

4. Sewer extensions constructed during 2013 that contributed flows to PAWC system:

Project / Development Name	Length & Diameter of Sewer Completed	Length and Diameter of Sewer Remaining	Total EDU's Completed	Total EDU's Remaining

5. Proposed Projects which shall require sewer extensions that will contribute flows to PAWC system but are not yet constructed.

Project / Development Name	Length & Diameter of Sewer Proposed	Total EDU's Proposed	Start of Construction (Year)
Sadsbury Commons	Combination Gravity & Forcemain	120	2014
Lafayette Square	Gravity	85	2014

6. Please provide discussion on the following:

a.) Sewer System Flow Monitoring:

P&B Maintenance Company of Essington, PA is currently under contract with Sadsbury Township to monitor Pump Station and Meter on a regular basis. The Township Engineer monitors flows on a regular basis. Currently, the only flow meter readings are from a Mag Meter located along the force main discharge from the pumps at the Pump Station (effluent flow). It is required by Chapter 94 to report on influent flow to evaluate Pump Station hydraulic loading and for determining peaking factors for projected flows. Since the only flow data currently available are the Pump Station discharge flow meter readings, these readings were used to prepare the 2013 report and assumptions were made for projected flows. Using the discharge flow readings would yield inaccurately high peaking factors and falsely indicate hydraulic overloading of the pump station, which is a fairly new station. There is ongoing discussion with the Township regarding installation of an influent flow meter at this station. The Township has placed the influent meter in the 2014 budget. It is anticipated that the influent meter will be installed and operational during 2014. The Township is in the process of evaluating possible Stottsville Pump Station upgrades to meet future demands while at the same time identifying sources of I/I.

b.) Sewer System Maintenance:

Sadsbury Township has a contract with P&B Maintenance Company for Pump Station maintenance. The Township will contract out with local contractors for major repairs.

c.) Sewer System I&I Program:

The Township reviews flows on a regular basis in order to keep a watchful eye on potential I/I. The Township Road Crew is available on a continual basis for routine repairs. Major repairs will be performed by local contractors as the need arises. Currently, the Lincoln Crest Mobile Home Park has been identified as a source of inflow as well as several manholes along Route 372 due to the relocation of a storm sewer line by PennDOT. The Township is monitoring the flows from the Lincoln Crest Mobile Home Park on a regular basis and is working with the owner of the mobile home park to identify and remedy an apparent inflow issue. Flows from the mobile home park continue to spike during rainfall events greater than one (1) inch. Lincoln Crest has received Conditional Final Land Development approval from the Township to expand the park with additional 50 units. The park currently has 125 existing connections. Improvements associated with the expansion should curtail inflow issues. The timing of the mobile home expansion is uncertain at this juncture due to litigation. In Addition, the Township is in the process of investigating another possible source of additional inflow that may be attributed to users within the Bellaire Business Park. The Township is in the process of monitoring their sewage flow and water usage to determine if there is an inflow issue.

7. Please provide discussion of the condition of your sewer system:

a.) Portions where conveyance capacity is being exceeded or will be exceeded in the next 5 years:

The Sanitary Sewer System is in Good Working Condition and no exceedances are anticipated in the next five years.

b.) Proposed projects to increase conveyance capacity, i.e. repair, rehabilitation, new construction:

As stated in 6(a), the Township is in the process of evaluating the possible need to upgrade the Stottsville Pump Station in order to provide for a capacity increase for flows from developments within West Caln Township.

8. Please provide data and discussion of your sewer flow:

Metering Point or Pump Station Name	Agreement or Rated Capacity <sup>1</sup> (gpm)	2013 Average Daily Flow (gpm)*	2014 Projected Average Daily Flow (gpm)*	2018 Projected Average Daily Flow (gpm)*
Stottsville Pump Station	1,008,000 gpd (700 gpm)	168,909gpd (117 gpm)	186,045 gpd (129 gpm)	255,813 gpd (178 gpm)

\* Based on Average Annual Flow

1. Excluding Capacity of Backup Pump = Maximum Pump Rate

a.) Other discussion or information:

The existing Stottsville Pump Station has Two (2) alternating pumps with a rated capacity of 700 gpm each. The pump station is in good condition and is more than capable of handling the projected 5-year flow of 178 gpm. Comparison of rainfall events greater than one (1) inch and flow at the pump station seem to indicate a direct correlation at times, yet at other times the station appears to be unaffected by significant rainfall events.

**THIS SECTION IS NOT APPLICABLE TO SADBURY TOWNSHIP**

9. Please provide a discussion of the industrial waste discharged into your system:

a.) Date of adoption of the ordinance or regulation governing industrial waste discharges into your system:

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b.) Discussion of program for the surveillance and monitoring of the industrial waste discharges into your system:

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c.) Discussion of specific problems in your sewer system, known or suspected to be caused by industrial waste discharges within the past 5 years:

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**Sadsbury Township 2013 Chapter 94 Annual Report  
Projection of EDU Connections and Flows (gpd)**

Project Name	Proposed Use	Location	Plan Status	Current EDUs	Remaining EDUs	TOTAL EDUs	Prior to 2013	2013	2014	2015	2016	2017	2018
Witmer Fire Store	30,000 s.f. Building Expansion	Independence Way	Approved Feb. 2009 - BUILT										
Constable LD	4 SFDUs on Lg. Lots - ON LOT Sewage Disposal	Limestone Road	Approved Mar. 2009	N.A.	N.A.	N.A.							
Sadsburyville Fire Company	Fire Station Expansion	Old Wilmington Rd	ON HOLD - NO EDUs	N.A.	N.A.	N.A.							
Chester County Airport		Rt 30 & Washington Ln	Pending Approval										
York Equity - Lot 6	Office Building	Morris Farm/ Independence Way	ON HOLD										
Sadsbury Commons	500,000 s.f. Shopping Center	Rt 30 & Rt 10	Pending Approval & Act 537 Plan Update	0	117	117	0			20	20	20	20
Sadsbury Commons - Medical Office Building	40,000 sf Medical Office Facility - ON LOT Sewage Disposal	Rt 10 Across from WalMart	Approved & Occupied - Currently On-lot Disposal pending approval of Wester Sewer District Act 537 Plan Approval	0	3	3	0		3				
Art Hurling	2 Existing Residential EDUs, 1 Proposed	Maple Avenue	Planning Module Approved - 2 Existing Connected	2	1	3	2		1				
Valley View Business Center Lots 2 & 3 (National Guard)	National Guard Armory	Waverly Blvd. & Washington Ln.	Connected & Occupied	3	0	3	3						
Lincoln Crest Mobile Home Park	50 Unit Expansion of 125 Existing Unit Park	Rt 30 & Sharon Ln	Conditional Final Approval - Awaiting Posting of Escrow*	0	50	50	0					10	10
Sadsbury Park - Phase 2A	67 EDUs (52 SFD, 15 SFA)+ 2 EDUs for Cabana = 69 TOTAL EDUs	Old Wilmington Rd south of Rt 30	Approved & Under Construction	33	36	69	31	2	12	12	12		
Sadsbury Park - Phase 4C	48 Townhouse Units (SFA) - Including 6 from Phase 2B	Old Wilmington Rd south of Rt 30	Approved & Under Construction	23	25	48	8	15	25				
Sadsbury Park - Phase 1	41 EDUs (All SFD)	Old Wilmington Rd south of Rt 31	Not submitted	0	41	41	0					41	
Sadsbury Park - Phase 2B	132 EDUs (38 SFD, 88 SFA+ 6 SFA Accounted for in Ph 4C)	Old Wilmington Rd south of Rt 32	Not submitted	0	126	126	0						44
Sadsbury Park - Phase 3A	42 EDUs (All SFD)	Old Wilmington Rd south of Rt 33	Not submitted	0	42	42	0						
Sadsbury Park - Phase 3B	46 EDUs (14 SFD, 32 SFA)	Old Wilmington Rd south of Rt 34	Not submitted	0	46	46	0						
Sadsbury Park - Phase 4A	57 EDUs (All SFD)	Old Wilmington Rd south of Rt 35	Not submitted	0	57	57	0						
Sadsbury Park - Phase 4B	12 EDUs (All SFD)	Old Wilmington Rd south of Rt 36	Not submitted	0	12	12	0						
Sadsbury Township Misc	Existing Residence	Renovated Farmhouse at Sads Park Development	Completed & Connected	1	0	1	1						
Lafayette Square - Phase 1	4 Bldgs (40 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 30	Approved Oct 2010 - Construction Complete (4 Bldgs Complete @ 10 Units EA)	40	0	40	40						
Lafayette Square - Phase 2	7 Bldgs (65 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 31	Approved Oct 2010 - Not Started	0	65	65	0		25	40			
Lafayette Square - Phase 3	2 Bldgs (20 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 32	Approved Oct 2010 - Not Started	0	20	20	0			20			
Sadsbury Township - Phase 4 Sewers	Existing Residential EDUs	Valley Road	Phase 4 Sewer Construction Complete - Not all EDUs connected	13	67	80	12	1	4	4	4	4	4
Sadsbury Township - Phase 3A Sewers	House and Apartment (2 EDUs)	31 Morris Lane	Connected	2	0	2	2						
Sadsbury Township Misc	Existing Residence	2907 Lincoln Highway	Connected	1	0	1	1						
Sadsbury Township Misc	Existing Residence	7931 Lincoln Highway	Connected	1	0	1	0	1					
Sadsbury Township - Phase 1 Sewers	Existing Residence	28 Chestnut Street	Connected	1	0	1	0	1					
* - Improvements should curtail Inflow													
<b>TOTAL EDUs</b>				120	<b>708</b>	828	100	20	70	96	36	75	78
<b>TOTAL FLOW (GPD) @ 244.8 GPD/EDU</b>				29,376	173,318	202,694	24,480	4,896	17,136	23,501	8,813	18,360	19,094
<b>STOTTISVILLE PUMP STATION 2-YR PROJECTION (GPD)</b>								<b>168,909</b>	186,045	<b>209,546</b>	218,359	236,719	255,813

<b>Pump Station</b>		
	<b>Volume (Gallons)</b>	<b>ADF (GPD)</b>
<b>Jan-13</b>	5,965,577	192,438
<b>Feb-13</b>	5,606,322	200,225
<b>Mar-13</b>	5,256,280	169,557
<b>Apr-13</b>	4,613,074	153,769
<b>May-13</b>	5,113,802	164,961
<b>Jun-13</b>	6,285,006	209,500
<b>Jul-13</b>	5,369,416	173,207
<b>Aug-13</b>	5,480,767	176,799
<b>Sep-13</b>	4,597,602	153,253
<b>Oct-13</b>	4,336,444	139,885
<b>Nov-13</b>	4,018,966	133,966
<b>Dec-13</b>	5,177,424	167,014
<b>TOTAL</b>	<b>61,820,680</b>	<b>168,909 GPD</b>
		<b>117.3 GPM</b>

<b>168,909</b>	GPD - Annual Average Daily Flow (ADF)
<b>7,038</b>	GPH - Annual Average Hourly Flow (AHF)
<b>117</b>	GPM - Annual Average Flow per Minute (AFM)

<b>389,569</b>	GPD - Maximum Daily Flow (MDF) October 29, 2013
<b>35,720</b>	GPH - Peak Hourly Flow (PHF) August, 11 2013 between 5:25 PM and 6:25 PM
<b>797</b>	GPM - Peak Instantaneous Flow (PIF) October 29, 2013 @ 6:10 pm

<b>2.31</b>	Current MDF Peaking Factor = (MDF/ADF)
<b>5.08</b>	Current PHF Peaking Factor = (PHF/AHF)
<b>6.79</b>	Current Instantaneous Flow Peaking Factor = (PIF/AFM)

**6.79** Current Instantaneous Flow Peaking Factor = (PIF/AFM)  
 From the Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance, last revised March 24, 1999.

<b>797</b>	GPM - Peak Instantaneous Flow (PIF)
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January 2013						
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)
01/01/13	133.5	192,178	21.3	30,671	0.00	0.00
01/02/13	146.5	210,887	17.5	25,161	0.00	0.00
01/03/13	137.8	198,447	16.8	24,208	0.00	0.00
01/04/13	143.0	205,907	15.3	21,977	0.00	0.00
01/05/13	163.5	235,400	18.6	26,802	0.00	0.00
01/06/13	177.7	255,810	20.5	29,576	0.09	0.70
01/07/13	137.7	198,332	17.0	24,431	0.00	0.00
01/08/13	134.8	194,149	15.8	22,722	0.00	0.00
01/09/13	120.5	173,562	16.4	23,606	0.00	0.00
01/10/13	114.0	164,203	16.2	23,397	0.00	0.00
01/11/13	112.2	161,615	16.9	24,378	0.68	0.00
01/12/13	114.9	165,418	19.8	28,538	0.00	0.00
01/13/13	114.6	165,006	20.9	30,025	0.00	0.00
01/14/13	101.5	145,519	17.5	25,225	0.20	0.00
01/15/13	139.1	200,286	17.5	25,164	0.35	0.00
01/16/13	224.5	323,267	25.2	36,269	0.85	0.00
01/17/13	143.9	207,165	17.6	25,344	0.00	0.00
01/18/13	127.4	183,474	17.7	25,556	0.00	0.00
01/19/13	141.0	202,971	20.0	28,736	0.00	0.00
01/20/13	136.4	196,445	21.5	30,966	0.00	0.00
01/21/13	122.7	176,665	18.8	27,042	0.05	1.40
01/22/13	112.1	161,480	16.3	23,473	0.00	0.00
01/23/13	115.5	166,266	16.0	23,017	0.00	0.00
01/24/13	103.5	149,094	15.6	22,441	0.00	0.00
01/25/13	102.7	147,829	15.2	21,853	0.07	1.50
01/26/13	126.9	182,775	19.3	27,854	0.00	0.00
01/27/13	130.0	187,158	20.7	29,779	0.00	0.00
01/28/13	105.6	152,020	16.3	23,513	0.11	0.20
01/29/13	100.4	144,501	15.9	22,953	0.00	0.00
01/30/13	131.2	188,948	22.8	32,794	0.32	0.00
01/31/13	228.3	328,798	35.4	50,976	0.62	0.10

Monthly Averages		192,438	27,047
Monthly Totals		5,965,577	838,445
Maximum Flows	1/31/2013 3:15	471.38	
Maximum Flows	1/31/2013 5:30		100.15

= Water Equivalent of Snowfall

February 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
02/01/13	120.5	173,578	17.5	25,252	0.00	0.10	
02/02/13	124.5	179,258	19.1	27,485	0.03	0.50	
02/03/13	139.8	201,262	22.3	32,062	0.01	0.20	
02/04/13	118.5	170,584	17.0	24,527	0.00	0.00	
02/05/13	106.4	153,258	16.9	24,333	0.01	0.30	
02/06/13	106.0	152,710	16.9	24,386	0.00	0.00	
02/07/13	108.8	156,619	16.3	23,488	0.00	0.00	
02/08/13	133.3	191,960	17.8	25,605	0.34	0.00	
02/09/13	164.7	237,142	21.6	31,114	0.11	1.40	
02/10/13	159.7	229,997	21.4	30,842	0.00	0.00	
02/11/13	139.3	200,608	21.7	31,311	0.49	0.00	
02/12/13	134.3	193,348	16.9	24,373	0.00	0.00	
02/13/13	137.1	197,353	17.4	25,103	0.26	0.20	
02/14/13	135.0	194,441	18.1	26,004	0.00	0.00	
02/15/13	161.7	232,883	18.3	26,310	0.00	0.00	
02/16/13	178.2	256,650	21.6	31,154	0.02	0.00	
02/17/13	182.0	262,009	20.1	28,979	0.00	0.00	
02/18/13	149.4	215,095	19.9	28,727	0.00	0.00	
02/19/13	130.1	187,283	17.3	24,900	0.21	0.00	
02/20/13	131.5	189,382	17.4	25,005	0.00	0.00	
02/21/13	149.7	215,505	16.6	23,842	0.00	0.00	
02/22/13	151.3	217,923	15.8	22,687	0.00	0.00	
02/23/13	170.0	244,828	19.8	28,493	0.12	0.00	
02/24/13	179.1	257,928	21.3	30,623	0.00	0.00	
02/25/13	128.2	184,671	17.5	25,180	0.00	0.00	
02/26/13	117.0	168,441	17.6	25,393	0.39	0.00	
02/27/13	129.0	185,709	22.3	32,041	0.12	0.00	
02/28/13	108.3	155,901	17.2	24,815	0.01	0.00	

Monthly Averages		200,226	26,930
Monthly Totals		5,606,322	754,033
Maximum Flows	2/24/2013 12:00	472.21	
Maximum Flows	2/3/2013 17:15		78.01

= Water Equivalent of Snowfall

March 2013						
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)
03/01/13	119.5	172,015	16.7	24,055	0.00	0.00
03/02/13	136.8	196,931	20.2	29,093	0.00	0.00
03/03/13	135.8	195,531	22.4	32,219	0.00	0.00
03/04/13	112.8	162,376	16.7	24,044	0.00	0.00
03/05/13	103.5	149,111	15.6	22,415	0.00	0.00
03/06/13	105.8	152,308	19.2	27,679	0.13	0.00
03/07/13	104.4	150,317	16.7	24,055	0.00	0.00
03/08/13	101.0	145,317	16.3	23,487	0.02	0.20
03/09/13	104.7	150,788	19.7	28,331	0.00	0.00
03/10/13	115.0	165,657	21.5	30,892	0.00	0.00
03/11/13	111.4	160,354	17.8	25,616	0.00	0.00
03/12/13	193.2	278,231	27.2	39,227	0.90	0.00
03/13/13	125.9	181,246	19.3	27,760	0.00	0.00
03/14/13	115.6	166,514	17.8	25,563	0.00	0.00
03/15/13	108.0	155,490	16.8	24,230	0.00	0.00
03/16/13	108.7	156,459	19.1	27,475	0.04	0.00
03/17/13	120.4	173,334	22.2	31,911	0.00	0.00
03/18/13	110.9	159,746	20.3	29,174	0.48	0.00
03/19/13	119.5	172,064	24.3	34,926	0.21	0.00
03/20/13	124.5	179,316	18.3	26,349	0.00	0.00
03/21/13	118.7	170,895	17.8	25,578	0.00	0.00
03/22/13	106.1	152,809	16.5	23,714	0.00	0.00
03/23/13	108.8	156,680	19.9	28,647	0.00	0.00
03/24/13	119.3	171,801	22.2	31,910	0.00	0.00
03/25/13	113.2	163,020	20.7	29,854	0.46	1.10
03/26/13	111.2	160,095	18.3	26,424	0.00	0.00
03/27/13	123.9	178,396	18.3	26,390	0.00	0.00
03/28/13	116.6	167,953	16.6	23,955	0.00	0.00
03/29/13	110.9	159,728	17.5	25,137	0.00	0.00
03/30/13	131.9	189,899	19.4	27,942	0.00	0.00
03/31/13	112.4	161,901	18.8	27,039	0.18	0.00

Monthly Averages

169,557

27,583

Monthly Totals

5,256,280

855,088

Maximum Flows 3/12/2013 12:30

576.57

Maximum Flows 3/3/2013 11:15

78.01

= Water Equivalent of Snowfall



April 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
04/01/13	113.7	163,796	11.1	15,985	0.00	0.00	
04/02/13	104.2	150,100	17.1	24,577	0.00	0.00	
04/03/13	101.4	146,049	18.0	25,977	0.00	0.00	
04/04/13	96.6	139,063	16.3	23,474	0.00	0.00	
04/05/13	97.2	140,035	16.8	24,144	0.09	0.00	
04/06/13	103.6	149,145	18.9	27,286	0.00	0.00	
04/07/13	117.2	160,028	21.3	30,655	0.00	0.00	
04/08/13	103.0	148,256	17.0	24,416	0.00	0.00	
04/09/13	103.9	149,577	17.0	24,461	0.00	0.00	
04/10/13	105.9	152,480	18.1	26,037	0.14	0.00	
04/11/13	105.7	152,241	16.1	23,130	0.00	0.00	
04/12/13	107.1	154,211	18.5	26,629	1.23	0.00	
04/13/13	115.6	166,519	19.0	27,369	0.00	0.00	
04/14/13	124.9	179,797	21.4	30,783	0.00	0.00	
04/15/13	101.6	146,283	17.0	24,449	0.01	0.00	
04/16/13	110.0	158,425	16.4	23,647	0.00	0.00	
04/17/13	102.1	146,974	16.7	23,999	0.00	0.00	
04/18/13	97.3	140,162	17.5	25,244	0.00	0.00	
04/19/13	103.1	148,466	19.3	27,735	0.44	0.00	
04/20/13	117.0	168,534	23.4	33,681	0.11	0.00	
04/21/13	116.8	168,120	21.9	31,542	0.00	0.00	
04/22/13	105.9	152,526	17.2	24,708	0.00	0.00	
04/23/13	102.1	147,029	16.6	23,951	0.00	0.00	
04/24/13	102.8	148,039	16.5	23,744	0.00	0.00	
04/25/13	102.3	147,359	17.3	24,958	0.01	0.00	
04/26/13	99.8	143,683	16.5	23,764	0.00	0.00	
04/27/13	106.3	153,127	19.5	28,060	0.00	0.00	
04/28/13	118.0	169,884	22.0	31,661	0.00	0.00	
04/29/13	111.7	160,871	19.4	27,907	0.28	0.00	
04/30/13	112.7	162,297	16.5	23,822	0.01	0.00	
Monthly Averages		153,769		25,927			
Monthly Totals		4,613,074		777,797			
Maximum Flows	4/10/2013 7:30	296.41					
Maximum Flows	4/28/2013 19:30			85.18			

May 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
05/01/13	108.6	156,445	18.3	26,349	0.00	0.00	
05/02/13	100.5	144,750	16.2	23,263	0.00	0.00	
05/03/13	94.1	135,481	16.7	24,071	0.00	0.00	
05/04/13	105.1	151,295	18.4	26,512	0.00	0.00	
05/05/13	115.9	166,878	20.5	29,590	0.00	0.00	
05/06/13	101.9	146,718	17.0	24,544	0.00	0.00	
05/07/13	108.9	156,769	17.8	25,629	0.09	0.00	
05/08/13	104.5	150,482	17.5	25,236	0.41	0.00	
05/09/13	114.0	164,189	18.0	25,909	0.54	0.00	
05/10/13	109.1	157,100	19.0	27,291	0.30	0.00	
05/11/13	134.9	194,291	27.0	38,851	0.18	0.00	
05/12/13	139.1	200,241	21.6	31,047	0.13	0.00	
05/13/13	131.3	189,128	17.9	25,751	0.00	0.00	
05/14/13	142.6	205,332	16.8	24,239	0.00	0.00	
05/15/13	134.5	193,625	17.0	24,477	0.03	0.00	
05/16/13	122.1	175,852	17.1	24,647	0.07	0.00	
05/17/13	121.7	175,294	17.3	24,851	0.00	0.00	
05/18/13	117.9	169,804	21.8	31,357	0.13	0.00	
05/19/13	125.6	180,838	23.7	34,113	0.04	0.00	
05/20/13	111.7	160,913	21.0	30,276	0.00	0.00	
05/21/13	104.8	150,856	20.2	29,105	0.00	0.00	
05/22/13	104.3	150,155	19.7	28,378	0.00	0.00	
05/23/13	97.7	140,626	17.5	25,257	0.19	0.00	
05/24/13	107.7	155,060	17.5	25,208	0.08	0.00	
05/25/13	109.8	158,172	19.8	28,519	0.00	0.00	
05/26/13	117.7	169,488	18.5	26,594	0.00	0.00	
05/27/13	134.4	193,509	22.5	32,444	0.00	0.00	
05/28/13	114.2	164,439	17.5	25,271	0.14	0.00	
05/29/13	107.9	155,409	18.3	26,313	0.00	0.00	
05/30/13	106.1	152,753	17.0	24,502	0.00	0.00	
05/31/13	102.7	147,913	18.0	25,922	0.00	0.00	

Monthly Averages

164,961

27,275

Monthly Totals

5,113,802

845,513

Maximum Flows

5/15/2013 21:15

312.97

Maximum Flows

5/6/2013 6:30

80.60

June 2013						
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)
06/01/13	103.3	148,700	20.2	29,115	0.00	0.00
06/02/13	112.7	162,229	20.9	30,145	0.01	0.00
06/03/13	107.5	154,858	18.0	25,850	0.86	0.00
06/04/13	111.2	160,078	16.9	24,329	0.00	0.00
06/05/13	109.6	157,815	16.6	23,841	0.00	0.00
06/06/13	124.7	179,588	18.0	25,961	0.20	0.00
06/07/13	233.9	336,761	35.8	51,532	3.50	0.00
06/08/13	154.7	222,747	23.0	33,095	0.12	0.00
06/09/13	162.5	233,948	20.8	29,967	0.00	0.00
06/10/13	242.2	348,829	27.1	39,019	2.10	0.00
06/11/13	184.3	265,333	22.6	32,595	0.00	0.00
06/12/13	136.9	197,089	17.8	25,578	0.00	0.00
06/13/13	143.9	207,175	18.9	27,268	0.47	0.00
06/14/13	178.3	256,793	19.4	27,949	0.07	0.00
06/15/13	168.2	242,217	20.0	28,845	0.00	0.00
06/16/13	171.6	247,155	19.4	27,972	0.00	0.00
06/17/13	162.3	233,772	17.9	25,760	0.00	0.00
06/18/13	156.0	224,636	19.4	27,879	0.98	0.00
06/19/13	148.3	213,510	17.5	25,136	0.00	0.00
06/20/13	148.4	213,663	16.5	23,798	0.00	0.00
06/21/13	150.3	216,378	17.5	25,213	0.00	0.00
06/22/13	151.8	218,565	20.3	29,230	0.00	0.00
06/23/13	141.9	204,281	20.3	29,174	0.00	0.00
06/24/13	120.1	172,923	18.1	26,076	0.44	0.00
06/25/13	109.0	156,936	17.7	25,449	0.05	0.00
06/26/13	104.3	150,201	18.0	25,907	0.01	0.00
06/27/13	159.0	229,029	24.0	34,542	0.56	0.00
06/28/13	128.2	184,670	19.7	28,436	0.74	0.00
06/29/13	121.4	174,831	21.1	30,373	0.00	0.00
06/30/13	118.3	170,295	19.1	27,478	0.45	0.00

Monthly Averages

209,500

28,917

Monthly Totals

6,285,006

867,511

Maximum Flows

6/27/2013 18:15

643.13

Maximum Flows

6/27/2013 17:45

145.21

July 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
07/01/13	160.9	231,682	24.6	35,438	0.26	0.00	
07/02/13	162.3	233,759	22.0	31,647	0.06	0.00	
07/03/13	123.8	178,239	17.4	25,127	0.00	0.00	
07/04/13	118.8	171,104	18.5	26,632	0.00	0.00	
07/05/13	116.9	168,393	18.2	26,275	0.00	0.00	
07/06/13	114.2	164,439	18.2	26,182	0.00	0.00	
07/07/13	124.7	179,558	20.8	29,949	0.00	0.00	
07/08/13	117.1	168,624	17.3	24,944	0.03	0.00	
07/09/13	114.6	165,038	16.9	24,293	0.00	0.00	
07/10/13	114.0	164,179	18.1	26,000	0.05	0.00	
07/11/13	112.5	161,967	17.3	24,945	0.02	0.00	
07/12/13	138.5	199,405	19.5	28,030	1.12	0.00	
07/13/13	159.6	222,646	26.4	38,075	0.00	0.00	
07/14/13	131.3	189,040	21.5	30,975	0.00	0.00	
07/15/13	122.0	175,738	17.6	25,392	0.00	0.00	
07/16/13	116.1	167,190	17.2	24,805	0.00	0.00	
07/17/13	112.9	162,631	17.2	24,809	0.00	0.00	
07/18/13	116.9	168,378	18.1	26,082	0.00	0.00	
07/19/13	110.7	159,378	17.1	24,674	0.00	0.00	
07/20/13	109.0	156,931	19.7	28,304	0.39	0.00	
07/21/13	115.5	166,334	19.6	28,226	0.00	0.00	
07/22/13	107.2	154,403	17.7	25,526	0.00	0.00	
07/23/13	123.4	177,637	19.3	27,746	3.05	0.00	
07/24/13	109.1	157,039	16.5	23,751	0.00	0.00	
07/25/13	106.8	153,843	17.0	24,484	0.00	0.00	
07/26/13	112.3	161,671	19.1	27,434	0.00	0.00	
07/27/13	113.0	162,733	17.7	25,536	0.00	0.00	
07/28/13	116.2	167,311	19.4	27,877	8.03	0.00	
07/29/13	113.5	163,374	18.7	26,993	0.24	0.00	
07/30/13	107.4	154,620	16.4	23,619	0.00	0.00	
07/31/13	112.6	162,133	17.9	25,842	0.00	0.00	
Monthly Averages		173,207		27,084			
Monthly Totals		5,369,416		839,610			
Maximum Flows	7/1/2013 7:45	162.30					
Maximum Flows	7/29/2013 12:15			104.90			

August 2013						
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)
08/01/13	122.8	176,788	19.4	27,988	1.33	0.00
08/02/13	114.4	164,778	17.6	25,386	0.00	0.00
08/03/13	110.0	158,376	18.9	27,241	0.00	0.00
08/04/13	116.9	168,404	20.3	29,197	0.00	0.00
08/05/13	110.1	158,571	17.3	24,956	0.00	0.00
08/06/13	129.4	186,305	16.5	23,738	0.00	0.00
08/07/13	139.3	200,617	17.9	25,750	0.06	0.00
08/08/13	133.6	192,350	17.0	24,451	0.35	0.00
08/09/13	122.6	176,545	19.0	27,329	0.00	0.00
08/10/13	112.3	161,704	18.2	26,150	0.00	0.00
08/11/13	116.4	167,615	21.6	31,096	0.00	0.00
08/12/13	106.0	152,579	17.8	25,652	0.00	0.00
08/13/13	270.5	389,569	25.7	36,983	2.02	0.00
08/14/13	130.0	187,148	20.3	29,267	0.00	0.00
08/15/13	121.3	174,720	17.5	25,239	0.00	0.00
08/16/13	119.9	172,641	18.3	26,300	0.00	0.00
08/17/13	114.2	164,409	20.9	30,158	0.00	0.00
08/18/13	121.6	175,145	21.0	30,274	0.03	0.00
08/19/13	109.2	157,178	18.2	26,175	0.00	0.00
08/20/13	106.5	153,407	18.1	26,112	0.00	0.00
08/21/13	107.4	154,649	18.7	26,910	0.00	0.00
08/22/13	112.4	161,866	18.8	27,027	1.08	0.00
08/23/13	108.1	155,592	17.4	25,065	0.00	0.00
08/24/13	109.9	158,229	19.1	27,510	0.00	0.00
08/25/13	122.7	176,690	22.6	32,535	0.00	0.00
08/26/13	108.0	155,459	17.9	25,717	0.00	0.00
08/27/13	107.7	155,044	19.1	27,566	0.00	0.00
08/28/13	129.2	186,083	18.2	26,179	1.04	0.00
08/29/13	125.1	180,160	17.6	25,398	0.00	0.00
08/30/13	126.5	182,219	19.9	28,626	0.00	0.00
08/31/13	122.2	175,930	19.3	27,855	0.00	0.00
Monthly Averages		176,799		27,414		
Monthly Totals		5,480,767		849,829		
Maximum Flows	8/13/2013 7:30	796.80				
Maximum Flows	8/26/2013 20:30			75.97		

SEPTEMBER 2013						
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)
09/01/13	117.3	168,896	19.2	27,677	0.00	0.00
09/02/13	137.8	198,464	24.1	34,674	1.89	0.00
09/03/13	142.7	205,534	18.6	26,715	0.00	0.00
09/04/13	156.5	225,427	18.1	26,117	0.00	0.00
09/05/13	142.2	204,735	17.4	25,116	0.00	0.00
09/06/13	134.4	193,520	18.0	25,873	0.00	0.00
09/07/13	139.6	201,026	20.5	29,525	0.00	0.00
09/08/13	159.1	229,038	24.8	35,716	0.01	0.00
09/09/13	115.7	166,591	18.4	26,427	0.00	0.00
09/10/13	97.7	140,665	17.9	25,816	0.00	0.00
09/11/13	99.8	143,750	18.0	25,961	0.00	0.00
09/12/13	94.9	136,604	19.1	27,574	0.03	0.00
09/13/13	88.0	126,648	17.5	25,267	0.16	0.00
09/14/13	93.2	134,236	20.0	28,802	0.00	0.00
09/15/13	102.8	148,048	22.9	32,944	0.00	0.00
09/16/13	92.2	132,703	19.2	27,671	0.05	0.00
09/17/13	87.8	126,410	17.7	25,505	0.00	0.00
09/18/13	87.1	125,369	18.9	27,180	0.00	0.00
09/19/13	86.4	124,404	17.6	25,279	0.00	0.00
09/20/13	86.7	124,907	18.2	26,240	0.00	0.00
09/21/13	94.7	136,352	22.6	32,522	1.05	0.00
09/22/13	108.2	155,739	23.9	34,448	0.07	0.00
09/23/13	91.8	132,241	18.4	26,523	0.00	0.00
09/24/13	95.6	137,698	17.8	25,563	0.00	0.00
09/25/13	90.3	130,035	17.4	25,113	0.00	0.00
09/26/13	86.9	125,089	16.6	23,915	0.00	0.00
09/27/13	85.1	122,592	16.8	24,166	0.00	0.00
09/28/13	90.0	129,561	18.1	26,086	0.00	0.00
09/29/13	100.3	144,448	21.8	31,420	0.00	0.00
09/30/13	88.1	126,873	17.2	24,754	0.00	0.00

Monthly Averages

153,253

27,686

Monthly Totals

4,597,602

830,588

Maximum Flows

9/4/2013 7:00

333.85

Maximum Flows

9/8/2013 19:45

85.89

October 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
10/01/13	86.1	123,984	17.9	25,814	0.00	0.00	
10/02/13	83.4	120,036	15.9	22,845	0.00	0.00	
10/03/13	86.1	123,946	16.7	23,996	0.00	0.00	
10/04/13	83.4	120,146	17.7	25,460	0.00	0.00	
10/05/13	91.7	132,079	18.4	26,468	0.01	0.00	
10/06/13	98.4	141,723	21.2	30,526	0.00	0.00	
10/07/13	87.3	125,760	18.5	26,590	0.28	0.00	
10/08/13	86.4	124,479	17.0	24,442	0.00	0.00	
10/09/13	83.2	119,788	17.5	25,168	0.00	0.00	
10/10/13	98.9	142,475	19.7	28,319	0.35	0.00	
10/11/13	241.3	347,469	39.9	57,438	1.67	0.00	
10/12/13	123.8	178,250	24.7	35,516	0.01	0.00	
10/13/13	110.3	158,846	24.4	35,169	0.00	0.00	
10/14/13	96.4	138,769	19.4	27,972	0.00	0.00	
10/15/13	91.4	131,546	18.1	26,097	0.00	0.00	
10/16/13	88.6	127,538	19.9	28,720	0.00	0.00	
10/17/13	89.5	128,935	19.1	27,525	0.01	0.00	
10/18/13	87.0	125,210	18.1	26,046	0.00	0.00	
10/19/13	90.6	130,441	20.7	29,809	0.07	0.00	
10/20/13	103.6	149,145	22.5	32,396	0.00	0.00	
10/21/13	92.3	132,976	19.2	27,613	0.00	0.00	
10/22/13	87.7	126,316	17.9	25,796	0.00	0.00	
10/23/13	89.1	128,267	17.6	25,296	0.01	0.00	
10/24/13	90.7	130,617	18.4	26,550	0.00	0.00	
10/25/13	89.8	129,299	17.9	25,752	0.00	0.00	
10/26/13	91.9	132,264	19.6	28,208	0.00	0.00	
10/27/13	104.6	150,569	22.2	31,972	0.00	0.00	
10/28/13	90.7	130,595	17.8	25,592	0.00	0.00	
10/29/13	92.9	133,734	17.4	24,989	0.00	0.00	
10/30/13	89.5	128,923	17.8	25,655	0.02	0.00	
10/31/13	84.9	122,323	17.2	25,756	0.02	0.00	
Monthly Averages		139,885		28,371			
Monthly Totals		4,336,444		879,496			
Maximum Flows	10/11/2013 8:00	519.50					
Maximum Flows	10/11/2013 18:30			92.99			

November 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
11/01/13	88.8	127,848	17.3	24,956	0.19	0.00	
11/02/13	97.8	140,877	19.8	28,498	0.00	0.00	
11/03/13	109.9	158,233	22.7	32,702	0.00	0.00	
11/04/13	87.6	126,138	16.9	24,340	0.00	0.00	
11/05/13	85.0	122,441	17.3	24,920	0.00	0.00	
11/06/13	84.6	121,781	17.6	25,411	0.00	0.00	
11/07/13	85.0	122,460	17.6	25,329	0.05	0.00	
11/08/13	85.3	122,882	17.3	24,861	0.00	0.00	
11/09/13	90.0	129,580	18.9	27,190	0.00	0.00	
11/10/13	99.4	143,154	22.6	32,576	0.00	0.00	
11/11/13	90.8	130,757	17.9	25,835	0.00	0.00	
11/12/13	85.9	123,642	16.6	23,845	0.00	0.00	
11/13/13	97.6	140,572	17.6	25,280	0.00	0.00	
11/14/13	91.6	131,925	17.0	24,469	0.00	0.00	
11/15/13	87.5	126,053	16.0	23,033	0.00	0.00	
11/16/13	90.6	130,477	18.6	26,751	0.00	0.00	
11/17/13	99.2	142,796	21.3	30,600	0.00	0.00	
11/18/13	86.2	124,143	17.1	24,602	0.18	0.00	
11/19/13	92.8	133,674	16.3	23,532	0.00	0.00	
11/20/13	90.8	130,811	15.9	22,842	0.00	0.00	
11/21/13	86.6	124,768	15.8	22,715	0.00	0.00	
11/22/13	82.3	118,515	15.5	22,267	0.03	0.00	
11/23/13	90.4	130,157	18.8	27,101	0.00	0.00	
11/24/13	100.1	144,175	20.5	29,482	0.00	0.00	
11/25/13	93.4	134,542	16.9	24,266	0.00	0.00	
11/26/13	92.8	133,651	18.3	26,318	0.72	0.00	
<b>11/27/13</b>	<b>135.0</b>	<b>194,463</b>	<b>31.1</b>	<b>44,762</b>	<b>1.56</b>	0.00	
11/28/13	102.4	147,449	23.6	33,996	0.00	0.00	
11/29/13	89.3	128,658	20.0	28,829	0.00	0.00	
11/30/13	91.9	132,348	20.0	28,867	0.00	0.00	

Monthly Averages

133,966

27,006

Monthly Totals

4,018,966

810,172

Maximum Flows 11/3/2013 9:45

263.87

Maximum Flows 11/20/2013 20:00

82.37



DECEMBER 2013							
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	Snowfall (in)	
12/01/13	99.9	143,835	22.8	32,787	0.00	0.00	
12/02/13	87.7	126,347	18.4	26,448	0.00	0.00	
12/03/13	89.2	128,446	17.1	24,693	0.00	0.00	
12/04/13	93.4	134,497	17.9	25,737	0.00	0.00	
12/05/13	94.4	135,902	18.3	26,289	0.00	0.00	
12/06/13	105.4	151,840	23.7	34,117	0.77	0.00	
12/07/13	113.4	163,273	27.5	39,655	0.07	0.00	
12/08/13	104.5	150,444	24.5	35,239	0.57	8.60	
12/09/13	107.1	154,261	27.0	38,860	0.99	0.00	
12/10/13	102.1	146,987	24.2	34,801	0.22	2.20	
12/11/13	103.5	148,982	19.3	27,852	0.00	0.00	
12/12/13	104.3	150,231	19.6	28,281	0.00	0.00	
12/13/13	102.8	148,025	18.8	27,133	0.00	0.00	
12/14/13	115.3	165,990	23.1	33,210	0.70	0.30	
12/15/13	141.4	203,674	30.9	44,556	0.07	0.00	
12/16/13	116.2	167,345	20.3	29,229	0.00	0.00	
12/17/13	115.1	165,713	20.2	29,090	0.06	0.10	
12/18/13	107.9	155,435	19.6	28,258	0.00	0.00	
12/19/13	108.4	156,129	20.4	29,376	0.00	0.00	
12/20/13	108.3	155,954	20.3	29,253	0.00	0.00	
12/21/13	131.6	189,571	30.3	43,578	0.00	0.00	
12/22/13	137.9	198,617	29.5	42,442	0.05	0.00	
12/23/13	163.6	235,545	30.3	43,621	0.50	0.00	
12/24/13	140.9	202,943	26.8	38,574	0.00	0.00	
12/25/13	120.2	173,040	23.6	33,943	0.00	0.00	
12/26/13	124.1	178,650	22.5	32,407	0.00	0.00	
12/27/13	119.4	171,936	22.7	32,690	0.00	0.00	
12/28/13	119.1	171,466	23.7	34,147	0.00	0.00	
12/29/13	157.5	226,865	31.1	44,841	1.19	0.00	
12/30/13	135.6	195,220	24.4	35,086	0.00	0.00	
12/31/13	125.2	180,263	23.2	33,341	0.00	0.00	

Monthly Averages

167,014

33,533

Monthly Totals

5,177,424

1,039,534

Maximum Flows 12/23/2013 11:00

319.01

Maximum Flows 12/29/2013 12:30

86.56

1.19 = Water Equivalent of Snowfall

	<b>Sadsbury PS Max</b>		<b>Sandy Hill Max</b>	
8/13/2013 7:30	796.8			
6/10/2013 6:45	629.5			
6/7/2013 18:15			97.27	
10/11/2013 18:30			92.99	
Max GPD (8/13)		389,569		
Max GPD (10/11)				57,438

**W.G. MALDEN**

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

**\*\*\*SERVICE REPORT\*\*\***

HERB MCCOMBY  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 6/10/2013  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

---

**\*WORK PERFORMED\***

**CLEANED EQUIPMENT:** X      **PRIMARY:** X

**\*RECORDER CALIBRATION\***    **CHECKED AT:** 0, 25, 50, 75 & 100%  
**ERROR:** +1%      **CORRECTED ACCURACY:** ± 1%

**\*TOTALIZER CALIBRATION\***    **CHECKED AT:** OPERATING RATE  
**ERROR:** 0%      **CORRECTED ACCURACY:** ± 1%

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
**ERROR:** 0%      **CORRECTED ACCURACY:** ± 1%

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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DENNIS  
copies:

**PERSON SEEN:** HAVE KEY

6/14/13

6/14/13

**W.G. MALDEN**

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

**\*\*\*SERVICE REPORT\*\*\***

HERB MCCOMBY  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 9/9/2013  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

---

**\*WORK PERFORMED\***

**CLEANED EQUIPMENT:** X     **PRIMARY:** X

**\*RECORDER CALIBRATION\*** CHECKED AT: 0, 25, 50, 75 & 100%  
**ERROR:** -1%     **CORRECTED ACCURACY:** ± 1%

**\*TOTALIZER CALIBRATION\*** CHECKED AT: OPERATING RATE  
**ERROR:** 0%     **CORRECTED ACCURACY:** ± 1%

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
**ERROR:** +15%     **CORRECTED ACCURACY:** ± 1%

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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DENNIS  
copies:

**PERSON SEEN:** HAVE KEY

E. [unclear]  
9-23-13  
9-23-13



**CHAPTER 94**  
**MUNICIPAL WASTELOAD MANAGEMENT**  
**2012 ANNUAL REPORT**  
**SADSBURY TOWNSHIP, CHESTER COUNTY, PA**  
**FOR THE**  
**PENNSYLVANIA AMERICAN WATER COMPANY**  
**COATESVILLE SEWERAGE SYSTEM**

**MARCH 2013**

Prepared By:

Herbert E. MacCombie, Jr., P.E.  
Consulting Engineers and Surveyors, Inc.  
P.O. Box 118  
Broomall, PA 19008

PENNSYLVANIA-AMERICAN WATER COMPANY  
 COATESVILLE DISTRICT  
 2012 WASTELOAD MANAGEMENT REPORT SURVEY

Municipality: **SADSBURY TOWNSHIP**

Information Furnished By:

Date: March 27, 2013

Municipality / Engineering Company: Herbert E. MacCombie, Jr. P.E.  
 Consulting Engineers and Surveyors, Inc.

Name: James W. MacCombie, P.E., P.L.S.

Address: P.O. Box 118  
 Broomall, PA 19008

Phone: 610-356-9550 Fax: 610-356-5032

E-Mail Address: [hem.engineers@verizon.net](mailto:hem.engineers@verizon.net)

1. Total Present Number of EDU's connected to PAWC system:

Residential	971
Commercial	89
Industrial	0

2. Total EDU's connected to PAWC system during 2012

Residential	63
Commercial	0
Industrial	0

3. Projections for future additional EDU's to be connected to PAWC system. These projections should reflect what is actually anticipated to be constructed and placed in service:

Year	Residential	Commercial	Industrial	Total EDU's
2013	60	10	0	70
2014	96	10	0	106
2015	30	20	2	52
2016	20	20	2	42
2017	51	20	2	73
Beyond 2017	310	23	7	340
<b>Total</b>	<b>1,538</b>	<b>192</b>	<b>13</b>	<b>1,743</b>

4. Sewer extensions constructed during 2012 that contributed flows to PAWC system:

Project / Development Name	Length & Diameter of Sewer Completed	Length and Diameter of Sewer Remaining	Total EDU's Completed	Total EDU's Remaining

5. Proposed Projects which shall require sewer extensions that will contribute flows to PAWC system but are not yet constructed.

Project / Development Name	Length & Diameter of Sewer Proposed	Total EDU's Proposed	Start of Construction (Year)
Sadsbury Commons	Combination Gravity & Forcemain	120	2013

6. Please provide discussion on the following:

a.) Sewer System Flow Monitoring:

P&B Maintenance Company of Essington, PA is currently under contract with Sadsbury Township to monitor Pump Station and Meter on a regular basis. The Township Engineer monitors flows on a regular basis. Currently the only flow meter readings are from a Mag Meter located along the force main discharge from the pumps at the Pump Station (effluent flow). It is required by Chapter 94 to report on influent flow to evaluate Pump Station hydraulic loading and for determining peaking factors for projected flows. Since the only flow data currently available are the Pump Station discharge flow meter readings, these readings were used to prepare the 2012 report and assumptions were made for projected flows. Using the discharge flow readings would yield inaccurately high peaking factors and falsely indicate hydraulic overloading of the pump station, which is a fairly new station. There is ongoing discussion with the Township regarding installation of an influent flow meter at this station. The Township has placed the influent meter in the 2013 budget. It is anticipated that the influent meter will be installed and operational during 2013. The Township is in the process of evaluating possible Stottsville Pump Station upgrades to meet future demands while at the same time identifying sources of I/I.

b.) Sewer System Maintenance:

Sadsbury Township has a contract with P&B Maintenance Company for Pump Station maintenance. The Township will contract out with local contractors for major repairs.



c.) Sewer System I&I Program:

The Township reviews flows on a regular basis in order to keep a watchful eye on potential I/I. The Township Road Crew is available on a continual basis for routine repairs. Major repairs will be performed by local contractors as the need arises. Currently, the Lincoln Crest Mobile Home Park has been identified as a source of inflow as well as several manholes along Route 372 due to the relocation of a storm sewer line by PennDOT. The Township is monitoring the flows from the Lincoln Crest Mobile Home Park on a regular basis and is working with the owner of the mobile home park to identify and remedy an apparent inflow issue. Flows from the mobile home park continue to spike during rainfall events greater than one (1) inch. Lincoln Crest has received Conditional Final Land Development approval from the Township to expand the park with additional 50 units. The park currently has 125 existing connections. Improvements associated with the expansion should curtail inflow issues. In addition, the Township is in the process of investigation another possible source of additional inflow that may be attributed to users within the Bellaire Business Park. The Township is in the process of monitoring their sewage flow and water usage to determine if there is an inflow issue.

7. Please provide discussion of the condition of your sewer system:

- a.) Portions where conveyance capacity is being exceeded or will be exceeded in the next 5 years:

The Sanitary Sewer System is in Good Working Condition and no exceedances are anticipated in the next five years.

- b.) Proposed projects to increase conveyance capacity, i.e. repair, rehabilitation, new construction:

As stated in 6(a), the Township is in the process of evaluating the possible need to upgrade of the Stottsville Pump Station in order to provide for a capacity increase for flows from developments within West Caln Township.

8. Please provide data and discussion of your sewer flow:

Metering Point or Pump Station Name	Agreement or Rated Capacity <sup>1</sup> (gpm)	2012 Average Daily Flow (gpm)*	2013 Projected Average Daily Flow (gpm)*	2017 Projected Average Daily Flow (gpm)*
Stottsville Pump Station	1,008,000 gpd (700 gpm)	160,472 gpd (111 gpm)	199,472 gpd (139 gpm)	224,722 gpd (156 gpm)

\* Based on Average Annual Flow

1. Excluding Capacity of Backup Pump = Maximum Pump Rate

a.) Other discussion or information:

The existing Stottsville Pump Station has Two (2) alternating pumps with a rated capacity of 700 gpm each. The pump station is in good condition and is more than capable of handling the projected 5-year flow of 156 gpm. Beginning on June 28<sup>th</sup> the Pump Station Meter and Data Logger lost data through July 6<sup>th</sup>. PAWC indicated that the meter lost programming and reverted back to factory default programming, likely due to a storm. The data for this time period could not be recovered. Comparison of rainfall events greater than one (1) inch and flow at the pump station seem to indicate a direct correlation at time, yet other times the station appears to be unaffected by significant rainfall events.

**THIS SECTION IS NOT APPLICABLE TO SADBURY TOWNSHIP**

9. Please provide a discussion of the industrial waste discharged into your system:

a.) Date of adoption of the ordinance or regulation governing industrial waste discharges into your system:

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b.) Discussion of program for the surveillance and monitoring of the industrial waste discharges into your system:

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c.) Discussion of specific problems in your sewer system, known or suspected to be caused by industrial waste discharges within the past 5 years:

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	Pump Station	
	Volume (Gallons)	ADF (GPD)
Jan-12	5,439,015	175,452
Feb-12	4,382,667	151,126
Mar-12	4,984,917	160,804
Apr-12	4,601,651	153,388
May-12	5,587,161	180,231
Jun-12	4,810,830	160,361
Jul-12	4,268,700	137,700
Aug-12	4,710,853	151,963
Sep-12	4,699,769	156,659
Oct-12	5,292,544	170,727
Nov-12	4,712,376	157,079
Dec-12	5,242,425	169,110
<b>TOTAL</b>	<b>58,732,908</b>	<b>160,472 GPD</b>
		<b>111.4 GPM</b>

<b>160,472</b>	GPD - Annual Average Daily Flow (ADF)
<b>6,686</b>	GPH - Annual Average Hourly Flow (AHF)
<b>111</b>	GPM - Annual Average Flow per Minute (AFM)

<b>377,708</b>	GPD - Maximum Daily Flow (MDF) October 29, 2012
<b>24,002</b>	GPH - Peak Hourly Flow (PHF) June 2, 2012 between 12:00 AM and 1:00 AM
<b>400</b>	GPM - Peak Hourly Flow (PHF) June 2, 2012 between 12:00 AM and 1:00 AM

<b>2.35</b>	Current MDF Peaking Factor = (MDF/ADF)
<b>3.59</b>	Current PHF Peaking Factor = (PHF/AHF)

<b>3.50</b>	Current Instantaneous Flow Peaking Factor = (GPM PHF/AFM) From the Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance, last revised March 24, 1999.
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<b>390</b>	GPM - Peak Instantaneous Flow (PIF)
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<b>Pump Station</b>		
	<b>Volume (Gallons)</b>	<b>ADF (GPD)</b>
<b>Jan-12</b>	5,439,015	175,452
<b>Feb-12</b>	4,382,667	151,126
<b>Mar-12</b>	4,984,917	160,804
<b>Apr-12</b>	4,601,651	153,388
<b>May-12</b>	5,587,161	180,231
<b>Jun-12</b>	4,810,830	160,361
<b>Jul-12</b>	4,268,700	137,700
<b>Aug-12</b>	4,710,853	151,963
<b>Sep-12</b>	4,699,769	156,659
<b>Oct-12</b>	5,292,544	170,727
<b>Nov-12</b>	4,712,376	157,079
<b>Dec-12</b>	5,242,425	169,110
<b>TOTAL</b>	<b>58,732,908</b>	<b>160,472 GPD</b>
		<b>111.4 GPM</b>

<b>160,472</b>	GPD - Annual Average Daily Flow (ADF)
<b>6,686</b>	GPH - Annual Average Hourly Flow (AHF)
<b>111</b>	GPM - Annual Average Flow per Minute (AFM)

<b>377,708</b>	GPD - Maximum Daily Flow (MDF) October 29, 2012
<b>40,920</b>	GPH - Peak Hourly Flow (PHF) October 29, 2012 between 5:25 PM and 6:25 PM
<b>687</b>	GPM - Peak Instantaneous Flow (PIF) October 29, 2012 @ 6:10 pm

<b>2.35</b>	Current MDF Peaking Factor = (MDF/ADF)
<b>6.12</b>	Current PHF Peaking Factor = (PHF/AHF)
<b>6.17</b>	Current Instantaneous Flow Peaking Factor = (PIF/AFM)

<b>3.50</b>	Current Instantaneous Flow Peaking Factor = (PIF/AFM) From the Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance, last revised March 24, 1999.
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<b>390</b>	GPM - Peak Instantaneous Flow (PIF)
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JANUARY 2012						Snowfall (in)
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	
1/1/2012	123.1	177,302	19.7	28,395	0.02	
1/2/2012	132.2	190,317	19.6	28,252	0.00	
1/3/2012	118.0	169,923	15.0	21,546	0.00	
1/4/2012	112.2	161,548	15.9	22,903	0.01	0.2
1/5/2012	138.1	198,829	15.2	21,947	0.00	
1/6/2012	124.0	178,596	15.3	22,075	0.00	
1/7/2012	127.8	184,057	18.2	26,243	0.00	
1/8/2012	125.9	181,341	19.0	27,422	0.00	
1/9/2012	108.0	155,571	15.6	22,454	0.00	
1/10/2012	107.1	154,264	15.0	21,638	0.00	
1/11/2012	109.4	157,497	15.7	22,561	0.36	
1/12/2012	154.4	222,375	24.6	35,473	0.68	
1/13/2012	122.3	176,079	17.1	24,663	0.05	
1/14/2012	126.6	182,304	19.1	27,481	0.00	
1/15/2012	161.8	233,014	18.2	26,137	0.00	
1/16/2012	142.7	205,518	18.1	26,122	0.03	
1/17/2012	122.0	175,742	17.0	24,504	0.30	
1/18/2012	115.3	166,073	16.1	23,113	0.00	
1/19/2012	111.3	160,203	15.1	21,685	0.00	
1/20/2012	105.6	152,002	14.8	21,287	0.00	
1/21/2012	115.3	165,972	18.9	27,224	0.38	2.3
1/22/2012	122.0	175,700	20.2	29,044	0.00	
1/23/2012	118.4	170,527	19.8	28,512	0.29	
1/24/2012	122.1	175,762	19.1	27,498	0.00	
1/25/2012	110.9	159,710	15.9	22,839	0.00	
1/26/2012	111.2	160,140	15.7	22,579	0.05	
1/27/2012	126.7	182,457	19.8	28,456	0.42	
1/28/2012	121.5	174,956	13.9	19,956	0.00	
1/29/2012	125.1	180,099	17.5	25,150	0.00	
1/30/2012	111.6	160,745	18.1	25,994	0.00	
1/31/2012	104.3	148,642			0.00	
					2.59	
		233,014		35,473		
1/15/2012 10:00	352.0					
1/3/2011 12:15			81.1			

= Water Equivalent of Snowfall

FEBRUARY 2012						Snowfall (In)
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	
2/1/2012	126.5	104,387	16.1	13,295	0.02	
2/2/2012	109.8	158,054	15.9	22,834	0.00	
2/3/2012	106.4	153,213	14.2	20,411	0.00	
2/4/2012	116.9	168,350	16.8	24,175	0.00	
2/5/2012	120.3	173,245	20.0	28,779	0.00	
2/6/2012	104.5	150,471	15.0	21,538	0.00	
2/7/2012	103.6	149,124	15.3	22,004	0.00	
2/8/2012	103.3	148,775	14.7	21,166	0.08	0.3
2/9/2012	101.3	145,848	15.3	21,986	0.00	
2/10/2012	97.7	140,708	14.7	21,182	0.00	
2/11/2012	111.4	160,409	17.9	25,793	0.26	0.9
2/12/2012	115.2	165,837	19.3	27,721	0.00	
2/13/2012	103.7	149,386	15.2	21,854	0.00	
2/14/2012	98.2	141,344	15.1	21,779	0.00	
2/15/2012	99.2	142,789	15.7	22,669	0.00	
2/16/2012	99.9	143,861	16.4	23,632	0.16	
2/17/2012	100.6	144,928	15.6	22,465	0.00	
2/18/2012	104.2	150,049	17.7	25,469	0.00	
2/19/2012	107.4	154,618	18.5	26,678	0.00	
2/20/2012	110.3	158,890	17.5	25,130	0.00	
2/21/2012	96.3	138,640	14.8	21,321	0.00	
2/22/2012	95.9	138,097	15.4	22,139	0.00	
2/23/2012	95.0	136,735	15.8	22,755	0.00	
2/24/2012	96.3	138,635	15.3	22,072	0.29	
2/25/2012	104.2	150,093	18.6	26,729	0.00	
2/26/2012	111.7	160,863	20.3	29,302	0.00	
2/27/2012	98.4	141,766	16.5	23,726	0.00	
2/28/2012	94.4	135,947	15.3	22,055	0.00	
2/29/2012	92.6	76,408	15.4	12,708	1.03	
					1.84	
		173,245		29,302		
2/18/2012 12:30	264.6					
2/2/2012 7:15			139.3			

= Water Equivalent of Snowfall

MARCH 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)
3/1/2012	140.9	135,299	18.6	17,840	0.02
3/2/2012	142.3	204,897	14.6	20,954	0.18
3/3/2012	140.1	201,814	20.7	29,831	0.12
3/4/2012	131.6	189,517	20.2	29,081	0.00
3/5/2012	109.5	157,613	16.3	23,446	0.00
3/6/2012	103.1	148,500	17.4	25,110	0.00
3/7/2012	106.3	153,072	15.5	22,336	0.00
3/8/2012	106.6	153,496	15.5	22,325	0.00
3/9/2012	101.0	145,479	14.8	21,350	0.02
3/10/2012	106.6	153,492	18.1	26,006	0.00
3/11/2012	119.8	172,461	20.7	29,864	0.00
3/12/2012	132.3	190,537	15.2	21,852	0.00
3/13/2012	141.5	203,712	15.2	21,873	0.08
3/14/2012	121.8	175,358	15.3	22,044	0.00
3/15/2012	121.6	175,126	15.3	22,007	0.00
3/16/2012	112.1	161,434	15.0	21,604	0.00
3/17/2012	110.7	159,362	17.8	25,632	0.00
3/18/2012	116.4	167,565	20.1	28,958	0.00
3/19/2012	101.4	145,964	15.3	22,045	0.00
3/20/2012	91.7	132,104	15.0	21,570	0.00
3/21/2012	93.9	135,192	15.3	21,998	0.01
3/22/2012	93.8	135,011	15.3	21,993	0.00
3/23/2012	95.5	137,523	15.5	22,339	0.00
3/24/2012	101.2	145,659	17.9	25,752	0.08
3/25/2012	104.5	150,536	18.9	27,221	0.01
3/26/2012	94.1	135,468	15.6	22,488	0.00
3/27/2012	90.6	130,504	15.7	22,564	0.00
3/28/2012	99.5	143,283	14.8	21,305	0.00
3/29/2012	118.7	170,985	14.9	21,399	0.00
3/30/2012	113.6	163,611	15.0	21,641	0.00
3/31/2012	60.6	29,076	10.2	4,889	0.27
					0.79
		204,897		29,864	
3/13/2012 6:45	319.3				
3/6/2012 8:00			316.1		

APRIL 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)
4/1/2012	149.0	134,067	26.0	23,375	0.17
4/2/2012	100.0	144,040	16.8	24,122	0.16
4/3/2012	98.7	142,163	15.6	22,462	0.00
4/4/2012	101.5	146,195	14.8	21,287	0.00
4/5/2012	102.3	147,258	15.2	21,869	0.00
4/6/2012	103.1	148,489	16.8	24,135	0.00
4/7/2012	111.6	160,667	18.0	25,974	0.00
4/8/2012	108.2	155,741	19.5	28,115	0.00
4/9/2012	96.4	138,872	17.1	24,617	0.00
4/10/2012	92.7	133,451	15.2	21,849	0.00
4/11/2012	92.1	132,605	15.6	22,454	0.00
4/12/2012	93.7	134,911	15.4	22,165	0.00
4/13/2012	88.7	127,666	14.4	20,691	0.00
4/14/2012	96.0	138,183	17.0	24,551	0.00
4/15/2012	109.8	158,058	20.6	29,663	0.04
4/16/2012	88.7	127,669	15.7	22,648	0.00
4/17/2012	87.4	125,916	16.0	23,046	0.00
4/18/2012	94.4	135,913	16.0	23,069	0.00
4/19/2012	91.2	131,295	15.8	22,808	0.00
4/20/2012	99.0	142,629	15.2	21,918	0.00
4/21/2012	129.6	186,574	19.4	27,913	0.15
4/22/2012	205.4	295,764	26.2	37,748	1.87
4/23/2012	168.3	242,394	25.3	36,413	0.10
4/24/2012	128.3	184,799	17.5	25,218	0.00
4/25/2012	110.8	159,558	14.8	21,291	0.00
4/26/2012	97.7	140,700	15.0	21,659	0.06
4/27/2012	93.8	135,104	15.3	22,044	0.00
4/28/2012	99.3	143,030	18.1	26,011	0.00
4/29/2012	106.2	152,981	19.7	28,423	0.00
4/30/2012	55.0	25,572	12.3	5,736	0.00
					2.55
		295,764		37,748	
4/22/2012 22:15	480.4				
4/19/2012 20:15			79.0		



MAY 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (In)
5/1/2012	109.8	98,794	17.2	15,498	0.25
5/2/2012	91.7	132,116	15.8	22,718	0.08
5/3/2012	103.2	148,672	16.9	24,301	0.08
5/4/2012	101.0	145,446	15.7	22,595	0.08
5/5/2012	122.2	175,934	22.5	32,358	0.00
5/6/2012	115.5	166,257	20.6	29,651	0.00
5/7/2012	98.9	142,385	15.7	22,559	0.00
5/8/2012	95.8	137,929	21.4	30,772	0.02
5/9/2012	98.2	141,356	17.1	24,657	0.50
5/10/2012	96.0	138,191	17.6	25,381	0.07
5/11/2012	92.5	133,140	15.3	21,973	0.00
5/12/2012	97.9	140,969	17.8	25,684	0.00
5/13/2012	100.0	143,989	19.1	27,517	0.00
5/14/2012	93.9	135,189	16.8	24,136	0.06
5/15/2012	112.7	162,281	21.4	30,784	0.82
5/16/2012	98.6	141,999	16.8	24,140	0.00
5/17/2012	99.2	142,918	16.7	24,074	0.00
5/18/2012	106.7	153,659	14.8	21,352	0.00
5/19/2012	137.4	197,869	19.0	27,332	0.00
5/20/2012	146.4	210,796	20.2	29,149	0.00
5/21/2012	139.7	201,133	15.3	22,069	0.25
5/22/2012	144.6	208,183	16.4	23,590	0.16
5/23/2012	154.9	223,100	15.5	22,327	0.00
5/24/2012	166.0	238,972	15.7	22,655	0.87
5/25/2012	165.2	237,842	16.1	23,143	0.00
5/26/2012	169.1	243,504	16.4	23,687	0.00
5/27/2012	167.7	241,465	17.9	25,756	0.00
5/28/2012	184.4	265,522	20.5	29,477	0.00
5/29/2012	170.7	245,825	16.1	23,120	0.11
5/30/2012	163.2	235,015	16.6	23,929	0.00
5/31/2012	125.1	78,812	14.0	8,814	0.00
					3.35
		265,522		32,358	
5/29/2012 21:15	421.6				
5/8/2012 9:00			500.3		

JUNE 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)
6/1/2012	161.6	232,732	17.4	24,992	0.71
6/2/2012	192.3	276,889	22.9	33,013	0.06
6/3/2012	144.4	207,986	20.1	28,882	0.05
6/4/2012	119.2	171,599	16.7	23,982	0.40
6/5/2012	109.4	157,558	16.9	24,347	0.00
6/6/2012	98.4	141,693	15.7	22,559	0.00
6/7/2012	91.9	132,349	15.4	22,135	0.00
6/8/2012	91.9	132,297	16.1	23,164	0.00
6/9/2012	94.0	135,428	17.8	25,562	0.00
6/10/2012	100.6	144,901	20.0	28,844	0.00
6/11/2012	98.4	141,710	15.5	22,335	0.00
6/12/2012	98.7	142,148	18.0	25,928	0.99
6/13/2012	96.8	139,321	16.5	23,794	0.00
6/14/2012	95.6	137,698	15.5	22,387	0.00
6/15/2012	98.5	141,882	15.7	22,629	0.00
6/16/2012	129.7	186,808	17.5	25,143	0.00
6/17/2012	129.6	186,643	17.3	24,856	0.00
6/18/2012	120.2	173,105	16.3	23,469	0.00
6/19/2012	121.5	174,895	16.7	23,982	0.00
6/20/2012	104.8	150,899	15.6	22,436	0.00
6/21/2012	90.9	130,900	16.0	23,070	0.00
6/22/2012	86.5	124,546	15.9	22,951	0.55
6/23/2012	108.2	155,777	16.7	24,108	0.00
6/24/2012	129.8	186,937	18.4	26,494	0.00
6/25/2012	106.7	153,677	15.8	22,738	0.00
6/26/2012	96.8	139,443	15.5	22,294	0.00
6/27/2012	90.8	130,695	15.5	22,368	0.00
6/28/2012	49.0	11,766	4.0	957	0.00
6/29/2012	0.0	0	14.7	21,170	0.14
6/30/2012	0.0	0	0.6	843	0.04
					2.94
		276,889		33,013	
6/2/2012 0:30	521.5				
6/5/2012 13:15			82.1		

JULY 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (In)
7/1/2012	0.0	0	23.0	18,942	0.00
7/2/2012	0.0	0	16.4	23,624	0.00
7/3/2012	0.0	0	13.9	20,015	0.00
7/4/2012	0.0	0	19.0	27,322	0.00
7/5/2012	0.0	0	18.0	25,908	0.00
7/6/2012	103.2	66,566	16.4	23,581	0.00
7/7/2012	91.1	131,184	17.5	25,204	0.00
7/8/2012	98.6	141,996	19.1	27,531	0.00
7/9/2012	92.8	133,700	16.5	23,712	0.00
7/10/2012	91.0	131,005	15.0	21,611	0.03
7/11/2012	88.9	127,970	14.9	21,422	0.00
7/12/2012	92.9	133,746	15.1	21,717	0.00
7/13/2012	89.2	128,376	15.5	22,284	0.00
7/14/2012	105.0	151,222	18.6	26,846	0.45
7/15/2012	134.9	194,320	19.6	28,261	0.24
7/16/2012	108.1	155,630	16.9	24,355	0.00
7/17/2012	93.6	134,796	14.6	21,053	0.00
7/18/2012	89.7	129,232	16.2	23,332	0.00
7/19/2012	100.9	145,357	15.7	22,602	0.00
7/20/2012	98.8	142,291	17.1	24,591	0.26
7/21/2012	91.5	131,691	17.0	24,418	0.00
7/22/2012	98.2	141,366	18.2	26,205	0.00
7/23/2012	94.3	135,830	15.4	22,212	0.00
7/24/2012	92.1	132,669	16.6	23,845	0.00
7/25/2012	91.3	131,498	15.5	22,287	0.00
7/26/2012	90.9	130,967	16.5	23,717	0.46
7/27/2012	93.9	135,153	15.0	21,648	0.00
7/28/2012	99.3	142,955	17.1	24,596	0.04
7/29/2012	103.3	148,743	18.4	26,546	0.00
7/30/2012	94.7	136,308	15.8	22,722	0.00
7/31/2012	85.8	70,761	13.5	11,098	0.00
					1.48
		194,320		28,261	
7/15/2012 12:30	280.0				
7/18/2012 9:00			105.3		

AUGUST 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)
8/1/2012	121.6	76,600	17.6	11,070	0.43
8/2/2012	108.2	155,791	14.7	21,238	0.00
8/3/2012	114.1	164,355	15.0	21,574	0.03
8/4/2012	103.6	149,225	16.5	23,798	0.00
8/5/2012	116.7	168,022	18.4	26,547	0.90
8/6/2012	101.8	146,658	16.6	23,887	0.00
8/7/2012	101.3	145,850	16.2	23,397	0.00
8/8/2012	98.9	142,405	16.6	23,926	0.00
8/9/2012	95.3	137,239	16.5	23,702	0.00
8/10/2012	98.1	141,241	17.7	25,456	1.10
8/11/2012	98.0	141,077	18.9	27,227	0.07
8/12/2012	101.3	145,867	19.7	28,430	0.00
8/13/2012	95.1	136,896	15.1	21,785	0.00
8/14/2012	101.5	146,140	16.4	23,589	0.39
8/15/2012	100.2	144,306	15.0	21,567	0.59
8/16/2012	93.5	134,571	14.7	21,106	0.00
8/17/2012	93.1	134,071	14.8	21,245	0.42
8/18/2012	99.8	143,659	16.8	24,232	0.43
8/19/2012	107.4	154,599	18.2	26,216	0.00
8/20/2012	98.5	141,911	15.0	21,671	0.00
8/21/2012	103.0	148,310	15.7	22,659	0.00
8/22/2012	100.4	144,571	16.2	23,328	0.00
8/23/2012	96.6	139,054	15.5	22,347	0.00
8/24/2012	105.2	151,484	15.9	22,947	0.00
8/25/2012	109.4	157,492	17.0	24,408	0.00
8/26/2012	116.6	167,854	20.1	28,938	0.00
8/27/2012	113.3	163,102	15.7	22,576	0.84
8/28/2012	115.9	166,947	16.4	23,561	0.17
8/29/2012	123.9	178,399	15.4	22,116	0.00
8/30/2012	128.9	185,641	15.7	22,548	0.00
8/31/2012	97.1	58,245	12.9	7,760	0.00
					5.37
		185,641		28,938	
8/30/2012 21:00	284.6				
8/23/2012 20:15			71.4		

SEPTEMBER 2012					
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)
9/1/2012	139.7	111,083	20.7	16,450	0.00
9/2/2012	101.7	146,503	16.0	23,090	0.16
9/3/2012	115.9	166,887	20.4	29,420	0.40
9/4/2012	119.9	172,597	16.2	23,334	3.12
9/5/2012	115.0	165,548	17.1	24,637	0.02
9/6/2012	106.0	152,696	14.7	21,130	0.00
9/7/2012	100.1	144,207	16.2	23,268	0.00
9/8/2012	117.1	168,682	18.7	26,992	0.31
9/9/2012	121.0	174,232	19.4	27,984	0.00
9/10/2012	102.0	146,887	15.6	22,458	0.00
9/11/2012	103.2	148,660	15.4	22,120	0.00
9/12/2012	122.3	176,077	15.5	22,265	0.00
9/13/2012	112.9	162,526	14.5	20,926	0.00
9/14/2012	96.5	138,969	15.2	21,917	0.00
9/15/2012	96.5	138,995	17.1	24,622	0.00
9/16/2012	111.6	160,656	20.2	29,060	0.00
9/17/2012	94.7	136,423	16.9	24,280	0.00
9/18/2012	118.9	171,262	18.6	26,800	0.73
9/19/2012	100.8	145,124	17.1	24,655	0.01
9/20/2012	96.0	138,302	15.5	22,343	0.00
9/21/2012	100.5	144,681	15.7	22,578	0.00
9/22/2012	116.3	167,414	17.5	25,135	0.51
9/23/2012	146.4	210,798	21.5	30,986	0.00
9/24/2012	113.8	163,921	15.9	22,840	0.00
9/25/2012	108.6	156,452	15.8	22,707	0.00
9/26/2012	101.8	146,584	15.5	22,353	0.00
9/27/2012	102.0	146,872	16.7	24,099	0.21
9/28/2012	93.5	134,573	14.8	21,290	0.01
9/29/2012	104.0	149,810	17.2	24,719	0.00
9/30/2012	76.6	55,163	14.2	10,209	0.00
					5.48
		210,798		30,986	
9/18/2012 17:45	365.7				
9/5/2012 20:15			75.8		

<b>OCTOBER 2012</b>					
<b>Date</b>	<b>Sadsbury P.S. Average Flow (gpm)</b>	<b>Sadsbury P.S. TOTAL Flow (Gallons)</b>	<b>Sandy Hill P.S. Average Flow (gpm)</b>	<b>Sandy Hill P.S. TOTAL Flow (Gallons)</b>	<b>Rainfall (in)</b>
10/1/2012	96.1	138,367	21.5	9,369	0.00
10/2/2012	99.7	143,527	19.1	27,555	0.07
10/3/2012	99.1	142,731	21.4	30,764	0.00
10/4/2012	96.0	138,176	15.9	22,943	0.01
10/5/2012	102.8	148,067	15.7	22,541	0.00
10/6/2012	111.2	160,132	18.8	27,142	0.00
10/7/2012	119.4	171,934	20.0	28,813	0.17
10/8/2012	117.0	168,450	17.2	24,830	0.02
10/9/2012	127.4	183,429	16.3	23,429	0.03
10/10/2012	133.7	192,480	16.5	23,786	0.00
10/11/2012	129.1	185,857	15.5	22,361	0.00
10/12/2012	111.8	161,016	15.3	22,055	0.00
10/13/2012	112.8	162,412	17.2	24,782	0.00
10/14/2012	129.4	186,401	20.3	29,259	0.00
10/15/2012	119.3	171,841	17.3	24,913	0.06
10/16/2012	115.9	166,925	16.2	23,326	0.00
10/17/2012	110.7	159,446	16.2	23,321	0.00
10/18/2012	113.8	163,891	15.8	22,761	0.00
10/19/2012	108.8	156,739	17.5	25,264	0.37
10/20/2012	106.2	152,987	20.1	28,914	0.00
10/21/2012	110.1	158,494	20.3	29,204	0.00
10/22/2012	93.5	134,675	16.5	23,697	0.00
10/23/2012	89.7	129,143	15.4	22,140	0.00
10/24/2012	96.0	138,258	15.6	22,514	0.00
10/25/2012	94.1	135,446	15.1	21,700	0.00
10/26/2012	91.5	131,825	14.8	21,314	0.00
10/27/2012	106.9	153,898	18.4	26,555	0.00
10/28/2012	126.5	182,113	22.6	32,588	0.41
10/29/2012	279.8	377,708	48.3	69,560	2.68
10/30/2012	209.7	302,034	36.3	52,329	0.26
10/31/2012	125.8	91,821	21.3	15,668	0.00
					4.08
		377,708		69,560	
10/29/2012 18:10	687.3				
10/29/2012 17:00			127.7		

<b>NOVEMBER 2012</b>					
<b>Date</b>	<b>Sadsbury P.S. Average Flow (gpm)</b>	<b>Sadsbury P.S. TOTAL Flow (Gallons)</b>	<b>Sandy Hill P.S. Average Flow (gpm)</b>	<b>Sandy Hill P.S. TOTAL Flow (Gallons)</b>	<b>Rainfall (in)</b>
11/1/2012	131.3	104,399	20.7	16,487	0.00
11/2/2012	115.9	166,936	16.5	23,760	0.00
11/3/2012	117.5	169,189	18.0	25,943	0.00
11/4/2012	118.0	169,917	20.8	29,894	0.00
11/5/2012	100.5	144,688	17.0	24,431	0.00
11/6/2012	93.4	134,432	16.9	24,283	0.00
11/7/2012	97.3	140,051	17.5	25,227	0.39
11/8/2012	93.8	135,108	16.5	23,747	0.01
11/9/2012	90.6	130,475	16.0	23,091	0.00
11/10/2012	100.0	143,968	18.8	27,007	0.00
11/11/2012	111.6	160,771	22.1	31,844	0.00
11/12/2012	95.5	137,453	16.9	24,316	0.00
11/13/2012	106.0	152,667	21.0	30,213	0.14
11/14/2012	95.5	137,553	17.0	24,488	0.00
11/15/2012	100.4	144,628	16.0	22,983	0.00
11/16/2012	99.2	142,833	16.6	23,923	0.00
11/17/2012	115.0	165,629	18.2	26,226	0.00
11/18/2012	116.6	167,975	21.1	30,397	0.00
11/19/2012	95.1	136,989	17.6	25,283	0.00
11/20/2012	96.5	138,972	17.9	25,748	0.00
11/21/2012	101.1	145,524	19.4	27,991	0.00
11/22/2012	112.8	162,497	21.7	31,302	0.00
11/23/2012	136.1	195,960	17.8	25,635	0.00
11/24/2012	158.8	228,616	20.4	29,383	0.00
11/25/2012	140.3	201,979	19.9	28,615	0.00
11/26/2012	111.7	160,802	17.3	24,899	0.00
11/27/2012	112.9	162,565	18.4	26,452	0.51
11/28/2012	107.6	155,010	16.7	24,085	0.00
11/29/2012	110.1	158,554	15.5	22,369	0.00
11/30/2012	75.6	37,421	14.7	7,280	0.00
					1.05
		228,616		31,844	
11/24/2012 11:00	404.2				
11/20/2012 8:30			108.3		

DECEMBER 2012						Snowfall (in)
Date	Sadsbury P.S. Average Flow (gpm)	Sadsbury P.S. TOTAL Flow (Gallons)	Sandy Hill P.S. Average Flow (gpm)	Sandy Hill P.S. TOTAL Flow (Gallons)	Rainfall (in)	
12/1/2012	128.3	101,974	20.5	16,292	0.00	
12/2/2012	111.3	160,342	21.6	31,109	0.01	
12/3/2012	95.2	137,115	17.1	24,681	0.00	
12/4/2012	91.2	131,370	15.5	22,306	0.00	
12/5/2012	92.2	132,830	15.6	22,516	0.01	
12/6/2012	97.3	140,045	15.4	22,164	0.00	
12/7/2012	106.7	153,576	15.5	22,271	0.21	
12/8/2012	122.8	176,896	18.2	26,261	0.17	
12/9/2012	129.7	186,716	22.1	31,811	0.32	
12/10/2012	106.0	152,667	16.2	23,378	0.05	
12/11/2012	98.3	141,529	15.6	22,440	0.09	
12/12/2012	97.2	139,915	15.7	22,548	0.00	
12/13/2012	96.1	138,393	15.2	21,903	0.00	
12/14/2012	98.9	142,362	14.7	21,105	0.00	
12/15/2012	97.4	140,282	17.8	25,651	0.00	
12/16/2012	107.4	154,668	20.3	29,261	0.05	
12/17/2012	101.0	145,442	16.5	23,759	0.04	
12/18/2012	109.6	257,808	16.8	24,193	0.33	
12/19/2012	99.0	142,561	15.2	21,828	0.00	
12/20/2012	101.4	145,966	17.2	24,773	0.30	
12/21/2012	180.5	259,905	26.8	38,653	1.28	
12/22/2012	115.0	165,634	20.7	29,802	0.00	
12/23/2012	111.1	159,962	20.7	29,818	0.00	
12/24/2012	112.1	161,397	20.6	29,673	0.13	0.2
12/25/2012	107.4	154,683	20.6	29,673	0.00	
12/26/2012	138.8	199,843	22.4	32,231	1.18	
12/27/2012	182.1	262,268	23.5	33,870	0.03	
12/28/2012	172.1	247,813	18.2	26,267	0.00	
12/29/2012	167.0	240,426	19.1	27,552	0.22	0.2
12/30/2012	158.1	227,649	20.7	29,797	0.00	
12/31/2012	133.2	189,838	19.8	28,210	0.00	
					4.43	
		262,268		38,653		
12/30/2012 12:00	421.4					
12/21/2012 8:15			77.1			

= Water Equivalent of Snowfall



	Sadsbury PS Max		Sandy Hill Max	
10/29/2012 18:10	687.3			
6/2/2012 0:30	521.5			
5/8/2012 9:00			500.3	
3/6/2012 8:00			316.1	
Max GPD (10/29)		377,708		
Max GPD (10/29)				69,560

**W.G. MALDEN**

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

**\*\*\*SERVICE REPORT\*\*\***

SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 12/6/2012  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

---

**\*WORK PERFORMED\***

**CLEANED EQUIPMENT:** X      **PRIMARY:** X

**\*RECORDER CALIBRATION\***    **CHECKED AT:** 0, 25, 50, 75 & 100%  
**ERROR:** -1%      **CORRECTED ACCURACY:** ± 1%

**\*TOTALIZER CALIBRATION\***    **CHECKED AT:** OPERATING RATE  
**ERROR:** 0%      **CORRECTED ACCURACY:** ± 1%

**\*TRANSMITTER CALIBRATION\***  
**VOLUMETRIC DRAWDOWN CALIBRATION**  
**ERROR:** 0%      **CORRECTED ACCURACY:** ± 1%

---

**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** BOB/ROY  
**copies:**

**PERSON SEEN:** GATE CODE

**Sadsbury Township 2012 Chapter 94 Annual Report  
Projection of EDU Connections and Flows (gpd)**

Project Name	Proposed Use	Location	Plan Status	Current EDUs	Remaining EDUs	TOTAL EDUs	Prior to 2012	2012	2013	2014	2015	2016	2017
Witmer Fire Store	30,000 s.f. Building Expansion	Independence Way	Approved Feb. 2009 - BUILT										
Constable LD	4 SFDUs on Lg. Lots - ON LOT Sewage Disposal	Limestone Road	Approved Mar. 2009	N.A.	N.A.	N.A.							
Sadsburyville Fire Company	Fire Station Expansion	Old Wilmington Rd	ON HOLD - NO EDUs	N.A.	N.A.	N.A.							
Chester County Airport		Rt 30 & Washington Ln	Pending Approval										
York Equity - Lot 6	Office Building	Morris Farm/ Independence Way	ON HOLD										
Sadsbury Commons	500,000 s.f. Shopping Center	Rt 30 & Rt 10	Pending Approval & Act 537 Plan Update										
Sadsbury Commons - Medical Office Building	40,000 sf Medical Office Facility - ON LOT Sewage Disposal	Rt 10 Across from WalMart	Conditional Final Approval - Planning Module Approved, Escrow Posted, Construction Shortly	N.A.	N.A.	N.A.							
Art Hurling	2 Existing Residential EDUs	Maple Avenue	Pending Planning Module and/or Act 537 Plan Update	0	2	2	0		2				
Valley View Business Center Lots 2 & 3 (National Guard)	National Guard Armory	Waverly Blvd. & Washington Ln.	Connected but not occupied	3	0	3	0	3					
Lincoln Crest Mobile Home Park	50 Unit Expansion of 125 Existing Unit Park	Rt 30 & Sharon Ln	Conditional Final Approval - Awaiting Posting of Escrow*	0	50	50	0			10	10	10	10
Sadsbury Park - Phase 2A	67 EDUs (52 SFD, 15 SFA)+ 2 EDUs for Cabana = 69 TOTAL EDUs	Old Wilmington Rd south of Rt 30	Approved & Under Construction	31	38	69	12	19	28	12			
Sadsbury Park - Phase 4C	48 Townhouse Units (SFA) - Including 6 from Phase 2B	Old Wilmington Rd south of Rt 30	Final Plan Pending AQUA Approval	8	40	48	0	8	15	25			
Sadsbury Park - Phase 1	41 EDUs (All SFD)	Old Wilmington Rd south of Rt 31	Not submitted	0	41	41	0						41
Sadsbury Park - Phase 2B	132 EDUs (38 SFD, 88 SFA+ 6 SFA Accounted for in Ph 4C)	Old Wilmington Rd south of Rt 32	Not submitted	0	126	126	0						
Sadsbury Park - Phase 3A	42 EDUs (All SFD)	Old Wilmington Rd south of Rt 33	Not submitted	0	42	42	0						
Sadsbury Park - Phase 3B	46 EDUs (14 SFD, 32 SFA)	Old Wilmington Rd south of Rt 34	Not submitted	0	46	46	0						
Sadsbury Park - Phase 4A	57 EDUs (All SFD)	Old Wilmington Rd south of Rt 35	Not submitted	0	57	57	0						
Sadsbury Park - Phase 4B	12 EDUs (All SFD)	Old Wilmington Rd south of Rt 36	Not submitted	0	12	12	0						
Sadsbury Township Misc	Existing Residence	Renovated Farmhouse at Sads Park Development	Completed & Connected	1	0	1	1						
Lafayette Square - Phase 1	4 Bldgs (40 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 30	Approved Oct 2010 - Construction Complete (4 Bldgs Complete @ 10 Units EA)	40	0	40	12	28					
Lafayette Square - Phase 2	7 Bldgs (65 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 31	Approved Oct 2010 - Not Started	0	65	65	0		10	45	10		
Lafayette Square - Phase 3	2 Bldgs (20 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 32	Approved Oct 2010 - Not Started	0	20	20	0				10	10	
Sadsbury Township - Phase 4 Sewers	Existing Residential EDUs	Valley Road	Phase 4 Sewer Construction Complete - Not all EDUs connected	12	68	80	10	2	5	4			
Sadsbury Township - Phase 3A Sewers	House and Apartment (2 EDUs)	31 Morris Lane	Connected	2	0	2	0	2					
Sadsbury Township Misc	Existing Residence	2907 Lincoln Highway	Connected	1	0	1	0	1					
* - improvements should curtail Inflow													
<b>TOTAL EDUs</b>				<b>98</b>	<b>607</b>	<b>705</b>	<b>35</b>	<b>63</b>	<b>60</b>	<b>96</b>	<b>30</b>	<b>20</b>	<b>51</b>
<b>TOTAL FLOW (GPD) @ 250 GPD/EDU</b>				<b>24,500</b>	<b>151,750</b>	<b>176,250</b>	<b>8,750</b>	<b>15,750</b>	<b>15,000</b>	<b>24,000</b>	<b>7,500</b>	<b>5,000</b>	<b>12,750</b>
<b>STOTTSVILLE PUMP STATION 2-YR PROJECTION (GPD)</b>								<b>160,472</b>	<b>175,472</b>	<b>199,472</b>	<b>206,972</b>	<b>211,972</b>	<b>224,722</b>



[Print](#)

**Subject: Fw: Sadsbury & Sandy Hill telog June 2012**  
**From: Patricia.Hudock@amwater.com**  
**Sent: Monday, July 09, 2012 11:31:48 AM**  
**To: hem.engineers.dporter@verizon.net**

---

Dave,

It lost the programming and went back to factory default programming, probably due to a storm. The data cannot be recovered for that time frame. Just a heads up....it will be missing data for the first week in July also. It is now back to normal.

Thanks,  
Patti

Patti Hudock  
PA American Water - Coatesville  
Admin Support  
100 Cheshire Ct, Ste 104  
Coatesville, PA 19320  
P 610-384-1776 ext 2127  
Internal 73152127  
F 610-384-2996  
Patricia.Hudock@amwater.com

----- Forwarded by Patricia A Hudock/PAWC/AWWSC on 07/09/2012 11:29 AM -----

**Patricia A Hudock/PAWC/AWWSC**  
07/09/2012 11:18 AM

To: Dave Porter <hem.engineers.dporter@verizon.net>@AWX  
cc  
Subject: Re: Sadsbury & Sandy Hill telog June 2012 [Link](#)

I believe it's a problem on the phone line. I'm checking on that though.

Thanks,  
Patti

Patti Hudock  
PA American Water - Coatesville  
Admin Support  
100 Cheshire Ct, Ste 104  
Coatesville, PA 19320  
P 610-384-1776 ext 2127  
Internal 73152127  
F 610-384-2996  
Patricia.Hudock@amwater.com

**Dave Porter <hem.engineers.dporter@verizon.net>**  
07/09/2012 11:09 AM

To: Patricia.Hudock@amwater.com  
cc hem.engineers@verizon.net, James.Kelly@amwater.com  
Subject: Re: Sadsbury & Sandy Hill telog June 2012

Thanks Patti. Any reason for the loss of data?

David M. Porter, E.I.T.

Herbert E. MacCombie, Jr., P.E.  
Consulting Engineers and Surveyors, Inc.  
P.O. Box 118  
Broomall, Pa 19008

610-356-9550  
Fax - 610-356-5032

[hem.engineers.dporter@verizon.net](mailto:hem.engineers.dporter@verizon.net)

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On Jul 9, 2012, [Patricia.Hudock@amwater.com](mailto:Patricia.Hudock@amwater.com) wrote:

Good morning,

There was data lost for Sadsbury from 6/28 at 4AM to 6/30.

Thanks,  
Patti

Patti Hudock  
PA American Water - Coatesville  
Admin Support  
100 Cheshire Ct, Ste 104  
Coatesville, PA 19320  
P 610-384-1778 ext 2127  
Internal 73152127  
F 610-384-2996  
[Patricia.Hudock@amwater.com](mailto:Patricia.Hudock@amwater.com)



**CHAPTER 94**  
**MUNICIPAL WASTELOAD MANAGEMENT**  
**2011 ANNUAL REPORT**  
**SADSBURY TOWNSHIP, CHESTER COUNTY, PA**  
**FOR THE**  
**PENNSYLVANIA AMERICAN WATER COMPANY**  
**COATESVILLE SEWERAGE SYSTEM**

**MARCH 2012**

**Prepared By:**

**Herbert E. MacCombie, Jr., P.E.**  
**Consulting Engineers and Surveyors, Inc.**  
**P.O. Box 118**  
**Broomall, PA 19008**

PENNSYLVANIA-AMERICAN WATER COMPANY  
 COATESVILLE DISTRICT  
 2011 WASTELOAD MANAGEMENT REPORT SURVEY

Municipality: **SADSBURY TOWNSHIP**

Information Furnished By:

Date: February 28, 2012

Municipality / Engineering Company: Herbert E. MacCombie, Jr. P.E.  
 Consulting Engineers and Surveyors, Inc.

Name: James W. MacCombie, P.E., P.L.S.

Address: P.O. Box 118  
 Broomall, PA 19008

Phone: 610-356-9550 Fax: 610-356-5032

E-Mail Address: [hem.engineers@verizon.net](mailto:hem.engineers@verizon.net)

1. Total Present Number of EDU's connected to PAWC system:

Residential	908
Commercial	89
Industrial	0

2. Total EDU's connected to PAWC system during 2011

Residential	26
Commercial	0
Industrial	0

3. Projections for future additional EDU's to be connected to PAWC system. These projections should reflect what is actually anticipated to be constructed and placed in service:

Year	Residential	Commercial	Industrial	Total EDU's
2012	78	3	0	81
2013	75	10	0	85
2014	67	10	2	79
2015	30	20	2	52
2016	20	20	2	42
Beyond 2016	360	40	7	407
<b>Total</b>	<b>1,538</b>	<b>192</b>	<b>13</b>	<b>1,743</b>



4. Sewer extensions constructed during 2011 that contributed flows to PAWC system:

Project / Development Name	Length & Diameter of Sewer Completed	Length and Diameter of Sewer Remaining	Total EDU's Completed	Total EDU's Remaining
Sadsbury Phase IV West End	4,044 L.F. 8" Dia. PVC	None Remaining	10	70
Sadsbury Park Phase 2A (Not Dedicated)	3,800 L.F. 8" Dia. PVC 540 L.F. 8" Dia. D.I.P.	None Remaining	13	69
Lafayette Square Phase 1			3	37

5. Proposed Projects which shall require sewer extensions that will contribute flows to PAWC system but are not yet constructed.

Project / Development Name	Length & Diameter of Sewer Proposed	Total EDU's Proposed	Start of Construction (Year)
Sadsbury Commons	Combination Gravity & Forcemain	120	2013

6. Please provide discussion on the following:

a.) Sewer System Flow Monitoring:

P&B Maintenance Company of Essington, PA is currently under contract with Sadsbury Township to monitor Pump Station and Meter on a regular basis. The Township Engineer monitors flows on a regular basis. Currently the only flow meter readings are from a Mag Meter located along the force main discharge from the pumps at the Pump Station (effluent flow). It is required by Chapter 94 to report on influent flow to evaluate Pump Station hydraulic loading and for determining peaking factors for projected flows. Since the only flow data currently available are the Pump Station discharge flow meter readings, these readings were used to prepare the 2011 report and assumptions were made for projected flows. Using the discharge flow readings would yield inaccurately high peaking factors and falsely indicate hydraulic overloading of the pump station, which is a fairly new station. There is ongoing discussion with the Township regarding installation of an influent flow meter at this station. The Township has placed the influent meter in the 2012 budget. It is anticipated that the influent meter will be installed and operational during 2012. The Township is in the process of evaluating possible Stottsville Pump Station upgrades to meet future demands while at the same time identifying sources of I/I.

b.) Sewer System Maintenance:

Sadsbury Township has a contract with P&B Maintenance Company for Pump Station maintenance. The Township will contract out with local contractors for major repairs.

c.) Sewer System I&I Program:

The Township reviews flows on a regular basis in order to keep a watchful eye on potential I/I. The Township Road Crew is available on a continual basis for routine repairs. Major repairs will be performed by local contractors as the need arises. Currently, the Lincoln Crest Mobile Home Park has been identified as a source of inflow as well as several manholes along Route 372 due to the relocation of a storm sewer line by PennDOT. The Township is monitoring the flows from the Lincoln Crest Mobile Home Park on a regular basis and is working with the owner of the mobile home park to identify and remedy an apparent inflow issue. Flows from the mobile home park continue to spike during rainfall events greater than one (1) inch. Lincoln Crest has received Conditional Final Land Development approval from the Township to expand the park with additional 50 units. The park currently has 125 existing connections. Improvements associated with the expansion should curtail inflow issues. In addition, the Township is in the process of investigation another possible source of additional inflow that may be attributed to Industrial users within the Bellaire Business Center. The Township is in the process of monitoring their sewage flow and water usage to determine if there is an inflow issue.

7. Please provide discussion of the condition of your sewer system:

a.) Portions where conveyance capacity is being exceeded or will be exceeded in the next 5 years:

The Sanitary Sewer System is in Good Working Condition and no exceedances are anticipated in the next five years.

b.) Proposed projects to increase conveyance capacity, i.e. repair, rehabilitation, new construction:

As stated in 6(a), the Township is in the process of evaluating the possible need to upgrade of the Stottsville Pump Station in order to provide for a capacity increase for flows from developments within West Caln Township.

8. Please provide data and discussion of your sewer flow:

Pump Stations						
Pump Station Name	Number of Pumps	Permitted Capacities		Present Flows		Projected Flows
		AA Permitted Capacity (gpd)	Hydraulic Design Capacity <sup>1</sup> (gpd)	Annual Average Flows (gpd)	Peak Instantaneous (or Peak Hourly) Flow (gpm)	2-Year Projected Maximum <sup>2</sup> Flow (gpd)
Stottsville Pump Station	2	1,008,000 (700 gpm)	1,058,400 (735 gpm) <sup>3</sup>	171,599	417.1 <sup>4</sup>	737,097 (511.9 gpm)

1. Excluding Capacity of Backup Pump = Maximum Pump Rate
2. 2-Year Projected Peak Flow = (Projected 2-Year AA Flow to P.S.) x (Pump Station Peaking Factor)
  - a. Projected 2-Year AA Flow to P.S. Based on Proposed Connections
  - b. Peaking Factor = Ratio of Peak Instantaneous Flow to AA Flow
3. The Hydraulic Design Capacity is assumed to be at 105% of the Permitted Capacity based upon available information for similar pump stations in the area. This assumption was made because no testing data is available for actual maximum pump performance.
4. The Peak Instantaneous Flow was determined by applying a Peaking Factor of 3.5 pursuant to the *Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance*, last revised March 24, 1999. This Peaking Factor was also applied to the 2-Year Projected Maximum Flow.

a.) Other discussion or information:

An unusually high peak hourly flow of 831.0 GPM (pump discharge) was recorded at the pump station between 7:15pm and 8:15pm on September 23rd and the meter readings indicate that the pump continuously ran from approximately 5:30 am on September 23rd until approximately 7:15 am on September 24th. There was a significant amount of rainfall (approximately 2.35 inches total) between September 23rd into the 24th. This storm was relatively intense dropping 2.35 inches of rain in about 12 hours. Furthermore, this event occurred after one of the wettest summers on record in which Hurricane Irene, Tropical Storm Lee, and several other significant rainfall events occurred. August saw six (6) days with over one (1) inch of rainfall with a total of 19.31 inches. About 5.7 inches of rain fell in 21 hours during Hurricane Irene (August 27th and 28th). September saw three (3) days with over one (1) inch of rainfall with a total of 10.27 inches.

This very high peak was considered but was not used in determining the peaking factor or calculating the projected flows since the instantaneous spike in flow occurred at the end of the summer where more than 19.5 inches of rain fell. Furthermore, since only pump discharge flow data is available at this time, a Peaking Factor of 3.5 was applied to the Annual Average Daily Flow (AADF) to determine the Peak Instantaneous Flow (PIF). This peaking factor is pursuant to the *Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance*, last revised March 24, 1999. This Peaking Factor was also applied to the 2-Year Projected Maximum Flow.

Hurricane Irene occurred over August 27<sup>th</sup> and 28<sup>th</sup> during a month that had 19.31 inches of rain (15.49 inches higher than normal). During the hurricane 1.49 inches of rain fell in a one (1) hour period on the 27<sup>th</sup> and a peak hourly flow of 715.9 GPM was recorded between 2:45am and 3:45am on the 28<sup>th</sup>. In all 5.7 inches of rain was recorded over 21 hours.

A week after Hurricane Irene ended Tropical Storm Lee arrived dropping 6.39 inches of rain over three (3) days (September 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup>). On the third day 2.33 inches fell in a one (1) hour period, which was more intense than Hurricane Irene. In fact, this was the most rain that fell in a one (1) hour period for the entire year. However, the highest peak hourly flow recorded during Lee was 768.0 GPM occurring on the 7<sup>th</sup> between 4:15pm and 5:15pm.

The existing Stottsville Pump Station has Two (2) alternating pumps with a rated capacity of 700 gpm each. The pump station is in good condition and is more than capable of handling the projected 2-year maximum flow of 511.9 gpm.

**THIS SECTION IS NOT APPLICABLE TO SADBURY TOWNSHIP**

9. Please provide a discussion of the industrial waste discharged into your system:

a.) Date of adoption of the ordinance or regulation governing industrial waste discharges into your system:

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b.) Discussion of program for the surveillance and monitoring of the industrial waste discharges into your system:

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c.) Discussion of specific problems in your sewer system, known or suspected to be caused by industrial waste discharges within the past 5 years:

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**Pump Station**

	<b>Volume (Gallons)</b>	<b>ADF (GPD)</b>
<b>Jan-11</b>	4,541,331	146,495
<b>Feb-11</b>	4,537,292	162,046
<b>Mar-11</b>	6,351,759	204,895
<b>Apr-11</b>	5,775,836	192,528
<b>May-11</b>	5,381,072	173,583
<b>Jun-11</b>	4,203,560	140,119
<b>Jul-11</b>	3,949,407	127,400
<b>Aug-11</b>	4,836,853	156,028
<b>Sep-11</b>	6,155,058	205,169
<b>Oct-11</b>	5,252,092	169,422
<b>Nov-11</b>	5,660,700	188,690
<b>Dec-11</b>	5,988,796	193,187
<b>TOTAL</b>	<b>62,633,756</b>	<b>171,599 GPD</b>
		<b>119.2 GPM</b>

<b>171,599</b>	GPD - Annual Average Daily Flow (ADF)
<b>7,150.0</b>	GPH - Annual Average Hourly Flow (AHF)
<b>119.2</b>	GPM - Annual Average Flow per Minute (AFM)

<b>502,959</b>	GPD - Maximum Daily Flow (MDF) August 28, 2011
<b>49,862</b>	GPH - Peak Hourly Flow (PHF) September 23, 2011 between 7:15 AM and 8:15 AM
<b>831.7</b>	GPM - Peak Instantaneous Flow (PIF) September 23, 2011 @ 7:30 pm

<b>2.93</b>	Current MDF Peaking Factor = (MDF/ADF)
<b>6.97</b>	Current PHF Peaking Factor = (PHF/AHF)
<b>6.98</b>	Current Instantaneous Flow Peaking Factor = (PIF/AFM)

**3.50** Current Instantaneous Flow Peaking Factor = (PIF/AFM)  
 From the Pennsylvania Department of Environmental Protection, Water Management Program, Southeast Regional Office, Sewage Pumping Station Guidance, last revised March 24, 1999.

<b>417.1</b>	GPM - Peak Instantaneous Flow (PIF)
--------------	-------------------------------------

	January	February	March	April	May	June	July	August	September	October	November	December	Total	GPD/365
Sadsbury Township														
Pump Station	4,541,331	4,537,292	6,351,759	5,775,836	5,381,072	4,203,560	3,949,407	4,836,853	6,155,058	5,252,092	5,660,700	5,988,796	62,633,756	171,599
Sadsbury Crossing/Valley Rd.	129,772	117,500	129,400	131,378	143,800	125,225	152,300	134,520	132,900	122,400	118,700	129,000	1,566,895	4,293
Sandy Hill	-728,143	-861,277	-1,611,202	-866,907	-728,528	-652,006	-600,065	-779,676	-802,881	-770,070	-775,197	-789,549	-9,965,501	
Total	3,942,960	3,793,515	4,869,957	5,040,307	4,796,344	3,676,779	3,501,642	4,191,697	5,485,077	4,604,422	5,004,203	5,328,247	54,235,150	
GPD	127,192	135,483	157,095	168,010	154,721	122,559	112,956	135,216	182,836	148,530	166,807	171,879		148,589
	3,942,960	3,793,515	4,869,957	5,040,307	4,796,344	3,676,779	3,501,642	4,191,697	5,485,077	4,604,422	5,004,203	5,328,247	54,235,150	

JANUARY 2011								
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)	Snowfall (in)
1/1/2011	128.8	115,953	25.9	23,282	224.8	323,744	0	
1/2/2011	112.4	161,862	20.5	29,489	226.5	326,206	0.09	
1/3/2011	108.4	156,050	17.1	24,645	221.6	319,061	0	
1/4/2011	109.3	157,418	14.6	21,022	220.5	317,582	0	
1/5/2011	106.8	153,757	15.3	22,061	218.9	315,249	0	
1/6/2011	94.0	135,409	14.7	21,102	216.7	312,065	0	
1/7/2011	102.3	147,317	14.7	21,170	205.8	296,310	0.11	1.3
1/8/2011	110.1	158,501	17.1	24,588	201.5	290,144	0.1	1.9
1/9/2011	111.5	160,577	18.4	26,507	201.7	290,404	0	
1/10/2011	103.2	148,605	15.0	21,534	200.8	289,222	0	
1/11/2011	89.7	129,168	14.5	20,829	199.3	286,963	0.31	4.1
1/12/2011	100.3	144,438	17.7	25,467	203.5	292,978	0.15	1.1
1/13/2011	108.5	156,206	15.7	22,641	200.9	289,284	0	
1/14/2011	98.4	141,654	15.3	22,095	200.6	288,819	0	
1/15/2011	103.7	149,301	17.2	24,760	197.2	284,009	0	
1/16/2011	107.1	154,286	17.9	25,748	200.9	289,366	0	
1/17/2011	110.1	158,474	17.0	24,489	119.8	172,521	0.11	0.9
1/18/2011	103.5	149,046	16.9	24,265	8.1	11,638	0.67	0.1
1/19/2011	102.9	148,222	16.8	24,220	10.7	15,454	0.05	
1/20/2011	96.6	139,039	15.1	21,719	9.8	14,162	0	
1/21/2011	97.5	140,406	15.7	22,652	9.4	13,568	0.15	0.6
1/22/2011	106.3	153,073	17.2	24,765	9.3	13,443	0	
1/23/2011	107.0	154,150	18.7	26,904	11.5	16,538	0	
1/24/2011	92.1	132,599	14.4	20,807	8.8	12,701	0	
1/25/2011	94.3	135,819	14.6	21,051	10.6	15,315	0	
1/26/2011	93.3	134,407	14.9	21,483	10.1	14,616	1.57	14.2
1/27/2011	94.7	136,345	16.6	23,893	9.5	13,728	0.05	0.9
1/28/2011	91.8	132,190	13.9	19,956	8.5	12,267	0.02	0.1
1/29/2011	98.4	141,708	17.5	25,150	9.5	13,619	0	
1/30/2011	108.9	156,744	18.1	25,994	11.2	16,106	0	
1/31/2011					8.2	11,808	0.01	
1/2/2011 12:00	227.0							
1/3/2011 12:15			125.5					

= Water Equivalent of Snowfall

FEBRUARY 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
2/1/2011	114.3	102,895	18.8	16,893	7.5	10,860	0.01
2/2/2011	120.7	173,840	28.4	40,933	16.1	23,172	0.7
2/3/2011	97.1	139,811	17.9	25,831	10.7	15,451	0
2/4/2011	91.5	131,777	15.2	21,906	8.6	12,320	0
2/5/2011	113.9	163,969	22.0	31,631	10.0	14,332	0.24
2/6/2011	123.7	178,173	24.6	35,405	12.7	18,333	0
2/7/2011	105.7	152,224	19.9	28,657	11.1	16,003	0.01
2/8/2011	119.7	172,315	21.0	30,188	11.4	16,405	0.02
2/9/2011	110.6	159,293	16.8	24,121	9.3	13,321	0
2/10/2011	109.8	158,137	15.9	22,848	7.6	11,004	0
2/11/2011	108.0	155,472	15.3	22,009	7.5	10,775	0
2/12/2011	106.9	153,961	17.4	25,115	7.0	10,101	0
2/13/2011	109.4	157,469	19.2	27,674	7.6	11,001	0
2/14/2011	102.1	147,054	19.4	27,933	7.5	10,849	0
2/15/2011	102.3	147,263	18.2	26,203	6.2	8,914	0
2/16/2011	96.0	138,193	16.8	24,149	6.5	9,404	0
2/17/2011	107.6	154,935	23.9	34,385	7.9	11,310	0
2/18/2011	128.0	184,367	27.8	40,022	12.9	18,545	0
2/19/2011	118.8	171,113	19.7	28,350	11.1	15,989	0
2/20/2011	111.5	160,525	18.1	26,027	9.8	14,165	0
2/21/2011	112.5	162,045	18.4	26,448	8.3	11,922	0.21
2/22/2011	108.8	156,630	21.5	30,894	7.7	11,106	0.27
2/23/2011	101.1	145,653	17.9	25,746	6.2	8,997	0
2/24/2011	99.6	143,487	15.4	22,220	7.0	10,062	0.01
2/25/2011	171.3	246,668	40.0	57,570	17.8	25,609	0.9
2/26/2011	125.4	180,507	28.6	41,147	9.6	13,815	0
2/27/2011	128.6	185,252	29.5	42,411	8.5	12,251	0
2/28/2011					8.5	12,263	0.28
2/25/2011 9:15	344.5						
2/25/2011 8:30			119.9				

Snowfall (in)  
0.1

3.1  
2.9

= Water Equivalent of Snowfall



MARCH 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
3/1/2011	123.2	177,406	24.6	19,907	7.1	10,246	0
3/2/2011	110.2	158,736	22.4	32,189	6.8	9,754	0
3/3/2011	103.8	149,489	22.0	31,731	6.3	9,091	0
3/4/2011	107.8	155,267	19.7	28,367	5.0	7,199	0
3/5/2011	110.1	158,598	19.5	28,009	5.9	8,470	0
3/6/2011	147.0	211,729	38.5	55,384	15.9	22,950	1.4
3/7/2011	198.5	285,896	50.4	72,598	14.6	21,016	0.04
3/8/2011	144.4	207,970	42.4	61,006	6.7	9,681	0
3/9/2011	125.7	181,020	40.5	58,353	6.4	9,214	0
3/10/2011	141.9	204,339	71.5	103,025	47.9	68,958	1.16
3/11/2011	194.6	280,243	50.3	72,385	13.2	19,064	0.3
3/12/2011	188.8	271,864	21.8	31,392	8.0	11,463	0
3/13/2011	206.5	297,366	58.6	84,406	8.7	12,511	0
3/14/2011	182.6	262,874	53.3	76,743	8.0	11,510	0
3/15/2011	172.5	248,452	52.3	75,285	7.4	10,705	0.01
3/16/2011	183.6	264,451	58.5	84,177	10.1	14,609	0.68
3/17/2011	161.9	233,102	48.5	69,867	6.8	9,785	0
3/18/2011	156.2	224,873	46.4	66,781	6.4	9,221	0
3/19/2011	141.2	203,269	36.6	52,706	6.7	9,666	0
3/20/2011	136.6	196,633	29.8	42,959	7.0	10,132	0
3/21/2011	121.8	175,447	23.9	34,407	7.3	10,489	0.4
3/22/2011	129.2	186,071	32.5	46,782	6.8	9,837	0
3/23/2011	138.2	198,968	37.6	54,106	6.6	9,450	0.23
3/24/2011	137.7	198,312	36.1	51,920	7.2	10,370	0.02
3/25/2011	125.9	181,244	30.8	44,412	6.7	9,712	0
3/26/2011	130.7	188,153	30.3	43,637	7.4	10,623	0
3/27/2011	134.9	194,299	30.7	44,260	6.9	9,983	0
3/28/2011	119.6	172,213	24.3	35,005	5.8	8,298	0
3/29/2011	113.5	163,393	22.2	31,981	6.3	9,029	0
3/30/2011	110.3	158,899	21.0	30,210	6.5	9,394	0
3/31/2011	113.1	161,183	19.3	14,205	7.2	10,354	0.05
3/12/2011 7:15	439.6						
3/10/2011 17:30			149.3				

APRIL 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
4/1/2011	132.3	119,037	26.2	23,572	7.5	10,788	0.2
4/2/2011	116.4	167,558	24.1	34,766	7.6	10,947	0
4/3/2011	117.3	168,984	20.6	29,719	24.1	34,722	0.01
4/4/2011	106.4	153,279	18.8	27,137	39.0	56,117	0
4/5/2011	128.1	184,468	24.6	35,456	45.4	65,317	0.15
4/6/2011	110.7	159,361	18.9	27,221	40.4	58,239	0
4/7/2011	105.6	152,094	16.9	24,404	39.4	56,720	0
4/8/2011	125.6	180,903	23.7	34,077	42.7	61,539	0.68
4/9/2011	132.7	191,084	26.9	38,726	42.9	61,764	0
4/10/2011	131.6	189,450	26.4	37,983	40.0	57,592	0
4/11/2011	113.0	162,670	18.4	26,486	34.2	49,230	0
4/12/2011	135.5	195,097	22.4	32,272	13.0	18,655	0.57
4/13/2011	163.3	235,105	22.6	32,523	11.8	16,920	0.08
4/14/2011	126.5	182,204	15.8	22,815	7.5	10,848	0
4/15/2011	116.2	167,292	14.8	21,279	8.4	12,041	0
4/16/2011	213.4	307,237	30.4	43,705	27.6	39,704	3.11
4/17/2011	214.9	309,399	26.8	38,644	14.5	20,923	0.01
4/18/2011	152.9	220,155	15.5	22,315	7.4	10,702	0
4/19/2011	138.7	199,744	15.3	21,976	7.5	10,792	0
4/20/2011	132.1	190,206	14.9	21,511	7.4	10,713	0
4/21/2011	127.6	183,760	14.8	21,290	7.6	10,887	0
4/22/2011	122.1	175,887	16.1	23,169	6.8	9,859	0
4/23/2011	143.4	206,470	21.7	31,221	8.0	11,467	0.38
4/24/2011	140.0	201,661	22.3	32,162	9.2	13,293	0.02
4/25/2011	139.1	200,351	18.7	26,994	9.1	13,072	0.01
4/26/2011	129.2	186,097	15.6	22,475	7.7	11,029	0
4/27/2011	120.6	173,594	15.3	22,097	5.9	8,424	0.02
4/28/2011	135.0	194,350	20.5	29,492	6.9	9,993	0.04
4/29/2011	127.6	183,789	16.3	23,427	6.2	8,865	0
4/30/2011	131.6	175,748	16.4	21,863	6.0	8,613	0
4/16/2011 19:30	535.6						
4/9/2011 10:15			95.1				

MAY 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
5/1/2011	143.6	206,843	19.5	28,104	7.5	10,824	0
5/2/2011	124.8	179,677	14.7	21,179	6.0	8,661	0
5/3/2011	121.8	175,413	15.3	22,083	6.0	8,602	0
5/4/2011	139.5	200,937	21.3	30,663	7.0	10,107	0.47
5/5/2011	126.3	181,910	15.4	22,142	5.8	8,313	0
5/6/2011	121.7	175,238	13.8	19,940	5.7	8,213	0
5/7/2011	122.0	175,680	15.2	21,833	6.0	8,681	0
5/8/2011	130.8	188,388	18.5	26,683	10.0	14,392	0
5/9/2011	121.1	174,450	14.8	21,337	11.5	16,551	0
5/10/2011	115.6	166,497	13.3	19,137	10.9	15,766	0
5/11/2011	109.0	156,918	14.3	20,657	7.4	10,720	0
5/12/2011	112.9	162,629	13.9	20,034	5.3	7,574	0
5/13/2011	113.2	162,983	13.9	19,984	5.3	7,596	0
5/14/2011	122.6	176,562	16.9	24,391	6.3	9,144	0.21
5/15/2011	128.4	184,842	18.3	26,423	6.5	9,362	0.16
5/16/2011	134.1	193,135	16.6	23,913	7.9	11,395	0.02
5/17/2011	151.9	218,690	20.1	29,008	11.5	16,529	0.36
5/18/2011	128.8	185,445	16.2	23,391	7.1	10,171	0.24
5/19/2011	125.4	180,583	15.5	22,368	7.8	11,301	0.36
5/20/2011	127.6	183,712	16.6	23,845	7.6	10,946	0.06
5/21/2011	120.5	173,524	17.4	24,985	5.9	8,529	0
5/22/2011	123.2	177,421	18.4	26,501	7.9	11,374	0
5/23/2011	114.8	165,374	16.7	24,053	6.3	9,016	0.03
5/24/2011	111.2	160,090	15.5	22,260	6.3	9,063	0
5/25/2011	106.9	153,983	15.4	22,241	5.2	7,417	0
5/26/2011	107.1	154,227	14.9	21,387	5.6	8,001	0
5/27/2011	107.2	154,371	14.5	20,825	5.3	7,691	0
5/28/2011	105.4	151,744	16.5	23,732	6.0	8,610	0
5/29/2011	102.1	147,085	18.1	26,046	5.1	7,413	0
5/30/2011	113.9	163,965	18.7	26,866	5.9	8,555	0
5/31/2011	104.0	149,701	15.6	22,518	5.3	7,631	0
5/16/2011 15:55	426.3						
5/21/2011 11:10			76.6				

JUNE 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
6/1/2011	101.4	146,048	13.8	19,941	7.2	10,389	0
6/2/2011	100.2	144,257	14.2	20,378	8.7	12,566	0
6/3/2011	94.8	136,484	14.6	21,055	7.5	10,804	0
6/4/2011	100.4	144,621	16.6	23,886	6.6	9,564	0
6/5/2011	107.2	154,432	18.9	27,240	8.5	12,243	0
6/6/2011	99.1	142,654	15.0	21,604	7.7	11,153	0
6/7/2011	100.2	144,308	15.2	21,917	9.4	13,555	0
6/8/2011	96.7	139,270	13.8	19,933	9.2	13,266	0
6/9/2011	97.2	139,934	14.3	20,641	6.5	9,314	0.18
6/10/2011	94.8	136,571	14.2	20,430	5.8	8,384	0
6/11/2011	101.6	146,247	17.1	24,588	7.6	10,930	0.61
6/12/2011	112.4	161,838	18.1	26,017	8.7	12,522	0.05
6/13/2011	100.8	145,128	14.4	20,746	8.1	11,689	0
6/14/2011	97.6	140,571	15.4	22,180	6.9	9,976	0.09
6/15/2011	97.3	140,101	15.2	21,817	6.4	9,227	0
6/16/2011	96.7	139,218	14.7	21,169	7.3	10,543	0.08
6/17/2011	93.6	134,856	15.1	21,673	6.4	9,164	1.38
6/18/2011	99.2	142,779	16.0	23,040	7.7	11,058	0
6/19/2011	98.6	142,040	16.8	24,179	7.0	10,050	0
6/20/2011	89.9	129,467	13.3	19,093	5.6	8,032	0
6/21/2011	89.8	129,242	13.7	19,773	6.6	9,469	0.02
6/22/2011	93.7	134,990	13.7	19,694	7.6	10,888	0.04
6/23/2011	94.9	136,628	14.0	20,139	7.8	11,169	0.03
6/24/2011	96.5	138,918	14.3	20,655	8.8	12,614	0
6/25/2011	95.7	137,871	15.9	22,832	7.5	10,769	0
6/26/2011	98.5	141,878	16.8	24,122	8.0	11,586	0
6/27/2011	95.2	137,096	15.1	21,803	7.4	10,700	0
6/28/2011	92.6	133,386	13.9	19,999	7.0	10,113	0.08
6/29/2011	90.9	130,963	14.0	20,094	6.5	9,296	0
6/30/2011	72.6	45,738	11.1	6,989	6.4	9,249	0
6/18/2011 8:00	304.0						
6/14/2011 10:45			137.4				

JULY 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
7/1/2011	104.4	90,811	15.8	13,769	5.6	7,992	0
7/2/2011	83.3	119,957	14.6	21,069	6.8	9,749	0
7/3/2011	85.8	123,564	17.2	24,805	6.0	8,622	0.02
7/4/2011	93.1	134,056	16.2	23,400	6.5	9,354	0
7/5/2011	92.2	132,762	15.3	22,087	6.4	9,243	0
7/6/2011	95.5	137,451	15.3	22,092	7.0	10,021	0
7/7/2011	93.7	134,860	14.6	21,060	6.7	9,656	0.01
7/8/2011	90.9	130,870	13.8	19,875	8.0	11,523	1.48
7/9/2011	95.8	137,936	16.8	24,137	8.9	12,881	0
7/10/2011	101.9	146,748	17.7	25,559	9.1	13,036	0
7/11/2011	92.1	132,612	14.6	21,052	8.5	12,245	0
7/12/2011	89.0	128,126	13.7	19,696	7.5	10,766	0
7/13/2011	91.4	131,581	13.2	19,027	8.7	12,600	0
7/14/2011	90.3	129,992	14.1	20,254	11.0	15,826	0
7/15/2011	87.7	126,264	14.4	20,728	11.0	15,860	0
7/16/2011	91.2	131,349	15.3	22,014	12.7	18,332	0
7/17/2011	99.8	143,682	17.5	25,165	13.0	18,767	0
7/18/2011	93.8	135,130	14.0	20,188	12.3	17,730	0
7/19/2011	92.0	132,409	13.2	18,970	11.7	16,919	0.59
7/20/2011	90.2	129,825	13.9	20,019	10.5	15,180	0
7/21/2011	90.3	129,982	14.0	20,131	9.7	13,974	0
7/22/2011	93.5	134,660	13.5	19,462	7.5	10,803	0
7/23/2011	115.3	165,979	14.7	21,159	8.5	12,234	0
7/24/2011	129.3	186,140	17.1	24,665	8.9	12,832	0
7/25/2011	136.2	196,199	13.7	19,773	9.1	13,130	0.25
7/26/2011	131.2	188,890	14.7	21,205	8.4	12,070	0
7/27/2011	110.2	158,664	13.4	19,307	7.7	11,136	0
7/28/2011	90.6	130,433	14.4	20,780	7.5	10,754	0.04
7/29/2011	89.7	129,111	14.5	20,872	7.0	10,092	0.32
7/30/2011	109.2	157,265	15.6	22,455	7.9	11,434	0
7/31/2011	74.8	56,114	13.3	9,982	9.0	13,013	0
7/30/2011 7:30	620.3						
7/24/2011 10:30			72.8				

AUGUST 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
8/1/2011	114.1	73,575	20.3	13,091	7.0	10,142	0.83
8/2/2011	91.7	132,052	15.0	21,668	6.5	9,348	0
8/3/2011	87.9	126,638	15.2	21,888	6.5	9,354	1.62
8/4/2011	91.7	132,043	15.4	22,239	6.4	9,230	0.13
8/5/2011	90.7	130,600	15.0	21,579	6.2	8,894	0
8/6/2011	91.8	132,127	15.0	21,655	6.8	9,765	0
8/7/2011	99.2	142,864	18.1	25,994	7.4	10,708	0.01
8/8/2011	91.4	131,569	14.8	21,255	7.2	10,357	0
8/9/2011	90.2	129,903	15.8	22,802	7.4	10,606	1.87
8/10/2011	88.5	127,398	14.6	21,080	6.1	8,806	0
8/11/2011	89.7	129,101	13.8	19,920	7.2	10,352	0
8/12/2011	88.4	127,237	16.5	23,828	6.3	9,091	0
8/13/2011	93.8	135,033	16.6	23,877	7.7	11,150	0.06
8/14/2011	110.9	159,631	20.2	29,109	9.7	14,023	4.84
8/15/2011	104.8	150,852	15.0	21,663	9.0	12,993	0.9
8/16/2011	91.9	132,264	14.2	20,466	7.1	10,227	0
8/17/2011	89.1	128,270	13.7	19,742	6.9	9,909	0
8/18/2011	91.6	131,890	15.7	22,672	6.7	9,618	1.98
8/19/2011	103.6	149,116	18.2	26,148	9.4	13,490	0.71
8/20/2011	108.7	156,552	16.2	23,360	10.1	14,490	0
8/21/2011	111.1	160,015	18.4	26,489	8.5	12,194	0.05
8/22/2011	103.3	148,755	14.9	21,520	5.7	8,206	0
8/23/2011	105.2	151,553	13.7	19,726	7.0	10,147	0
8/24/2011	96.3	138,659	14.4	20,683	6.8	9,784	0
8/25/2011	96.8	139,450	13.3	19,087	7.8	11,277	0.61
8/26/2011	96.3	138,636	15.3	21,976	6.7	9,649	0
8/27/2011	148.4	213,738	23.2	33,369	11.3	16,310	4.55
8/28/2011	349.3	502,959	62.8	90,440	-	-	1.15
8/29/2011	120.9	174,142	20.4	29,404	-	-	0
8/30/2011	123.0	177,102	14.0	20,229	-	-	0
8/31/2011	99.1	56,464	12.6	7,201	-	-	0
8/28/2011 3:15	718.6						
8/28/2011 5:30			140.9				

**SEPTEMBER 2011**

<b>Date</b>	<b>Sadsbury P.S. Average Flow</b>	<b>Sadsbury P.S. TOTAL Flow</b>	<b>Sandy Hill P.S. Average Flow</b>	<b>Sandy Hill P.S. TOTAL Flow</b>	<b>Lincoln Crest Average Flow</b>	<b>Lincoln Crest Total Flow</b>	<b>Rainfall (in)</b>
9/1/2011	127.0	104,759	15.8	13,032	6.9	9,979	0
9/2/2011	120.7	173,791	15.0	21,660	9.8	14,052	0
9/3/2011	121.7	175,262	17.2	24,787	7.1	10,172	0
9/4/2011	120.4	173,392	16.2	23,279	7.6	10,911	0
9/5/2011	138.2	184,456	19.4	27,937	10.3	14,777	0.08
9/6/2011	202.2	291,137	29.6	42,630	34.8	50,057	2.17
9/7/2011	314.4	452,701	40.5	58,388	54.5	78,528	0.47
9/8/2011	219.9	316,594	25.7	37,034	24.2	34,841	3.65
9/9/2011	154.1	221,935	18.3	26,351	8.8	12,643	0
9/10/2011	139.2	200,499	16.8	24,125	40.0	57,614	0
9/11/2011	141.5	203,768	18.9	27,239	22.0	31,715	0.46
9/12/2011	122.3	176,117	15.1	21,719	18.3	26,303	0.02
9/13/2011	115.8	166,807	14.8	21,264	20.7	29,743	0
9/14/2011	110.7	159,387	13.5	19,393	12.3	17,741	0
9/15/2011	106.0	152,589	15.4	22,147	5.8	8,408	0.18
9/16/2011	105.5	151,857	12.9	18,595	4.9	7,078	0
9/17/2011	106.9	153,902	15.8	22,768	5.6	8,052	0
9/18/2011	122.7	176,667	20.1	28,924	7.9	11,321	0
9/19/2011	110.0	158,436	17.2	24,737	5.6	8,023	0
9/20/2011	107.8	155,224	14.8	21,254	6.7	9,583	0.03
9/21/2011	107.5	154,800	14.9	21,417	6.5	9,422	0.03
9/22/2011	105.8	152,343	14.8	21,331	7.2	10,314	0.01
9/23/2011	260.9	375,767	33.6	48,440	30.8	44,329	2.35
9/24/2011	177.2	255,137	23.3	33,559	12.0	17,298	0
9/25/2011	150.6	216,915	20.0	28,821	10.0	14,470	0
9/26/2011	129.3	186,210	15.3	21,977	8.0	11,572	0
9/27/2011	134.5	193,643	14.2	20,506	6.4	9,209	0.19
9/28/2011	141.7	204,021	16.6	23,907	7.5	10,771	0.44
9/29/2011	155.9	224,534	19.2	27,653	-	-	0.04
9/30/2011	117.3	73,909	12.8	8,069	-	-	0.15
9/23/2011 19:30	831.7						
9/7/2011 15:30			136.0				

OCTOBER 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
10/1/2011	143.2	139,579	20.9	20,423	7.4	10,658	0.11
10/2/2011	146.7	211,233	22.9	33,013	10.9	15,657	0.46
10/3/2011	120.9	174,123	16.3	23,518	6.5	9,300	0
10/4/2011	118.9	171,226	15.1	21,787	7.2	10,359	0.01
10/5/2011	112.2	161,584	14.5	20,852	6.5	9,390	0
10/6/2011	113.2	162,959	14.3	20,548	5.3	7,566	0
10/7/2011	110.3	158,901	14.8	21,319	5.7	8,278	0
10/8/2011	115.4	166,132	16.6	23,972	6.0	8,672	0
10/9/2011	123.8	178,236	18.1	26,122	7.4	10,650	0
10/10/2011	118.3	170,376	15.9	22,956	7.5	10,850	0
10/11/2011	107.0	154,101	14.0	20,228	5.7	8,263	0
10/12/2011	112.9	162,599	15.9	22,892	38.9	56,033	0.26
10/13/2011	112.2	161,588	15.1	21,773	6.9	9,887	0.03
10/14/2011	115.8	166,698	18.0	25,914	7.9	11,398	0.26
10/15/2011	116.7	167,986	17.9	25,844	7.6	11,011	0
10/16/2011	126.0	181,450	19.8	28,466	7.7	11,031	0
10/17/2011	111.9	161,163	16.9	24,402	21.7	31,308	0
10/18/2011	115.4	166,223	15.1	21,693	84.0	120,952	0
10/19/2011	126.7	182,433	20.9	30,051	44.2	63,686	0.93
10/20/2011	117.4	169,013	18.1	26,012	8.4	12,163	0
10/21/2011	107.1	154,236	14.1	20,240	7.2	10,354	0
10/22/2011	112.7	162,353	16.6	23,887	6.4	9,186	0
10/23/2011	122.5	176,420	19.6	28,258	7.1	10,252	0
10/24/2011	107.4	154,587	15.4	22,213	6.0	8,589	0.01
10/25/2011	107.9	155,365	15.5	22,320	7.0	10,151	0
10/26/2011	105.4	151,748	14.2	20,409	6.9	9,875	0
10/27/2011	109.8	158,072	16.5	23,700	6.6	9,501	0.17
10/28/2011	103.4	148,912	14.5	20,945	6.4	9,201	0
10/29/2011	129.4	186,270	20.8	29,936	8.0	11,521	1.47
10/30/2011	155.5	223,910	30.1	43,306	11.5	16,567	0
10/31/2011	111.6	76,990	17.4	12,029	7.8	11,192	0
10/8/2011 8:15	274.9						
10/2/2011 19:15			76.2				



NOVEMBER 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
11/1/2011	133.7	114,945	18.5	15,938	10.0	14,335	0
11/2/2011	109.9	158,232	15.0	21,535	7.3	10,503	0
11/3/2011	112.2	161,555	15.4	22,199	6.8	9,764	0
11/4/2011	108.6	156,350	14.2	20,421	6.2	8,873	0
11/5/2011	115.0	165,609	17.2	24,829	7.1	10,234	0
11/6/2011	121.0	174,283	19.6	28,271	7.8	11,247	0
11/7/2011	105.5	151,873	14.5	20,816	7.3	10,541	0
11/8/2011	123.2	177,404	15.7	22,618	6.4	9,187	0
11/9/2011	144.0	207,420	15.1	21,679	5.6	8,074	0
11/10/2011	128.9	185,662	14.4	20,754	5.6	8,083	0.05
11/11/2011	124.9	179,922	14.4	20,672	5.9	8,480	0
11/12/2011	124.3	179,032	16.9	24,369	6.0	8,685	0
11/13/2011	159.1	229,084	18.6	26,827	7.3	10,533	0
11/14/2011	124.7	179,612	14.7	21,154	6.2	8,954	0
11/15/2011	108.2	155,786	14.8	21,273	7.4	10,604	0
11/16/2011	122.0	175,617	20.5	29,536	7.8	11,193	0.74
11/17/2011	111.7	160,866	18.6	26,759	7.0	10,020	0
11/18/2011	101.6	146,358	14.6	21,057	6.1	8,782	0
11/19/2011	112.3	161,687	15.7	22,539	6.8	9,721	0
11/20/2011	117.6	169,284	18.5	26,702	7.4	10,687	0.04
11/21/2011	104.4	150,348	15.8	22,790	6.1	8,809	0.03
11/22/2011	156.9	225,909	27.8	40,086	13.4	19,284	1.66
11/23/2011	294.6	424,217	33.9	48,819	33.7	48,547	0.77
11/24/2011	154.6	222,657	23.2	33,362	8.7	12,507	0
11/25/2011	129.3	186,146	16.8	24,240	6.7	9,718	0
11/26/2011	126.0	181,470	17.8	25,565	7.3	10,555	0
11/27/2011	133.4	192,138	19.7	28,375	7.2	10,315	0
11/28/2011	118.5	170,627	15.4	22,235	5.9	8,448	0.01
11/29/2011	153.5	221,043	23.1	33,313			0.57
11/30/2011	126.3	75,760	17.0	10,216			0
11/23/2011 5:30	515.8						
11/29/2011 20:00			101.7				

DECEMBER 2011							
Date	Sadsbury P.S. Average Flow	Sadsbury P.S. TOTAL Flow	Sandy Hill P.S. Average Flow	Sandy Hill P.S. TOTAL Flow	Lincoln Crest Average Flow	Lincoln Crest Total Flow	Rainfall (in)
12/1/2011	134.3	106,766	16.1	12,789			0
12/2/2011	115.3	166,078	13.7	19,666			0
12/3/2011	116.4	167,652	16.3	23,439			0
12/4/2011	126.9	182,750	19.1	27,491			0
12/5/2011	111.5	160,541	14.4	20,767			0.04
12/6/2011	111.4	160,446	15.7	22,547			0.15
12/7/2011	203.6	293,252	26.2	37,765			2.04
12/8/2011	217.7	313,508	23.3	33,578			0.07
12/9/2011	142.3	205,833	16.2	23,399			0
12/10/2011	136.6	196,766	16.6	23,961			0
12/11/2011	138.7	199,792	19.9	28,587			0
12/12/2011	125.0	179,952	15.5	22,345			0
12/13/2011	120.9	174,145	14.1	20,375			0
12/14/2011	116.3	167,419	15.0	21,663			0
12/15/2011	119.3	171,808	14.9	21,498			0.01
12/16/2011	118.3	170,299	14.7	21,131			0
12/17/2011	124.3	178,965	17.4	25,066			0
12/18/2011	128.1	184,470	18.9	27,185			0
12/19/2011	117.5	169,164	16.3	23,427			0
12/20/2011	113.3	163,100	15.9	22,828			0.03
12/21/2011	116.5	167,818	16.6	23,891			0.07
12/22/2011	117.2	168,786	16.2	23,306			0.18
12/23/2011	178.4	256,950	23.2	33,424			1.21
12/24/2011	142.6	205,413	21.5	30,949			0
12/25/2011	130.9	188,435	18.3	26,410			0
12/26/2011	134.7	194,014	19.0	27,412			0
12/27/2011	176.5	254,224	22.3	32,055			0.57
12/28/2011	151.3	217,850	19.3	27,773			0
12/29/2011	131.1	188,749	17.1	24,634			0
12/30/2011	126.2	181,783	17.0	24,428			0
12/31/2011	85.3	51,192	9.7	5,794			0
12/28/2011 13:30	593.4						
12/12/2011 12:45			98.3				

	<b>Sadsbury PS Max</b>		<b>Sandy Hill Max</b>	
8/28/2011 3:15	718.6			
9/23/2011 19:30	831.7			
3/10/2011 17:30			149.3	
8/28/2011 5:30			140.9	
Max GPD (8/28)		502,959		
Max GPD (3/10)				103,025

**PRECIPITATION (inches) 2011 PHILADELPHIA (KPHL)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1982	4.45	3.16	2.66	6.06	4.47	5.76	1.94	2.20	2.32	1.94	3.67	1.80	40.43
1983	2.81	3.53	6.70	8.12	7.03	2.75	0.68	2.57	3.45	3.69	5.71	7.37	54.41
1984	2.22	2.81	6.14	4.25	6.87	2.85	6.99	3.28	1.96	2.56	1.56	2.17	43.66
1985	1.55	2.44	1.95	0.52	4.99	1.88	4.66	2.82	5.78	1.54	6.09	0.98	35.20
1986	4.13	3.38	1.25	4.46	0.70	1.99	4.10	3.70	2.33	2.22	6.27	5.89	40.42
1987	4.58	1.17	1.16	3.63	3.15	2.01	4.82	3.72	2.78	2.62	2.08	1.68	33.40
1988	2.72	4.11	2.24	2.92	3.67	0.57	8.07	3.16	2.62	2.16	5.17	1.00	38.41
1989	2.41	3.25	4.41	2.27	6.76	4.73	9.44	3.92	5.03	3.44	1.79	1.21	48.66
1990	4.09	1.44	2.59	3.16	6.08	3.39	2.62	4.07	1.71	1.68	1.17	3.79	35.79
1991	4.10	0.75	4.13	2.81	1.82	3.36	4.79	3.86	3.58	1.61	1.55	3.86	36.22
1992	0.88	1.31	3.19	1.26	2.74	1.84	5.05	2.00	3.04	1.23	3.26	4.61	30.41
1993	1.97	3.03	6.61	4.20	2.42	1.52	1.98	5.18	6.66	2.69	2.23	3.69	42.18
1994	4.27	3.27	6.44	2.86	3.66	1.74	10.42	4.54	1.64	0.94	3.03	2.11	44.92
1995	3.10	2.41	1.67	1.96	2.67	0.62	2.92	1.15	3.55	5.99	3.34	2.15	31.53
1996	4.39	2.12	4.27	4.48	3.25	4.73	8.17	4.29	4.95	4.30	3.03	8.47	56.45
1997	2.80	2.48	3.91	2.58	2.32	1.49	2.38	4.56	1.59	1.83	3.49	3.09	32.52
1998	4.24	3.25	3.93	2.70	3.87	4.91	1.79	1.26	1.86	1.84	1.18	0.82	31.65
1999	4.89	2.95	4.02	3.31	3.70	1.16	1.22	5.32	13.07	3.55	2.31	2.99	48.49
2000	3.22	2.02	6.32	3.05	3.03	3.82	5.54	2.90	8.28	1.51	2.21	2.82	44.72
2001	2.77	3.04	5.44	1.49	3.99	5.93	1.30	0.97	2.58	0.83	0.56	2.11	31.01
2002	2.43	0.55	4.03	2.17	3.57	3.73	2.12	2.47	3.67	5.90	4.61	4.05	39.30
2003	1.93	5.04	4.09	2.20	4.17	8.08	2.01	3.26	4.66	4.45	2.63	5.46	47.98
2004	1.70	2.50	3.54	6.02	3.62	4.57	7.91	4.17	5.19	2.24	4.55	3.17	49.18
2005	4.45	2.61	3.66	5.32	1.27	3.31	4.31	2.57	0.21	8.68	2.86	2.97	42.22
2006	4.34	1.51	0.91	3.71	2.16	7.95	4.27	3.93	5.97	6.42	4.88	2.15	48.20
2007	3.35	1.73	3.82	9.05	2.68	4.02	3.44	2.94	0.58	4.66	1.45	4.41	42.13
2008	1.74	3.93	3.67	2.19	4.55	2.87	3.45	2.44	4.31	1.59	4.02	5.57	40.33
2009	2.70	0.84	1.62	3.99	4.84	4.79	3.35	10.29	3.65	5.51	2.06	8.86	52.50
2010	2.19	5.75	7.33	2.65	2.53	2.05	6.28	2.19	3.48	5.01	1.76	3.24	44.46
2011	3.39	2.65	4.29	5.29	1.91	2.56	2.71	19.31	10.27	3.71	3.87	4.37	64.33
POR= 64 YRS	3.16	2.75	3.82	3.51	3.53	3.60	4.09	4.16	3.67	2.97	3.19	3.53	41.98

WBAN : 13739

**AVERAGE TEMPERATURE (°F) 2011 PHILADELPHIA (KPHL)**

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1982	24.7	34.4	41.7	50.2	65.9	68.7	76.9	73.5	67.6	56.9	48.4	41.3	54.2
1983	34.1	34.0	43.7	51.0	62.1	72.0	77.9	77.1	69.0	56.6	46.7	33.2	54.8
1984	26.2	38.7	35.5	50.2	60.2	73.0	73.9	75.2	64.7	61.2	44.4	41.9	53.8
1985	27.3	35.3	44.6	55.5	64.5	68.8	75.4	74.1	69.1	59.3	51.3	33.3	54.9
1986	32.8	32.1	44.5	53.3	66.8	73.8	78.1	74.0	68.3	57.8	44.5	37.9	55.3
1987	31.9	32.5	45.7	53.1	63.9	74.6	79.5	75.4	68.8	52.5	48.0	39.2	55.4
1988	27.3	34.6	44.7	51.3	63.6	72.3	80.7	78.3	66.7	51.8	47.7	35.4	54.5
1989	36.5	34.8	42.3	52.4	62.4	74.7	76.3	75.6	69.7	58.3	44.9	25.5	54.5
1990	40.3	41.2	46.1	53.3	61.3	72.2	78.0	75.8	68.0	61.9	49.7	42.1	57.5
1991	35.2	40.0	46.1	55.5	70.8	75.7	79.0	79.0	69.5	58.9	47.3	39.6	58.1
1992	35.7	37.5	41.6	53.2	62.5	71.3	77.1	73.5	68.4	55.2	48.0	38.8	55.2
1993	38.2	31.9	39.8	54.2	66.4	74.4	81.4	78.9	69.7	58.0	49.0	38.4	56.7
1994	27.4	33.2	42.8	59.5	62.5	78.1	82.1	74.9	68.3	57.5	51.7	41.9	56.7
1995	38.2	31.5	47.3	54.5	64.3	74.3	81.5	79.9	70.4	61.4	43.0	31.6	56.5
1996	30.2	33.9	38.7	52.7	60.6	73.0	74.4	74.5	68.7	56.3	41.3	40.2	53.7
1997	32.5	40.0	44.1	51.4	59.5	71.1	77.5	73.9	67.1	57.3	44.4	38.5	54.8
1998	41.0	41.8	45.5	55.3	66.2	71.5	77.5	78.0	71.8	58.3	48.2	42.0	58.1
1999	35.0	38.0	42.4	53.5	64.0	72.9	81.2	77.4	69.9	56.1	50.9	39.9	56.8
2000	32.1	37.5	48.0	52.6	64.2	72.6	74.1	74.1	66.4	57.7	45.4	31.3	54.7
2001	32.5	37.4	41.1	54.9	64.7	75.2	75.4	79.9	68.4	59.1	52.9	43.7	57.1
2002	39.2	41.1	45.5	57.2	63.3	73.9	79.6	79.5	72.2	57.6	45.9	35.4	57.5
2003	28.6	29.9	44.9	52.6	60.6	71.3	78.8	78.3	70.1	56.0	50.8	36.8	54.9
2004	26.1	35.5	45.1	54.4	69.3	71.8	76.3	75.0	70.5	56.2	47.9	37.8	55.5
2005	31.8	36.1	39.5	55.3	59.6	74.8	78.9	79.7	73.8	58.8	49.3	34.4	56.0
2006	40.8	35.6	44.5	56.7	64.6	72.8	79.5	78.1	67.2	56.2	51.3	42.7	57.5
2007	38.2	28.0	43.7	50.8	66.1	73.8	77.3	77.0	72.0	64.5	45.7	37.7	56.2
2008	35.9	36.9	44.8	56.3	61.2	76.4	79.3	74.6	70.4	56.6	45.6	38.7	56.4
2009	29.1	37.1	43.7	55.6	65.0	71.1	75.9	78.2	68.0	56.4	50.9	36.4	55.6
2010	33.2	31.8	48.3	58.4	67.5	78.2	81.8	79.0	72.9	59.0	48.2	32.7	57.6
2011	29.3	37.3	44.1	56.8	67.4	75.5	82.4	76.1	71.2	57.7	51.4	43.3	57.7
POR= 64 YRS	32.3	34.5	42.7	53.4	63.4	72.5	77.4	75.9	68.6	57.1	46.9	36.6	55.1

Projection of EDU Connections and Flows (gpd)

Project Name	Proposed Use	Location	Plan Status	Current EDUs	Remaining EDUs	TOTAL EDUs	Prior to 2011	2011	2012	2013	2014	2015	2016
Witmer Fire Store	30,000 s.f. Building Expansion	Independence Way	Approved Feb. 2009 - BUILT										
Constable LD	4 SFDUs on Lg. Lots - ON LOT Sewage Disposal	Limestone Road	Approved Mar. 2009	N.A.	N.A.	N.A.							
Sadsburyville Fire Company	Fire Station Expansion	Old Wilmington Rd	ON HOLD - NO EDUs	N.A.	N.A.	N.A.							
Chester County Airport		Rt 30 & Washington Ln	Pending Approval										
York Equity - Lot 6	Office Building	Morris Farm/ Independence Way	ON HOLD										
Sadsbury Commons	500,000 s.f. Shopping Center	Rt 30 & Rt 10	Pending Approval & Act 537 Plan Update										
Sadsbury Commons - Medical Office Building	40,000 sf Medical Office Facility - ON LOT Sewage Disposal	Rt 10 Across from WalMart	Conditional Final Approval - Planning Module Approved, Escrow Posted, Construction Shortly	N.A.	N.A.	N.A.							
Art Hurling	2 Existing Residential EDUs	Maple Avenue	Pending Planning Module and/or Act 537 Plan Update	0	2	2	0			2			
Valley View Business Center Lots 2 & 3 (National Guard)	National Guard Armory	Waverly Blvd. & Washington Ln.	Conditional Final Approval	0	3	3	0		3				
Lincoln Crest Mobile Home Park	50 Unit Expansion of 125 Existing Unit Park	Rt 30 & Sharon Ln	Conditional Final Approval - Awaiting Posting of Escrow*	0	50	50	0				10	10	10
Sadsbury Park - Phase 2A	67 EDUs (52 SFD, 15 SFA)+ 2 EDUs for Cabena = 69 TOTAL EDUs	Old Wilmington Rd south of Rt 30	Approved & Under Construction	12	57	69	0	12	17	28	12		
Sadsbury Park - Phase 4C	48 Townhouse Units (SFA) - Including 6 from Phase 2B	Old Wilmington Rd south of Rt 30	Final Plan Pending AQUA Approval	0	48	48	0	0	18	30			
Sadsbury Park - Phase 1	41 EDUs (All SFD)	Old Wilmington Rd south of Rt 31	Not submitted	0	41	41	0						
Sadsbury Park - Phase 2B	132 EDUs (38 SFD, 88 SFA+ 6 SFA Accounted for in Ph 4C)	Old Wilmington Rd south of Rt 32	Not submitted	0	126	126	0						
Sadsbury Park - Phase 3A	42 EDUs (All SFD)	Old Wilmington Rd south of Rt 33	Not submitted	0	42	42	0						
Sadsbury Park - Phase 3B	46 EDUs (14 SFD, 32 SFA)	Old Wilmington Rd south of Rt 34	Not submitted	0	46	46	0						
Sadsbury Park - Phase 4A	57 EDUs (All SFD)	Old Wilmington Rd south of Rt 35	Not submitted	0	57	57	0						
Sadsbury Park - Phase 4B	12 EDUs (All SFD)	Old Wilmington Rd south of Rt 36	Not submitted	0	12	12	0						
Lafayette Square - Phase 1	4 Bldgs (40 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 30	Approved Oct 2010 - Under Construction (4 Bldgs Complete @ 10 Units EA)	3	37	40	0	3	37				
Lafayette Square - Phase 2	7 Bldgs (65 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 31	Approved Oct 2010 - Not Started	0	65	65	0			10	45	10	
Lafayette Square - Phase 3	2 Bldgs (20 Units) of Total 13 Bldgs (125 Units)	Old Wilmington Rd North of Rt 32	Approved Oct 2010 - Not Started	0	20	20	0					10	10
Sadsbury Township - Phase IV Sewers	Existing Residential EDUs	Valley Road	Phase IV Sewer Construction Complete - Not all EDUs connected	10	70	80	0	10	6	5			
Sadsbury Township Misc	Existing Residence	Renovated Farmhouse at Sads Park Development	Completed & Connected	1	0	1	0	1					
* - Improvements should curtail inflow													
<b>TOTAL EDUs</b>				26	676	702	0	26	81	75	67	30	20
<b>TOTAL FLOW (GPD) @ 250 GPD/EDU</b>				6,500	169,000	175,500	0	6,500	20,250	18,750	16,750	7,500	5,000
<b>STOTTSDALE PUMP STATION 2-YR PROJECTION (GPD)</b>								171,599	191,849	210,599	227,349	234,849	239,849

**PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
WATER MANAGEMENT PROGRAM  
SOUTHEAST REGIONAL OFFICE**

DRAFT

DRAFT

**SEWAGE PUMPING STATION GUIDANCE**

This guidance is a supplement to the 10/97 DOMESTIC WASTEWATER FACILITIES MANUAL and to the instructions included with the APPLICATION FOR WATER QUALITY MANAGEMENT PART II PERMIT for SEWER EXTENSIONS AND PUMPING STATIONS.

**PART II PERMIT APPLICATIONS** for the construction or expansion of sewage pumping stations will only be accepted by the Department of Environmental Protection after ACT 537 PLANNING APPROVAL has been granted by the Department. The required PLANNING APPROVAL may be granted through an update of a Municipality's Official Sewage Facilities 537 Plan, through a Special Study in support of an existing official plan, or through a Sewage Facilities Planning Module proposing new land development that will be served by the pumping station.

Note: Many existing pumping stations are experiencing overflows when peak usage periods coincide with increases in inflow and infiltration that occur during wet-weather events. At many pumping stations the back-up or lag pump activates during these peak use periods. The back-up pump is only to be used when one of the lead pumps is out of service. Pumping stations must be adequately sized so that the back-up or lag pump does not come on, even during periods of maximum flow. (However, the back-up pump may alternate service with the lead pumps.)

This guidance is intended to be used in conjunction with the Domestic Wastewater Facilities Manual to provide supplementary information for determining instantaneous peak flows and required pump capacities. The Department will accept projects for review that are designed by analogy, with appropriate justification (such as a year of daily flow meter readings from a similar project, that indicates maximum daily flows and instantaneous peak flows, with no instances where the back-up pump has activated).

1. Name of the proposed Permittee. If the name of the Permittee on the Part II Permit Application is not consistent with your Act 537 Planning Approval, your application cannot be accepted. For private pumping stations, your planning approval must be consistent with the sewage management requirements of the Pennsylvania Code, Title 25, § 71.72.
2. Basis of Design. Indicate the design year of the project and the corresponding design population, including both the initial population and any future population to be served.
3. Design Flows – New Pumping Stations. The following recommended peaking factors for Peak Hourly Flows are derived from the graph on Page 20-2 of the 1978 Edition of Recommended Standards for Sewage Works, from the Great Lakes-Upper Mississippi River Board of State Sanitary Engineers, upon which Pennsylvania's Domestic Wastewater Facilities Manual was based. Alternate calculation methods may also be submitted, along with appropriate justification:

Average Daily Flow in MGD*	.010	.030	.060	.100	.300	1.000	4.000	10.000
Peaking Factor	4.2	4.0	3.9	3.8	3.5	3.0	2.5	2.0

\* 100 gallons per person multiplied by the population figures listed on the graph referenced above

# W.G. MALDEN

P.O. BOX 156, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

## \*\*\*SERVICE REPORT\*\*\*

LISA MYERS  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

SERVICE DATE: 12/27/2011  
METER#: C8099 AA  
LOCATION: SADSBURY  
SERIAL #: 00W011634/883533-0003  
MANUFACTURER: F & P/PARTLOW  
RECORDER: MRC 5000  
TRANSMITTER: 50XM13NXAB20AABC229  
PRIMARY: MAGMETER  
MAXIMUM CAPACITY: 2500 GPM  
SERVICE CONTRACT: QUARTERLY

# of pages: 1 Date: 12/29/11  
To:  
Co./Dept: Lisa Myers  
Fax #:  
From: 610-857-2690  
W.G. Malden  
Phone: 717-768-0800  
Fax: 717-768-0802

---

### \*WORK PERFORMED\*

**\*RECORDER CALIBRATION\*** CHECKED AT: 0, 25, 50, 75 & 100%  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**\*TOTALIZER CALIBRATION\*** CHECKED AT: OPERATING RATE  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**FAXED**  
12/29/11

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COMMENTS: PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

SERVICE REPRESENTATIVE: DENNIS/ROY  
copies:

PERSON SEEN: HAVE CODE

# W.G. MALDEN

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

## \*\*\*SERVICE REPORT\*\*\*

LISA MYERS  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 9/19/2011  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

# of pages: 1 Date: 9/28/11  
To:  
Co./Dept: Lisa Myers  
Fax #:  
From: 610-857-2690  
W.G. Malden  
Phone: 717-768-0800  
Fax: 717-768-0802

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**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
ERROR: 0% CORRECTED ACCURACY: ± 1%

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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** BOB  
copies:

**PERSON SEEN:** HAVE KEY

 **E-MAILED**  
9/28/11  
to Sadsbury

**FAXED**  
9/28/11  
to L. Myers



# W.G. MALDEN

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

## \*\*\*SERVICE REPORT\*\*\*

LISA MYERS  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 6/27/2011  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

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**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DENNIS  
copies:

**PERSON SEEN:** SPOKE WITH LISA

FAXED  
7/13/11

E-MAILED  
7/13/11

## W.G. MALDEN

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

### \*\*\*SERVICE REPORT\*\*\*

LISA MYERS  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 3/21/2011  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** Magmeter  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

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#### \*WORK PERFORMED\*

**\*RECORDER CALIBRATION\*** CHECKED AT: 0, 25, 50, 75 & 100%  
ERROR: +1% CORRECTED ACCURACY:  $\pm 1\%$

**\*TOTALIZER CALIBRATION\*** CHECKED AT: OPERATING RATE  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DENNIS  
copies:

**PERSON SEEN:** HAVE KEY

FAXED  
3/30/11

# W.G. MALDEN

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

## \*\*\*SERVICE REPORT\*\*\*

LISA MYERS  
SADSBURY SEWER-CHESTER CO.  
P.O. BOX 261  
SADSBURYVILLE, PA 19369

**SERVICE DATE:** 12/27/10 & 1/5/11  
**METER#:** C8099 AA  
**LOCATION:** SADSBURY  
**SERIAL #:** 00W011634/883533-0003  
**MANUFACTURER:** F & P/PARTLOW  
**RECORDER:** MRC 5000  
**TRANSMITTER:** 50XM13NXAB20AABC229  
**PRIMARY:** MAGMETER  
**MAXIMUM CAPACITY:** 2500 GPM  
**SERVICE CONTRACT:** QUARTERLY

---

### \*WORK PERFORMED\*

**\*RECORDER CALIBRATION\*** CHECKED AT: 0, 25, 50, 75 & 100%  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**\*TOTALIZER CALIBRATION\*** CHECKED AT: OPERATING RATE  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC DRAWDOWN CALIBRATION  
ERROR: \* 0% CORRECTED ACCURACY:  $\pm 1\%$

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**COMMENTS:** PERFORMED QUARTERLY CALIBRATION. \*FOUND EXTERNAL TOTALIZER UN-READABLE. NEEDS BATTERY REPLACED. MUST USE METER'S TOTALIZER UNTIL BATTERY IS REPLACED. LAST TOTALIZER READINGS WERE 2245355 x 100. 1/5/11 - RE-INSTALLED EXTERNAL TOTALIZER. VERIFIED CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DS/DW/RLH  
copies:

**PERSON SEEN:** HAVE KEY



**E-MAILED**

1/7/11

## W.G. MALDEN

P.O. BOX 196, EAST EARL, PA 17519  
PHONE: (717) 768-0800 FAX: (717) 768-0802

### \*\*\*SERVICE REPORT\*\*\*

JIM KELLY  
PENNSYLVANIA AMERICAN WATER  
100 CHESHIRE COURT, SUITE 104  
COATESVILLE, PA 19320

**SERVICE DATE:** 6/14/2011  
**METER#:** C8317 AE  
**LOCATION:** SANDYHILL PUMP STATION  
**SERIAL #:** M073281304/ UR3030-001  
**MANUFACTURER:** SPARLING/CHESELL  
**RECORDER:** 392  
**TRANSMITTER:** TIGERMAG FM626  
**PRIMARY:** 4" MAG  
**MAXIMUM CAPACITY:** 1182 GPM  
**SERVICE CONTRACT:** QUARTERLY

---

#### \*WORK PERFORMED\*

**\*RECORDER CALIBRATION\*** CHECKED AT: 0, 25, 50, 75, & 100%  
ERROR: -1% CORRECTED ACCURACY:  $\pm 1\%$

**\*TOTALIZER CALIBRATION\*** CHECKED AT: OPERATING RATE  
ERROR: 0% CORRECTED ACCURACY:  $\pm 1\%$

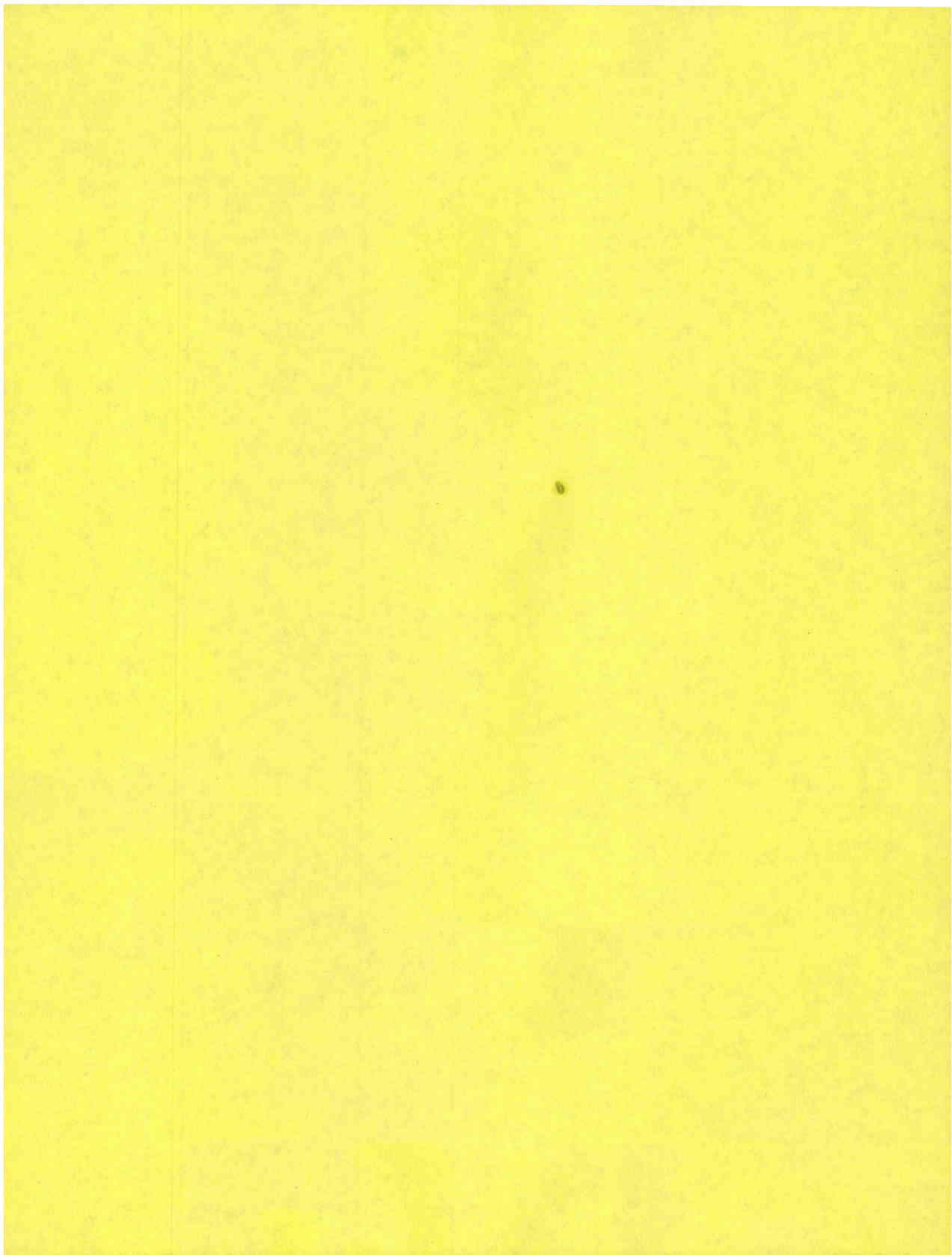
**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC CALIBRATION  
ERROR: -1.2% CORRECTED ACCURACY:  $\pm 1\%$

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COMMENTS: PERFORMED QUARTERLY CALIBRATION. ADJUSTED 4-20 mA. LEFT EQUIPMENT OPERATING PROPERLY.

SERVICE REPRESENTATIVE: BOB  
copies:

PERSON SEEN: HAVE KEY



**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Water/wastewater Industry**  
**Financials and Operating Statistics**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

US Water Industry  
Financial and Operational Statistics

	American	Aqua	Average	Use
<b>Income Statement</b>				
<b>Water</b>				
Customers	3,112,154	850,328		
Revenues	2,595,000,000	689,468,000		
Revenue Growth	3.68%	3.73%	3.71%	
Customer Growth	0.75%	2.02%	1.39%	
Revenue Growth Rates	2.93%	1.71%	2.32%	
Annual Revenues per customer	833.83	810.83		
<b>Wastewater</b>				
Customers	140,537	107,538		
Revenues	97,000,000	79,399,000		
Revenue Growth	7.12%	5.05%	6.08%	
Customer Growth	7.67%	4.63%	6.15%	
Revenue Growth Rates	-0.56%	0.42%	-0.07%	
Annual Revenues per customer	690.21	738.33		
Total Revenues	2,692,000,000	768,867,000		
<b>Operating Expenses</b>				
Operations & Maintenance	3,159,000,000	309,310,000		
O&M Exp as % of Rev.	46.72%	37.24%	41.98%	
Depreciation	440,000,000	125,290,000		
Depr as % of End Gross Plant	2.43%	2.19%	2.31%	
Taxes Other than Income Taxes	243,000,000	55,057,000		
Other taxes as % of Net Plant	1.87%	1.19%	1.53%	
Total Operating Expenses (calc'd)	2,084,000,000	493,104,000		
Operating Income (EBIT) (calc'd)	1,075,000,000	321,100,000		
<b>Other (Income) / Expense</b>				
Interest Expense	308,000,000	76,536,000		
Interest Exp as % of Long-Term Debt	5.76%	4.99%	5.38%	
Income before State and Federal Taxes (EBT) (calc'd)	782,000,000	216,752,000		
Income Taxes	306,000	14,962		
Income Taxes as % of EBT	39.72%	20.92%	30.32%	
Income after Income Taxes (calc'd)	476,000,000	201,790,000		
Earnings before interest, depreciation & Amortization, and Taxes (EBITDA) (calc'd)	1,224,306,000	403,630,962		

US Water Industry  
Financial and Operational Statistics

	American	Aqua	Average
<b>Balance Sheet</b>			
<b>Assets</b>			
Property, Plant, and Equipment			
Begin Balance	18,504,000,000	6,088,011,000	
Additions	1,344,000,000	412,225,000	
Adds as % of Beg Plant Balance	7.17%	7.18%	7.17%
Retirements	(109,000,000)	(31,231,000)	
Rets as % of Beg Plant Balance	-0.89%	-0.84%	-0.87%
Transfers & Adjustments	0	0	
Trnsf as % of Beg Plant Balance	0.00%	0.00%	0.00%
Ending Balance (calc'd)			
Accumulated Reserve for Depreciation			
Begin Reserve Balance	4,571,000,000	1,399,086,000	
Depreciation	440,000,000	125,290,000	
Depr as a % of Beg Plnt Bal	2.43%	2.19%	2.31%
Retirements	(109,000,000)	(31,231,000)	
Rets as % of Beg Plant Balance	-0.89%	-0.84%	-0.87%
Transfers & Adjustments	0	0	
Trnsf as % of Beg Plant Balance	0.00%	0.00%	0.00%
Ending Reserve Balance (calc'd)			
Net Plant Begin Balance (calc'd)	13,933,000,000	4,688,925,000	
Current Assets			
CA as % of Rev	19.92%	19.28%	19.60%
Regulatory Assets	1,271,000,000	830,118,000	
Goodwill	1,302,000,000	33,866,000	
Other Assets	78,000,000	59,759,000	
Total Assets	17,241,000,000	5,741,038,000	
<b>Liabilities</b>			
Current Liabilities			
CL as % of Rev	44.40%	37.12%	40.76%
Long Term Debt			
Begin Long term Debt	5,874,000,000	1,743,612,000	
Additional Debt			
Current Debt			
Ending Long term Debt			
Deferred Liabilities	3,664,000,000	1,565,862,000	
Contribution in Aid of Construction	1,121,000,000	512,435,000	
Total Liabilities	17,241,000,000	3,821,909,000	
<b>Equity</b>			
Authorized Shares	500,000,000	300,000,000	
Issued	180,907,483	179,363,660	
Equity Par Value	0.011055375		
Capital @ Par	2,000,000	89,682,000	
Capital in Excess of Par	6,351,000,000	773,585,000	
Retained Earnings			
Begin Year	(1,161,000,000)	849,952,000	
Income from Operations			
Dividends paid			
Other Retained earnings			
Ending Year			
Total Equity	5,049,000,000	1,713,219,000	
Total Liabilities and Stockholder equity	17,241,000,000	5,741,038,000	



## Aqua America, Inc and Subsidiaries

In thousands, except per share amounts

	Average Statistics		2015	2014	2013	2012	2011	2010
	2013 through 2015	2010 through 2015						
<b>Income Statement</b>								
Operating Revenues			814,204	779,903	761,893	757,760	687,291	660,186
Revenue Growth % per year	2.44%	4.33%	4.40%	2.36%	0.55%	10.25%	4.11%	
Operating Costs and Expenses								
Operations and maintenance			309,310	288,556	283,561	271,843	256,743	250,989
Op Ex as % of Revenues	37.40%	37.24%	37.99%	37.00%	37.22%	35.87%	37.36%	38.02%
Depreciation			125,290	123,054	118,414	111,767	103,412	100,606
Depr as % of Gross Book	2.14%	2.19%	2.06%	2.16%	2.20%	2.21%	2.29%	2.24%
Amortizations			3,447	3,481	5,571	5,229	4,888	11,110
Amortization as % of Goodwill	13.69%	17.57%	10.18%	11.16%	19.74%	18.57%	18.14%	27.61%
Taxes other than income taxes			55,057	50,453	52,685	47,404	41,449	40,147
General Tax as % of Revenues	6.72%	6.42%	6.76%	6.47%	6.92%	6.26%	6.03%	6.08%
General Tax as % of Net Plant	1.19%	1.19%	1.17%	1.15%	1.26%	1.20%	1.17%	1.16%
Total Operating Expenses			493,104	465,544	460,231	436,243	406,492	402,852
Operating Income			321,100	314,359	301,662	321,517	280,799	257,334
<b>Other expense (income)</b>								
Interest expense, net			76,536	76,397	77,316	77,757	77,804	73,393
Interest Exp as % of Debt	4.85%	4.99%	4.39%	4.90%	5.26%	5.04%	5.58%	4.79%
Allowance for funds used during construction			(6,219)	(5,134)	(2,275)	(4,142)	(7,250)	(4,831)
(Gains) loss on sale of other assets			(468)	4	(148)	(1,090)	(649)	(2,547)
Gain on extinguishment of debt			(678)	-	-	-	-	-
Equity loss in joint venture			35,177	3,989	2,665	(1,976)	-	-
Income from continuing operations before income taxes			216,752	239,103	224,104	250,968	210,794	191,319
Provision for income taxes			14,962	25,219	21,233	66,881	69,111	74,940
Income Taxes as % of Income Before Taxes	8.97%	20.92%	6.90%	10.55%	9.47%	26.65%	32.79%	39.17%
Income from continuing operations	26.28%	23.56%	201,790	213,884	202,871	184,087	141,683	116,379
Discontinued operations			24.78%	27.42%	26.63%	24.29%	20.61%	17.63%
Income from discontinued operations before income taxes			-	32,155	28,311	20,493	14,279	12,750
Provision for income taxes			-	12,800	9,882	8,017	12,893	5,154
Income from discontinued operations before income taxes			-	19,355	18,429	12,476	1,386	7,596
Net income attributable to common shareholders			201,790	233,239	221,300	196,563	143,069	123,975
Other comprehensive income, net of tax								
Unrealized holding gain (loss) on investment			(101)	193	141	198	(10)	1,588
Reclassification adjustment for gain reported in net income			-	249	90	(339)	(233)	(1,369)
Comprehensive income			201,689	233,681	221,531	196,422	142,826	124,194
Income Check			201,689	233,681	221,531	196,422	142,826	124,194
Difference			-	-	-	-	-	-
<b>Balance Sheet</b>								
<b>Assets</b>								
Property, Plant and Equipment at cost			6,088,011	5,707,017	5,387,852	5,050,400	4,517,966	4,489,653
Net Additions			380,994	319,165	337,452	532,434	28,313	-
Retirements			(31,231)	(38,586)	(12,092)	15,446	(136,783)	-
Retirements as % of Begin Balance	-0.50%	-0.84%	-0.55%	-0.72%	-0.24%	0.34%	-3.05%	-
Additions			412,225	357,751	349,544	516,988	165,096	-
Adds as % of Begin Balance	6.93%	7.18%	7.22%	6.64%	6.92%	11.44%	3.68%	-
Less accumulated depreciation			1,399,086	1,305,027	1,220,559	1,114,237	987,024	1,020,395
Net Depreciation			94,059	84,468	106,322	127,213	(33,371)	-
Depreciation			125,290	123,054	118,414	111,767	103,412	-
Retirements			(31,231)	(38,586)	(12,092)	15,446	(136,783)	-
Net Property, Plant and Equipment			4,688,925	4,401,990	4,167,293	3,936,163	3,530,942	3,469,258
<b>Current Assets</b>								
Cash and cash equivalents			3,229	4,138	5,058	5,521	8,204	5,934
Account receivable and unbilled revenues, net			99,146	96,999	95,356	92,921	75,546	85,881
Income tax receivable			-	-	7,873	16,082	-	33,600
Deferred income taxes			-	26,849	40,038	37,818	37,758	-
Inventory, material and supplies			12,414	12,788	11,438	11,757	11,014	9,158
Prepayment and other current assets			11,802	11,748	11,112	10,372	9,775	10,846
Assets held for sale			1,779	-	794	86,423	263,061	-
Total Current assets			128,370	152,522	171,669	260,894	405,358	145,419
CA as % of Rev	19.28%	19.28%	15.77%	19.56%	22.53%	34.43%	58.98%	22.03%
<b>Regulatory Assets</b>								
deferred charges and other assets, net			830,118	725,591	585,600	521,264	240,032	217,376
Investment in joint venture			52,043	52,084	50,290	49,852	51,152	65,093
Funds restricted for construction activity			7,716	43,334	48,695	38,620	5,087	-
Goodwill			33,866	31,184	28,223	28,152	26,944	135,086
Total Assets			5,741,038	5,406,752	5,051,817	4,858,517	4,348,420	4,072,466
Assets Check			5,741,038	5,406,752	5,051,817	4,858,517	4,348,420	4,072,466
Difference			-	-	-	-	-	-
<b>Aqua America stockholders' equity</b>								
Common stock								
Authorized			300,000	300,000	300,000	300,000	300,000	300,000
Issued			179,364	178,591	177,929	140,944	139,526	138,449
Common Stock @\$50 par value			89,682	89,296	88,964	70,472	69,762	69,223
Capital in excess of Par value			773,585	758,145	743,335	718,482	686,106	664,369
Retained earnings			930,061	849,952	729,272	611,303	508,334	452,470
Treasury Stock			(68,085)	(47,838)	(27,082)	(14,668)	(13,145)	(12,307)
Accumulated other comprehensive income			687	788	346	115	256	499
Total Aqua America equity			1,725,930	1,655,343	1,534,835	1,385,704	1,251,313	1,174,254

## Aqua America, Inc. and Subsidiaries

In thousands, except per share amounts

	Average Statistics		2015	2014	2013	2012	2011	2010
	2013 through 2015	2010 through 2015						
Noncontrolling interest			-	40	208	188	504	572
Total Equity			1,725,930	1,655,383	1,535,043	1,385,892	1,251,817	1,174,826
Long-term debt, excluding current portion			1,743,612	1,560,655	1,468,583	1,543,954	1,395,457	1,531,976
Commitment and contingencies (note 9)			-	-	-	-	-	-
Current liabilities								
Current portion of long-term debt			35,593	58,615	86,288	45,038	80,429	28,413
Loans Payable			16,721	18,398	36,740	80,383	107,771	89,668
Accounts payable			56,452	63,035	65,816	55,506	67,595	45,382
Accrued interest			12,651	12,437	13,615	14,026	14,563	15,891
Accrued taxes			21,887	31,462	15,442	28,214	16,694	16,401
Other accrued liabilities			49,895	41,388	34,193	27,360	22,595	27,960
Liabilities of discontinued operations held for sale			-	-	14,816	23,637	137,171	-
Total Current Liabilities			193,199	225,335	266,910	274,164	446,818	223,715
	29.22%	37.12%	23.73%	28.89%	35.03%	36.18%	65.01%	33.89%
Deferred credits and other liabilities								
Deferred income taxes and investments tax credits			1,118,923	1,000,791	867,880	723,367	596,644	478,705
Customers' advances for construction			86,934	78,301	74,257	71,595	66,198	66,966
Regulatory Liabilities			259,507	278,317	281,014	241,363	41,344	35,921
Other			100,692	109,692	81,552	157,978	121,986	116,250
Total Deferred credits and other liabilities			1,565,862	1,467,101	1,304,703	1,194,303	826,172	697,842
Contributions in aid of construction			512,435	498,278	476,578	460,204	428,156	444,107
Total liabilities and equity			5,741,038	5,406,752	5,051,817	4,858,517	4,348,420	4,072,466
Checl			5,741,038	5,406,752	5,051,817	4,858,517	4,348,420	4,072,466
Difference			-	-	-	-	-	-
Working Capital								
Current Assets			128,370	152,522	173,669	260,894	405,358	145,419
Current Liabilities			193,199	225,335	266,910	274,164	446,818	223,715
Working capital			(64,829)	(72,813)	(93,241)	(13,270)	(41,460)	(78,296)
Working capital as % of Revenues	-9.93%	-8.24%	-7.96%	-9.34%	-12.50%	-1.75%	-6.03%	-11.86%
Customers								
Residential Water			791,404	779,665	771,660	766,121	711,664	719,812
Commercial Water			40,151	39,614	39,237	38,805	34,806	34,649
Industrial Water			1,353	1,357	1,368	1,373	1,212	1,226
Other Water			17,420	17,412	17,230	16,643	15,676	15,376
Total Water			850,328	838,048	829,495	822,942	763,358	771,063
Growth	1.10%	2.02%	1.47%	1.03%	0.80%	7.81%	-1.00%	-
Wastewater			107,538	102,071	98,705	95,044	84,978	86,108
Growth	4.21%	4.63%	5.36%	3.41%	3.85%	11.85%	-1.31%	-
Total Utility Customers			957,866	940,119	928,200	917,986	848,336	857,171
Customer Growth	1.43%	2.29%	1.89%	1.28%	1.11%	8.21%	-1.03%	-
Operating Revenues								
Residential Water			477,773	460,013	457,404	441,240	403,311	391,922
Commercial Water			126,677	122,795	121,178	117,559	105,461	99,632
Industrial Water			28,021	27,369	25,263	24,822	21,407	20,716
Other Water			56,997	59,474	57,446	70,693	64,769	63,222
Total Water			689,468	669,651	661,291	654,314	594,948	575,492
Growth	1.76%	3.73%	2.96%	1.26%	1.07%	9.98%	3.38%	-
Wastewater			79,399	76,472	73,062	68,225	62,780	62,156
Growth	5.19%	5.05%	3.83%	4.67%	7.09%	8.67%	1.00%	-
Other utility			10,746	9,934	10,174	10,416	10,585	10,973
Total Utility Revenues			779,613	756,057	744,527	732,955	668,313	648,621
Revenue Growth	2.08%	3.79%	3.12%	1.55%	1.58%	9.67%	3.04%	-
Tariff rate growth	0.65%	1.50%	1.23%	0.26%	0.47%	1.46%	4.07%	-
Water Revenue Growth	1.76%	3.73%	2.96%	1.26%	1.07%	9.98%	3.38%	-
Water Customer Growth	1.10%	2.02%	1.47%	1.03%	0.80%	7.81%	-1.00%	-
Water Rate Growth	0.67%	1.71%	1.49%	0.23%	0.27%	2.17%	4.38%	-
Wastewater Revenue Growth	5.19%	5.05%	3.83%	4.67%	7.09%	8.67%	1.00%	-
Wastewater Customer Growth	4.21%	4.63%	5.36%	3.41%	3.85%	11.85%	-1.31%	-
Wastewater Rate Growth	0.99%	0.42%	-1.53%	1.26%	3.24%	-3.17%	2.32%	-

## American Water Works Company, Inc. and Subsidiaries

In thousands, except per share amounts

	Average Statistics		2015	2014	2013	2012	2011	2010
	2013 through 2015	2010 through 2015						
<b>Income Statement</b>								
Operating Revenues			3,159,000	3,011,000	2,879,000	2,876,889	2,666,236	2,555,035
Revenue Growth	3.19%	4.37%	4.92%	4.58%	0.07%	7.90%	4.35%	
Operating Costs and Expenses								
Operations and maintenance			1,404,000	1,350,000	1,289,000	1,350,040	1,301,794	1,290,941
Depreciation	44.68%	46.72%	44.44%	44.84%	44.77%	46.93%	48.83%	50.53%
Depr. Exp as % of Gross Plant	2.43%	2.43%	2.38%	2.46%	2.47%	2.45%	2.42%	2.42%
Amortizations								
Taxes other than income taxes			243,000	236,000	234,000	221,212	210,478	205,597
General Taxes as % of Revenues	7.89%	7.88%	7.69%	7.84%	8.13%	7.69%	7.89%	8.05%
General Taxes as % of Net Plant	1.81%	1.87%	1.74%	1.81%	1.89%	1.88%	1.91%	1.98%
(Gain) loss on asset dispositions and purchases			(3,000)	(2,000)	1,000	(839)	(993)	111
Total Operating Expenses			2,084,000	2,008,000	1,931,000	1,951,916	1,863,100	1,826,913
Operating Income			1,075,000	1,003,000	948,000	924,973	803,136	728,122
Other expense (income)								
Interest expense, net	5.55%	5.76%	308,000	299,000	308,000	316,152	317,470	318,281
Allowance for funds used during construction			5.24%	5.49%	5.91%	6.09%	5.95%	5.90%
(Gains) loss on sale of other assets						(23,363)	(19,054)	(14,869)
Gain on extinguishment of debt					41,000	926	1,040	(4,714)
Equity loss in in joint venture			(15,000)	(6,000)	(9,000)			
Income from continuing operations before income taxes			782,000	710,000	608,000	631,258	503,680	429,424
Provision for income taxes			306,000	280,000	237,000	257,008	198,751	174,352
Income taxes as % of Income before tax	39.18%	39.72%	39.13%	39.44%	38.98%	40.71%	39.46%	40.60%
Income from continuing operations			476,000	430,000	371,000	374,250	304,929	255,072
Discontinued operations								
Income from discontinued operations before income taxes			-	(7,000)	(2,000)	(16,180)	4,684	12,755
Provision for income taxes								
Income from discontinued operations before income taxes			-	(7,000)	(2,000)	(16,180)	4,684	12,755
Net income attributable to common shareholders			476,000	423,000	369,000	358,070	309,613	267,827
Other comprehensive income, net of tax			(6,000)	(47,000)	81,000	(18,514)	(26,231)	(6,769)
Unrealized holding gain (loss) on investment								
Reclassification adjustment for gain reported in net income								
Comprehensive income			470,000	376,000	450,000	339,556	283,382	261,058
Income Check			470,000	376,000	450,000	339,556	283,382	261,058
Difference			-	-	-	-	-	-
<b>Balance Sheet</b>								
<b>Assets</b>								
Property, Plant and Equipment at cost			18,504,000	17,269,000	16,497,763	15,596,052	14,545,520	13,653,217
Net Additions			1,235,000	771,237	901,711	1,050,532	892,303	
Retirements			(109,000)	(293,409)	(154,279)	(49,237)	(98,976)	
Retirement as % of Begin Balance	-1.13%	-0.89%	-0.63%	-1.78%	-0.99%	-0.34%	-0.72%	
Adds			1,344,000	1,064,646	1,055,990	1,099,769	991,279	
Adds as % of Begin Bal	7.00%	7.17%	7.78%	6.45%	6.77%	7.56%	7.26%	
Less accumulated depreciation			4,571,000	4,240,000	4,109,409	3,856,688	3,524,422	3,271,577
Net Depreciation			331,000	130,591	252,721	332,266	252,845	
Depreciation Exp			440,000	424,000	407,000	381,503	351,821	
Retirements			(109,000)	(293,409)	(154,279)	(49,237)	(98,976)	
Net Property, Plant and Equipment			13,933,000	13,029,000	12,388,354	11,739,364	11,021,098	10,381,640
Current Assets								
Cash and cash equivalents			45,000	23,000	26,964	24,433	14,207	13,112
Restricted Funds			21,000	14,000	28,505	29,756	32,438	94,066
Account receivable and unbilled revenues, net			522,000	453,000	423,828	375,409	366,828	332,738
Income tax receivable					23,500	9,594	7,672	6,473
Deferred income taxes								
Inventory, material and supplies			38,000	37,000	32,973	29,772	28,598	27,743
Prepayment and other current assets					7,761		929,858	937,705
Other Assets			31,000	48,000	28,276	30,483	18,058	45,938
Total Current assets	19.92%	19.92%	657,000	575,000	571,807	499,447	1,397,659	1,457,775
			20.8%	19.1%	19.9%	17.4%	52.4%	57.1%
Regulatory Assets			1,271,000	1,153,000	858,465	1,199,114	1,079,661	976,174
deferred charges and other assets, net					754	10,791	25,503	26,718
Investment in joint venture								
Funds restricted for construction activity								
Goodwill			1,302,000	1,208,000	1,207,764	1,207,250	1,195,069	1,195,585
Other Assets			78,000	73,000	60,998	63,010	57,401	48,354
Total Assets			17,241,000	16,038,000	15,088,142	14,718,976	14,776,391	14,086,246
Assets Check			17,241,000	16,038,000	15,088,142	14,718,976	14,776,391	14,086,246
Difference								
America Water stockholders' equity								
Common stock								
Authorized			500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000
Issued			180,907,483	179,461,606	178,379	176,988	175,664	174,996
Common Stock @\$50 par value			2,000	2,000	1,784	1,770	1,757	1,750
Capital in excess of Par value			6,351,000	6,302,000	6,261,396	6,222,644	6,180,558	6,156,675
Retained earnings			(1,161,000)	(1,389,000)	(1,530,333)	(1,664,955)	(1,848,801)	(1,959,235)
Treasury Stock			(143,000)		(5,043)	(116,191)	(97,677)	(71,465)
Accumulated other comprehensive income								
Total America equity			5,049,000	4,915,000	4,727,804	4,443,268	4,235,837	4,127,725
Noncontrolling interest						1,720	4,547	4,547
Total Equity			5,049,000	4,915,000	4,727,804	4,444,988	4,240,384	4,132,272
Long-term debt, excluding current portion			5,874,000	5,442,000	5,212,881	5,190,509	5,339,947	5,394,135
Commitment and contingencies [note 9]					17,177	18,861	21,137	22,135

American Water

## American Water Works Company, Inc. and Subsidiaries

In thousands, except per share amounts

	Average Statistics		2015	2014	2013	2012	2011	2010
	2013 through 2015	2010 through 2015						
<b>Current liabilities</b>								
Current portion of long-term debt			682,000	511,000				
Loans Payable								
Accounts payable			126,000	100,000				
Accrued interest			62,000	57,000				
Accrued taxes			26,000	25,000				
Other accrued liabilities			637,000	548,000				
Liabilities of discontinued operations held for sale								
<b>Total Current Liabilities</b>	<b>44.22%</b>	<b>44.40%</b>	<b>1,533,000</b>	<b>1,241,000</b>	<b>1,235,533</b>	<b>994,832</b>	<b>1,489,105</b>	<b>1,106,764</b>
			<b>48.53%</b>	<b>41.22%</b>	<b>42.92%</b>	<b>34.58%</b>	<b>55.85%</b>	<b>43.32%</b>
<b>Deferred credits and other liabilities</b>								
Deferred income taxes and investments tax credits								
Customers' advances for construction								
Regulatory Liabilities								
Other			3,664,000	3,365,000				
<b>Total Deferred credits and other liabilities</b>			<b>3,664,000</b>	<b>3,365,000</b>	<b>2,852,043</b>	<b>3,073,650</b>	<b>2,719,070</b>	<b>2,505,384</b>
Contributions in aid of construction			1,121,000	1,075,000	1,042,704	996,136	966,748	925,556
<b>Total liabilities and equity</b>			<b>17,241,000</b>	<b>16,038,000</b>	<b>15,088,142</b>	<b>14,718,976</b>	<b>14,776,391</b>	<b>14,086,246</b>
Checl			17,241,000	16,038,000	15,088,142	14,718,976	14,776,391	14,086,246
Difference								
<b>Operating Statistics</b>								
Working Capital								
Current Assets			657,000	575,000	571,807	499,447	1,397,659	1,457,775
Current Liabilities			1,533,000	1,241,000	1,235,533	994,832	1,489,105	1,106,764
Working capital			(876,000)	(666,000)	(663,726)	(495,385)	(91,446)	351,011
Working capital as % of Revenues	-24.30%	-13.30%	-27.73%	-22.12%	-23.05%	-17.22%	-3.43%	13.74%
<b>Customers</b>								
<b>Water</b>								
Residential			2,829,170	2,813,715	2,813,601	2,783,354	2,730,524	2,728,205
Commercial			218,798	218,314	219,510	218,988	216,415	216,967
Industrial			3,765	3,793	3,822	3,885	3,885	4,033
Private fire						34,858	33,887	33,610
Public Authority & Other			60,421	59,249	58,420	15,844	15,818	15,436
<b>Total Water Customers</b>			<b>3,112,154</b>	<b>3,095,071</b>	<b>3,095,353</b>	<b>3,056,938</b>	<b>3,000,529</b>	<b>2,998,251</b>
Growth	0.60%	0.75%	0.55%	-0.01%	1.26%	1.88%	0.08%	
<b>Customers</b>								
<b>Wastewater</b>								
Residential			132,870	117,602	117,584	95,576	95,092	93,156
Commercial			7,308	6,221	6,287	5,477	5,462	5,355
Industrial			17	17	16	12	13	13
Private fire						10	10	11
Public Authority & Other			342	281	259	213	199	197
<b>Total Water Customers</b>			<b>140,537</b>	<b>124,121</b>	<b>124,146</b>	<b>101,288</b>	<b>100,776</b>	<b>98,732</b>
Growth	11.92%	7.67%	13.23%	-0.02%	22.57%	0.51%	2.07%	
<b>Revenues</b>								
<b>Water Service</b>								
Residential			1,536,000	1,515,049	1,465,174	1,468,600	1,339,400	1,300,200
Commercial			559,000	550,124	520,875	518,300	474,200	457,000
Industrial			130,000	131,834	118,939	128,400	116,600	110,200
Public & other			370,000	359,425	312,369	328,400	323,000	314,100
<b>Total Water Service</b>			<b>2,595,000</b>	<b>2,556,432</b>	<b>2,417,357</b>	<b>2,443,700</b>	<b>2,142,200</b>	<b>2,181,500</b>
Wastewater Service	2.06%	3.68%	1.51%	5.75%	-1.08%	13.76%	-1.53%	
			97,000	93,067	82,831	78,200	76,300	69,000
			4.23%	12.36%	5.92%	2.49%	10.58%	
<b>Total Revenues</b>	<b>7.50%</b>	<b>7.12%</b>	<b>2,692,000</b>	<b>2,649,499</b>	<b>2,500,188</b>	<b>2,521,900</b>	<b>2,224,500</b>	<b>2,250,500</b>
Growth	2.24%	3.79%	1.60%	5.97%	-0.86%	13.37%	-1.16%	
Water Revenue Growth	2.06%	3.68%	1.51%	5.75%	-1.08%	13.76%	-1.53%	
Water Customer Growth	0.60%	0.75%	0.55%	-0.01%	1.26%	1.88%	0.08%	
Water Rate Growth	1.46%	2.93%	0.96%	5.76%	-2.33%	11.88%	-1.60%	
Wastewater Revenue Growth	7.50%	7.12%	4.23%	12.36%	5.92%	2.49%	10.58%	
Wastewater Customer Growth	11.92%	7.67%	13.23%	-0.02%	22.57%	0.51%	2.07%	
Wastewater Rate Growth	-4.42%	-0.56%	-9.00%	12.38%	-16.65%	1.98%	8.51%	
<b>Capital Expenditures</b>								
<b>Transmission &amp; Distribution</b>								
Treatment & Pumping			527,000	462,706	435,449	343,640	298,564	299,303
Services, meter & Fire hydrants			136,000	96,535	89,278	138,072	191,771	133,473
General Structures & Equipment			174,000	170,193	178,412	171,855	175,635	157,982
Business transformation projects				142,193	131,446	104,854	84,059	88,932
Sources of Supply				8,379	59,746	107,049	95,891	22,462
Wastewater			53,000	30,916	50,013	44,602	58,066	31,462
<b>Total CapX</b>			<b>1,160,000</b>	<b>955,842</b>	<b>980,252</b>	<b>928,574</b>	<b>924,858</b>	<b>765,646</b>
<b>Water Plant</b>								
Land & other non-depreciable assets			141,000	137,199	132,295	129,953	128,286	156,976
Source of Supply			705,000	680,623	659,249	623,015	565,301	598,802
Treatment & pumping facilities			3,070,000	2,969,411	3,006,140	2,944,178	2,665,525	2,766,548
Transmission & Distribution facilities			8,516,000	7,969,759	7,489,208	7,033,958	6,632,828	6,682,273
Services, meters, and fire hydrants			3,250,000	3,062,568	2,898,293	2,729,679	2,539,696	2,515,234
General Structures & equipment			1,227,000	1,035,857	995,186	865,992	693,880	692,717

American Water

## American Water Works Company, Inc. and Subsidiaries

in thousands, except per share amounts

	Average Statistics		2015	2014	2013	2012	2011	2010
	2013 through 2015	2010 through 2015						
Wastewater			786,000	739,963	683,112	565,894	546,002	735,917
Wastewater Treatment			313,000	281,000				
Waste Collection			473,000	399,000				
Total Plant			17,695,000	16,595,380	15,863,483	14,892,669	13,771,518	14,148,467
CapX Rate								
Transmission & Distribution	5.94%	5.44%	6.2%	5.8%	5.8%	4.9%	4.5%	4.5%
Treatment & Pumping	3.55%	4.51%	4.4%	3.3%	3.0%	4.7%	7.2%	4.8%
Services, meter & Fire hydrants	6.10%	6.30%	6.6%	5.6%	6.2%	6.3%	6.9%	6.3%
General Structures & Equipment	13.71%	13.07%	14.2%	13.7%	13.2%	12.1%	12.1%	12.8%
Business transformation projects								
Sources of Supply	6.55%	7.42%	7.5%	4.5%	7.6%	7.2%	10.3%	5.3%
Wastewater	6.15%	4.96%	7.1%	6.1%	5.3%	3.3%	3.1%	4.4%
Total Plant	6.16%	6.29%	6.6%	5.8%	6.2%	6.2%	6.7%	5.4%
Market Valuation								
Stock Price @ 12-31-Year			69.05	28.25	244.4247788			
Debt			6544 million	178008765 million	1229150522	1883550522	1058122347	1532400213
					3,159			
					29.85			



**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Income Approach**  
**Cost of Capital / Required Return**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

**Water and Wastewater Cost of Capital  
2016 through 2017**

1st Qtr 2017  
1/1/2017

**As a Investor-Owned Utility**

**Weighted Cost of Capital (Discount  
Rate)** 7.05%

**Weighted Cost of Capital  
(Capitlization Rate)** 7.63%

**Weighted Cost of Capital (Discount  
Rate)**

**Weighted Cost of Capital (Rate of  
Return on Rate Base)** 7.23%

**As a Municipal Financed Entity**

**Weighted Cost of Capital (Discount  
Rate)** 3.80%



**Water and Wastewater Cost of Capital  
First Quarter 2017 (1-1-2017)**

**As a Investor-Owned Utility**

**Weighted Cost of Capital (Discount Rate)**

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)*(4a)
Debt	30%	Market	4.63%	Market	41.49%	58.5%	0.81%
Equity	70%	Market	8.92%	Market	0.0%	100.0%	6.24%
<b>Total Capital r</b>	<b>100.0%</b>						<b>7.05%</b>
Growth (g)							1.63%
<b>Rate without Growth: <math>\frac{r}{1+g}-1</math></b>							<b>5.33%</b>

**Weighted Cost of Capital (Capitlization Rate)**

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)
Debt	30%	Market	4.63%	Market	Not Applicable	Not Applicable	1.39%
Equity	70%	Market	8.92%	Market	Not Applicable	Not Applicable	6.24%
<b>Total Capital r</b>	<b>100.0%</b>						<b>7.63%</b>
Growth (g)							1.63%
<b>Rate without Growth: <math>\frac{r}{1+g}-1</math></b>							<b>5.90%</b>

**Weighted Cost of Capital (Rate of Return on Rate Base)**

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)
Debt	41%	Embedded	4.80%	Embedded	Not Applicable	Not Applicable	1.97%
Equity	59%	Embedded	8.92%	Market	Not Applicable	Not Applicable	5.26%
<b>Total Capital r</b>	<b>100.0%</b>						<b>7.23%</b>
Growth (g)							0.00% Not Applicable
<b>Rate without Growth: <math>\frac{r}{1+g}-1</math></b>							<b>7.23%</b>

**As a Municipal Financed Utility**

**Municipal Financed Rate (100% Debt Financed)**

(1)	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)
	Portion of Capital AUS Input	Type of Data	Capital Cost AUS Input	Type of Data	Tax Rate	Tax affect on cost of capital	After-tax Market Capital Cost (2)*(3)
Debt	100%	100% Municipal Financing	3.80%	Market	Not Applicable	Not Applicable	3.80%
Equity	0%	100% Municipal Financing	0.00%	Market	Not Applicable	Not Applicable	0.00%
<b>Total Capital r</b>	<b>100.0%</b>						<b>3.80%</b>
Growth (g)							1.63%
<b>Rate without Growth: <math>\frac{r}{1+g}-1</math></b>							<b>2.14%</b>

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Income Approach**  
**Cost of Capital / Required Return**  
**Cost of Debt**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

1  
 Value Line Investment Surveys  
 Water Industry  
 As of First Quarter 2017 (1-1-2017)

	2	3	4	5
				Long Term Interest Rate
S&P			Long	Rate
Debt	Long	Term	(embedded)	
Rating	Term	Debt	Interest	

Input Value Long Term Value Line (M/1%)

American States Water		320.9	21.1	6.58%
American Water	A	5,853.0	287.0	5.07%
Aqua American		1,748.7	78.6	4.45%
California Water		555.5	27.2	4.90%
Connecticut Water		200.2	8.0	4.00%
Consolidated Water Company				0.00%
Indiana Water		150.8	5.4	4.28%
SIW Corporation		364.2	21.0	5.77%
York Water		84.6	3.1	6.03%
		9,257.9	463.6	5.01%
Minimum				0.00%
weighted Mean				5.01%
Mean				4.57%
Median				4.90%
Maximum				6.58%

Debt Rating and Cost of Debt

Embedded 5.01% wtd mean col 5

Rating (S&P) A Input

Market Cost of Debt @ S&P

Rating 4.27% Input

Use 4.27% Input

S&P Capital IQ

Title-Industry Code & Co. Finances (In Italics)	GICS Sub Ind	Fixed Charge Coverage				Year End	Million \$ Cash & Equiv.	Curr. Assets	Curr. Liab.	Balance Sheet Date	L. Term Debt (Mil \$)	Capitalization (Mil \$)	Total Debt % Capital	Yield to Mat.						
		2013	2014	2015	Price Range															
		Date of Last Rating Change												Regular (Begins) Thru		Sinking Fund (Begins) Thru		Redempt/Other Restriction (Begins) Thru		2016 High
<b>AmeriGen Energy Generating (Cont.)</b> SPSec Nts 5.10s 2019 ..... <sup>1</sup> ao AmeriGen Mow ..... <sup>2</sup> 50102010 Gld Sr Nt 6% 2040 ..... <sup>3</sup> ms30 GRSR Nt 5% 2017 ..... <sup>4</sup> mn15 Gld Sr Nt 5% 2020 ..... <sup>5</sup> ms30 SPSec 144a 5% 2019 ..... <sup>6</sup> ao15 AmeriGen Gen'l Finance ..... <sup>7</sup> 40202010 MSB 6.90s 2017 ..... <sup>8</sup> rd15 AmeriGen Re Corp ..... <sup>9</sup> 40301030 SPSec Sr B 7.45s 2026 ..... <sup>10</sup> rd15 American Stores ..... <sup>11</sup> 30101030 Deb 8s 2026 ..... <sup>12</sup> rd15 Deb 7.90s 2017 ..... <sup>13</sup> rd15 MTP 7.10s 2028 ..... <sup>14</sup> ms20 American Tower Corp ..... <sup>15</sup> 60101000 Fxd Rt Sr Nt 3.45s 2021 ..... <sup>16</sup> ms15 Fxd Rt Sr Nt 2 2/5s 2022 ..... <sup>17</sup> rd15 Sr Nt 7s 2017 ..... <sup>18</sup> ao15 Sr Nt 4s 2025 ..... <sup>19</sup> rd15 Fxd Rt Sr 5s 2024 ..... <sup>20</sup> fa15 Fxd Rt Sr 3.40s 2019 ..... <sup>21</sup> fa15 Sr Nt 4.70s 2022 ..... <sup>22</sup> ms15 Sr Nt 6.90s 2021 ..... <sup>23</sup> mn Fxd Rt Sr Nt 4 1/2s 2018 ..... <sup>24</sup> rd15 Fxd Rt Sr Nt 4.40s 2026 ..... <sup>25</sup> rd15 Fxd Rt Sr Nt 3.30s 2021 ..... <sup>26</sup> rd15 Fxd Rt Sr Nt 3 3/5s 2026 ..... <sup>27</sup> ao15 Sr Nt 3 3/5s 2023 ..... <sup>28</sup> rd31 Sr Fixed Rt Nt 5.05s 2020 ..... <sup>29</sup> ms American Water Capital ..... <sup>30</sup> 50104010 Sr Nt 6.085s 2017 ..... <sup>31</sup> ao Fxd Rt Sr Nt 3.40s 2025 ..... <sup>32</sup> ms Fxd Rt Sr Nt 4.30s 2042 ..... <sup>33</sup> rd AmeriGas Pbrs/Finance ..... <sup>34</sup> NA Fxd Rt Sr Nt 5 1/2s 2024 ..... <sup>35</sup> rd20 Fxd Rt Sr Nt 5 1/2s 2026 ..... <sup>36</sup> rd20 AmeriSourceBergen Corp ..... <sup>37</sup> 35102010 Sr Fixed Rt Nt 3 3/5s 2021 ..... <sup>38</sup> mn15 Sr Nt 3 3/5s 2025 ..... <sup>39</sup> ms													Redemption Provisions Regular (Begins) Thru      Sinking Fund (Begins) Thru      Redempt/Other Restriction (Begins) Thru				Price Range 2016 High Low      No. End Price Sale(s) or Bid      Curr. Yield      Yield to Mat.			
Interest Dates      S&P Rating      Date of Last Rating Change      Prior Rating      Eligible Bond Form													Price      (Begins) Thru      Price      (Begins) Thru      Price      (Begins) Thru				Price Range 2016 High Low      No. End Price Sale(s) or Bid      Curr. Yield      Yield to Mat.			

Uniform Footnote Explanations-See Page 1. Other: <sup>1</sup> Due 10/01/2019. <sup>2</sup> Red at greater of 100 or amt based on formula. <sup>3</sup> Due 03/30/2040. <sup>4</sup> Due 11/15/2017. <sup>5</sup> Due 03/30/2020. <sup>6</sup> Due 10/15/2019. <sup>7</sup> Subsid of Amer Genl Corp. <sup>8</sup> Was Creditmktl Finl Corp. <sup>9</sup> Due 12/15/2017. <sup>10</sup> Subsid of Munich Reinsurance. <sup>11</sup> Due 12/15/2026. <sup>12</sup> Due 06/01/2026. <sup>13</sup> Due 05/01/2017. <sup>14</sup> Due 03/20/2028. <sup>15</sup> Due 09/15/2021. <sup>16</sup> Due 10/15/2017. <sup>17</sup> Due 06/01/2025. <sup>18</sup> Due 03/15/2022. <sup>19</sup> Due 11/01/2021. <sup>20</sup> Due 01/15/2018. <sup>21</sup> Due 02/15/2026. <sup>22</sup> Due 02/15/2021. <sup>23</sup> Due 01/31/2023. <sup>24</sup> Due 08/01/2020. <sup>25</sup> Due 12/01/2042. <sup>26</sup> Data of AmeriGen Pbrs. <sup>27</sup> Due 05/20/2024. <sup>28</sup> See Bergen Brunswick. <sup>29</sup> Due 11/15/2021. <sup>30</sup> Due 03/01/2025.

Title-Industry Code & Co. Finances (In Italics)	GICS Sub Ind	Fixed Charge C.		Date of Last Rating Change	P				
		2013	2014						
		Date of Last Rating Change							
<b>AmeriSourceBergen Corp (Cont.)</b> Fxd Rt Sr Nt 3.40s 2024 ..... <sup>1</sup> mn15 Sr Nt 1.15s 2017 ..... <sup>2</sup> mn15 Fxd Rt Sr Nt 4 1/2s 2045 ..... <sup>3</sup> ms Ameristar Casinos Inc ..... <sup>4</sup> 25301010 Sr Nt 7 1/2s 2021 ..... <sup>5</sup> ao15 Ameritech Capital Funding ..... <sup>6</sup> 50101020 Deb 5.95s 2038 ..... <sup>7</sup> rd15 Deb 6.45s 2018 ..... <sup>8</sup> rd15 Deb 6.55s 2028 ..... <sup>9</sup> rd15 Gld Nt 6 1/2s 2027 ..... <sup>10</sup> rd15 Ameriprise Financial ..... <sup>11</sup> 40203010 Sr Fixed Rt Nt 5.30s 2020 ..... <sup>12</sup> ms15 Fxd Rt Sr Nt 2 1/2s 2026 ..... <sup>13</sup> ms15 Jr Sub Nt Fixed To Float 7.518s 2086 ..... <sup>14</sup> rd Fxd Rt Sr Nt 3.70s 2024 ..... <sup>15</sup> ao15 Sr Nt 4s 2023 ..... <sup>16</sup> ao15 Amgen Inc ..... <sup>17</sup> 35201010 Sr Fxd Rt Nt 1.296s 2017 ..... <sup>18</sup> rd15 Sr Fxd Rt Nt 2.20s 2019 ..... <sup>19</sup> rd15 Fxd Rt Sr Nt 3 3/5s 2024 ..... <sup>20</sup> rd22 Fxd Rt Sr Nt 1.85s 2021 ..... <sup>21</sup> rd19 Fxd Rt Sr Nt 2 1/2s 2023 ..... <sup>22</sup> rd19 Fxd Rt Sr Nt 2.80s 2026 ..... <sup>23</sup> rd19 Sr Nt 144a 5.85s 2017 ..... <sup>24</sup> rd Sr Nt 5.85s 2017 ..... <sup>25</sup> rd Sr Nt 6 1/2s 2037 ..... <sup>26</sup> rd Sr Nt 6.90s 2038 ..... <sup>27</sup> rd Fixed Rt Sr Nts 3.45s 2020 ..... <sup>28</sup> rd Fixed Rt Sr Nt 4.95s 2041 ..... <sup>29</sup> rd Sr Nt 3 3/5s 2022 ..... <sup>30</sup> rd Sr Nt 5 1/2s 2043 ..... <sup>31</sup> rd Sr Nt 2 1/2s 2017 ..... <sup>32</sup> rd Fxd Rt Sr Nt 2 1/2s 2020 ..... <sup>33</sup> rd Fxd Rt Sr Nt 2.70s 2022 ..... <sup>34</sup> rd Fxd Rt Sr Nt 3 1/2s 2025 ..... <sup>35</sup> rd Fxd Rt Sr Nt 4.40s 2045 ..... <sup>36</sup> rd Fxd Rt Sr Nt 144a 4.563s 2048 ..... <sup>37</sup> rd Fxd Rt Sr Nt 144a 4.663s 2051 ..... <sup>38</sup> rd Deb 8 1/2s 2097 ..... <sup>39</sup> rd						Interest Dates      S&P Rating		Date of Last Rating Change      P	

Uniform Footnote Explanations-See Page 1. Other: <sup>1</sup> Due 05/15/2024. <sup>2</sup> Due 03/15/2020. <sup>3</sup> Due 09/15/2026. <sup>4</sup> Due 6-1-66 Int paid Jun & Dec 1 to 6. <sup>5</sup> Due 08/19/2021. <sup>6</sup> Due 08/19/2023. <sup>7</sup> Due 08/19/2026. <sup>8</sup> Due 08/01/2017. <sup>9</sup> Due 05/01/2020. <sup>10</sup> Due 05/01/2022. <sup>11</sup> Due 05/01/2024. <sup>12</sup> Due 05/01/2024.

J. 2017 2020 16

# MERGENT BOND RECORD



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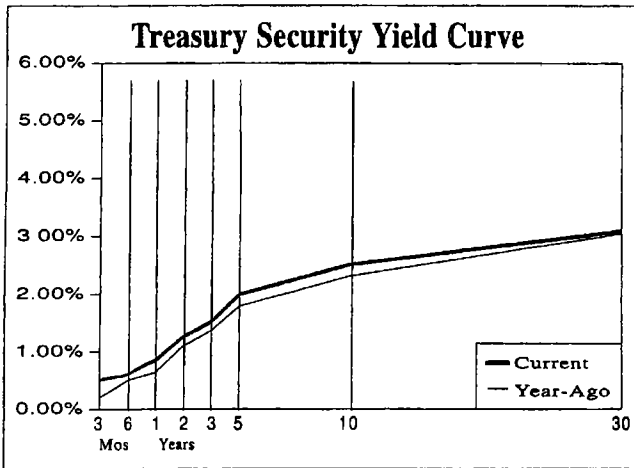
DATE

Corporate Bond Yield Averages

DATE	AV. CORP.	CORPORATE BY RATINGS				CORPORATE BY GROUPS			PUBLIC UTILITY BONDS				INDUSTRIAL BONDS				RAILROAD BONDS					
		Aaa	Aa	A	Baa	P.U.	IND.	R.R.	Aaa	Aa	A	Baa	Aaa	Aa	A	Baa	Aaa	Aa	A	Baa		
2010																						
09/15	5.76	5.26	5.50	5.76	6.25	5.83	5.69	---	Jan.	5.55	5.77	6.16	Jan.	5.26	5.44	5.73	6.33	Jan.	---	---	---	---
03/31	5.86	5.35	5.62	5.84	6.34	5.94	5.79	---	Feb.	5.69	5.87	6.25	Feb.	5.35	5.55	5.80	6.43	Feb.	---	---	---	---
	5.81	5.27	5.57	5.80	6.27	5.90	5.71	---	Mar.	5.62	5.84	6.22	Mar.	5.27	5.49	5.75	6.32	Mar.	---	---	---	---
	5.80	5.29	5.57	5.78	6.25	5.87	5.71	---	Apr.	5.62	5.81	6.19	Apr.	5.29	5.50	5.74	6.32	Apr.	---	---	---	---
12/22	5.52	4.96	5.25	5.49	6.05	5.59	5.44	---	May	5.29	5.50	5.97	May	4.96	5.19	5.47	6.13	May	---	---	---	---
	5.52	4.88	5.16	5.44	6.23	5.62	5.42	---	June	5.22	5.46	6.18	June	4.88	5.11	5.42	6.28	June	---	---	---	---
	5.32	4.72	4.96	5.25	6.01	5.41	5.23	---	July	4.99	5.26	5.98	July	4.72	4.92	5.23	6.04	July	---	---	---	---
12/18	5.05	4.49	4.72	5.00	5.66	5.10	4.98	---	Aug.	4.75	5.01	5.55	Aug.	4.49	4.68	4.98	5.77	Aug.	---	---	---	---
	5.05	4.53	4.72	5.01	5.66	5.10	5.00	---	Sept.	4.74	5.01	5.53	Sept.	4.53	4.70	5.00	5.78	Sept.	---	---	---	---
04/11	5.15	4.68	4.83	5.09	5.72	5.20	5.08	---	Oct.	4.89	5.10	5.62	Oct.	4.68	4.77	5.07	5.81	Oct.	---	---	---	---
	5.37	4.87	5.07	5.33	5.92	5.45	5.29	---	Nov.	5.12	5.37	5.85	Nov.	4.87	5.02	5.29	5.99	Nov.	---	---	---	---
09/30	5.55	5.02	5.26	5.52	6.10	5.64	5.46	---	Dec.	5.32	5.56	6.04	Dec.	5.02	5.19	5.47	6.15	Dec.	---	---	---	---
2011																						
10/30	5.56	5.04	5.26	5.53	6.09	5.64	5.46	---	Jan.	5.29	5.57	6.06	Jan.	5.04	5.22	5.48	6.11	Jan.	---	---	---	---
10/30	5.66	5.22	5.37	5.64	6.15	5.73	5.58	---	Feb.	5.42	5.68	6.10	Feb.	5.22	5.31	5.59	6.19	Feb.	---	---	---	---
	5.55	5.13	5.28	5.52	6.03	5.62	5.48	---	Mar.	5.33	5.56	5.97	Mar.	5.13	5.22	5.48	6.09	Mar.	---	---	---	---
12/05	5.56	5.16	5.29	5.52	6.02	5.62	5.49	---	Apr.	5.32	5.55	5.98	Apr.	5.16	5.25	5.48	6.06	Apr.	---	---	---	---
	5.33	4.96	5.06	5.29	5.78	5.38	5.27	---	May	5.08	5.32	5.74	May	4.96	5.04	5.26	5.81	May	---	---	---	---
07/01	5.30	4.99	5.04	5.26	5.75	5.34	5.25	---	June	5.04	5.26	5.67	June	4.99	5.02	5.25	5.82	June	---	---	---	---
	5.30	4.93	5.03	5.26	5.76	5.34	5.25	---	July	5.05	5.27	5.70	July	4.99	4.99	5.25	5.81	July	---	---	---	---
07/01	4.79	4.37	4.47	4.74	5.36	4.78	4.79	---	Aug.	4.44	4.69	5.11	Aug.	4.37	4.50	4.79	5.49	Aug.	---	---	---	---
	4.60	4.09	4.23	4.54	5.27	4.61	4.58	---	Sept.	4.24	4.48	4.91	Sept.	4.09	4.21	4.59	5.42	Sept.	---	---	---	---
09/15	4.60	3.88	4.16	4.34	5.37	4.66	4.54	---	Oct.	4.21	4.52	5.24	Oct.	3.98	4.11	4.56	5.50	Oct.	---	---	---	---
	4.39	3.87	3.97	4.34	5.14	4.37	4.41	---	Nov.	3.92	4.25	4.93	Nov.	3.87	4.01	4.43	5.34	Nov.	---	---	---	---
02/16	4.47	3.93	4.03	4.40	5.25	4.47	4.47	---	Dec.	4.00	4.33	5.07	Dec.	3.93	4.06	4.46	5.43	Dec.	---	---	---	---
2012																						
12/12	4.45	3.85	4.01	4.39	5.23	4.48	4.41	---	Jan.	4.03	4.34	5.06	Jan.	3.85	3.98	4.43	5.39	Jan.	---	---	---	---
	4.42	3.85	3.99	4.39	5.14	4.47	4.37	---	Feb.	4.02	4.36	5.02	Feb.	3.85	3.96	4.41	5.26	Feb.	---	---	---	---
03/25	4.54	3.99	4.14	4.51	5.23	4.59	4.50	---	Mar.	4.16	4.48	5.13	Mar.	3.99	4.12	4.53	5.33	Mar.	---	---	---	---
	4.49	3.96	4.08	4.44	5.19	4.53	4.44	---	Apr.	4.10	4.40	5.11	Apr.	3.96	4.06	4.48	5.27	Apr.	---	---	---	---
12/19	4.33	3.80	3.91	4.26	5.07	4.36	4.30	---	May	3.92	4.20	4.97	May	3.80	3.90	4.32	5.17	May	---	---	---	---
	4.22	3.64	3.78	4.14	5.02	4.26	4.18	---	June	3.79	4.08	4.91	June	3.64	3.77	4.18	5.13	June	---	---	---	---
09/08	4.03	3.40	3.54	3.93	4.87	4.12	3.93	---	July	3.58	3.93	4.85	July	3.40	3.49	3.93	4.89	July	---	---	---	---
09/08	4.09	3.48	3.61	3.99	4.91	4.18	3.99	---	Aug.	3.65	4.00	4.88	Aug.	3.48	3.57	3.98	4.93	Aug.	---	---	---	---
09/08	4.09	3.49	3.68	4.01	4.84	4.17	4.00	---	Sept.	3.69	4.02	4.84	Sept.	3.49	3.66	4.00	4.87	Sept.	---	---	---	---
	3.97	3.47	3.63	3.90	4.58	4.05	3.89	---	Oct.	3.68	3.91	4.84	Oct.	3.47	3.58	3.89	4.62	Oct.	---	---	---	---
09/12	3.92	3.50	3.57	3.87	4.51	3.95	3.88	---	Nov.	3.60	3.84	4.42	Nov.	3.50	3.54	3.89	4.60	Nov.	---	---	---	---
	4.05	3.65	3.70	3.98	4.63	4.10	3.99	---	Dec.	3.75	4.00	4.56	Dec.	3.65	3.65	3.96	4.70	Dec.	---	---	---	---
2013																						
04/11	4.19	3.80	3.87	4.14	4.73	4.24	4.14	---	Jan.	3.90	4.15	4.66	Jan.	3.80	3.84	4.13	4.81	Jan.	---	---	---	---
06/17	4.27	3.90	3.95	4.19	4.85	4.29	4.25	---	Feb.	3.95	4.18	4.74	Feb.	3.90	3.95	4.20	4.95	Feb.	---	---	---	---
	4.29	3.93	3.97	4.23	4.85	4.29	4.29	---	Mar.	3.95	4.20	4.72	Mar.	3.93	3.98	4.25	4.99	Mar.	---	---	---	---
05/14	4.07	3.73	3.77	4.03	4.59	4.08	4.07	---	Apr.	3.74	4.00	4.49	Apr.	3.73	3.79	4.05	4.69	Apr.	---	---	---	---
	4.23	3.89	3.94	4.19	4.73	4.24	4.22	---	May	3.91	4.17	4.65	May	3.89	3.97	4.20	4.80	May	---	---	---	---
06/16	4.63	4.27	4.32	4.56	5.19	4.63	4.63	---	June	4.27	4.53	5.08	June	4.27	4.36	4.58	5.29	June	---	---	---	---
	4.76	4.34	4.46	4.69	5.32	4.78	4.74	---	July	4.44	4.68	5.21	July	4.34	4.47	4.69	5.43	July	---	---	---	---
06/16	4.88	4.54	4.63	4.78	5.42	4.85	4.92	---	Aug.	4.53	4.73	5.28	Aug.	4.54	4.72	4.83	5.57	Aug.	---	---	---	---
06.	4.95	4.64	4.69	4.85	5.47	4.90	4.99	---	Sept.	4.58	4.80	5.31	Sept.	4.64	4.80	4.90	5.62	Sept.	---	---	---	---
	4.82	4.53	4.59	4.73	5.31	4.78	4.86	---	Oct.	4.48	4.70	5.17	Oct.	4.53	4.69	4.76	5.44	Oct.	---	---	---	---
	4.91	4.63	4.67	4.82	5.38	4.86	4.95	---	Nov.	4.56	4.77	5.24	Nov.	4.63	4.79	4.85	5.32	Nov.	---	---	---	---
	4.92	4.62	4.68	4.85	5.38	4.89	4.95	---	Dec.	4.59	4.81	5.25	Dec.	4.62	4.76	4.89	5.51	Dec.	---	---	---	---
2014																						
Jan.	4.76	4.49	4.53	4.69	5.19	4.72	4.78	---	Jan.	4.44	4.63	5.09	Jan.	4.49	4.62	4.74	5.29	Jan.	---	---	---	---
Feb.	4.68	4.45	4.46	4.60	5.10	4.64	4.71	---	Feb.	4.38	4.53	5.01	Feb.	4.45	4.54	4.66	5.19	Feb.	---	---	---	---
Mar.	4.65	4.38	4.44	4.56	5.06	4.63	4.65	---	Mar.	4.40	4.51	5.00	Mar.	4.38	4.49	4.60	5.13	Mar.	---	---	---	---
Apr.	4.52	4.24	4.33	4.45	4.90	4.52	4.51	---	Apr.	4.30	4.41	4.85	Apr.	4.24	4.36	4.48	4.96	Apr.	---	---	---	---
May	4.38	4.16	4.20	4.31	4.76	4.37	4.40	---	May	4.16	4.26	4.69	May	4.16	4.24	4.35	4.83	May	---	---	---	---
June	4.44	4.25	4.26	4.35	4.80	4.42	4.45	---	June	4.23	4.29	4.73	June	4.25	4.29	4.41	4.86	June	---	---	---	---
July	4.37	4.16	4.20	4.28	4.73	4.35	4.39	---	July	4.16	4.23	4.66	July	4.16	4.23	4.34						

## Selected Yields

TAXABLE	Recent (12/28/16)	3 Months Ago (9/28/16)	Year Ago (12/29/15)	TAXABLE	Recent (12/28/16)	3 Months Ago (9/28/16)	Year Ago (12/29/15)
<b>Market Rates</b>				<b>Mortgage-Backed Securities</b>			
Discount Rate	1.25	1.00	1.00	GNMA 5.5%	1.99	1.49	2.21
Federal Funds	0.50-0.75	0.25-0.50	0.25-0.50	FHLMC 5.5% (Gold)	2.50	1.58	2.32
Prime Rate	3.75	3.50	3.50	FNMA 5.5%	2.28	1.34	1.94
30-day CP (A1/P1)	0.50	0.35	0.25	FNMA ARM	1.76	1.92	1.81
3-month LIBOR	1.00	0.85	0.61	<b>Corporate Bonds</b>			
<b>U.S. Treasury Securities</b>				Financial (10-year) A	3.69	2.87	3.74
3-month	0.51	0.27	0.20	Industrial (25/30-year) A	4.18	3.57	4.35
6-month	0.61	0.44	0.50	Utility (25/30-year) A	4.27	3.65	4.42
1-year	0.85	0.58	0.64	Utility (25/30-year) Baa/BBB	4.72	4.09	4.88
5-year	2.00	1.14	1.79	<b>Foreign Bonds (10-Year)</b>			
10-year	2.51	1.57	2.31	Canada	1.73	0.98	1.42
10-year (inflation-protected)	0.54	0.01	0.85	Germany	0.20	-0.15	0.63
30-year	3.09	2.29	3.04	Japan	0.06	-0.09	0.27
30-year Zero	3.17	2.38	3.17	United Kingdom	1.30	0.68	1.97
<b>Common Stocks</b>				<b>Preferred Stock</b>			
VL Stocks (Median)	2.00	2.30	2.30	Utility A	5.93	5.57	6.01
DJ Industrials (12-mo. est.)	2.50	2.70	2.60	Financial BBB	6.11	5.67	5.94
VL Utilities	3.50	3.40	3.77	Financial Adjustable A	5.48	5.48	5.48



<b>TAX-EXEMPT</b>			
<b>Bond Buyer Indexes</b>			
20-Bond Index (GOs)	3.83	2.98	3.57
25-Bond Index (Revs)	3.96	3.23	3.97
<b>General Obligation Bonds (GOs)</b>			
1-year AAA	1.01	0.63	0.51
1-year A	1.45	0.68	0.78
5-year AAA	1.82	1.04	1.31
5-year A	2.17	1.34	2.01
10-year AAA	2.39	1.50	1.99
10-year A	2.94	1.98	2.74
25/30-year AAA	3.06	2.19	2.85
25/30-year A	4.03	2.86	3.63
<b>Revenue Bonds (Revs) (15 Years)</b>			
Education AA	3.16	2.21	2.74
Electric AA	3.10	2.16	2.25
Housing AA	3.35	2.45	3.09
Hospital AA	3.32	2.32	2.22
Toll Road AA	3.14	2.20	2.70

Source: Bloomberg Finance L.P.

## Federal Reserve Data

### BANK RESERVES (Two-Week Period; in Millions, Not Seasonally Adjusted)

	Recent Levels			Average Level Over the Last...		
	12/21/16	12/7/16	Change	12 Wks.	26 Wks.	52 Wks.
Excess Reserves	1979295	2010077	-30782	2014158	2126946	2219261
Borrowed Reserves	33	38	-5	96	143	105
Net Free/Borrowed Reserves	1979262	2010039	-30777	2014063	2126804	2219156

### MONEY SUPPLY (One-Week Period; in Billions, Seasonally Adjusted)

	Recent Levels			Annual Growth Rates Over the Last...		
	12/12/16	12/5/16	Change	3 mo.	6 mo.	12 Mos.
M1 (Currency+demand deposits)	3359.5	3369.9	-10.4	4.6%	8.9%	9.2%
M2 (M1+savings+small time deposits)	13234.1	13231.8	2.3	5.7%	7.0%	7.6%

Source: United States Federal Reserve Bank

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**  
**Appraisal Work Papers**  
**As of January 1, 2017**

**Income Approach**  
**Cost of Capital / Required Return**  
**Cost of Equity**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**



Value Line Investment Surveys  
 Water Industry  
 As of First Quarter 2017 (1-1-2017)

Company	Exchange	Ticker	Valueline No	Valueline Issue	Beta	Dividend	Revenues					Cash Flows					Earnings					Dividends					Book Value	
							Past 10		Est'd 13		Past 10		Est'd 13		Past 10		Est'd 13		Past 10		Est'd 13		Past 10		Est'd 13			
							yr	5 yrs	15 to 19	21	yr	5 yrs	15 to 19	21	yr	5 yrs	15 to 19	21	yr	5 yrs	15 to 19	21	yr	5 yrs	15 to 19	21	yr	5 yrs
American States Water	NYSE	AWR	1781	1/1/2017	0.75	2.2%	6.0%	4.5%	4.0%	9.0%	8.0%	6.0%	12.0%	12.0%	4.0%	6.5%	10.0%	7.0%	5.5%	6.0%	4.0%							
American Water	NYSE	AWR	1782	1/1/2017	0.65	2.2%	3.0%	4.5%	3.0%	9.0%	5.5%	13.0%	8.0%	10.0%	10.5%	2.5%	4.0%	2.5%	4.0%									
Aqua Americas	NYSE	WTR	1783	1/1/2017	0.7	2.7%	5.0%	2.5%	4.5%	8.0%	8.0%	4.0%	8.5%	13.0%	7.0%	8.0%	7.5%	9.0%	7.0%	7.0%								
California Water	NYSE	CWT	1784	1/1/2017	0.75	2.1%	4.0%	5.0%	3.0%	6.0%	5.5%	6.0%	5.0%	4.0%	7.5%	1.5%	2.0%	7.0%	5.5%	5.0%								
Connecticut Water	NDQ	CTWS	1785	1/1/2017	0.65	2.0%	4.0%	4.5%	8.0%	4.0%	7.5%	4.0%	4.0%	9.0%	5.0%	2.0%	2.0%	5.0%	4.5%	9.5%								
Consolidated Water Company	NDQ	CWCO	1786	1/1/2017	0.95	2.8%	10.0%	1.0%	14.5%	4.0%	2.5%	10.5%	3.0%	2.0%	15.5%	5.0%	0.0%	5.0%	10.5%	2.5%								
Midstate Water	NDQ	MSEX	1787	1/1/2017	0.75	2.1%	1.5%	2.0%	4.0%	4.0%	4.5%	8.0%	5.0%	5.5%	8.5%	1.5%	3.5%	4.5%	3.0%									
SIW Corporation	NYSE	SIW	1788	1/1/2017	0.75	1.5%	5.0%	4.5%	4.0%	6.5%	10.0%	3.0%	6.5%	15.0%	5.5%	4.0%	2.5%	5.5%	6.0%									
York Water	NDQ	YORW	1789	1/1/2017	0.75	1.7%	4.5%	3.0%	7.5%	7.0%	6.5%	6.0%	5.5%	6.0%	4.0%	2.5%	6.5%	4.5%										
Minimum					0.65	1.50%	1.00%	3.00%	4.00%	2.50%	3.00%	3.00%	2.00%	5.00%	1.50%	0.00%	3.50%	4.50%	2.50%									
Mid Mean					0.74	2.14%	5.00%	3.33%	6.00%	6.06%	6.28%	6.11%	6.19%	8.39%	7.87%	4.06%	4.22%	6.56%	6.50%	5.00%								
Median					0.75	2.10%	4.75%	3.00%	4.50%	6.75%	7.50%	6.00%	5.25%	9.00%	7.00%	4.00%	3.50%	6.50%	8.25%	5.00%								
Maximum					0.95	2.80%	10.00%	5.00%	14.50%	9.00%	10.00%	10.50%	12.00%	15.00%	8.00%	10.00%	10.50%	10.50%	9.50%									

Cost of Equity Dividend Growth Mode

Dividend 2.14% mean Col 7

Cost of Equity Capital Asset Pricing Model (CAPM)

	Past 10		Est'd 13		Beta
	yr	5 yrs	21	15 to 19	
Growth	5.00%	3.33%	6.00%		
Revenues	6.25%	6.28%	6.11%		
Cash Flow	6.19%	6.28%	7.67%		
Earnings	4.00%	4.22%	6.56%		
Dividends	6.25%	5.00%	4.17%		
Book Value	5.54%	5.44%	6.10%		
Mean					0.74 0.65-0.95

Growth 5.50% input

Cost of Equity Dividend Growth Mode

Dividend 2.14%  
 Growth 5.50%  
 Cost of Equity 7.64%

Cost of Equity Capital Asset Pricing Model (CAPM)

Risk Free Rate 5.02% Input 10 year treasury per PA PUC  
 Risk Premium  
 Beta 0.74  
 Risk Premia 6.90% Input 1.0%  
 Size Premia  
 Micro 3.67% Input 5.88  
 Small 1.75% Input 5.88  
 Mid 1.02% Input 5.88  
 Large 0.00% Input 5.88  
 Size Premia 0.00% Input  
 Cost of Equity 10.19%

Cost of Equity  
 Dividend Growth Model 7.64%  
 Capital Asset Pricing Model (CAPM) 10.19%  
 Mean 8.92%

Cost of Equity 8.92% Input  
 Growth 5.50% Input

**2017** Valuation Handbook  
U.S. Guide to Cost of Capital  
Market Results Through 2016  
Duff & Phelps

**WILEY**

**Exhibit 7.2:** Largest Company (by market capitalization) in CRSP (NYSE/NYSE MKT/NASDAQ)  
Deciles and Size Groupings  
September 30, 2016

<u>Decile</u>	<u>Company Name</u>	<u>Recent Market Capitalization (in \$thousands)</u>
1-Largest	Apple Inc.	609,163,498
2	Apache Corp.	24,233,747
3	Textron Inc	10,711,194
4	C F Industries Holdings Inc.	5,676,716
5	Ellie Mae Inc	3,512,913
6	Generac Holdings Inc.	2,390,899
7	Flagstar Bancorp Inc.	1,569,984
8	SEACOR Holdings Inc.	1,030,426
9	Kadant Inc.	567,843
10-Smallest	Pioneer Energy Services Corp.	262,891

**Source of underlying data:** CRSP databases © 2017 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business (2017)

In the following sections we provide an example of (i) calculating a CRSP Deciles Size Premium and (ii) a Risk Premium Report size premium, using example data from each of the two data sets.

**Size Premium Calculation: CRSP Deciles Size Premia**

In the *2017 Valuation Handbook – U.S. Guide to Cost of Capital*, the CRSP Deciles Size Premia are calculated over the years 1926–2016. The following statistics are calculated over this time period:

- The “historical” average annual long-term equity risk premium is 6.94%.
- The average annual risk-free rate is 5.02%.
- CRSP portfolio 10b average annual return equals 23.14%.
- CRSP portfolio 10b OLS beta equals 1.37

The beta-adjusted size premium for CRSP portfolio 10b is calculated as follows:

$$10b \text{ Size Premium} = \text{actual excess return} - \text{excess return predicted by CAPM}$$

Looking at Exhibit 7.3, the *actual* excess return of portfolio 10b is 18.12% (23.14% – 5.02%), and the excess return that CAPM *predicted* is 9.49% (1.37 x 6.94%) (difference due to rounding). The size premium for CRSP portfolio 10b is therefore 8.64%, which is “what actually happened” (18.12%) minus “what CAPM predicted” (9.49%) (difference due to rounding). This is what is meant when we say that the beta of smaller companies doesn’t explain all of their returns. In this simple example, beta fell 8.64% short of explaining what actually happened.

**Exhibit 7.3:** CRSP (NYSE/NYSE MKT/NASDAQ) Deciles; Returns in Excess of CAPM (i.e., beta-adjusted Size Premium, as of December 31, 2016)

Size Grouping	OLS Beta	Arithmetic Mean	Return in Excess of Risk-free Rate (actual)	Return in Excess of Risk-free Rate (as predicted by CAPM)	Size Premium
Mid-Cap (3–5)	1.12	13.82%	8.80%	7.79%	1.02%
Low-Cap (6–8)	1.22	15.26%	10.24%	8.49%	1.75%
Micro-Cap (9–10)	1.35	18.04%	13.02%	9.35%	3.67%
Breakdown of Deciles 1–10					
1-Largest	0.92	11.05%	6.04%	6.38%	-0.35%
2	1.04	12.82%	7.81%	7.19%	0.61%
3	1.11	13.57%	8.55%	7.66%	0.89%
4	1.13	13.80%	8.78%	7.80%	0.98%
5	1.17	14.62%	9.60%	8.09%	1.51%
6	1.17	14.81%	9.79%	8.14%	1.66%
7	1.25	15.41%	10.39%	8.67%	1.72%
8	1.30	16.14%	11.12%	9.04%	2.08%
9	1.34	16.97%	11.96%	9.28%	2.68%
10-Smallest	1.39	20.27%	15.25%	9.66%	5.59%
Breakdown of 10th Decile					
10a	1.41	18.85%	13.84%	9.75%	4.09%
	10w	1.38	17.69%	12.67%	3.10%
	10x	1.45	20.37%	15.36%	5.33%
10b	1.37	23.14%	18.12%	9.49%	8.64%
	10y	1.42	22.07%	17.06%	7.21%
	10z	1.28	25.54%	20.53%	11.63%

**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

### Size Premium Calculation: Risk Premium Report

In the *2017 Valuation Handbook – U.S. Guide to Cost of Capital*, the Risk Premium Report size studies are calculated over the years 1963–2016. The following statistics are calculated over this time period:

- The “historical” average annual long-term equity risk premium is 5.02%.
- The average annual risk-free rate is 6.46%.
- In Risk Premium Report Exhibit B-3 (25 portfolios sorted from largest companies to smallest companies by net income), portfolio 25 average annual return equals 21.44%.
- In Risk Premium Report Exhibit B-3, portfolio 25 has a sum beta of 1.31.

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>713</sup>

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

<u>Decile</u>	<u>Historic Average Percentage of Total Capitalization</u>	<u>Recent Number of Companies</u>	<u>Recent Decile Market Capitalization (in \$thousands)</u>	<u>Recent Percentage of Total Capitalization</u>
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>713</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.

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Income Approach**  
**Cost of Capital / Required Return**  
**2016 Stocks, Bonds, Bills, and Inflation**  
**Duff & Phelps**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

Source: Ibbotson SBBI 2013 Valuation 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
	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
	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	
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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

Source: Ibbotson S&P 1963 Valuation 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
	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
	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	
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 *
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
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
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
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
1970	0.0401	0.0341	0.0016	-0.1743	0.1837	0.0016	0.0674	0.1837	0.1211	0.0674	0.0484	0.1686	0.0749	0.0871	0.0549
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
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
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
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
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
1976	0.2384	0.0438	0.1915	0.5738	0.1865	0.1915	0.0789	0.0807	0.1675	0.0789	0.1287	0.0710	0.0525	0.0600	0.0481
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
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
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
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
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
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
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
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
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
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
1987	0.0523	0.0364	0.0203	-0.0930	-0.0027	-0.0271	0.0792	-0.1069	0.0920	0.0747	0.0747	-0.0475	0.0832	0.0547	0.0441
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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
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



Source: Ibbotson S&P 1381 Valuation 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
	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
	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	
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 *
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
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
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
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
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
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
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
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
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
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	0.0118
2016															
Average	0.1175	0.0401	0.0771	0.1678	0.0630	0.0603	0.0505	0.0075	0.0509	0.0522	0.0447	0.0069	0.0443	0.0346	0.0299
Median	0.1307	0.0384	0.1053	0.1832	0.0475	0.0368	0.0422	0.0033	0.0435	0.0370	0.0385	0.0032	0.0383	0.0305	0.0272
High	0.5399	0.0877	0.4659	1.4287	0.4256	0.4036	0.1950	0.2395	0.1334	0.2910	0.1297	0.1423	0.1396	0.1471	0.1816
Low	-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
Last 5 year (60 months)															
Average	0.1311	0.0227	0.1073	0.1187	0.0756	0.0856	0.0299	0.0535	0.0276	0.0253	0.0126	0.0125	0.0116	0.0003	0.0163
Median	0.1369	0.0216	0.1139	0.0292	0.1068	0.0331	0.0288	0.0088	0.0248	0.0207	0.0151	0.0135	0.0149	0.0002	0.0151
High	0.3239	0.0250	0.2960	0.4507	0.1795	0.2823	0.0381	0.2374	0.0378	0.0946	0.0163	0.0779	0.0169	0.0006	0.0296
Low	0.0138	0.0210	-0.0073	-0.0360	-0.0707	-0.1278	0.0240	-0.1570	0.0241	-0.0368	0.0058	-0.0468	0.0046	0.0002	0.0076

\* Compound Annual Return

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

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

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

Value Line Investment Surveys  
Water Industry  
As of First Quarter 2017 (1-1-2017)

Company	Exchange	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	Preferred Equity	Preferred Stock	% Preferred	Shares Outstanding	Price per Share	Market Equity	Market Equity	Market Capitalization	Total Market Capital
American States Water	NYSE	AWR	1781	1/1/2017	398.2	19.50%	320.9	21.1	6.58%	40.0%	40.0%	60.0%		0.00%	34,569,746.00	44.95	1,643.8	80.50%	Mid Cap	2,042.0
American Water	NYSE	AWK	1782	1/1/2017	6,857.0	34.76%	5,853.0	297.0	5.07%	53.0%	55.0%	45.0%	11.0	0.06%	178,003,870.00	72.25	12,860.7	65.19%	Large Cap	19,718.7
Aqua American	NYSE	WTR	1783	1/1/2017	1,880.5	26.13%	1,748.7	78.6	4.49%	49.0%	50.0%	50.0%	-	0.00%	177,358,257.00	29.98	5,317.2	73.87%	Large Cap	7,197.7
California Water	NYSE	CWT	1784	1/1/2017	618.7	27.65%	555.5	27.2	4.90%	47.0%	46.0%	54.0%	-	0.00%	47,968,000.00	33.75	1,618.9	72.35%	Mid Cap	2,297.6
Connecticut Water	NDQ	CTWS	1785	1/1/2017	203.1	24.48%	200.2	8.0	4.00%	47.0%	46.0%	54.0%	0.8	0.10%	11,240,417.00	55.87	825.8	75.42%	Small Cap	829.7
Consolidated Water Company	NDQ	CWCO	1786	1/1/2017	0.5	0.31%	-	-	0.00%	0.0%	0.0%	100.0%	-	0.00%	14,818,895.00	10.85	160.8	99.69%	Small Cap	161.3
Middlesex Water	NDQ	MSEX	1787	1/1/2017	150.5	18.22%	130.8	5.6	4.28%	38.0%	37.5%	62.5%	2.4	0.28%	16,289,772.00	41.32	473.1	81.49%	Small Cap	826.0
SNW Corporation	NYSE	SNW	1788	1/1/2017	439.7	28.05%	364.2	21.0	5.77%	48.0%	47.5%	52.5%	-	0.00%	20,456,250.00	55.14	1,128.0	71.95%	Mid Cap	1,567.7
York Water	NDQ	YORW	1789	1/1/2017	84.6	14.65%	84.6	5.1	6.03%	44.0%	43.5%	56.5%	-	0.00%	12,869,960.00	38.30	482.9	85.35%	Small Cap	577.5
<b>Total</b>					<b>10,832.8</b>	<b>30.23%</b>	<b>9,257.9</b>	<b>463.6</b>	<b>5.01%</b>	<b>53.00%</b>	<b>55.00%</b>	<b>100.00%</b>	<b>14.2</b>	<b>0.04%</b>		<b>24,521.1</b>		<b>69.73%</b>		<b>35,168.1</b>
Minimum							0.31%		0.00%	0.00%	0.00%	45.00%		0.00%					65.19%	
Std Mean							30.23%		5.01%	53.00%	55.00%	100.00%		0.04%					68.73%	
Mean							21.53%		4.57%	40.67%	40.61%	58.38%		0.05%					78.42%	
Median							24.48%		4.90%	47.00%	46.00%	54.00%		0.00%					75.42%	
Maximum							34.76%		6.58%	53.00%	55.00%	100.00%		0.29%					99.69%	
Water Industry Capital Structure																				
Market											Embedded									
Capital Structure	Proportion	Reference	Proportion	Reference																
Debt	30.23%	col 7	40.67%	mean col 11																
Preferred	0.04%	col 15	0.05%	mean col 15																
Equity	69.73%	col 19	59.39%	mean col 13																
Total	100.00%		100.11%																	
Use																				
Debt	30%	Input	41%	Input																
Equity	70%	Input	59%	Input																
Total	100%		100%																	

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

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

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

1  
 Value Line Investment Surveys  
 Water Industry  
 As of First Quarter 2017 (1-1-2017)

Company	Exchange	Ticker	ValueLine No	ValueLine Issue	Tax Rate			
					2015	2016	2017	19-21
Input Value Line	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	1781	1/1/2017	38.4%	33.0%	36.0%	36.0%
American Water	NYSE	AWK	1782	1/1/2017	35.1%	39.0%	38.5%	37.0%
Aqua American	NYSE	WTA	1783	1/1/2017	6.9%	7.0%	7.0%	20.0%
California Water	NYSE	CWT	1784	1/1/2017	35.3%	32.0%	32.0%	35.0%
Connecticut Water	NDQ	CTWS	1785	1/1/2017	4.2%	7.5%	19.0%	28.0%
Consolidated Water Company	NDQ	CWCO	1786	1/1/2017				
Middlesex Water	NDQ	MSEX	1787	1/1/2017	34.5%	35.0%	35.0%	35.0%
SIW Corporation	NYSE	SIW	1788	1/1/2017	38.1%	38.0%	39.0%	39.0%
York Water	NDQ	YORW	1789	1/1/2017	27.2%	28.5%	29.0%	32.5%
Maximum					4.20%	7.00%	7.00%	20.00%
wd Mean								
Mean					27.96%	27.50%	29.44%	32.81%
Median					34.90%	32.50%	33.50%	35.00%
Maximum					39.10%	39.00%	39.00%	39.00%
Historical		34.00%	Median					
Marginal		35.00%	AUS Input					
US 50-state average		4.91%	AUS Input					
Pennsylvania		9.99%	AUS Input					
Tax Rate		41.49%	Calculated					

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**  
**Appraisal Work Papers**  
**As of January 1, 2017**

**Income Approach**  
**Cost of Capital / Required Return**

**Value Line Investment Surveys**  
**Water Industry**  
**January 2017**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**



# THE VALUE LINE INVESTMENT SURVEY®

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Part 3  
Ratings  
&  
Reports

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### ESPECIALLY NOTEWORTHY

We welcome a trio of companies to The Value Line Investment Survey this week, with two of the new additions taking up residence in the e-commerce space. Specifically, **Lo-MeIn, Inc.**, which provides cloud-based services for remote access, device management and collaboration worldwide, is making its debut on page 1820. In addition **Canada-based Sleepify Inc.**, which provides a cloud-based and multi-channel commerce platform for small and medium-sized businesses, can be found on page 1826 of the Survey.

Separately, **Raven Indc** series, which designs and manufactures a variety of products for the industrial, agricultural, energy, construction, and defense markets, joins the ranks of the Diversified Industry on page 1767.

Despite persistent currency headwinds, **Siemens AG** seems set for a strong earnings advance in the current fiscal year. What's more, at this juncture, the issue seems to have something to offer investors of all ilk. Read our take on the company's prospects on page 1771.

**Stanley Black & Decker** has been quite busy on the acquisition trail. In early October, it inked a deal to acquire the tools business of Newell Brands, and more recently, agreed to purchase the Craftsman brand from Sears Holdings. Learn more on page 1729.

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In three parts: Part 1 is the Summary & Index. Part 2 is the "Section" Opinion. This is Part 3, Ratings & Reports. Volume 127, No. 2  
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INDUSTRY TIMELINESS: 39 (of 97)

Stocks in the Water Utility Industry have traditionally been purchased by income-oriented investors for their yield and dividend growth prospects. Accounts interested in these equities typically are willing to sacrifice capital appreciation in return for a well-defined income stream and a reduced amount of risk. This may be changing, however, as the yields of many water utility stocks are now lower than the *Value Line* median.

Five of the eight regulated utility stocks we follow outperformed the market averages since we last reviewed the group three months ago. Of these, the best performers were the small capitalization equities.

From an operational standpoint, the group continued to post decent earnings. Much of this is the result of positive regulatory climates in many states around the country.

Capital spending in the industry is significant as the water infrastructure in the United States had long been neglected. Utilities are now investing heavily to replace aging pipelines and valves, and to modernize waste water facilities.

Consolidation remains an ongoing trend in the industry. Smaller municipally run water districts do not have sufficient funds to bring their plant and equipment up to EPA-mandated standards. As a result, they are being merged with larger utilities that have better access to capital. In addition, because this industry is plagued with redundancies, mergers are leading to economies of scale.

Are Water Utility Stocks Still Yield Plays?

The average dividend yield on the eight regulated water utilities we follow is currently 2.1%, or exactly the same as the median for all stocks in the *Value Line* universe. Historically, the yield on these stocks has been much higher. As an example, the typical yield on an electric utility equity is about 3.6%, or 150 basis points higher than the water utility industry. Why is this? One reason is that when taken as a whole, the market capitalization of the group is very modest. Thus, it doesn't take a large shift into the sector by institutional investors to drive the price of these stocks higher and their yields lower. Indeed, the three stocks with the best returns over the past three months were all small cap stocks. *York Water* and *SJW* each surged 30% while *Middlesex Water* rose about 25%. Before these moves, the market capitalization of each individual stock was \$375 million, \$850 million, and \$550 million, respectively. The spike in prices has also left the equities with respective yields of 1.7%, 1.5%, and 2.1%. Taking a look at the three biggest members of the group, only *American Water Works* performed well, while *Aqua America* and *American States Water* both only rose a meager 1%.

Operations And Earnings Are Solid

For the most part, water companies have been experiencing reasonable earnings growth. This comes despite a nationwide trend aimed at getting households to reduce their consumption of water. How can the bottom line do well when state authorities and the utilities themselves are discouraging water usage? The answer is that many states have implemented strategies that not only don't penalize utilities for selling less water, but provides incentives for households to conserve more.

State regulatory authorities are actively working with the industry in a way that is benefited both parties. In drought-stricken California, regulators have changed the compensation methodology for water utilities. Now they earn income on a fee basis, regardless of the amount of water sold. This has proven to be successful in cutting consumption without hurting the utilities bottom line.

As we often point out, the most important factor in a any utility's success, whether it provides electricity, gas, or water, is the regulatory climate in which it operates. Harsh regulatory conditions can make it nearly impossible for the best run utilities to earn a reasonable return on their investment.

Looking forward, the outlook for continued successful cooperation between states and utilities seems likely. Both parties realize that for decades much-needed capital improvements were deferred. Industry experts are now in agreement that large sums have to be made to bring the nation's water infrastructure up to par. Because water bills have been less than homeowners have been paying for other utility services, there appears to be less resistant in increasing them.

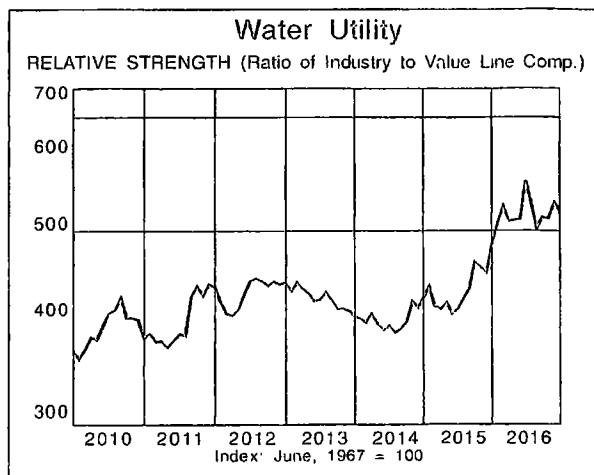
Consolidation

There are over 50,000 mostly small water authorities in the U. S. Many of these districts find themselves without the sums needed to modernize their facilities. As a result, many are merging with larger entities that have the financial wherewithal to make the required investment. *American Water Works*, *American States Water*, and *Aqua America* are three of the most active acquirers. Another benefit from these mergers is that there are a large amounts of redundancies in the industry and substantial cost savings can be achieved.

Conclusion

Our ranking system suggests that stock prices in this group are fully valued. None of the eight stocks are timely with *American Water Works*, *Connecticut Water Service*, *Middlesex Water*, *SJW Corp*, and *York Water* all ranked to underperform the market averages in the year ahead.

James A. Flood







# AMERICAN WATER NYSE-AWK

<b>TIMELINESS</b> 4 Raised 1/13/17 <b>SAFETY</b> 3 New 7/25/08 <b>TECHNICAL</b> 3 Lowered 9/30/16 BETA 65 (1.00 - Market)	<b>RECENT PRICE</b> 72.25 <b>P/E RATIO</b> 26.9 (Trailing: 27.6 Median: NMF)	<b>RELATIVE P/E RATIO</b> 1.37 <b>DIV'D YLD</b> 2.2%	<b>VALUE LINE</b> 1782	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>High</th> <th>23.7</th> <th>23.0</th> <th>25.8</th> <th>32.8</th> <th>39.4</th> <th>45.1</th> <th>56.2</th> <th>61.2</th> <th>85.2</th> </tr> <tr> <th>Low</th> <th>16.5</th> <th>16.2</th> <th>19.4</th> <th>25.2</th> <th>31.3</th> <th>37.0</th> <th>41.1</th> <th>48.4</th> <th>58.9</th> </tr> </table> <div style="margin-top: 10px;"> <p><b>LEGENDS</b></p> <ul style="list-style-type: none"> <li>0.85 x Dividends p sh divided by Interest Rate</li> <li>Relative Price Strength</li> <li>Options: Yes</li> <li>Shaded area indicates recession</li> </ul> </div>	High	23.7	23.0	25.8	32.8	39.4	45.1	56.2	61.2	85.2	Low	16.5	16.2	19.4	25.2	31.3	37.0	41.1	48.4	58.9
High	23.7	23.0	25.8	32.8	39.4	45.1	56.2	61.2	85.2															
Low	16.5	16.2	19.4	25.2	31.3	37.0	41.1	48.4	58.9															

2019-21 PROJECTIONS		Ann'l Total Return	
High	90	Gain	+25%
Low	60	Gain	-15%

Insider Decisions			
M	A	M	J
0	0	0	0
0	0	0	0
0	0	0	0

Institutional Decisions			
10/2016	20/2016	30/2016	Percent shares traded
313	280	265	21
232	254	289	14
150654	150627	142186	7

2000	2001	2002	2003	2004	2005	2006	2007E	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	VALUE LINE PUB. LLC	19-21
13.08	13.84	14.61	13.98	15.49	15.18	16.25	16.28	16.78	17.72	18.65	19.45	Revenues per sh	22.20						
.65	d.47	2.87	2.89	3.56	3.73	4.27	4.36	4.75	5.13	5.25	5.75	"Cash Flow" per sh	6.55						
d.97	d2.14	1.10	1.25	1.53	1.72	2.11	2.06	2.39	2.64	2.60	3.05	Earnings per sh	3.75						
---	---	40	82	86	90	1.21	84	1.21	1.33	1.47	1.61	Div'd Decl'd per sh	2.05						
4.31	4.74	6.31	4.50	4.38	5.27	5.25	5.50	5.33	6.51	7.25	7.10	Cap'l Spending per sh	6.00						
23.86	28.39	25.64	22.91	23.59	24.11	25.11	26.52	27.39	28.25	29.05	30.95	Book Value per sh	34.60						
160.00	160.00	160.00	174.63	175.00	175.66	176.99	178.25	179.46	178.28	178.50	180.00	Common Shs Outst'g	187.50						
---	---	18.9	15.6	14.6	16.8	16.7	19.9	20.0	20.5	27.9	---	Avg Ann'l P/E Ratio	20.0						
---	---	1.14	1.04	.93	1.05	1.06	1.12	1.05	1.04	1.17	---	Relative P/E Ratio	1.25						
---	---	1.9%	4.2%	3.8%	3.1%	3.4%	2.0%	2.5%	2.5%	2.0%	---	Avg Ann'l Div'd Yield	2.7%						

CAPITAL STRUCTURE as of 9/30/16	
Total Debt \$6857.0 mil. Due in 5 Yrs \$1272.0 mil.	2093.1
LT Debt \$5853.0 mil. (53% of Cap'l)	d155.8
Leases, Uncapitalized: Annual rentals \$14.0 mil.	2214.2
Pension Assets 12/15 \$1376.0 mil.	2336.9
Pfd Stock \$11.0 mil Pfd Div'd \$2 mil	2440.7
	2710.7
	2666.2
	2076.9
	2901.9
	3011.3
	3159.0
	3325
	3500
	Revenues (\$mill)
	4160
	Net Profit (\$mill)
	700
	Income Tax Rate
	37.0%
	AFUDC % to Net Profit
	3.0%
	Long-Term Debt Ratio
	55.0%
	Common Equity Ratio
	45.0%
	Total Capital (\$mill)
	14540
	Net Plant (\$mill)
	17200
	Return on Total Cap'l
	6.0%
	Return on Shr. Equity
	10.5%
	Return on Com Equity
	10.5%
	Retained to Com Eq
	5.0%
	All Div'ds to Net Prof
	55%

**MARKET CAP: \$12.9 billion (Large Cap)**

CURRENT POSITION (\$MILL.)	2014	2015	9/30/16
Cash Assets	23.1	45.0	69.0
Accts Receivable	267.1	255.0	285.0
Other	638.3	357.0	447.0
Current Assets	928.5	657.0	801.0
Accts Payable	285.8	126.0	135.0
Debt Due	511.1	682.0	1004.0
Other	444.1	725.0	789.0
Current Liab.	1241.0	1533.0	1928.0

**ANNUAL RATES** Past 10 Yrs. Past 5 Yrs. Est'd '13-'15 to '19-21

Revenues	3.0%	4.5%
"Cash Flow"	9.0%	5.5%
Earnings	13.0%	8.0%
Dividends	10.0%	10.5%
Book Value	2.5%	4.0%

Cal-endar	QUARTERLY REVENUES (\$mill.)				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	636.1	724.3	829.2	712.3	2901.9
2014	679.0	754.8	846.1	731.4	3011.3
2015	698.0	782.0	896.0	783.0	3159.0
2016	743.0	827.0	930.0	825	3325
2017	760	870	990	880	3500

Cal-endar	EARNINGS PER SHARE ^				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	.32	.57	.84	.33	2.06
2014	.39	.62	.86	.52	2.39
2015	.44	.68	.96	.56	2.64
2016	.46	.77	.83	.54	2.60
2017	.50	.82	1.08	.65	3.05

Cal-endar	QUARTERLY DIVIDENDS PAID ^				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	---	.28	.28	.28	.84
2014	.28	.31	.31	.31	1.21
2015	.31	.34	.34	.34	1.33
2016	.34	.375	.375	.375	1.47

**AMERICAN WATER WORKS COMPANY, INC.** is the largest investor-owned water and wastewater utility in the U.S., providing services to over 15 million people in over 47 states and Canada (Regulated presence in 16 states) Nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 86.8% of 2015 revenues.

**BUSINESS:** American Water Works Company, Inc. is the largest investor-owned water and wastewater utility in the U.S., providing services to over 15 million people in over 47 states and Canada (Regulated presence in 16 states) Nonregulated business assists municipalities and military bases with the maintenance and upkeep as well. Regulated operations made up 86.8% of 2015 revenues.

**AMERICAN WATER WORKS PROBABLY EXPERIENCED A RARE EARNINGS DECLINE IN 2016.** In the third quarter, the company had to take a \$0.22-a-share charge resulting from a 2014 chemical spill in West Virginia. This would mark only the second time since 2008 that American Water Works has not posted a strong year-over-year earnings gain. Excluding the one-time writedown, however, the utility's share net would have advanced a healthy 7%, in our opinion.

**We expect the bottom line to get back on track this year.** Due to American Water Works' broad geographic footprint, the firm continually has pending cases seeking higher tariffs in different states. This year, we think added revenues from these sources should be sufficient for the company's share net to reach \$3.05, a 17% rise over 2016's depressed number.

**Management has projected annual profit growth of 7%-10% through 2021.** This rate is considerably higher than the industry average. How does American Water Works achieve these results in a regulated industry? The answer is through an ambitious acquisition strategy, combined with a major focus on reining in expenses. By far the largest company in the industry, American Water Works is able to purchase smaller water authorities that do not have the financial wherewithal to maintain their water systems and keep them in compliance with EPA requirements. Because there are such redundancies among systems, American Water Works can absorb these smaller utilities and realize significant cost savings. The effectiveness of the program is measured by the maintenance expense-to-operating ratio. In 2010, this ratio was at 44.2% and we estimate it ended 2016 at around 35%. Over the next five years, the goal is to lower the ratio to 32.5%. This should be the primary driver behind the earnings and dividends growth.

**These shares are not favored by our Ranking System.** Despite all of the positive operational developments, AWK is pegged to underperform the market averages in the year ahead. Moreover, over the next 3- to 5-year pull, its total return potential is unattractive as the equity is already trading in our Target Price Range.

*James A. Flood*      *January 13, 2017*

# AQUA AMERICA NYSE-WTR

RECENT PRICE **29.98** P/E RATIO **21.3** (Trailing: 25.0 Median: 22.0) RELATIVE P/E RATIO **1.09** DIV'D YLD **2.7%** VALUE LINE **1783**

<b>TIMELINESS</b> 3 Lowered 02/29/16 <b>SAFETY</b> 2 Raised 4/20/12 <b>TECHNICAL</b> 3 Lowered 10/7/16 BETA .70 (1.00 = Market)	High 23.4 Low 14.0 23.8 16.1	21.3 17.6 17.2 18.4 19.0 21.5 28.1 20.6	28.2 31.1 35.8 22.4 24.4 28.0	Target Price Range 2019 2020 2021 60 60 50 40 30 25 20 15 10 10 5
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2019-21 PROJECTIONS		Ann'l Total Return	
Price	Gain	Ann'l	Total
High 45	(+50%)	13%	
Low 35	(+15%)	7%	

Insider Decisions		Institutional Decisions	
M A M J J A S O N		102016	202016
to Buy	0 0 0 0 0 0 0 0 0	190	179
Options	8 13 1 0 7 0 0 7 0	147	152
to Sell	4 0 3 0 0 0 1 0 0	85054	85171
		85006	

CAPITAL STRUCTURE as of 9/30/16		Pension Assets-12/15 \$238.6 mill	
Total Debt \$1800.5 mill	Due in 5 Yrs \$441.5 mill.	51.6%	55.4%
LT Debt \$1748.7 mill	LT Interest \$78.6 mill.	48.4%	44.6%
	(49% of Cap'l)	1904.4	2191.4

MARKET CAP: \$5.3 billion (Large Cap)		CURRENT POSITION	
2014	2015	9/30/16	
3.3%	2.5%	3.7%	3.7%

ANNUAL RATES		Past 10 Yrs		Past 5 Yrs		Est'd '13-'15	
Revenues	5.0%	5.0%	2.5%	4.5%	4.5%	4.5%	4.5%
"Cash Flow"	8.0%	8.0%	8.0%	6.0%	6.0%	6.0%	6.0%
Earnings	8.5%	13.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Dividends	8.0%	7.5%	9.0%	9.0%	9.0%	9.0%	9.0%
Book Value	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%

QUARTERLY REVENUES (\$ mill.)		EARNINGS PER SHARE ^		QUARTERLY DIVIDENDS PAID ^	
Cal-endar	Mar.31 Jun.30 Sep.30 Dec.31	Mar.31 Jun.30 Sep.30 Dec.31	Mar.31 Jun.30 Sep.30 Dec.31	Mar.31 Jun.30 Sep.30 Dec.31	Mar.31 Jun.30 Sep.30 Dec.31
2013	180.0 195.7 204.3 188.6	.26 .30 .36 .24	.14 .14 .152 .152	.14 .14 .152 .152	.58
2014	182.7 195.3 210.5 191.4	.24 .31 .38 .27	152 152 165 165	152 152 165 165	63
2015	190.3 205.8 221.0 197.1	.27 .32 .38 .17	165 165 178 178	165 165 178 178	69
2016	192.6 208.4 226.6 202.4	.29 .33 .41 .32	178 178 1913 1913	178 178 1913 1913	74
2017	205 220 240 210	.31 .37 .45 .32			

**BUSINESS:** Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Has 1,617 employees. Acquired AquaSource, 7/13; North Maine Utilities, 7/15; and others. Water supply revenues '2015 residential, 69%; commercial, 10%; industrial & other, 13%. Officers and directors own less than 1% of the common stock; Vanguard Group, 7.7%; Blackrock, Inc., 7.3%; State Street Capital, 5.5% (3/16 Proxy). President & Chief Executive Officer: Christopher Franklin. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Tel.: 610-525-1400. Internet: www.aquaamerica.com

**Aqua America most likely enjoyed a solid 2016.** Regulators in six different states granted the company's various water utilities permission to raise rates at different times during the year. We think these higher revenues enabled the company to post share earnings of \$1.35, versus 2015's tally of \$1.14. An unusual expense taken in last year's final quarter made the comparison better than it otherwise would have appeared.

**Bottom-line results should be solid in 2017, as well.** Aqua has rate cases pending in Indiana, Ohio, and Virginia. With the carryover rate relief from 2016 and our assumption of reasonable regulatory treatment in 2017, we expect the company's share net to increase a healthy 7.4%.

**Tuck-in acquisitions will continue to play a major role in Aqua's expansion.** The water utility industry in the United States is comprised of over 50,000 mostly small municipal authorities. Many of these are under pressure because they do not have the funds to upgrade their antiquated infrastructure. Larger companies such as Aqua have been purchasing many of these water districts and integrating them into their operations. Because there are many redundant functions in the industry, economies of scale and cost savings are very achievable. The company made 13 acquisitions in the past year and plans on maintaining this strategy. Since Aqua earns a return on its net plant, increasing the rate base helps expand profits.

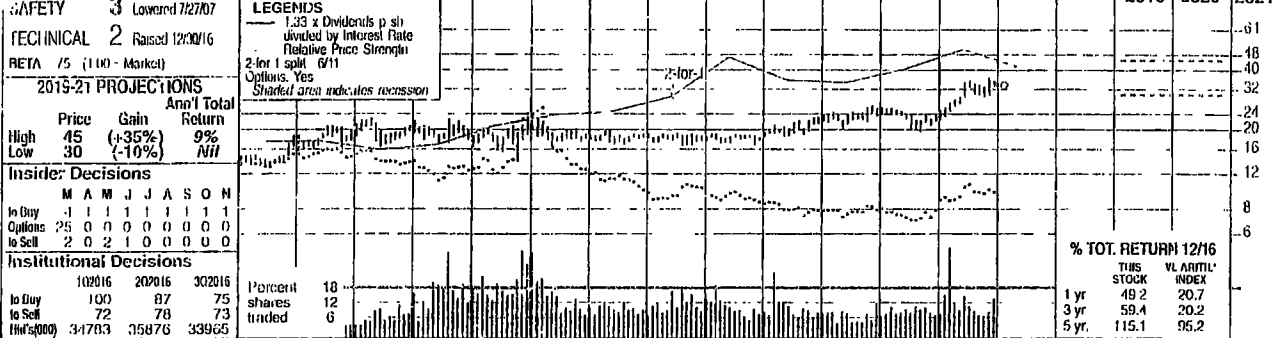
**Projected capital expenditures are manageable.** The company plans on spending \$1.1 billion over the next three years upgrading and maintaining its plant and equipment. While internally generated funds won't be sufficient to cover all of the outlays, only a modest amount of debt will be required to meet the shortfall. Thus, Aqua's balance sheet should remain very sound.

**Shares of Aqua are an Average selection for the year ahead.** Looking further out to late decade, the stock may have some appeal for conservative investors. Potential total returns are close to the Value Line median, but this is good on a risk-adjusted basis because the equity has a Safety ranking of 2, and well-defined earnings and dividends.

James A. Flood      January 13, 2017

# CALIFORNIA WATER NYSE-CWT

RECENT PRICE **\$37.75** P/E RATIO **31.3** (Trailing: 38.4, Median: 20.0) RELATIVE P/E RATIO **1.60** DIVD YLD **2.1%** VALUE LINE **1764**



2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	19-21	
0.00	0.15	0.67	8.18	0.59	0.72	8.10	0.88	9.50	10.82	11.05	12.00	13.34	12.23	12.50	12.20	12.55	13.45	Revenues per sh	14.70
1.26	1.10	1.32	1.26	1.42	1.52	1.36	1.56	1.86	1.93	1.93	2.07	2.32	2.21	2.47	2.22	2.20	2.65	"Cash Flow" per sh	3.25
66	47	63	61	73	74	57	75	95	98	91	86	1.02	1.02	1.19	.94	.90	1.35	Earnings per sh <sup>A</sup>	1.60
55	56	56	56	57	57	58	58	59	59	60	62	.63	.64	.65	.67	.69	.71	Div'd Decl'd per sh <sup>B</sup>	.99
1.23	2.04	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	3.65	3.55	Cap'l Spending per sh	3.65
6.45	6.48	6.56	7.22	7.83	7.90	9.07	9.25	9.72	10.13	10.45	10.76	11.28	12.54	13.11	13.41	13.55	14.25	Book Value per sh <sup>C</sup>	16.00
30.29	30.36	30.36	33.86	36.73	36.70	41.31	41.33	41.45	41.53	41.67	41.82	41.98	47.74	47.81	47.88	48.00	48.00	Common Shs Outst'g <sup>D</sup>	50.00
15.6	27.1	19.6	21.1	20.1	24.9	29.2	26.1	19.8	19.7	20.3	21.3	17.9	20.1	19.7	24.8	33.3		Avg Ann'l P/E Ratio	23.0
1.27	1.39	1.00	1.26	1.06	1.33	1.58	1.39	1.19	1.31	1.29	1.34	1.14	1.13	1.04	1.26	1.77		Relative P/E Ratio	1.45
4.3%	4.4%	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%		Avg Ann'l Div'd Yield	2.6%

CAPITAL STRUCTURE as of 9/30/16		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	19-21	
Total Debt	\$618.7 mill.	334.7	367.1	410.3	449.4	460.4	501.8	560.0	584.1	597.5	588.3	602.5	645	65	65	65	65	65	65	Revenues (\$mill) <sup>E</sup>	735
LT Debt	\$555.5 mill	25.6	31.2	39.8	40.6	37.7	36.1	42.6	47.3	56.7	45.0	43.0	65.0	80.0	80.0	80.0	80.0	80.0	80.0	Net Profit (\$mill)	80.0
LT Interest	\$27.2 mill. (47% of Cap'l)	37.4%	39.9%	37.7%	40.3%	39.5%	40.5%	37.5%	30.3%	33.0%	35.3%	32.0%	32.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	Income Tax Rate	35.0%
Pension Assets-12/15	\$328.6 mill	10.6%	6.3%	8.6%	7.6%	4.2%	7.6%	8.0%	4.3%	2.7%	4.2%	5.0%	5.0%	4.0%	4.2%	5.0%	5.0%	5.0%	5.0%	AFUDC % to Net Profit	5.0%
Oblig.	\$501.9 mill.	43.5%	42.9%	41.6%	47.1%	52.4%	51.7%	47.8%	41.6%	40.1%	44.4%	46.0%	45.0%	40.1%	44.4%	46.0%	45.0%	45.0%	45.0%	Long-Term Debt Ratio	42.0%
Pfd Stock	None	55.9%	56.6%	58.4%	52.9%	47.0%	48.3%	52.2%	58.4%	59.9%	55.6%	54.0%	55.0%	59.9%	55.6%	54.0%	55.0%	55.0%	55.0%	Common Equity Ratio	50.0%
Common Stock	47,908,000 shs.	670.1	674.9	690.4	794.3	914.7	931.5	908.2	1024.0	1045.9	1154.5	1200	1250	1045.9	1154.5	1200	1250	1250	1250	Total Capital (\$mill)	1375
		941.5	1010.2	1112.4	1198.1	1294.3	1381.1	1457.1	1515.8	1590.4	1701.8	1775	1815	1590.4	1701.8	1775	1815	1815	1815	Net Plant (\$mill)	1900
		5.2%	5.9%	7.1%	6.5%	5.5%	5.5%	6.3%	6.0%	6.3%	5.1%	4.5%	6.5%	6.3%	5.1%	4.5%	4.5%	4.5%	4.5%	Return on Total Cap'l	7.0%
		6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	7.9%	9.1%	7.0%	6.5%	9.5%	9.1%	7.0%	6.5%	6.5%	6.5%	6.5%	Return on Shr. Equity	10.0%
		6.8%	8.1%	9.9%	9.6%	8.6%	8.0%	9.0%	7.9%	9.1%	7.0%	6.5%	9.5%	9.1%	7.0%	6.5%	6.5%	6.5%	6.5%	Return on Com Equity	10.0%
		1.0%	1.8%	3.8%	3.0%	3.0%	2.3%	3.4%	3.4%	4.1%	2.0%	1.5%	4.5%	4.1%	2.0%	1.5%	4.5%	4.5%	4.5%	Retained to Com Eq	4.0%
		06%	77%	61%	60%	66%	71%	62%	56%	55%	71%	77%	52%	55%	71%	77%	52%	52%	52%	All Div'ds to Net Prof	62%

**MARKET CAP: \$1.6 billion (Mid Cap)**

**CURRENT POSITION (\$ MILL.)**

Cash Assets	19.6	8.8	21.4
Other	134.5	118.8	129.7
Current Assets	154.1	127.6	151.1
Accts Payable	59.4	66.4	84.1
Debt Due	85.7	40.2	63.2
Other	72.6	41.9	56.7
Current Liab	217.7	148.5	204.0

**ANNUAL RATES** Past 10 Yrs. Past 5 Yrs. Est'd '13-'15 of change (per sh)

Revenues	4.0%	5.0%	3.0%
"Cash Flow"	6.0%	5.5%	6.0%
Earnings	5.0%	4.0%	7.5%
Dividends	1.5%	2.0%	7.0%
Book Value	5.5%	5.0%	3.5%

**BUSINESS:** California Water Service Group provides regulated and nonregulated water service to 477,900 customers in 85 communities in the state of California. Accounts for over 94% of total customers. Also operates in Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay Area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp., West Hawaii Utilities (9/04). Revenue breakdown, '15: residential, 70%; business, 20%; industrial, 5%; public authorities, 4%; other 1% '15 reported depreciation rate: 4.0%. Has 1,155 employees. President, Chairman, and CEO: Peter C. Nelson, Inc., DE. Address: 1720 North First St, San Jose, CA 95112-4598. Tel: 408-367-8200. Internet: www.cawatergroup.com.

**California Water Service Group has received favorable news regarding a long-sought-after rate case decision.** The California Public Utilities Commission has accepted the company's proposal, which was submitted back in August of 2015, for increased water rates and subsequent investment into its water systems and infrastructure. This will allow California Water to raise its water prices, year over year, by approximately \$45 million, \$17 million, and \$16 million, respectively over the coming three-year stint. Too, about \$3 million in collectible surcharges from drought expenses has been granted. On balance, implementation of CWT's plan is able to start immediately in 2017, thereby underpinning our sanguine financial outlook.

**We are raising only our 2017 top-line estimate, at this time.** The company will likely end 2016 with revenues fractionally above the \$600 million mark. Thus, we are lifting next year's revenue estimate by \$20 million, to \$645 million, staying conservatively in line with the authorized rate increase. Meanwhile, our current 2017 earnings forecast of \$1.35 a share already factors in improved operating efficiencies and moderate revenue growth. This represents a 50% advance over our recently lowered 2016 share-net call, at \$0.90.

**Capital investment over the 3- to 5-year stretch may be more intensive than we previously anticipated.** Indeed, capital improvements through the September-period were up about 40% from the like-2015 figure. We do not see any signs of a spending slowdown, especially given the \$600 million budget approval on infrastructure upgrades, though the extent of this spending is unknown. Furthermore, we would not be surprised to see a number of small-to-midsized acquisitions enter the picture.

**Investors should press pause on this neutrally ranked equity, for now.** True, the long-term story is compelling. However, CWT's current valuation appears rather stretched, as the stock has risen about 10% in price over the past three months. Therefore, we recommend waiting for a more attractive entry point before committing funds to this water utility.

*Nicholas P. Patrikis*      *January 13, 2017*

(A) Basic EPS. Excl. nonrecurring gain (loss): '00, (4c); '01, 2c; '02, 4c; '11, 4c. Next earnings report due late February	(B) Dividends historically paid in late Feb.	(C) Incl. intangible assets. In '15: \$7.5 mill., \$0.16/sh.	(D) In millions, adjusted for splits.	(E) Excludes non-reg rev	Company's Financial Strength	B++
					Stock's Price Stability	90
					Price Growth Persistence	35
					Earnings Predictability	75

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<b>TIMELINESS</b> 4 Lowered 11/10/16	High: 28.2	27.7	25.6	29.0	26.4	27.9	29.1	32.8	36.4	37.5	39.9	58.3	Target Price Range 2019 2020 2021																																
<b>SAFETY</b> 3 New 1/10/13	Low: 21.9	20.3	22.4	19.3	17.3	20.0	23.3	26.2	27.8	31.0	33.2	37.5		2019 2020 2021																															
<b>TECHNICAL</b> 3 Raised 11/25/16	<p><b>LEGENDS</b> 1.30 x Dividends p sh divided by Interest Rate Relative Price Strength Options Yes Shaded area indicates recession</p>																																												
<b>BETA</b> 65 (1.00 = Market)	<p><b>2019-21 PROJECTIONS</b></p> <table border="1"> <tr> <th></th> <th>Price</th> <th>Gain</th> <th>Ann'l Total Return</th> </tr> <tr> <td>High</td> <td>55</td> <td>(NH)</td> <td>2%</td> </tr> <tr> <td>Low</td> <td>40</td> <td>(-30%)</td> <td>-5%</td> </tr> </table>													Price	Gain	Ann'l Total Return	High	55	(NH)	2%	Low	40	(-30%)	-5%																					
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High	55	(NH)	2%																																										
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<b>Insider Decisions</b>	<table border="1"> <tr> <th></th> <th>M</th> <th>A</th> <th>M</th> <th>J</th> <th>J</th> <th>A</th> <th>A</th> <th>S</th> <th>O</th> <th>N</th> </tr> <tr> <td>To Buy</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>To Sell</td> <td>2</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> </table>													M	A	M	J	J	A	A	S	O	N	To Buy	0	0	0	0	0	0	0	0	0	0	To Sell	2	0	0	0	0	0	0	0	0	0
	M	A	M	J	J	A	A	S	O	N																																			
To Buy	0	0	0	0	0	0	0	0	0	0																																			
To Sell	2	0	0	0	0	0	0	0	0	0																																			
<b>Institutional Decisions</b>	<table border="1"> <tr> <th></th> <th>10/2016</th> <th>20/2016</th> <th>30/2016</th> <th>Percent shares traded</th> </tr> <tr> <td>To Buy</td> <td>45</td> <td>49</td> <td>51</td> <td>12</td> </tr> <tr> <td>To Sell</td> <td>48</td> <td>52</td> <td>48</td> <td>0</td> </tr> <tr> <td>Mkts(000)</td> <td>4728</td> <td>5138</td> <td>5226</td> <td>4</td> </tr> </table>													10/2016	20/2016	30/2016	Percent shares traded	To Buy	45	49	51	12	To Sell	48	52	48	0	Mkts(000)	4728	5138	5226	4													
	10/2016	20/2016	30/2016	Percent shares traded																																									
To Buy	45	49	51	12																																									
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Mkts(000)	4728	5138	5226	4																																									

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	** VALUE LINE PUBL. LLC	19-21
5.70	5.93	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	8.75	9.20	Revenues per sh	13.35
1.73	1.78	1.78	1.89	1.91	1.62	1.52	1.90	1.95	1.93	2.04	2.11	2.64	2.63	2.97	3.18	3.35	3.45	"Cash Flow" per sh	3.75
1.09	1.13	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	2.20	2.25	Earnings per sh ^	2.50
.79	.80	.81	.83	.84	.85	.86	.87	.88	.90	.92	.94	.96	.98	1.01	1.05	1.12	1.20	Div'd Decl'd per sh ^b	1.35
1.43	1.86	1.98	1.49	1.58	1.96	1.96	2.24	2.44	3.28	3.06	2.61	2.79	3.02	4.11	4.29	5.80	4.35	Cap'l Spending per sh	3.35
8.92	9.25	10.06	10.46	10.94	11.52	11.60	11.95	12.23	12.67	13.05	13.50	20.95	17.92	18.83	20.02	20.70	21.75	Book Value per sh ^d	22.90
7.28	7.65	7.94	7.97	8.04	8.17	8.27	8.38	8.46	8.57	8.68	8.76	8.85	11.04	11.12	11.19	11.35	11.50	Common Shs Outst'g ^c	72.00
16.2	21.5	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	17.6	22.0	22.0	Avg Ann'l P/E Ratio	19.0
1.18	1.10	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	1.17	1.17	Relative P/E Ratio	1.20
4.0%	3.3%	3.0%	3.0%	3.1%	3.4%	3.6%	3.6%	3.6%	4.1%	3.9%	3.6%	3.2%	3.2%	3.0%	2.9%	2.3%	2.3%	Avg Ann'l Div'd Yield	2.8%

<b>CAPITAL STRUCTURE as of 9/30/16</b>																	
Total Debt \$203.1 mill. Due in 5 Yrs \$19.3 mill																	
LT Debt \$200.2 mill      LT Interest \$0.0 mill. (47% of Cap'l)																	
<b>Leases, Uncapitalized:</b> Annual rentals \$ 3 mill.																	
<b>Pension Assets-12/15</b> \$56.6 mill.      Oblig. \$75.8 mill																	
<b>Pfd Stock</b> \$0.8 mill <b>Pfd Divd</b> NMF																	
<b>Common Stock</b> 11,240,417 shs																	
<b>MARKET CAP:</b> \$625 million (Small Cap)																	
<b>CURRENT POSITION (SMILL.)</b>																	
Cash Assets	2.5	7	1.2	<b>BUSINESS:</b> 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 2015, 92% of net income was derived from these activities. Provides water services to 400,000 people in 77 municipalities throughout Connecticut and Maine. Acquired The Maine Water Company, January, 2012; Diddeldorf and Sisco Water, December, 2012. Incorporated Connecticut. Has 266 employees. Chairman/President/Chief Executive Officer Eric W Thornburg. Officers and directors own 2.6% of the common stock; BlackRock, Inc. 7.0%; (4/16 proxy) Address: 93 West Main Street, Clinton, CT 06413 Telephone: (860) 669-8636 Internet: www.cwwater.com													
Accounts Receivable	12.0	11.0	13.8	State regulatory authorities have cleared the way for Connecticut Water Service to acquire Heritage Village Water Company. The application for purchase was filed back in July of 2016, and was recently approved by the state's utility authorities. The deal would expand the company's operational footprint into Southbury, Middlebury, and Oxford, Connecticut. As mentioned in our previous report, the deal is a stock-for-stock transaction, valued at \$20 million. Upon Heritage shareholder approval, approximately 7,700 water customers (about 40,000 people) will be added to the fold. Heritage would continue to operate under its current name, but as a wholly-owned subsidiary of CTWS. The deal is expected to close in the first quarter of 2017. Additional acquisitions, coupled with fairly aggressive capital investments, are likely in store over the long haul. On top of the abovementioned deal, Connecticut announced the acquisition of Avon Water Company, which is also slated to close next year, for about \$30 million, in cash and stock. The company's healthy balance sheet and strong free cash gener-													
Other	21.7	15.3	21.5	tion should allow this purchase rate to persist. What's more, we look for spending on its water facilities and service infrastructure to ramp up considerably in the years to come. Annual top- and bottom-line growth appears more than achievable in 2016 and 2017. Financials are on the right track, as Connecticut delivered a slightly better-than-expected performance in the third quarter. We expect low- to mid-single-digit revenue and share-not growth this year and next. Several positive catalysts, including higher customer demand and consumption of water, and lower operation and maintenance expenses, should stay in place for some time. Despite our optimism, this is not an opportune time for investors to get their feet wet, in our view. The stock registered a minor dip in price several months ago, but has regained some ground, and is now trading at the upper end of our 3- to 5-year Target Price Range. Too, this equity is now untimely (4), and pegged to trail the year-ahead broader market averages. Nicholas P. Patrikis      January 13, 2017													
Current Assets	36.2	27.0	36.5	his w. ng. ap- has past end oint. util-													
Accts Payable	10.0	11.9	11.7	20													
Debt Due	4.4	2.8	2.9	B+													
Other	9.2	22.2	26.8	9L													
Current Liab.	23.6	36.9	41.4	35													

<b>ANNUAL RATES</b>				Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '19-'21
Revenues	4.0%	4.5%	0.0%			
"Cash Flow"	4.0%	7.5%	4.0%			
Earnings	4.0%	9.0%	5.0%			
Dividends	2.0%	2.0%	5.0%			
Book Value	6.5%	9.5%	3.0%			

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	19.7	22.6	27.6	21.6	91.5
2014	20.3	25.4	27.6	20.7	94.0
2015	20.0	26.6	28.4	21.0	96.0
2016	21.6	26.1	29.5	22.3	99.9
2017	23.0	26.0	32.0	23.0	106

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.24	.39	.86	.17	1.66
2014	.27	.67	.76	.22	1.92
2015	.28	.77	.79	.20	2.04
2016	.28	.89	.84	.19	2.20
2017	.30	.79	.88	.28	2.25

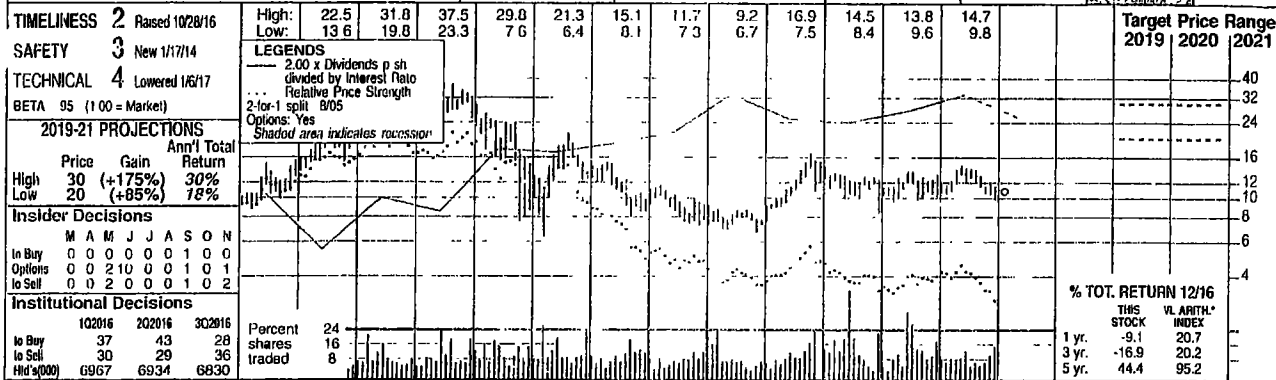
Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.2425	.2425	.2475	.2475	.98
2014	.2475	.2475	.2575	.2575	1.01
2015	.2575	.2575	.2675	.2675	1.05
2016	.2675	.2825	.2825	.2825	1.12
2017					

(A) Diluted earnings. Next earnings report due late February.      (B) Dividends historically paid in mid-March, June, September, and December = Div'd reinvestment plan available.      (C) In millions, adjusted for split      (D) Includes intangibles. In 2015, \$30.4 million/\$2.72 a share.

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# CONSOLIDATED WATER CO. NDCQ-CWCO

RECENT PRICE **10.05** P/E RATIO **37.4** (Trailing: 40.2 Median: 25.0) RELATIVE P/E RATIO **1.91** DIV YLD **2.8%** VALUE LINE **1786**



Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Value Line Pub. LLC	19-21
Revenues per sh	1.24	1.41	1.52	1.68	2.02	1.12	2.71	3.41	4.52	3.99	3.49	3.79	4.49	4.35	4.46	3.86	3.90	4.00	9.40	
"Cash Flow" per sh	.46	.52	.50	.63	.77	.37	.87	1.20	.95	1.18	.86	.93	1.17	.96	.80	.88	.65	1.00	1.60	
Earnings per sh <sup>A</sup>	.34	.35	.32	.42	.49	.23	.59	.79	.50	.74	.43	.42	.64	.58	.42	.51	.28	.60	1.20	
Div'd Decl'd per sh <sup>B</sup>	.17	.20	.21	.21	.23	.12	.24	.20	.33	.28	.30	.30	.30	.30	.30	.30	.30	.30	.40	
Cap'l Spending per sh	.30	.24	.39	.19	.24	.77	1.83	.54	.46	.18	.09	.96	.31	.29	.32	.21	.45	1.70	.40	
Book Value per sh <sup>D</sup>	2.30	2.45	2.64	3.89	4.20	2.54	7.49	8.21	8.36	8.53	8.69	8.83	9.20	9.44	9.58	9.81	9.75	10.00	11.85	
Common Shs Outst'g <sup>C</sup>	7.73	7.84	7.99	11.37	11.51	23.46	14.13	14.40	14.53	14.54	14.55	14.57	14.59	14.69	14.72	14.78	14.90	15.00	16.00	
Avg Ann'l P/E Ratio	10.4	13.9	21.6	19.3	23.1	NMF	43.0	35.4	37.8	19.0	26.9	22.4	12.4	20.0	28.3	22.7	43.2		21.0	
Relative P/E Ratio	.68	.71	1.18	1.10	1.22	NMF	2.32	1.88	2.27	1.27	1.71	1.41	.79	1.12	1.49	1.15	2.27		1.30	
Avg Ann'l Div'd Yield	4.9%	4.2%	3.1%	2.6%	2.0%	.7%	.9%	.7%	1.7%	2.0%	2.6%	3.2%	3.8%	2.6%	2.5%	2.6%	2.5%		1.6%	

**CAPITAL STRUCTURE** as of 9/30/16  
 Total Debt \$0.5 mill. Due in 5 Yrs \$5 mill.  
 LT Debt None LT Interest None

Leases, Uncapitalized: Annual rentals \$ 7 mill

No Defined Benefit Pension Plan

Pfd Stock NMF (38,804 shares out.) Div'd NMF

Common Stock 14,818,699 shs. as of 11/4/16

**MARKET CAP: \$150 million (Small Cap)**

CURRENT POSITION (\$MILL.)	2014	2015	9/30/16
Cash Assets	40.7	50.4	37.1
Accts Receivable	11.8	9.5	15.1
Other	6.9	5.5	6.9
Current Assets	59.4	65.4	59.1
Accts Payable	6.0	4.8	5.3
Debt Due	9.0	7.0	5
Other	1.2	1.4	1.2
Current Liab.	16.2	13.2	7.0

ANNUAL RATES of change (per sh)	Past 10 Yrs.	Past 5 Yrs.	Est'd '13-'15 to '19-'21
Revenues	10.0%	1.0%	14.5%
"Cash Flow"	4.0%	-2.5%	10.5%
Earnings	3.0%	-2.0%	15.5%
Dividends	5.0%	-	5.0%
Book Value	10.5%	2.5%	3.5%

Cal-endar	QUARTERLY REVENUES (\$ mill.)				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	16.6	16.6	15.4	15.2	63.8
2014	16.3	16.9	17.0	15.4	65.6
2015	14.7	14.4	14.6	13.4	57.1
2016	14.0	15.4	14.4	14.2	56.0
2017	14.5	15.5	15.0	15.0	60.0

Cal-endar	EARNINGS PER SHARE <sup>A</sup>				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	.26	.19	.06	.07	.58
2014	.04	.19	.13	.06	.42
2015	.13	.15	.12	.11	.51
2016	.14	.15	.13	.12	.52
2017	.15	.15	.15	.15	.60

Cal-endar	QUARTERLY DIVIDENDS PAID <sup>B</sup>				Full Year
	Mar.31	Jun.30	Sep.30	Dec.31	
2013	.075	.075	.075	.075	.30
2014	.075	.075	.075	.075	.30
2015	.075	.075	.075	.075	.30
2016	.075	.075	.075	.075	.30
2017	.075	.075	.075	.075	.30

**BUSINESS:** Consolidated Water Co. Ltd. develops and operates seawater desalination plants and water distribution systems in areas where naturally occurring supplies of potable water are scarce or nonexistent. Its desalination process involves reverse osmosis tech. It provides water in the Cayman Islands, Belize, the Bahamas, the British Virgin Islands, and Bali. At 12/31/15, it opera-

**Consolidated Water was forced to write down the value of its Bali project.** The Nusa Dua desalination plant was constructed on the Indonesian island to meet the growing demand for potable water on the high-end tourist destination. The facility was constructed mostly on spec meaning that there were not many firm contracts in hand once Nusa Dua began operations. Consolidated did not view this as too risky since the island has been experiencing strong population growth even though supplies of fresh water are limited. Since the facility came on line, though, the sales volume of the plant has not been sufficient enough to cover operating costs. Indeed, in last year's third quarter, Consolidated was forced to take a \$2 million charge to reflect the reduced carrying value of the plant. Making matters worse, the company is also being forced to take on a domestic partner in order to obtain the required licenses.

**Operations in the Caribbean remain status quo.** Consolidated supplies water in the Grand Cayman, the Bahamas, and the British Virgin Islands (BVI). The businesses here are profitable, but dis-

puted 14 plants with a capacity of 26.5 million gallons per day. Inc.: Cayman Islands. Has 127 employees. President & Chief Executive Officer: Frederick McTaggart. Officers & directors own 3.2% of stock; (4/16 proxy). Address: Regatta Office Park Windward Three, 4th Floor, West Bay Road P.O. Box 1114 Grand Cayman, KYI-1102, Cayman Islands. Tel.: (345) 945-4277 Int.: www.cwco.com.

putes with the local regulators are not uncommon. A long-running lawsuit over the Baughers Bay project was won by Consolidated in 2012, but the BVI government continues to fight the court ruling. In any case, the BVI could eventually have to pay Consolidated a sizable windfall.

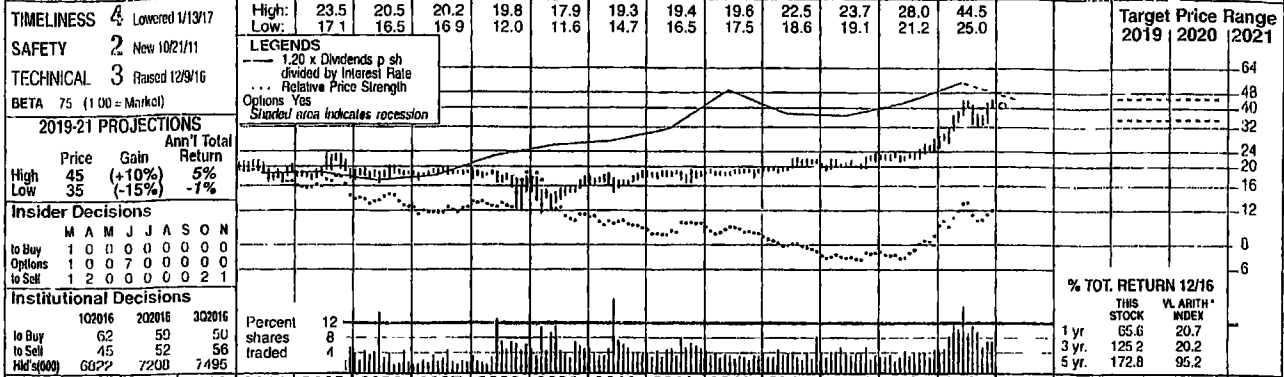
**On a positive note, plans for a promising construction project are progressing well.** Almost all the regulatory matters concerning a \$500 million desalination project to be built in the Mexican state of Baja have been resolved. When running, this plant would supply water to the drought-stricken cities of San Diego and Tijuana, within 36 months of when construction begins.

**These timely shares carry significantly more risk than other members of this group.** Consolidated is not a regulated water utility and, as such, offers greater potential rewards and losses. Assuming the situation in Bali can be rectified and the desalination project in Mexico is completed, CWCO could offer well-above-average long-term total returns. This is not a sure thing, however.

James A. Flood  
January 13, 2017

(A) Fully diluted earnings. Next earnings report due early February. (B) Dividends historically paid in late January, April, July and October. (C) Dividend reinvestment plan available. (C) In millions adjusted for stock split. (D) Includes intangibles As of 3/16, \$18 million/\$1.22 a share.

Company's Financial Strength	B+
Stock's Price Stability	30
Price Growth Persistence	15
Earnings Predictability	50



2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	VALUE LINE PUB. LLC	19-21
5.39	5.87	5.90	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	8.30	8.50	Revenues per sh	9.40
.99	1.18	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	2.30	2.45	"Cash Flow" per sh	2.90
.51	.66	.73	.61	.73	.71	.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.50	1.60	Earnings per sh ^	1.85
.61	.62	.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.84	Div'd Dec'd per sh ^B	.95
1.32	1.25	1.59	1.87	2.54	2.18	2.31	1.66	2.12	1.49	1.80	1.50	1.36	1.26	1.40	1.59	1.75	1.80	Cap'l Spending per sh	2.05
6.90	7.11	7.39	7.60	8.02	8.26	9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.50	13.95	Book Value per sh	15.60
10.11	10.17	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	16.50	Common Shs Outst'g ^C	17.00
28.7	24.6	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	23.6		Avg Ann'l P/E Ratio	21.0
1.87	1.26	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	.97	1.25		Relative P/E Ratio	1.30
4.2%	3.8%	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%		Avg Ann'l Div'd Yield	2.4%

**CAPITAL STRUCTURE as of 9/30/16**

Total Debt \$150.5 mill Due in 5 Yrs \$30.8 mill.  
 LT Debt \$130.0 mill LT Interest \$5.6 mill.  
 (Total interest coverage 12.4x)  
 (30% of Cap'l)

Pension Assets-12/15 \$52.9 mill.  
 Oblig. \$72.5 mill.

Pfd Stock \$2.4 mill Pfd Div'd: \$.1 mill

Common Stock 16,209,172 shs.  
 as of 10/31/16

**MARKET CAP: \$675 million (Small Cap)**

**CURRENT POSITION (SMILL.)**

	2014	2015	9/30/16
Cash Assets	2.7	3.5	1.5
Other	20.2	20.9	29.0
Current Assets	22.9	24.4	30.5
Accts Payable	6.4	6.5	10.3
Debt Due	24.9	8.7	19.7
Other	12.6	13.1	14.4
Current Liab.	43.9	28.3	44.4

**ANNUAL RATES of change (per sh)**

	Past 10 Yrs	Past 5 Yrs	Est'd '13-'15 to '19-'21
Revenues	1.5%	2.0%	4.0%
"Cash Flow"	4.0%	4.5%	8.0%
Earnings	5.0%	5.5%	8.5%
Dividends	1.5%	1.5%	3.5%
Book Value	4.5%	3.0%	4.0%

**QUARTERLY REVENUES (\$ mill.)**

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	27.0	29.7	31.3	27.4	114.8
2014	27.1	29.2	32.7	28.1	117.1
2015	28.8	31.7	34.7	30.8	126.0
2016	30.6	32.7	37.8	33.9	135.0
2017	32.0	34.0	39.0	35.0	140.0

**EARNINGS PER SHARE ^**

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.20	.28	.36	.19	1.03
2014	.20	.29	.42	.22	1.13
2015	.22	.31	.41	.28	1.22
2016	.29	.36	.54	.31	1.50
2017	.33	.37	.55	.35	1.60

**QUARTERLY DIVIDENDS PAID ^B**

Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year
2013	.1875	.1875	.1875	.19	.75
2014	.19	.19	.19	.1925	.76
2015	.1925	.1925	.1925	.19875	.78
2016	.19875	.19875	.19875	.21125	.81
2017					

**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 60,000 retail customers, primarily in Middlesex County, New Jersey. In 2015, the Middlesex System accounted for 59% of operating revenues. At 12/31/15, the company had 293 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% (4/16 proxy). Add: 1500 Ronson Road, Iselin, NJ 08830. Tel.: 732-634-1500. Internet: www.middlesexwater.com

**Middlesex Water Company performed admirably in the third quarter.** The New Jersey-based water utility put together its second-consecutive quarter of better-than-expected financial results, helping to stem investors' desire to take some profits off the table. Revenues of nearly \$38 million improved 9%, on an annual basis, underpinned by the fairly recent rate increase approval by the New Jersey Board of Public Utilities, as well as generally favorable weather conditions and higher water consumption by its customers. A good amount of these gains was able to flow through to the bottom line, as share net jumped almost 32%, year over year, to \$0.54. Some relief on the operation and maintenance end gave the figure a boost, along with higher capitalized labor expenses. **Accordingly, we are raising our financial projections across the board.** Our model now calls for revenues of \$135 million this year and \$140 million in the next. Moreover, we are lifting our 2016 and 2017 bottom-line estimates to \$1.50 a share and \$1.60 a share, respectively. Indeed, we think the company ought to be

able to keep the good times rolling, especially once its Edison and South Amboy infrastructure replacement projects are completed (\$12 million of water main and service line upgrades are being done to strengthen its distribution capabilities in these areas). **The stock is trading near its all-time high price.** No doubt the market reacted favorably to the recent quarterly performance. Middlesex shares are up approximately 25% in price since our October review, and are now lingering in the vicinity of their record-high value recorded earlier in 2016. **The issue is pegged as lag the year ahead broader market (Timeliness, 4).** Capital gains potential is fairly limited at recent levels. However, this equity may still pique the interest of pure income-seeking accounts. Though the current yield has lost some of its luster due to the recent price surge, we think the annual return should be increasingly attractive over the long-term, as consistent annual dividend hikes are likely in the cards out to 2019-2021. *Nicholas P. Patrikis January 13, 2017*

(A) Diluted earnings. May not sum due to rounding. Next earnings report due early February.  
 (B) Dividends historically paid in mid-Feb.  
 (C) In millions, adjusted for split.  
 May, Aug., and November. Div'd reinvestment plan available.  
 Company's Financial Strength B++  
 Stock's Price Stability 85  
 Price Growth Persistence 40  
 Earnings Predictability 85  
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# YORK WATER NDQ:YORW

RECENT PRICE **38.30** P/E RATIO **37.9** (Trailing: 39.9 Median: 24.0) RELATIVE P/E RATIO **1.93** DIV YLD **1.7%** VALUE LINE **1789**

TIMELINESS <b>4</b> Lowered 12/30/16	High: 17.9	21.0	18.5	18.5	18.0	18.0	18.1	18.5	22.0	24.3	26.7	39.8	Target Price Range	2019	2020	2021																																																																				
SAFETY <b>3</b> Lowered 7/17/15	Low: 11.7	15.3	15.5	16.2	9.7	12.8	15.8	16.8	17.6	18.8	19.7	23.8	2019	2020	2021	64																																																																				
TECHNICAL <b>3</b> Lowered 9/30/16	<p>LEGENDS</p> <p>1.10 x Dividends per sh divided by Interest Rate</p> <p>Relative Price Strength</p> <p>3- for-2 split 9/06</p> <p>Options: Yes</p> <p>Shaded area indicates recession</p>																																																																																			
BETA .75 (1.00 = Market)	<p>2019-21 PROJECTIONS</p> <table border="1"> <tr> <td></td> <td>Price</td> <td>Gain</td> <td>Ann'l Total Return</td> <td colspan="13"></td> </tr> <tr> <td>High</td> <td>35</td> <td>(-10%)</td> <td>N/A</td> <td colspan="13"></td> </tr> <tr> <td>Low</td> <td>25</td> <td>(-35%)</td> <td>-7%</td> <td colspan="13"></td> </tr> </table>																	Price	Gain	Ann'l Total Return														High	35	(-10%)	N/A														Low	25	(-35%)	-7%																														
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125	<p>CAPITAL STRUCTURE as of 9/30/16</p> <p>Total Debt \$84.6 mill Due in 5 Yrs \$30.5 mill</p> <p>LT Debt \$84.6 mill. LT Interest \$5.1 mill.</p>																																																																																																																																																																																																																										
0.0	<p>Pension Assets 12/15 \$31.8 mill. (44% of Cap'l)</p> <p>Oblig. \$39.5 mill.</p>																																																																																																																																																																																																																										
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5%	<p>EARNINGS PER SHARE</p> <table border="1"> <tr> <td>Cal-endar</td> <td>Mar.31</td> <td>Jun.30</td> <td>Sep.30</td> <td>Dec.31</td> <td>Full Year</td> <td colspan="14"></td> </tr> <tr> <td>2013</td> <td>.17</td> <td>.18</td> <td>.19</td> <td>.21</td> <td>.75</td> <td colspan="14"></td> </tr> <tr> <td>2014</td> <td>.16</td> <td>.22</td> <td>.23</td> <td>.28</td> <td>.89</td> <td colspan="14"></td> </tr> <tr> <td>2015</td> <td>.20</td> <td>.22</td> <td>.28</td> <td>.27</td> <td>.97</td> <td colspan="14"></td> </tr> <tr> <td>2016</td> <td>.19</td> <td>.23</td> <td>.27</td> <td>.27</td> <td>.96</td> <td colspan="14"></td> </tr> <tr> <td>2017</td> <td>.22</td> <td>.25</td> <td>.30</td> <td>.28</td> <td>1.05</td> <td colspan="14"></td> </tr> </table>																			Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year															2013	.17	.18	.19	.21	.75															2014	.16	.22	.23	.28	.89															2015	.20	.22	.28	.27	.97															2016	.19	.23	.27	.27	.96															2017	.22	.25	.30	.28	1.05																																																																																														
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**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, 2015, the company's average daily availability was 35.4 million gallons and its service territory had an estimated population of 194,000. Has more than 66,000 customers. Residential customers accounted for 63% of 2015 revenues; commercial and industrial (29%); other (8%). It also provides sewer billing services. Incorporated: PA. York had 108 full-time employees at 12/31/15. President/CEO: Jeffrey R. Hines. Officers/directors own 1.1% of the common stock (4/16 proxy). Address: 130 East Market Street, York, Pennsylvania 17401. Telephone: (717) 845-3601. Internet: www.yorkwater.com.

**York Water shares continue to surge higher.** The stock has advanced an impressive 30% in value since our October review, with the majority of its gains coming after the results of November's Presidential election were announced. Indeed, YORW shares are trading near an all-time high, having doubled in price since mid-2015.

**From a valuation perspective, its financials may not be able to support this elevated price level.** The water utility delivered a decent third-quarter showing, which was roughly on par with our expectations. Revenues edged higher, year over year, to \$12.6 million, attributed largely to increased consumption, while net income contracted by a penny, to \$0.27 a share. Based on our 12-month forward-looking earnings-per-share estimate, we think YORW shares are now overvalued, boasting a current P/E ratio of 37.9x, well above industry norms. However, profit prospects are brighter in 2017 and beyond, as general rate activity should begin to move into the picture.

**The company raised its quarterly payout by 3%, to \$0.1602.** This keeps intact

a long-standing track record of annual dividend hikes, though the current yield is noticeably lower than historical averages. **Longer term, we remain optimistic that York can execute on its growth-through-acquisition strategy, while efficiently allocating its capital spending budget.** The new year ought to start off strong, in terms of customer additions, with the purchase of Stockham Village Mobile Home Park and the anticipated close of its acquisition of West York Borough wastewater. We expect tuck-in acquisitions to be a staple in the company's growth profile, helped along by its healthy, cash-rich balance sheet. Meanwhile, investments to bolster and renew its pipes and service lines, water treatment facilities, and various other infrastructure upgrades ought to be par for the course over the pull to late decade. **Investment appeal is limited here, at this time.** The equity is ranked to trail the year-ahead boarder market averages (Timeliness: 4), and is already trading above the high-end of our 3- to 5-year Target Price Range.

Nicholas P. Patrikis January 13, 2017

(A) Diluted earnings. Next earnings report due late February (C) In millions, adjusted for splits

(B) Dividends historically paid in late-December, February, June, and September.

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Company's Financial Strength B+  
 Stock's Price Stability 80  
 Price Growth Persistence 55  
 Earnings Predictability 95

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the same number.

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Part 2

Ratings & Reports

January 13, 2017

### New Rank 1 Stocks:

Archrock Partners;  
Aviat Networks Inc.;  
Black Diamond Inc.;  
Cardiovascular Sys.;  
Century Alum Co;  
Dorchester; Eclipse  
Resources; Empire  
Resorts; First South;  
GP Strategies;  
GrubHub, Inc.;  
Hooker Furniture;  
Iberiabank Corp;  
Matrix Service Co.;  
Novabay Pharma.;  
Park City Group; SPX  
FLOW, Inc.; Square  
Inc.; XPO Logistics  
Inc.

**Especially Noteworthy:** In this Issue 9, we are initiating coverage of 11 "New Additions companies (CB Financial Services Inc., FS Bancorp Inc., First Community Corp., Investar Holding Corp., Peoples Bancorp of North Carolina, Two River Bancorp., Kura Oncology Inc., OncoCyte Corp., Syndax Pharmaceuticals Inc.,

(Continued on page 4740)

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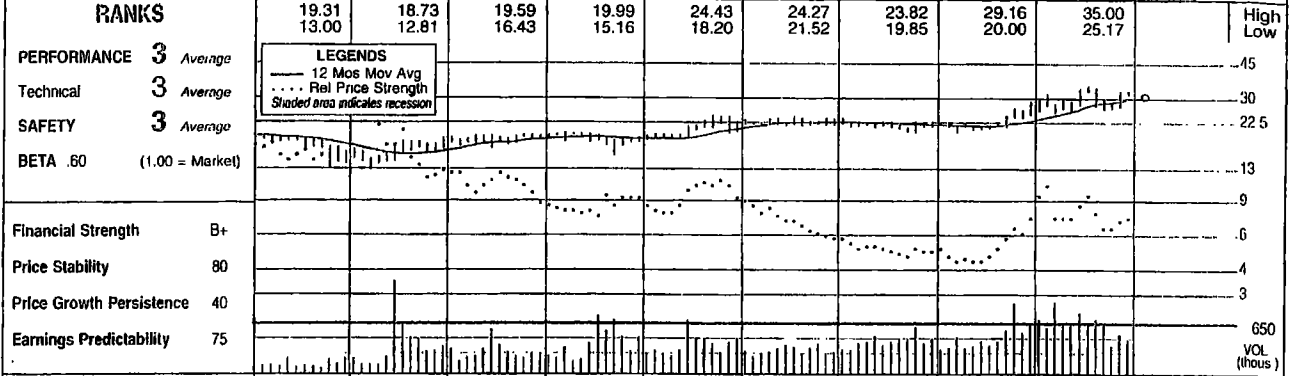
\*\* Rank highest for Performance.  
\* Rank above average.

### In Two Parts:

Part 1 is the *Summary & Index*.  
This is Part 2, *Ratings & Reports*.  
Volume XXII, Number 48.

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VALUE LINE PUBLISHING LLC	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017/2018
SALES PER SH	7.59	8.11	8.48	7.56	8.10	7.82	8.13	8.50	--	
"CASH FLOW" PER SH	1.65	1.84	1.92	1.64	2.04	1.87	2.04	2.22	--	
EARNINGS PER SH	.86	.97	1.00	.83	1.13	.94	1.07	1.26	NA	NA/NA
DIV'DS DECL'D PER SH	.71	.72	.75	.76	.79	.82	.85	.87	--	
CAP'L SPENDING PER SH	6.09	2.32	2.57	1.83	2.36	2.40	2.66	2.28	--	
BOOK VALUE PER SH	11.86	12.15	12.44	13.12	13.57	13.80	14.09	14.61	--	
COMMON SHS OUTST'G (MILL)	7.40	7.51	7.65	8.61	8.71	8.83	8.91	9.06	--	
AVG ANN'L P/E RATIO	20.1	16.4	18.2	22.5	18.3	23.9	20.5	18.0	NA	NA/NA
RELATIVE P/E RATIO	1.21	1.09	1.16	1.41	1.17	1.34	1.08	.93	--	
AVG ANN'L DIV'D YIELD	4.1%	4.5%	4.1%	4.1%	3.8%	3.7%	3.9%	3.8%	--	
SALES (\$MILL)	56.2	60.9	64.9	65.1	70.6	69.1	72.5	77.0	--	Bold figures are consensus earnings estimates and, using the recent prices, P/E ratios.
OPERATING MARGIN	45.1%	46.9%	46.5%	45.5%	48.7%	47.0%	48.8%	43.0%	--	
DEPRECIATION (\$MILL)	5.8	6.6	7.0	7.4	7.9	8.3	8.7	8.8	--	
NET PROFIT (\$MILL)	6.4	7.3	7.6	6.7	9.8	8.3	9.5	11.3	--	
INCOME TAX RATE	40.8%	40.1%	40.0%	40.8%	40.2%	40.2%	40.1%	--	--	
NET PROFIT MARGIN	11.4%	11.9%	11.7%	10.4%	14.0%	12.0%	13.1%	14.7%	--	
WORKING CAP'L (\$MILL)	d20.9	d23.3	d27.9	d11.4	d11.4	d12.3	d13.5	d8.8	--	
LONG-TERM DEBT (\$MILL)	107.6	106.0	105.1	106.5	106.3	105.5	105.0	103.6	--	
SHR. EQUITY (\$MILL)	87.8	91.2	95.1	113.0	118.2	121.8	125.6	132.3	--	
RETURN ON TOTAL CAP'L	4.7%	5.2%	5.6%	4.6%	5.9%	5.1%	5.5%	6.3%	--	
RETURN ON SHR. EQUITY	7.3%	8.0%	8.0%	6.0%	8.3%	6.8%	7.6%	8.5%	--	
RETAINED TO COM EQ	1.4%	2.1%	2.0%	.5%	2.5%	.9%	1.6%	2.6%	--	
ALL DIV'DS TO NET PROF	81%	74%	75%	92%	70%	87%	79%	69%	--	

Note: No analyst estimates available.

ANNUAL RATES					ASSETS (\$mill.)			INDUSTRY: Water Utility					
of change (per share)	5 Yrs.	1 Yr.			2014	2015	9/30/16	<b>BUSINESS:</b> Artesian Resources Corp. operates as a holding company of wholly owned subsidiaries offering water, wastewater services, and related services. Artesian Water Co., the principal subsidiary, is the oldest and largest investor-owned water utility on the Delmarva Peninsula, supplying roughly 7.6 billion gallons of water per year through 1,218 miles of water main to about 301,000 people. Artesian Wastewater Management, Inc. is a regulated entity that owns wastewater collection and treatment infrastructure and provides wastewater services to customers in Delaware as a regulated public wastewater service company. It currently operates wastewater treatment facilities for the town of Middletown, in southern New Castle County, Delaware, under a 20-year contract that expires in July 2022. The facilities include two wastewater treatment stations with capacities of up to about 2.5 mgd and 250,000 gallons per day, respectively. It also operates a wastewater disposal facility in Middletown. Has 231 employees. Chairman, C.E.O. & President: Dian C. Taylor. Address: 664 Churchmans Rd., Newark, DE 19702. Tel.: (302) 453-6900. Internet: <a href="http://www.artesianwater.com">http://www.artesianwater.com</a> . J.V.					
Sales	--	4.5%			Cash Assets	.2	.2				.2		
"Cash Flow"	2.5%	9.0%			Receivables	8.4	6.4				7.8		
Earnings	3.0%	18.0%			Inventory	1.9	1.7				2.1		
Dividends	3.0%	3.0%			Other	6.1	6.1				5.8		
Book Value	3.0%	3.5%			Current Assets	16.6	14.4				15.9		
Fiscal Year	QUARTERLY SALES (\$mill.)				Property, Plant & Equip, at cost								
	1Q	2Q	3Q	4Q	Full Year	496.2	514.8				--		
12/31/14	16.9	17.9	19.6	18.1	72.5	98.4	105.2				--		
12/31/15	18.0	19.5	20.8	18.7	77.0	397.8	409.6				423.8		
12/31/16	18.4	19.4	21.8			Other	7.8	7.6	7.2				
12/31/17						Total Assets	422.2	431.6	446.9				
Fiscal Year	EARNINGS PER SHARE				Full Year	LIABILITIES (\$mill.)							
	1Q	2Q	3Q	4Q	Full Year	Accts Payable	3.8	5.5	5.3				
12/31/13	.20	.28	.29	.17	.94	Debt Due	19.9	11.8	5.3				
12/31/14	.24	.22	.37	.24	1.07	Other	6.5	5.9	10.3				
12/31/15	.28	.36	.41	.21	1.26	Current Liab	30.2	23.2	20.9				
12/31/16	.31	.33	.48			LONG-TERM DEBT AND EQUITY as of 9/30/16							
12/31/17						Total Debt \$107.9 mill.	Due in 5 Yrs. NA						
Cal-endar	QUARTERLY DIVIDENDS PAID				Full Year	LT Debt \$102.6 mill.	(43% of Cap'l)						
	1Q	2Q	3Q	4Q	Full Year	Including Cap. Leases NA	Leases, Uncapitalized Annual rentals NA						
2014	.209	.212	.212	.215	.85	Pension Liability \$1.1 mill. in '15 vs. \$.3 mill. in '14							
2015	.215	.218	.218	.222	.87	Pfd Stock None			Pfd Div'd Paid None				
2016	.222	.225	.225	.228	.90	Common Stock 9,115,000 shares			(57% of Cap'l)				
2017						INSTITUTIONAL DECISIONS			TOTAL SHAREHOLDER RETURN				
	1Q'16	2Q'16	3Q'16			to Buy			Dividends plus appreciation as of 12/31/2016				
						to Sell			3 Mos.				
						Hld's(000)			6 Mos.				
	3432	3491	3488						1 Yr.				
									3 Yrs.				
									5 Yrs.				
									12.82%				
									-4.41%				
									18.91%				
									55.19%				
									103.86%				

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**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Market Approach**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

**Pennsylvania American Water Company  
 Sadsbury Township Wastewater Utility  
 Wastewater  
 Potential Purchaser: Investor-Owned Utility  
 As of January 1, 2017**

**Market Approach Summary**

	Purchase Price to Depreciated Original Cost (Book Value)		
Comparable Sales			
New Garden	1.59		
McKeesport	1.53		
Mean	1.56		
	Market Value per Share to Book Value		
Financial Markets	per Share	American	Aqua
Market to Book (equity)	2.79	2.48	2.87
Market to Book (equity and debt)	1.96	1.64	1.93
Minumum	1.53		
Mean	1.89		
Median	1.59		
Maximum	2.79		
	Value to Depreciated Original Cost (Book Value)		
Market Conclusion			
Use	1.56		
Sadsbury	5,540,079		
Market to Book Ratio	1.56		
Market Value	8,642,523		
Use	8,642,523		

**Pennsylvania American Water Company  
Sadsbury Township Wastewater Utility  
Wastewater  
Potential Purchaser: Investor-Owned Utility  
As of January 1, 2017**

**Comparable Sales Approach**

**Market Sales Basis**

	OCLD	Net Book Financials	RCNLD
<b>New Garden Statistics</b>			
Purchase Price (Aqua-PA and New Garden)	29,500,000	29,500,000	29,500,000
AUS Depreciated Original Cost 6-30-2016	18,567,728	17,967,319	30,615,410
Purchase to DOC	1.59	1.64	0.96
<b>McKeesport Wastewater System</b>			
Purchase Price (America-PA and McKeesport)	156,000,000	156,000,000	
AUS Depreciated Original Cost 3-31-2016	\$ 101,915,080	\$ 85,320,322	
Contributed Property	\$ 14,647,396		
Rate Base OCLD	\$ 87,267,683	\$ 73,813,794	
Purchase to DOC	1.53	1.83	

**Pennsylvania American Water Company  
Sadsbury Township Wastewater Utility  
Wastewater  
Potential Purchaser: Investor-Owned Utility  
January 1, 2017**

**Comparable Sales Approach**

**Financial Basis<sup>1</sup>**

	Industry Averages	American States Water	American Water	Aqua America	California Water	Connecticut Water	Consolidated Water	Middlesex Water	SIW Corp	York
Price per Share		44.95	72.05	29.98	33.75	55.67	10.85	41.32	55.14	38.3
Book value per share		13.7	29.05	10.45	13.55	20.7	9.75	13.5	20.25	8.65
Market to Book Ratio		3.28	2.48	2.87	2.49	2.69	1.11	3.06	2.72	4.43
Minimum	1.11									
Mean	2.79		2.48	2.87						
Median	2.72									
Maximum	4.43									
Debt (Total)		398.2	6,857.0	1,880.5	618.7	203.1	0.5	150.5	439.7	84.6
Outstanding Shares		36.60	178.00	177.40	48.00	11.20	14.80	16.30	20.46	12.87
Debt per share		10.88	38.52	10.6	12.89	18.13	0.03	9.23	21.49	6.57
Market Value per Share (Equity+Debt)		55.83	110.57	40.58	46.64	73.8	10.88	50.55	76.63	44.87
Book Value per Share (Equity+Debt)		24.58	67.57	21.05	26.44	38.83	9.78	22.73	41.74	15.22
Market to Book Ratio		2.27	1.64	1.93	1.76	1.9	1.11	2.22	1.84	2.95
Minimum	1.11									
Mean	1.96		1.64	1.93						
Median	1.9									
Maximum	2.95									

1. Value Line Investment Survey



**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Market Approach**  
**Aqua Pennsylvania Wastewater, Inc.**  
**Acquisition of**  
**New Garden Township Sewer Authority**

**AUS Consultants**  
**Suite 201**  
**8555 West Forest Home Avenue**  
**Greenfield, Wisconsin 53228**  
**Office Telephone: 414-529-5755**  
**J. Weinert's Cell: 414-698-8371**  
**J. Weinert's E-Mail: [weinertj@auswest.net](mailto:weinertj@auswest.net)**

**New Garden Township  
Sewer System**

**Summary of Original Cost, Calculated Depreciation and Development of Depreciated  
Original Cost as of June 30, 2016**

<u>Acct. No</u>	<u>Description</u>	<u>Original Cost</u>	<u>Curve /Life</u>	<u>Calculated Depreciation Reserve</u>	<u>Depreciated Original Cost at June 30, 2016</u>
<b><u>NON-DEPRECIABLE</u></b>					
353 10	Pump Station Land/Land Rights	\$ 919,506			\$ 919,506
353 40	Treatment Land	<u>5,043,671</u>			<u>5,043,671</u>
	Total Non-Depreciable Plant	<u>\$ 5,963,177</u>			<u>\$ 5,963,177</u>
<b><u>DEPRECIABLE</u></b>					
Treatment Structures					
354.10	Structure - Pump Station	1,975,241	45-R4	800,848	1,174,393
354 20	Structure - Treatment Plant	8,190,011	45-R4	3,858,427	4,331,584
354 30	Structure - Other Building	<u>285,200</u>	30-R4	<u>227,852</u>	<u>57,348</u>
	Total Account 354	\$ 10,450,452		\$ 4,887,127	\$ 5,563,325
355 00	Power Generator Equipment	224,878	55-R3	65,495	159,383
Collection Mains - Force					
360.11	Conveyance Mains Force - 4" & Under Plastic Pipe	902,143	60-R3	199,611	702,532
360 12	Conveyance Mains Force - 6"- 8" Plastic Pipe	697,346	65-R3	119,005	578,341
360.13	Conveyance Mains Force - 10" - 12" Plastic Pipe	51,462	70-R3	7,872	43,590
360 21	Conveyance Mains Force - 4" & Under AC Pipe	17,115	75-R3	11,129	5,986
360 22	Conveyance Mains Force - 6"- 8" AC Pipe	210,590	75-R3	136,931	73,659
360.31	Air Release	50,900	35-R3	11,971	38,929
360 41	Valves	39,731	35-R3	10,079	29,652
360 51	Crossings	73,662	65-R3	16,918	56,744
360 61	Cleanouts	67,152	35-R3	18,396	48,756
360 71	Manholes	<u>3,374</u>	45-R3	<u>294</u>	<u>3,080</u>
	Total Account 360	\$ 2,113,475		\$ 532,206	\$ 1,581,269
Collection Mains - Gravity					
361 12	Collection Mains Gravity - 6" - 8" Plastic Pipe	2,890,048	65-R3	783,455	2,106,593
361 13	Collection Mains Gravity - 10"-12" Plastic Pipe	1,510,172	65-R3	527,683	982,489
361.21	Collection Mains Gravity - 4" & Under AC Pipe	15,966	75-R3	8,826	7,140
361 22	Collection Mains Gravity - 6"-8" AC Pipe	434,215	75-R3	240,041	194,174
361 23	Collection Mains Gravity - 10"-12" AC Pipe	273,682	75-R3	100,313	173,369
361 51	Crossings	39,270	35-R3	23,260	16,010
361 61	Cleanouts	10,600	35-R3	3,582	7,018
361 71	Manholes	<u>1,290,565</u>	45-R3	<u>556,090</u>	<u>734,475</u>
	Total Account 361	\$ 6,464,517		\$ 2,243,250	\$ 4,221,267
363 00	Service Laterals	1,180,945	60-R3	439,122	741,823
364.00	Flow Meter	29,216	40-R3	6,105	23,111
371.00	Pumping Equipment	590,127	25-R3	327,950	262,177
390 00	Office Furniture & Equipment	67,342	10-R3	31,465	35,877
391 00	Transportation Equipment	8,605	8-R3	5,605	3,000
395 00	Power Operated Equipment	<u>54,118</u>	12-R3	<u>40,799</u>	<u>13,319</u>
	Total Depreciable Plant	\$ 21,183,675		\$ 8,579,124	\$ 12,604,551
	Total Plant	<u>\$ 27,146,852</u>		<u>\$ 8,579,124</u>	<u>\$ 18,567,728</u>

1 Excluding Assets detailed in the Asset Purchase Agreement between New Garden Township and New Garden Township Sewer Authority and Aqua Pennsylvania Wastewater, Inc

ASSET PURCHASE AGREEMENT

Between

NEW GARDEN TOWNSHIP

And

NEW GARDEN TOWNSHIP SEWER AUTHORITY

And

AQUA PENNSYLVANIA WASTEWATER, INC.

August \_\_\_\_, 2016

## ASSET PURCHASE AGREEMENT

THIS ASSET PURCHASE AGREEMENT (“Agreement”) dated August \_\_\_, 2016 by and between New Garden Township, Chester County, a Pennsylvania second-class township having a mailing address of 299 Starr Road, Landenberg, PA 19350 (hereinafter referred to as the “Township”) and New Garden Township Sewer Authority, a Pennsylvania municipal authority having a mailing address of 299 Starr Road, Landenberg, PA 19350 (hereinafter referred to as the “Authority” and collectively with the Township, “Seller”), and Aqua Pennsylvania Wastewater, Inc., a Pennsylvania corporation, with a business address located at 762 W. Lancaster Avenue, Bryn Mawr, PA 19010 (hereinafter referred to as “Aqua” or “Buyer”).

### RECITALS

A. The Township and Authority each own portions of a community wastewater system that provides sewage collection and treatment services (“System”) within portions of New Garden Township, Chester County, Pennsylvania. The System is located within New Garden Township except for one 4” force discharge main, a portion of which is in Kennett Township.

B. Seller issued a Request for Proposal, including addenda (the “RFP”), for the sale and acquisition of its System.

C. Seller has reviewed all offers to purchase the System and has determined that Buyer is the most responsible bidder, and that Buyer’s December 4, 2014 proposal and March 18, 2016 supplemental proposal (collectively, the “Proposal”) represents the best reasonable offer for the System to continue the services to the customers within the System, and its current and future operation.

D. The provisions of the RFP, including, without limitation, Exhibit B to the RFP dated November 7, 2014, and the Proposal are hereby incorporated by reference herein and deemed a part of this Agreement. In the event of any conflict between this Agreement and the RFP and/or Proposal, the terms of this Agreement shall prevail.

E. The purpose of this Agreement is to memorialize the agreements between Seller and Buyer for the sale of the System.

F. Seller desires to sell, and Buyer desires to purchase, the Assets (as defined herein), all upon the terms and conditions set forth herein.

G. Buyer is a public wastewater utility regulated by the Pennsylvania Public Utility Commission (“PA PUC”) that furnishes wastewater services to the public in portions of the Commonwealth of Pennsylvania, including Chester County.

NOW, THEREFORE, in consideration of the recitals and the covenants, warranties, representations, and agreements herein contained, and intending to be legally bound hereby, Buyer and Seller hereto agree as follows.

1. INCORPORATION OF RECITALS. The recitals set forth above are incorporated by reference herein and deemed a part of this Agreement.

## 2. SALE AND PURCHASE OF THE ASSETS

2.1 Sale and Delivery of the Assets. Subject to the terms and conditions hereinafter set forth, Buyer shall purchase from Seller, and Seller shall sell, assign, transfer, grant, convey and deliver to Buyer at the Closing (hereinafter defined) the Assets. The Assets are to be sold free and clear of all liens, pledges, security interests, charges, claims, restrictions and encumbrances of any nature whatsoever.

### 2.2 Assets Defined

The Assets are herein defined to be: all of the assets, properties and rights of Seller (whether tangible or intangible, real, personal or mixed), which are held and used in connection with the System. Seller provides wastewater service to its customers exclusively in the area depicted on Schedule 4(c)(1) as the "Service Area". All Assets are situated within New Garden Township, Chester County, Pennsylvania except for one discharge main located outside the Township as depicted on Schedule 2.2.

The Assets shall, without limitation to the definition stated above, include the specific assets, properties, powers and rights set forth in Schedule 2.2.

2.3 Customer Billing; Accounts Receivable. Unless Buyer and Seller agree to a different procedure prior to Closing, Seller shall issue final bills for all customer accounts in accordance with its current billing practices after the Closing Date. Seller shall be solely responsible for the collection of payments and/or accounts receivable including delinquent amounts due on these and any final bills to its customers. Except as set forth below, Buyer shall not be responsible for the payment of and/or collection for any amounts due to Seller from Seller's former customers. If Buyer and Seller agree to a different procedure prior to Closing, upon receipt of the next scheduled meter readings after the Closing Date and as mutually agreed upon, either Seller or Buyer shall issue the currently due billings with the billing receipts apportioned between Seller and Buyer on a prorated basis based on the number of days in the billing cycle each party had ownership of the System. The billing for next billing cycle and collection will be the sole responsibility of the Buyer. Following the issuance of Seller's final bill and Buyer's initial bill, Buyer shall thereafter issue bills for all customer accounts on the next scheduled billing date and all future billing dates and shall be solely responsible for the collection of payments and/or its accounts receivable. Buyer and Seller shall work in good faith to resolve uncollectible amounts and to coordinate volumetric block billing and base changes for Seller's final bills and Buyer's initial bills so that both parties bills are consistent as to such volumetric billing and base charges.

### 2.4 Excluded Assets

The Assets shall not include any of the following:

- a. Any and all customer service laterals that run from the curb area (or edge of road) to each of the individual customer's residences or structures.

b. Any and all piping and fixtures (excluding Seller's meters, which shall be included in the Assets) internal to each of the individual customer's residences or structures.

c. Any of Seller's accounts, including cash, investments, and account receivables up to the date of Closing.

d. The real and personal property, including the improvements on said real property, described in Schedule 2.4.

e. The real property (the "Cell Tower Parcel") consisting of 2,500 square feet described in the Site Lease With Option between New Garden Township Sewer Authority and Omnipoint Communications Enterprises L.P., dated June 29, 2001 (the "Cell Tower Lease"), and as depicted in the plan, dated November 9, 2001, prepared by OPCS Philadelphia Holdings, LLC for Omnipoint Communications Enterprises L.P. titled "Proposed Unmanned Wireless Communications Site", a copy of which is attached as Schedule 2.4e(1). The Cell Tower Parcel is managed and operated by CCTMO LLC pursuant to a Master Prepaid Lease and Management Agreement and Management Agreement, each effective November 30, 2012, between CCTMO LLC and T-Mobile USA Tower LLC. A true and complete copy of the Cell Tower Lease is attached as Schedule 2.4(e)(2).

f. Any other asset, property, easement or interest as is shown in Schedule 2.4.

## 2.5 Consideration

a. Upon its execution and delivery of this Agreement to Seller, Buyer shall obtain a performance bond equal to ten percent (10%) of the Purchase Price (the "Bond"). The Bond shall be a bond form issued by a bonding company or surety that is approved by the Federal Treasury Board and acceptable to Seller, in Seller's reasonable discretion. The Bond amount shall be paid or released and returned as following:

(1) The Bond amount shall be paid to Seller in the event that the Closing does not occur and Buyer defaults under this Agreement.

(2) If Closing does not occur due to Seller's default under this Agreement (including, without limitation, Seller's inability to convey good title to the Assets free and clear of encumbrances and liens of record), a failure of a condition precedent under Section 4 below, or Seller's termination of this Agreement under Article 3 hereof, this Agreement shall terminate, the Seller shall promptly return the original Bond to Buyer with written acknowledgment that the Bond is no longer needed, and thereafter neither party shall have any further obligations or liability to the other party.

(3) If Closing does not occur for any other reason not listed in clauses (1) or (2) above, Buyer shall pay Seller \$300,000 as liquidated damages, and upon receipt of such payment Seller shall promptly return the original Bond to Buyer with written acknowledgment that the Bond is no longer needed and thereafter neither party shall have any further obligations or liability to the other party.

b. The purchase price for the Assets will consist of payment of Twenty-nine Million Five Hundred Thousand Dollars (\$29,500,000.00) (the "Purchase Price") to be paid by Buyer at Closing in one lump sum payment of immediately available funds. Buyer and Seller agree that the results of the appraisals pursuant to Act 12 (as defined herein) shall have no effect on the Purchase Price.

c. Buyer also agrees to contribute Twenty Thousand Dollars (\$20,000.00) toward Seller's closing costs.

### 2.6 Assumption of Liabilities and Contracts

a. Buyer will (a) satisfy and comply with all conditions and requirements of the permits specified in Schedule 2.6(a) upon transfer of such permits to Aqua.

b. Seller and Buyer shall: (I) obtain consents to the assignment of the contracts listed on Schedule 2.6(b), section I from all parties to said contracts if required by the terms of the respective contracts; and (II) arrange for the termination or amendment of the contract listed on Schedule 2.6(b), section II and the execution of a new agreement or, in the case of an amendment, an assignment, that is agreeable to Aqua in its sole discretion, with any such new agreement to replace the terminated contract. The contracts listed on Schedule 2.6(b) are collectively referred to herein as the "Assumed Liabilities".

c. Seller hereby acknowledges that, following the effective time of Closing, Aqua shall be responsible for the provision of wastewater service to the customers of Seller.

d. All other liabilities and obligations of Seller shall remain the sole responsibility of Seller. Other than the Assumed Liabilities, Buyer shall not assume and shall not be liable for, and Seller shall indemnify and hold harmless Aqua and its officers, employees and agents from and against, any and all liabilities or obligations of Seller of any nature whatsoever whether express or implied, fixed or contingent, known or unknown at the time of Closing.

### 3. CLOSING

Closing hereunder (the "Closing") shall take place at the offices of Lamb McErlane PC located at 24 E. Market St., West Chester, PA 19381 or other mutually agreed upon location, commencing at 10:00 a.m. local time, on the later to occur of: (i) one hundred fifty (150) days from the date Seller accepts Buyer's offer, as evidenced by the date of Seller's execution of this Agreement, and (ii) forty-five (45) days (a) after receipt of the last required unappealed regulatory approval of the transactions contemplated herein and (b) fulfillment of all conditions precedent under Section 4 hereof. Seller may terminate this Agreement should Buyer fail to obtain unappealed regulatory approval of the transactions contemplated herein within 365 days of the Effective Date, unless mutually extended in writing. The date of the Closing is referred to herein as the "Closing Date". The effective time of the Closing shall be 12:01 a.m. on the day following the Closing Date.

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Market Approach**  
**American Pennsylvania, Inc.**  
**Acquisition of the**  
**City of McKeesport Wastewater System**

**AUS Consultants**  
**Suite 201**  
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AUS Market Approach Saddle City

## Pennsylvania American Water Announces Agreement to Acquire McKeesport Wastewater System

Company Release - 09/09/2016 10:19

PITTSBURGH--(BUSINESS WIRE)-- Pennsylvania American Water, a subsidiary of American Water (NYSE: AWK), announced today that it has signed an asset purchase agreement to acquire the McKeesport wastewater system. The agreement signing follows recent votes by the McKeesport City Council and the Municipal Authority of the City of McKeesport (MACM) in favor of Pennsylvania American Water purchasing the wastewater assets.

"I firmly believe this transaction is being made in the best interest of the wastewater customers served by this system now and in the future," Mayor Michael Cherepko said. "It became very clear to this administration that the only way to save our community from municipal bankruptcy, while continuing to offer the same level of services our residents deserve, would be to transfer our local sewage system to a regional or national utility company. This transaction will balance the city's current financial problems, allow this administration to safeguard the city's future and ensure reliable wastewater service for 22, 000 customers."

The total value of the transaction is approximately \$156 million, subject to certain adjustments provided in the agreement. The McKeesport wastewater system serves approximately 22,000 customers.

"Our company and our employees have been providing water service in the Mon Valley for decades, and we are excited for the opportunity to be the future wastewater provider to the residents of McKeesport, Dravosburg, Duquesne and Port Vue," said Pennsylvania American Water President Kathy L. Pape. "We look forward to closing the proposed acquisition and to providing wastewater services that reflect our commitment to environmental stewardship and quality customer service."

Pennsylvania American Water and the City of McKeesport will seek approval of the acquisition from the Pennsylvania Public Utility Commission (PUC) and other necessary approvals, such as the Pennsylvania Department of Environmental Protection. The MACM initially issued a request for bids in June 2016 for the potential acquisition of its wastewater system.

Pape said long-term rate stability is one of the most important benefits for wastewater customers. Under the purchase agreement, Pennsylvania American Water will not increase base wastewater rates any earlier than one calendar year after the closing.

The company's rates are regulated by the PUC and any future rate changes would have to be reviewed and approved by the PUC. Pennsylvania American Water offers its low-income wastewater customers grants and discounted service to those who qualify through its H2O Help to Others Program.

Pape said upon closing the proposed acquisition that "we look forward to welcoming the MACM's employees and customers to the Pennsylvania American Water family." The company currently expects to close the transaction in the second half of 2017, pending regulatory approvals and the satisfaction of other closing conditions.

Pennsylvania American Water, a subsidiary of American Water, is the largest investor-owned water utility in

Market Annrnrh

Page 1 of 1

Pennsylvania, providing high-quality and reliable water and/or wastewater services to approximately 2.3 million people. Founded in 1886, American Water is the largest publicly traded U.S. water and wastewater utility company. Marking its 130th anniversary this year, the company employs more than 6,700 dedicated professionals who provide regulated and market-based drinking water, wastewater and other related services to an estimated 15 million people in 47 states and Ontario, Canada. More information can be found at [www.amwater.com](http://www.amwater.com).

**Cautionary Statement Concerning Forward-Looking Statements**

Certain statements in this press release are forward-looking statements within the meaning of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements relate to, among other things, the execution of a definitive purchase agreement; the completion of the proposed acquisition; the ability to satisfy closing and other conditions related to the proposed transaction, including obtaining regulatory approvals; anticipated capital investments; and the ability to achieve certain benefits, synergies and goals relating to the transaction and the operations to be acquired. These statements are based on the current expectations of management of Pennsylvania American Water. There are a number of risks and uncertainties that could cause actual results to differ materially from these forward-looking statements, including with respect to (1) obtaining the regulatory and other approvals required for the acquisition; (2) satisfying other conditions to the closing of the acquisition; (3) the occurrence of the benefits and synergies expected or predicted to occur as a result of the acquisition; (4) unexpected costs, liabilities or delays associated with the acquisition or the integration of the acquired business; (5) regulatory, legislative, local or municipal actions affecting the water and wastewater industries, which could adversely affect Pennsylvania American Water; and (6) other economic, business and other factors. Forward-looking statements are not guarantees or assurances of future performance or results, and Pennsylvania American Water and its affiliates do not undertake any duty to update any forward-looking statement.

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Pennsylvania American Water  
Gary Lobaugh  
T: 724-873-8674  
M: 724-944-5148  
[gary.lobaugh@amwater.com](mailto:gary.lobaugh@amwater.com)

Source: Pennsylvania American Water

Market Approach  
Market Approach

**Pennsylvania American, Inc.  
The Municipal Authority of the City of McKeesport  
Wastewater  
Investor-Owned Utility  
September 2016**

**Cost Approach Summary**

Service Area	Original Cost	Original Cost less Depreciation	Cost New	Cost New less Depreciation	Cost New less Depreciation adjusted for External Obsolescence
McKeesport	35,663,314.30	24,781,311	125,338,615	61,696,103	61,696,103
Duquesne	8,488,374.00	4,009,366	57,112,541	22,405,247	22,405,247
Dravosburg	1,188,766.76	398,682	11,821,704	3,718,174	3,718,174
Port Vue	1,455,194.00	362,190	20,893,663	4,942,794	4,942,794
<b>Summary</b>	<b>46,795,649.06</b>	<b>29,551,549</b>	<b>215,166,523</b>	<b>92,762,318</b>	<b>92,762,318</b>
Treatment & Pumping Plant	61,374,789	50,472,921	106,863,107	62,652,591	62,652,591
Subtotal	108,170,438.06	80,024,470	322,029,630	155,414,909	155,414,909
Land	61,132	61,132	1,110,000	-	1,110,000
<b>Total</b>	<b>108,231,570.06</b>	<b>80,085,602</b>	<b>323,139,630</b>	<b>155,414,909</b>	<b>156,524,909</b>

**Pennsylvania American Water Company**  
**Sadsbury Township, Pennsylvania Wastewater Utility**

**Appraisal Work Papers**  
**As of January 1, 2017**

**Market Approach**  
**Value Line Investment Surveys**  
**Water Industry**  
**Market and Financial Ratios**  
**January 2017**

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