96	47.14	0.96	2.04	9.00	11.04
California Water Service Group	49.07	35.25	42.16	0.75	1.78	8.25	10.03
Aqua America, Inc.	39.55	32.09	35.82	0.88	2.46	7.27	9.72
American Water Works Co., Inc.	98.18	76.04	87.11	1.82	2.09	8.00	10.09
Average					2.04		
Group Average Do/Pa					2.04		
Group Average G					7.70		
<b>DCF</b>					<b>9.74</b>		
Average of Current and 52-Week							<b>9.67</b>

Multiple sources of the Barometer companies projected 5 year Earnings Per Share are used to calculate the Group Average Dividend Growth Estimate.

**Development of a Representative Dividend Growth Rate  
for the Barometer Group of Water Companies**

	<u>5 Yr Forecast</u>					Average	
	Value Line	Value Line	Zacks	Yahoo	Reuters	Earnings	Growth
	<u>DPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>EPS</u> (%)	<u>Growth</u> (%)	<u>Estimate</u> (%)
American States Water Company	8.00	6.00	6.00	6.00	6.00	6.00	6.00
Middlesex Water Company	5.50	9.00		2.70		5.85	9.00
California Water Service Group	6.50	9.50	7.00	9.80		8.77	8.25
Aqua America, Inc.	9.00	7.50	5.30	5.00	9.00	6.70	7.27
American Water Works Co., Inc.	10.00	10.00	7.80	8.20	10.60	9.15	8.00
Group Average	7.80	8.40	6.53	6.34	8.53	7.29	7.70
USE							<u>7.70</u>

Sources: Reuters, December 17, 2018 ([www.reuters.com/finance/stocks](http://www.reuters.com/finance/stocks))  
 Value Line Investment Survey, December 17, 2018  
 Zacks, December 17, 2018 ([www.zacks.com](http://www.zacks.com))  
 Yahoo!, December 17, 2018 (<http://finance.yahoo.com>)



Company Size	Arithmetic Mean Return 1926-2017	Risk Premia over Income Return Long-term Government Bonds	Size Risk Premia over Large Company Risk Premia	Capitalization Size	
Decile 1 (Largest)	11.19%	6.2%	-0.9%	18,612,367,381	18,612,367,381
Large Company (Decile 1-2)					
Total Return	12.1%	7.1%	0.0%	1,878,839,877	18,612,367,381
Income Return	4.0%				
Capital Appreciation Return	7.8%				
Decile 2	12.89%	7.9%	0.8%	1,878,839,877	3,226,232,338
Decile 3	13.67%	8.7%	1.6%	1,188,986,271	1,878,839,877
Mid-cap Stocks (Decile 3-5)					
Total Return	13.9%	8.9%	1.8%	612,455,110	1,878,839,877
Income Return	3.8%				
Capital Appreciation Return	9.9%				
Decile 4	13.84%	8.8%	1.7%	752,944,915	1,188,986,271
Decile 5	14.62%	9.6%	2.5%	612,455,110	752,944,915
Decile 6	14.89%	9.9%	2.8%	428,291,875	612,455,110
Low-cap Stocks (Decile 6-8)					
Total Return	15.3%	10.3%	3.2%	212,070,070	612,455,110
Income Return	3.4%				
Capital Appreciation Return	11.7%				
Decile 7	15.41%	10.4%	3.3%	327,841,070	428,291,875
Decile 8	16.08%	11.1%	4.0%	212,070,070	327,841,070
Decile 9	16.94%	11.9%	4.8%	99,799,059	212,070,070
Micro-cap Stocks (Decile 9-10)					
Total Return	18.0%	13.0%	5.9%	-	212,070,070
Income Return	2.5%				
Capital Appreciation Return	15.4%				
Decile 10	20.19%	15.2%	8.1%	-	99,799,059
Long-term Government Bonds					
Total Return	6.0%	1.0%			
Income Return	5.0%				
Capital Appreciation Return	0.8%				

Inputs

## Chapter 3

# Basic Building Blocks of the Cost of Equity Capital – Risk-free Rate and Equity Risk Premium

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Chapter 3 is in the final process of being updated through December 31, 2017, and will be posted as soon as it is completed, likely during the first week of March 2018.

**NOTE:** All of the critical year-end risk-free rate and equity risk premia data (Historical ERP, Supply-Side ERP, and Duff & Phelps Conditional ERP) through December 31, 2017 is calculated and is available for Analysts to use in the online Cost of Capital Navigator.

For your convenience, the Historical ERP, Supply-Side ERP, and Duff & Phelps Recommended ERP (and the corresponding normalized risk-free rate the Duff & Phelps Recommended ERP should be used with) are listed below, all as of December 31, 2017.

On page two of this document, we have also included a table entitled: "Duff & Phelps Recommended U.S. ERP and Corresponding Risk-Free Rates from January 2008–Present" for your convenience.

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## Long-term Equity Risk Premia Estimates as of December 31, 2017

**Long-horizon expected equity risk premium (historical):**

large company stock total returns minus long-term government bond income returns 7.07%

**Long-horizon expected equity risk premium (supply-side):** historical equity risk premium minus price-to-earnings ratio calculated using three-year average earnings

6.04%

**Duff & Phelps recommended equity risk premium (conditional):** The Duff & Phelps recommended ERP was developed in relation to (and should be used in conjunction with) a 3.5% "normalized" risk-free rate.

5.00%



1926-2017	Geometric Mean Returns (%)	Arithmetic Mean Returns (%)	Standard Deviation of Returns (%)
<b>Large Company Stocks</b>			
Total Return	10.2	12.1	19.8
Income Return	4.0	4.0	1.6
Capital Appreciation Return	6.0	7.8	19.1
<b>Small Company Stocks</b>			
Total Return	12.1	16.5	31.7
<b>Mid-cap Stocks (Decile 3-5)</b>			
Total Return	11.2	13.9	24.3
Income Return	3.7	3.8	1.8
Capital Appreciation Return	7.2	9.9	23.6
<b>Low-cap Stocks (Decile 6-8)</b>			
Total Return	11.6	15.3	28.5
Income Return	3.4	3.4	2.0
Capital Appreciation Return	8.0	11.7	27.9
<b>Micro-cap Stocks (Decile 9-10)</b>			
Total Return	12.2	18.0	38.6
Income Return	2.5	2.5	1.7
Capital Appreciation Return	9.7	15.4	37.8
<b>Long-term Corporate Bonds</b>			
Total Return	6.1	6.4	8.3
<b>Long-term Government Bonds</b>			
Total Return	5.5	6.0	9.9
Income Return	5.0	5.0	2.6
Capital Appreciation Return	0.4	0.8	8.9
<b>Intermediate-term Government Bonds</b>			
Total Return	5.1	5.2	5.6
Income Return	4.4	4.4	2.9
Capital Appreciation Return	0.6	0.7	4.4
<b>US Treasury Bills</b>			
Total Return	3.4	3.4	3.1
<b>Inflation</b>			
	2.9	3.0	4.0

Risk  
Premium

7.1

Summary statistics over the 1926–2017 period for CRSP NYSE/NYSE MKT/NASDAQ<sup>46</sup> deciles 1–10 are shown in Exhibit 4.1. As size (in this case, as measured by market cap) *decreases*, return tends to *increase*. For example, the annual arithmetic mean return of decile 1 (the largest-cap companies) was 11.19% over the 1926–2017 period, while the annual arithmetic mean return of decile 10 (the smallest-cap companies) was 20.19%. Note that this increased return comes at a price: risk (as measured by standard deviation) increases from 18.86% for decile 1 to 42.22% for decile 10. The relationship between risk and return is a fundamental principle of finance and for estimating the cost of capital.

Summary Statistics of Annual Returns (CRSP NYSE/NYSE MKT/NASDAQ Deciles)  
1926–2017

<b>Decile</b>	<b>Geometric Mean (%)</b>	<b>Arithmetic Mean (%)</b>	<b>Standard Deviation (%)</b>
1-Largest	9.45%	11.19%	18.86%
2	10.65%	12.89%	21.37%
3	11.16%	13.67%	23.24%
4	10.93%	13.84%	25.42%
5	11.53%	14.62%	26.03%
6	11.48%	14.89%	26.97%
7	11.63%	15.41%	28.87%
8	11.55%	16.08%	32.84%
9	11.59%	16.94%	36.97%
10-Smallest	13.31%	20.19%	42.22%

CRSP U.S. Stock Database and CRSP U.S. Indices Database © 2018 Center for Research in Security Prices (CRSP®), University of Chicago Booth School of Business. CRSP NYSE/NYSE MKT/NASDAQ deciles 1–10. Used with permission. All rights reserved. Calculations performed by Duff & Phelps, LLC

Exhibit 4.2 illustrates the size effect. As size (measured by market cap in this case) *decreases*, return tends to *increase*. For example, an investment of \$1 in CRSP decile 1 (comprised of the largest companies) at the end of 1925 would have grown to \$4,065 by the end of 2017, and an investment in CRSP decile 6 (comprised of medium-sized companies) would have grown to \$21,937. However, an investment of \$1 in CRSP decile 10 (comprised of the smallest companies) would have grown to \$98,396 over the same period.

<sup>46</sup> On October 1, 2008, NYSE Euronext acquired the American Stock Exchange (AMEX). The "NYSE MKT" is the former American Stock Exchange, or AMEX. The CRSP standard market-cap-based NYSE/AMEX/NASDAQ indices are now called the NYSE/NYSE MKT/NASDAQ indices.

S:\Cap Rate\2018 Report Telephone\AUS Cap Rate 2018.xlsx

Ibbotson Annual Return Series

Year	A-1 Large Company Stocks Total Returns Jan-Dec *	A-2 Large Company Stocks Income Returns Jan-Dec *	A-3 Large Company Stocks Capital Appreciation Returns Jan-Dec *	A-4 Small Company Stocks Total Returns Jan-Dec *	A-5 Long-Term Corporate Bonds Total Returns Jan-Dec *	A-6 Long-Term Government Bonds Total Returns Jan-Dec *	A-7 Long-Term Government Bonds Income Returns Jan-Dec *	A-8 Long-Term Government Bonds Capital Appreciation Returns Jan-Dec *	A-9 Long-Term Government Bonds Yields Jan-Dec *	A-10 Intermediate-Term Government Bonds Total Returns Jan-Dec *	A-11 Intermediate-Term Government Bonds Income Returns Jan-Dec *	A-12 Intermediate-Term Government Bonds Capital Appreciation Returns Jan-Dec *	A-13 Intermediate-Term Government Bonds Yields Jan-Dec *	A-14 U.S. Treasury Bills Total Returns Jan-Dec *	A-15 Inflation Jan-Dec *	A-16 Risk Premia (A-1)-(A-7) Jan-Dec *
2008	-0.3700	0.0192	-0.3849	-0.3672	0.0878	0.2587	0.0445	0.2050	0.0303	0.1311	0.0296	0.0992	0.0126	0.0160	0.0009	-0.4145
2009	0.2646	0.0248	0.2345	0.2809	0.0302	-0.1490	0.0347	-0.1825	0.0458	-0.0240	0.0201	-0.0442	0.0242	0.0010	0.0272	0.2299
2010	0.1506	0.0202	0.1278	0.3126	0.1244	0.1014	0.0425	0.0589	0.0414	0.0712	0.0192	0.0516	0.0170	0.0012	0.0150	0.1081
2011	0.0211	0.0213	0.0000	-0.0326	0.1795	0.2823	0.0381	0.2374	0.0248	0.0946	0.0158	0.0779	0.0059	0.0004	0.0296	-0.0170
2012	0.1600	0.0250	0.1341	0.1824	0.1068	0.0331	0.0240	0.0088	0.0241	0.0207	0.0058	0.0148	0.0046	0.0006	0.0174	0.1360
2013	0.3239	0.0248	0.2960	0.4507	-0.0707	-0.1278	0.0288	-0.1570	0.0378	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0151	0.2951
2014	0.0138	0.0210	-0.0073	-0.0360	-0.0102	-0.0065	0.0247	-0.0311	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0073	-0.0109
2015	0.0138	0.0210	-0.0073	-0.0360	-0.0102	-0.0065	0.0247	-0.0311	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0073	-0.0109
2016	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0230	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0185	0.0020	0.0207	0.0966
2017	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0230	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0185	0.0020	0.0207	0.0966
<b>Average</b>	0.1175	0.0398	0.0775	0.1697	0.0631	0.0694	0.0499	0.0073	0.0504	0.0514	0.0440	0.0068	0.0437	0.0339	0.0297	0.0676
<b>Median</b>	0.1221	0.0383	0.0990	0.1907	0.0480	0.0365	0.0417	0.0006	0.0420	0.0396	0.0376	0.0047	0.0372	0.0297	0.0270	0.0797
<b>High</b>	0.5398	0.0677	0.4659	1.4287	0.4258	0.4036	0.1350	0.2395	0.1334	0.2910	0.1297	0.1423	0.1396	0.1471	0.1816	0.5087
<b>Low</b>	-0.4334	0.0110	-0.4707	-0.5801	-0.0809	-0.1490	0.0194	-0.1825	0.0194	-0.0601	0.0058	-0.1114	0.0046	-0.0002	-0.1030	-0.4887
<b>Last 5 year (60 months)</b>																
<b>Average</b>	0.1426	0.0225	0.1187	0.1914	0.0452	0.0297	0.0267	0.0026	0.0287	0.0099	0.0138	-0.0036	0.0169	0.0009	0.0143	0.1160
<b>Median</b>	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0247	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0169	0.0002	0.0151	0.0966
<b>High</b>	0.3239	0.0248	0.2960	0.4507	0.1728	0.2478	0.0341	0.2093	0.0378	0.0300	0.0163	0.0135	0.0185	0.0020	0.0207	0.2951
<b>Low</b>	0.0138	0.0210	-0.0073	-0.0360	-0.0707	-0.1278	0.0230	-0.1570	0.0246	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0073	-0.0109

\* Compound Annual Return

Source: Ibbotson SBBI 2017 Valuation Yearbook  
2017 use 2016 ICW

Ibbotson Annual Return Series

Year	A-1 Large Company Stocks Total Returns Jan-Dec *	A-2 Large Company Stocks Income Returns Jan-Dec *	A-3 Large Company Stocks Capital Appreciation Returns Jan-Dec *	A-4 Small Company Stocks Total Returns Jan-Dec *	A-5 Long-Term Corporate Bonds Total Returns Jan-Dec *	A-6 Long-Term Government Bonds Total Returns Jan-Dec *	A-7 Long-Term Government Bonds Income Returns Jan-Dec *	A-8 Long-Term Government Bonds Capital Appreciation Returns Jan-Dec *	A-9 Long-Term Government Bonds Yields Jan-Dec *	A-10 Intermediate-Term Government Bonds Total Returns Jan-Dec *	A-11 Intermediate-Term Government Bonds Income Returns Jan-Dec *	A-12 Intermediate-Term Government Bonds Capital Appreciation Returns Jan-Dec *	A-13 Intermediate-Term Government Bonds Yields Jan-Dec *	A-14 U.S. Treasury Bills Total Returns Jan-Dec *	A-15 Inflation Jan-Dec *	A-16 Risk Premia (A-1) - (A-7) Jan-Dec *
1967	0.2398	0.0364	0.2090	0.8357	-0.0495	-0.0918	0.0459	-0.1355	0.0556	0.0101	0.0488	-0.0385	0.0577	0.0421	0.0304	0.1939
1968	0.1106	0.0318	0.0766	0.3597	0.0257	-0.0026	0.0550	-0.0551	0.0598	0.0454	0.0549	-0.0099	0.0596	0.0521	0.0472	0.0556
1969	-0.0850	0.0304	-0.1142	-0.2505	-0.0809	-0.0507	0.0595	-0.1083	0.0687	-0.0074	0.0665	-0.0727	0.0829	0.0658	0.0611	-0.1445
1970	0.0401	0.0341	0.0016	-0.1743	0.1837	0.1211	0.0674	0.0484	0.0648	0.1686	0.0749	0.0871	0.0590	0.0652	0.0549	-0.0273
1971	0.1431	0.0333	0.1079	0.1650	0.1101	0.1323	0.0632	0.0661	0.0597	0.0872	0.0575	0.0272	0.0525	0.0439	0.0336	0.0799
1972	0.1898	0.0309	0.1563	0.0443	0.0726	0.0569	0.0587	-0.0035	0.0599	0.0516	0.0575	-0.0075	0.0585	0.0384	0.0341	0.1311
1973	-0.1466	0.0286	-0.1737	-0.3090	0.0114	-0.0111	0.0651	-0.0770	0.0726	0.0461	0.0658	-0.0219	0.0679	0.0693	0.0880	-0.2117
1974	-0.2647	0.0369	-0.2972	-0.1995	-0.0306	0.0435	0.0727	-0.0345	0.0760	0.0569	0.0724	-0.0199	0.0712	0.0800	0.1220	-0.3374
1975	0.3720	0.0537	0.3155	0.5282	0.1464	0.0920	0.0799	0.0073	0.0805	0.0783	0.0735	0.0012	0.0719	0.0580	0.0701	0.2921
1976	0.2384	0.0438	0.1915	0.5738	0.1865	0.1675	0.0789	0.0807	0.0721	0.1287	0.0710	0.0525	0.0600	0.0508	0.0481	0.1595
1977	-0.0718	0.0431	-0.1150	0.2538	0.0171	-0.0069	0.0714	-0.0786	0.0803	0.0141	0.0649	-0.0515	0.0751	0.0512	0.0677	-0.1432
1978	0.0656	0.0533	0.0106	0.2346	-0.0007	-0.0118	0.0790	-0.0905	0.0898	0.0349	0.0783	-0.0449	0.0883	0.0718	0.0903	-0.0134
1979	0.1844	0.0571	0.1231	0.4346	-0.0418	-0.0123	0.0886	-0.0984	0.1012	0.0409	0.0904	-0.0507	0.1033	0.1038	0.1331	0.0958
1980	0.3242	0.0573	0.2577	0.3988	-0.0276	-0.0395	0.0997	-0.1400	0.0997	0.0391	0.1055	-0.0681	0.1245	0.1124	0.1240	0.2245
1981	-0.0491	0.0489	-0.0972	0.4134	-0.0124	0.0186	0.1155	-0.1033	0.1334	0.0945	0.1297	-0.0455	0.1396	0.1471	0.0894	-0.1646
1982	0.2141	0.0550	0.1476	0.2801	0.4256	0.4036	0.1350	0.2395	0.1095	0.2910	0.1281	0.1423	0.0990	0.1054	0.0387	0.0791
1983	0.2251	0.0500	0.1727	0.3967	0.0626	0.0065	0.1038	-0.0982	0.1197	0.0741	0.1035	-0.0330	0.1141	0.0880	0.0380	0.1213
1984	0.0627	0.0456	0.0139	-0.0667	0.1686	0.1548	0.1174	0.0232	0.1170	0.1402	0.1168	0.0122	0.1104	0.0985	0.0395	-0.0547
1985	0.3216	0.0510	0.2634	0.2466	0.3009	0.3097	0.1125	0.1784	0.0956	0.2033	0.3097	0.0901	0.0855	0.0772	0.0377	0.2091
1986	0.1847	0.0374	0.1463	0.0685	0.1985	0.2453	0.0898	0.1499	0.0789	0.1514	0.0772	0.0699	0.0685	0.0616	0.0113	0.0949
1987	0.0523	0.0364	0.0203	-0.0930	-0.0027	-0.0271	0.0792	-0.1069	0.0920	0.0290	0.0747	-0.0475	0.0832	0.0547	0.0441	-0.0269
1988	0.1681	0.0417	0.1241	0.2287	0.1070	0.0967	0.0897	0.0036	0.0918	0.0610	0.0824	-0.0226	0.0917	0.0635	0.0442	0.0784
1989	0.3149	0.0385	0.2726	0.1018	0.1623	0.1811	0.0881	0.0862	0.0816	0.1329	0.0846	0.0434	0.0794	0.0837	0.0465	0.2268
1990	-0.0317	0.0336	-0.0656	-0.2156	0.0678	0.0618	0.0819	-0.0261	0.0844	0.0973	0.0815	0.0102	0.0770	0.0781	0.0611	-0.1136
1991	0.3055	0.0382	0.2631	0.4463	0.1989	0.1930	0.0822	0.1010	0.0730	0.1546	0.0743	0.0736	0.0597	0.0560	0.0306	0.2233
1992	0.0767	0.0303	0.0446	0.2335	0.0939	0.0805	0.0726	0.0034	0.0726	0.0719	0.0627	0.0064	0.0610	0.0351	0.0290	0.0041
1993	0.0999	0.0283	0.0706	0.2098	0.1319	0.1824	0.0717	0.1071	0.0654	0.1124	0.0553	0.0556	0.0522	0.0290	0.0275	0.0282
1994	0.0131	0.0282	-0.0154	0.0311	-0.0576	-0.0777	0.0659	-0.1429	0.0799	-0.0514	0.0607	-0.1114	0.0780	0.0390	0.0267	-0.0528
1995	0.3743	0.0291	0.3411	0.3446	0.2720	0.3167	0.0760	0.2304	0.0603	0.1680	0.0669	0.0966	0.0538	0.0560	0.0254	0.2983
1996	0.2307	0.0254	0.2026	0.1762	0.0140	-0.0093	0.0618	-0.0737	0.0673	0.0210	0.0582	-0.0390	0.0616	0.0521	0.0332	0.1689
1997	0.3336	0.0211	0.3101	0.2278	0.1295	0.1585	0.0664	0.0851	0.0602	0.0838	0.0614	0.0195	0.0573	0.0526	0.0170	0.2672
1998	0.2858	0.0168	0.2667	-0.0731	0.1076	0.1306	0.0583	0.0689	0.0542	0.1210	0.0529	0.0466	0.0468	0.0486	0.0161	0.2275
1999	0.2104	0.0136	0.1953	0.2979	-0.0745	-0.0896	0.0557	-0.1435	0.0682	-0.0177	0.0530	-0.0706	0.0645	0.0468	0.0268	0.1547
2000	-0.0911	0.0110	-0.1014	-0.0959	0.1287	0.2148	0.0650	0.1436	0.0558	0.1259	0.0619	0.0594	0.0507	0.0589	0.0339	-0.1561
2001	-0.1188	0.0118	-0.1304	0.2277	0.1065	0.0370	-0.0553	-0.0189	0.0575	0.0762	0.0427	0.0323	0.0442	0.0383	0.0155	-0.1741
2002	-0.2210	0.0139	-0.2337	-0.1328	0.1633	0.1784	0.0559	0.1169	0.0484	0.1293	0.0398	0.0865	0.0261	0.0165	0.0238	-0.2769
2003	0.2870	0.0200	0.2638	0.6070	0.0527	0.0145	0.0480	-0.0336	0.0511	0.0240	0.0240	0.0285	0.0297	0.0102	0.0188	0.2390
2004	0.1087	0.0175	0.0899	0.1839	0.0872	0.0851	0.0502	0.0326	0.0484	0.0225	0.0328	-0.0107	0.0347	0.0120	0.0326	0.0585
2005	0.0491	0.0184	0.0300	0.0569	0.0587	0.0781	0.0469	0.0302	0.0461	0.0136	0.0392	-0.0258	0.0434	0.0298	0.0342	0.0022
2006	0.1580	0.0201	0.1362	0.1617	0.0324	0.0119	0.0468	-0.0364	0.0491	0.0314	0.0454	-0.0151	0.0465	0.0480	0.0254	0.1112
2007	0.0549	0.0196	0.0353	-0.0522	0.0260	0.0988	0.0486	0.0469	0.0450	0.1005	0.0444	0.0533	0.0328	0.0466	0.0408	0.0063

## Appendix 3

# CRSP Deciles Size Premia Study: Key Variables

Appendix 3 includes the "key variables in estimating the cost of capital" that were previously published in the *Ibbotson Stocks, Bonds, Bills and Inflation (SBBi) Valuation Yearbook*.<sup>A3.1</sup>

The equity risk premium, size premium, and other valuation data reported in Appendix 3 of the *2017 Valuation Handbook – U.S. Guide to Cost of Capital*:

- Was calculated using the same data sources that were used to calculate the equity risk premium, size premium, and other valuation data previously published in the former *SBBi Valuation Yearbook*, and
- Was calculated using the same methodology that was used to calculate the equity risk premium, size premium, and other valuation data previously published in the former *SBBi Valuation Yearbook*.

For detailed examples of using the equity risk premium, size premium, and other valuation data reported in Appendix 3 to estimate cost of equity capital using the capital asset pricing model (CAPM) and the build-up method, see Chapter 8, "CRSP Deciles Size Premia Examples".

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<sup>A3.1</sup> The *Ibbotson SBBi Valuation Yearbook* was previously published by Morningstar, Inc. (Chicago). The *SBBi Valuation Yearbook* was discontinued in 2013.

**Exhibit 2.3:** Summary Statistics of Annual Total Returns, Income Returns, and Capital Appreciation Returns of Basic U.S. Asset Classes  
1926–2016

1926–2016	Geometric Mean Returns (%)	Arithmetic Mean Returns (%)	Standard Deviation of Returns (%)
<b>Large Company Stocks</b>			
Total Return	10.0	12.0	19.9
Income Return	4.0	4.0	1.6
Capital Appreciation Return	5.8	7.7	19.2
<b>Small Company Stocks</b>			
Total Return	12.1	16.6	31.9
<b>Mid-cap Stocks (Decile 3-5)</b>			
Total Return	11.1	13.8	24.4
Income Return	3.8	3.8	1.8
Capital Appreciation Return	7.1	9.8	23.7
<b>Low-cap Stocks (Decile 6-8)</b>			
Total Return	11.5	15.3	28.7
Income Return	3.4	3.5	2.0
Capital Appreciation Return	7.9	11.6	28.1
<b>Micro-cap Stocks (Decile 9-10)</b>			
Total Return	12.1	18.0	38.8
Income Return	2.5	2.5	1.7
Capital Appreciation Return	9.7	15.4	38.0
<b>Long-term Corporate Bonds</b>			
Total Return	6.0	6.3	8.4
<b>Long-term Government Bonds</b>			
Total Return	5.5	6.0	9.9
Income Return	5.0	5.0	2.6
Capital Appreciation Return	0.3	0.7	8.9
<b>Intermediate-term Government Bonds</b>			
Total Return	5.1	5.3	5.6
Income Return	4.4	4.4	2.9
Capital Appreciation Return	0.6	0.7	4.5
<b>US Treasury Bills</b>			
Total Return	3.4	3.4	3.1
<b>Inflation</b>			
	2.9	3.0	4.1

**Source of underlying data in both Exhibit 2.3 and 2.4:** (i) Stocks, Bonds, Bills, and Inflation<sup>®</sup> (SBB<sup>®</sup>) return series from the Morningstar Direct database. Series used: Large Company Stocks (IA SBB<sup>®</sup> US Large Stock TR USD Ext). The "SBB<sup>®</sup> US Large Stock" return series is essentially the S&P 500 index; Small Company Stocks (IA SBB<sup>®</sup> US Small Stock TR USD); Long-term Corp. Bonds (IA SBB<sup>®</sup> US LT Corp TR USD); Long-term Gov't Bonds (IA SBB<sup>®</sup> US LT Govt TR USD); Intermediate-term Gov't Bonds (IA SBB<sup>®</sup> US IT Govt TR USD); T-bills (IA SBB<sup>®</sup> US 30 Day TBill TR USD); Inflation (IA SBB<sup>®</sup> US Inflation). All rights reserved. Used with permission. (ii) CRSP U.S. Stock Database and CRSP U.S. Indices Database © 2017 Center for Research in Security Prices (CRSP<sup>®</sup>), University of Chicago Booth School of Business. (continued on next page)

In Exhibit 7.2, the largest company in each of the CRSP (NYSE/NYSE MKT/NASDAQ) deciles and size groupings (by market capitalization) as of September 30, 2016.<sup>7.13</sup>

**Exhibit 7.1:** Aggregate Market Capitalization and Company Counts of the CRSP (NYSE/NYSE MKT/NASDAQ) Deciles and Size Groupings  
December 31, 2016

<b>Decile</b>	<b>Historic Average Percentage of Total Capitalization</b>	<b>Recent Number of Companies</b>	<b>Recent Decile Market Capitalization (in \$thousands)</b>	<b>Recent Percentage of Total Capitalization</b>
1-Largest	63.13%	191	15,290,475,300	66.12%
2	13.95%	200	3,010,671,018	13.02%
3	7.55%	202	1,609,575,618	6.96%
4	4.73%	221	1,010,851,810	4.37%
5	3.26%	227	677,120,067	2.93%
6	2.41%	259	541,037,999	2.34%
7	1.79%	283	384,129,198	1.66%
8	1.33%	361	297,164,943	1.28%
9	1.03%	487	212,609,644	0.92%
10-Smallest	0.82%	790	92,882,169	0.40%
Mid-Cap 3-5	15.54%	650	3,297,547,494	14.26%
Low-Cap 6-8	5.53%	903	1,222,332,139	5.29%
Micro-Cap 9-10	1.85%	1,277	305,491,813	1.32%

**Source of underlying data:** Calculated (or derived) based on data from CRSP © 2017 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business (2017). Calculations by Duff & Phelps, LLC.

<sup>7.13</sup> The CRSP deciles are re-constituted and rebalanced at the end of each calendar quarter (March, June, September, and December). These quarter-end portfolios are then followed for the subsequent three months. For example, the breakpoints in Exhibit 7.2 were a key input in defining the companies placed in each decile at the end of September 2016; these portfolio compositions were then used to calculate the October, November, and December 2016 returns associated with each decile.

The beta-adjusted size premium for Risk Premium Report Exhibit B-3, portfolio 25, is calculated as follows:

*Exhibit B-3, portfolio 25 Size Premium = actual excess return – excess return predicted by CAPM*

The *actual* excess return of Exhibit B-3, portfolio 25 is 14.98% (21.44% – 6.46%), and the excess return that CAPM *predicted* is 6.60% (1.31 x 5.02%) (difference due to rounding). The (un-smoothed; see next section) size premium for Exhibit B-3 portfolio 25 is therefore 8.39%, which is "what actually happened" (14.98%) minus "what CAPM predicted" (6.60%) (difference due to rounding).

### **"Smoothed" Premia versus "Average" Premia**

The CRSP Deciles Size Premia are not smoothed.

We recommend using the "smoothed" size premia (and risk premia) in the Risk Premium Report. Smoothing the premia essentially averages out the somewhat scattered nature of the raw average premia. The "smoothed" average risk premium is generally the more appropriate indicator for most of the portfolio groups. It should be noted, however, that at the largest-size and smallest-size ends of the range, the average historical risk premia may tend to jump off of the smoothed line, particularly for the portfolios ranked by size measures that incorporate market capitalization (Exhibits A-1 and A-4).

### **OLS Beta versus Sum Beta**

The CRSP Deciles Size Premia use ordinary least square (OLS) betas to calculate the size premia shown in Appendix 3 (the size premia in Appendix 3 are the same size premia previously published on the *SBBi Valuation Yearbook's* "back page" ("Key Variables in Estimating the Cost of Capital"). Sum beta equivalents to these OLS size premia estimates are available in Chapter 4, "Basic Building Blocks of the Cost of Equity Capital – Size Premium".

The Risk Premium Report uses "sum" betas in all calculations. Sum betas have been shown to be better predictors of smaller companies' expected returns. To learn more about sum betas, see Chapter 5, "Basic Building Blocks of the Cost of Equity Capital – Betas and Industry Risk Premia".

### **Risk Premia Over the Risk Free Rate**

The Risk Premium Report exhibits also provides a second type of premia, "risk premia over the risk-free rate". Risk premia over the risk-free rate are provided in the Size Study's A exhibits, and in the Risk Study's D exhibits.

Risk premia over the risk-free rate in the Size Study's A exhibits and the Risk Study's D exhibits represent the overall difference between the historical (observed) return of equities over the risk-free rate, and are therefore a measure of risk in terms of the combined effect of *market* risk and *size* risk. These premia are simply added to the risk-free rate, within the context of the build-up method.

The CRSP Deciles Size Premia do not include "risk premia over the risk-free rate".



Source: Ibbotson S&BBI 2018 Stock, Bonds, Bills, and Inflation Yearbook

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks Capital	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds Capital	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds Capital	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premia
	Total Returns	Income Returns	Appreciation	Total Returns	Total Returns	Total Returns	Income Returns	Appreciation	Yields	Total Returns	Income Returns	Appreciation	Yields	Total Returns		(A-1)-(A-7)
Year	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	
1926	0.1162	0.0541	0.0572	0.0028	0.0737	0.0777	0.0373	0.0391	0.0354	0.0538	0.0378	0.0151	0.0361	0.0327	-0.0149	0.0789
1927	0.3749	0.0571	0.3091	0.2210	0.0744	0.0893	0.0341	0.0540	0.0316	0.0452	0.0349	0.0096	0.0340	0.0312	-0.0208	0.3408
1928	0.4361	0.0481	0.3788	0.3969	0.0284	0.0010	0.0322	-0.0312	0.0340	0.0092	0.0364	-0.0273	0.0401	0.0356	-0.0097	0.4039
1929	-0.0842	0.0398	-0.1191	-0.5136	0.0327	0.0342	0.0347	-0.0020	0.0340	-0.0601	0.0407	0.0177	0.0362	0.0475	0.0020	-0.1189
1930	-0.2490	0.0457	-0.2848	-0.3815	0.0798	0.0466	0.0332	0.0128	0.0330	0.0672	0.0330	0.0333	0.0291	0.0241	-0.0603	-0.2822
1931	-0.4334	0.0535	-0.4707	-0.4975	-0.0185	-0.0531	0.0333	-0.0846	0.0407	-0.0232	0.0316	-0.0540	0.0412	0.0107	-0.0952	-0.4667
1932	-0.0819	0.0616	-0.1515	-0.0539	0.1082	0.1684	0.0369	0.1294	0.0315	0.0810	0.0363	0.0502	0.0304	0.0096	-0.1030	-0.1188
1933	0.5399	0.0639	0.4659	1.4287	0.1038	-0.0007	0.0312	-0.0314	0.0336	0.0183	0.0283	-0.0099	0.0325	0.0030	0.0051	0.5087
1934	-0.0144	0.0446	-0.0594	0.2422	0.1384	0.1003	0.0318	0.0676	0.0293	0.0900	0.0293	0.0597	0.0249	0.0016	0.0203	-0.0462
1935	0.4767	0.0495	0.4137	0.4019	0.0961	0.0498	0.0281	0.0214	0.0276	0.0701	0.0202	0.0494	0.0163	0.0017	0.0299	0.4486
1936	0.3392	0.0536	0.2792	0.6480	0.0674	0.0752	0.0277	0.0464	0.0255	0.0306	0.0144	0.0160	0.0129	0.0018	0.0121	0.3115
1937	-0.3503	0.0466	-0.3859	-0.5801	0.0275	0.0023	0.0266	-0.0248	0.0273	0.0156	0.0148	0.0005	0.0114	0.0031	0.0310	-0.3769
1938	0.3112	0.0483	0.2521	0.3280	0.0553	0.0553	0.0264	0.0283	0.0252	0.0623	0.0182	0.0437	0.0152	-0.0002	-0.0278	0.2848
1939	-0.0041	0.0469	-0.0545	0.0035	0.0397	0.0594	0.0240	0.0348	0.0226	0.0452	0.0131	0.0318	0.0098	0.0002	-0.0048	-0.0281
1940	-0.0978	0.0536	-0.1529	-0.0516	0.0339	0.0609	0.0223	0.0377	0.0194	0.0296	0.0090	0.0204	0.0057	0.0000	0.0096	-0.1201
1941	-0.1159	0.0671	-0.1786	-0.0900	0.0273	0.0093	0.0194	-0.0101	0.0204	0.0050	0.0067	-0.0017	0.0082	0.0006	0.0972	-0.1353
1942	0.0234	0.0679	0.1243	0.4451	0.0260	0.0322	0.0246	0.0074	0.0246	0.0194	0.0076	0.0117	0.0072	0.0027	0.0929	-0.0012
1943	0.2590	0.0624	0.1945	0.8837	0.0283	0.0208	0.0244	-0.0037	0.0248	0.0281	0.0156	0.0123	0.0145	0.0035	0.0316	0.2346
1944	0.1975	0.0548	0.1380	0.5372	0.0473	0.0281	0.0246	0.0032	0.0246	0.0180	0.0144	0.0035	0.0140	0.0033	0.0211	0.1729
1945	0.3611	0.0497	0.3072	0.7361	0.0408	0.1073	0.0234	0.0827	0.0199	0.0222	0.0119	0.0102	0.0103	0.0033	0.0225	0.3377
1946	-0.0807	0.0409	-0.1187	-0.1163	0.0172	-0.0010	0.0204	-0.0215	0.0212	0.0100	0.0108	-0.0008	0.0112	0.0035	0.1816	-0.1011
1947	0.0571	0.0549	0.0000	0.0092	-0.0234	-0.0262	0.0213	-0.0470	0.0243	0.0091	0.0121	-0.0030	0.0134	0.0050	0.0901	0.0358
1948	0.0550	0.0608	-0.0065	-0.0211	0.0414	0.0340	0.0240	0.0096	0.0237	0.0185	0.0156	0.0027	0.0151	0.0081	0.0271	0.0310
1949	0.1879	0.0750	0.1026	0.1975	0.0331	0.0645	0.0225	0.0415	0.0209	0.0232	0.0136	0.0095	0.0123	0.0110	-0.0180	0.1654
1950	0.3171	0.0877	0.2178	0.3875	0.0212	0.0006	0.0212	-0.0206	0.0224	0.0070	0.0139	-0.0069	0.0162	0.0120	0.0579	0.2959
1951	0.2402	0.0691	0.1646	0.0780	-0.0269	-0.0393	0.0238	-0.0627	0.0269	0.0036	0.0198	-0.0163	0.0217	0.0149	0.0587	0.2164
1952	0.1837	0.0593	0.1178	0.0303	0.0352	0.0116	0.0266	-0.0148	0.0279	0.0163	0.0219	-0.0057	0.0235	0.0166	0.0088	0.1571
1953	-0.0099	0.0546	-0.0662	-0.0649	0.0341	0.0364	0.0284	0.0067	0.0274	0.0323	0.0255	0.0061	0.0218	0.0182	0.0062	-0.0383
1954	0.5262	0.0621	0.4502	0.6058	0.0539	0.0719	0.0279	0.0435	0.0272	0.0268	0.0160	0.0108	0.0172	0.0086	-0.0050	0.4983
1955	0.3156	0.0456	0.2640	0.2044	0.0048	-0.0129	0.0275	-0.0407	0.0295	-0.0065	0.0245	-0.0310	0.0280	0.0157	0.0037	0.2881
1956	0.0656	0.0383	0.0262	0.0428	-0.0681	-0.0559	0.0299	-0.0846	0.0345	-0.0042	0.0305	-0.0345	0.0363	0.0246	0.0286	0.0357
1957	-0.1078	0.0384	-0.1431	-0.1457	0.0871	0.0746	0.0344	0.0382	0.0323	0.0784	0.0359	0.0405	0.0284	0.0314	0.0302	-0.1422
1958	0.4336	0.0438	0.3806	0.6489	-0.0222	-0.0609	0.0327	-0.0923	0.0382	-0.0129	0.0293	-0.0417	0.0381	0.0154	0.0176	0.4009
1959	0.1196	0.0331	0.0848	0.1640	-0.0097	-0.0226	0.0401	-0.0620	0.0447	-0.0039	0.0418	-0.0456	0.0498	0.0295	0.0150	0.0795
1960	0.0047	0.0326	-0.0297	-0.0329	0.0907	0.1378	0.0426	0.0929	0.0380	0.1176	0.0415	0.0742	0.0331	0.0266	0.0148	-0.0379
1961	0.2689	0.0348	0.2313	0.3209	0.0482	0.0097	0.0383	-0.0286	0.0415	0.0185	0.0354	-0.0172	0.0384	0.0213	0.0067	0.2306
1962	-0.0873	0.0298	-0.1110	-0.1190	0.0795	0.0689	0.0400	0.0278	0.0395	0.0556	0.0373	0.0173	0.0350	0.0273	0.0122	-0.1273
1963	0.2280	0.0361	0.1889	0.2357	0.0219	0.0121	0.0389	-0.0270	0.0417	0.0164	0.0371	-0.0210	0.0404	0.0312	0.0165	0.1891
1964	0.1648	0.0333	0.1297	0.2352	0.0477	0.0351	0.0415	-0.0072	0.0423	0.0404	0.0400	-0.0003	0.0403	0.0354	0.0119	0.1233
1965	0.1245	0.0321	0.0906	0.4175	-0.0046	0.0071	0.0419	-0.0345	0.0450	0.0120	0.0415	-0.0310	0.0490	0.0393	0.0192	0.0826
1966	-0.1006	0.0311	-0.1309	-0.0701	0.0020	0.0365	0.0449	-0.0106	0.0455	0.0469	0.0493	-0.0041	0.0479	0.0476	0.0335	-0.1455
1967	0.2398	0.0364	0.2090	0.8357	-0.0495	-0.0918	0.0459	-0.1355	0.0556	0.0101	0.0488	-0.0385	0.0577	0.0421	0.0304	0.1939
1968	0.1106	0.0318	0.0766	0.3597	0.0257	-0.0026	0.0550	-0.0551	0.0598	0.0454	0.0549	-0.0099	0.0596	0.0521	0.0472	0.0556

Source: Ibbotson S&P 1980 Stock, Bonds, Bills, and Inflation Yearbook

Year	A-1 Large Company Stocks Total Returns Jan-Dec *	A-2 Large Company Stocks Income Returns Jan-Dec *	A-3 Large Company Stocks Appreciation Returns Jan-Dec *	A-4 Small Company Stocks Total Returns Jan-Dec *	A-5 Long-Term Corporate Bonds Total Returns Jan-Dec *	A-6 Long-Term Government Bonds Total Returns Jan-Dec *	A-7 Long-Term Government Bonds Income Returns Jan-Dec *	A-8 Long-Term Government Bonds Appreciation Returns Jan-Dec *	A-9 Long-Term Government Bonds Yields Jan-Dec *	A-10 Intermediate-Term Government Bonds Total Returns Jan-Dec *	A-11 Intermediate-Term Government Bonds Income Returns Jan-Dec *	A-12 Intermediate-Term Government Bonds Appreciation Returns Jan-Dec *	A-13 Intermediate-Term Government Bonds Yields Jan-Dec *	A-14 U.S. Treasury Bills Total Returns Jan-Dec *	A-15 Inflation Jan-Dec *	A-16 Risk Premia (A-1)-(A-7)
1969	-0.0850	0.0304	-0.1142	-0.2505	-0.0809	-0.0507	0.0595	-0.1083	0.0687	-0.0074	0.0665	-0.0727	0.0829	0.0658	0.0611	-0.1445
1970	0.0401	0.0341	0.0016	-0.1743	0.1837	0.1211	0.0674	0.0484	0.0648	0.1686	0.0749	0.0871	0.0590	0.0652	0.0549	-0.0273
1971	0.1431	0.0333	0.1079	0.1650	0.1101	0.1323	0.0632	0.0661	0.0597	0.0872	0.0575	0.0272	0.0525	0.0439	0.0336	0.0799
1972	0.1898	0.0309	0.1563	0.0443	0.0726	0.0569	0.0587	-0.0035	0.0599	0.0516	0.0575	-0.0075	0.0585	0.0384	0.0341	0.1311
1973	-0.1466	0.0286	-0.1737	-0.3090	0.0114	-0.0111	0.0651	-0.0770	0.0726	0.0461	0.0658	-0.0219	0.0679	0.0693	0.0880	-0.2117
1974	-0.2647	0.0369	-0.2972	-0.1995	-0.0306	0.0435	0.0727	-0.0345	0.0760	0.0569	0.0724	-0.0199	0.0712	0.0800	0.1220	-0.3374
1975	0.3720	0.0537	0.3155	0.5282	0.1464	0.0920	0.0799	0.0073	0.0805	0.0783	0.0735	0.0012	0.0719	0.0580	0.0701	0.2921
1976	0.2384	0.0438	0.1915	0.5738	0.1865	0.1675	0.0789	0.0807	0.0721	0.1287	0.0710	0.0525	0.0600	0.0508	0.0481	0.1595
1977	-0.0718	0.0431	-0.1150	0.2538	0.0171	-0.0069	0.0714	-0.0786	0.0803	0.0141	0.0649	-0.0515	0.0751	0.0512	0.0677	-0.1432
1978	0.0656	0.0533	0.0106	0.2346	-0.0007	-0.0118	0.0790	-0.0905	0.0898	0.0349	0.0783	-0.0449	0.0883	0.0718	0.0903	-0.0134
1979	0.1844	0.0571	0.1231	0.4346	-0.0418	-0.0123	0.0886	-0.0984	0.1012	0.0409	0.0904	-0.0507	0.1033	0.1038	0.1331	0.0958
1980	0.3242	0.0573	0.2577	0.3988	-0.0276	-0.0395	0.0997	-0.1400	0.1199	0.0391	0.1055	-0.0681	0.1245	0.1124	0.1240	0.2245
1981	-0.0491	0.0489	-0.0972	0.4134	-0.0124	0.0186	0.1155	-0.1033	0.1334	0.0945	0.1297	-0.0455	0.1396	0.1471	0.0894	-0.1646
1982	0.2141	0.0550	0.1476	0.2801	0.4256	0.4036	0.1350	0.2395	0.1095	0.2910	0.1281	0.1423	0.0990	0.1054	0.0387	0.0791
1983	0.2251	0.0500	0.1727	0.3967	0.0626	0.0065	0.1038	-0.0982	0.1197	0.0741	0.1035	-0.0330	0.1141	0.0880	0.0380	0.1213
1984	0.0627	0.0456	0.0139	-0.0667	0.1686	0.1548	0.1174	0.0232	0.1170	0.1402	0.1168	0.0122	0.1104	0.0985	0.0395	-0.0547
1985	0.3216	0.0510	0.2634	0.2466	0.3009	0.3097	0.1125	0.1784	0.0956	0.2033	0.1029	0.0901	0.0855	0.0772	0.0377	0.2091
1986	0.1847	0.0374	0.1463	0.0685	0.1985	0.2453	0.0898	0.1499	0.0789	0.1514	0.0772	0.0699	0.0685	0.0616	0.0113	0.0949
1987	0.0523	0.0364	0.0203	-0.0930	-0.0027	-0.0271	0.0792	-0.1069	0.0920	0.0290	0.0747	-0.0475	0.0832	0.0547	0.0441	-0.0269
1988	0.1681	0.0417	0.1241	0.2287	0.1070	0.0967	0.0897	0.0036	0.0918	0.0610	0.0824	-0.0226	0.0917	0.0635	0.0442	0.0784
1989	0.3149	0.0385	0.2726	0.1018	0.1623	0.1811	0.0881	0.0862	0.0816	0.1329	0.0846	0.0434	0.0794	0.0837	0.0465	0.2268
1990	-0.0317	0.0336	-0.0656	-0.2156	0.0678	0.0618	0.0819	-0.0261	0.0844	0.0973	0.0815	0.0102	0.0770	0.0781	0.0611	-0.1136
1991	0.3055	0.0382	0.2631	0.4463	0.1989	0.1930	0.0822	0.1010	0.0730	0.1546	0.0743	0.0736	0.0597	0.0560	0.0306	0.2233
1992	0.0767	0.0303	0.0446	0.2335	0.0939	0.0805	0.0726	0.0034	0.0726	0.0719	0.0627	0.0064	0.0610	0.0351	0.0290	0.0041
1993	0.0999	0.0283	0.0706	0.2098	0.1319	0.1824	0.0717	0.1071	0.0654	0.1124	0.0553	0.0556	0.0522	0.0290	0.0275	0.0282
1994	0.0131	0.0282	-0.0154	0.0311	-0.0576	-0.0777	0.0659	-0.1429	0.0799	-0.0514	0.0607	-0.1114	0.0780	0.0390	0.0267	-0.0528
1995	0.3743	0.0291	0.3411	0.3446	0.2720	0.3167	0.0760	0.2304	0.0603	0.1680	0.0669	0.0966	0.0538	0.0560	0.0254	0.2983
1996	0.2307	0.0254	0.2026	0.1762	0.0140	-0.0093	0.0618	-0.0737	0.0673	0.0210	0.0582	-0.0390	0.0616	0.0521	0.0332	0.1689
1997	0.3336	0.0211	0.3101	0.2278	0.1295	0.1585	0.0664	0.0851	0.0602	0.0838	0.0614	0.0195	0.0573	0.0526	0.0170	0.2672
1998	0.2858	0.0168	0.2667	-0.0731	0.1076	0.1306	0.0583	0.0689	0.0542	0.1210	0.0529	0.0466	0.0468	0.0486	0.0161	0.2275
1999	0.2104	0.0136	0.1953	0.2979	-0.0745	-0.0896	0.0557	-0.1435	0.0682	-0.0177	0.0530	-0.0706	0.0645	0.0468	0.0268	0.1547
2000	-0.0911	0.0110	-0.1014	-0.0359	0.1287	0.2148	0.0650	0.1436	0.0558	0.1259	0.0619	0.0594	0.0507	0.0589	0.0339	-0.1561
2001	-0.1188	0.0118	-0.1304	0.2277	0.1065	0.0370	0.0553	-0.0189	0.0575	0.0762	0.0427	0.0323	0.0442	0.0383	0.0155	-0.1741
2002	-0.2210	0.0139	-0.2337	-0.1328	0.1633	0.1784	0.0559	0.1169	0.0484	0.1293	0.0398	0.0865	0.0261	0.0165	0.0238	-0.2769
2003	0.2870	0.0200	0.2638	0.6070	0.0527	0.0145	0.0480	-0.0336	0.0511	0.0240	0.0285	-0.0048	0.0297	0.0102	0.0188	0.2390
2004	0.1087	0.0175	0.0899	0.1839	0.0872	0.0851	0.0502	0.0326	0.0484	0.0225	0.0328	-0.0107	0.0347	0.0120	0.0326	0.0585
2005	0.0491	0.0184	0.0300	0.0569	0.0587	0.0781	0.0469	0.0302	0.0461	0.0136	0.0392	-0.0258	0.0434	0.0298	0.0342	0.0022
2006	0.1580	0.0201	0.1362	0.1617	0.0324	0.0119	0.0468	-0.0364	0.0491	0.0314	0.0454	-0.0151	0.0465	0.0480	0.0254	0.1112
2007	0.0549	0.0196	0.0353	-0.0522	0.0260	0.0988	0.0486	0.0469	0.0450	0.1005	0.0444	0.0533	0.0328	0.0466	0.0408	0.0063
2008	-0.3700	0.0192	-0.3849	-0.3672	0.0878	0.2587	0.0445	0.2050	0.0303	0.0303	0.0296	0.0992	0.0126	0.0160	0.0009	-0.4145
2009	0.2646	0.0248	0.2345	0.2809	0.0302	-0.1490	0.0347	-0.1825	0.0458	-0.0240	0.0201	-0.0442	0.0242	0.0010	0.0272	0.2299
2010	0.1506	0.0202	0.1278	0.3126	0.1244	0.1014	0.0425	0.0589	0.0414	0.0712	0.0192	0.0516	0.0170	0.0012	0.0150	0.1081
2011	0.0211	0.0213	0.0000	-0.0326	0.1795	0.2823	0.0381	0.2374	0.0248	0.0946	0.0158	0.0779	0.0059	0.0004	0.0296	-0.0170

Source: Ibbotson S&P 2018 Stock, Bonds, Bills, and Inflation Yearbook

Year	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premia
	Total Returns	Income Returns	Appreciation Returns	Total Returns	Total Returns	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns	Total Returns	(A-1)-(A-7)
	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
2012	0.1600	0.0250	0.1341	0.1824	0.1068	0.0331	0.0240	0.0088	0.0241	0.0207	0.0058	0.0148	0.0046	0.0006	0.0174	0.1360
2013	0.3239	0.0248	0.2960	0.4507	-0.0707	-0.1278	0.0288	-0.1570	0.0378	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0151	0.2951
2014	0.1369	0.0216	0.1139	0.0292	0.1728	0.2471	0.0341	0.2093	0.0246	0.0300	0.0163	0.0135	0.0155	0.0002	0.0076	0.1028
2015	0.0138	0.0210	-0.0073	-0.0360	-0.0102	-0.0065	0.0247	-0.0311	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0073	-0.0109
2016	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0230	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0185	0.0020	0.0207	0.0966
2017	0.2183	0.0221	0.1942	0.1119	0.1225	0.0624	0.0267	0.0351	0.0254	0.0164	0.0193	-0.0029	0.0211	0.0080	0.0211	0.1916
2018	0.0438	0.0201	-0.0624	-0.1160	-0.0473	-0.0057	0.0282	0.0350	0.0284	0.0116	0.0265	-0.0155	0.0250	0.0181	0.0191	0.0156
Average	0.1178	0.0396	0.0770	0.1661	0.0626	0.0692	0.0497	0.0080	0.0601	0.0510	0.0439	0.0065	0.0436	0.0338	0.0296	0.0681
Median	0.1245	0.0382	0.1028	0.1824	0.0477	0.0366	0.0415	0.0034	0.0417	0.0323	0.0373	0.0029	0.0363	0.0296	0.0268	0.0795
High	0.6399	0.0877	0.4659	1.4287	0.4266	0.4036	0.1360	0.2395	0.1354	0.2910	0.1297	0.1423	0.1396	0.1471	0.1818	0.6087
Low	-0.4334	0.0110	-0.4707	-0.8901	-0.0808	-0.1490	0.0184	-0.1825	0.0194	-0.0601	0.0058	-0.1114	0.0048	-0.0002	-0.1030	-0.4667
Last 5 year (60 months)																
Average	0.1065	0.0215	0.0868	0.0491	0.0610	0.0630	0.0273	0.0489	0.0285	0.0190	0.0182	0.0008	0.0194	0.0067	0.0152	0.0791
Median	0.1196	0.0216	0.0954	0.0292	0.0670	0.0175	0.0287	0.0350	0.0268	0.0179	0.0163	0.0029	0.0185	0.0020	0.0191	0.0966
High	0.2183	0.0226	0.1942	0.2665	0.1728	0.2471	0.0341	0.2093	0.0284	0.0300	0.0285	0.0136	0.0250	0.0181	0.0211	0.1916
Low	0.0138	0.0201	-0.0624	-0.1160	-0.0473	-0.0065	0.0230	-0.0311	0.0246	0.0116	0.0136	-0.0165	0.0155	0.0002	0.0073	-0.0108

\* Compound Annual Return

**Township of East Norriton  
Utility Valuation Experts' (UVE) Valuation of  
East Norriton Wastewater Collection System  
Montgomery County, Pennsylvania**

**Appraisal Work Papers  
As of October 29, 2018**

**Cost of Capital / Required Return  
Capital Structure**

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Value Line Investment Surveys  
Water Industry  
As of Second Quarter 2018 (7-1-2018)

Company	Exchanges	Ticker	ValueLine No.	ValueLine Issue	Total Debt	Market Debt	Long Term Debt	Long Term Interest	Long Term Interest Rate (embedded)	Proportion of Debt	Book Debt/Equity	Preferred Stock	% Preferred	Shares Outstanding	Price per Share	Market Equity	Portion Market Equity	Capitalization	Total Market Capital	
					(\$ Mil)	(\$ Mil)	(\$ Mil)	(\$ Mil)	(%)	(%)	(%)	(\$ Mil)	(%)	(Millions)	(\$)	(\$ Mil)	(%)	(\$ Mil)	(Millions)	
American States Water	NYSE	AWR	1784	10/12/2018	321.3	12.72%	281.0	19.6	6.98%	34.0%	41.5%	58.5%	0.00%	36,733,50600	60.01	2,204.4	87.28%	Mid Cap	2,525.7	
American Water	NYSE	AWK	1785	10/12/2018	8,358.0	34.38%	6,345.0	320.0	5.04%	52.0%	56.5%	43.5%	0.03%	180,492,19800	88.35	15,946.5	65.59%	Large Cap	24,311.5	
Aqua American	NYSE	WTR	1786	10/12/2018	2,299.9	25.94%	2,181.4	89.5	4.10%	52.0%	51.0%	49.0%	0.00%	177,913,90900	36.90	6,585.0	74.05%	Large Cap	8,864.9	
California Water	NYSE	1787	10/12/2018	844.6	29.53%	414.5	36.0	8.09%	38.0%	36.5%	63.5%	0.00%	48,070,00000	41.93	2,015.6	70.47%	Mid Cap	2,860.2		
Connecticut Water	NDQ	CTWS	1788	10/12/2018	255.7	23.46%	251.7	9.0	3.58%	46.0%	46.5%	53.5%	0.00%	12,040,00600	69.28	834.4	76.54%	Small Cap	1,090.1	
Consolidated Water Company	NDQ	CWCO	1789	10/12/2018	0.3	0.15%	-	-	-	0.0%	0.0%	100.0%	0.00%	14,963,95300	13.51	202.2	99.85%	Small Cap	202.5	
Middlesex Water	NDQ	MSEX	1790	10/12/2018	188.3	19.60%	142.1	5.5	3.87%	38.0%	37.0%	62.5%	0.25%	16,392,35000	46.97	769.9	80.15%	Small Cap	960.6	
SIW Corporation	NYSE	SIW	1791	10/12/2018	431.2	25.76%	431.3	20.0	4.64%	48.0%	48.5%	51.5%	0.00%	20,618,10200	60.28	1,242.9	74.24%	Mid Cap	1,674.1	
York Water	NYSE	YORV	1792	10/12/2018	92.0	19.01%	81.0	5.3	6.54%	40.0%	38.0%	62.0%	0.02%	12,914,26700	30.36	392.1	80.99%	Small Cap	484.1	
Total					12,781.3	29.77%	10,128.0	504.9	4.99%	4.99%	0.00%	43.50%	0.00%			30,172.9	70.21%		42,973.6	
Minimum						0.15%			3.58%									65.59%		
Weighted Mean						29.77%			4.99%									70.21%		
Mean						21.17%			5.43%									78.80%		
Median						23.46%			4.84%									76.54%		
Maximum						34.38%			8.69%									99.85%		

Water Industry Capital Structure

Capital Structure#	Market Proportion	Embedded Reference
Debt	29.77%	col 7
Preferred	0.02%	col 15
Equity	70.21%	col 19
Total	100.00%	99.14%
Use		
Debt	30% AUS Input	45% AUS Input Jurisdictional Exception
Equity	70% AUS Input	55% AUS Input Jurisdictional Exception
Total	100%	100%

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**Cost of Capital / Required Return  
Income Tax Rate**

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Value Line Investment Surveys  
Water Industry  
As of Second Quarter 2018 (7-1-2018)

Company	Exchange	Ticker	Valueline No.	Valueline Issue	Tax Rate		
					2017	2018	2019
	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line	Input Value Line
American States Water	NYSE	AWR	1784	10/12/2018	36.0%	23.0%	23.0%
American Water	NYSE	AWK	1785	10/12/2018	43.3%	21.0%	21.0%
Aqua American	NYSE	WTR	1786	10/12/2018	6.6%	9.0%	15.0%
California Water	NYSE	CWT	1787	10/12/2018	30.1%	21.0%	21.0%
Connecticut Water	NDQ	CTWS	1788	10/12/2018	19.0%	21.0%	21.0%
Consolidated Water Company	NDQ	CWCO	1789	10/12/2018			
Middlesex Water	NDQ	MSEX	1790	10/12/2018	32.7%	21.0%	21.0%
SIW Corporation	NYSE	SIW	1791	10/12/2018	36.7%	21.0%	21.0%
York Water	NDQ	YORW	1792	10/12/2018	25.9%	21.0%	21.0%
Minimum					6.60%	9.00%	15.00%
wtd Mean					28.79%	19.75%	20.50%
Mean					31.40%	21.00%	21.00%
Median					43.30%	23.00%	23.00%
Maximum							
Embedded Tax Rate	Historical		Current				
	28.79% Mean 2017		19.75% Mean 2018				
Federal Tax Rate (Marginal)	35.00% AUS Input		21.00% AUS Input				
US 50-state average	4.91% AUS Input		4.91% AUS Input				
Pennsylvania	9.99% AUS Input		9.99% AUS Input				
Composite Federal and State Tax Rate	41.49% Calculated Federal Tax + (1- State Tax)-State Tax		28.89% Calculated Federal Tax + (1- State Tax)-State Tax				

**Township of East Norriton  
Utility Valuation Experts' (UVE) Valuation of  
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**Appraisal Work Papers  
As of October 29, 2018**

**Cost of Capital / Required Return  
2018 Stocks, Bonds, Bills, & Inflation  
Duff & Phelps**

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Source: Ibbotson S&B 2018 Stock, Bonds, Bills, and Inflation Yearbook

Year	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premium
	Total Returns	Total Returns	Appreciation Returns	Total Returns	Total Returns	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns	Total Returns	(A-1)-(A-7)
	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
2012	0.1600	0.0250	0.1341	0.1824	0.1068	0.0331	0.0240	0.0088	0.0241	0.0207	0.0058	0.0148	0.0046	0.0006	0.0174	0.1360
2013	0.3239	0.0248	0.2960	0.4507	-0.0707	-0.1278	0.0288	-0.1570	0.0378	-0.0368	0.0102	-0.0468	0.0149	0.0002	0.0151	0.2951
2014	0.1369	0.0216	0.1139	0.0292	0.1728	0.2471	0.0341	0.2093	0.0246	0.0300	0.0163	0.0135	0.0155	0.0002	0.0076	0.1028
2015	0.0138	0.0210	-0.0073	-0.0360	-0.0102	-0.0065	0.0247	-0.0311	0.0268	0.0179	0.0151	0.0029	0.0169	0.0002	0.0073	-0.0109
2016	0.1196	0.0226	0.0954	0.2565	0.0670	0.0175	0.0230	-0.0040	0.0272	0.0192	0.0136	0.0058	0.0185	0.0020	0.0207	0.0966
2017	0.2183	0.0221	0.1942	0.1119	0.1225	0.0624	0.0267	0.0351	0.0254	0.0164	0.0193	-0.0029	0.0211	0.0080	0.0211	0.1916
2018	0.0438	0.0201	-0.0624	-0.1160	-0.0473	-0.0057	0.0282	0.0350	0.0284	0.0116	0.0265	-0.0155	0.0250	0.0181	0.0191	0.0156
Average	0.1178	0.0395	0.0770	0.1651	0.0625	0.0592	0.0497	0.0080	0.0601	0.0510	0.0439	0.0085	0.0435	0.0338	0.0296	0.0681
Median	0.1245	0.0382	0.1026	0.1824	0.0477	0.0365	0.0415	0.0034	0.0417	0.0323	0.0373	0.0029	0.0363	0.0295	0.0268	0.0795
High	0.5399	0.0877	0.4659	1.4287	0.4256	0.4036	0.1350	0.2395	0.1354	0.2910	0.1297	0.1423	0.1396	0.1471	0.1816	0.5087
Low	-0.4334	0.0110	-0.4707	-0.8801	-0.0809	-0.1490	0.0194	-0.1825	0.0194	-0.0601	0.0058	-0.1114	0.0046	-0.0002	-0.1030	-0.4667
Last 5 Year (60 months)																
Average	0.1065	0.0215	0.0668	0.0491	0.0610	0.0630	0.0273	0.0489	0.0265	0.0190	0.0182	0.0008	0.0194	0.0067	0.0152	0.0791
Median	0.1186	0.0216	0.0954	0.0292	0.0670	0.0175	0.0267	0.0350	0.0288	0.0179	0.0163	0.0029	0.0155	0.0020	0.0191	0.0966
High	0.2183	0.0226	0.1942	0.2565	0.1728	0.2471	0.0341	0.2093	0.0284	0.0300	0.0265	0.0135	0.0250	0.0181	0.0211	0.1916
Low	0.0150	0.0201	-0.0624	-0.1160	-0.0473	-0.0065	0.0230	-0.0311	0.0248	0.0116	0.0136	-0.0155	0.0155	0.0002	0.0073	-0.0109

\* Compound Annual Return

Source: Ibbotson SBBI 2018 Stock, Bonds, Bills, and Inflation Yearbook

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks Capital	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds Capital	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds Capital	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premia
	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Jan-Dec *	Total Returns Jan-Dec *	Total Returns Jan-Dec *	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Jan-Dec *	Yields Jan-Dec *	Total Returns Jan-Dec *	Income Returns Jan-Dec *	Appreciation Jan-Dec *	Yields Jan-Dec *	Total Returns Jan-Dec *	Total Returns Jan-Dec *	(A-1)-(A-7)
Year	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
1926	0.1162	0.0541	0.0572	0.0028	0.0737	0.0777	0.0373	0.0391	0.0354	0.0538	0.0378	0.0151	0.0361	0.0327	-0.0149	0.0789
1927	0.3749	0.0571	0.3091	0.2210	0.0744	0.0893	0.0341	0.0540	0.0316	0.0452	0.0349	0.0096	0.0340	0.0312	-0.0208	0.3408
1928	0.4361	0.0481	0.3788	0.3969	0.0284	0.0010	0.0322	-0.0312	0.0340	0.0092	0.0364	-0.0273	0.0401	0.0356	-0.0097	0.4039
1929	-0.0842	0.0398	-0.1191	-0.5136	0.0327	0.0342	0.0347	-0.0020	0.0340	-0.0601	0.0407	0.0177	0.0362	0.0475	0.0020	-0.1189
1930	-0.2490	0.0457	-0.2848	-0.3815	0.0798	0.0466	0.0332	0.0128	0.0330	0.0672	0.0330	0.0333	0.0291	0.0241	-0.0603	-0.2822
1931	-0.4334	0.0535	-0.4707	-0.4975	-0.0185	-0.0531	0.0333	-0.0846	0.0407	-0.0232	0.0316	-0.0540	0.0412	0.0107	-0.0952	-0.4667
1932	-0.0819	0.0616	-0.1515	-0.0539	0.1082	0.1684	0.0369	0.1294	0.0315	0.0810	0.0363	0.0502	0.0304	0.0096	-0.1030	-0.1188
1933	0.5399	0.0639	0.4659	1.4287	0.1038	-0.0007	0.0312	-0.0314	0.0336	0.0183	0.0283	-0.0099	0.0325	0.0030	0.0051	0.5087
1934	-0.0144	0.0446	-0.0594	0.2422	0.1384	0.1003	0.0318	0.0676	0.0293	0.0900	0.0293	0.0597	0.0249	0.0016	0.0203	-0.0462
1935	0.4767	0.0495	0.4137	0.4019	0.0961	0.0498	0.0281	0.0214	0.0276	0.0701	0.0202	0.0494	0.0163	0.0017	0.0299	0.4486
1936	0.3392	0.0536	0.2792	0.6480	0.0674	0.0752	0.0277	0.0464	0.0255	0.0306	0.0144	0.0160	0.0129	0.0018	0.0121	0.3115
1937	-0.3503	0.0466	-0.3859	-0.5801	0.0275	0.0023	0.0266	-0.0248	0.0273	0.0156	0.0148	0.0005	0.0114	0.0031	0.0310	-0.3769
1938	0.3112	0.0483	0.2521	0.3280	0.0613	0.0553	0.0264	0.0283	0.0252	0.0623	0.0182	0.0437	0.0152	-0.0002	-0.0278	0.2848
1939	-0.0041	0.0469	-0.0545	0.0035	0.0397	0.0594	0.0240	0.0348	0.0226	0.0452	0.0131	0.0318	0.0098	0.0002	-0.0048	-0.0281
1940	-0.0978	0.0536	-0.1529	-0.0516	0.0339	0.0609	0.0223	0.0377	0.0194	0.0296	0.0090	0.0204	0.0057	0.0000	0.0096	-0.1201
1941	-0.1159	0.0671	-0.1786	-0.0900	0.0273	0.0093	0.0194	-0.0101	0.0204	0.0050	0.0067	-0.0017	0.0082	0.0006	0.0972	-0.1353
1942	0.0234	0.0679	0.1243	0.4451	0.0260	0.0322	0.0246	0.0074	0.0246	0.0194	0.0076	0.0117	0.0072	0.0027	0.0929	-0.0012
1943	0.2590	0.0624	0.1945	0.8837	0.0283	0.0208	0.0244	-0.0037	0.0248	0.0281	0.0156	0.0123	0.0145	0.0035	0.0316	0.2346
1944	0.1975	0.0548	0.1380	0.5372	0.0473	0.0281	0.0246	0.0032	0.0246	0.0180	0.0144	0.0035	0.0140	0.0033	0.0211	0.1729
1945	0.3611	0.0497	0.3072	0.7361	0.0408	0.1073	0.0234	0.0827	0.0199	0.0222	0.0119	0.0102	0.0103	0.0033	0.0225	0.3377
1946	-0.0807	0.0409	-0.1187	-0.1163	0.0172	-0.0010	0.0204	-0.0215	0.0212	0.0100	0.0108	-0.0008	0.0112	0.0035	0.1816	-0.1011
1947	0.0571	0.0549	0.0000	0.0092	-0.0234	-0.0262	0.0213	-0.0470	0.0243	0.0091	0.0121	-0.0030	0.0134	0.0050	0.0901	0.0358
1948	0.0550	0.0608	-0.0065	-0.0211	0.0414	0.0340	0.0240	0.0096	0.0237	0.0185	0.0156	0.0027	0.0151	0.0081	0.0271	0.0310
1949	0.1879	0.0750	0.1026	0.1975	0.0331	0.0645	0.0225	0.0415	0.0209	0.0232	0.0136	0.0095	0.0123	0.0110	-0.0180	0.1654
1950	0.3171	0.0877	0.2178	0.3875	0.0212	0.0006	0.0212	-0.0206	0.0224	0.0070	0.0139	-0.0069	0.0162	0.0120	0.0579	0.2959
1951	0.2402	0.0691	0.1646	0.0780	-0.0269	-0.0393	0.0238	-0.0627	0.0269	0.0036	0.0198	-0.0163	0.0217	0.0149	0.0587	0.2164
1952	0.1837	0.0593	0.1178	0.0303	0.0352	0.0116	0.0266	-0.0148	0.0279	0.0163	0.0219	-0.0057	0.0235	0.0166	0.0088	0.1571
1953	-0.0099	0.0546	-0.0662	-0.0649	0.0341	0.0364	0.0284	0.0067	0.0274	0.0323	0.0255	0.0061	0.0218	0.0182	0.0062	-0.0383
1954	0.5262	0.0621	0.4502	0.6058	0.0539	0.0719	0.0279	0.0435	0.0272	0.0268	0.0160	0.0108	0.0172	0.0086	-0.0050	0.4983
1955	0.3156	0.0456	0.2640	0.2044	0.0048	-0.0129	0.0275	-0.0407	0.0295	-0.0065	0.0245	-0.0310	0.0280	0.0157	0.0037	0.2881
1956	0.0656	0.0383	0.0262	0.0428	-0.0681	-0.0559	0.0299	-0.0846	0.0345	-0.0042	0.0305	-0.0345	0.0363	0.0246	0.0286	0.0357
1957	-0.1078	0.0384	-0.1431	-0.1457	0.0871	0.0746	0.0344	0.0382	0.0323	0.0784	0.0359	0.0405	0.0284	0.0314	0.0302	-0.1422
1958	0.4336	0.0438	0.3806	0.6489	-0.0222	-0.0609	0.0327	-0.0923	0.0382	-0.0129	0.0293	-0.0417	0.0381	0.0154	0.0176	0.4009
1959	0.1196	0.0331	0.0848	0.1640	-0.0097	-0.0226	0.0401	-0.0620	0.0447	-0.0039	0.0418	-0.0456	0.0498	0.0295	0.0150	0.0795
1960	0.0047	0.0326	-0.0297	-0.0329	0.0907	0.1378	0.0426	0.0929	0.0380	0.1176	0.0415	0.0742	0.0331	0.0266	0.0148	-0.0379
1961	0.2689	0.0348	0.2313	0.3209	0.0482	0.0097	0.0383	-0.0286	0.0415	0.0185	0.0354	-0.0172	0.0384	0.0213	0.0067	0.2306
1962	-0.0873	0.0298	-0.1110	-0.1190	0.0795	0.0689	0.0400	0.0278	0.0395	0.0556	0.0373	0.0173	0.0350	0.0273	0.0122	-0.1273
1963	0.2280	0.0361	0.1889	0.2357	0.0219	0.0121	0.0389	-0.0270	0.0417	0.0164	0.0371	-0.0210	0.0404	0.0312	0.0165	0.1891
1964	0.1648	0.0333	0.1297	0.2352	0.0477	0.0351	0.0415	-0.0072	0.0423	0.0404	0.0400	-0.0003	0.0403	0.0354	0.0119	0.1233
1965	0.1245	0.0321	0.0906	0.4175	-0.0046	0.0071	0.0419	-0.0345	0.0450	0.0120	0.0415	-0.0310	0.0490	0.0393	0.0192	0.0826
1966	-0.1006	0.0311	-0.1309	-0.0701	0.0020	0.0365	0.0449	-0.0106	0.0455	0.0469	0.0493	-0.0041	0.0479	0.0476	0.0335	-0.1455
1967	0.2398	0.0364	0.2090	0.8357	-0.0495	-0.0918	0.0459	-0.1355	0.0556	0.0101	0.0488	-0.0385	0.0577	0.0421	0.0304	0.1939
1968	0.1106	0.0318	0.0766	0.3597	0.0257	-0.0026	0.0550	-0.0551	0.0598	0.0454	0.0549	-0.0099	0.0596	0.0521	0.0472	0.0556

Source: Ibbotson S&P 500 Stock, Bonds, Bills, and Inflation Yearbook

	A-1	A-2	A-3	A-4	A-5	A-6	A-7	A-8	A-9	A-10	A-11	A-12	A-13	A-14	A-15	A-16
	Large Company Stocks	Large Company Stocks	Large Company Stocks Capital	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Long-Term Government Bonds	Long-Term Government Bonds Capital	Long-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds	Intermediate-Term Government Bonds Capital	Intermediate-Term Government Bonds	U.S. Treasury Bills	Inflation	Risk Premia
	Total Returns	Income Returns	Appreciation Returns	Total Returns	Total Returns	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns	Income Returns	Appreciation Returns	Yields	Total Returns		(A-1)-(A-7)
Year	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *	Jan-Dec *
1969	-0.0850	0.0304	-0.1142	-0.2505	-0.0809	-0.0507	0.0595	-0.1083	0.0687	-0.0074	0.0665	-0.0727	0.0829	0.0658	0.0611	-0.1445
1970	0.0401	0.0341	0.0016	-0.1743	0.1837	0.1211	0.0674	0.0484	0.0648	0.1686	0.0749	0.0871	0.0590	0.0652	0.0549	-0.0273
1971	0.1431	0.0333	0.1079	0.1650	0.1101	0.1323	0.0632	0.0661	0.0597	0.0872	0.0575	0.0272	0.0525	0.0439	0.0336	0.0799
1972	0.1898	0.0309	0.1563	0.0443	0.0726	0.0569	0.0587	-0.0035	0.0599	0.0516	0.0575	-0.0075	0.0585	0.0384	0.0341	0.1311
1973	-0.1466	0.0286	-0.1737	-0.3090	0.0114	-0.0111	0.0651	-0.0770	0.0726	0.0461	0.0658	-0.0219	0.0679	0.0693	0.0880	-0.2117
1974	-0.2647	0.0369	-0.2972	-0.1995	-0.0306	0.0435	0.0727	-0.0345	0.0760	0.0569	0.0724	-0.0199	0.0712	0.0800	0.1220	-0.3374
1975	0.3720	0.0537	0.3155	0.5282	0.1464	0.0920	0.0799	0.0073	0.0805	0.0783	0.0735	0.0012	0.0719	0.0580	0.0701	0.2921
1976	0.2384	0.0438	0.1915	0.5738	0.1865	0.1675	0.0789	0.0807	0.0721	0.1287	0.0710	0.0525	0.0600	0.0508	0.0481	0.1595
1977	-0.0718	0.0431	-0.1150	0.2538	0.0171	-0.0069	0.0714	-0.0786	0.0803	0.0141	0.0649	-0.0515	0.0751	0.0512	0.0677	-0.1432
1978	0.0656	0.0533	0.0106	0.2346	-0.0007	-0.0118	0.0790	-0.0905	0.0898	0.0349	0.0783	-0.0449	0.0883	0.0718	0.0903	-0.0134
1979	0.1844	0.0571	0.1231	0.4346	-0.0418	-0.0123	0.0886	-0.0984	0.1012	0.0409	0.0904	-0.0507	0.1033	0.1038	0.1331	0.0958
1980	0.3242	0.0573	0.2577	0.3988	-0.0276	-0.0395	0.0997	-0.1400	0.1199	0.0391	0.1055	-0.0681	0.1245	0.1124	0.1240	0.2245
1981	-0.0491	0.0489	-0.0972	0.4134	-0.0124	0.0186	0.1155	-0.1033	0.1334	0.0945	0.1297	-0.0455	0.1396	0.1471	0.0894	-0.1646
1982	0.2141	0.0550	0.1476	0.2801	0.4256	0.1350	0.2395	0.2395	0.2910	0.1281	0.1281	0.1423	0.0990	0.1054	0.0387	0.0791
1983	0.2251	0.0500	0.1727	0.3967	0.0626	0.0065	0.1038	-0.0982	0.1197	0.0741	0.1035	-0.0330	0.1141	0.0880	0.0380	0.1213
1984	0.0627	0.0456	0.0139	-0.0667	0.1686	0.1548	0.1174	0.0232	0.1170	0.1402	0.1168	0.0122	0.1104	0.0985	0.0395	-0.0547
1985	0.3216	0.0510	0.2634	0.2466	0.3009	0.3097	0.1125	0.1784	0.0956	0.2033	0.1029	0.0901	0.0855	0.0772	0.0377	0.2091
1986	0.1847	0.0374	0.1463	0.0685	0.1985	0.2453	0.0898	0.1499	0.0789	0.1514	0.0772	0.0699	0.0685	0.0616	0.0113	0.0949
1987	0.0523	0.0364	0.0203	-0.0930	-0.0027	-0.0271	0.0792	-0.1069	0.0920	0.0290	0.0747	-0.0475	0.0832	0.0547	0.0441	-0.0269
1988	0.1681	0.0417	0.1241	0.2287	0.1070	0.0967	0.0897	0.0036	0.0918	0.0610	0.0824	-0.0226	0.0917	0.0635	0.0442	0.0784
1989	0.3149	0.0385	0.2726	0.1018	0.1623	0.1811	0.0881	0.0862	0.0816	0.1329	0.0846	0.0434	0.0794	0.0837	0.0465	0.2268
1990	-0.0317	0.0336	-0.0656	-0.2156	0.0678	0.0618	0.0819	-0.0261	0.0844	0.0973	0.0815	0.0102	0.0770	0.0781	0.0611	-0.1136
1991	0.3055	0.0382	0.2631	0.4463	0.1989	0.1930	0.0822	0.1010	0.0730	0.1546	0.0743	0.0736	0.0597	0.0560	0.0306	0.2233
1992	0.0767	0.0303	0.0446	0.2335	0.0939	0.0805	0.0726	0.0034	0.0726	0.0719	0.0627	0.0064	0.0610	0.0351	0.0290	0.0041
1993	0.0999	0.0283	0.0706	0.2098	0.1319	0.1824	0.0717	0.1071	0.0654	0.1124	0.0553	0.0556	0.0522	0.0290	0.0275	0.0282
1994	0.0131	0.0282	-0.0154	0.0311	-0.0576	-0.0777	0.0659	-0.1429	0.0799	-0.0514	0.0607	-0.1114	0.0780	0.0390	0.0267	-0.0528
1995	0.3743	0.0291	0.3411	0.3446	0.2720	0.3167	0.0760	0.2304	0.0603	0.1680	0.0669	0.0966	0.0538	0.0560	0.0254	0.2983
1996	0.2307	0.0254	0.2026	0.1762	0.0140	-0.0093	0.0618	-0.0737	0.0673	0.0210	0.0582	-0.0390	0.0616	0.0521	0.0332	0.1689
1997	0.3336	0.0211	0.3101	0.2278	0.1295	0.1585	0.0664	0.0851	0.0602	0.0838	0.0614	0.0195	0.0573	0.0526	0.0170	0.2672
1998	0.2858	0.0168	0.2667	-0.0731	0.1076	0.1306	0.0583	0.0689	0.0542	0.1210	0.0529	0.0466	0.0468	0.0486	0.0161	0.2275
1999	0.2104	0.0136	0.1953	0.2979	-0.0745	-0.0896	0.0557	-0.1435	0.0682	-0.0177	0.0530	-0.0706	0.0645	0.0468	0.0268	0.1547
2000	-0.0911	0.0110	-0.1014	-0.0359	0.1287	0.2148	0.0650	0.1436	0.0558	0.1259	0.0619	0.0594	0.0507	0.0589	0.0339	-0.1561
2001	-0.1188	0.0118	-0.1304	0.2277	0.1065	0.0370	0.0553	-0.0189	0.0575	0.0762	0.0427	0.0323	0.0442	0.0383	0.0155	-0.1741
2002	-0.2210	0.0139	-0.2337	-0.1328	0.1633	0.1784	0.0559	0.1169	0.0484	0.1293	0.0398	0.0865	0.0261	0.0165	0.0238	-0.2769
2003	0.2870	0.0200	0.2638	0.6070	0.0527	0.0145	0.0480	-0.0336	0.0511	0.0240	0.0285	-0.0048	0.0297	0.0102	0.0188	0.2390
2004	0.1087	0.0175	0.0899	0.1839	0.0872	0.0851	0.0502	0.0326	0.0484	0.0225	0.0328	-0.0107	0.0347	0.0120	0.0326	0.0585
2005	0.0491	0.0184	0.0300	0.0569	0.0587	0.0781	0.0469	0.0302	0.0461	0.0136	0.0392	-0.0258	0.0434	0.0298	0.0342	0.0022
2006	0.1580	0.0201	0.1362	0.1617	0.0324	0.0119	0.0468	-0.0364	0.0491	0.0314	0.0454	-0.0151	0.0465	0.0480	0.0254	0.1112
2007	0.0549	0.0196	0.0353	-0.0522	0.0260	0.0988	0.0486	0.0469	0.0450	0.1005	0.0444	0.0533	0.0328	0.0466	0.0408	0.0063
2008	-0.3700	0.0192	-0.3849	-0.3672	0.0878	0.2587	0.0445	0.2050	0.0303	0.1311	0.0296	0.0992	0.0126	0.0160	0.0009	-0.4145
2009	0.2646	0.0248	0.2345	0.2809	0.0302	-0.1490	0.0347	-0.1825	0.0458	-0.0240	0.0201	-0.0442	0.0242	0.0100	0.0272	0.2299
2010	0.1506	0.0202	0.1278	0.3126	0.1244	0.1014	0.0425	0.0589	0.0414	0.0712	0.0192	0.0516	0.0170	0.0012	0.0150	0.1081
2011	0.0211	0.0213	0.0000	-0.0326	0.1795	0.2823	0.0381	0.2374	0.0248	0.0946	0.0158	0.0779	0.0059	0.0004	0.0296	-0.0170

**Township of East Norriton  
Utility Valuation Experts' (UVE) Valuation of  
East Norriton Wastewater Collection System  
Montgomery County, Pennsylvania**

**Appraisal Work Papers  
As of October 29, 2018**

**Cost of Capital / Required Return**

**Value Line Investment Surveys  
Water Industry  
October 29, 2018**

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# THE VALUE LINE

## Investment Survey®

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Part 3  
Ratings  
&  
Reports

ISSUE 9  
Pages 1700-1850

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previous issue bearing  
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### ESPECIALLY NOTEWORTHY:

**General Electric** is certainly a company in flux. Indeed, the former Dow-30 component is in the midst of reinventing itself, and the going has not been easy, with a dropoff in profits and escalating debt resulting in a more-than-30% year-to-date decline in the stock's value. The October 1<sup>st</sup> appointment of a new chairman and CEO, which bid shares up about 15% on that trading day, is aimed at righting the ship. Learn more on page 1753.

**ABB Ltd.**, a global provider of a wide variety of power and automation technologies, recently closed on its acquisition of GE Industrial Solutions. Details of the deal can be found on page 1739.

**Altra Industrial Motion Corp.**, has consummated its merger with Fortive's Automation and Specialty platform. The transaction moves Altra into higher-growth categories that suffer far less cyclicality than the company's more-traditional energy and mining markets. Details are on page 1704.

**Brooks Automation, Inc.**, has agreed to sell its cryogenics business lines to Sweden-based Atlas Gopco for \$675 million, and Brooks shares initially skyrocketed on the news. Turn to page 1707 for more color on the deal.

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★★ Rank 1 (Highest) for Timeliness.  
★ Rank 2 (Above Average).

In three parts: Part 1 is the Summary & Index. Part 2 is Selection & Opinion. This is Part 3, Ratings & Reports. Volume LXXIV, No. 9

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Value Line's estimates of sales and earnings growth for individual companies are derived by correlating sales, earnings, and dividends to appropriate components or subcomponents of the Gross Domestic Product, presented below. A more detailed forecast appears periodically in *Selection & Opinion*.

**HYPOTHESIZED ECONOMIC ENVIRONMENT 3 TO 5 YEARS HENCE**

The hypothesized 2021-2023 economic environment into which earnings are forecast is as follows: Unemployment will average about 4% of the national labor force. There will be no major war in progress at that time. Industrial production will be expanding by 1.5%-2.0% per year. Inflation will continue to be relatively modest. Prices as measured by

the broad-based GDP deflator will advance by nearly 2.5% per year, on average. Long-term interest rates on AAA corporate bonds are projected to average close to 4% in the years 2021-2023. We expect the Federal Reserve to pursue moderately tighter monetary policies except in years in which the economy is slowing or there is a recession. Based on these assumptions, the Gross Domestic Product will average just over \$24,600 billion in the years 2021-2023, a level that is slightly more than 26% above the 2017 total of \$19,487 billion.

Things may turn out differently. But in the absence of knowledge of the future, we use the above assumptions, which appear to be most plausible. Thus we are able to apply a common economic environment to all stocks for the purpose of measuring relative growth potential.

THESE ARE THE NATIONAL INCOME SERIES TO WHICH VALUE LINE SALES, EARNINGS, AND DIVIDEND ESTIMATES ARE CORRELATED

ANNUAL STATISTICS	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018*	2019*	2021-23*
Gross Domestic Product (\$Bill.)	14452	14713	14449	14992	15543	16197	16785	17522	18219	18707	19487	20515	21607	24644
Real GDP (2012 Chained \$Bill.)	15626	15805	15209	15599	15841	16197	16495	16900	17367	17659	18051	18577	19177	20267
Total Consumption (\$Bill.)	10615	10593	10460	10643	10844	11007	11187	11494	11922	12248	12559	12906	13334	14331
Nonresidential Fixed Investment (\$Bill.)	1982	1994	1704	1781	1935	2119	2206	2357	2400	2411	2538	2728	2908	3239
Industrial Prod. (% Change, Annualized)	2.5	-3.4	-11.3	5.7	3.3	2.8	1.9	3.7	-3.3	-0.6	3.1	3.4	2.5	1.8
Housing Starts (Mill. Units)	1.34	0.90	0.55	0.59	0.61	0.78	0.93	1.00	1.11	1.18	1.21	1.29	1.34	1.40
Total Light Vehicle Sales (Mill. Units)	16.1	13.2	10.4	11.6	12.7	14.4	15.5	16.4	17.4	17.5	17.2	17.0	16.8	16.5
Personal Savings Rate (%)	3.7	5.0	6.1	5.6	5.7	7.6	4.8	4.8	7.6	6.7	6.7	6.6	6.4	6.0
National Unemployment Rate (%)	4.6	5.8	9.3	9.6	8.9	8.1	7.4	6.2	5.3	4.9	4.4	3.9	3.5	4.0
AAA Corp Bond Rate (%)	5.6	5.6	5.3	4.9	4.6	3.7	4.2	4.2	3.9	3.7	3.8	3.9	3.6	3.8
10-Year Treasury Note Rate (%)	4.6	3.7	3.3	3.2	2.8	1.8	2.4	2.5	2.2	1.9	2.3	2.9	3.3	3.3
3-Month Treasury Bill Rate (%)	4.4	1.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.9	2.0	2.7	3.0
<b>ANNUAL RATES OF CHANGE</b>														
Real GDP	1.9	-0.3	-2.8	2.5	1.6	2.2	1.8	2.5	2.9	1.6	2.2	2.9	2.9	1.7
GDP Deflator	2.7	1.9	0.8	1.2	2.0	1.8	1.6	1.8	0.9	1.6	2.0	2.4	2.4	2.4
Consumer Price Index*	2.9	3.8	-0.3	1.6	3.1	2.1	1.5	1.6	0.4	1.8	2.1	2.7	2.5	2.2
<b>QUARTERLY ANNUALIZED RATES</b>														
	2017				2018				2019					
	1st*	2nd*	3rd*	4th*	1st*	2nd*	3rd*	4th*	1st*	2nd*	3rd*	4th*		
Gross Domestic Product (\$Bill.)	19158	19358	19599	19832	20040	20892	20675	20953	21218	21476	21738	21997		
Real GDP (2012 Chained \$Bill.)	17863	17996	18121	18224	18323	18508	18664	18811	18942	19084	19177	19286		
Total Consumption (\$Bill.)	12428	12517	12585	12706	12722	12848	12968	13086	13193	13291	13383	13469		
Nonresidential Fixed Investment (\$Bill.)	2487	2531	2552	2582	2654	2701	2753	2803	2851	2893	2929	2957		
Industrial Production (% Change, Annualized)	1.0	5.0	-1.5	7.7	2.4	6.0	2.8	2.5	2.3	2.5	2.5	2.5	2.5	
Housing Starts (Mill. Units)	1.23	1.17	1.17	1.26	1.32	1.26	1.29	1.30	1.33	1.33	1.33	1.33	1.35	
Total Light Vehicle Sales (Mill. Units)	17.1	16.8	17.1	17.6	17.1	17.2	16.7	16.8	16.8	16.8	16.7	16.7	16.7	

\*Estimated

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**INDUSTRY TIMELINESS: 71 (of 97)**

Historically, the Water Utility Industry has attracted conservative, income-oriented investors. This has been changing of late, however.

The Federal Reserve continued to pursue a more-restrictive monetary policy last month. Treasury notes and bill compete with income stocks for investors' funds. Should the Fed hike short-term rates further, the more attractive they will become on a comparison basis to this group.

Almost every utility has a large capital budget as the companies are trying to modernize the nation's aging pipelines and wastewater facilities.

Consolidation continues in this industry as the market is incredibly splintered.

In the recent past, regulators have generally been constructive when dealing with water utilities. The regulatory climate of a state has a major impact on how a utility performs.

Even though the Water Utility Industry's ranking has moved higher over the past three months, it still is in the third quartile.

**Fish or Fowl?**

Traditionally, investors have flocked to water utilities for the current income, dividend growth potential, low Beta-coefficients, and well-defined business prospects. These equities tended to trail the market averages during rallies and outperform in downturns. About three years ago, this correlation began to deteriorate. Total returns of this group started to do well in a bull market. It's only been over the past 12 months or so that the previous relationship has returned.

The combined market capitalization of this entire collection of stocks totals less than half the amount of just one large electric utility. Thus, these equities have benefited from demand being much greater than supply. Indeed, only two members in this sector qualify as large cap stocks. Hence, institutional investors looking to have some exposure to the industry, don't have many options. As a result, a premium has to be paid to own these shares.

In the past, yields in this segment have been much higher than that of the typical equity. Currently, many have yields that are less than the average for stocks in the Value Line universe. This raises the question: "Are water utility stocks still a yield play?"

**Short-Term Interest Rates Keep Rising**

The Federal Reserve has made no secret of its intentions to keep hiking the federal funds rate at a gradual pace through 2019 should the economy continue to be strong. The yield on a one-year Treasury bill is now about 2.6%, up from close to zero from several years ago, and 131 basis points higher in the past 12 months. Investors buying a one-year bill are getting 50 basis more than from the yield of the average stock included in the Value Line Investment Survey. Treasury bills come with about as little risk as possible. Thus, should rates continue trending upward, accounts seeking income (with as little uncertainty as possible), may well switch from these stocks to the fixed-income market.

**America's Antiquated Water Infrastructure**

According to a well-known national association of civil engineers, a good portion of our pipes and valves are in desperate need of replacement. In addition, many waste-

water facilities must be upgraded to be in compliance with federal regulations. How did this situation come about? For years, both utilities and state regulators didn't want to annoy water consumers (i.e. voters) by charging higher rates. All parties are now in agreement, however, that on a comparative basis, the price of water services has not kept pace with increases for electricity and other utility bills. Over the past decade or so, water companies have been spending heavily to replace old pipelines. Much still remains to be done, though.

**A Positive Regulatory Environment**

None of the progress made improving water assets would be possible if state regulators and water utilities did not form constructive relationships. As regulated utilities, what these companies are permitted to earn on investments made in their systems is determined by state commissions. The current status appears to be good for customers and utilities. Investors should always stay abreast of any such changes in the regulatory climate by reading each specific report.

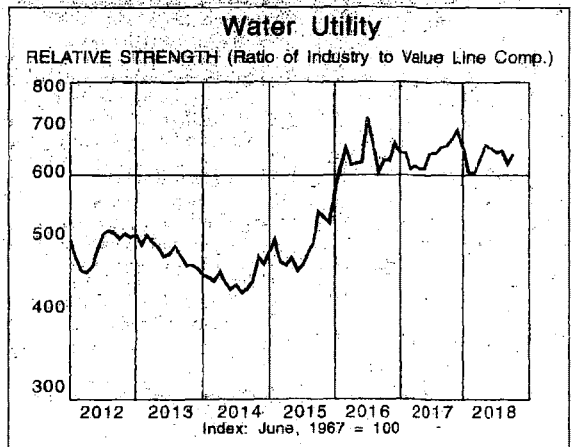
**Consolidation**

The publicly traded companies we follow here are actually atypical. Most water systems in the country are run by towns, cities, and states. There over 50,000 independent municipally run entities scattered throughout the country. As a result, there is a lot of inefficiencies in the market. A large company can acquire a smaller one and raise margins substantially by integrating it into existing operations. American Water Works and Aqua America are constantly absorbing multiple tuck-in acquisitions, which enables them to expand their customer bases. This trend could actually accelerate as small water districts lack the financial wherewithal required to modernize their assets.

**Conclusion**

Despite several stocks being favorably ranked for Timeliness, investors should proceed with caution when evaluating this group. In general, almost all have poor long-term total-returns prospects. The changing interest rate environment is also a potential problem.

*James A. Flood*

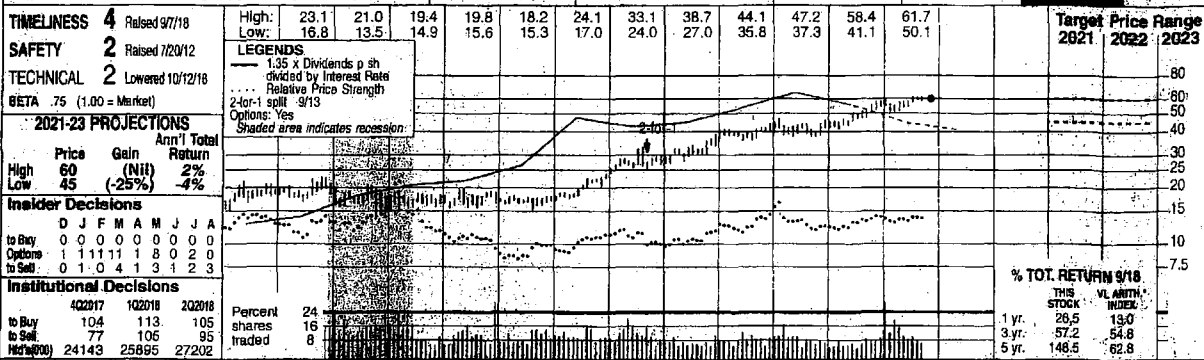


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# AMER. STATES WATER NYSE-AWR

RECENT PRICE **60.01** P/E RATIO **34.3** (Trailing: 38.5 Median: 20.0) RELATIVE P/E RATIO **1.91** DIV'D YLD **1.9%** VALUE LINE **1784**



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
6.89	6.99	6.81	7.03	7.88	8.75	9.21	9.74	10.71	11.12	12.12	12.19	12.17	12.56	11.92	12.01	11.80	12.45	12.45	12.45	12.45	12.45
1.27	1.04	1.11	1.32	1.45	1.65	1.89	1.70	2.11	2.13	2.48	2.65	2.67	2.81	2.70	2.96	2.75	3.25	3.25	3.25	3.25	3.25
.67	.39	.53	.66	.67	.81	.78	.84	1.11	1.12	1.41	1.61	1.57	1.60	1.62	1.88	1.65	1.90	1.90	1.90	1.90	1.90
.44	.44	.44	.45	.46	.48	.50	.51	.52	.55	.64	.76	.83	.87	.91	.99	1.08	1.16	1.16	1.16	1.16	1.16
1.34	1.88	2.51	2.12	2.28	2.09	2.12	2.12	2.13	1.77	2.52	1.89	2.39	3.55	3.08	3.40	3.40	3.40	3.40	3.40	3.40	3.40
7.02	6.98	7.51	7.86	8.32	8.77	8.97	9.70	10.13	10.84	11.80	12.72	13.24	12.77	13.52	14.45	15.20	15.95	15.95	15.95	15.95	15.95
30.36	30.42	33.50	33.60	34.10	34.46	34.60	37.06	37.36	37.70	38.53	38.72	38.29	36.50	36.57	36.68	36.80	37.00	37.00	37.00	37.00	37.00
18.3	31.9	23.2	21.9	27.7	24.0	22.6	21.2	15.7	15.4	14.3	17.2	20.1	24.6	25.6	25.7	25.7	25.7	25.7	25.7	25.7	25.7
1.00	1.82	1.23	1.17	1.50	1.27	1.36	1.41	1.00	.97	.91	.97	1.06	1.24	1.34	1.29	1.29	1.29	1.29	1.29	1.29	1.29
3.6%	3.5%	3.6%	3.1%	2.5%	2.5%	2.9%	2.9%	3.0%	3.2%	3.1%	2.7%	2.6%	2.2%	2.2%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
<b>CAPITAL STRUCTURE as of 6/30/18</b>																					
Total Debt \$321.3 mill. Due in 5 Yrs \$100.7 mill.																					
LT Debt \$261.0 mill. LT Interest \$19.6 mill. (34% of Cap)																					
Leases, Uncapitalized: Annual rentals \$2.3 mill.																					
Pension Assets-12/17-\$173.6 mill. Oblig. \$207.7 mill.																					
Pfd Stock None																					
Common Stock 36,733,506 shs. as of 8/1/18																					
<b>MARKET CAP: \$2.1 billion (Mid Cap)</b>																					
<b>CURRENT POSITION (2016 2017 6/30/18)</b>																					
<b>(MILL)</b>																					
Cash Assets	4	2	5.6																		
Accts Receivable	20.0	26.1	26.6																		
Other	146.5	129.2	109.0																		
Current Assets	166.9	155.5	141.2																		
Accts Payable	43.7	51.0	43.4																		
Debt Due	90.3	59.3	40.3																		
Other	43.9	46.4	46.2																		
Current Liab.	177.9	156.7	129.9																		

**BUSINESS:** American States Water Co. operates as a holding company. Through its principal subsidiary, Golden State Water Co., it supplies water to 258,949 customers in 70 cities in 10 counties. Service areas include the metropolitan areas of Los Angeles and Orange Counties. The company also provides electricity to 24,274 customers in Big Bear Lake and San Bernardino Cnty. Provides water & wastewater services to U.S. military bases through its ASUS sub. Sold Chaparral City Wr. of AZ. (6/11). Employs 758. BlackRock, Inc. owns 11.7% of out. shares; Vanguard, 9.5%; off. & dir. 1.5%. (4/18 Proxy). Chairman: Lloyd Ross. Pres. & CEO: Robert Sprowls, Inc. CA. Addr.: 630 East Foothill Blvd., San Dimas, CA 91773. Tel: 909-394-3600, Intemet: www.aswater.com.

**American States Water raised its dividend.** Last quarter, the water utility hiked the per-share payout by \$0.02 to \$0.275. This was about one-third more than we had expected. To reflect this, our dividend estimates for next year and through 2021-2023 have been increased.

**It appears that a settlement will be reached in an important pending rate case.** Through its Golden State Water subsidiary, the utility must petition for higher tariffs every three years. The process can take time as rates from 2016 to 2018 were only finalized earlier this year. The outcome for 2018 was below what American States expected and led to a decline in first-half profits. By the end of this year, California regulators were supposed to make a final decision on rates for American States through the 2019-2021 period. In late summer, however, the utility and the Office of Ratepayers Advocates (ORA) agreed to the terms on a new deal. Typically, regulators will go along with the ORA, which makes the outcome almost certain. This also removes much of the regulatory risk faced by the utility. According to the pact, the utility will invest \$335 million in capital infrastructure over the three-year cycle. Excluding certain revenues, the water gross margin will increase by \$6.0 million as compared to 2018. Additional rate hikes of \$10 million and \$12 million are possible in 2020 and 2021, if certain goals are reached.

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2015	100.9	114.6	133.0	110.1	458.6
2016	93.5	112.0	123.8	106.8	436.1
2017	98.8	113.2	124.4	104.2	440.6
2018	94.7	105.9	128.4	105	435
2019	97.0	118	128	107	450

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2015	.32	.41	.56	.31	1.60
2016	.28	.45	.59	.30	1.62
2017	.34	.62	.57	.35	1.88
2018	.20	.44	.60	.41	1.65
2019	.30	.55	.63	.42	1.90

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2014	.2025	.2025	.213	.213	.83
2015	.213	.213	.224	.224	.87
2016	.224	.224	.224	.242	.91
2017	.242	.242	.255	.255	.99
2018	.255	.255	.275		

(A) Primary earnings. Excludes nonrecurring gains/losses: '04, '76, '05, '13; '06, '36, '08, (14c), '10, (23c), '11, '10c. Next earnings report due early November.

(B) Dividends historically paid in early March, June, September, and December. Div'd reinvestment plan available.

(C) In millions, adjusted for split.

(D) Includes Intangibles. As of 12/31/17; \$7.9 million/\$0.22 a share.

**Company's Financial Strength** A  
**Stock's Price Stability** 75  
**Price Growth Persistence** 80  
**Earnings Predictability** 95

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# AMERICAN WATER NYSE-AWK

<b>TIMELINESS</b> 2 Raised 10/12/18 <b>SAFETY</b> 3 New 7/25/08 <b>TECHNICAL</b> 3 Lowered 9/2/18 <b>BETA</b> 80 (1.00 = Market)	<b>RECENT PRICE</b> 88.35 <b>P/E RATIO</b> 26.7 (Trailing: 33.6, Median: 19.0) <b>RELATIVE P/E RATIO</b> 1.48 <b>DRY'D YLD</b> 2.2% <b>VALUE LINE</b> 1785	<b>High:</b> 23.7 <b>Low:</b> 16.5 <b>23.0</b> <b>25.8</b> <b>32.8</b> <b>39.4</b> <b>45.1</b> <b>56.2</b> <b>61.2</b> <b>85.2</b> <b>92.4</b> <b>91.5</b> <b>76.0</b>	<b>Target Price Range</b> 2021 2022 2023 160 120 100 80 60 50 40 30 20 15	<b>LEGENDS</b> 1.10 x Dividends p sh divided by Interest Rate Relative Price Strength Options: Yes Shaded area indicates recession
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2021-23 PROJECTIONS		Ann'l Total Return	
High	115	Gain	(+30%)
Low	75	Return	(-15%)

Insider Decisions		Institutional Decisions	
D	J F M A M J J A	4Q2017	1Q2018
to Buy	0 0 0 0 0 0 0 0	to Buy	285
to Sell	0 0 0 0 0 0 0 0	to Sell	237
Options	0 7 13 2 0 9 0 0	to Buy	307
	0 0 0 0 0 2 0 0	to Sell	337
		to Buy	289
		to Sell	289
		to Buy	153130
		to Sell	150336
		to Buy	151828
		to Sell	151828

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Revenues per sh							13.08	13.84	14.61	13.98	15.49	15.18	16.25	16.28	16.78	17.72	18.54	18.81	18.90	20.00			
"Cash Flow" per sh							0.65	0.47	2.87	2.89	3.56	3.73	4.27	4.36	4.75	5.13	5.26	5.14	5.80	6.30			
Earnings per sh							0.97	0.21	1.10	1.25	1.53	1.72	2.11	2.06	2.39	2.64	2.62	2.38	3.50	3.50			
Div'd Decl'd per sh							0.40	0.82	0.86	0.90	1.21	0.84	1.21	1.33	1.47	1.62	1.78	1.95	3.50	3.50			
Cap'l Spending per sh							4.31	4.74	6.31	4.50	4.38	5.27	5.25	5.50	5.33	6.51	7.36	8.04	9.60	9.55			
Book Value per sh							23.86	28.39	25.64	22.91	23.59	24.11	25.11	26.52	27.39	28.25	29.24	30.13	31.75	33.90			
Common Shs Outst'g							160.00	160.00	160.00	174.63	175.00	175.66	176.99	178.25	179.46	178.26	178.10	178.44	181.00	182.00			
Relative P/E Ratio							1.9%	1.14	1.04	0.93	1.05	1.06	1.12	1.05	1.03	1.03	1.03	1.03	1.03	1.03			
Avg Ann'l Div'd Yield							1.9%	4.2%	3.8%	3.1%	3.4%	2.0%	2.5%	2.5%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%			

CAPITAL STRUCTURE as of 6/30/18		2016	2017	6/30/18
Total Debt	\$8358.0 mil.	2336.9	2440.7	2710.7
LT Debt	\$6345.0 mil.	187.2	209.9	267.8
LT Interest	\$320.0 mil.	37.4%	37.9%	40.4%
(52% of Cap'l)				
<b>Leases, Un capitalized:</b> Annual rentals \$15.0 mil.				
<b>Pension Assets:</b> \$1649.0 mil				
<b>Oblig:</b> \$2034.0 mil				
<b>Pfd Div'd:</b> \$.4 mil				
<b>Common Stock:</b> 180,492,198 shs as of 7/26/18				

ANNUAL RATES of change (per sh)		10 Yrs.	5 Yrs.	Est'd '15-'17 to '21-'23
Revenues	3.0%	3.0%	3.5%	4.0%
"Cash Flow"	50.0%	6.0%	7.0%	7.0%
Earnings	7.5%	7.5%	10.0%	10.0%
Dividends	8.5%	8.5%	10.0%	10.0%
Book Value	1.0%	4.0%	6.0%	6.0%

Cal-ender	QUARTERLY REVENUES (\$ mil.)					Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	Dec.31	
2015	688.0	782.0	896.0	783.0	3150.0	
2016	743.0	827.0	930.0	802.0	3302.0	
2017	756.0	844.0	936.0	821.0	3357.0	
2018	761.0	853.0	971.0	835.0	3420.0	
2019	780.0	890.0	1050.0	890.0	3600.0	

Cal-ender	EARNINGS PER SHARE					Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	Dec.31	
2015	.44	.68	.96	.56	2.64	
2016	.46	.77	.83	.57	2.62	
2017	.52	.73	1.12	.61	2.38	
2018	.59	.91	1.16	.64	3.30	
2019	.60	.88	1.27	.75	3.50	

Cal-ender	QUARTERLY DIVIDENDS PAID					Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	Dec.31	
2014	.28	.31	.31	.31	1.21	
2015	.31	.34	.34	.34	1.33	
2016	.34	.375	.375	.375	1.47	
2017	.375	.415	.415	.415	1.62	
2018	.415	.455	.455			

(A) Diluted earnings. Excludes nonrecurring items: '08, \$4.62; '09, \$2.63; '11, \$1.07. Disc. oper.: '06, (\$0.04); '11, \$0.03; '12, (\$0.10); '13, (\$0.01). GAAP used as of 2014. Next earnings report due mid-November. Quarterly earnings do not sum in '16 due to rounding. (B) Dividends paid in March, June, September, and December. = Div. reinvestment available. (C) In millions. (D) Includes intangibles. On 12/31/17: \$1.379 billion, \$7.72/share. (E) Pro forma numbers for '06 & '07.

# AQUA AMERICA NYSE-WTR

RECENT PRICE **36.90** P/E RATIO **26.0** (Trailing: 26.5 Median: 22.0) RELATIVE P/E RATIO **1.44** DIV YLD **2.4%** VALUE LINE **1786**

<b>TIMELINESS</b> 3 Raised 9/21/18	High: 21.3 17.6 17.2 18.4 19.0 21.5 28.1 28.2 31.1 35.8 39.6 39.4	Target Price Range 2021 2022 2023
<b>SAFETY</b> 2 Raised 4/20/12	Low: 15.1 9.8 12.3 13.2 15.4 16.8 20.6 22.4 24.4 28.0 29.4 32.4	
<b>TECHNICAL</b> 3 Lowered 10/12/18	LEGENDS 1.50x Dividends p sh divided by Interest Rate Relative Price Strength 4-for-3 split 12/05 5-for-4 split 9/13 Options: Yes Shaded area indicates recession	
<b>BETA</b> .70 (1.00 = Market)	Options: Yes Shaded area indicates recession	
<b>2021-25 PROJECTIONS</b>		
Price Gain Return	High 50 (+35%) 10%	Low 40 (+10%) 5%
<b>Insider Decisions</b>		
D J F M A M J J A		
to Buy 0 0 0 0 0 0 0 0		
to Sell 0 7 6 6 7 0 0 7 0		
to Hold 0 0 0 0 0 0 0 0		
<b>Institutional Decisions</b>		
Percent shares traded		
to Buy 187 192 199		
to Sell 184 191 174		
to Hold 95401 96914 98448		

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	© VALUE LINE PUB, LLC 21-23	
2.28	2.38	2.78	3.08	3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.32	4.37	4.61	4.62	4.58	4.75	5.00	Revenues per sh	6.35
.76	.77	.87	.97	1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.62	1.89	1.87	2.07	2.12	2.20	2.40	"Cash Flow" per sh	2.90
.43	.46	.51	.57	.58	.57	.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.35	1.40	1.50	Earnings per sh A	1.95
.26	.28	.28	.32	.35	.38	.41	.44	.47	.50	.54	.58	.63	.69	.74	.79	.85	.91	Div'd Decl'd per sh B=C	1.25
.96	1.08	1.23	1.47	1.64	1.83	1.98	1.88	1.89	1.90	1.98	1.73	1.84	2.07	2.16	2.69	2.65	2.85	Cap'l Spending per sh	2.10
3.49	4.27	4.71	5.06	5.57	5.85	6.26	6.50	6.61	7.21	7.90	8.63	9.27	9.78	10.43	11.02	11.00	12.00	Book Value per sh	14.50
191.349	154.33	158.97	164.21	165.41	166.75	169.21	170.81	172.46	173.60	175.43	177.93	178.59	176.54	177.39	177.71	178.28	178.75	Common Shs Outst'g C	180.00
23.6	24.5	25.1	31.8	34.7	32.0	28.9	28.1	21.1	21.3	21.9	21.2	20.8	23.5	23.9	24.7	24.7	24.7	Avg Ann'l P/E Ratio	23.0
1.29	1.40	1.33	1.69	1.87	1.70	1.50	1.54	1.34	1.34	1.39	1.19	1.09	1.18	1.25	1.24	1.24	1.24	Relative P/E Ratio	1.25
2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%	2.5%	2.6%	2.3%	2.4%	2.4%	2.4%	Avg Ann'l Div'd Yield	2.8%

<b>CAPITAL STRUCTURE as of 6/30/18</b>		627.0	578.5	528.1	712.6	757.8	768.6	779.9	814.2	819.9	809.5	850	850	850	850	850	850	Revenues (\$mill)	1145
Total Debt \$2289.9 mill. Due in 5 Yrs \$368.4 mill.		97.9	104.4	124.0	144.8	153.1	205.0	213.9	201.8	234.2	239.7	250	270	270	270	270	270	Net Profit (\$mill)	350
LT Debt \$2181.4 mill. LT Interest \$89.5 mill. (52% of Cap'l)		39.7%	38.4%	38.2%	32.9%	39.0%	10.0%	10.5%	8.9%	8.2%	6.6%	9.0%	15.0%	15.0%	15.0%	15.0%	15.0%	Income Tax Rate	10.0%
<b>Pension Assets-12/17 \$270.4 mill. Oblig. \$321.0 mill.</b>		54.1%	55.0%	56.6%	52.7%	52.7%	48.9%	48.5%	50.3%	48.4%	50.6%	51.0%	53.5%	53.5%	53.5%	53.5%	53.5%	Long-Term Debt Ratio	53.5%
<b>Pfd Stock None</b>		45.9%	44.4%	45.4%	47.3%	47.3%	51.1%	51.5%	49.7%	51.6%	49.4%	49.0%	46.5%	46.5%	46.5%	46.5%	46.5%	Common Equity Ratio	46.5%
Common Stock 177,913,909 shares as of 7/24/18		2306.6	2496.5	2708.2	2646.8	2329.7	3003.5	3216.0	3469.5	3587.7	3985.4	4250	4800	4800	4800	4800	4800	Total Capital (\$mill)	5600
		2397.4	3227.3	3489.3	3612.9	3836.2	4167.3	4402.0	4888.9	5001.6	5399.9	5775	6070	6070	6070	6070	6070	Net Plant (\$mill)	6800
		5.7%	5.6%	5.9%	6.0%	6.6%	8.0%	7.8%	6.9%	7.6%	7.1%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	Return on Total Cap'l	7.5%
		9.3%	9.4%	10.6%	11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	12.5%	13.0%	13.0%	13.0%	13.0%	13.0%	Return on Str. Equity	12.5%
		9.3%	9.4%	10.6%	11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.2%	12.5%	13.0%	13.0%	13.0%	13.0%	13.0%	Return on Com Equity	12.5%

<b>MARKET CAP: \$6.6 billion (Large Cap)</b>		2.8%	2.7%	3.7%	4.6%	4.9%	6.7%	6.1%	4.7%	5.8%	5.1%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	Retained to Com Eq	4.5%
<b>CURRENT POSITION 2016 2017 6/30/18 (\$MILL.)</b>		7.0%	7.2%	6.5%	6.0%	6.1%	5.0%	5.2%	6.0%	5.6%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	All Div'ds to Net Prof	6.2%
Cash Assets	3.7	4.2	52.9																
Receivables	97.4	98.6	103.9																
Inventory (Avg Cost)	13.0	14.4	18.0																
Other	14.6	14.0	18.6																
Current Assets	128.7	131.2	189.4																
Accs Payable	59.9	59.2	42.5																
Debt Due	157.2	117.4	118.5																
Other	84.4	107.9	93.0																
Current Liab.	301.5	284.5	254.0																

<b>ANNUAL RATES</b>		10 Yrs.	5 Yrs.	16-17 to 21-23
Revenues	3.5%	2.0%	5.5%	
"Cash Flow"	7.0%	6.5%	6.0%	
Earnings	8.5%	9.5%	7.5%	
Dividends	7.5%	8.0%	9.0%	
Book Value	6.5%	7.5%	5.5%	
<b>QUARTERLY REVENUES (\$ mill.)</b>		Full Year		
Calendar	Mar.31 Jun.30 Sep.30 Dec.31	Year		
2015	190.3 205.8 221.0 197.1	814.2		
2016	192.6 203.9 226.6 196.8	819.9		
2017	187.8 203.4 215.0 203.3	809.5		
2018	194.3 211.9 228.8 215	850		
2019	205 225 235 225	890		
<b>EARNINGS PER SHARE A</b>		Full Year		
Calendar	Mar.31 Jun.30 Sep.30 Dec.31	Year		
2015	.27 .32 .38 .17	1.14		
2016	.29 .34 .41 .28	1.32		
2017	.28 .34 .43 .30	1.35		
2018	.29 .37 .43 .31	1.40		
2019	.31 .38 .48 .33	1.50		
<b>QUARTERLY DIVIDENDS PAID B=C</b>		Full Year		
Calendar	Mar.31 Jun.30 Sep.30 Dec.31	Year		
2014	.152 .152 .165 .165	.63		
2015	.165 .165 .178 .178	.69		
2016	.178 .178 .1913 .1913	.74		
2017	.1913 .1913 .2047 .2047	.79		
2018	.2047 .2047 .210			

(A) Diluted eqs. Excl. nonrec. gains: '02, '46; '03, '36; '12, '18c. Excl. gain from disc. operations: '12, '7c; '13, '9c; '14, '11c. May not sum due to rounding. Next earnings report due Nov. 5th following the market close.

(B) Dividends historically paid in early March, June, Sept. & Dec. = Div'd. reinvestment plan available (5% discount).

(C) In millions, adjusted for stock splits.

Company's Financial Strength A  
 Stock's Price Stability 95  
 Price Growth Persistence 85  
 Earnings Predictability 90

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CALIFORNIA WATER NYSE-CWT				RECENT PRICE	P/E RATIO	Trailing: 34.7 Median: 20.0	RELATIVE P/E RATIO	DIV'D YLD	VALUE LINE																									
				41.93	28.7		1.59	1.8%	1787																									
TIMELINESS	4	Lowered 3/9/18	High: 22.7 Low: 17.1	23.3 13.8	24.1 16.7	19.8 16.9	19.4 16.7	19.3 16.8	23.4 18.4	26.4 20.3	26.0 19.5	36.8 22.5	46.2 32.4	45.8 35.3	Target Price Range 2021 2022 2023																			
SAFETY	3	Lowered 7/27/07	LEGENDS 1.33 x Dividends p sh divided by Interest Rate Relative Price Strength 2-for-1 split 8/11 Options: Yes Shaded area indicates recession																															
TECHNICAL	3	Lowered 9/24/18	2021-23 PROJECTIONS Price Gain Ann'l Total High 50 (+20%) 7% Low 35 (-15%) -2%																															
BETA	.75	(1.00 = Market)	Insider Decisions D J F M A M J J A to Buy 1 1 1 1 1 0 0 0 0 to Sell 0 0 0 0 1 9 0 0 0 1 Options to Sell 0 0 0 2 0 0 0 0 0 0																															
				Institutional Decisions to Buy 429017 102616 202018 to Sell 74 114 87 Held 33803 34461 35009 Percent shares traded 18 12 6																														
				% TOT. RETURN 9/18 THIS STOCK VS. S&P 500 INDEX 1 yr. 14.5 13.0 3 yr. 107.0 54.8 5 yr. 138.6 62.8																														
				© VALUELINE PUBL. LLC 21-23																														
2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Revenues per sh	15.20											
8.57	8.18	8.59	8.72	8.10	8.88	9.90	10.82	11.05	12.00	13.34	12.23	12.50	12.29	12.70	13.89	14.00	14.40	14.40	14.40	14.40	14.40	14.40	14.40	14.40										
1.32	1.26	1.42	1.52	1.36	1.56	1.86	1.93	1.93	2.07	2.32	2.21	2.27	2.22	2.34	3.00	2.65	2.95	2.95	2.95	2.95	2.95	2.95	2.95	2.95										
.63	.61	.73	.74	.67	.75	.95	.98	.91	.86	1.02	1.02	1.19	.94	1.01	1.40	1.30	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60										
.56	.56	.57	.57	.58	.58	.59	.59	.60	.82	.63	.64	.65	.67	.69	.72	.75	.78	.78	.78	.78	.78	.78	.78	.78										
2.91	2.19	1.87	2.01	2.14	1.84	2.41	2.66	2.97	2.83	3.04	2.58	2.76	3.69	4.77	5.40	4.35	3.95	3.95	3.95	3.95	3.95	3.95	3.95	3.95										
6.56	7.22	7.93	7.90	9.07	9.25	9.72	10.13	10.45	10.76	11.28	12.54	13.11	13.41	13.75	14.44	14.45	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00										
30.36	33.86	36.73	36.78	41.31	41.33	41.45	41.53	41.67	41.82	41.98	47.74	47.81	47.98	47.97	48.01	48.50	49.00	49.00	49.00	49.00	49.00	49.00	49.00	49.00										
19.8	22.1	20.1	24.9	29.2	26.1	19.8	19.7	20.3	21.3	17.9	20.1	19.7	24.8	29.6	26.9	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5										
1.08	1.26	1.06	1.33	1.58	1.39	1.19	1.31	1.29	1.34	1.14	1.13	1.04	1.25	1.55	1.34	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99										
4.5%	4.2%	3.9%	3.1%	2.9%	3.0%	3.1%	3.1%	3.2%	3.4%	3.5%	3.1%	2.8%	2.9%	2.3%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%										
CAPITAL STRUCTURE as of 6/30/18				410.3 449.4 460.4 501.8 560.0 584.1 597.5 588.4 608.4 668.9 680 705																														
Total Debt \$844.6 mill. Due in 5 Yrs \$430.1 mill.				39.8 40.6 37.7 36.1 42.6 47.3 56.7 45.0 48.7 67.2 63.0 79.0																														
LT Debt \$414.5 mill. LT Interest \$36.0 mill. (38% of Cap'l)				37.7% 40.3% 39.5% 40.5% 37.5% 30.3% 33.0% 36.0% 35.5% 30.1% 21.0% 21.0%																														
Pension Assets-12/17 \$460.9 mill. Oblig. \$671.3 mill.				8.6% 7.6% 4.2% 7.6% 8.0% 4.3% 2.7% 4.3% 6.1% 3.5% 5.0% 5.0%																														
Paid Stock None				41.6% 47.1% 52.4% 51.7% 47.8% 41.6% 40.1% 44.4% 44.6% 42.7% 36.5% 36.5%																														
Common Stock 48,070,000 shs.				58.4% 52.9% 47.8% 48.3% 52.2% 58.4% 59.9% 55.6% 55.4% 57.3% 63.5% 63.5%																														
MARKET CAP: \$2.0 billion (Mid Cap)				690.4 794.9 914.7 931.5 908.2 1024.9 1045.9 1154.4 1191.2 1209.3 1100 1160																														
CURRENT POSITION				1124.4 1198.1 1294.3 1381.1 1457.1 1515.8 1580.4 1701.8 1859.3 2048.0 2075 2100																														
Cash Assets				7.1% 8.5% 5.5% 5.5% 6.3% 6.0% 6.3% 5.2% 5.5% 7.1% 7.0% 8.0%																														
Other				9.9% 9.6% 8.6% 8.0% 9.0% 7.9% 9.1% 7.0% 7.4% 9.7% 8.0% 10.5%																														
Current Assets				9.9% 9.6% 8.6% 8.0% 9.0% 7.9% 9.1% 7.0% 7.4% 9.7% 8.0% 10.5%																														
Accts Payable				3.8% 3.8% 3.0% 2.3% 3.4% 3.4% 4.1% 2.0%																														
Debt Due				61% 60% 66% 71% 62% 56% 55% 71%																														
Other				68% 51% 48% 49%																														
Current Liab.				68% 51% 48% 49%																														
ANNUAL RATES Past 5 Yrs. to '17-'13				Past 5 Yrs. to '17-'13																														
Revenues				4.0% 1.5% 2.5%																														
"Cash Flow"				5.5% 3.5% 4.5%																														
Earnings				4.5% 4.0% 9.5%																														
Dividends				2.0% 2.5% 6.5%																														
Book Value				4.5% 5.0% 3.0%																														
QUARTERLY REVENUES (\$ mill.) <sup>F</sup>				Full Year																														
Calendar	Mar.31	Jun.30	Sep.30	Dec.31	2015	122.0	144.4	183.5	138.5	588.4	2016	121.7	152.4	184.3	151.0	609.4	2017	122.1	171.1	211.7	162.0	666.9	2018	132.2	172.6	215	160.2	680	2019	135	180	220	170	705
EARNINGS PER SHARE <sup>A</sup>				Full Year																														
Calendar	Mar.31	Jun.30	Sep.30	Dec.31	2015	.03	.21	.52	.18	.94	2016	d.02	.24	.48	.31	1.01	2017	.02	.39	.70	.29	1.40	2018	d.05	.27	.73	.35	1.30	2019	.11	.40	.74	.35	1.60
QUARTERLY DIVIDENDS PAID <sup>B</sup>				Full Year																														
Calendar	Mar.31	Jun.30	Sep.30	Dec.31	2014	.1625	.1625	.1625	.1625	.65	2015	.1675	.1675	.1675	.1675	.67	2016	.1725	.1725	.1725	.1725	.69	2017	.18	.18	.18	.18	.72	2018	.1875	.1875	.1875		

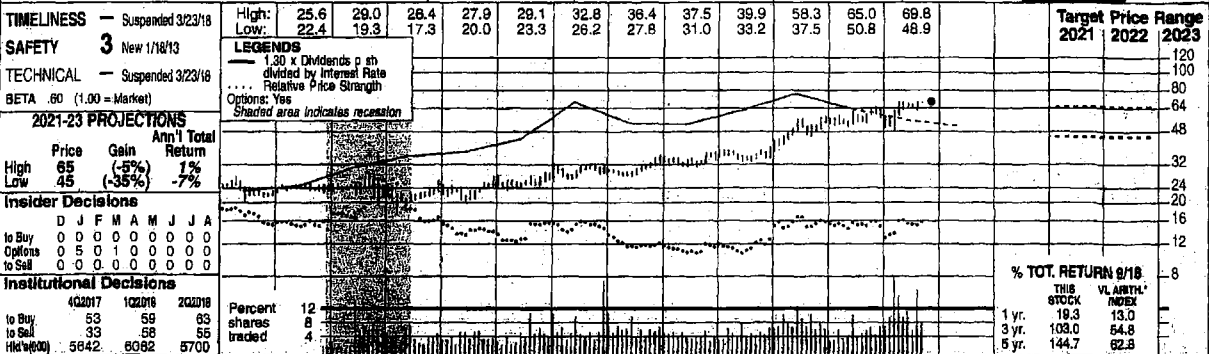
(A) Basic EPS. Excl. nonrecurring gain (loss). '02, '4c, '11, '4c. Next earnings report due late November. (B) Dividends historically paid in late Feb., May, Aug., and Nov. Div'd reinvestment plan available. (C) Incl. intangible assets. In '17: \$24.8 mill., \$0.52/sh. (D) In millions, adjusted for splits. (E) Excludes non-reg. rev.

Company's Financial Strength B++  
 Stock's Price Stability 75  
 Price Growth Persistence 40  
 Earnings Predictability 65

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# CONNECTICUT WATER NDQ-CTWS

RECENT PRICE **69.28** P/E RATIO **32.5** (Trailing: 52.1 Median: 20.0) RELATIVE P/E RATIO **1.81** DIV'D YLD **1.8%** VALUE LINE **1788**



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
5.77	5.91	6.04	5.81	5.68	7.05	7.24	6.93	7.65	7.93	9.47	8.29	8.45	8.58	8.77	8.87	9.48	9.95
1.78	1.89	1.91	1.82	1.52	1.90	1.95	1.93	2.04	2.11	2.64	2.63	2.97	3.18	3.31	3.39	3.15	3.85
1.12	1.15	1.16	.88	.81	1.05	1.11	1.19	1.13	1.13	1.53	1.66	1.92	2.04	2.08	2.13	1.85	2.50
.81	.83	.84	.85	.88	.87	.88	.90	.92	.94	.98	.98	1.01	1.05	1.12	1.18	1.24	1.30
1.98	1.49	1.68	1.96	1.96	2.24	2.44	3.28	3.08	2.81	2.78	3.02	4.11	4.29	5.63	4.39	4.45	4.00
10.08	10.46	10.94	11.52	11.60	11.95	12.23	12.97	13.05	13.50	20.85	17.92	18.83	20.01	20.88	24.34	24.70	25.70
7.94	7.97	8.04	8.17	8.27	8.38	8.46	8.57	8.68	8.78	8.85	11.04	11.12	11.19	11.25	12.07	12.15	12.25
24.3	23.5	22.9	28.6	29.0	23.0	22.2	18.4	20.7	23.0	19.4	18.4	17.5	17.8	23.3	26.5	26.5	26.5
1.33	1.34	1.21	1.52	1.57	1.22	1.34	1.23	1.32	1.44	1.23	1.03	.92	.89	1.22	1.33	1.33	1.33
3.0%	3.0%	3.1%	3.4%	3.6%	3.6%	3.6%	4.1%	3.8%	3.6%	3.2%	3.2%	3.0%	2.9%	2.3%	2.1%	2.3%	2.1%

CAPITAL STRUCTURE as of 6/30/18		2015	2016	2017	2018	2019
Total Debt	\$256.7 mill. Due in 5 Yrs \$6.2 mill.	61.3	66.4	66.4	69.4	83.8
LT Debt	\$261.7 mill. LT Interest \$9.0 mill. (48% of Cap'l)	8.4	10.2	9.8	9.9	13.6
Leases, Uncapitalized:	Annual rentals \$3 mill.	27.0%	16.5%	35.2%	41.3%	32.0%
Pension Assets:	12/17 \$73.1 mill. Oblig. \$88.6 mill.	1.7%	...	...	...	...
Pfd Stock	None	48.9%	50.6%	49.5%	53.2%	49.0%
Common Stock	12,044,006 shs.	82.7%	49.1%	60.2%	46.5%	50.8%
MARKET CAP:	\$825 million (Small Cap)	196.5	221.3	225.8	254.2	364.6
CURRENT POSITION	2016 2017 6/30/18 (\$MILL.)	302.3	325.2	344.2	382.4	447.9
Cash Assets	1.6	3.6	3.9	5.9%	5.5%	5.4%
Accounts Receivable	13.0	15.0	13.3	9.0%	9.3%	9.8%
Other	14.8	17.1	21.0	9.1%	9.4%	8.3%
Current Assets	29.4	35.7	38.2	7.9%	7.8%	8.1%
Accts Payable	13.1	11.3	9.4	1.4%	1.4%	2.8%
Debt Due	4.9	6.2	4.0	2.8%	3.8%	4.8%
Other	37.1	24.0	47.5	3.8%	5.9%	5.3%
Current Liab.	55.1	41.5	60.9	4.8%	5.2%	5.2%

**BUSINESS:** Connecticut Water Service, Inc. is a non-operating holding company, whose income is derived from earnings of its wholly-owned subsidiary companies (regulated water utilities). In 2017, 95% of net income was derived from these activities. Provides water services to 450,000 people in 80 municipalities throughout Connecticut and Maine. Acquired The Maine Water Company, January, 2012; Biddeford and Saco Water, December, 2012; Heritage Village, February, 2017. Inc.: Conn. Has 294 employees. Chairman/President/Chief Executive Officer: Eric W. Thomburg. Officers and directors own 1.2% of the common stock; BlackRock, Inc., 7.0% (4/18 proxy). Address: 93 West Main Street, Clinton, CT 06413. Telephone: (860) 668-8636; internet: www.ctwater.com.

ANNUAL RATES of change (per sh)	Past 10 Yrs	Past 5 Yrs	Est'd '15-'17 to '21-'23
Revenues	3.5%	1.0%	6.5%
"Cash Flow"	7.0%	8.0%	5.5%
Earnings	8.5%	10.5%	5.5%
Dividends	2.5%	3.5%	5.5%
Book Value	6.5%	6.5%	3.5%

QUARTERLY REVENUES (\$ mill.)	Full Year
Cal-ender Mar.31 Jun.30 Sep.30 Dec.31	Full Year
2015	96.0
2016	98.7
2017	107.1
2018	115
2019	122

EARNINGS PER SHARE A	Full Year
Cal-ender Mar.31 Jun.30 Sep.30 Dec.31	Full Year
2015	2.04
2016	2.08
2017	2.13
2018	1.65
2019	2.50

QUARTERLY DIVIDENDS PAID B	Full Year
Cal-ender Mar.31 Jun.30 Sep.30 Dec.31	Full Year
2014	1.01
2015	1.05
2016	1.12
2017	1.18
2018	1.18

**Connecticut Water's merger with SJW Group has been amended.** The original agreement (whereby CTWS shareholders would have received 1.1375 shares of SJW stock for each share of CTWS held) has shifted to an all-cash transaction in which CTWS shareholders will receive \$70 per share. The updated valuation places a 33% premium on CTWS shares over the stock's closing price prior to the original transaction, and would represent an all-time high price for Connecticut stock. To wit, the revised deal has once again been unanimously approved by both boards of directors, despite continued efforts by its West Coast utility competitor, California Water Service Group (which recently upped its bid for SJW to \$70 per share, only to be promptly rejected). Moreover, Connecticut Water announced a special mid-November meeting of shareholders to vote on the amended agreement. In our view, it is probable that the deal's projected closing date will be pushed back into early 2019. **From our vantage point, the benefits of the deal have not changed.** Indeed, the marriage is expected to be immediately accretive to SJW's bottom line.

Likewise, the top line is poised to significantly expand. The acquisition is set to create one of the largest water and wastewater utilities in the country, with an operating footprint across California, Connecticut, Maine, and Texas. Aggressive capital investments are also likely to persist, as both companies are currently allocating a moderate amount of funds to infrastructure investments and water main upgrades. Meanwhile, current customers are not expected to be hit with a rate increase in the near term. Too, Connecticut employees have been assured that no acquisition-related terminations would be implemented.

**The stock is trading fractionally below the proposed deal price.** Thus, at the recent quotation, we see limited upside to holding onto one's shares until the deal closes. Those with a desire to remain invested in Connecticut Water may want to consider rolling their position into SJW stock. Too, with both companies already rejecting several offers from competitors, we think that specific risk is almost entirely off the table.

Nicholas P. Patrikis October 12, 2018

(A) Diluted earnings. Next earnings report due late November. (B) Dividends historically paid in mid-March, June, September, and December. (C) In millions. (D) Includes intangibles. In 2017: \$67.0 million/\$5.55 a share.

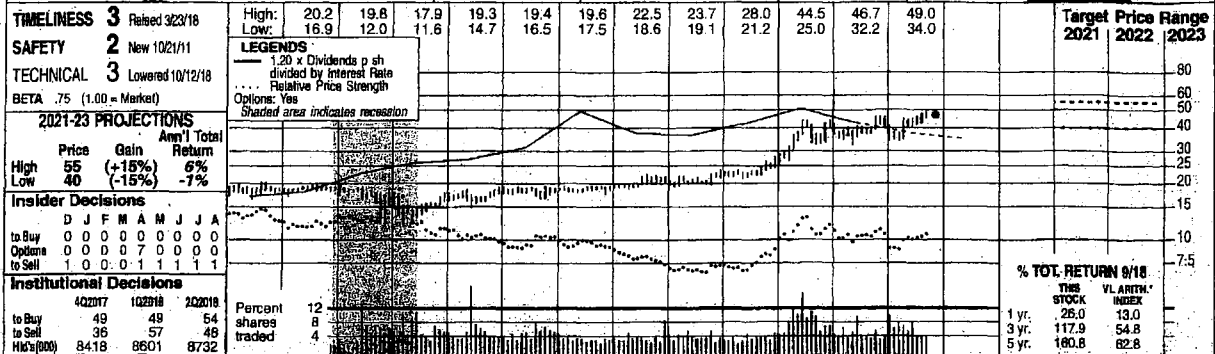
Company's Financial Strength B+  
 Stock's Price Stability 80  
 Price Growth Persistence 55  
 Earnings Predictability 80

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# MIDDLESEX WATER NDQ-MSEX

RECENT PRICE **46.97** P/E RATIO **26.1** (Trailing: 29.9) (Median: 20.0) RELATIVE P/E RATIO **1.45** DIV'D YLD **1.9%** VALUE LINE **1790**



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
5.98	6.12	6.25	6.44	6.16	6.50	6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.00	8.25	8.50	8.50	8.40	8.40	8.40
1.20	1.15	1.28	1.33	1.33	1.49	1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.24	2.65	2.65	2.65	2.65	2.65	2.65
.73	.61	.73	.71	.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.38	1.75	1.85	1.85	1.85	1.85	1.85
.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.86	.91	.96	.96	.96	.96	.96
1.59	1.87	2.54	2.18	2.31	1.66	2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	3.08	3.05	3.05	3.05	3.05	3.05	3.05
7.39	7.60	8.02	8.28	9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	14.02	14.85	15.15	15.15	15.15	15.15	15.15
10.36	10.48	11.36	11.58	13.17	13.25	13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.35	16.50	16.75	16.75	16.75	16.75	16.75
23.5	30.0	26.4	27.4	22.7	21.6	19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.5	28.4	28.4	28.4	28.4	28.4	28.4	28.4
1.28	1.71	1.39	1.46	1.23	1.15	1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.34	1.43	1.43	1.43	1.43	1.43	1.43	1.43
3.7%	3.5%	3.4%	3.5%	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%	2.2%

CAPITAL STRUCTURE as of 6/30/18		2016	2017	6/30/18
Total Debt	\$188.3 mill.	91.0	91.2	102.7
LT Debt	\$142.1 mill.	12.2	10.0	14.3
LT Interest	\$5.5 mill.	33.2%	34.1%	32.1%
(Total Interest coverage: 6.9x)		45.6%	46.6%	43.1%
(38% of Cap'l)		51.8%	52.1%	55.8%
		259.4	267.9	310.5
		366.3	376.5	405.9
		5.8%	5.0%	5.7%
		8.6%	7.0%	8.1%
		8.9%	7.0%	8.2%
		2.0%	1%	2.1%
		78%	98%	75%

CURRENT POSITION (\$MILL)		2016	2017	6/30/18
Cash Assets		3.9	4.9	2.7
Other		22.8	24.3	28.4
Current Assets		26.7	29.2	31.1
Accts Payable		12.3	13.9	16.4
Debt Due		18.2	34.9	46.2
Other		16.6	15.7	19.0
Current Liab.		47.1	64.5	81.6

ANNUAL RATES (per ah)		10 Yrs.	5 Yrs.	Est'd '15-'17 to '21-'23
Revenues		2.5%	3.5%	3.0%
"Cash Flow"		4.5%	7.0%	7.5%
Earnings		5.0%	8.0%	9.0%
Dividends		2.0%	2.0%	5.5%
Book Value		3.5%	3.5%	4.0%

Cal-ender	QUARTERLY REVENUES (\$ mill.)				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2015	28.8	31.7	34.7	30.8	126.0
2016	30.6	32.7	37.8	31.8	132.9
2017	30.1	33.0	36.2	31.5	130.8
2018	31.2	34.9	37.5	32.4	136
2019	33.0	36.0	39.0	34.0	142

Cal-ender	EARNINGS PER SHARE A				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2015	.22	.31	.41	.28	1.22
2016	.29	.36	.54	.18	1.38
2017	.27	.33	.46	.32	1.38
2018	.27	.52	.60	.36	1.75
2019	.32	.53	.62	.38	1.85

Cal-ender	QUARTERLY DIVIDENDS PAID B				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2014	.19	.19	.19	.19	.76
2015	.1925	.1925	.1925	.19875	.78
2016	.19875	.19875	.19875	.21125	.81
2017	.21125	.21125	.21125	.22375	.86
2018	.22375	.22375	.22375		

(A) Diluted earnings. Next earnings report due early November. (B) Dividends historically paid in mid-Feb., May, Aug., and November. Div'd reinvestment plan available. (C) In millions.

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**BUSINESS:** Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 61,000 retail customers, primarily in Middlesex County, New Jersey. In 2017, the Middlesex System accounted for 58% of operating revenues. At 12/31/17, the company had 315 employees. Incorporated: NJ. President, CEO, and Chairman: Dennis W. Doll. Officers & directors own 3.5% of the common stock; BlackRock Institutional Trust Co., 6.4% (4/18 proxy). Add.: 1600 Ronson Road, Iselin, NJ 08830. Tel: 732-634-1500. Internet: www.middlesexwater.com.

**Middlesex Water's stock price has continued to edge higher over the past three months.** In fact, shares of the Northeast water provider etched another all-time high (\$49 per share) in recent trading sessions, though the price has retreated modestly since then. Still, over the past three months, the stock is up approximately 10% in value. To no surprise, the investment community is rewarding the company for a stellar second-quarter financial showing.

**Net income rose sharply, year over year, in the June period.** Middlesex reported earnings of \$0.52 a share, well above last year's \$0.33 tally. Reasons for the advance include slimmer operating and maintenance costs (better margins) and a decreasing income tax burden thanks to federal tax cuts and increased qualified deductions. Calmer weather also played a role. Meanwhile, the company generated revenues of \$34.9 million, about 6% higher than the previous-year figure. Middlesex continues to benefit from an increasing Delaware customer base, as well as greater water usage from industrial and commercial customers in New Jersey.

**Our model now calls for high double-digit share-profit growth this year.** Due to the recent showing, we are adding a quarter to our 2018 bottom-line estimate, to \$1.75 a share. Too, our 2019 earnings estimate is being raised from \$1.65 a share, to \$1.85 a share.

**Substantial investment is expected over the long haul.** As mentioned in our previous review, Middlesex's recently introduced capital spending program (Water For Tomorrow) has commenced, starting with a \$52 million project along its New Jersey territory. The construction of the Western Transmission Main will supplement its existing main, which services 300,000 customers through Middlesex County. Over the pull to 2021-2023, we think MSEX will shell out nearly \$300 million in total to revamp its aging water delivery and filtration systems. Ultimately, this spending ought to generate moderate cost savings on the operating front.

**There are better options elsewhere at this juncture.** The valuation is a bit rich, and capital appreciation potential three to five years out is below average.

Nicholas P. Patrikis October 12, 2018

Company's Financial Strength		B++
Stock's Price Stability		65
Price Growth Persistence		40
Earnings Predictability		85

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# SJW GROUP NYSE-SJW

RECENT PRICE **60.28** P/E RATIO **23.3** (Training: 24.5 Median: 21.0) RELATIVE P/E RATIO **1.29** DIV'D YLD **1.9%** VALUE LINE **1791**

**TIMELINESS** — Suspended 5/4/18  
**SAFETY** **3** New 4/22/11  
**TECHNICAL** — Suspended 5/4/18  
**BETA** .66 (1.00 = Market)

**2021-23 PROJECTIONS**  
 Price Gain Amt'l Total  
 High 90 (+50%) 12%  
 Low 60 (Nil) 2%

**Insider Decisions**  
 D J F M A M J J A  
 to Buy 0 0 0 0 0 0 0 0 0  
 to Sell 0 0 0 0 0 0 0 0 0

**Institutional Decisions**  
 4Q2017 1Q2018 2Q2018  
 to Buy 59 72 70  
 to Sell 87 73 79  
 Held 11290 11728 12312

Percent shares traded 15  
 10  
 5

**LEGENDS**  
 1.50 x Dividends p sh divided by Interest Rate  
 Relative Price Strength  
 2-for-1 split 3/08  
 Options: Yes  
 Shaded area indicates recession

**% TOT. RETURN 9/18**  
 1 yr. 10.0  
 3 yr. 110.8  
 5 yr. 143.8

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
7.97	8.20	9.14	9.66	10.35	11.25	12.12	11.88	11.82	12.85	14.01	13.73	15.78	14.97	16.61	16.97	18.80	18.65	18.65	18.65	18.65	18.65
1.55	1.75	1.89	2.21	2.39	2.30	2.44	2.21	2.38	2.60	2.97	2.90	4.42	3.86	4.76	5.24	4.75	5.20	5.20	5.20	5.20	5.20
.78	.91	.87	1.12	1.19	1.04	1.08	.81	.84	1.11	1.18	1.12	2.54	1.85	2.57	2.86	2.35	2.90	2.90	2.90	2.90	2.90
.48	.49	.51	.53	.57	.61	.65	.66	.69	.69	.71	.73	.75	.78	.81	1.04	1.12	1.20	1.20	1.20	1.20	1.20
2.08	3.41	2.31	2.85	3.87	6.82	3.79	3.17	5.85	3.75	5.67	4.68	5.02	5.24	8.95	7.26	5.50	5.28	5.28	5.28	5.28	5.28
8.40	9.11	10.11	10.72	12.48	12.90	13.99	13.86	13.75	14.20	14.71	15.92	17.75	18.83	20.81	22.57	22.80	23.40	23.40	23.40	23.40	23.40
18.27	18.27	18.27	18.27	18.28	18.36	18.18	18.50	18.55	18.59	18.67	20.17	20.29	20.38	20.46	20.82	21.00	22.00	22.00	22.00	22.00	22.00
17.3	15.4	19.8	18.7	23.5	33.4	28.2	28.7	29.1	21.2	20.4	24.3	11.2	18.8	18.7	18.8	18.7	18.8	18.8	18.8	18.8	18.8
.94	.88	1.04	1.05	1.27	1.77	1.58	1.91	1.85	1.33	1.30	1.37	.59	.84	.82	.89	.82	.89	.89	.89	.89	.89
3.4%	3.5%	3.0%	2.4%	2.0%	1.7%	2.3%	2.8%	2.8%	2.9%	3.0%	2.7%	2.6%	2.5%	2.0%	1.9%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

**CAPITAL STRUCTURE as of 6/30/18**  
 Total Debt \$431.3 mill. Due in 5 Yrs \$14.3 mill.  
 LT Debt \$431.3 mill. LT Interest \$20.0 mill.  
 (LT Interest Coverage: 5.8x)

**Leases, Uncapitalized:** Annual rentals \$6.7 mill.

**Penalty Assets-12/17** \$133.4 mill. Oblig. \$196.2 mill.

**Pfd Stock None.**  
 Common Stock 20,618,102 shs.  
 as of 7/23/18

**MARKET CAP: \$1.2 billion (Mkt Cap)**

2016	2017	6/30/18
59%	60%	61%
20.2	15.2	15.8
39.5%	40.4%	38.8%
2.3%	2.0%	2.0%
48.0%	49.4%	53.7%
54.0%	50.6%	46.3%
470.9	489.8	650.7
684.2	718.5	756.2
5.9%	4.4%	4.3%
8.0%	6.0%	6.2%
8.0%	6.0%	6.2%
3.3%	1.2%	1.2%
59%	60%	61%

**BUSINESS:** SJW Group engages in the production, purchase, storage, purification, distribution, and retail sale of water. It provides water service to approximately 230,000 connections with a total population of roughly one million people in the San Jose area and 14,000 connections that reach about 42,000 residents in the region between San Antonio and Austin, Texas. The company also offers nonregulated water-related services and owns and operates commercial real estate investments. Has about 411 employees. Officers and directors (including Nancy O. Moss) own 22.9% of outstanding shares (3/18 proxy). Chairman & CEO: Richard Roth, Incorporated. California. Address: 110 West Taylor Street, San Jose, CA 95110. Telephone: (408) 279-7800. Internet: www.sjwater.com.

**It has been a roller coaster ride for SJW Group in its quest to finalize a deal with Connecticut Water.** There have been several developments worth noting. First, SJW and Connecticut Water reached an agreement to amend their previous merger arrangement to an all-cash acquisition. Under the new structure, SJW will buy the New England utility for \$70 per share in cash, which represents a 33% premium to CTWS' share price prior to the original deal in March, and an all-time high price for the stock. Both boards of directors support the revised deal, with a special shareholder meeting slated to be held in mid-November. Second, California Water Service Group has not made things easy, as the company attempted to yet again derail the marriage. California Water offered a revised proposal to purchase SJW for \$70 per share in cash. Not surprisingly, SJW Group's board of directors rejected the bid, sticking with its initial evaluation that a deal with Connecticut Water delivers superior value to its shareholders. All told, it appears probable that the amended acquisition of CTWS will ultimately go through.

**The acquisition is likely to be a boon to SJW's operations.** Once finalized, SJW will become one of the nation's largest water and waste water utilities with annual revenues in excess of \$500 million. A rather obvious positive will be the company's wider footprint (California, Connecticut, Texas, and Maine), which ought to generate substantial operational synergies and drive more-efficient customer service. Further, as was a noted deal point under the original agreement, the combined entity will not result in any immediate customer rate increase or employee-related terminations. Lastly, SJW's bottom line ought to get a nice boost, as the deal is expected to be instantly accretive (our current financial projections are exclusive of the acquisition). **This issue remains unranked for Timeliness due to the pending transaction.** At this time, we are hesitant to advise new investors to initiate a position here. However, established accounts looking to roll the dice and hold on to their shares may be rewarded, as the combined entity's prospects are bright.

*Nicholas P. Patrikis October 12, 2018*

Cal-ender	QUARTERLY REVENUES (\$ mill.)	Full Year
	Mar.31 Jun.30 Sep.30 Dec.31	
2015	62.1 72.4 83.0 87.6	305.1
2016	61.1 86.9 112.3 79.4	339.7
2017	69.0 102.1 124.6 93.5	389.2
2018	75.0 99.1 125 95.9	395
2019	78.0 105 130 97.0	410

Cal-ender	EARNINGS PER SHARE <sup>A</sup>	Full Year
	Mar.31 Jun.30 Sep.30 Dec.31	
2015	.23 .36 .46 .80	1.85
2016	.16 .82 .92 .67	2.57
2017	.18 .90 .94 .84	2.86
2018	.06 .82 1.00 .67	2.35
2019	.30 .85 1.05 .70	2.90

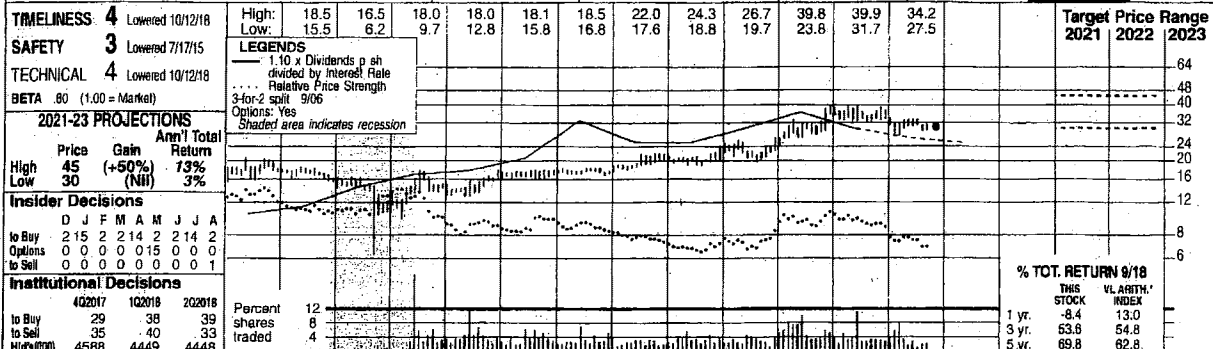
Cal-ender	QUARTERLY DIVIDENDS PAID <sup>B=C</sup>	Full Year
	Mar.31 Jun.30 Sep.30 Dec.31	
2014	.1875 .1875 .1875 .1875	.75
2015	.1950 .1950 .1950 .1950	.78
2016	.2025 .2025 .2025 .2025	.81
2017	.2175 .2175 .2175 .3875	1.04
2018	.28 .28 .28 .28	1.12

(A) Diluted earnings. Excludes nonrecurring losses: '03, \$1.97; '04, \$3.78; '05, \$1.09; '06, \$16.36; '08, \$1.22; '10, \$0.46. GAAP accounting as of 2013. Next earnings report due late November. Quarterly earnings may not add due to rounding.  
 (B) Dividends historically paid in early March, June, September, and December. \* Div'd reinvestment plan available.  
 (C) In millions, adjusted for stock splits.  
 (D) Paid special dividend of \$0.17 per share on 11/17

**Company's Financial Strength**  
 Stock's Price Stability B+  
 Price Growth Persistence B  
 Earnings Predictability 45

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**YORK WATER NDQ-YORW** RECENT PRICE **30.36** P/E RATIO **26.6** (Trailing: 23.2 Median: 24.0) RELATIVE P/E RATIO **1.48** DIV'D YLD **2.2%** VALUE LINE **1792**



2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
2.05	2.17	2.18	2.58	2.79	2.89	2.95	3.07	3.18	3.21	3.27	3.58	3.68	3.70	3.77	3.75	3.95	3.95	3.95	3.95	3.95	3.95
.57	.65	.65	.79	.77	.86	.88	.95	1.07	1.09	1.12	1.19	1.36	1.45	1.42	1.53	1.70	1.60	1.60	1.60	1.60	1.60
40	47	49	56	58	57	57	64	71	71	72	75	89	97	92	1.01	1.10	1.20	1.20	1.20	1.20	1.20
35	37	39	42	45	48	49	51	52	53	54	55	57	60	63	65	70	.75	.75	.75	.75	.75
.86	1.07	2.50	1.69	1.85	1.69	2.17	1.18	.83	.74	.94	.76	1.10	1.11	1.03	1.95	2.00	1.75	1.75	1.75	1.75	1.75
3.90	4.06	4.65	4.85	5.84	5.97	6.14	6.92	7.19	7.45	7.73	7.98	8.15	8.51	8.88	9.28	10.00	10.90	10.90	10.90	10.90	10.90
9.55	9.63	10.33	10.40	11.20	11.27	11.37	12.56	12.69	12.79	12.92	12.98	12.83	12.81	12.85	12.87	13.00	12.90	12.90	12.90	12.90	12.90
26.9	24.5	26.7	26.3	31.2	30.3	24.6	21.9	20.7	23.9	24.4	26.3	23.1	23.5	32.8	34.6	34.6	34.6	34.6	34.6	34.6	34.6
1.47	1.40	1.36	1.40	1.68	1.61	1.48	1.46	1.32	1.50	1.55	1.48	1.22	1.18	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72
3.3%	3.2%	3.1%	2.9%	2.5%	2.8%	3.5%	3.6%	3.5%	3.1%	3.1%	2.8%	2.8%	2.6%	2.1%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%

**CAPITAL STRUCTURE as of 6/30/18**  
 Total Debt \$92.0 mill. Due in 5 Yrs \$42.5 mill.  
 LT Debt \$81.0 mill. LT Interest \$5.3 mill.

**Penston Assets** 12/17 \$41.4 mill. (40% of Cap'l)  
 Oblig. \$44.6 mill.

**Pfd Stock** None

**Common Stock** 12,914,267 shs.

**MARKET CAP: \$400 million (Small Cap)**

CURRENT POSITION	2016	2017	6/30/18
Cash Assets (\$MILL)	4.2	4.2	4.2
Accounts Receivable	4.3	4.5	4.3
Inventory (Avg. Cost)	.7	.9	.9
Other	3.4	3.2	3.8
Current Assets	12.6	8.6	9.0
Accts Payable	3.7	3.1	3.4
Debt Due	---	---	11.0
Other	4.5	6.0	4.5
Current Liab.	8.2	9.1	18.9

**BUSINESS:** The York Water Company is the oldest investor-owned regulated water utility in the United States. It has operated continuously since 1816. As of December 31, 2017, the company's average daily availability was 35.4 million gallons and its service territory had an estimated population of 198,000. Has more than 69,000 customers. Residential customers accounted for 64% of 2017 revenues; commercial and industrial (28%); other (8%). It also provides sewer billing services. Incorporated: PA. York had 102 full-time employees at 12/31/17. President/CEO: Jeffrey R. Hines. Officers/directors own 1.1% of the common stock (3/18 proxy). Address: 130 East Market Street, York, Pennsylvania 17401. Telephone: (717) 845-3601. Internet: www.yorkwater.com.

**ANNUAL RATES** Past 10 Yrs. Past 5 Yrs. Est'd '15-'17 to '21-'23

Revenues	3.5%	3.5%	6.0%
"Cash Flow"	6.0%	6.0%	8.5%
Earnings	5.5%	6.5%	9.0%
Dividends	3.5%	3.5%	3.0%
Book Value	5.0%	3.5%	4.5%

Cal-endar	QUARTERLY REVENUES (\$ mill.)				Full-Year
	Mar.31	Jun. 30	Sep. 30	Dec. 31	
2015	11.2	11.9	12.4	11.6	47.1
2016	11.3	11.8	12.6	11.9	47.6
2017	11.3	12.3	12.7	12.3	48.6
2018	11.6	12.0	12.4	12.5	48.5
2019	12.0	12.8	13.3	12.9	51.0

Cal-endar	EARNINGS PER SHARE A				Full-Year
	Mar.31	Jun. 30	Sep. 30	Dec. 31	
2015	.20	.22	.28	.27	.97
2016	.19	.23	.27	.23	.92
2017	.20	.23	.31	.27	1.01
2018	.20	.26	.33	.31	1.10
2019	.24	.28	.35	.33	1.20

Cal-endar	QUARTERLY DIVIDENDS PAID B				Full-Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2014	.1431	.1431	.1431	.1431	.572
2015	.1495	.1495	.1495	.1555	.604
2016	.1555	.1555	.1555	.1602	.627
2017	.1602	.1602	.1602	.1666	.647
2018	.1666	.1666	.1666		

**York Water is performing better than expected on the profit front.** The Pennsylvania-based water utility reported earnings of \$0.26 a share for the June period, a penny ahead of our call. The beat was largely driven by a lower tax rate (a combination of last year's tax cuts and higher deductions from maintenance and repairs). Notably, the company managed to outperform even as operating expenses (increased maintenance costs) are on the rise. Capital spending (more below) is apt to persist through the remainder of this year and next, which ought to keep producing beneficial deductions. Overall, we are boosting both our 2018 and 2019 bottom-line estimates by a nickel, to \$1.10 a share and \$1.20 a share, respectively. **There is a high probability that York's recent rate case filing will go through.** As mentioned in our previous review, the company is asking for a \$6 million hike in annual revenue to help recover infrastructure improvements and upgrade costs. Too, the Pennsylvania Public Utilities Commission will also take into account the company's growing customer base when evaluating the case.

**Capital investments are poised to accelerate significantly.** During the first half of the year, York spent roughly \$7 million on upgrades such as raw water pumping stations and infrastructure improvements and replacements. Management expects this figure to nearly double in the back half of 2018, to approximately \$13 million (total annual spending of about \$20 million). Looking forward, investments are likely to remain elevated through next decade, as a fair share of its infrastructure still needs updating. **The dividend yield is about average at the current quotation.** Shares of York Water have edged higher in value since mid-2015, effectively shaving 50 to 60 basis points off its average annual yield over the past two years. But after it gave back a portion of these gains over the course of 2018, coupled with a now higher annual payout, income-seeking accounts may eventually have something to get excited about again. **That said, we continue to recommend investors take a pass on this untimely equity.**

Nicholas P. Patrikis October 12, 2018

(A) Diluted earnings. Next earnings report due late November. (B) Dividends historically paid in late February, June, September, and December. (C) In millions, adjusted for split.

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Company's Financial Strength	B+
Stock's Price Stability	60
Price Growth Persistence	55
Earnings Predictability	90

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**EAST NORRITON TOWNSHIP  
SEWAGE FACILITIES ASSESSMENT  
FEBRUARY 2019  
(REV. MAY 2019)**

**PREPARED FOR:**



**EAST NORRITON TOWNSHIP  
2501 STANBRIDGE STREET  
EAST NORRITON, PA 19401**

**PREPARED BY:**



**Carroll Engineering Corporation  
949 EASTON ROAD  
WARRINGTON, PA 18976**



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## **1. INTRODUCTION**

This assessment of the tangible assets of facilities and equipment of the East Norriton sanitary sewer system has been prepared in accordance with PA Act 12 and following the guidelines of the “Uniform System of Accounts for Class A Wastewater Utilities.” Each facility and class of equipment has been coded per section 300 of the “Wastewater Utility Plant Accounts” section of the Guidelines. The Asset Survey includes nine (9) pump stations, and approximately 63 miles of gravity sewers and force mains. Information was obtained from sanitary sewer as-built plans and Chapter 94 mapping. Site visits were conducted at each pump station to inventory and assess equipment. Construction costs were obtained where available. Many historical costs were pulled from Helmuth J.H. Baerwald’s October 2000 report on the history of the sewer system from 1957 – 2000. A copy of this report is included in the background material.

## 2. OVERVIEW OF THE SEWER SYSTEM

East Norriton Township, Montgomery County, PA is bordered by Plymouth Township to the east, Whitpain Township to the north, Worcester and Lower Providence Townships to the west and West Norriton Township and the Norristown Borough to the south. The Township covers an area of approximately 6.1 square miles and has a population of 13,590 as of the 2010 Census.

The wastewater system in the Township consists of approximately 59 miles of gravity sewer collection mains and interceptors in sizes ranging from eight (8) to twenty-four (24) inches. There are nine (9) dedicated pump stations and approximately four (4) miles of force mains, sized four (4) to sixteen (16) inches. A surge tank is located at the Einstein Pump Station to assist with managing flows during wet weather.

The majority of the sewer system was constructed under two phases in the 1960s and 1970s. These phases are shown on the enclosed map as Sewer System Phase I and Sewer System Phase 2. Phase I was completed by 1965, and Phase II was completed by the mid-1970s. The remainder of the sewer system was built over the intervening years mostly as new developments were built in the Township. An inventory of the physical assets of the sewer system is included in Section 3 of this report. The sewer mains have been categorized by development and the inventory includes street, pipe size, material and approximate age. The index also includes estimated original construction costs. These costs are based on 2018 unit prices indexed to the Installation Year using the Engineering News-Record's Construction Cost Index. The Construction Cost Index and details on the 2018 Unit Costs are included in Appedix A. The pump station inventory includes a description of each pump station, any available construction costs, and a list of equipment identified at each pump station.

Sewage flows from the Township are conveyed to the East Norriton-Plymouth-Whitpain Joint Sewer Authority (ENPWJSA) via a single connection at ENPWJSA's Sawmill Pump Station, located in the southeast corner of the Township. Flows are ultimately treated at the East Norriton-Plymouth-Whitpain Wastewater Treatment Plant. A map of the system is included in Appendix B.

### 3. SYSTEM INVENTORY

#### 3.1 PUMP STATIONS

##### A. STONY CREEK NO 1 (TIMBERLAKE)

###### Facility Description

Stony Creek No. 1 (Timberlake) Pump Station is located at 2501 Stanbridge Street. It was originally built in the 1960s as part of the original sewer system and rehabilitated in 1996. In 1999, an enclosure and air filtration system were installed to deal with odors related to gases emitting from the wet well. The northern half of the central third of the Township, an area bordered by Swede Road to the east, Germantown Pike to the south and Whitehall Road to the west, is tributary to this pump station via the Stony Creek Interceptor No. 1. The Stony Creek No. 3 (Germantown), Felton Road, Sandra Lane, Whitehall Road and Einstein pump stations are also tributary to this pump station.

Sewage is discharged through a 1,704 foot long, 12-inch diameter CIP force main to manhole 16, located at the intersection of Dogwood Lane and Stanbridge St.

The pump station is housed in a 21' x 22' brick building. The wet well is outside of the building and can be accessed via a 36" x 36" aluminum hatch. The pumps and valves are located in a dry well below the building.

The 300 kW Spectrum generator sits on a pad behind the pump station. It has an integral diesel tank and is controlled by an ASCO automatic transfer switch.

The property is surrounded by a chainlink and barbed wire fence. There are also an upright steel surge tank and an abandoned chlorine shed from a previously used chlorine dosing system on the property.

###### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1960 - 1970	Included in \$2,100,000 Sewer District No. 1 construction	Initial facility construction costs	Helmuth J.H. Baerwald report
1996	Approx. one third of \$2,450,913	Rehabilitation of Stony Creek PS No. 1, 2 & 3, including replacing pumps and installing generators at all three pump stations	Helmuth J.H. Baerwald report
1999	\$47,500	Modifications to wet well to treat odors	Helmuth J.H. Baerwald report

## Stony Creek No. 1 (Timberlake) Information Sheet

	Station Name	Stony Creek No. 1 (Timberlake)	
	Location	2501 Stanbridge St, Norristown, PA 19401	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>Pumps (Qty 3)</b>		
	Pump Manufacturer	A-C Pump	
	Pump Model Number	300	
	Type	NSWV	
	Pump GPM	2500	
	Pump TDH Ft.	120	
	Pump Size	8x6x17	
	Motor HP	125	
	Pump Control	LS 8000-2 Level Switch	
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Control Panels & Systems, Inc.	
	Model/Serial Number	96021D,E,	
	Manufacturer	AGM	
	Model	TA 5300-2	
	Serial No.	409-223	
371	<b>GRINDER</b>	Muffin Monster	
	Manufacture	JWC Environmental	
	Model	CMD1810-XDS2.0	
	HP	5	
371	<b>CRAIN/HOIST</b>		
	Manufacture	Columbus McKinnon Corp	
	Serial No.	L5076RW	
	Manufacture	Columbus McKinnon Corp	In pump room (roller bearing trolley)
	Model	3974	
360	<b>VALVES</b>		
	Type	Electronic Drain Valve	
	Manufacturer	Norgren	
	Model No.	17-020-202	
355	<b>GENERATOR</b>		
	Manufacturer	Spectrum	
	Generator KW	300	
	Serial No.	370992	
	ATS Manufacture	ASCO	
354.2	<b>BUILDING</b>		Pump Room
	Size	21' x 22'	
	Main Structure Material	Brick	
	Roof Type	Asphalt Shingles	
	Doors (number/material)	(1) Steel	
	Lighting		
	<b>ELECTRICAL</b>		
371.3	MCC	Allen-Bradley	
	Serial No.	B 811147/2	
396	Alarm System (Autodialer)	Sensaphone Express II	
	Model	FGD6700	
	Transient Voltage Surge Surpressor		
	Model No.	AORN-1S 120/240A-WX	
	Air Compressor	Speedaire	

## Stony Creek No. 1 (Timberlake) Information Sheet

	Station Name	Stony Creek No. 1 (Timberlake)	
	Location	2501 Stanbridge St, Norristown, PA 19401	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
	Model No.	TWD58	
	Serial No.	DO73281	
	Utility Sink		
	Surge Arrestor		
	Manufacturer	Fluid Kinetics	
	Model No.	SAC 48	
	Serial No.	844	
354.3	<b>HVAC</b>		
	Type	Exhaust Fan (Effluent 1)	
	Manufacture	Greenheck	
	Model No.	SE1-20-428-B7	
	Type	Supply fan (SF-1)	
	Manufacture	Greenheck	
	Model No.	BSQ-160-10	
	Type	Supply fan ()SF-2	
	Manufacture	Greenheck	
	Model No.	AIS-18-B3	
364	<b>FLOW METER</b>		
	Manufacture	Krohne America, Inc	
	Size	12"	
	Model	Remote (NEMA6P)W/DS&Vulto	
	Product No.	VU204AA13311111-000	
	Ecograph Recorder		
	Manufacturer	Endress + Hauser	
	Model No.	RSG30	
354.3	Hydrants		
354.3	Fence (length and type)	227' Chain Link w/ 3 barbed wire strands	
354.3	Paving and Walkways	Long driveway from Stanbridge Rd	116" x 560" Paved in Fence
	<b>MISCELLANEOUS</b>		
	Annunciator	Panalarm	
	Heat Tracing Control Panel	HTD Heat Trace, Inc.	
	Rain guage		
	Outside Lights (6)		
	Flag Pole(1)		

B. STONY CREEK NO 2 (NORRIS CITY)

Facility Description

Stony Creek No. 2 (Norris City) Pump Station is located at 527 Norris City Avenue. It was originally built in the 1960s as part of the original sewer system and rehabilitated in 1996. Most of the eastern third of the Township is tributary to this pump station via the Stony Creek Interceptor No. 2. This area is between Stanbridge Street and Old Arch Road south of Germantown Pike and between Swede Road and Arch Road north of Germantown. The Stony Creek No. 1 (Timberlake) pump station is also tributary to this pump station.

Sewage is discharged through a 3,757 foot long, 16-inch diameter CIP force main to manhole 569 in Hartranft Avenue.

The pump station is housed in a 25' x 22' brick building. The wet well is outside of the building and can be accessed via a 36" x 36" aluminum hatch. The pumps and valves are located in a dry well below the building.

The 500 kW Spectrum generator sits on a pad behind the pump station. It has an integral diesel tank and is controlled by an ASCO automatic transfer switch.

The property is surrounded by a chainlink and barbed wire fence. There are also an upright steel surge tank and an abandoned chlorine shed from a previously used chlorine dosing system on the property.

Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1960 - 1970	Included in \$2,100,000 Sewer District No. 1 construction	Initial facility construction costs	Helmuth J.H. Baerwald report
1996	Approx. one third of \$2,450,913	Rehabilitation of Stony Creek PS No. 1, 2 & 3, including replacing pumps and installing generators at all three pump stations	Helmuth J.H. Baerwald report



## Stony Creek No. 2 (Norris City) Information Sheet

	Station Name	Stony Creek No. 2 (Norris City)	
	Location	527 Norris City Ave, Norristown, PA 19401	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>Pumps (Qty 3)</b>		
	Pump Manufacturer	A-C Pump	
	Pump Model Number	150	
	Type	PWO	
	Pump GPM	2600	
	Pump TDH Ft.	245	
	Pump Size	8x6x17	
	Motor HP	250	
	Pump Control	PRO-950824	Sigma Controls Myriad Model No. TPC-L
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Control Panels & Systems, Inc.	
	Model/Serial Number	96021A,B,	
	Manufacturer	AGM	
	Model	TA 5300-2	
	Serial No.	409-223	
371	<b>GRINDER</b>	Muffin Monster	
	Manufacture	JWC Environmental	
	Model	CMD1810-XDS2.0	
	HP	5	
355	<b>GENERATOR</b>		
	Manufacturer	Spectrum	
	Generator KW	500	
	Serial No.	370992	
	ATS Manufacture	ASCO	
354.2	<b>BUILDING</b>		
	Size	25' x 22'	
	Main Structure Material	Brick	
	Roof Type	Asphalt Shingles	
	Doors (number/material)	Front and Back Steel Doors (2)	
	Lighting	Flourescent	
	<b>ELECTRICAL</b>		
371.3	MCC	Allen-Bradley	
	Model	800 T	
396	Alarm System (Autodialer)	Sensaphone Express II Remote Monitoring System	
	Model	FGD6700	
	Surge Arrestor		
	Manufacturer	Fluid Kinetics	
	Model No.	SAC 72	
	Transient Voltage Surge Surpressor		
	Model No.	AORN-1S 120/240A-WX	
	Air Compressor	Speedaire	
	Model No.	TWD58	
	Serial No.	DO73281	
354.3	<b>HVAC</b>		
	Manufacture	York	
	Model No.	ZF060C00N4AAA2A	
	Type	Exhaust (Effluent 1)	
	Manufacture	Greenheck	
	Model No.	GWB-14-3	
	Type	Effluent 2	
	Manufacture	Greenheck	
	Model No.	SE1-18-429-A7	
	Type	Supply (SF-1)	
	Manufacture	Greenheck	
	Model No.	BSQ-160-10	

## Stony Creek No. 2 (Norris City) Information Sheet

	Station Name	Stony Creek No. 2 (Norris City)	
	Location	527 Norris City Ave, Norristown, PA 19401	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
	Type	Supply (SF-2)	
	Manufacture	Greenheck	
	Model No.	AIS-14-A	
364	<b>FLOW METER</b>		
	Manufacture	Krohne America, Inc	
	Size	16"	
	Model	Remote (NEMA6P)W/DS&Vulto	
	Product No.	VU220AA13391111-000	
364	Ecograph Recorder		
	Manufacturer	Endress + Hauser	
	Model No.	RSG30	
354.3	Hyrdants		
354.3	Fence (length and type)	227' Chain Link w/ 3 barbed wire strands	
354.3	Paving and Walkways	Paved inside fence	
	<b>MISCELLANEOUS</b>		
	Annunciator	Panalarm	
	Utility Sink		
	Heat Tracing Control Panel	HTD Heat Trace, Inc.	
	Rain guage		
	Outside Lights (8)		

### C. STONY CREEK NO 3 (GERMANTOWN)

#### Facility Description

Stony Creek No. 3 (Germantown) Pump Station is located at 821 W. Germantown Pike. It was originally built in the 1960s as part of the original sewer system and rehabilitated in 1996 and again in 2011. The western third of the Township, between Sandra Lane and Trooper Road, is tributary to this pump station via the Stony Creek Interceptor No. 3. The Schultz Road and Burnside Avenue pump stations are also tributary to this pump station.

During normal flow conditions, sewage is discharged through a 4,872 foot long, 12-inch diameter CIP force main to manhole 1020A in Germantown Pike. This main was sliplined in 2011. Due to the loss of capacity this created, in 2013 a parallel 931 foot long, 6-inch diameter force main was installed. This force main discharges into manhole 1212 at Sunset Avenue and Germantown Pike, and flows are carried to the Einstein pump station for storage in the surge tank located there. The 6-inch parallel main is controlled by a pinch valve, which opens based on wet well levels. It only operates during significant rain events.

The pump station is housed in a 24' x 15' brick building. The wet well is outside of the building and can be accessed via a 36" x 36" aluminum hatch. The pumps and valves are located in a dry well below the building. A second valve vault sits in the driveway to connect the parallel force main to the primary one.

The 250 kW Spectrum generator sits on a pad next to the pump station. It has an integral diesel tank and is controlled by an ASCO automatic transfer switch.

The property is surrounded by a chainlink and barbed wire fence. There are also an upright steel surge tank and an abandoned chlorine shed from a previously used chlorine dosing system on the property.

#### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1960 - 1970	Included in \$2,100,000 Sewer District No. 1 construction	Initial facility construction costs	Helmuth J.H. Baerwald report
1996	Approx. one third of \$2,450,913	Rehabilitation of Stony Creek PS No. 1, 2 & 3, including replacing pumps and installing generators at all three pump stations	Helmuth J.H. Baerwald report
2011	\$619,500.00	Slip lining force main	Damage Analysis Table
2013	\$298,095.84	Parallel force main project	Payment application

### Stony Creek No. 3 (Germantown) Information Sheet

	Station Name	Stony Creek No. 3 (Germantown)	
	Location	821 W Germantown Pike, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>Pumps (Qty 3)</b>		
	Pump Manufacturer	A-C Pump	
	Pump Model Number	300	
	Type	NSWV	
	Pump GPM	1050	
	Pump TDH Ft.	142	
	Pump Size	8x6x17	
	Motor HP	100	
	Pump Control	Sigma Controls Myriad Model No. TPC-L	
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Control Panels & Systems, Inc.	
	Model/Serial Number	96021G,H,	
	Manufacturer	AGM	
	Model	TA 5300-2	
	Serial No.	409-223	
371	<b>GRINDER</b>	Muffin Monster	
	Manufacture	JWC Environmental	
	Model	CMD1810-XDS2.0	
	HP	5	
371	<b>CRAIN/HOIST</b>		
	Manufacture	Columbus McKinnon Corp	
	Model	L5076RW	
355	<b>GENERATOR</b>		
	Manufacturer	Spectrum	
	Model No.	250DS60	
	Serial No.	371288	
	Generator KW	250	
	Serial No.	370992	
	ATS Manufacture	ASCO	
354.2	<b>BUILDING</b>		Pump Room
	Size	23.5' x 15'	
	Main Structure Material	Brick	
	Roof Type	Asphalt Shingles	
	Doors (number/material)	(1) Steel	
	Lighting	Flourescent	
	<b>ELECTRICAL</b>		
371.3	MCC	Allen-Bradley	
	Serial No.	B 811147/2	
396	Alarm System (Autodialer)	Sensaphone Express II	
	Model	FGD6700	
	Manufacturer	Allen Bradley PanelView Plus 700	
	Model No.	2711P-T7C4D8	
	Transient Voltage Surge Suppressor	(2)	
	Model No.	AORN-1S 120/240A-WX	
	Surge Arrestor		
	Manufacturer	Fluid Kinetics	
	Model No.	SAC 72	
	Serial No.	843	
	Manufacturer	Fluid Kinetics	
	Serial No.	A1130	
354.3	<b>HVAC</b>		
	Type	Effluent 1	
	Manufacture	Greenheck	
	Model No.	GWB-14-5	
	Type	SF-1	

### Stony Creek No. 3 (Germantown) Information Sheet

	Station Name	Stony Creek No. 3 (Germantown)	
	Location	821 W Germantown Pike, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
	Manufacture	Greenheck	
	Model No.	BSQ-130-7	
	Type	SF-2	
	Manufacture	Greenheck	
	Model No.	AIS-18-B3	
364	<b>FLOW METER</b>		
	Manufacture	Krohne America, Inc	
	Size	12"	
	Model	Remote (NEMA6P)W/DS&Vulto	
	Product No.	VU204AA13311111-000	
	Manufacture	Eastech Badger	
	Model No.	2200	
364	Ecograph Recorder		
	Manufacturer	Endress + Hauser	
	Model No.	RSG30	
354.3	Hydrants		
354.3	Fence (length and type)	292' Chain Link w/ 3 barbed wire strands	
354.3	Paving and Walkways	Driveway 24' x 49'	Entire Station Paved
	<b>MISCELLANEOUS</b>		
	Utility Sink		
	Heat Tracing Control Panel	HTD Heat Trace, Inc.	
	Rain Measurer		
	Outside Lights (6)		
	Hot Water Heater Manufacture	Rheemglas Electric	

#### D. SANDRA LANE

##### Facility Description

Sandra Lane Pump Station is located at Sandra Lane & Whitehall Road. It was originally built in 1975 as part of the Sheffield Village Development and rehabilitated in 1985. The area south of Germantown Pike, bounded by Sandra Lane and North Whitehall Road, is tributary to this pump station.

Sewage is discharged through a 2,671 foot long, 4-inch CIP force main to a manhole at Germantown Pike & Sandra Lane.

The pump station has a precast concrete wet well, valve vault and meter pit. Controls are housed in a covered enclosure.

Emergency power is supplied by a portable generator connection.

The property is surrounded by a wooden shadowbox fence. There is also an abandoned chlorine shed from a previously used chlorine dosing system on the property.

##### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1975	\$88,000.00	Constructed as part of the Sheffield Village development	Replacement cost from 2015 Comprehensive Report, adjusted by ENR CCI
1985	\$74,488.00	Rehabilitation of Sandra Lane PS	Helmuth J.H. Baerwald report

**Sandra Lane Information Sheet**

	Station Name	Sandra Lane	
	Location	525 N Whitehall Road, Eagleville, PA 19403	
<b>CODE</b>	<b>PUMP STATION</b>	<b>DESCRIPTION</b>	<b>COMMENTS</b>
371.3	Pump Manufacturer	KSB Pumps	
	Pump Model Number	5-M07-738316	
	Type	Submersible	
	Pump GPM		
	Pump TDH Ft.		
	Pump Size		
	Motor HP	31	
370.3	Wet Well Size	112" x 112"	
370.3	Hatchway	Aluminum	
370.3	Valve Vault Size	88" x 88"	
370.3	Meter Pit Size	60" x 60"	
371.3	Pump Control	Multitrode, backup floats	
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Sta-Con Inc.	
	Model/Serial Number	55108AE	
	<b>ELECTRICAL</b>		
396	Alarm System (Autodialer)	Sensaphone Express II Remote Monitoring System	
	Model	FGD6700	
354.3	<b>HVAC</b>		
	Manufacturer	YASKAWA	HVAC Drive
	Model No.	CIMR-ZU2A0088FAA	
	Serial no.	1W1345276890010	
364	<b>FLOW METER</b>		
354.3	Fence (length and type)	150.33'	Wooden
354.3	Paving and Walkways	Parking Lot	
371.3	<b>ODOR CONTROL</b>		
	50 gal poly drum		
	Metering Pump		
	Manufacturer	Flexflo	
	Model No.	A1N20F-6T	
	Serial No.	DB3546	
	<b>MISCELLANEOUS</b>		
	Plastic shed		
	Lighting	Outdoor Light (1)	

E. BURNSIDE AVENUE

Facility Description

The Burnside Avenue Pump Station is located at 2071 Potshop Lane. It was originally built in 1994. It serves the Norriton Business Campus, Pimlico Farms developments, and part of the Village of Caralea development.

Sewage is discharged through a 2,092 foot long, 6-inch diameter PVC force main to manhole 1624 at Germantown Pike & Burnside Avenue.

The pump station has a precast concrete wet well and valve vault. Controls are housed in a covered enclosure.

Emergency power is supplied by a portable generator connection.

The property is surrounded by a chainlink fence. There is also an abandoned chlorine shed from a previously used chlorine dosing system on the property.

Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1994	\$387,638.01	Constructed as part of the Norriton Business Campus	3/13/96 Ltr. From Robert E Blue Consulting Engineers, P.C.



### Burnside Avenue Information Sheet

	Station Name	Burnside Avenue	
	Location	2071 Potshop Ln, Norristown, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>PUMPS (Qty 2)</b>		
	Pump Manufacturer	Barnes Pumps, Inc.	
	Pump Model Number	4SE15034L	
	Type	Submersible	
	Pump GPM	210	
	Pump TDH Ft.	81	
	Pump Size	4 inch	
	Motor HP	15	
	Motor Voltage	230	
370.3	Wet Well Size	113"x113"	
370.3	Hatchway	Aluminum	
370.3	Valve Vault Size	6' x 9'	
371.3	Pump Control		
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Underwriters Laboratories, Inc.	
	Model/Serial Number	AA- 688637	
371	<b>CRAIN/HOIST</b>		
	Manufacture	Dutton-Lainson Company	
	Model	B1500	
355	<b>PORTABLE GENERATOR</b>		
	Manufacturer	Cummins Onan	
	Model No.	50DGCA	
	Generator KW	50	
	ATS Manufacturer	Cummins Onan	
	ATS Model No.	0T 150	
	Inside Model No.	306-3479-03	
	Generator Receptacle	Appleton Electric Company	
	CAT No.	AR20034	
	Amp	200	
	<b>ELECTRICAL</b>		
396	Alarm System (Autodialer)	Sensaphone Express II Remote Monitoring System	
	Model	FGD6700	
354.3	<b>HVAC</b>		
	Type/Manf./Model #	Dayton	
		Model No. 4YC 486	
		Serial No. 11385516 0806	
354.3	Fence (length and type)	151' Chain link w/barbed wire	
354.3	Paving and Walkways	Gravel Driveway	
371.3	<b>ODOR CONTROL</b>		
	50 gal poly drum		
	Metering Pump		
	Manufacturer	Flexflo	
	Model No.	A1N20F-6T	
	Serial No.	KA3831	

### Burnside Avenue Information Sheet

	Station Name	Burnside Avenue	
	Location	2071 Potshop Ln, Norristown, PA 19403	
<b>CODE</b>	<b>PUMP STATION</b>	<b>DESCRIPTION</b>	<b>COMMENTS</b>
	<b>MISCELLANEOUS</b>		
	Chemical Dosing Bldg		
	Spare Hose		
	Lighting	Outdoor Light (1)	

## F. SCHULTZ ROAD

### Facility Description

The Schultz Road Pump Station is located at 1031 Schultz Road. It was originally built in the 1970s and the pumps and controls were replaced in 1999. It serves Lena Lane, Lewis Lane, Doris Lane, Singer Lane, Schultz Road and the western end of Tanglewood Drive.

Sewage is discharged through a 2,343 foot long, 4-inch diameter CIP force main to manhole 952 at Woodland Avenue & Black Swift Road.

The pump station has a precast concrete wet well and valve vault. Controls are housed in an enclosure mounted on the wet well.

Emergency power is supplied by a portable generator connection.

The property is surrounded by a chainlink fence.

### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1970 - 1979	\$73,000.00	Initial facility construction costs	Replacement cost from 2015 Comprehensive Report, adjusted by ENR CCI
1999	\$24,000.00	Pumps/controls replaced	Helmuth J.H. Baerwald report

### Schultz Road Information Sheet

	Station Name	Schultz Road	
	Location	1031 Schultz Rd, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>PUMPS (Qty 2)</b>		
	Pump Manufacturer	Barnes	
	Pump Model Number		
	Type	Submersible	
	Pump GPM		
	Pump TDH Ft.		
	Pump Size		
	Motor HP	15	
370.3	Wet Well Size	85.5" Diameter	
370.3	Hatchway	Aluminum	
371.3	Pump Control	Flygt Multitrode	
	<b>CONTROL PANEL</b>		
371.3	Manufacturer	Sta-Con, Inc.	
	Model/Serial Number	99-0953	
	Manufacturer	Enclosed Industrial Control Panel	
	Model/Serial Number	No. AS629155	
371	<b>CRAIN/HOIST</b>		
	Manufacture	Dutton-Lainson Company	
	Model	B1200	
355	<b>GENERATOR RECEPTACLE</b>		
	Powertite Receptacle Manuf	Appleton Electric Company	
	CAT No.	AR20034	
	Amp	200	
	<b>ELECTRICAL</b>		
396	Alarm System (Autodialer)	Sensaphone Express II Remote Monitoring System	
	Model	FGD6700	
354.3	Fence (length and type)	91' Chain link	
354.3	Paving and Walkways	Paved Driveway	
	<b>MISCELLANEOUS</b>		
	Lighting	Outdoor Light (1)	

## G. WHITEHALL ROAD

### Facility Description

The Whitehall Road Pump Station is located at 619 Township Line Road. It was originally built in the 1970s. It serves the portion of Whitehall Road north of Heatherwood Drive.

Sewage is discharged through a 799 foot long, 4-inch diameter CIP force main to manhole 723 in Township Line Road.

The pump station has an abandoned steel dry pit pump station with two air compressor/ejector pumps. In 1999, repairs were made to the pump station. In around 2014, the dry-pit pumps were abandoned, a manhole on the property was converted into a wet well, and a submersible pump was installed. An above grade force main with air release valve was run across the ground and tied into the existing force main. Controls for the pump are housed in an enclosure mounted on the fence.

A new grinder pump packaged pump station was purchased in 2018. This pump station has not yet been installed. Estimates for the installation of this pump station were procured and are indicated in the construction costs below.

Emergency power is supplied by a portable generator connection.

The property is surrounded by a chainlink fence.

### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1970 - 1979	\$68,000.00	Initial facility construction costs	Replacement cost from 2015 Comprehensive Report, adjusted by ENR CCI
1999	\$6,925.76	Repairs to pump station	Helmuth J.H. Baerwald report
2014 - 2015	\$5,800.00	Pumps/controls replaced	Est. cost for pump
2018	\$35,769.00	Packaged pump station procurement	Payment application
Future	\$44,500.00	Installation of packaged pump station (GC, electrical and site work)	E-mail summary of quotes received

### Whitehall Road Information Sheet

	Station Name	Whitehall Road	
	Location	619 Township Line Rd, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>PUMPS (Qty 1)</b>		
	Pump Manufacturer		
	Pump Model Number		
	Type	Submersible	
	Pump GPM		
	Pump TDH Ft.		
	Pump Size		
	Motor HP	5	
370.3	Wet Well Size		
370.3	Hatchway		
371.3	Pump Control		
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Hydromatic	
	Model/Serial Number	62021-826-7	
360	<b>VALVES</b>		
	Type	Air Release Valve	
	Manufacture/Model No.	Crspin Valve A11111S20AB	
355	<b>GENERATOR RECEPTACLE</b>		
	Receptacle Manufacturer	Appleton Electric Company	
	CAT No.	ADR1034	
	Amp	100	
354.3	<b>HVAC</b>		
	Type/Manf.	Dayton Electric Convection Heater	
	Model No.	3VU37B	
354.3	Fence (length and type)	100' Chain Link	
354.3	Paving and Walkways	Driveway 27' x 21'	

## H. EINSTEIN

### Facility Description

The Einstein Pump Station is located at 619 Township Line Road. It was built in 2012 as part of the Einstein Medical Center. It serves the medical center, the portion of Whitehall Road between Heatherwood Drive and Germantown Pike, the south end of Sunset Avenue, and the portion of Germantown Pike from Sunset Avenue to Whitehall Road. The Sandra Lane pump station and the Germantown Pike pump station's parallel force main are also tributary to this station. In addition to the pump station, this facility includes a buried, precast concrete surge tank capable of storing 286,515 gallons.

Sewage is discharged through a 2,286 foot long, 6-inch diameter DIP force main to manhole 265A in Germantown Pike.

The pump station has a precast concrete wet well containing four pumps, two to the surge tank and two to the force main. There are two precast concrete valve vaults, one on the line to the surge tank and the other on the force main. The controls are housed in a 17' x 17' concrete block building.

The 1250 kW Caterpillar generator sits on a pad behind to the pump station. It has an integral diesel tank and is controlled by an ASCO automatic transfer switch.

The pump station facility is surrounded by a chainlink fence. The surge tank is located below grade outside of the fence.

### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
2012	\$3,281,205.00	Initial facility construction costs, includes gravity sewer modifications in Germantown Pike, Sandra Lane, and Marion Ave.	Escrow release

### Einstein Information Sheet

	Station Name	Einstein (including Surge Tank)	
	Location	689 W Germantown Pike, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>PUMPS (Qty 2)</b>	To force main	
	Pump Manufacturer	FLYGT	
	Pump Model Number	NP-3171	
	Type	Submersible	
	Motor HP	34	
	Motor Voltage	460	
371.3	<b>PUMPS (Qty 2)</b>	To surge tank	
	Pump Manufacturer	FLYGT	
	Pump Model Number	NP-3127	
	Type	Submersible	
	Motor HP	7.5	
	Motor Voltage	460	
370.3	Wet Well Size	12'x12'	
370.3	Hatchway	87.5" x 63.5"	
371.3	Pump Control	Transducers w/float backup	
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	FLYGT	
	Serial Number	12-0074	
371.3	<b>RTU</b>		
	Manufacturer	Optimum Controls Corporation	
	OCC Job #	3966E	
371	<b>GRINDER</b>		
	Manufacture	Muffin Monster	
	Model Number	30005-0012-DI	
	HP	5	
	Motor Controller Model	PC2200	
671	<b>CRAIN/HOIST</b>		
	Manufacture	Halliday Products, Inc.	
	Model Number	D3B	
360	<b>VALVES</b>		
	Type	Check Valves	
	Manufacturer	Milliken Valve Company	
	Model #	Series 8501	
	Type	Plug Valve	
	Manufacturer	Milliken Valve Company	
	Model #	Series 600	
	Type	Universal Air Release Valve	
	Manufacturer	Crispin Valves	
	Type	Globe Surge Relief Valve	
	Manufacturer	APCO Valve and Primer Corp	
	Type	Valve Automation	
	Manufacturer	Auma	



### Einstein Information Sheet

	Station Name	Einstein (including Surge Tank)	
	Location	689 W Germantown Pike, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
	Model #	AO926914001	
355	<b>GENERATOR</b>		
	Manufacturer	Caterpillar	
	Model Number	C6.6	
	Generator KW	125	
	Generator HP		
	Fuel Tank (Gals)		
	ATS Manufacturer	ASCO	
	Serial Number	496599 RE	
354.2	<b>BUILDING</b>		
	Size	17'X17'	
	Main Structure Material	Concrete Block	
	Roof Type	Metal	
	Doors (number/material)	Double Doors	
	Lighting	Fluorescent	
	<b>ELECTRICAL</b>		
371.3	Power Panelboard		
	Manufacturer	GE	
	Model Number	APNB3304FHITA	
	Manufacturer	Allen Bradley PanelView Plus 700	
	Model No.	2711P-T7C4D8	
	Surge Protector	Ge Tranquell	
396	Alarm System (Autodialer)	Verbatim	
	Model No.	Series VSS	
354.3	<b>HVAC</b>		
364	Flow Meter	Endress + Hauser	
	Serial No.	E9041716000	
364	Flow Meter	Endress + Hauser	
	Serial No.	E9049216000	
364	Ecograph		
	Manufacturer	Endress + Hauser	
	Model No.	RSG30	
354.3	Fence (length and type)	217' Chain link\	
354.3	Paving and Walkways	Entire Site Paved	
354.3	Driveway	47.5'x16'	
371.3	<b>ODOR CONTROL</b>		
	Type	Metering pump	
	Manufacturer	FLEXFLO	
	Model No.	A1N20F-6T	
	Max PSI	100	
	Max Feed	24 GPD @ 0PSI	

### Einstein Information Sheet

	Station Name	Einstein (including Surge Tank)	
	Location	689 W Germantown Pike, East Norriton, PA 19403	
<b>CODE</b>	<b>PUMP STATION</b>	<b>DESCRIPTION</b>	<b>COMMENTS</b>
	Voltage	115/60Hz-80W	
	<b>MISCELLANEOUS</b>		
	Surge Tank	Precast concrete, buried Max Storage: 286,515 gal	
	Utility Sink		
	Light Poles (x2)	Outdoor Lights on Bldg (x3)	
	Rainwise		
	Household Storage Tank		
	Water Heater		
	Manufacturer	ARISTON	
	Model No.	GL 4Ti	

## I. FELTON ROAD

### Facility Description

The Felton Road Pump Station is located at 2940 Felton Road. It was originally built in the 1970s. It serves the northern end of Felton Road.

Sewage is discharged through a 441 foot long, 4-inch diameter CIP force main to manhole 298 in Felton Road.

The pump station has two air compressor/ejector pumps located in a steel dry pit.

Emergency power is supplied by a portable generator connection.

The property is surrounded by a chainlink and barbed wire fence.

### Facility Construction Costs

<b>Year</b>	<b>Cost</b>	<b>Description</b>	<b>Source</b>
1970 - 1979	\$68,000.00	Initial facility construction costs	Replacement cost from 2015 Comprehensive Report, adjusted by ENR CCI

### Felton Road Information Sheet

	Station Name	Felton Road	
	Location	2940 Felton Rd, East Norriton, PA 19403	
CODE	PUMP STATION	DESCRIPTION	COMMENTS
371.3	<b>PUMPS (Qty 2)</b>		
	Pump Manufacturer	Gast Manufacturing	
	Pump Model Number	72-204461	
	Type	Air ejector/compressor	
	Air Compressor Motor Manufacturer	Century	
	Motor HP	2	
	Motor Voltage	250	
371.3	<b>CONTROL PANEL</b>		
	Manufacturer	Gast Manufacturing	
355	<b>GENERATOR RECEPTACLE</b>		
	Powertite Receptacle Manuf	Appleton Electric Company	
	CAT No.	ADR1034	
	Amp	100	
	<b>ELECTRICAL</b>	N/A	
396	Alarm System (Autodialer)	Sensaphone Express II Remote Monitoring System	
	Model	FGD6700	
	Fence (length and type)	60' Chain Link	

### 3.2 SEWER MAINS

The following inventories of sewer mains have been broken down by project. The first table is a summary showing the total of all mains by size, followed by lists for Phase I, Phase II, and individual developments within the Township.

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
ASSET INVENTORY REPORT**

**TOTAL OF ALL SEWER MAINS**

	Quantity	Pipe Size & Material	Original Pipe Construction Cost	No. of Manholes	Original Manhole Construction Cost
Sewer District No. 1 Phase I	155,563	8" VCP	\$1,678,647		
	78	8" CIP	\$1,429		
	6,723	10" VCP	\$33,403		
	138	10" CIP	\$3,069		
	4,616	12" VCP	\$25,566	820	\$360,661
	5,271	15" VCP	\$41,727		
	1,317	18" RCP	\$8,582		
	3,809	21" RCP	\$50,570		
	1,240	24" RCP	\$9,646		
	45,148	8" VCP	\$700,070		
Sewer District No. 1 Phase II	3,280	10" VCP	\$58,556	249	\$167,862
	2,712	12" VCP	\$23,023		
	2,803	15" VCP	\$59,838		
	37,356	8" VCP	\$1,132,258		
Developments	38,562	8" PVC	\$2,524,435	433	\$1,044,803
	762	8" DIP	\$61,436		
	2,212	8" Unknown	\$98,923		
	6,254	4" CIP	\$190,087		
Force Mains	3,217	6" DIP	\$244,256		
	2,092	6" PVC	\$117,615		
	1,704	12" CIP	\$32,338		
	4,872	12" CIP (sliplined)	\$92,460		
	3,757	16" CIP	\$81,092		
Total Gravity Sewer (miles)	59	Total Manholes		1,502	
Total Force Mains (miles)	4				
Total (all mains)	63				

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
ASSET INVENTORY REPORT**

**SEWER DISTRICT NO. 1 PHASE I**

STREET	PIPE			MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST2	TOTAL MH COST
	LENGTH	SIZE	SIZE								
Adams Ave (MH 180 - 177A)	1,126	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$12,381.22	\$1,759.32	
Alan Rd (MH 46 - 44)	663	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,290.18	\$879.66	
Arch Rd (MH 244 - 241)	1,039	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$11.00	\$11,424.59	\$1,319.49	
Avon Rd (MH 291 - 288)	197	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,166.16	\$439.83	
Baldwin Ave (MH 726 - 382A)	1,289	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$14,173.52	\$3,078.81	
Barbara Dr (MH 272 - 266)	1,003	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$11,028.74	\$1,759.32	
Barbara Dr (MH 415 - 420)	1,559	8	VCP	8	1960 - 1965	\$135.00	0.0815	\$11.00	\$17,142.38	\$3,518.64	
Barbara Dr (MH 677 - 415)	1,566	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$17,219.35	\$3,078.81	
Barbara Dr (MH 679 - 678)	262	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,880.89	\$439.83	
Beechwood Rd (MH 478 - 440)	1,275	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$14,019.58	\$3,078.81	
Birchwood Cir (MH 632 - 631)	264	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,902.88	\$879.66	
Birchwood Dr (MH 633A - 582)	1,562	8	VCP	8	1960 - 1965	\$135.00	0.0815	\$11.00	\$17,175.36	\$3,518.64	
Brenda Ln (MH 700 - 696)	682	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,499.10	\$1,759.32	
Brenda Ln (MH 740 - 737)	534	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,871.73	\$1,319.49	
Briar Ln (MH 37 - 22)	824	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$9,060.50	\$1,759.32	
Bristol Ave (MH 605 - 602)	331	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,639.59	\$439.83	
Brookside Rd (MH 485 - 439)	1,588	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$17,461.25	\$3,078.81	
Bryans Rd (MH 512 - 498)	1,938	8	VCP	9	1960 - 1965	\$135.00	0.0815	\$11.00	\$21,309.77	\$3,958.47	
Butchers Ln (MH 218 - 213)	1,345	8	VCP	5	1960 - 1965	\$135.00	0.0815	\$11.00	\$14,789.29	\$2,199.15	
Carol Ln (MH 639 - 589A)	1,244	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$13,678.71	\$3,078.81	
Central St (MH 610A - 610)	189	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,078.20	\$439.83	
Coles Blvd (MH 544 - 543)	478	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,255.97	\$879.66	
Coles Blvd (MH 555 - 548)	121	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$1,330.49	\$439.83	
Coles Blvd (MH 564 - 557)	258	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,836.90	\$439.83	
Coles Blvd (MH 655 - 92)	623	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$11.00	\$6,850.35	\$1,319.49	
Coles Blvd (MH 86 - 84)	947	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,412.98	\$1,759.32	
Coles Blvd Esmt (MH 765 - 768)	839	8	VCP	4	1960 - 1965	\$53.00	0.0815	\$4.32	\$3,621.84	\$1,759.32	
Coles Blvd Esmt (MH 83 - 81)	547	8	VCP	1	1960 - 1965	\$53.00	0.0815	\$4.32	\$2,361.32	\$439.83	
Colonial Cir (MH 108 - 107)	279	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,067.81	\$439.83	
Colonial Dr (MH 101 - 109)	1,476	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$11.00	\$16,229.73	\$3,078.81	
Conner St (MH 606 - 601)	287	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,155.78	\$439.83	
Cottage Ln (MH 495 - 487)	821	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11.00	\$9,027.51	\$1,759.32	
Dekalb Pike (MH 113 - 110)	1,155	8	VCP	6	1960 - 1965	\$135.00	0.0815	\$11.00	\$12,700.09	\$2,638.98	
Dekalb Pike (MH 127 - 126)	275	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,023.83	\$879.66	
Dekalb Pike (MH 190 - 171A)	2,464	8	VCP	11	1960 - 1965	\$135.00	0.0815	\$11.00	\$27,093.53	\$4,838.13	
Dekalb Pike (MH 196A - 171)	399	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,387.30	\$879.66	
Dekalb Pike (MH 566 - 567)	347	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,815.53	\$439.83	
Dekalb Pike (MH 567 - 578)	1,129	21	RCP	9	1960 - 1965	\$163.00	0.0815	\$13.28	\$14,989.00	\$3,958.47	

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
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**SEWER DISTRICT NO. 1 PHASE I**

STREET	PIPE			YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST2	TOTAL MH COST
	LENGTH	SIZE	MATERIAL						
Dekalb Pike (MH 576 - 573B)	705	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,752.00	\$1,319.49
Denis Rd (MH 273 - 271)	400	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,398.30	\$439.83
Denis Rd (MH 431 - 423)	749	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,235.82	\$879.66
Dermon Rd (MH 294 - 283)	658	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,235.20	\$1,319.49
Dogwood Ln (MH 16 - 14)	468	15	VCP	1960 - 1965	\$171.00	0.0815	\$13.93	\$6,518.28	\$879.66
Dogwood Ln (MH 18 - 14)	536	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,893.72	\$879.66
Donna Dr (MH 749 - 747)	574	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$6,311.56	\$879.66
Dorp Ln (MH 316 - 307)	646	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,103.26	\$1,759.32
Dorp Ln (MH 39 - 37)	517	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,684.80	\$879.66
Evergreen Ave (MH 40A - 20)	347	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,815.53	\$879.66
Fairview Rd (MH 32 - 24)	751	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,257.81	\$1,319.49
Felton Rd (MH 298 - 256)	973	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,698.87	\$1,759.32
Felton Rd (MH 298D - 298A)	825	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$9,071.49	\$1,759.32
Fourth St (MH 534 - 527)	344	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,782.54	\$439.83
Francis Ave (MH 561 - 520)	1,676	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$18,428.88	\$2,638.98
Germantown Pike (MH 155 - 152)	372	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,090.42	\$879.66
Germantown Pike (MH 166 - 153)	3,859	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$42,432.60	\$8,356.77
Germantown Pike (MH 205A - 160A)	2,508	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$27,577.34	\$4,838.13
Germantown Pike (MH 207 - 205A)	275	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,023.83	\$879.66
Germantown Pike (MH 208 - 205)	235	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,584.00	\$879.66
Germantown Pike (MH 257A - 255C)	225	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,474.04	\$1,319.49
Germantown Pike (MH 258 - 257A)	78	8	CIP	1960 - 1965	\$225.00	0.0815	\$18.33	\$1,429.45	\$439.83
Germantown Pike (MH 265A - 258)	2,475	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$27,214.48	\$5,277.96
Germantown Pk (MH 29 - 304)	2,012	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$22,123.45	\$3,518.64
Germantown Pk (MH 325 - 300)	2,721	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$29,919.44	\$6,157.62
Halzelton Ave (MH 616 - 608)	337	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,705.57	\$439.83
Hancock Ave (MH 553 - 519)	2,230	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$24,520.53	\$3,518.64
Hancock Ave (MH 572 - 573)	505	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,552.85	\$879.66
Hannah Ave (MH 231 - 229A)	2,489	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$27,368.42	\$4,398.30
Hanover Ln (MH 666 - 664)	367	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,035.44	\$879.66
Hartranft Ave (MH 533 - 518)	2,224	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$24,454.55	\$3,078.81
Hartranft Ave (MH 569 - 567)	530	21	RCP	1960 - 1965	\$163.00	0.0815	\$13.28	\$7,036.47	\$879.66
Heather Ln (MH 644 - 648)	633	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$6,960.31	\$1,319.49
Hemlock Dr (MH 647 - 248A)	969	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,654.88	\$1,319.49
Hemlock Dr (MH 248A - 238)	1,082	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$11,897.40	\$2,199.15
Hilgest Ave (MH 25 - 19)	1,722	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$18,934.68	\$3,078.81
Hilltop Rd (MH 75 - 67)	707	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$7,774.00	\$1,319.49
Jefferson Ave (MH 183 - 181A)	972	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,687.87	\$1,319.49



**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
ASSET INVENTORY REPORT**

**SEWER DISTRICT NO. 1 PHASE I**

STREET	PIPE			YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST2	TOTAL MH COST
	LENGTH	SIZE	MATERIAL						
Jefferson Ave Esmt (MH 181B - 181)	221	8	VCP	1960 - 1965	\$53.00	0.0815	\$4.32	\$954.02	\$439.83
Johnson Hwy (MH 526 - 521)	1,730	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$19,022.65	\$3,078.81
Johnson Hwy (MH 578 - Sawmill PS)	2,150	21	RCP	1960 - 1965	\$163.00	0.0815	\$13.28	\$28,544.16	\$5,717.79
Kenwood Rd (MH 290 - 276)	1,427	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$15,690.94	\$3,958.47
Kenwood Rd (MH 764 - 290)	747	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,213.83	\$1,319.49
Knoeller Rd (MH 718 - 721)	761	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,367.77	\$1,319.49
Lafayette Rd (MH 122 - 114)	743	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,169.84	\$1,319.49
Lawnton Rd (MH 118 - 116)	324	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,562.62	\$439.83
Lawnton Rd (MH 123 - 126)	1,170	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$12,865.03	\$1,759.32
Lisa Rd (MH 759 - 751)	1,181	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$12,985.98	\$2,199.15
Manchester Dr (MH 694 - 687)	1,529	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$16,812.50	\$3,078.81
Marcia Ln (MH 393 - 386)	442	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,860.12	\$1,319.49
Mark Ln (MH 741 - 744)	195	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,144.17	\$439.83
Markle Rd (MH 742 - 747)	1,530	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$16,823.50	\$3,518.64
Marsha Rd (MH 429 - 426)	146	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$1,605.38	\$439.83
Meadowbrook Ln (MH 671 - 662)	1,000	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,995.75	\$2,638.98
Meadowbrook Ln Esmt (MH 669 - 667)	262	8	VCP	1960 - 1965	\$53.00	0.0815	\$4.32	\$1,131.01	\$879.66
Meadowbrook Rd (MH 50 - 43)	635	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$6,982.30	\$1,319.49
Michele Dr (MH 274 - 270)	375	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,123.41	\$439.83
Michele Dr (MH 428 - 416)	1,270	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$13,964.60	\$3,078.81
Mill Rd (MH 133 - 190)	734	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,070.88	\$1,319.49
Mill Rd (MH 138 - 129)	1,648	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$18,121.00	\$3,518.64
Montgomery Ave (MH 542 - 534)	2,229	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$24,509.53	\$3,518.64
Montgomery Ave (MH 565 - 566)	241	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,649.98	\$439.83
Norris City Ave (MH 2 - 1)	167	24	RCP	1960 - 1965	\$163.00	0.0815	\$13.28	\$2,217.15	\$879.66
Norris City Ave (MH 5 - 2)	845	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$9,291.41	\$1,319.49
Norriton Dr (MH 760 - 762)	427	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$4,695.19	\$879.66
North Wales Rd (MH 269 - 390)	1,508	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$16,581.59	\$1,759.32
North Wales Rd (MH 365 - 390)	2,960	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$23,547.42	\$5,277.96
Northampton Rd (MH 701 - 706)	953	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$10,478.95	\$1,759.32
Norwood Ln (MH 455 - 450)	293	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,221.76	\$439.83
Norwood Ln (MH 460 - 459)	354	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$3,892.50	\$879.66
Nottingham Rd (MH 712A - 684)	2,296	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$25,246.24	\$6,597.45
Nottingham Rd (MH 713 - 1154)	271	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$2,979.85	\$439.83
Oak Dr (MH 651 - 248A)	480	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$5,277.96	\$879.66
Oak Dr (MH 652 - 239A)	785	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$8,631.66	\$1,319.49
Oak Tree Rd (MH 472 - 443)	849	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$9,335.39	\$2,199.15
Old Arch Road (MH 597 - 581A)	4,566	8	VCP	1960 - 1965	\$135.00	0.0815	\$11.00	\$50,206.60	\$7,037.28

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
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**SEWER DISTRICT NO. 1 PHASE I**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST2	TOTAL MH COST	
	LENGTH	SIZE							MATERIAL
Orchard Rd (MH 503 - 496)	1,424	8	VCP	7	1960 - 1965	\$135.00	0.0815	\$15,657.95	\$3,078.81
Overhill Rd (MH 47 - 46)	210	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$2,309.11	\$439.83
Pace Ln (MH 661 - 658)	393	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$4,321.33	\$879.66
Pace Ln Esmt (MH 659A - 2A)	397	8	VCP	3	1960 - 1965	\$53.00	0.0815	\$1,713.79	\$1,319.49
Pace Ln Esmt (MH 659C)	114	8	VCP	1	1960 - 1965	\$53.00	0.0815	\$492.12	\$439.83
Penn Square Rd (MH 329 - 323)	1,077	8	VCP	4	1960 - 1965	\$135.00	0.0815	\$11,842.42	\$1,759.32
Penn Square Rd (MH 468 - 445)	616	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$6,773.38	\$879.66
Pinecrest Rd (MH 281 - 278)	597	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$6,564.46	\$879.66
Rahway Ave (MH 603 - 600)	814	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$8,950.54	\$1,319.49
Rahway Ave (MH 612 - 607)	1,017	8	VCP	6	1960 - 1965	\$135.00	0.0815	\$11,182.68	\$2,638.98
Robin Ln (MH 641 - 638)	410	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$4,508.26	\$879.66
Robin Ln (MH 642 - 590A)	431	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$4,739.17	\$1,319.49
Roland Dr Esmt (MH 345A - 345)	114	8	VCP	1	1960 - 1965	\$53.00	0.0815	\$492.12	\$439.83
Rome St (MH 613 - 1)	589	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$6,476.50	\$1,319.49
Saint Vincent St (MH 412 - 402)	487	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$5,354.93	\$1,319.49
Sardaro Ln (MH 19 - 11)	235	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$2,584.00	\$439.83
Scenic Rd (MH 279 - 259)	1,059	8	VCP	5	1960 - 1965	\$135.00	0.0815	\$11,644.50	\$2,199.15
Second St (MH 562 - 561)	138	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$1,517.41	\$439.83
Shamokin Ave (MH 604 - 603)	348	8	VCP	1	1960 - 1965	\$135.00	0.0815	\$3,826.52	\$439.83
Sharon Ln (MH 724 - 726)	450	8	VCP	2	1960 - 1965	\$135.00	0.0815	\$4,948.09	\$879.66
Sharon Ln (MH 727 - 730)	669	8	VCP	3	1960 - 1965	\$135.00	0.0815	\$7,356.16	\$1,319.49
Shirlene Rd (MH 407A - 394)	1,367	8	VCP	8	1960 - 1965	\$135.00	0.0815	\$15,031.19	\$3,518.64
Shirlene Rd (MH 729 - 394)	849	8	VCP	6	1960 - 1965	\$135.00	0.0815	\$9,335.39	\$2,638.98
Springview Rd (MH 117 - 102)	1,194	8	VCP	6	1960 - 1965	\$135.00	0.0815	\$13,128.93	\$2,638.98
Springview Rd Esmt (MH 624 - 117)	990	8	VCP	4	1960 - 1965	\$53.00	0.0815	\$4,273.68	\$1,759.32
Springview Rd Esmt (MH 94 - 91)	527	8	VCP	2	1960 - 1965	\$53.00	0.0815	\$2,274.98	\$879.66
Stanbridge St (MH 304A - 312)	1,524	8	VCP	8	1960 - 1965	\$135.00	0.0815	\$16,757.52	\$3,518.64
Stony Creek Interceptor 1 (MH 300 to Timberlake PS)	1,317	18	RCP	8	1960 - 1965	\$80.00	0.0815	\$8,581.57	\$3,518.64
Stony Creek Interceptor 1 (MH 331 - 300)	603	15	VCP	2	1960 - 1965	\$90.00	0.0815	\$4,420.29	\$879.66
Stony Creek Interceptor 1 (MH 342 - 331)	1,745	12	VCP	9	1960 - 1965	\$68.00	0.0815	\$9,664.86	\$3,958.47
Stony Creek Interceptor 1 (MH 372 - 342)	2,649	10	VCP	14	1960 - 1965	\$61.00	0.0815	\$13,161.43	\$6,157.62
Stony Creek Interceptor 1 (MH 373 - 372)	138	10	CIP	1	1960 - 1965	\$273.00	0.0815	\$3,068.55	\$439.83
Stony Creek Interceptor 1 (MH 381 - 373)	1,279	10	VCP	7	1960 - 1965	\$61.00	0.0815	\$6,354.65	\$3,078.81
Stony Creek Interceptor 2 (MH 14 - 42)	1,507	15	VCP	8	1960 - 1965	\$90.00	0.0815	\$11,047.06	\$3,518.64
Stony Creek Interceptor 2 (MH 167 - 91)	2,871	12	VCP	14	1960 - 1965	\$68.00	0.0815	\$15,901.32	\$6,157.62
Stony Creek Interceptor 2 (MH 223 - 167)	2,795	10	VCP	15	1960 - 1965	\$61.00	0.0815	\$13,886.82	\$6,597.45
Stony Creek Interceptor 2 (MH 42 - 2)	1,073	24	RCP	3	1960 - 1965	\$85.00	0.0815	\$7,428.65	\$1,319.49
Stony Creek Interceptor 2 (MH 91 - 42)	2,693	15	VCP	12	1960 - 1965	\$90.00	0.0815	\$19,741.04	\$5,277.96

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
ASSET INVENTORY REPORT**

**SEWER DISTRICT NO. 1 PHASE I**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST2	TOTAL MH COST
	LENGTH	SIZE						
Stony Creek Rd (MH 514 - 454)	5,205	8	VCP	1960 - 1965	\$135.00	0.0815	\$57,232.89	\$10,555.92
Stony Creek Rd Esmt (MH 432 - 331)	333	8	VCP	1960 - 1965	\$53.00	0.0815	\$1,437.51	\$879.66
Swede Rd (MH 194 - 192)	473	8	VCP	1960 - 1965	\$135.00	0.0815	\$5,200.99	\$1,319.49
Swede Rd (MH 518 - 515)	651	8	VCP	1960 - 1965	\$135.00	0.0815	\$7,158.23	\$1,759.32
Swede Rd (MH 521 - 519)	653	8	VCP	1960 - 1965	\$135.00	0.0815	\$7,180.23	\$1,759.32
Swede Rd (MH 72 - 50)	6,246	8	VCP	1960 - 1965	\$135.00	0.0815	\$68,679.46	\$10,555.92
Sycamore Ln (MH 458 - 466)	1,973	8	VCP	1960 - 1965	\$135.00	0.0815	\$21,694.62	\$3,958.47
Third St (MH 537A - 537)	226	8	VCP	1960 - 1965	\$135.00	0.0815	\$2,485.04	\$439.83
Third St (MH 546 - 545)	397	8	VCP	1960 - 1965	\$135.00	0.0815	\$4,365.31	\$879.66
Third St (MH 554 - 549)	166	8	VCP	1960 - 1965	\$135.00	0.0815	\$1,825.29	\$439.83
Third St (MH 563 - 559)	218	8	VCP	1960 - 1965	\$135.00	0.0815	\$2,397.07	\$439.83
Township Line Rd (MH 192 - 190)	709	8	VCP	1960 - 1965	\$135.00	0.0815	\$7,795.99	\$439.83
Township Line Rd (MH 241 - 234)	3,092	8	VCP	1960 - 1965	\$135.00	0.0815	\$33,998.86	\$5,277.96
Township Line Rd (MH 370 - 365)	1,483	8	VCP	1960 - 1965	\$135.00	0.0815	\$16,306.70	\$2,199.15
Township Line Rd (MH 723 - 370)	683	8	VCP	1960 - 1965	\$135.00	0.0815	\$7,510.10	\$1,319.49
Valleyview Cir (MH 100 - 97)	197	8	VCP	1960 - 1965	\$135.00	0.0815	\$2,166.16	\$439.83
Valleyview Rd (MH 99 - 95)	760	8	VCP	1960 - 1965	\$135.00	0.0815	\$8,356.77	\$1,759.32
Warsaw St (MH 615 - 609)	326	8	VCP	1960 - 1965	\$135.00	0.0815	\$3,584.61	\$439.83
Washington Ave (MH 186 - 187)	741	8	VCP	1960 - 1965	\$135.00	0.0815	\$8,147.85	\$1,319.49
Wellington Rd (MH 409 - 404)	1,411	8	VCP	1960 - 1965	\$135.00	0.0815	\$15,515.00	\$3,518.64
Wellington Rd (MH 678 - 409)	1,335	8	VCP	1960 - 1965	\$135.00	0.0815	\$14,679.33	\$2,638.98
Wellington Rd Esmt (MH 413 - 407)	430	8	VCP	1960 - 1965	\$53.00	0.0815	\$1,856.25	\$439.83
Windsor Dr (MH 715 - 710)	477	8	VCP	1960 - 1965	\$135.00	0.0815	\$5,244.97	\$879.66
Windsor Dr (MH 716 - 717)	369	8	VCP	1960 - 1965	\$135.00	0.0815	\$4,057.43	\$879.66
Woodlawn Rd (MH 491 - 433)	1,124	8	VCP	1960 - 1965	\$135.00	0.0815	\$12,359.22	\$2,638.98
Woodlyn Ave (MH 33 - 23)	302	8	VCP	1960 - 1965	\$135.00	0.0815	\$3,320.72	\$439.83

Totals: 155,563

8" VCP \$1,678,646.89  
8" CIP \$1,429.45  
10" VCP \$33,402.90  
10" CIP \$3,068.55  
12" VCP \$25,566.18  
15" VCP \$41,726.67  
18" RCP \$8,581.57  
21" RCP \$50,569.63  
24" RCP \$9,645.80  
Manholes \$360,660.64  
Total \$2,213,298.28

**EAST NORRITON TOWNSHIP  
SANITARY SEWER SYSTEM  
ASSET INVENTORY REPORT**

**SEWER DISTRICT NO. 1 PHASE II**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST		
	LENGTH	SIZE							MATERIAL	MANHOLES
Black Swift Rd (MH 911 - 907)	733	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$12,353.72	\$2,022.44
Black Swift Rd (MH 952 - 836)	949	8	VCP	4	1965 - 1975	\$135.00	0.1248	\$16.85	\$15,994.11	\$2,696.58
Black Swift Rd Esmt (MH 902 - 901)	182	8	VCP	1	1965 - 1975	\$53.00	0.1248	\$6.62	\$1,204.22	\$674.15
Brambling Ln (MH 906 - 892)	1,863	8	VCP	8	1965 - 1975	\$135.00	0.1248	\$16.85	\$31,398.34	\$5,393.17
Bunting Rd (MH 908 - 905)	379	8	VCP	2	1965 - 1975	\$135.00	0.1248	\$16.85	\$6,387.53	\$1,348.29
Capital Rd (MH 1007 - 1004)	778	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$13,112.13	\$2,022.44
Congress Rd (MH 884 - 856)	267	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$4,499.92	\$674.15
Congress Rd (MH 885 - 887)	293	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$4,938.12	\$674.15
Doris Ln (MH 944 - 947)	730	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$12,303.16	\$3,370.73
Doris Ln (MH 953 - 954)	187	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$3,151.63	\$674.15
Doris Ln Esmt (MH 940 - 938)	423	8	VCP	2	1965 - 1975	\$53.00	0.1248	\$6.62	\$2,798.83	\$1,348.29
Doris Ln Esmt (MH 946 - 944)	343	8	VCP	2	1965 - 1975	\$53.00	0.1248	\$6.62	\$2,269.50	\$1,348.29
Eisenhower Dr (MH 871 - 854)	1,502	8	VCP	6	1965 - 1975	\$135.00	0.1248	\$16.85	\$25,314.17	\$4,044.87
Embassy Cir (MH 859 - 773)	665	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$11,207.67	\$2,022.44
Faith Dr (MH 973 - 969)	283	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$4,769.58	\$674.15
Filmore Rd (MH 1011 - 1009)	526	8	VCP	2	1965 - 1975	\$135.00	0.1248	\$16.85	\$8,865.02	\$1,348.29
Germantown Pike (MH 1020A - 1033)	2,803	15	VCP	15	1965 - 1975	\$171.00	0.1248	\$21.35	\$59,838.30	\$10,112.19
Germantown Pike (MH 1205 - 1175)	1,055	8	VCP	6	1965 - 1975	\$135.00	0.1248	\$16.85	\$17,780.59	\$4,044.87
Germantown Pike (MH 1212 - 1210)	920	8	VCP	6	1965 - 1975	\$135.00	0.1248	\$16.85	\$15,505.35	\$4,044.87
Germantown Pike (MH 961 - 959)	587	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$9,893.09	\$2,022.44
Hayes Rd (MH 789 - 783)	1,540	10	VCP	6	1965 - 1975	\$143.00	0.1248	\$17.85	\$27,492.66	\$4,044.87
Hayes Rd (MH 817 - 802)	705	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$11,881.82	\$2,022.44
Hayes Rd (MH 818 - 789)	2,372	8	VCP	10	1965 - 1975	\$135.00	0.1248	\$16.85	\$39,976.84	\$6,741.46
Independence Rd (MH 870 - 863)	1,246	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$20,999.64	\$3,370.73
Kelly Dr (MH 839 - 838)	235	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$3,960.61	\$674.15
Kennedy Rd (MH 816 - 792)	1,598	8	VCP	7	1965 - 1975	\$135.00	0.1248	\$16.85	\$26,932.12	\$4,719.02
Kinglet Dr (MH 891 - 894)	762	8	VCP	4	1965 - 1975	\$135.00	0.1248	\$16.85	\$12,842.48	\$2,696.58
Kinglet Dr (MH 914 - 913)	182	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$3,067.36	\$674.15
Lena Ln (MH 948 - 951)	517	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$8,713.33	\$2,022.44
Lewis Ln (MH 958 - 955)	456	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$7,685.26	\$2,022.44
Pierce Rd (MH 795 - 789)	1,493	10	VCP	6	1965 - 1975	\$143.00	0.1248	\$17.85	\$26,653.60	\$4,044.87
Pierce Rd (MH 833 - 789)	492	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$8,291.99	\$674.15
Polk Rd (MH 805 - 794)	1,412	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$23,797.34	\$3,370.73
Potshop Rd (MH 851-1 - 851)	733	8	VCP	4	1965 - 1975	\$135.00	0.1248	\$16.85	\$12,353.72	\$2,696.58
Potshop Rd (MH 915 - 913)	546	8	VCP	2	1965 - 1975	\$135.00	0.1248	\$16.85	\$9,202.09	\$1,348.29
Potshop Rd Esmt (MH 890 - 883)	583	8	VCP	4	1965 - 1975	\$53.00	0.1248	\$6.62	\$3,857.49	\$2,696.58

Potshop Rd Esmt (MH 919 - 915)	888	8	VCP	3	1965 - 1975	\$53.00	0.1248	\$6.62	\$5,875.55	\$2,022.44
Sandra Ln (MH 962 - 961)	155	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$2,612.31	\$674.15
Sandra Ln (MH 972 - 963)	2,137	8	VCP	9	1965 - 1975	\$135.00	0.1248	\$16.85	\$36,016.24	\$6,067.31
Senator Rd (MH 886A - 861)	1,122	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$18,909.79	\$3,370.73
Schultz Rd (MH 921 - 925)	761	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$12,825.62	\$3,370.73
Singer Ln (MH 938 - 924)	274	8	VCP	2	1965 - 1975	\$135.00	0.1248	\$16.85	\$4,617.90	\$1,348.29
Singer Ln (MH 949 - 954)	810	8	VCP	4	1965 - 1975	\$135.00	0.1248	\$16.85	\$13,651.45	\$2,696.58
Singer Ln Esmt (MH 932 - 927)	1,007	8	VCP	6	1965 - 1975	\$53.00	0.1248	\$6.62	\$6,662.93	\$4,044.87
Singer Ln Esmt (MH 936 - 933)	421	8	VCP	3	1965 - 1975	\$53.00	0.1248	\$6.62	\$2,785.60	\$2,022.44
Stony Creek Interceptor 3 (MH 781 - Germantown PS)	2,712	12	VCP	15	1965 - 1975	\$68.00	0.1248	\$8.49	\$23,022.83	\$10,112.19
Sunset Ave (MH 1215 - 1212)	777	8	VCP	3	1965 - 1975	\$135.00	0.1248	\$16.85	\$13,095.28	\$2,022.44
Sunset Ave (MH 842 - 829)	3,768	8	VCP	13	1965 - 1975	\$135.00	0.1248	\$16.85	\$63,504.53	\$8,763.89
Taft Rd (MH 1009 - 1000)	1,168	8	VCP	4	1965 - 1975	\$135.00	0.1248	\$16.85	\$19,685.06	\$2,696.58
Taft Rd (MH 851 - 865)	2,694	8	VCP	15	1965 - 1975	\$135.00	0.1248	\$16.85	\$45,403.71	\$10,112.19
Taft Rd Esmt (MH 864 - 780)	228	8	VCP	1	1965 - 1975	\$53.00	0.1248	\$6.62	\$1,508.59	\$674.15
Taft Rd Esmt (MH 883 - 853)	1,868	8	VCP	7	1965 - 1975	\$53.00	0.1248	\$6.62	\$12,359.84	\$4,719.02
Tollgate Rd (MH 843 - 857)	1,258	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$21,201.88	\$3,370.73
Woodland Ave (MH 1002A - 781)	963	8	VCP	5	1965 - 1975	\$135.00	0.1248	\$16.85	\$16,230.06	\$3,370.73
Woodland Ave (MH 783 - 781)	247	10	VCP	2	1965 - 1975	\$143.00	0.1248	\$17.85	\$4,409.54	\$1,348.29
Woodland Ave (MH 783A - 783)	345	8	VCP	1	1965 - 1975	\$135.00	0.1248	\$16.85	\$5,814.51	\$674.15
Totals:				45,148	8" VCP				\$700,069.62	
				3,280	10" VCP				\$58,555.80	
				2,712	12" VCP				\$23,022.83	
				2,803	15" VCP				\$59,838.30	
				249	Manholes				\$167,862.29	
								Total	\$1,009,348.84	

**EAST NORRITON TOWNSHIP  
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**AUTUMN RIDGE**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Crimson Dr (MH 1744 - 2728)	1,810	8	PVC	10	2000	\$128.00	0.5624	\$71.98	\$130,291.20	\$30,368.29
Sienna Dr (MH 1732 - 1728)	684	8	PVC	4	2000	\$128.00	0.5624	\$71.98	\$49,237.12	\$12,147.32
Amber Cir (MH 1737 - 1733)	532	8	PVC	4	2000	\$128.00	0.5624	\$71.98	\$38,295.54	\$12,147.32
Totals:					3,026	8' PVC			\$217,823.86	
					18	Manholes			\$54,662.92	

**OLD ARCH CROSSING**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Carol Ln (MH 1438 - 1441)	1,282	8	PVC	9	1986	\$128.00	0.5624	\$71.98	\$92,283.60	\$27,331.46
Teardrop Terr (MH 1443 - 1440)	369	8	PVC	2	1986	\$128.00	0.5624	\$71.98	\$26,562.13	\$6,073.66
Carol Ln Esmt (MH 1433 - 354)	424	8	PVC	2	1986	\$46.00	0.5624	\$25.87	\$10,968.58	\$6,073.66
Totals:					2,075	8' PVC			\$129,814.31	
					13	Manholes			\$39,478.77	

**NEW HOPE VILLAGE**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Sawmill Ct (MH 354 - 356)	352	8	VCP	3	1980	\$135.00	0.2926	\$39.50	\$13,905.46	\$4,740.50
Sawmill Ct (MH 357 - 360)	222	8	VCP	4	1980	\$135.00	0.2926	\$39.50	\$8,769.92	\$6,320.67
Sawmill Ct Esmt (MH 355 - 362)	287	8	VCP	2	1980	\$53.00	0.2926	\$15.51	\$4,451.09	\$3,160.33
Totals:					861	8' VCP			\$27,126.48	
					9	Manholes			\$14,221.50	

**VILLAGE EAST**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Carol Ln (MH 1112 - 1115)	756	8	VCP	3	1978	\$135.00	0.2509	\$33.88	\$25,611.87	\$4,065.38
Carol Ln (MH 1111 - 1109)	295	8	VCP	3	1978	\$135.00	0.2509	\$33.88	\$9,994.05	\$4,065.38
Carol Ln Esmt (MH 1115 - 109)	1,028	8	VCP	6	1978	\$53.00	0.2509	\$13.30	\$13,672.72	\$8,130.75
Carol Ln Esmt (MH 1119 - 1120)	124	8	VCP	1	1978	\$53.00	0.2509	\$13.30	\$1,649.24	\$1,355.13
Totals:					2,203	8' VCP			\$50,927.88	
					13	Manholes			\$17,616.63	

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**FOX HUNT**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Marielle Ln (MH 1472 - 604)	695	8	PVC	1994	\$128.00	0.4889	\$62.58	\$43,490.84
Megann Ct (MH 1470 - 1464)	657	8	PVC	1994	\$128.00	0.4889	\$62.58	\$41,112.92
Totals:				1,352	8" PVC		\$84,603.76	
				9	Manholes		\$23,759.61	

**RESERVE AT PENNS CROSSING**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Penn Crossing Dr (MH 1490 - 597)	645	8	PVC	2003	\$128.00	0.6051	\$77.46	\$49,959.92
Penn Crossing Dr (MH 1489 - 1481)	345	8	PVC	2003	\$128.00	0.6051	\$77.46	\$26,722.75
William Ct (MH 1493 - 1492)	148	8	PVC	2003	\$128.00	0.6051	\$77.46	\$11,463.67
Vincent Wy (MH 1486 - 1491)	137	8	PVC	2003	\$128.00	0.6051	\$77.46	\$10,611.64
Vincent Wy (MH 1485 - 1485A)	283	8	PVC	2003	\$128.00	0.6051	\$77.46	\$21,920.40
Brownstone Dr (MH 1483 - 595)	543	8	PVC	2003	\$128.00	0.6051	\$77.46	\$42,059.28
Brownstone Dr (MH 1482 - 1477)	972	8	PVC	2003	\$128.00	0.6051	\$77.46	\$75,288.44
Brownstone Dr Esmt (MH 1475 - 1117)	775	8	PVC	2003	\$46.00	0.6051	\$27.84	\$21,573.05
Totals:				3,848	8" PVC		\$259,599.15	
				26	Manholes		\$84,960.91	

**KIMBERLY KNOLL**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Kimberly Dr (MH 1093 - 1098)	1,195	8	VCP	1979	\$135.00	0.2715	\$36.65	\$43,794.88
Kimberly Dr (MH 1099 - 1104)	935	8	VCP	1979	\$135.00	0.2715	\$36.65	\$34,266.29
Jennifer Dr (MH 1095 - 1104)	798	8	VCP	1979	\$135.00	0.2715	\$36.65	\$29,245.45
Patricia Cir (MH 1092 - 1107)	497	8	VCP	1979	\$135.00	0.2715	\$36.65	\$18,214.27
Kristin Ct (MH 1108 - 1101)	189	8	VCP	1979	\$135.00	0.2715	\$36.65	\$6,926.55
Kory Ln (MH 1104 - 1090)	354	8	VCP	1979	\$135.00	0.2715	\$36.65	\$12,973.55
Totals:				3,968	8" VCP		\$145,420.99	
				19	Manholes		\$27,852.81	

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**EVERGREEN TERRACE**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Terrace Dr (MH 19B - 19A)	144	8	2010	\$128.00	0.7954	\$101.81	\$14,661.29	\$4,295.30
Terrace Dr Esmt (MH 19A - 19)	115	8	2010	\$46.00	0.7954	\$36.59	\$4,207.80	\$4,295.30

Totals: 259 8" PVC \$18,869.09  
2 Manholes \$8,590.60

**THOMAS END**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Green Hill Ln (MH 1460 - 444)	933	8	1983	\$135.00	0.3676	\$49.62	\$46,296.60	\$7,939.40
Green Hill Ln Esmt (MH 1462 - 1460)	430	8	1983	\$53.00	0.3676	\$19.48	\$8,376.80	\$3,969.70
Caln Cir (MH 1457 - 1456)	200	8	1983	\$135.00	0.3676	\$49.62	\$9,924.25	\$1,984.85

Totals: 1,563 8" Unknown \$64,597.65  
7 Manholes \$13,893.94

**BARLEY SHEAF**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Barley Sheaf Dr (MH 1300 - 1308)	1,010	8	1986	\$128.00	0.3883	\$49.70	\$50,195.05	\$16,773.10
Barley Sheaf Dr (MH 1314 - 1316)	330	8	1986	\$128.00	0.3883	\$49.70	\$16,400.36	\$2,096.64
Barley Sheaf Ct (MH 1313 - 1314)	196	8	1986	\$128.00	0.3883	\$49.70	\$9,740.82	\$2,096.64
Barley Sheaf Dr Esmt (MH 1302 - 1301)	136	8	1986	\$46.00	0.3883	\$17.86	\$2,428.99	\$2,096.64
Barley Sheaf Dr Esmt (MH 1309B - 1307)	184	8	1986	\$46.00	0.3883	\$17.86	\$3,286.28	\$6,289.91
Barley Sheaf Dr Esmt (MH 1305 - 1316)	855	8	1986	\$46.00	0.3883	\$17.86	\$15,270.51	\$6,289.91
Barley Sheaf Dr Esmt (MH 1311 - 1310A)	417	8	1986	\$46.00	0.3883	\$17.86	\$7,447.72	\$6,289.91
Barley Sheaf Dr Esmt (MH 1316 - 1317)	166	8	1986	\$85.00	0.3883	\$33.00	\$5,478.44	\$2,096.64
Barley Sheaf Dr Esmt (MH 1317 - Timberlake PS)	122	8	1986	\$46.00	0.3883	\$17.86	\$2,178.95	\$4,193.27

Totals: 3,250 8" PVC \$106,948.68  
166 8" DIP \$5,478.44  
23 Manholes \$48,222.65



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**MARION AVENUE SEWER EXTENSION**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Marion Ave (MH 1165 - 1043)	904	8	PVC	2009	\$128.00	0.7747	\$99.16	\$89,644.90
Marion Ave (MH 1043 - 673)	484	8	PVC	2009	\$128.00	0.7747	\$99.16	\$47,995.72
Totals:				1,388	8" PVC		\$137,640.61	
				6	Manholes		\$25,101.07	

**WHITEHALL ROAD PROJECT**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Whitehall Rd (MH 1159 - Whitehall PS)	2,217	8	VCP	1980	\$135.00	0.2926	\$39.50	\$87,580.72
Whitehall Rd (MH 1160 - 1222)	3,419	8	VCP	1980	\$135.00	0.2926	\$39.50	\$135,064.72
Whitehall Rd (MH 1175 - 972)	2,143	8	VCP	1980	\$135.00	0.2926	\$39.50	\$84,657.41
Totals:				7,779	8" VCP		\$307,302.85	
				37	Manholes		\$58,466.15	

**WOODLANDS AT WHITEHALL**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Irenic Cir (MH 1431 - 1171A)	614	8	PVC	1993	\$128.00	0.4710	\$60.29	\$37,015.40
Woodland Ave (MH 1432 - 1168A)	415	8	PVC	1993	\$128.00	0.4710	\$60.29	\$25,018.55
Totals:				1,029	8" PVC		\$62,033.95	
				8	Manholes		\$20,346.41	

**SUNSET KNOLL**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Woodland Ave (MH 1419 - 1422)	681	8	PVC	1986	\$128.00	0.3883	\$49.70	\$33,844.38
Sunset Ave (MH 1427 - 829)	531	8	PVC	1986	\$128.00	0.3883	\$49.70	\$26,389.67
James Cir (MH 1425 - 1423)	450	8	PVC	1986	\$128.00	0.3883	\$49.70	\$22,364.13
Totals:				1,662	8" PVC		\$82,598.18	
				8	Manholes		\$16,773.10	

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**HEATHERWOOD**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Heatherwood Dr (MH 1707 - 1710)	1,406	8	2006	\$128.00	0.7007	\$89.69	\$126,101.24	\$30,269.68
Heatherwood Dr Esmt(MH 1703 - 834)	657	8	2006	\$46.00	0.7007	\$32.23	\$21,176.16	\$11,351.13

Totals: 2,063 8" PVC  
11 Manholes  
\$147,277.41  
\$41,620.81

**LINFOOT WALKER**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Baker Dr (MH 1427 - 1428)	244	8	1985	\$135.00	0.3792	\$51.20	\$12,491.71	\$2,047.82
Baker Dr Esmt (MH 1428 - 838A)	772	8	1985	\$53.00	0.3792	\$20.10	\$15,516.42	\$8,191.29

Totals: 1,016 8" VCP  
5 Manholes  
\$28,008.13  
\$10,239.11

**PIMLICO FARMS**

STREET	PIPE		YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Bridlepath Rd (MH 1569 - 1554)	656	8	2007	\$128.00	0.7201	\$92.18	\$60,467.28	\$19,443.32
Bridlepath Rd (MH 1554 - 1553)	139	8	2007	\$167.00	0.7201	\$120.26	\$16,716.21	\$3,888.66
Pimlico Dr (MH 1574 - 1567)	1,418	8	2007	\$128.00	0.7201	\$92.18	\$130,705.19	\$38,886.64
Equestrian Wy (MH 1559 - 1556)	274	8	2007	\$128.00	0.7201	\$92.18	\$25,256.15	\$11,665.99
Equestrian Wy Esmt (MH 1556 - 1554)	319	8	2007	\$46.00	0.7201	\$33.13	\$10,567.08	\$7,777.33
Germentown Pike (MH 1553 - 1550)	458	8	2007	\$128.00	0.7201	\$92.18	\$42,216.49	\$15,554.66

Totals: 3,125 8" PVC  
139 8" DIP  
25 Manholes  
\$269,212.20  
\$16,716.21  
\$97,216.60

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**WHITEHALL ESTATES**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Faith Dr (MH 1614 - 973)	705	8	1985	\$135.00	0.3792	\$51.20	\$36,092.85	\$6,143.46
Faith Dr (MH 1615 - 1622)	702	8	1985	\$135.00	0.3792	\$51.20	\$35,939.27	\$10,239.11
Faith Dr Esmt (MH 1619 - 1183)	354	8	1985	\$53.00	0.3792	\$20.10	\$7,115.04	\$4,095.64
Totals:			1,761	8" VCP			\$79,147.16	
			10	Manholes			\$20,478.21	

**VILLAGE OF CARALEA**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Caralea Dr (MH 1579 - 1624)	1,334	8	2007	\$128.00	0.7201	\$92.18	\$122,962.43	\$27,220.65
Dutch Dr (MH 1580 - 1577)	329	8	2007	\$128.00	0.7201	\$92.18	\$30,325.82	\$3,888.66
Dutch Dr (MH 1586 - 1587)	297	8	2007	\$128.00	0.7201	\$92.18	\$27,376.19	\$7,777.33
Blue Meadow Dr (MH 1585 - 1584)	193	8	2007	\$128.00	0.7201	\$92.18	\$17,789.92	\$3,888.66
Blue Meadow Dr (MH 1584 - 1583)	50	8	2007	\$167.00	0.7201	\$120.26	\$6,013.03	\$3,888.66
Germantown Pike (MH 1576 - 1551)	370	8	2007	\$128.00	0.7201	\$92.18	\$34,105.02	\$7,777.33
Totals:			2,523	8" PVC			\$232,559.38	
			50	8" DIP			\$6,013.03	
			14	Manholes			\$54,441.29	

**NORRITON BUSINESS CAMPUS**

STREET	PIPE		YEAR	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE						
Potshop Ln (MH 1637 - 1645)	1,324	8	2007	\$128.00	0.7201	\$92.18	\$122,040.68	\$27,220.65
Potshop Ln (MH 1650 - 1647)	572	8	2007	\$128.00	0.7201	\$92.18	\$52,724.52	\$11,665.99
Campus Ln Esmt (MH 1655 - 1651)	1,003	8	2007	\$46.00	0.7201	\$33.13	\$33,225.03	\$15,554.66
Foundry Ln (MH 1535 - 1534)	277	8	2007	\$128.00	0.7201	\$92.18	\$25,532.68	\$7,777.33
Foundry Ln Esmt (MH 1533 - Burnside Ave PS)	2,411	8	2007	\$46.00	0.7201	\$33.13	\$79,865.96	\$54,441.29
Germantown Pike (MH 1624 - Germantown PS)	1,146	8	2007	\$128.00	0.7201	\$92.18	\$105,633.39	\$31,109.31
Totals:			6,733	8" PVC			\$419,022.26	
			38	Manholes			\$147,769.23	

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**STONEBRIDGE ESTATES**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Cresswell Dr (MH 1600 - 1603)	720	8	PVC	3	1994	\$128.00	0.4889	\$62.58	\$45,055.26	\$7,919.87
Crossing Cir (MH 1603 - 1610)	918	8	PVC	5	1994	\$128.00	0.4889	\$62.58	\$57,445.46	\$13,199.78
Crossing Cir (MH 1608 - 1610)	436	8	PVC	2	1994	\$128.00	0.4889	\$62.58	\$27,283.46	\$5,279.91
Crossing Cir (1610 - 959)	407	8	DIP	2	1994	\$167.00	0.4889	\$81.64	\$33,228.74	\$5,279.91
Totals:				2,074	8" PVC				\$129,784.18	
				407	8" DIP				\$33,228.74	
				12	Manholes				\$31,679.48	

**ELIZABETH MYERS**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Embassy Cir (MH 1631 - 1634)	683	8	VCP	3	1985	\$135.00	0.3792	\$51.20	\$34,966.55	\$6,143.46
Embassy Cir Esmt (MH 1634 - 770)	452	8	VCP	3	1985	\$135.00	0.3792	\$51.20	\$23,140.38	\$6,143.46
Rosa Ln (MH 1635B - 1635)	279	8	PVC	2	2000	\$128.00	0.5624	\$71.98	\$20,083.56	\$6,073.66
Totals:				1,135	8" VCP				\$58,106.93	
				279	8" PVC				\$20,083.56	
				8	Manholes				\$18,360.59	

**GLEN MOORE**

STREET	PIPE		MATERIAL	MANHOLES	YEAR INSTALLED	2018 PIPE UNIT COST	ENR RATIO	INDEXED UNIT COST2	TOTAL PIPE COST	TOTAL MH COST
	LENGTH	SIZE								
Sunset Ave (MH 1428 - 1656)	199	8	VCP	1	1978	\$135.00	0.2509	\$33.88	\$6,741.75	\$1,355.13
Marna Court (MH 1656 - 1658)	675	8	VCP	2	1978	\$135.00	0.2509	\$33.88	\$22,867.75	\$2,710.25
Marna Court Esmt (MH 1658 - 773)	435	8	VCP	2	1978	\$53.00	0.2509	\$13.30	\$5,785.63	\$2,710.25
Totals:				1,309	8" VCP				\$35,395.13	
				5	Manholes				\$6,775.63	