PUBLIC HEARING ON
PROPOSED WATER AND WASTEWATER RATES
2015

WATER DEPARTMENT
PHILADELPHIA, PENNSYLVANIA

DIRECT TESTIMONY OF
BLACK & VEATCH CORPORATION
AND
EXHIBITS BV-E1, BV-E2, AND BV-E3

DECEMBER 2015

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BEFORE THE
PHILADELPHIA WATER, SEWER AND STORMWATER RATE BOARD

Re Application of the Philadelphia Water Department for Increased Rates and Charges	Fiscal Years 2017-2018

DIRECT TESTIMONY OF BLACK & VEATCH CORPORATION

Q1. PLEASE STATE YOUR NAMES AND BUSINESS AFFILIATION.

A. Our names are David A. Jagt, Prabha N. Kumar, and Ann Bui. All three of us are employed by the firm of Black & Veatch Corporation (Black & Veatch), 11401 Lamar Avenue, Overland Park, Kansas. Our collective testimony in this proceeding will be presented as a panel on behalf of the City of Philadelphia Water Department (Water Department). Our respective resumes of experience are appended to the Direct Testimony.

Q2. PLEASE DESCRIBE THE NATURE OF THE FIRM OF BLACK & VEATCH.

A. Black & Veatch Corporation, a partnership organized in 1915, and reorganized as a privately held corporate entity in 1999, ranks today among the largest, oldest and most experienced engineering firms serving the Water, Energy, Telecommunications utility sectors in the United States. The firm is an employee-owned company of more than 10,000 professionals with more than 110 offices worldwide and is on the *Forbes* list of "America's Largest Private Companies." Its headquarters are in Overland Park,

Kansas, with additional offices located in other major cities in the United States and throughout the world. The firm has been engaged in projects for clients including municipalities, ranging from small townships to large metropolitan regions; public and investor owned utilities; industrial and commercial businesses; local, state, and Federal agencies, international bodies, and governments of overseas nations.

Q3. WOULD YOU DESCRIBE THE FUNCTIONS OF THE MANAGEMENT CONSULTING DIVISION?

A. The Management Consulting Division within Black & Veatch offers assistance in a wide range of financial, management, and technology consulting services. Our service offerings span water, wastewater, stormwater, electric, gas, telecommunications, and solid waste utility sectors. The services we provide include utility financial planning, cost of service rate studies, bond feasibility studies, affordability analysis, systems valuation, utility business efficiency and transformation services, operations technology planning and integration services, and customer engagement and advanced metering/billing solutions implementation, and expert testimony during rate proceedings, litigation support, and regulatory review.

Q4. WHAT IS THE NATURE OF YOUR RESPECTIVE PROJECT RESPONSIBILITIES WITH BLACK & VEATCH WITH REGARD TO THIS MATTER?

A. Mr. Jagt is a Manager in Black & Veatch, and is currently the project manager for this comprehensive water and wastewater cost of service study. He is responsible for the

phases of the study involving projection of revenues under existing rates and revenue requirements; cost of service analysis for the water and wastewater systems including stormwater cost allocations; and for the design of water, sanitary sewer, and stormwater rates.

Ms. Kumar is a Director in Black & Veatch and is currently the technical lead for the stormwater cost of service allocations and the design of stormwater rates. She is responsible for the review of the retail wastewater cost allocation between sanitary sewer and stormwater services, and for the design of stormwater rates, including (a) the development of the billable gross area (GA) and impervious area (IA) units of service; (b) the projection of the reduction in GA and IA units of service due to stormwater credits; incentive programs; and stormwater appeals; (c) the projection of revenue impact due to the ongoing stormwater Customer Assistance Program ("CAP"); and (d) the design of stormwater GA and IA rates for the Residential and Non-Residential classes of parcels.

Ms. Bui is a Managing Director in Black & Veatch and currently leads the water practice within Black & Veatch's Management Consulting. She is responsible for providing overall technical guidance and advisory support on all aspects of the water and wastewater revenue requirement projections, cost of service allocations, and rate design.

Q5. MR. JAGT, WILL YOU PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE?

A. I graduated from Virginia Tech with a Bachelor of Science Degree in Civil Engineering. I am a registered professional engineer in Virginia. I joined the firm of Black & Veatch in 1987. During my employment with Black & Veatch I have been involved in various studies related to water and wastewater utility engineering, financial feasibility and rates, serving in increasing levels of responsibility from staff engineer, to project engineer, and to project manager. Among the clients for which I have been involved in studies regarding water, wastewater and stormwater rates and related matters, in addition to the City of Philadelphia Water Department, are the City of Norfolk, Virginia; City of Chesapeake, Virginia; Fairfax County, Virginia; Chesterfield County, Virginia; and City of Dallas, Texas; and City of Newark, Delaware.

Q6. MS. KUMAR, WILL YOU PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE?

A. I graduated from the University of California, Riverside with a Master of Business Administration. I have been with Black & Veatch since 1999 and have served in increasing levels of responsibility from staff consultant, project manager, principal consultant and director. I currently lead the stormwater utility consulting practice within the Management Consulting Division.

I specialize in directing and managing water and wastewater financial planning and cost of service rate studies, stormwater utility development and implementation services, including the development and implementation of stormwater credits and appeals programs. In addition to providing parcel area based stormwater charge

implementation services to the Water Department, I have provided stormwater utility consulting services to various municipal clients including Pittsburgh Water and Sewer Authority, Pennsylvania; Wilmington, Delaware; Springfield, Ohio; Dallas, Texas; New London, Connecticut; and Lee's Summit, Missouri. In addition, I am also involved in directing business operations efficiency and implementation services, billing systems evaluation, mediation and litigation support, and benchmarking studies.

I am currently a member of the American Water Works Association (AWWA), and an active member within the Strategic Practices Management Committee of AWWA. I am also a member of the Stormwater Committee of the National Association of Clean Water Agencies (NACWA). I was a lead author for the *User Fee Funded Stormwater Manual*, published in 2011 by the Water Environment Federation (WEF), and have also presented in multiple webinars and conferences sponsored by organizations such as the AWWA, WEF and Storm Solutions.

Q7. MS. BUI, WILL YOU PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE?

A. I am a chemical engineer by training, with my undergraduate work completed at the University of British Columbia, Vancouver, Canada and my graduate work at the University of California, Los Angeles. Additionally, I have a Masters of Business Administration from the University of California, Davis.

I have over 25 years of experience working with utilities on more than 250 engagements, and have provided financial and business services for public and investor-owned utilities across the US of all different sizes ranging from those with only 5,000 service connections to those that serve populations over three million.

Some of my recent assignments have focused on drought, water scarcity and value of water issues; addressing affordability and assistance program needs; promoting operational excellence through effectiveness studies; quantifying the financial impact of deferred asset maintenance; developing innovative approaches for structuring alternative delivery projects using private and public financing instruments and preparing financial feasibility reports supporting over $4 billion of revenue bond sales.

I am a long-standing member of several industry associations. Currently, I am serving as the American Water Works Association (AWWA) Chair for the Finance, Accounting, and Management Controls (FAMC) Committee and am involved with AWWA's Strategic Practices Committee and the National Association of Clean Water Agency's (NACWA's) Utility Management Committee.

Under my six-year tenure as FAMC Vice-Chair and Chair, I was a lead author and editor for AWWA's book Financial Management for Water Utilities: Principles of Finance, Accounting and Management Controls. Additionally, I have been a key reviewer for the last two versions of AWWA's *M1 – Principles of Water Rates, Fees*

and Charges, the current version of Water Environment Federation (WEF)'s *Manual of Practice 27, Financing and Charges for Wastewater Systems*, and WEF's *User-Fee Funded Stormwater Program*. I have organized numerous AWWA-sponsored webinars related to capital financing and made presentations on financing topics throughout the country.

Q8. WHAT IS THE PURPOSE OF THE PANEL'S TESTIMONY TODAY?

A. Our testimony addresses the analytical approach and results of Black & Veatch's cost of service study related to water, wastewater, and stormwater rates prepared for the City of Philadelphia Water Department.

Q9. HOW LONG HAS THE FIRM OF BLACK & VEATCH BEEN A CONSULTANT TO THE CITY OF PHILADELPHIA WITH REGARDS TO WATER, WASTEWATER, AND STORMWATER RATE MATTERS?

A. Black & Veatch was initially retained by the City to undertake a study of water, wastewater, and stormwater revenue requirements and rates in 1972. Since the completion of those initial studies early in 1974, we have subsequently been involved in several other studies for the City involving water, wastewater, and stormwater rates and financing.

Q10. WOULD YOU BRIEFLY STATE THE NATURE OF BLACK & VEATCH ENGAGEMENTS FOR THE WATER DEPARTMENT SINCE 1972?

A. Since 1972, Black & Veatch has performed several water, sewer, and stormwater cost of service studies and bond engineering feasibility studies. As part of these various

studies performed, Black & Veatch has delivered numerous reports for the Water Department including the following as indicated in Figure 1.

Figure 1 – Reports Related to Black & Veatch Financial Engagements

Nature of the Reports Delivered	Schedule
Comprehensive cost of service water and wastewater rate study	1974; 1976; 1978; 1980; 1982; 1985; and 1990
Engineering Reports under the 1974 General Ordinance for the Seventh, Eighth, Ninth, Eleventh, Twelfth, Fourteenth, Fifteenth and Sixteenth Series Water and Sewer Revenue Bonds	1981; 1982; 1983; 1985; 1986; 1989; and 1991
Remarketing of the Thirteenth Series Bonds and issuance of Tenth Series Bonds	1992
Engineering Reports under the 1989 General Ordinance for the Series	1993; 1995; 1997; 1998; 1999; 2001; 2003; 2005; 2007; 2009; 2010; 2011, 2012, 2013, 2014, and 2015
Study which examined the factors contributing to the revenue shortfall in Fiscal Year 1991;	1991
Four additional comprehensive studies regarding cost of service and rates for water and wastewater rates completed	1992; 2001; 2004; 2008; and 2012
Letter reports for water and wastewater rates for contract customers	Multiple years

Q11. WOULD YOU BRIEFLY STATE THE NATURE OF YOUR ENGAGEMENT IN THE DEVELOPMENT OF THE WATER, WASTEWATER, AND STORMWATER RATES NOW BEING CONSIDERED FOR ADOPTION BY THE CITY OF PHILADELPHIA?

A. Black & Veatch was engaged to undertake a comprehensive water, sanitary sewer, and stormwater rate study which consists of three principal elements as shown in Figure 2.

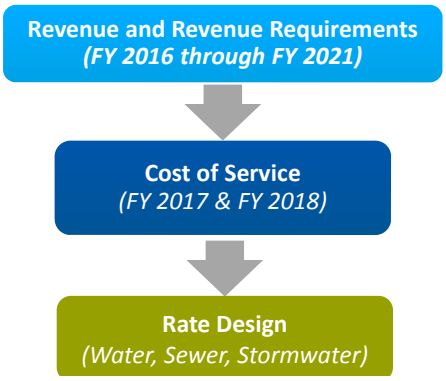

Figure 2 – Comprehensive Rate Study

(1) Projection of revenue under existing rates and the projection of revenue requirements for the water and wastewater utilities;

(2) Allocation of costs of service for water, wastewater and stormwater service to the wholesale and retail types of customers; and

(3) Design of water, wastewater, and stormwater retail rates which recognize the costs of service.

In the context of this comprehensive rate study, it should be noted that water service, the Water Department provides two additional types of services – (a) sanitary wastewater collection and treatment and (b) stormwater collection and treatment. In sixty percent (60%) of the wastewater service area served by the Water Department, the stormwater flow is collected and conveyed by City's combined sanitary/storm system.

Q12. PLEASE BRIEFLY DESCRIBE THE STUDY PERIOD ENCOMPASSED IN YOUR COST OF SERVICE STUDY AND THE TEST YEAR FOR WHICH RATES ARE BEING PROPOSED?

A. The projection of revenue requirements examined in the study includes the six-year period of the fiscal years (FY) ending June 30, 2016 (FY 2016) through June 30, 2021 (FY 2021). It is noted that the rates applicable to FY 2016 are the same as the FY 2015 rates. The FY 2015 rates were the final year of the rates approved during the rate hearing process which was concluded in 2012.

In this rate proceeding, the detailed cost of service analysis and rate design is performed for the "Test Year." For purposes of this testimony and rate proceeding, the term "Test Year" refers to the *fully forecasted fiscal year(s)* for which the schedules of water, wastewater, and stormwater charges, for retail service, are developed to recover the cost of service requirements of the fiscal year[1]. In this rate proceeding, the schedules of retail water, wastewater, and stormwater charges are proposed for two successive "Test Years," namely, '*Test Year-1'* which reflects

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[1] AWWA's "Principles of Water Rates, Fees, and Charges Manual of Water Supply Practices M1" acknowledges that government owned utilities can set their own policies regarding test-year periods and acknowledges the projected test year period as one of the three general types of test periods. AWWA identifies that rates developed for the projected test year "will likely match up to the utility's budget or anticipated costs." The historical and proforma test years may not fully capture the utility's costs. AWWA also acknowledges that government owned utilities may separate a multiple-year rate period into separate 12-month test year periods to phase in rates over the rate period. (Source: American Water Works Association, *Principles of Water Rates, Fees, and Charges Manual of Water Supply Practices M1*, American Water Works Association, 2012, pp 11-12, and 16)
Similar standards for using a multi-year rate methodology to phase in a rate structure that helps to smooth out changes in rates from year to year are set forth for wastewater systems in the Water Environment Federation's "*Financing and Charges for Wastewater Systems Manual of Practice No. 27*." (Source: Water Environment Federation, *Financing and Charges for Wastewater Systems Manual of Practice No. 27*, McGraw-Hill, 2005, p. 85)

FY 2017 ending on June 30, 2017, and the *'Test Year-2'* which reflects FY 2018 ending on June 30, 2018.

The cost of service rates are proposed for two distinct test years to assure that the Water Department is able to meet all of its general bond covenants, insurance covenants, and rate board ordinance requirements in each of these two years.

Q13. I WOULD LIKE TO ENTER THE TABLES MARKED EXHIBIT (BV-E1), (BV-E2) AND EXHIBIT (BV-E3) INTO THE RECORD. WOULD YOU IDENTIFY THESE EXHIBITS?

A. Yes. Exhibit BV-E1 includes various summary tables related to the comprehensive rate study, including the projection of revenue requirements, cost of service allocations, and rate design for water, wastewater, and stormwater service performed by Black & Veatch for the Water Department. Exhibit BV-E2 includes summary tables related to the allocation of wastewater costs to the ten (10) contract customers. Exhibit BV-E3 includes supplemental supporting summary tables relating to the stormwater billable impervious area and gross area units of service analysis; development of Gross Area (GA) and Impervious Area (IA) rates; CAP analysis and its impact on non-residential rates and charges; and the determination of the stormwater Billing & Collection charges.

List of Exhibits

BV-E1
- Table W-1 to W-20
- Table WW-1 to WW-18
- Table C-1 to C-5

BV-E2
- Table WH-1 to WH-31

BV-E3
- Table SW-1 to SW-19

Q14. WOULD YOU PLEASE SUMMARIZE THE CONTENTS OF EXHIBIT BV-E1?

A. Exhibit BV-E1 contains various summary tables from the water and wastewater cost of service study. The summary and detailed tables reflect the following:

Table Reference	Summary of Results
Tables W-1 through W-6	WATER: Projection of revenues under existing rates and revenue requirements for the water system
Tables W-7 through W-10	WATER: Allocation of test year 2017 cost of service to *functional components*
Tables W-11 through W-18	WATER: Projection of *customer type* cost of service for test year FY 2017
Tables W-19 through W-20	WATER: Proposed rates for General Service and Fire Protection for FY 2017 and FY 2018
Tables WW-1 through WW-6	WASTEWATER: Projection of revenues under existing rates and revenue requirements for the wastewater system
Tables WW-7 through WW-14	WASTEWATER: Allocation of cost of service to functional components, and to contract customers and retail customers for test year FY 2017
Tables WW-15 through WW-18	WASTEWATER: Proposed wastewater Service Charge and Volume Charge rates for FY 2017 and FY 2018
Tables C-1 to C-3	COMBINED: Projection of revenues and revenue requirements for the study period FY 2016 through FY 2021.

Table Reference	Summary of Results
Tables C-4 to C-5	COMBINED: Projection of typical residential and non-residential example monthly bills for water, wastewater, and stormwater services for the study period FY 2017 through FY 2018.

Q15. WOULD YOU PLEASE SUMMARIZE THE CONTENTS OF EXHIBIT BV-E2?

A. Exhibit BV-E2 includes summary tables related to the allocation of wastewater costs to the ten (10) contract customers. The summary and detailed tables reflect the following:

Table Reference	Summary of Results
Table WH-1 through WH-4	WHOLESALE: Allocable test year plant investment and operation maintenance expense and units of service.
Table WH-5 through WH-16	WHOLESALE: Allocation of test year *plant investment* to the individual contract customers
Table W-17 through W-28	WHOLESALE: Allocation of test year *Operation & Maintenance Expense* to the individual contract customers
Table W-29 through W-31	WHOLESALE: Summary of Allocated Cost of Service and Proposed Test Year Charges

Q16. WOULD YOU PLEASE SUMMARIZE THE CONTENTS OF EXHIBIT BV-E3?

A. Exhibit BV-E3 includes supplemental summary tables relating to the stormwater billable impervious area and gross area units of service analysis; development of Gross Area (GA) and Impervious Area (IA) rates; CAP analysis and its impact on non-residential rates and charges; and the determination of the stormwater Billing & Collection charges. The summary and detailed tables in Exhibit BV-E3 reflect the following:

Table Reference	Summary of Results
Table SW-1 through SW-4	STORMWATER Projection of billable Gross Area (GA) and Impervious Area (IA)
Table SW-5 through SW-11	STORMWATER Projection of billable Gross Area (GA) and Impervious Area (IA) credits
Table SW-12	STORMWATER Projection of billable stormwater accounts
Table SW-13 through SW-18	STORMWATER Projection of test year FY 2017 customer class stormwater costs
Table SW-19	STORMWATER Projection of test year 2017 final GA and IA rates, and Billing & Collection charge

Q17. WOULD YOU BRIEFLY EXPLAIN HOW THE DISCUSSION IN THIS TESTIMONY IS ORGANIZED?

A. Yes. The discussions in this direct testimony are organized in the following order:

a. **Section 1: Overview of the Cost of Service Study.** In this section we provide a brief overview of the concept of "Cost of Service' and discuss the overall methodology. This section is organized as follows:

Topics Addressed	Question
Overview of cost of service concept and methodology	Q18 to Q20

b. **Section 2: Projection of Revenue and Revenue Requirements.** In this section we discuss the overall summary findings and details of the projection of revenue and revenue requirements for FY 2017 and FY 2018. This section is organized as follows:

Topics Addressed	Question
Overall summary of the revenue requirement projection and the level of revenue increases needed in FY 2017 and FY 2018.	Q21
Summary of revenue projection under existing rates	Q22
Summary of revenue requirement projections	Q23 to Q31
Summary of cash flow results	Q32

c. **Section 3: Projected Cost of Service Allocations.** In this section we discuss the projection of water, wastewater, and stormwater cost of service for the initial test year of FY 2017, as follows:

Topics Addressed	Question
Overall Summary of Cost of Service Steps	Q33
WATER: Summary of the Cost of Service for test year FY 2017	Q34
WATER: Details of the functional cost allocation	Q35 to Q43
WATER: Details of the customer type cost allocation	Q44 to Q47
WASTEWATER: Summary of Cost of Service for test year FY 2017	Q49
WASTEWATER: Details of the functional cost allocation	Q50 to Q57
WASTEWATER: Details of the customer type cost allocation	Q58 to Q62

Section 4: Projection of Cost of Service Water, Sewer, and Stormwater Rates. In this section, we discuss the projection of water, sanitary sewer, and stormwater rates for the initial test year of FY 2017, as follows:

Topics Addressed	Question
WATER: Summary of Retail Cost of Service Rates for test year FY 2017	Q48
WASTEWATER: Summary of Retail Cost of Service Rates for test year FY 2017	Q63 to Q65

Section 1: Overview of Cost of Service Study

Q18. WOULD YOU BRIEFLY DESCRIBE WHAT COST OF SERVICE IS?

A. The underlying principle behind a Cost of Service analysis is to reasonably match the costs of providing service to various customer types with their associated service demands. As it is not practical to perform this matching of costs to service at an individual customer level, cost of service is always performed at a customer type level. Cost of Service projections then provide the basis for designing a rate structure that allows the utility to recover its costs in an equitable fashion from its customers.

Q19. ARE THERE WATER AND WASTEWATER INDUSTRY STANDARDS FOR PERFORMING A COST OF SERVICE ANALYSIS? IF SO, WHAT STANDARD METHODOLOGY DOES THE WATER DEPARTMENT USE?

A. Yes, there are two major industry guidelines for performing Cost of Service analyses. For water systems, the American Water Works Association's "Principles of Water Rates, Fees, and Charges Manual of Water Supply Practices M1" is the industry standard. For wastewater systems, Water Environmental Federation's "Financing and Charges for Wastewater Systems" M27 Manual is the industry standard. These manuals provide generally accepted industry guidelines for the Cost of Service allocation processes. Black & Veatch has used these industry standard principles and guidelines in the Cost of Service study.

It is important to note that the methodology used in this Cost of Service study is consistent with the methodology used in all the cost of service studies presented in the previous rate proceedings.

Q20. WHAT DOES A COST OF SERVICE STUDY INVOLVE AND CAN YOU PROVIDE A BRIEF DESCRIPTION FOR EACH PART OF THE STUDY?

A. A Cost of Service analysis consists of three parts: (1) Revenue Requirements, (2) Cost of Service Allocations, and (3) Rate Design.

Revenue Requirements: Simply put, the Revenue Requirements part of a Cost of Service study establishes how much money the utility needs to meet its operating and capital obligations. When the revenues generated from existing user charges and other sources of revenue are insufficient to cover operating and capital costs, one or more revenue adjustments may be required. The Water Department has legal requirements and bond covenants that require that its revenue requirements use receipt-based revenue projections or a legally-enacted basis for analysis. Revenue requirements includes a review of operations and maintenance (O&M) expenses, debt service payments, funding for specific reserves, and the cost of capital improvement projects that the utility does not fund via debt or contributions from third parties.

Black & Veatch reviewed the revenue requirements of the water and wastewater utilities to determine whether utility revenues are sufficient to cover all the cash expenditures for the study period. Section 2 of this testimony provides additional details on how we project revenue and revenue requirements using historical customer type service demands, revenue receipts, and operating and capital cost trends.

Cost of Service Analysis: The Cost of Service analysis begins after you have established the revenue requirements for the utility over the planning period. The first step involves selecting a fiscal year (known as the Test Year) for the analysis. The test year is used to illustrate how we allocate costs to customer types and then design a rate structure to recover those costs from the various customer types. This part of the COS study involves taking the identified costs (O&M, debt service, reserves, cash funded capital) and allocating these costs to functional cost centers and cost components. We then calculate the unit cost for each cost component by dividing the component cost by the number of relevant system level units of service. Finally, we determine the cost for each customer type by multiplying the unit cost of each component by the number of units within each customer type. Section 3 of this testimony provides additional details on the cost of service allocations to customer types.

Rate Design: The final step in conducting a Cost of Service study involves developing the rate structure that allows the utility to recover its costs for a given test year. For the Water Department, rate development is a little more involved than it is for other utilities. Since the Water Department uses receipts as the basis for calculating revenues, we need to evaluate the Water Department's "collection lag factor". The lag factor reflects a final adjustment to the cost of service rates to recognize the fact that there will be a proration of billings between the existing and proposed rates during the first month following the effective date of the rate increase, as well as the fact that the fiscal year billings will not be fully collected within that fiscal year. Section 4 of this testimony provides additional details on the final cost of service rate design.

Section 2: Projection of Revenue and Revenue Requirements

Q21. WOULD YOU BRIEFLY SUMMARIZE THE OVERALL FINDINGS OF THE REVENUE REQUIREMENTS AND THE REVENUE INCREASES PROJECTED IN THE STUDY?

A. For the water and wastewater utilities combined, the revenue requirement projections for the initial test year (FY 2017) and the following year (FY 2018), for which rates are being proposed, indicate the need for an overall increase in water and wastewater revenue requirements of $34,735,000 in FY 2017 and $70,906,000 in FY 2018. This level of revenue requirements necessitates a corresponding overall increase in revenues from the existing levels (based on FY 2016 rates) of approximately 5.42 percent in FY 2017 and 5.42 percent in FY 2018. The cumulative overall increase in revenues from the combined water and wastewater systems over the two-year period, relative to FY 2016, is approximately 11.1 percent (11.1%).

Table C-1 (Exhibit BV-E1) presents a summary of the series of revenue adjustments projected for the combined water and wastewater utilities for the study period of FY 2016 through FY 2021.

Q22. PLEASE BRIEFLY DESCRIBE THE PROJECTIONS OF WATER AND WASTEWATER UTILITY REVENUES UNDER EXISTING RATES, AS SUMMARIZED IN TABLE C-3 OF EXHIBIT BV-E1.

A. The total revenue projections for the study period of FY 2016 through FY 2021 for the water and wastewater utilities include two categories of revenues, namely,

"*Operating Revenues*" and "*Other* Revenues." Table C-3 (Exhibit BV-E1) presents the projection of operating and other revenues for the water and wastewater utilities, respectively, for the study period.

Total Water Receipts:	**Total Sanitary Sewer Receipts:**	**Total Stormwater Receipts:**
FY 2017: $266.7 Million	FY 2017: $245.0 Million	FY 2017: $152.1 Million
FY 2018: $257.9 Million	FY 2018: $234.6 Million	FY 2018: $150.9 Million

Projection of Operating Revenues Under Existing Rates

The total operating revenues for the water and wastewater utilities include the following sources of revenues:

a. Retail Water and Sanitary Sewer Service and Volume charges and Stormwater Management Service Charges

b. Wholesale contract customers water and sewer charges

a. Retail Operating Revenues

The operating revenue is calculated for each customer type as listed in the inset box to the right, through a two-step process.

- First, Projected water and wastewater gross billings are calculated by applying the FY 2016 schedules of usage rates and service charges to the projections of water sales and number of customer accounts, respectively. The water sales and number of customer accounts are projected based on the historical trends determined from the data provided by the Water Department.

Customer Types

General Customers

- Residential
- Senior Citizens
- Commercial
- Industrial
- Public Utilities

Others

- Housing Authority
- Charities & Schools
- Hospital & Universities
- Hand Billed
- City Leased

City

- City

Fire Protection

- Public & Private

Groundwater

- Stormwater billings are calculated by applying the FY 2016 GA and IA rates to the projected billable Gross Area (GA), Impervious Area (IA), and by applying the Billing & Collection charge to the projected number of billable accounts.
- In addition, appropriate discounts are applied to those customer types that are eligible for discounts.
- Next, receipt factors ("collection factors") pertinent to the various customer types are applied to the corresponding gross billings to determine the operating retail cash receipts. The collection factors that were applied to the gross billings were based on three year (FY 2013 through FY 2015) collection reports provided by the Water Department's report consultant.
- Revenues from City accounts are derived from water and wastewater service provided to various municipal entities within the City of Philadelphia and the provision of system facilities for public fire protection. Existing schedules of charges also include a charge for private fire protection connections to the water system.
- Retail customers which contribute high strength wastewater are presently assessed an extra strength surcharge based upon their monitored strength.

b. Wholesale Operating Revenues

Water: Historically, Bucks County Water and Sewer Authority ("Bucks County"), and Aqua Pennsylvania (formerly the Philadelphia Suburban Water Company), were the two wholesale water customers.

- Bucks County: The historical charges for water service provided to Bucks County included an annual fixed charge to recover allocated capital costs and certain fixed operating expenses, a commodity charge applicable to metered usage for the recovery of power and chemical expenses, and a demand charge per unit of measured maximum demand to recover other operation and maintenance expenses. However, no revenues are projected during the study period for this customer, as Bucks County is no longer a water contract customer.
- Aqua Pennsylvania: The Water Department's Service to Aqua Pennsylvania commenced in Fiscal Year 2002. Water charges for this service include a commodity charge that is designed to recover power and chemical costs and a fixed charge that is designed to recover allocated capital costs and all other allocated operation and maintenance expenses, excluding power and chemical costs.

Projected Aqua Receipts:
FY 2017: $3.69 Million
FY 2018: $3.69 Million

Wastewater: Wholesale wastewater service is provided to ten (10) suburban customers on a contractual basis. Contractual rates for wastewater service generally consist of charges for operation and maintenance expense and certain capital costs associated with the collection and treatment facilities used in providing the service.

Projected Wastewater Contract Receipts
FY 2017: $31.7 Million
FY 2018: $31.7 Million

Projection of "Other Operating" and "Non-Operating" Revenues

Other Operating Revenue consists of penalties on overdue bills for retail service customers and other miscellaneous income from permits and licenses, fines, operating grants, and transfers from the Debt Service Reserve Fund to the Operating Fund. A key component that negatively impacts the projection of the other operating revenue

is the ‘contra revenue’ estimated for the *Low Income Affordability Discount Program* (“Affordability Program”). The Affordability Program is expected to be launched effective July 1, 2017 (FY 2018), and hence cause a revenue reduction beginning FY 2018. The reduction in revenue receipts due to the Affordability Program discounts is estimated to increase from $16.1 million in FY 2018 to $18.6 million by FY 2021. The supplemental testimony on the Affordability Program provides additional details on the Water Department’s proposed program.

Non-operating Income of the Water Department consists primarily of interest earnings. Interest income recognizes the current revenue bond ordinance requirement which provides for the transfer of all interest earnings from investment of the Debt Service Reserve Fund, the Residual Fund, and the Rate Stabilization Fund to the Operating Fund of the Water Department. Projections of interest income are based on the projected average balances in these funds. Interest earnings in the Debt Service Reserve Fund Reserves in excess of $4,994,000 are transferred to the Operating Fund.

Actual annual fund valuations and interest earnings are based on a mark-to-market valuation which the City performs at end of the fiscal year. For the Debt Service Reserve Fund, a comparison of the mark-to-market and the debt service reserve requirement is subsequently compared to the debt service reserve interest owed to the City in accordance with the General Ordinance. Up to $4,994,000 of the annual interest earnings on the Debt Service Reserve Fund is transferred to the City via the Residual Fund.

The differential between market-to-market and the Debt Service Reserve Fund requirement results in either a transfer from Operating Fund of the Water Department

to the Debt Service Reserve Fund or a transfer from the Debt Service Reserve Fund to the Operating Fund of the Water Department. As noted above, projected transfers from the Debt Service Fund to the Operating Fund are included as other operating revenue.

Q23. PLEASE BRIEFLY DESCRIBE THE PROJECTIONS OF OPERATION AND MAINTENANCE EXPENSE FOR THE STUDY PERIOD WHICH ARE SUMMARIZED IN TABLE W-2 AND TABLE WW-2 OF EXHIBIT BV-E1.

A. The Fiscal Year 2016 operating budget is utilized as the starting base for the projections of Operation and Maintenance (O&M) expenses for Fiscal Year 2017 through FY 2021. The O&M expenses, for Fiscal Year 2016, are determined based on the expected expenditure levels (spend factors) for FY 2016, and the operating budget of that same fiscal year. The following steps were used in projecting the O&M expense for FY 2017 through FY 2021.

- First historical actual expenditures versus budgeted expenses were evaluated to determine the expected spend factors for each of the object classes such as personal services, pension obligations, pension, benefits, purchases of services, materials and supplies, equipment, transfers, and contributions, indemnities, and taxes. The average spend factors by cost classification were determined based on the spending levels of the recent three years of FY 2013 through FY 2015.
- The spend factors were then utilized to adjust the Fiscal Year 2016 budget to an estimated expenditure level for Fiscal Year 2016 for each of the cost classes.

- Next, the FY 2016 budget for the various budget categories or object classes were escalated by appropriate inflation factors, assumed by Black & Veatch, to project the budget for each year of the study period. The escalation factors used in the projection of the O&M budget are discussed in detail in the supplemental paper titled, *"PWD Financial Plan: Revenue and Revenue Requirement Assumptions"* (Exhibit BV-S1).

Summary Discussion on the O&M Cost Projections

Personal Services: The personal services costs are projected taking into consideration four factors: (i) the actual to budget spend levels; (ii) the annual escalation factor based on labor agreement that the City has entered in to with the two unions DC-33 and DC-47 to which the majority of the Water Department's personnel belong, and (iii) the projection of Pensions, Pension Obligation, and Benefits based on the City's five year plan; and (iv) additional staffing during the study period as anticipated by the Water Department.

- Due to the effective hiring that has occurred in FY 2015 and FY 2016, an actual spend factor of 100% is used to project the Water Department personnel costs, and to project the City pension and pension obligations costs;
- Pension, pension obligation, and benefits, which are directly related to personal services expenses, were estimated based upon current levels of such expenses and the growth rate reflected in the City's 5-Year Plan;
- An annual escalation factor of three percent (3.0%) is used to project personnel budget costs; and

- Additional staffing costs are included to account for the additional staffing anticipated in the various divisions of the Water Department during the study period.

Power Costs: Discussions with the Water Department staff indicated that the City has already completed a block purchase of three-fourths of its power at a cost that is on par with the FY 2016 power costs. Hence, the FY 2017 power costs are set to remain at the FY 2016 levels. Black & Veatch has assumed a conservative annual escalation of five percent (5%) for FY 2018 and beyond.

Chemical Costs: Chemical costs were projected to increase by 3.3 percent (3.3%) percent annually for the FY 2017 through FY 2021 period. This annual escalation factor is assumed based upon the most recent three-year average of Water Department chemical costs, and validated with the three year average of the Producer Price Index.

Other Expenses: For other expense categories, Black & Veatch has used an annual escalation factor of three percent (3%) based upon the recent three year average cost increases, as well as a review of various cost indices.

Interdepartmental Charges: Interdepartmental charges represent the Water Fund's proportionate charge for services provided directly by other City departments and agencies, including the Water Revenue Bureau, which has the responsibility for the collection of revenue for water and wastewater service provided by the Water Department. Other interdepartmental charges are for services provided by the Law Department, Fleet Management, the Finance Department (including pension, pension obligation, and benefits), Public Properties, Division of Technology and other departments and agencies of the City. Interdepartmental charges were estimated by

Black & Veatch to increase from $164.4 million in FY 2016 to $195.9 million in FY 2021.

Q24. PLEASE DESCRIBE THE WATER DEPARTMENT'S PROJECTED CAPITAL IMPROVEMENT PROGRAM (CIP) AND THE INDICATED FINANCING OF THE PROGRAM DURING THE STUDY PERIOD.

A. Tables W-3 and WW-3 summarize the Water Department's capital improvement program for Fiscal Years 2016 through 2021 on an encumbrance basis. Encumbrance reflects the total cost of each project in the year construction of the project is scheduled to commence. Costs shown in Tables W-3 and WW-3 reflect the estimated total costs of the various projects, which will be financed from the annual Capital Account Deposit, transfers from the Residual Fund, and the issuance of revenue bonds.

Projection of CIP Costs (Tables W-3 and WW-3)

The FY 2016 CIP costs reflect the Water Department's FY 2016 cost levels. The Water Department presents the FY 2017 through FY 2021 CIP costs based on the FY 2017 levels. Accordingly, an annual inflation allowance of four percent (4%) has been applied to the CIP costs beginning with Fiscal Year 2018. The inflation allowance is based upon a review of the ENR Construction Cost Index and the Handy-Whitman Construction Cost Index. The cash flow adjustment indicated in Line 9 of Table W-3 and Line 10 of Table WW-3 represents the net result of carrying forward costs which are encumbered in one year, but which do not become a cash expenditure until a subsequent year. Line 10 on Table W-3 and Line 11 on WW-3

show the net cash expenditures to be financed from the sale of revenue bonds and other sources of capital.

Projected Capital Improvement Flow of Funds (Tables W-4 and WW-4)

Tables W-4 and WW-4 present an estimate of the flow of funds in the Construction Fund of the Water Department.

- *Bond Proceeds:* Line 1 indicates the projected total revenue bond principal amounts to be issued, during the second half of each of the Fiscal Years 2017 through 2021, to finance the proposed capital improvements of the water and wastewater utilities. There was no bond issuance in FY 2016.

Bond Issuance Projection
FY 2017: $270.0 Million
FY 2018: $275.0 Million
FY 2019: $280.0 Million
FY 2020: $270.0 Million
FY 2021: $285.0 Million

- *Debt Service Reserve:* As shown in Lines 2 through 4, in addition to funding construction costs, the bond issuance proceeds are also used to fund the debt service reserve fund and pay the costs of bond issuance. The deposit into the Debt Service Reserve Fund equals the maximum future annual debt service estimated for the outstanding and proposed bonds. The debt service is estimated based on a 30 year amortization schedule and an annual interest rate of 5.25% for each of the bond issues proposed during FY 2017 through FY 2020, and 5.50% for FY 2021. The proposed bonds in fiscal year 2017 reflect interest only payments through fiscal year 2018.
- *Capital Account Deposit:* In addition to funds from bond proceeds, Line 8 shows that during the six year projected study period a total of approximately

$135.5 million from the Capital Account Deposit will be available to finance water and wastewater capital improvements. In addition, Line 10 indicates that $246.9 million will be available from the Residual Fund as another major source of funding of the capital improvement program.

- *Interest Income:* Interest income on annual average balances in the Construction Fund and the Debt Service Reserve Fund are shown on Lines 11 and 19. The interest earnings in the Construction Fund, which primarily consists of bond proceeds, are not available to the Revenue Fund as a part of the overall project revenues available for meeting annual revenue requirements of the Water Department. An interest rate of 0.36% percent was assumed to determine the interest income for FY 2016 through FY 2021.

Q25. WOULD YOU PLEASE SUMMARIZE THE ANNUAL DEBT SERVICE REQUIREMENTS OF THE WATER DEPARTMENT?

A. Tables W-5 and WW-5 summarize the annual debt service payments for the water and wastewater utilities, respectively. Line 1 shows the annual debt service on existing revenue bonds, while Lines 2 through 9 show the projected debt service on the proposed revenue bond issues reflected in Tables W-4 and WW-4. The projected debt service on the proposed bonds issued in FY 2017 reflects interest only payments through FY 2018. Line 11 shows the applicable revenue bond debt service on Pennvest Loans allocable to the water and wastewater utilities.

Q26. IN ADDITION TO THE PROJECTED REVENUE REQUIREMENTS FOR OPERATION AND MAINTENANCE EXPENSES AND FOR DEBT SERVICE

PAYMENTS, ARE THERE ANY OTHER ANNUAL REVENUE REQUIREMENTS WHICH MUST BE MET FROM WATER AND WASTEWATER REVENUES?

A. Yes, in addition to the aforementioned revenue requirements, there are two additional revenue requirements.

Interest Earnings Payment: The first is an interest earnings payment to the City. This payment reflects application of the 1989 General Ordinance, as amended and supplemented, that in any fiscal year in which a balance exists in the Department's Operating Fund, a payment may be made to the City's General Fund which does not exceed the lowest of (i) the amount of interest earnings in the Debt Service Reserve Fund Reserves transferred to the Operating Fund during the fiscal year or (ii) $4,994,000. Projected annual payments for the study period are summarized in the tabulation below:

	Water Utility	Wastewater Utility
Fiscal Year 2016	$313,000	$475,000
Fiscal Year 2017	$316,000	$478,000
Fiscal Year 2018	$318,000	$478,000
Fiscal Year 2019	$306,000	$481,000
Fiscal Year 2020	$306,000	$460,000
Fiscal Year 2021	$325,000	$458,000

Capital Account Deposit: The second additional revenue requirement is the required Capital Account Deposit. Under the 1989 General Ordinance, the City covenants to make a Capital Account Deposit in each fiscal year, in an amount not less than one percent (1%) of the total value of the net assets of the Water Department. The Capital

Account Deposits are to be used by the Water Department to finance capital improvements for the water and wastewater systems.

The total annual Capital Account Deposits for each utility are summarized below:

	Water Utility	Wastewater Utility
Fiscal Year 2016	$8,711,000	$12,504,000
Fiscal Year 2017	$8,929,000	$12,817,000
Fiscal Year 2018	$9,152,000	$13,137,000
Fiscal Year 2019	$9,381,000	$13,466,000
Fiscal Year 2020	$9,615,000	$13,802,000
Fiscal Year 2021	$9,856,000	$14,147,000

Tables W-6 and WW-6 present an estimate of the interest earnings payment, and the capital account deposit, for the water and wastewater utilities.

Q27. PLEASE DESCRIBE ANY FURTHER REQUIREMENTS THAT MUST BE ADDRESSED IN DETERMINING THE OVERALL LEVELS OF WATER AND WASTEWATER REVENUES NEEDED?

A. Yes. There are three additional revenue requirements that need to be addressed, (i) 1989 General Ordinance Requirement, (ii) Assured Guaranty Municipal Corp (AGM) Insurance Requirement, and (iii) Water Rate Board Ordinance Requirement.

i. 1989 General Ordinance Requirement: In addition to meeting cash revenue requirements (effectively the operation and maintenance expenses and annual capital costs), the authorizing revenue bond ordinance (the 1989 General Ordinance) stipulates that, during any given fiscal year, the Water Department's revenues (for both water and wastewater service combined), must be sufficient to satisfy the following debt service coverage obligations.

Bond Coverage Minimum

Senior Debt Coverage: 1.2

Total Coverage: 1.0

In the first instance, the 1989 General Ordinance requires that, during any given fiscal year the Water Department must, at a minimum, impose, charge, and collect in each fiscal year such water and wastewater rents, rates, fees, and charges as shall yield net revenues which shall be equal to at least 1.20 times the debt service requirements for such fiscal year (excluding the principal and interest payments in respect of Subordinated Bonds). Line 4 in Table C-2 (Exhibit BV-E1) presents the projected Senior Debt Coverage for the study period.

In addition, in each fiscal year, water and wastewater rents, rates, fees, and charges shall yield net revenues which shall be at least equal to 1.00 times the sum of the following:

a. the debt service requirements for such fiscal year (including debt service requirements in respect of Subordinated Bonds);
b. amounts required to be deposited into the Debt Reserve Account during such fiscal year;
c. the principal or redemption price of and interest on General Obligation Bonds payable during such fiscal year;
d. debt service requirements on interim debt payable during such fiscal year; and
e. the Capital Account Deposit to the Construction Fund for such fiscal year (less any amounts transferred from the Residual Fund to the Capital Account during such fiscal year).

Line 5 in Table C-2 (Exhibit BV-E1) presents the projected Total Coverage for the study period.

ii. AGM Insurance Requirement: In addition to the rate covenant of the 1989 General Ordinance described above, the City has agreed with Assured Guaranty Municipal Corporation (AGM) for so long as the Series 2005A Bonds, the Series 2005B Bonds, and the portion of the Series 2010A Bonds insured by AGM are outstanding, to establish rates and charges for use by the Water and Wastewater systems sufficient to yield Net Revenues (excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year) at least equal to 90 percent of the Debt Service Requirements (excluding debt service due on any Subordinated Bonds) in such fiscal year.

Further, any calculation by a consulting engineer of projected rate covenant compliance in connection with the proposed issuance of additional Bonds for each fiscal year ending on or after June 30, 2000, must state that Net Revenues (excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year) in each fiscal year included in the projection period are projected to be at least 90 percent of the Debt Service Requirements (excluding debt service due on any Subordinated Bonds) in such fiscal year.

Line 6 in Table C-2 (Exhibit BV-E1) presents the projected Senior Debt Coverage from current revenues (Insurance Requirement) for the study period.

iii. Water Rate Board Ordinance Requirement: Section 13-101(4)(a) of the City Code sets the floor for the amounts that rates and charges must generate to support the System. The rates and charges must yield to the City at least an amount equal to the sum of:

1. Operating expenses of the City in respect of the water, sewer, storm water systems;

2. Debt service on all obligations of the City in respect of the water, sewer, storm water systems,

3. In respect of water, sewer and storm water revenue obligations of the City, such additional amounts as will be required to comply with any rate covenant and sinking fund reserve requirements approved by ordinance of Council in connection with the authorization or issuance of water, sewer and storm water revenue bonds, and

4. Proportionate charges for all services performed for the Water Department by all officers, departments, boards or commissions of the City.

In addition, Section 13-101(4)(b) of the City Code states that the rates and charges must not exceed ("ceiling") the total appropriations from the Water Fund, and provides considerations of the elements that are to be included in the calculation of the ceiling. The rates and charges projected for FY 2017 and FY 2018 do not exceed the Water Fund's projected appropriations for each of these two years.

Line 11 in Table C-2 (Exhibit BV-E1) reflects the compliance with the Water Rate Board Ordinance Requirement during the study period.

Q28. PLEASE BRIEFLY EXPLAIN HOW THE ADDITIONAL BOND ORDINANCE COVENANTS WERE RECOGNIZED IN THE REVENUE REQUIREMENT PROJECTIONS?

A. Since the outstanding revenue bonds are combined water and wastewater bonds, compliance with the debt service coverage obligations is estimated using a projected cash flow schedule for the two utilities on a combined basis.

Q29. WHAT WERE THE FINDINGS WITH REGARD TO THE UTILITIES' COMPLIANCE WITH THE STATED DEBT SERVICE COVERAGE OBLIGATIONS?

A. With the inclusion of the overall additional increase in revenues projected as necessary for the two utilities combined, these required debt service coverage requirements are indicated to be satisfied over the total six-year study period.

Q30. ARE THERE ANY OTHER CONSIDERATIONS THAT WERE REFLECTED IN EXAMINING THE OVERALL NEED FOR AN INCREASE IN WATER AND WASTEWATER REVENUES?

A. Yes. The Department must also establish rates and charges to meet the financial management requirements of the 1989 General Ordinance with respect to, among other things, (1) maintaining the Rate Stabilization Fund; (2) financing a portion of major annual capital improvement requirements directly from annual system revenues; and (3) making required deposits into the Residual Fund of any monies remaining after payment of all current cash obligations.

Q31. WOULD YOU PLEASE BRIEFLY SUMMARIZE THE ABOVE REQUIREMENTS OF THE 1989 GENERAL ORDINANCE?

A. *Rate Stabilization Fund:* Balances in the Rate Stabilization Fund, as its name implies, are intended to help stabilize or level the magnitude of future increases in water and wastewater rates. Available funds, from annual system revenues are deposited into the Rate Stabilization Fund, generally as a result of complying with the minimum

1.20 bond coverage covenant. Additional revenues result from the 20 percent coverage being in excess of revenue bond debt and other cash related capital requirements. When revenues are deposited into the Rate Stabilization Fund, they are excluded from eligibility in the numerical calculation of annual debt service coverage. Conversely, when revenues are transferred from the Rate Stabilization into the Revenue Fund, they are then included in the debt service coverage computation.

It should be noted that the Water Department has utilized the Rate Stabilization Fund balances in the past several years to "manage" its revenue increases such that they are effectively used to provide the minimum required 1.20 coverage level stipulated in the 1989 General Ordinance. The Rate Stabilization Fund balance is projected to decrease from $169,196,000 at the end of Fiscal Year 2016 to $111,006,000 at the end of Fiscal Year 2018 (which is the end of the two-year rate increase period). The projected revenue increases were established, taking in to consideration this anticipated draw down from the Rate Stabilization Fund. A targeted combined minimum balance of approximately $125 million in the Rate Stabilization Fund and the Residual Fund (discussed below) is believed to be an appropriate level of working capital for an organization with the level of revenues and expenses of the Water Department.

Cash Financing of Capital Program: In discussions among the Water Department and the Water Department's financial advisor, Public Financial Management (PFM) it was determined that the Water Fund should transition from the minimum 1.2 requirement to a higher coverage level of 1.35 beginning FY 2019, consistent with industry financial management best practices. Such an approach will also provide for

more revenues to be deposited into the Residual Fund in order to be used to provide additional cash funding of major capital improvements. The financial markets and the rating agencies have been encouraging the Water Department to rely less on debt financing of its major capital improvements. Moving to the higher coverage level will accomplish this and will support the Water Department's objective of improving its bond ratings over time.

Under the 1989 General Ordinance, there is a mandatory annual revenue requirement referred to as the Capital Account Deposit. The amount of this requirement, at a minimum, is set equal to one percent of the net investment in Water Department assets. This annual requirement, which ranges from approximately $21.2 million to $24.0 million during the study period, is to be used for financing major capital improvements directly from annual system revenues.

Residual Fund: After meeting the annual cash obligation for operation and maintenance expenses, payment of debt service, the Capital Account Deposit, and transfers to/from the Rate Stabilization Fund, any remaining monies are deposited into the Residual Fund. Balances in the Residual Fund may be used for retirement of debt, payment of capital expenditures, and any other payments as provided by the 1989 General Ordinance. For purposes of projections over the study period, we have generally shown the balances in the Residual Fund to be utilized for financing of the major capital improvement program.

An annual balance of approximately $15 million is projected to be maintained in the Residual Fund during each year of the study period as reflected in Line 38 in Table C-1 (Exhibit BV-E1).

Q32. WOULD YOU PLEASE SUMMARIZE THE OVERALL RELATIONSHIP OF THE PROJECTION OF REVENUE UNDER EXISTING RATES AND REVENUE REQUIREMENTS FOR THE STUDY PERIOD?

A. Table C-1 (Exhibit BV-E1) presents a cash flow statement of projected revenues and revenue and rate covenant requirements for water and wastewater utility operations for the projected period of Fiscal Years 2016 through 2021. The financial projections provide a clear indication of the adequacy of the Department's revenues in complying with the stipulations of the 1989 General Ordinance. As indicated on Lines 4 through 9 in Table C-1, annual increases in revenue are required beginning in Fiscal Year 2017. A 5.42% revenue adjustment is necessary in each of the two fiscal years of FY 2017 and FY 2018. The increase in each of these two fiscal years is assumed to be at the beginning of the fiscal year.

As indicated in Lines 26 and 30 in Table C-1, the debt service coverage requirements discussed previously would be met with these overall levels of increase in revenues. Annual cash requirements for the combined water and wastewater utilities would also be met with these levels of increase as indicated by the positive balances shown in Line 34 of Table C-1.

Tables W-6 and WW-6 show the projected cash flow for the water and wastewater utilities, respectively. The revenue requirement projected for FY 2017 and FY 2018 respectively for Water and Wastewater utilities are then used in the development of the test year cost of service to be allocated for each utility. As indicated in Table W-6, an overall increase in revenue of 5.00 percent (or $12,727,000) in Fiscal Year 2017 and 5.00 percent (or $25,921,000) in Fiscal Year 2018 are proposed for the water utility. For the wastewater utility, an overall increase in revenue of 5.70 percent (or $22,007,000) in Fiscal Year 2017 and 5.70 percent (or $44,985,000) in Fiscal Year 2018, are proposed, as shown in Table WW-6.

Section 3: Projection of Cost of Service Allocations

Q33. AFTER THE DETERMINATION OF THE NECESSARY OVERALL INCREASE IN WATER AND WASTEWATER SERVICE REVENUES TO MEET REVENUE REQUIREMENTS, WHAT IS INVOLVED IN THE NEXT PHASE OF YOUR RATE STUDY, PREVIOUSLY REFERRED TO AS THE COST OF SERVICE ALLOCATION PHASE OF THE STUDY?

A. As briefly explained earlier in response to Q20, the cost of service phase of the study consists of essentially three steps: (1) the determination of the cost of service to be recovered from charges for water and wastewater service; (2) the allocation of cost of service to functional cost components which recognizes the system characteristics; and (3) the distribution of functionalized cost of service components to customer types.

The total revenue requirements to be derived from charges for water and wastewater service are synonymous with, and are the definition of, the total cost of service. As a basis for developing an equitable rate structure, these costs are allocable to the various customer classifications according to respective service requirements.

For the water utility, allocations of these requirements to customer types should take into account the quantity of water use, relative peak capacity requirements placed on the system, the number and size of services to customers, and proprietary interest in the system investment.

For the wastewater utility, factors considered in allocating costs to each customer type include the annual volume and peak rates of sanitary wastewater, infiltration, and stormwater flows; wastewater strengths; the number and sizes of customers served; and proprietary interest in system investment.

Section 3a: Projection of Water Utility Cost of Service Allocations

Q34. WHAT DID YOU DETERMINE TO BE THE OVERALL COST OF SERVICE FOR THE WATER UTILITY FOR PURPOSES OF YOUR STUDY?

A. In analyzing costs of service of the water utility for allocation to customer types, the annual revenue requirements for Fiscal Year 2017 were selected as the "test year" as the first rate adjustment is proposed for FY 2017. In determining the costs of service to be met from charges for water service, funds from other operating revenue and non-operating income are deducted from total water revenue requirements. The results of the FY 2017 cost of service to be recovered through charges for water

service are summarized in Table W-7 (Exhibit BV-E1). In Table W-7 the elements comprising the FY 2017 annual cost of service are assigned to the two cost categories of operating expense and capital costs.

Operating Costs: Operating expense consists of operation and maintenance expense, direct interdepartmental charges applicable to the utility, deposit to the Rate Stabilization Fund, a portion of the year end revenue balance which is deposited into the Residual Fund. An additional element of operation and maintenance expense which is recognized in the cost of service study for the water utility is the cost of treating and disposing of water treatment plant sludge which is discharged into the City's wastewater system. This projected expense of $10,952,000 is shown in Line 3 of Table W-7. A corresponding credit for this amount is shown in the wastewater cost of service in Table WW-7.

Capital Costs: Capital costs consist of debt service on existing and proposed bonds, the Capital Account Deposit, and a portion of the year end revenue balance which is deposited into the Residual Fund.

Further, additional credits to both operating expense and capital costs are provided from interest earnings on various funds. The total Fiscal Year 2017 test year cost of service to be met from water sales revenue, shown in Line 12 of Table W-7, is $267,277,000.

Q35. AFTER HAVING DETERMINED THE TEST YEAR TOTAL COST OF SERVICE TO BE RECOVERED FROM RATES FOR WATER SERVICE,

WHAT IS THE NEXT STEP IN THE ALLOCATION OF THESE COSTS TO THE VARIOUS TYPES OF CUSTOMERS SERVED BY THE UTILITY?

A. In allocating the test year cost of service, revenue requirements are apportioned among the customer types on a utility basis, that is, in terms of operating expense, depreciation expense, and return on investment.

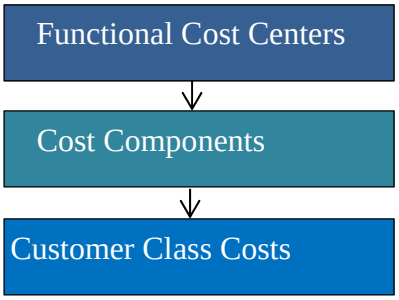
For a municipal utility, the total of depreciation expense and return on investment is equal to the total cash requirements, beyond operating expense, to be recovered from revenues to meet capital investment related costs. The restatement of cost of service on a "utility" basis is necessary as the Water Department provides service to wholesale customers outside the City, and hence is entitled to obtaining a return on investment from those wholesale customers.

Depreciation Expense: Depreciation is the loss, not restored by current maintenance, which occurs in plant due to decay, inadequacy, and obsolescence. Depreciation accounting is usually based on an annual percentage allowance of plant investment adequate to return the investment during the useful life of the facility. The annual depreciation allowance is not customarily accrued as a cash reserve, but is used to meet principal payments for long-term debt or is reinvested in replacements and additions to plant facilities. Unless an amount equal to annual depreciation expense is reinvested in the system or is accrued for future investment, the original investment is gradually depleted, which may be an inequitable basis for utility financing.

For purposes of determining an estimated equivalent depreciation expense on the test year plant in service, depreciation rates actually employed by the water utility on various categories of plant investment were used in the rate study. The annual test year depreciation expense is estimated to total $33,826,000 for the water utility. Table W-9 (Exhibit BV-E1) presents the total water utility depreciation expense for the test year.

Return on Investment: In a publicly owned utility, such as the Philadelphia water system, "return on investment" is the balance of the total annual revenue requirements for capital costs, over and above the allowance for depreciation. The total capital cost to be met from water service revenue, for FY 2017, is projected to be $81,891,000, and is shown in Column 2 of Table W-7 (Exhibit BV-E1). Deduction of the estimated water utility depreciation expense of $33,826,000 from this total net capital cost requirement yields a Return on Investment, on the water system, of $48,065,000 to be recovered from both inside City retail and outside City wholesale customers.

Q36. HOW ARE THE TEST YEAR OPERATING AND CAPITAL COSTS ASSIGNED OR ALLOCATED TO THE VARIOUS TYPES OF CUSTOMERS?



A. The basic underlying principle in developing cost of service rates is the determination of what causes the cost, or what elements in a water system are responsible for causing the level of revenue requirements to be what they are. To allocate the

costs to customer types, first the operating and capital costs are aggregated into "Functional Cost Centers" and the functional costs are then further allocated to cost components. Each component cost is then apportioned to customer types. To perform these allocations, one must have a working knowledge of the functional cost centers, the cost components, and how a water system operates.

Q37. WHAT ARE THE TYPICAL FUNCTIONAL COST CENTERS FOR WATER UTILITIES?

A. Functional cost centers represent cost driver activities for the utility systems. For a water utility, they often include *source of raw water supply*, *pumping*, *treatment*, *distribution*, and *customer* costs.

Q38. WOULD YOU BRIEFLY DESCRIBE HOW A WATER SYSTEM OPERATES AND SOME OF THE CONSIDERATIONS INVOLVED IN DESIGNING SUCH A SYSTEM?

A. A water system is comprised of various facilities each designed and operated to fulfill a given function. In order to provide adequate service to its customers at all times, the system must be capable of providing not only the average annual amount of water used, but also supplying water at maximum rates of demand. However, since all customers do not exert maximum demands at the same time, capacities of the various system components are established to meet the maximum coincidental demand of all types of customers.

The capacities of some facilities, such as certain raw water source of supply facilities, are designed on the basis of annual average, or base, water demands. Other facilities such as raw water pumping and the water treatment plants are designed to meet maximum day demands. Still other facilities, such as treated water pumping, filtered water storage, and transmission and distribution mains, are designed to meet maximum hourly rates of water use. These requirements result in different demand ratios of maximum to average demands to be met by the various parts of the system. The demand ratios, in turn, are the basis for allocating costs of respective facilities to the cost components.

Q39. WHAT WOULD YOU RECOGNIZE AS THE COST COMPONENTS FOR A WATER SYSTEM?

A. The total cost of water service may be allocated to specific cost elements according to the service requirements of the various types of customers. The Water functional costs are usually classified and assigned to five functional cost components: Base cost, Extra Capacity cost, Customer cost, Public Fire Protection, and Wholesale Direct. The separation of the costs of service into these five principal components provides a means for further allocation of such costs directly to wholesale customers and to the various retail customer types on the basis of the respective Base, Extra Capacity, and Customer cost requirements of each customer type.

Base Costs: Base costs are those which vary directly with the total quantity of water used, as well as those costs associated with serving customers under average load conditions without the elements necessary to meet water use variations or peak demands. Base costs include operating costs of supply, treatment, pumping and distribution facilities, and a portion of administrative and general costs, as well as capital costs on water plant investment associated with serving customers to the extent required for a constant, or average annual rate of use.

Extra Capacity Costs: Extra Capacity costs represent those operating costs incurred due to demands in excess of average load conditions, and capital costs for additional plant and system capacity beyond that required for the average rate of use. This includes two components: Maximum Day and Maximum Hour.

- Maximum Day Extra Capacity costs are those incurred in meeting demands in excess of average day requirements.
- Maximum Hour Extra Capacity costs are those incurred in meeting demands in excess of maximum day use.

Historical annual average, maximum day, and maximum hour system water demands are utilized to develop the coincidental system demand allocation factors used in this study.

- Based on the historical demands experienced, the maximum day demands placed on the treatment plants can be expected to amount to approximately 130 percent of average day demand. Consequently, 77 percent of the capacity of these maximum day facilities is required for base use, and the remaining 23 percent is required for maximum day extra capacity demands. Similarly, peak

demands for maximum hour facilities can be expected to amount to about 174 percent of average day demands.

- Of the facilities designed to meet maximum hour demands, 58 percent of the capacity is required for average rates of water use, 14 percent is required to meet maximum day extra capacity requirements, and the remaining 28 percent is needed to meet maximum hour requirements.

These cost allocation factors reflect a small, but continued shift towards the Base cost component as system maximum day demands have leveled off in recent years.

Customer Costs: Customer costs are defined as costs which tend to vary in proportion to the number of customers connected to the system. These costs include meter reading, billing, collecting and accounting, a portion of administrative and general costs, and maintenance and capital charges associated with meters and services. Customer costs, such as meter related expenses and billing, collecting, and accounting expenses, are usually allocated to customer types on the basis of the number of bills rendered or customers served and are assigned directly to the customer meter and billing cost components.

Public Fire Protection: Costs directly related to the public fire protection include operating expenses and capital costs associated with the standard pressure fire system. It should be noted that the City's high pressure fire system was decommissioned in Fiscal Year 2008. Costs related to the standard pressure fire system are assigned directly to the cost component for public fire protection.

Wholesale Direct: Costs allocable to Wholesale Direct include the operating expenses and capital costs related to those facilities required to serve Aqua Pennsylvania on a

wholesale basis in accordance with the contract capacity and contractual terms of the agreement. The contractual maximum day capacity reserved by Aqua Pennsylvania for Fiscal Year 2016 and the remainder of the study period is 9.5 mgd. Aqua has more than one connection point to the Water Department's system. However, they have ceased using one interconnection. The units of service assumed for Aqua Pennsylvania reflects this reduction in usage.

As noted previously, Bucks County Water and Sewer Authority is no longer a wholesale water customer to the Water Department.

Q40. HAVE YOU PREPARED A SUMMARY OF THE TEST YEAR PLANT INVESTMENT IN THE WATER SYSTEM USED IN YOUR STUDY TO ALLOCATE CAPITAL COSTS TO THE VARIOUS COST COMPONENTS?

A. Yes, Table W-8 (Exhibit BV-E1) summarizes the test year investment in the water system used in the allocation of test year capital related costs of service. The total test year investment of $1,426,716,000 is the total original cost investment in facilities which are anticipated to be in service during the test year.

Q41. PLEASE EXPLAIN THE PROCEDURES USED TO ALLOCATE THE TEST YEAR PLANT INVESTMENT TO THE WATER COST COMPONENTS DISCUSSED PREVIOUSLY.

The Test Year (FY 2017) plant investment is allocated to the cost components using a two-step process.

- First, a portion of the water system plant investment costs are allocated to wholesale water contract customers.
- Then the retail portion of the total plant investment costs (which is the total plant investment less the proportionate share allocated to wholesale contract customers), are allocated to the cost components.

Wholesale Contract Plant Investment Allocation: As noted in Q22, Bucks County is no longer a wholesale water contract customer. Currently, Aqua Pennsylvania is the only wholesale water contract customer.

Aqua Pennsylvania is allocated a share of total water system investment in large transmission mains, defined as 24 inch and larger mains, as well as raw water and treated water storage and pumping facilities, and a share of the investment in the Baxter, Queen Lane and Belmont treatment facilities. The plant investment costs are allocated to Aqua Pennsylvania based on the proportionate share of their contract capacity in the various facilities relative to the total design capacity of the various facilities. Aqua Pennsylvania's contract capacity in the various classes of facilities is in the range of 1.15% to 1.74% of the total design capacity of the facilities.

Allocation of Retail Plant Investment to Cost Components: After deducting the investment directly allocable to Aqua Pennsylvania, the balance of the investment assignable to the retail customers of the water system is allocated as follows:

- ***Source of Supply:*** The investment in the source of supply facilities shown in Lines 1 and 2 of Table W-8 (Exhibit BV-E1) includes the Fairmont Dam and associated structures and equipment. These facilities are designed to meet

annual water supply requirements and are allocated 100 percent to the Base cost component.

- ***Raw Water Pumping:*** The investment in the Baxter, Queen Lane, and Belmont raw water intakes, buildings, structures, and raw water pumping equipment is shown in Lines 3 and 4 of Table W-8. These facilities not only supply the average annual volume needs, but are also designed to meet the capacity needs of maximum day requirements. Hence, investment in these facilities is allocated 77 percent to Base cost component and 23 percent to Maximum Day Extra Capacity cost component.
- ***Water Treatment:*** The water purification and treatment facilities at the Baxter, Queen Lane, and Belmont treatment plants are designed to provide maximum day capacity needs and are allocated to the Base cost component (77%) and the Maximum Day Extra Capacity cost component (23%).
- ***Treated Water Pumping:*** The investment in treated water pumping facilities at all three treatment plants, as well as the booster pumping stations in the distribution system, is included in Lines 6 and 7 of Table W-8. These facilities are designed to fulfill maximum hour capacity needs in addition to meeting the Base and Maximum Day requirements. Hence, the retail portion of the plant investment costs of these facilities are allocated 58 percent to Base, 14 percent to Maximum Day Extra Capacity, and 28 percent to Maximum Hour Extra Capacity cost components.
- ***Transmission and Distribution:*** Transmission and distribution investment, including transmission and distribution mains, and filtered water storage

facilities are designed to meet maximum hour requirements of the system. Investment in these facilities is therefore allocated to Base, Maximum Day, and Maximum Hour cost components, with factors identical to that of the Treated Water Pumping allocation, discussed above.

- ***Customer Meters and Public Fire Protection:*** Customer meters are wholly customer related facilities allocable to the Customer Meters cost component. Public fire protection service is comprised of the standard pressure fire system. Investment in these facilities is directly allocable to the respective cost components shown in Table W-8.
- ***General Plant and Equipment:*** Other general plant and equipment includes investment allocable to all of the above, and is allocated to cost components in proportion to the total of the preceding items of the direct plant investment allocation to those cost components.

Q42. PLEASE EXPLAIN THE PROCEDURES USED TO ALLOCATE THE TEST YEAR DEPRECIATION EXPENSE TO THE WATER COST COMPONENTS.

A. The annual depreciation expense of the water system is estimated to be $33,826,000 for the test year (FY 2017). The annual depreciation expense to be distributed to water system cost components is based on the application of appropriate depreciation expense rates to the various categories of water system facilities. The allocation of the estimated depreciation expense to functional cost components is shown in Table W-9 (Exhibit BV-E1). The various items of depreciation expense are allocated to cost components on the same basis as the plant investment costs of the corresponding system element.

Q43. HAVE YOU PREPARED A SUMMARY OF THE TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE PROVISION OF WATER SERVICE TO THE VARIOUS WATER COST COMPONENTS IN YOUR STUDY?

A. Yes, the projected operation and maintenance expense for the test year (FY 2017) is $185,387,000. This expense is allocated to cost components as shown in Table W-10 (Exhibit BV-E1). Operation and Maintenance expense is allocated to water cost components generally in the same manner as plant investment and depreciation expense.

The Test Year (FY 2017) operation and maintenance is allocated to the cost components using a two-step process.

- First, a portion of the operation and maintenance costs are allocated to wholesale water contract customers.
- Then the retail portion of the total operation and maintenance expense (which is the total operation and maintenance expense less the proportionate share allocated to wholesale contract customers), are allocated to the cost components.

Wholesale Contract Operation and Maintenance Allocation: Bucks County used to be a contract customer to the Water Department, and hence under its previous contract was allocated a proportionate share of the operation and maintenance expense of the water system utilized in serving the County. However, since the beginning of FY 2015, Bucks County is no longer a water contract customer to the

Water Department. Currently, Aqua Pennsylvania is the only wholesale water contract customer.

Allocated operation and maintenance expenses to Aqua Pennsylvania recognize the projected annual usage and maximum day demands for service to Aqua Pennsylvania relative to the annual production and maximum day demand of the overall water system, excluding costs associated with mains less than 24 inches in diameter. As shown in Column 9 of Table W-10, a total of $1,818,000 of test year operation and maintenance expense has been allocated to Aqua Pennsylvania.

Allocation of Retail Operation and Maintenance Expense to Cost Components: After deducting the operation and maintenance expenses directly allocable to Aqua Pennsylvania from the total expenses shown in Column 1 of Table W-10, the remaining expenses are allocated to the retail customer types as follows:

- ***Source of Supply:*** Raw water pumping expense, other than purchased power, is allocated 77 percent to Base and 23 percent to Maximum Day cost components. The power costs associated with raw water pumping is allocated 95 percent to Base and 5 percent to Maximum Day cost components in recognition of the operating characteristics of pumps and the demand structure of electric rates.
- ***Water Treatment Costs:*** Different expense items within the water treatment costs are allocated differently to the cost components.
    - Projected test year operating expense, exclusive of power, chemical costs, and sludge treatment and disposal costs, for the Baxter, Queen

Lane, and Belmont treatment plants is allocated 77 percent to Base and 23 percent to Maximum Day.

- Chemical costs and sludge treatment and disposal costs, which generally vary directly with the quantity of water treated, are assigned 100% to the Base cost component.
- Test year treated water pumping operating expenses, exclusive of power costs, are allocated 58% to Base, 14 percent to Maximum Day, and 28 percent to Maximum Hour cost components.
- Treatment plant power costs are allocated 90 percent to Base, 5 percent to Maximum Day Extra Capacity and 5 percent to Maximum Hour Extra Capacity in recognition of the effect of the demand structure of electric rates.

- ***Water Treatment Sludge Costs:*** It should be noted that as previously developed in Table W-7, a total of $10,952,000 has been added to the test year operation and maintenance expense to be met from water rates. The $10,952,000 represents the cost of treating water plant sludge from the water treatment plants, which is discharged into the wastewater system. This cost, which occurs in the wastewater utility operations, is appropriately charged against the water utility.
- ***Transmission and Distribution:*** Transmission and distribution test year operating expenses associated with mains and reservoirs are allocated to Base, Maximum Day, and Maximum Hour cost components, with factors identical

to that of the Treated Water Pumping operation and maintenance expense allocation, discussed above.

- ***Customer Meters and Public Fire Protection:*** Meter maintenance expense is allocated 100% to the Meter component of Customer costs. Projected fire hydrant maintenance expense is allocated 100% to Direct Public Fire Protection cost component. Test year customer accounting and collection is allocated 100% to the Billing component of Customer costs.
- ***Administrative and General:*** Administrative and general expense is allocated to cost components in proportion to the total allocation of all other expenses to the cost components, excluding expenses for power and chemicals.
- ***Residual Fund and Rate Stabilization Fund Transfers:*** The deposit into the Residual Fund (Line 23) and the deposit from the Rate Stabilization Fund (Line 24), each of which is allocable to operation and maintenance expense, are allocated to the various cost components in proportion to the allocation of the Administrative and General (Line 21 of Table W-10).
- ***Net Operating Expense:*** The net operating expense to be recovered from all customers through charges for water service is derived by deducting the "Other Operating Revenue" and the non-operating "Interest Income" from the total operating expense.
    - Miscellaneous revenue is allocated in proportion to the allocation of the Administrative and General costs (Line 21 of Table W-10).
    - Other revenue is allocated to the various cost components applicable to retail customers, as shown on Line 26 of Table W-10. Since virtually

all of these revenues are generated from retail customers, no credit is applicable to wholesale service.

- The non-operating interest income which is assigned to operation and maintenance expense (Line 27) is allocated in proportion to the allocation of the Administrative and General costs (Line 21 of Table W-10).
- The total net operation and maintenance expense to be recovered from water rates ($185,387,000) is shown on Line 28 of Table W-10.

Q44. AFTER COSTS ARE ALLOCATED TO FUNCTIONAL COST COMPONENTS, WHAT IS THE NEXT STEP IN THE OVERALL COST OF SERVICE ANALYSIS?

A. As indicated in the response to Q36, the next step in the cost of service analysis is to distribute the retail costs of the water utility to customer types. To do this, customers with similar characteristics are grouped together into to specific customer types. For each customer type, the units of service are determined for each of the five cost components to which the capital costs and operation and maintenance costs were allocated.

Water utility customers are grouped into two distinct categories, namely, *Inside City Retail* and *Outside City Wholesale.* The types of customers within the Inside City Retail and Outside City Wholesale categories has already been discussed in response to Q22.

Q45. PLEASE EXPLAIN THE METHODOLOGY YOU USED TO DETERMINE THE CUSTOMER TYPE LEVEL UNITS OF SERVICE FOR EACH COST COMPONENT OF THE WATER UTILITY.

A. An overview of the Base-Extra Capacity concepts and cost components was presented in response to Q39. The operation and maintenance and capital costs that were allocated to the five cost components including Base, Maximum Day, Maximum Hour, and Customer costs need to be distributed to customer types according to the respective service requirements of the types. In determining the responsibility of each customer type for the Base and Extra Capacity cost components, the Base and peak requirements of the various types are estimated on the basis of an analysis of Department operating records, and experience in the study of other water utility systems.

Table W-11, (Exhibit BV-E1), shows the projected test year water use by retail customer types, including annual and average day usage (Base), the estimated total capacity factors for both Maximum Day and Maximum Hour requirements, and the resulting Maximum Day requirements in excess of average day and Maximum Hour requirements in excess of Maximum Day. The breakdown of projected usage between the General Service customer types of Residential, Commercial, and Industrial is based upon an analysis of water bills by user code. The test year units of service, for Aqua Pennsylvania, are not included in Table W-11, since this table is used for allocating costs just among the retail customer types.

Determination of Base Units: The estimates of total annual water usage (aka 'Base' usage), shown in Column 1 of the table, are based upon units of service projections utilized for determining revenue under existing rates.

Determination of Maximum Day and Maximum Hour Units: Generally, the peak water usage characteristics vary among the different customer groups as follows:

- Residential and Commercial customers place a more severe peak demand on the water system than Industrial customers. For example, the Residential customers typically would all have high water usage in the morning due to shower and other morning chores and similarly may reflect a higher usage in the evening when residents are usually back home from work/school, etc.
- Other customer types including Charities and Schools are projected to exhibit usage patterns similar to Commercial customers.
- The Senior Citizen and Housing Authority types are projected to have usage patterns more closely related to the Residential customers.
- Industrial use is generally spread more uniformly throughout the day and hence their maximum rates of use vary less from their average day use.

Due to these types of differences in peak usage, Residential and Commercial customers are assigned higher Maximum Day and Maximum Hour factors than the Industrial customers. Charities, Schools, Hospitals, etc are given the same Maximum Day and Maximum Hour factors as that of the Commercial customers. Senior Citizen and Housing Authority customers are assigned peak usage factors that are closer to that of the Residential customers.

Determination of Fire Protection Units: Fire Protection Extra Capacity requirements are based on standards for determining peak fire flow requirements. Fire protection capacity requirements are allocated between Public Fire Protection and Private Fire Protection in proportion to the relative total number of equivalent fire connections in each type.

Determination of Customer Units: Customer units of service include two sub-components namely, *Equivalent Meters* and *Equivalent Bills*. The units for these two sub-components are estimated as follows:

- Equivalent meter units for the test year are estimated based of the number and size of water meters in service. Equivalency is expressed as a ratio of the capacity of various sized meters to the capacity of a 5/8 inch meter. Therefore, the number of equivalent meters is estimated for each customer classification by translating each customer type's total number of meters *by size* to the capacity of a 5/8 inch meter.
- Billing related Customer units are determined based on the number of equivalent bills for each type of customer. The estimated number of equivalent bills for each classification is based upon the respective number of bills rendered and the estimated ratios of meter reading, billing, and collection costs of customers with larger meters to such costs attributable to customers with a 5/8 inch meter. The ratios used for these determinations are shown in Table W-12, Exhibit BV-E1.

Q46. PLEASE SUMMARIZE THE TOTAL TEST YEAR COST OF SERVICE ALLOCATED TO AQUA PENNSYLVANIA.

A. Table W-13 (Exhibit BV-E1) summarizes the test year cost of service for Aqua Pennsylvania. The total plant investment, depreciation expense, and operation and maintenance expense for Aqua Pennsylvania are included in the last column of Tables W-8, W-9 and W-10, respectively. The total cost of service allocable to Aqua Pennsylvania amounts to $3,070,000. This amount includes a return on investment requirement of $964,000, which is determined based on a 7.50 percent rate of return on allocated investment. Table W-13 shows the test year FY 2017 contractual rates applicable to Aqua Pennsylvania. Table W-14 shows the proposed rates for Aqua Pennsylvania for Fiscal Year 2018.

Q47. PLEASE DESCRIBE THE ALLOCATION OF COSTS OF SERVICE TO THE RETAIL CUSTOMERS OF THE WATER UTILITY.

A. The *retail* cost of service is allocated to the various retail customer groups through a two-step process:

- ***Step 1:*** First, the <u>*retail unit costs*</u> of service, for each expense category, (*Operating*; *Depreciation*; and *Return on Investment*), and for each cost component (*Base*; *Maximum Day*; *Maximum Hour*; *Customer*; and *Public Fire Protection*), is determined. The unit cost is derived by dividing the total cost allocated to each expense category and cost component by the total applicable units of service.

- ***Step 2:*** The retail customer type responsibility for service is then obtained by applying unit costs of service to the number of units for which each customer type is responsible.

Determination of Retail Unit Costs: The development of retail unit costs involves the following two sub-tasks:

- ***Estimate of the Inside City Rate of Return:*** The capital cost revenue requirement of the system less depreciation is considered the equivalent of return on investment. The system return on investment is recovered from both *Inside City Retail* and *Outside City Wholesale customers.* The *Inside City Retail* rate of return requirement is calculated as follows:
    - The total return on investment in the system required in the test year amounts to $48,065,000. This return when applied to the test year system plant investment of $1,426,716,000, results in an overall system rate of return requirement of 3.369 percent.
    - As previously discussed in Q46, for purposes of this study, a return on investment of $964,000 has been allocated to the wholesale customer Aqua Pennsylvania.
    - The wholesale customer's return on investment of $964,000 is deducted from the total system return on investment of $48,065,000, to allocate the Inside City's return on investment of $47,101,000. Based on this allocation, the Inside City rate of return on plant investment is estimated to be 3.331%.

Table W-15 (Exhibit BV-E1) presents the Test Year-1 retail unit costs, and is also summarized in the following table.

Cost Components Expense Category	Base ($)	Max Day ($)	Max Hour ($)	Meters ($)	Billing ($)	Direct Public Fire ($)
Operating	17.8534	1,259.007	793.2129	7.8565	4.3948	2,965,000
Depreciation	2.9295	287.5613	226.0026	8.8875		259,000
Rate of Return	4.5924	448.4897	373.8215	4.5181		343,000
Total Unit Cost	25.3753	1,995.0584	1,393.0370	21.2621	4.3948	3,567,000

Lines 4 and 6 present the operating expense and depreciation expense unit costs of service, and Line 8 presents the retail customers' plant investment per unit of service applicable to the relevant cost components. Lines 9 and 10 present the return on investment and unit costs for return on investment for inside City retail customers. The total retail customer unit costs of service are the sum of the test year unit costs for operating expense, depreciation expense, and return on investment. Line 11 presents total unit costs of service applicable to all inside City retail customers.

The unit cost of the Base component is applicable to all water use. The unit cost of the Maximum Day and Maximum Hour are applicable to extra capacity requirements. The unit cost of meters is applied to each equivalent meter, while the unit cost of billing is applicable to each equivalent bill issued.

Determination of Costs of Service by Customer Type: Column 2 of Table W-18 (Exhibit BV-E1) shows the test year costs of service allocated to the various customer types. The projected revenue under existing rates for each customer type is shown in Column 1.

The proposed cost of service reflects the continuation of the current practice of providing fee discounts to the following customer types:

- Currently Senior Citizens, and Charities and Schools customer types are billed at 75 percent of the general customer rate levels.
- The Philadelphia Housing Authority is billed at 95 percent of general customer rate levels.

The revenue reduction resulting from the discounts is recovered from all inside City retail customer types in order to recover the total Test Year-1 cost of service for retail customers. Key factors that influence the approach used to recover the revenue reduction due to discounts from all customer types include the following: (i) Use of this approach vetted through a history of previous rate proceedings; (ii) the Environmental Protection Agency's low income discount cost recovery guidelines for grant recipients; (iii) the administrative complexity associated with any potential changes to the Water Department's billing system; and (iv) the potential positive impact on collections due to affordable fees and charges, which then benefits all the rate payers.

Column 3 of Table W-18 presents the adjusted cost of service of the inside City customer types. This adjusted cost of service recognizes the fee reduction due to discounts and the recovery of those discounts from all customer types. A comparison of the adjusted costs of service in Column 3 with revenue under existing rates in Column 1 indicates that the percentage of revenue increase that is needed varies among the various customer types.

Q48. ONCE THE ANNUAL TEST YEAR COSTS OF SERVICE HAVE BEEN ALLOCATED TO CUSTOMER TYPES, WHAT IS THE NEXT STEP IN THE COST OF SERVICE STUDY FOR THE WATER UTILITY?

A. The final step in the Water Cost of Service analysis is the development of the cost of service water rates. Utilizing the adjusted costs of service presented in Table W-18, cost of service rates are designed which, when applied to the annual billing units for

each customer type, recovers the costs from each customer type as closely as practical to the allocated costs of service.

Application of the Lag Factor: The cost of service water rates that are designed for Test Year-1 requires the application of a "lag factor." The lag factor reflects a final adjustment to the cost of service rates to recognize the fact that there will be a proration of volume charge billings between the existing and proposed rates during the first month following the effective date of the rate increase, as well as the fact that the fiscal year billings will not be fully collected within that fiscal year. The lag factor is calculated to recover only the anticipated receipts of the prorated revenue increase projected for Fiscal Year 2017, recognizing the normally expected historical payment patterns.

Proposed Schedule of Water Rates for Test Years: Table W-19 (Exhibit BV-E1) presents the proposed water rates for general service customers. The proposed rates reflect a continuation of the existing rate structure, including a service charge which varies by meter size and a declining block volume rates. Proposed schedules of rates applicable for Test Year-1 (FY 2017) and Test Year-2 (FY 2018) are presented in Table W-19. The proposed rates designed for each fiscal year, are designed to recover the water revenue increase indicated in Table W-6, taking in to consideration the collection factor patterns as applied to billings from current and prior fiscal years.

Typical Residential Monthly Bill Impact: The typical residential customer has a 5/8 inch meter and uses approximately 6 hundred cubic feet (6 Ccf) of water per month. The impact of the combined rates for water and wastewater reflecting full cost of service for this typical residential customer in Fiscal Year 2017 results in an increase of approximately 6.2 percent increase.

Table W-20 (Exhibit BV-E1) presents the proposed rates for private fire connections and for public fire protection for Test Year-1 and Test Year-2.

Section 3b: Projection of Wastewater Utility Cost of Service Allocations

Q49. TURNING ATTENTION BACK TO THE WASTEWATER UTILITY, WHAT DID YOU DETERMINE TO BE THE OVERALL COST OF SERVICE FOR THE WASTEWATER UTILITY FOR PURPOSES OF YOUR STUDY?

A. In analyzing the costs of service of the wastewater utility for allocation to customer types, the annual revenue requirements for Fiscal Year 2017 were selected as the test year as the first rate adjustment is proposed for FY 2017. In determining costs of service to be met from charges for wastewater service, funds from other operating revenue and non-operating income applicable to the wastewater utility are deducted from total wastewater revenue requirements. In addition the transfer to the Rate Stabilization Fund is also reflected as a revenue requirement to be met from wastewater rates. The results of the FY 2017 cost of service to be recovered through charges for wastewater service are summarized in Table WW-7 (Exhibit BV-E1). In Table WW-7 the elements comprising the FY 2017 annual cost of service are assigned to the two cost categories of operating expense and capital costs.

Operating Costs: Operating expense consists of operation and maintenance expense, direct interdepartmental charges applicable to the wastewater utility, a portion of the deposit to the Rate Stabilization Fund, and a portion of the year end revenue balance which is deposited into the Residual Fund. The Operating Costs are reduced by a portion of the credit received from the water utility for the treatment of water plant sludge which is discharged to the wastewater system.

Capital Costs: Capital costs consist of debt service on existing and proposed bonds, the Capital Account Deposit, a portion of the deposit to the Rate Stabilization Fund, and a portion of the year end revenue balance which is deposited into the Residual Fund.

Further, additional credits to both operating expense and capital costs are provided from interest earnings on various funds. The total Fiscal Year 2017 test year cost of service to be recovered from wastewater service revenue, shown in Line 12 of Table WW-7, is $408,059,000.

Q50. AFTER HAVING DETERMINED THE TEST YEAR TOTAL COST OF SERVICE TO BE RECOVERED FROM RATES FOR WASTEWATER SERVICE, WHAT IS THE NEXT STEP IN THE ALLOCATION OF THESE COSTS TO THE VARIOUS CUSTOMERS TYPES SERVED BY THE UTILITY?

A. As indicated previously for the water utility, in allocating the test year cost of service, revenue requirements are apportioned among the customer types on a utility basis, that is, in terms of operating expense, depreciation expense and return on investment. The restatement of cost of service on a "utility" basis is necessary as the Water Department provides service to wholesale customers outside the City, and hence is entitled to obtaining a return on investment from those wholesale customers.

Depreciation Expense: Depreciation is the loss, not restored by current maintenance, which occurs in plant due to decay, inadequacy, and obsolescence. Depreciation

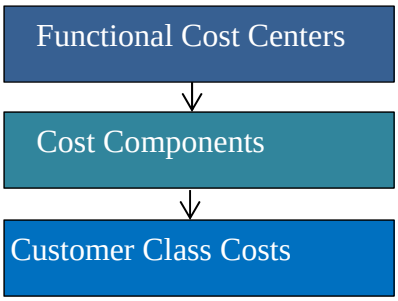
accounting is usually based on an annual percentage allowance of plant investment adequate to return the investment during the useful life of the facility. The annual depreciation allowance is not customarily accrued as a cash reserve, but is used to meet principal payments for long-term debt or is reinvested in replacements and additions to plant facilities. Unless an amount equal to annual depreciation expense is reinvested in the system or is accrued for future investment, the original investment is gradually depleted, which may be an inequitable basis for utility financing.

For purposes of determining an estimated equivalent depreciation expense on the test year plant in service, depreciation rates actually employed by the wastewater utility on various categories of plant investment were used in the rate study. The annual test year depreciation expense is estimated to total $42,642,000 for the wastewater utility. Table WH-1 (Exhibit BV-E2) presents the total wastewater utility depreciation expense for the test year.

Return on Investment: In a publicly owned utility, such as the Philadelphia wastewater system, return on investment is the balance of the total annual revenue requirements for capital costs, over and above the allowance for depreciation. The total capital cost to be met from wastewater service revenue for FY 2017, is projected to be $146,932,000, and is shown in Column 2 of Table WW-7 (Exhibit BV-E1). Deduction of the estimated wastewater utility depreciation expense of $42,642,000 from the total annual capital cost requirements for the wastewater utility of $150,507,000 (the water treatment plant sludge capital costs must initially be included in the cost of service allocations so the $3,575,000 is included here) leaves

$107,865,000 to be recovered from both inside City retail and outside City wholesale customers as return on investment on wastewater utility plant investment.

Q51. HOW ARE THE TEST YEAR OPERATING AND CAPITAL COSTS ASSIGNED OR ALLOCATED TO THE VARIOUS TYPES OF CUSTOMERS?



A. The basic underlying principle in developing cost of service rates is the determination of what causes the cost, or what elements in a wastewater system are responsible for causing the level of revenue requirements to be what they are. To allocate the costs to customer types, first the operating and capital costs are aggregated into "Functional Cost Centers" and the functional costs are then further allocated to cost components. Each component cost is then apportioned to customer types. To perform these allocations, one must have a working knowledge of the functional cost centers, the cost components, and how a wastewater system operates.

Q53. WHAT ARE THE TYPICAL FUNCTIONAL COST CENTERS FOR WASTEWATER UTILITIES?

A. Functional cost centers represent cost driver activities for the utility systems. For a wastewater utility, they often include *collection system - pipes, collection system – pumping*, *treatment*, and *customer* costs.

Q52. WOULD YOU BRIEFLY DESCRIBE HOW A WASTEWATER SYSTEM OPERATES AND SOME OF THE CONSIDERATIONS INVOLVED IN DESIGNING SUCH A SYSTEM?

A. A wastewater system includes many different facilities, each of which is designed and operated to fulfill a given function. The sewage collection system in the City of Philadelphia is comprised of both separate sanitary and storm sewers as well as combined sanitary and storm sewers which are designed to handle peak rates of sanitary and stormwater flows and to transport a large part of these flows to one of the three wastewater treatment plants for treatment prior to discharge into the rivers.

The wastewater treatment plants are comprised of many different facilities. Certain of the facilities, such as the sedimentation basins, are sized on the basis of the average annual volume of wastewater received at the plant. Other facilities, such as the aeration basins, are sized on the basis of the biochemical oxygen demand (BOD), a measurable pollutant which is contained in the influent wastewater, since these facilities are to provide the oxygen required to reduce this pollutant prior to discharge into the river. Still other facilities are sized on the basis of the amount of suspended solids, another readily measurable pollutant, contained in the influent wastewater. Certain other facilities, such as sludge disposal facilities, are designed on the basis of both BOD and suspended solids loadings.

Q54. WHAT WOULD YOU RECOGNIZE AS THE COST COMPONENTS FOR A WASTEWATER SYSTEM?

A. The total costs of wastewater service are allocated to specific cost elements recognizing the system characteristics of the utility and the parameter or parameters having the most significant influence on the magnitude of each element of cost. The cost components of a wastewater system normally include volume cost, capacity cost, strength cost and customer cost.

Volume Costs: Volume costs are operating and capital costs associated with the total volume of flow in a system. They include consideration of the volume of waste contributed directly by customers and volumes received as a result of nonpoint sources such as infiltration/inflow and stormwater flow into the system.

Capacity Costs: Capacity costs relate to the capital and operating costs associated with meeting peak flow conditions in the wastewater system.

Strength Costs: Strength costs are associated with the treatment of BOD and suspended solids loadings in the influent wastewater received at the treatment plants. BOD is a measure of the oxygen requirement for removal of a portion of the pollutant loading influent to the treatment plants, while suspended solids is a measure of the pollutants in the wastewater which can ordinarily be removed by mechanical means such as screening or sedimentation.

Customer Costs: Customer costs of a wastewater system are separated into elements related to meter reading, billing, collecting, and accounting costs related to the provision of wastewater service.

Q55. HAVE YOU PREPARED A SUMMARY OF THE TEST YEAR PLANT INVESTMENT IN WASTEWATER SYSTEM USED IN YOUR STUDY TO ALLOCATE CAPITAL COSTS TO THE VARIOUS FUNCTIONAL COST COMPONENTS?

A. Yes, Table WW-9 (Exhibit BV-E1), summarizes the test year investment in the wastewater system used in the allocation of test year capital related costs of service. The total test year investment of $2,120,961,000 is the total original cost investment in facilities which are anticipated to be in service during the test year. Contributed plant, including federal grants on the three wastewater treatment plants and miscellaneous other contributions for collection system improvements, is deducted in arriving at the plant investment for cost allocation and rate design purposes.

Q56. PLEASE EXPLAIN THE PROCEDURES USED TO ALLOCATE THE TEST YEAR PLANT INVESTMENT TO THE WASTEWATER COST COMPONENTS DISCUSSED PREVIOUSLY.

A. The Test Year (FY 2017) plant investment is allocated to the cost components using a two-step process.

- First, a portion of the water system plant investment costs are allocated to wholesale water contract customers.
- Then the retail portion of the total plant investment costs (which is the total plant investment less the proportionate share allocated to wholesale contract customers), are allocated to the cost components.

Wholesale Contract Plant Investment Allocation: The Water Department provides wholesale wastewater service to ten (10) suburban customers on a contractual basis. The City is obligated to provide capacity in various wastewater system facilities to accept and treat wastewater from wholesale contract customers up to the rates of flow and strength units of service specified in contracts between the City and the respective customers. The various contracts typically provide for maximum short-term flow rates expressed in cubic feet per second (cfs), maximum average daily flow rates expressed in million gallons per day (mgd), and maximum annual suspended solids and BOD loadings expressed in pounds. This obligation must be recognized in the allocation of plant investment and operating expenses which are primarily related to capacity installed to meet contract requirements. Therefore, contract wholesale customer allocations are based upon the relationship of the contract service requirements to the total installed capacity of the respective facilities. Only plant investment associated with facilities used directly by a customer are allocated to that customer.

Table WH-3 (Exhibit BV-E2) summarizes the units of service applicable to contract customers used in the cost of service analysis. The bottom portion of Table WH-3, entitled "Contract Maximum Units," is based upon the contractual rate of flow for each customer, including an allowance for infiltration/inflow downstream from the delivery point into the City's wastewater system. Contract maximum units for suspended solids and BOD are based upon the contractual strength loadings for those customers which have such provisions in their contracts or the estimated measured strength for each customer as applied to their contract maximum daily flow rate in

mgd for those customers which do not have specific loadings in their contracts. Contract maximum units are used in the allocation of capital investment related costs to the contract customers.

Each contract wholesale customer is allocated a share of wastewater system investment in the wastewater collection system (mains, pumping, and long term control plan) and treatment facilities serving them. The plant investment costs are allocated to the wholesale customers based on the proportionate share of their contract capacity in the various facilities relative to the total design capacity of the various facilities. Tables WH-6 to WH-16 (Exhibit BV-E2) present the allocation of plant investment allocation for each wholesale customer. Column 2 of Table WW-9 summarizes the plant investment allocated to the contract wholesale customers.

Allocation of Retail Plant Investment to Cost Components: After deducting the investment directly allocable to wholesale wastewater customers, the balance of the investment assignable to the retail customers of the wastewater system is allocated as follows:

- ***Wastewater Collection System - Sewers*:** The investment in the wastewater collection system sewers is shown on Line 1 of Table WW-9. These facilities are designed to carry maximum rates of wastewater flows and are allocated 100 percent to the capacity cost component.

  The test year retail customer plant investment associated with the collection system has been separated between sanitary sewer related costs and

stormwater related costs. An analysis of the collection system serving retail customers, including sewers carrying combined sanitary and stormwater flows and sewers carrying the respective flows in separate sewers, indicates that approximately 30 percent of the capacity of the system is for conveyance of sanitary flows and 70 percent is for stormwater drainage. This analysis is based upon the inch (diameter) times the number of feet or the sewer system as a surrogate basis of assigning capacity responsibility, and has been used in previous cost of service studies. In discussing this allocation further with Water Department staff, it was indicated that often with the construction of separate sewers, the sanitary sewer is buried deeper and a storm sewer is placed in the same trench above the sanitary sewer. Since this construction utilizes the same trench for both sewers, the overall cost of construction is reduced. In reviewing the allocation of the cost of separate sanitary and storm sewers and the construction technique of utilizing the same trench, the allocation of the investment of separate sewers has been revised to 64 percent for the stormwater function and 36 percent for the sanitary wastewater function for purposes of the current cost of service study and beyond.

- ***Wastewater Collection System – Pumping***: The investment in the pumping stations located on the collection system is shown in Line 2 of Table WW-9. These facilities are designed to meet maximum rates of wastewater flows and are allocated 100 percent to the capacity cost component.
- ***Wastewater Collection System – Long Term Control Plan:*** The investment in the green infrastructure associated with the Long Term Control Plan for the

wastewater collection system sewers is shown in Line 3 of Table WW-9. These facilities are designed to reduce the maximum rates of wastewater flows and are allocated 100 percent to the capacity cost component.

- ***Wastewater Treatment:*** The various functional elements of the water pollution control plants are designed on the basis of different parameters, and the respective investment for each element is allocated accordingly. The allocation of the plant investment for each of the wastewater pollution control plants is presented in Tables WW-9B, WW-9C and WW-9D and is summarized in Lines 5 to 21 on Table WW-9.

  Volume: Water pollution control plant facilities such as flocculation, sedimentation basins, and recirculation pumping, are designed largely on the basis of total average flow projected for the plant. Therefore, related investment, which varies according to the size or capacity of such facilities, is allocated to the volume cost component.

  Capacity: The investment in facilities such as raw wastewater pumps, preliminary treatment, chlorine contact basins, wastewater conduits, and outfall lines varies according to maximum, or peak, wastewater flow rates, and is allocated to the capacity functional cost component.

  The raw wastewater pumping facilities at the Southwest plant are not used by the wholesale contract customers whose flow is tributary to the plant. Consequently, the investment in raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Strength (BOD and Suspended Solids): Aeration basins and oxygen, or air supply, facilities are designed principally on the basis of BOD, and the related investment is assigned to the BOD functional cost component.

The investment in sludge conditioning and disposal facilities depends upon both the suspended solids and BOD parameters, and is allocated to those two components of cost. The design of facilities handling only sludge from the primary sedimentation basins, such as the primary sludge pumps and scum disposal facilities, reflects the suspended solids content of the raw wastewater, and the related investment is therefore allocated to that cost component. The investment in facilities handling waste activated sludge, such as waste activated sludge thickeners, is allocated 50 percent to the suspended solids and 50 percent to the BOD functional cost components based upon the design loadings and degree of treatment provided.

Likewise, the investment in certain other facilities handling both primary and waste activated sludge, such as digesters and sludge dewatering and composting facilities, is allocated to the suspended solids functional cost component and to the BOD functional cost component. The percentage allocation to these cost components is derived from an analysis of the relative quantities of sludge from the two sources, and reflects the relative difficulty of treating waste activated sludge as compared with primary sludge. The resulting allocation percentages are 75 percent to the suspended solids functional cost component and 25 percent to the BOD functional cost component. The investment in the sludge force main at the Southeast plant is

allocated 75 percent to suspended solids and 25 percent to BOD functional cost components, based on design flows.

The raw wastewater pumping facilities at the Southwest plant are not used by the wholesale contract customers whose flow is tributary to the plant. Consequently, the investment in raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Certain of the treatment and sludge related facilities located at or near the Southwest treatment plant, such as the digesters and the sludge processing and distribution facilities, are designed to also provide treatment and disposal of sludge from the Southeast treatment plant, and to provide disposal of sludge from the Northeast treatment plant. To properly recognize cost responsibility for these joint use facilities, a portion of the investment in both existing and expanded plant joint use facilities is allocated to the Southeast and Northeast plants.

- ***General Plant and Equipment:*** Other general plant and equipment includes investment allocable to all of the above, and is allocated to cost components in proportion to the total of the preceding items of the direct plant investment allocation to those cost components.

Q57. HAVE YOU PREPARED A SUMMARY OF THE TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE PROVISION OF WASTEWATER SERVICE TO THE VARIOUS WASTEWATER COST COMPONENTS IN YOUR STUDY?

A. Yes, the projected operation and maintenance expense for the test year (FY 2017) is $279,084,000. This expense is allocated to cost components as shown in Table WW-10 (Exhibit BV-E1). Operation and Maintenance expense is allocated to wastewater cost components generally in the same manner as plant investment.

The Test Year (FY 2017) operation and maintenance is allocated to the cost components using a two-step process.

- First, a portion of the operation and maintenance costs are allocated to wholesale contract customers.
- Then the retail portion of the total operation and maintenance expense (which is the total operation and maintenance expense less the proportionate share allocated to wholesale contract customers), are allocated to the cost components.

Wholesale Contract Operation and Maintenance Expense Allocation: The Water Department provides wholesale wastewater service to ten (10) suburban customers on a contractual basis. Operation and maintenance expenses are allocated to contract wholesale customers in the following manner:

- ***Wastewater Treatment:*** The allocations of Wastewater Treatment related operation and maintenance expenses recognize the contract capacities and the projected wastewater volumes and annual strength (BOD and suspended solids) loadings contributed by each contract customer relative to the annual treatment volumes and strength loadings and maximum day demand of the facilities system. Only costs associated with facilities used directly by a customer are allocated to that customer.

Table WH-3 (Exhibit BV-E2) summarizes the units of service applicable to contract customers used in the cost of service analysis. The top portion of the table, entitled "FY 2017 Test Year," indicates the projected volume and strength units anticipated to be contributed by the contract customers during the test year of the study period. These units are based on the historical measured annual volume, suspended solids, and BOD loadings for these customers and are used in the allocation of test year operation and maintenance expense to the contract customers.

- ***Wastewater Collection System - Sewers:*** Total projected sewage system maintenance expense in the test year is approximately 4.0 percent of the total estimated test year collection system investment. Contract service customers are allocated sewer maintenance expense on the basis of 4.0 percent of their respective allocated investment in the collection system.
- ***Wastewater Collection System – Long Term Control Plan:*** Contract service customers are allocated a share of the long term control plan operating and maintenance expenses in accordance with their contractual agreements. In lieu of recovering the annual Stormwater Management Incentives Program (SMIP) and Green Acre Retrofit Program (GARP) operating and maintenance costs in the year the expenses are incurred, the costs are allocated based on the amortization of the costs upon the project completion.
- ***Customer:*** Customer costs allocated to the contract service customers reflect estimates of costs of billing for wastewater service, including allowances for flow and strength monitoring, bill preparation, and calibration of the flow meters.

Tables WH-18 to WH-28 (Exhibit BV-E2) present the operation and maintenance cost allocation for each wholesale customer. Column 2 of Table WW-10 summarizes the total operation and maintenance expenses allocated to the contract wholesale customers.

Allocation of Retail Operation and Maintenance Costs to Cost Components: After deducting the operation and maintenance costs directly allocable to wholesale wastewater customers, the balance of the operation and maintenance expense is assignable to the retail customers of the wastewater system is allocated as follows:

- ***Wastewater Collection System - Sewers*:** The operation and maintenance costs of the wastewater collection system sewers are shown on Line 1 of Table WW-10. These facilities are designed to carry maximum rates of wastewater flows and are allocated 100 percent to the capacity cost component.

  The test year retail customer operating and maintenance expense associated with the collection system has been separated between sanitary sewer related costs and stormwater. An analysis was performed to analyze the system-wide ratio of peak wet weather flows to peak dry weather flows. The peak flow ratio analysis was performed using flow data obtained from the Water Department's Long Term Control Plan Update, the Monthly Managers Report, and other metered volume data. The purpose of this analysis was to identify a better metric for allocating the cost of sewer maintenance between the sanitary wastewater function and the stormwater function. The rationale for this allocation methodology would be that maintenance would be proportional to the quantity of flow. On the basis of this

analysis, the sewer maintenance expense is estimated for purposes of this study and beyond to be allocable 60 percent to stormwater and 40 percent to sanitary wastewater.

- ***Wastewater Collection System – Inlet Cleaning:*** The inlet cleaning related operation and maintenance expenses are shown on Line 2 of Table WW-10. These expenses are allocated 100 percent to the stormwater related capacity cost component.

- ***Wastewater Collection System – Pumping***: The power costs of the pumping stations located in the collection system, shown on Lines 3, 5, and 7 of Table WW-10A, are allocated 85% to the volume cost component and 15% to the capacity cost component. The other operation and maintenance expense of the pumping stations located in the collection system, shown on Lines 4, 6, and 8 of Table WW-10, is allocated 100 percent to the capacity cost component.

- ***Wastewater Treatment:*** The various functional elements of the water pollution control plants are designed on the basis of different parameters, and the respective operation and maintenance expenses of each element is allocated accordingly. The allocation of the operation and maintenance expense for each of the wastewater pollution control plants is presented in Tables WW-10B, WW-10C and WW-10D and is summarized in Lines 10 to 28 on Table WW-10.

  Volume: Wastewater treatment related power costs are allocated 85% to the volume cost component. Water pollution control plant facilities such as flocculation, sedimentation basins, recirculation pumping and chlorination, are designed largely on the basis of total average flow projected for the plant.

Therefore, related operation and maintenance expense excluding power is allocated to the volume cost component.

Capacity: Wastewater treatment related power costs are allocated 15% to the capacity cost component. The operation and maintenance expense excluding power associated with facilities such as raw wastewater pumps, preliminary treatment, and effluent pumping varies according to maximum, or peak, wastewater flow rates, and is allocated to the capacity functional cost component.

The raw wastewater pumping facilities at the Southwest plant are not used by the wholesale contract customers whose flow is tributary to the plant. Consequently, the operation and maintenance expense of raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Strength (BOD and Suspended Solids): Aeration basins and oxygen, or air supply, facilities are designed principally on the basis of BOD, and the related operation and maintenance expense is assigned to the BOD functional cost component.

The operation and maintenance expense of sludge conditioning and disposal facilities depends upon both the suspended solids and BOD parameters, and is allocated to those two components of cost. The design of facilities handling only sludge from the primary sedimentation basins, such as the primary sludge pumps and scum disposal facilities, reflects the suspended solids content of the raw wastewater, and the related operating expense is therefore allocated to

that cost component. The operation and maintenance expense of facilities handling waste activated sludge, such as waste activated sludge thickeners, is allocated 50 percent to the suspended solids and 50 percent to the BOD functional cost components based upon the design loadings and degree of treatment provided.

Likewise, the operation and maintenance expense of certain other facilities handling both primary and waste activated sludge, such as digesters and sludge dewatering and composting facilities, is allocated to the suspended solids functional cost component and to the BOD functional cost component. The percentage allocation to these cost components is derived from an analysis of the relative quantities of sludge from the two sources, and reflects the relative difficulty of treating waste activated sludge as compared with primary sludge. The resulting allocation percentages are 75 percent to the suspended solids functional cost component and 25 percent to the BOD functional cost component. The operation and maintenance expense of the sludge force main at the Southeast plant is allocated 85 percent to suspended solids and 15 percent to BOD functional cost components, based on design flows.

The raw wastewater pumping facilities at the Southwest plant are not used by the wholesale contract customers whose flow is tributary to the plant. Consequently, the operation and maintenance expense of raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Certain of the treatment and sludge related facilities located at or near the Southwest treatment plant, such as the digesters and the sludge processing and distribution facilities, are designed to also provide treatment and disposal of sludge from the Southeast treatment plant, and to provide disposal of sludge from the Northeast treatment plant. To properly recognize cost responsibility for these joint use facilities, a portion of the operation and maintenance expense of both existing and expanded plant joint use facilities is allocated to the Southeast and Northeast plants.

- ***Customer:*** Test year customer accounting and collection is allocated 100% to the equivalent bills component of Customer costs. Meter maintenance expense is allocated 100% to the meter component of Customer costs. $2,897,000 in retail stormwater related costs are allocated 100% to Direct Stormwater costs and recovered by retail stormwater charges. The operation and maintenance costs of the Industrial Waste Unit are allocated 33% to the excess strength component and 67% to the meter component of Customer costs.

- ***Administrative and General:*** Administrative and general expense is allocated to cost components in proportion to the total allocation of all other expenses to the cost components, excluding expenses for power.

- ***Residual Fund and Rate Stabilization Fund Transfers:*** The deposit into the Residual Fund (Line 7 of Table WW-7) and the deposit from the Rate Stabilization Fund (Line 8 of Table WW-7), each of which is allocable to operation and maintenance expense, are allocated to the various cost

components in proportion to the direct operation and maintenance expense [Column 3 of Table WH-2 (Exhibit BV-E2)].

- ***Net Operating Expense:*** The net operating expense to be recovered from all customers through charges for water service is derived by deducting the "Other Operating Revenue" and the non-operating "Interest Income" from the total operating expense.
  - Other revenue is allocated to the various cost components applicable to retail customers, as shown on Column 4 of Table WW-10. Since virtually all of these revenues are generated from retail customers, no credit is applicable to wholesale service.
  - The non-operating interest income which is assigned to operation and maintenance expense (Line 11 of Table WW-7) is allocated in proportion to the distribution of the operating and maintenance expenses allocable retail service (Column 3 of Table WW-10).

The total net operation and maintenance expense to be recovered from retail water rates ($241,524,000) is shown on Line 35 in Column 5 of Table WW-10.

Q58. AFTER COSTS ARE ALLOCATED TO FUNCTIONAL COST COMPONENTS, WHAT IS THE NEXT STEP IN THE OVERALL COST OF SERVICE ANALYSIS?

A. As indicated in the response to Q51, the next step in the cost of service analysis is to distribute the retail costs of the wastewater utility to various customer types. To do this, customers with similar characteristics are grouped together into specific

customer types. For each customer type, the units of service are determined for each of the functional cost components to which the capital costs and operation and maintenance costs were allocated.

Wastewater utility customers are grouped in to two distinct categories, namely, *Inside City Retail* and *Outside City Wholesale*. The types of customers within the Inside City Retail and Outside City Wholesale categories have already been discussed in response to Q22.

The sum of the units of service for all customer types for each particular cost component is divided into the total cost allocated to that component to arrive at unit costs of service.

Q59. PLEASE EXPLAIN THE METHODOLOGY YOU USED TO DISTRIBUTE COSTS TO THE CUSTOMER TYPES SERVED BY THE WASTEWATER UTILITY.

A. As a basis for estimating the cost of providing wastewater service to each of the classifications of customers, the elements of cost of service are distributed among the customer types in proportion to their respective service requirements. Analysis of resulting costs of service to each classification provides bases for design of a schedule of wastewater rates.

The units of service requirements of each customer type provide a means of proportionate distribution of costs, previously allocated to functional cost components, to the customer types. Requirements indicative of service responsibility for distribution of various costs include the quantity of wastewater, the peak flow rate

of wastewater, the strength of wastewater, the number and size of water meters, and the number of bills rendered.

Q60. WHAT IS THE INITIAL STEP USED TO DISTRIBUTE COSTS TO THE VARIOUS CUSTOMER TYPES SERVED BY THE WASTEWATER UTILITY?

A. We begin our analysis with the development of test year units of services applicable to each customer type served by the wastewater utility. Basic customer groupings include wholesale contract customers and retail customer types.

Wholesale Contract Customers: Table WW-8 (Exhibit BV-E2), summarizes the test year units of service for volume, capacity, strength, and customer units of service for each of the customer types. The test year units of service for the contract customers are taken from Table WH-3 (Exhibit BV-E2), Lines 1 through 12. The strength units from contract customers, as measured at their point of discharge to the City sewers, are estimated for each contract customer based on projected study period flows and historical measured wastewater strength concentrations.

Retail Customers: The units of service for the retail customer types of the wastewater system are determined as follows:

- ***Volume:*** For the retail customer types the estimated sanitary wastewater quantities are obtained by applying an estimated factor of 95 percent to the projected test year water sales from each customer type as an allowance for water consumption which is not discharged into the wastewater system. The test year infiltration/inflow in the wastewater system assignable to the retail

customer types is based upon the total projected test year flow at all three treatment plants, less the estimated annual sanitary sewage contribution from the retail customers and the total annual flow projected for the contract service customers.

- ***Collection System – Capacity:*** The responsibility of retail customers for sanitary wastewater capacity flow rates in the collection system, shown in Column 2 of Table WW-8 (Exhibit BV-E1), is estimated to be approximately 4 times the average daily flow computed from the annual volumes shown in Column 1. These estimated capacity requirements reflect consideration of the average ratio of maximum to average sanitary wastewater flow rates applicable over the entire system, which, due to customer diversity and the time of concentration of peak flows, is estimated to range downward from 6 to 8 in the upper reaches of the system to 1.5 to 2 in the lower reaches.
- ***Treatment – Capacity:*** The peak sanitary wastewater flow, exclusive of infiltration/inflow, from retail customers to the treatment plants, shown in Column 3 of the table, is estimated to be 1.5 times the average of such flow. Retail customers' infiltration/inflow, which includes leakage into sewers and direct extraneous inflows, is estimated to have a peak in the collection system of 8 times the average rate of such flow, and at the water pollution control plants of 2.5 times the average flow.
- ***Strengths (BOD and Suspended Solids):*** The estimated strength units for each customer type are shown in Columns 4 and 5 of Table WW-8 (Exhibit BV-E1). Based upon an analysis of historical data, the wastewater reaching

the water pollution control plants is estimated to have a weighted average suspended solids concentration of approximately 184 milligrams per liter (mg/l), and a weighted average BOD concentration of approximately 125 mg/l. These weighted averages are based on estimated influent concentrations at the three treatment plants.

The estimates of strength units for customers with excess strength wastewater are based upon an analysis of surcharge bills.

The estimated strength allowances for pollutants in infiltration/inflow are based upon judgment considering the very limited pertinent information available. Infiltration/ inflow is assumed to have a suspended solids and BOD concentration of 70mg/l and 10mg/l, respectively.

Additional wastewater strength loadings at the treatment plants are attributable to water plant sludge from the Belmont and Queen Lane treatment plants. An estimate of the volume and pounds of sludge from the water treatment plants has been included in the units of service shown in Table WW-8 on Line 9.

The strength assigned to the retail customer sanitary wastewater accounts for the remainder of the total strength units projected to reach the plants. Resulting retail suspended solids and BOD concentrations are 300 mg/l and 280 mg/l, respectively.

- ***Customer***: Units of service applicable for the allocation of customer costs are summarized in Columns 6 to 8 of Table WW-8 (Exhibit BV-E1). The number of accounts and bills for each customer type and meter size are derived from billing information prepared by the Water Department. Equivalent meters are based upon factors relating the capacity of various size meters relative to the capacity associated with a 5/8 inch meter. This capacity based equivalent meter ratio was directed to be used by the Water Commissioner in his 1991 rate decision and has approved as a part of overall cost allocation in every subsequent rate decision.

Q61. PLEASE SUMMARIZE THE TOTAL TEST YEAR COST OF SERVICE ALLOCATED TO THE CONTRACT SERVICE CUSTOMERS.

A. Table WH-29 (Exhibit BV-E2) summarizes the test year cost of service allocated to the contract service customers. The total allocated plant investment, depreciable investment, depreciation expense, return on rate base, and operation and maintenance expense for the contract service customers are presented in Table WH-29. The total cost of service allocable to contract service customers' amounts to $32,663,989. This amount includes a return on investment requirement of $4,054,000, which is determined based on a 7.50 percent rate of return on allocated investment.

It should be noted, that six of the contract service customers have made front-end capital contributions related to the investment in plant which provides them service. These customers include Bensalem, Bucks County, DELCORA, Lower Merion, Lower Southampton, and Upper Darby. It is anticipated that Bensalem, Lower

Merion and Upper Darby will make additional upfront annual capital contributions in the future associated with applicable plant improvements. Therefore, there is no cost of service allocation of depreciation or return on rate based for these four customers. Although Bucks County, DELCORA, and Lower Southampton were initially capital contribution based customers their current contracts recognizes the utility basis for the recovery of allocated capital investment.

Bucks County: Bucks County's current contract provides for recovery of depreciation and return on their allocated share pf plant investment put into service after June 30, 2007.

DELCORA: DELCORA's current contract provides for recovery of depreciation and return on their allocated share pf plant investment put into service after July 1, 2011.

Lower Southampton: Lower Southampton's current contract transitions the township from a capital contribution basis to the utility basis over 18 years starting in Fiscal Year 2007. In Test Year 2017 Lower Southampton is allocated 11/18 of their allocable share of return on investment and depreciation. In Test Year 2018 Lower Southampton is allocated 12/18 of their allocable share of return on investment and depreciation.

The allocation of return on investment and depreciation presented in Table WH-29 reflects the terms of the current contracts for these customers.

The depreciation expense presented in Column 4 of Table WH-29 is based upon 2 percent of the depreciable investment in the collection system and 2.5 percent of the depreciable investment in treatment and pumping facilities.

Q62. PLEASE EXPLAIN THE METHODOLOGY USED TO DISTRIBUTE COSTS TO THE RETAIL CUSTOMER TYPES.

A. The *retail* cost of service is allocated to the various retail customer groups through a two-step process:

- ***Step 1:*** First, the *retail unit costs* of service, for each expense category (*Operating*; *Depreciation*; and *Return on Investment*) and for each cost component [Sewer Capacity, Pumping (Volume and Capacity), Treatment (Volume, Capacity, BOD, and Suspended Solids), Meters, and Bills]. is determined. The unit cost is derived by dividing the total cost allocated to each expense category and cost component by the total applicable units of service.
- ***Step 2:*** The retail customer type responsibility for service is then obtained by applying unit costs of service to the number of units for which each customer type is responsible.

Determination of Retail Unit Costs: The development of retail unit costs involves the following two sub-tasks:

- ***Estimate of the Inside City Rate of Return:*** The capital cost revenue requirement of the system less depreciation is considered the equivalent of return on investment. The system return on investment is recovered from both *Inside City*

Retail and *Outside City Wholesale customers.* The *Inside City Retail* rate of return requirement is calculated as follows:

- As previously discussed in Q50, the total return on investment in the system required in the test year amounts to $107,865,000. This return when applied to the test year system plant investment of $2,120,961,000, results in an overall system rate of return requirement of 5.10 percent.
- As previously discussed in Q61, for purposes of this study, a return on investment of $4,054,000 has been allocated to the wholesale customers.
- The wholesale customer's return on investment of $4,054,000 and the estimated test year management fee revenue of $3,561,000 is deducted from the total system return on investment of $107,865,000, to allocate the Inside City's return on investment of $100,250,000, as presented in Table WW-11 (Line 11, Column 1). Based on this allocation, the Inside City rate of return on plant investment is estimated to be 5.16%.

- ***Calculate the Retail unit costs of service:*** Tables WW-11 and WW-12 (Exhibit BV-E1) present the Test Year-1 retail unit costs of service. Lines 3 and 10 present the operating expense and depreciation expense unit costs of service, and Line 6 presents the retail customers' plant investment per unit of service applicable to the relevant cost components. Line12 presents the return on investment for inside City retail customers. The total retail customer unit costs of service are the sum of the test year unit costs for operating expense, depreciation expense, and return on investment. Line 14 presents total unit costs of service applicable to all inside City retail customers.

The unit cost of the Volume component is applicable to retail customer contributed wastewater volumes. The unit cost of the Pumping Capacity, Sanitary Sewer Capacity and Treatment Capacity are applicable to the corresponding capacity requirements. The unit costs of the strength components are applied to the respective strength loadings. The unit cost of meters is applied to each equivalent meter, while the unit cost of billing is applicable to each equivalent bill issued.

Determination of Costs of Service by Customer Type: Table WW-13 (Exhibit BV-E1) presents the test year costs of service allocated to the various customer types. The cost of service by cost component is developed by multiplying the unit cost for each component (Line 14 of Tables 11 and 12) by the corresponding units of service for each customer type (Table WW-8).

Costs of service for stormwater drainage are not related to the sanitary wastewater service requirements. The most appropriate theoretical measure of stormwater runoff responsibility by respective customer types would be one which includes consideration of (1) the overall area of customer properties, and (2) stormwater runoff potential, the latter factor reflecting the relative slopes and physical characteristics of the properties, including the impervious area of the property. Stormwater cost allocation is more fully addressed in the Supplemental Direct Testimony of Black & Veatch (Testimony BV-T2) and the associated Exhibit BV-E3, as well as in the Direct Testimony of Joanne Dahme and Erin Williams.

Table WW-14 (Exhibit BV-E1) presents the allocated test year costs of service for each customer types and presents cost of service adjustments for the allocation of system inflow and infiltration costs and fee discounts.

- Infiltration/Inflow: The cost of service allocable to infiltration/inflow must be distributed among the retail service customer types. As in the case of the allocation of stormwater costs, the relative customer type responsibility for infiltration/inflow cost is not exactly determinable, nor can it be directly related to the parameters of sanitary wastewater service.

  In general, infiltration/inflow due to leakage in lateral sewers of individual residences would be expected to be less than in the services of individual large commercial or industrial establishments. The greater length, due to larger lot frontage, and greater size of main sewer required for the larger customers would also contribute to potential increased infiltration/inflow with the size of customer. The number of equivalent meters of each customer type, discussed previously in this report, provides a reasonable means of recognizing both numbers and relative sizes of customers and provides a measure of customer type responsibility for infiltration/inflow cost.

  Columns 3 and 4 of Table WW-14 reflect the redistribution of the cost of infiltration/inflow to the other customer types based upon equivalent meters and volume. In accordance with the rate proceeding decisions issued in 1993, 2001, and 2004, the rate design for the current study reflects a 30 percent recovery of infiltration/inflow costs through the service charge and 70 percent through the volume charge.

- Fee Discounts: The proposed cost of service reflects the continuation of the current practice of providing fee discounts to the following customer types:

- Currently Senior Citizens, and Charities and Schools customer types are billed at 75 percent of the general customer rate levels.
- The Philadelphia Housing Authority is billed at 95 percent of general customer rate levels.

The revenue reduction resulting from the discounts is recovered from all inside City retail customer types in order to recover the total Test Year-1 cost of service for retail customers. Key factors that influence the approach used to recover the revenue reduction due to discounts from all customer types include the following: (i) Use of this approach vetted through a history of previous rate proceedings; (ii) the Environmental Protection Agency's low income discount cost recovery guidelines for grant recipients; (iii) the administrative complexity associated with any potential changes to the Water Department's billing system; and (iv) the potential positive impact on collections due to affordable fees and charges, which then benefits all the rate payers.

Column 9 of Table WW-14 presents the adjusted cost of service of the inside City customer types. This adjusted cost of service recognizes the fee reduction due to discounts and the recovery of those discounts from all customer types.

Section 4: Projection of Cost of Service Water, Sewer, and Stormwater Rates

Q63. IN YOUR PREVIOUS ANSWERS REGARDING THE VARIOUS STEPS REQUIRED IN UNDERTAKING THIS RATE STUDY, YOU HAVE COVERED EVERYTHING UP TO THE LAST STEP, THE DESIGN OF RATES WHICH WILL RECOVER THE TEST YEAR COST OF SERVICE FROM THE VARIOUS

RETAIL CUSTOMER TYPES ON AN EQUITABLE BASIS. WOULD YOU BRIEFLY DISCUSS THIS LAST STEP?

A. Yes. The design of the cost of service rates for the water utility was already discussed in Q48 in Section 3. Therefore this section only addresses the cost of service rate design for the wastewater utility. The proposed charges for wastewater service to wholesale and retail service customers are based on the cost of service analyses discussed in Section 3.

A key consideration in designing a schedule of rates and charges is to develop charges to customers, commensurate with the cost of providing that service. Since it is not practical to set rates specific to each individual customer in a system with over thousands of customers, rates are normally designed to fit average conditions for groups of customers having similar service requirements. Another key practical consideration is that rate schedules be relatively simple and easy to understand so as to minimize any misinterpretations.

Wholesale Wastewater Charges: The proposed charges for wholesale customers are shown in Tables WH-30 and WH-31of Exhibit BV-E2. These charges consist of unit charges for operation and maintenance expenses and annual lump sum charges to recover the fixed costs of maintenance of the collection system, customer costs, and capital costs for those customers which pay annual depreciation and return charges.

The rates applicable to Test Year-1 (FY 2017) and Test Year-2 (FY 2018) are shown in Table WH-30 and Table WH-31, respectively. The proposed charges for Fiscal Year 2018 recognizes the projected level of inflation in operation and maintenance expenses for that year.

Retail Sewer Charges for General Service: The proposed charges for sewer service to retail service customers are presented in Table WW-18 (Exhibit BV-E1). The proposed sewer rates reflect a continuation of the existing sewer rate structure, which includes a service charge which varies by meter size and a uniform volume charge applicable to billable water usage. Proposed schedules of retail sewer rates applicable to Test Year-1 (FY 2017) and Test Year-2 (FY 2018) are presented in Table WW-18. The proposed rates for each fiscal year are designed to recover the cost of service allocations and the overall increases in wastewater revenues indicated in Table WW-6, taking in to consideration the collection factor patterns as applied to billings from the current and two prior fiscal years.

Retail Sewer Surcharges: Table WW-18 (Exhibit BV-E1) also presents the proposed surcharges applicable for retail sanitary sewer customers with high suspended solids and/or high BOD strength loadings.

Retail Stormwater Charges: The retail stormwater charges are designed for the Residential and Non-residential customer.

- *Residential Stormwater Charges:* The Water Department proposes to retain the current residential rate structure which consists of a uniform monthly GA and IA charge per parcel, and a monthly billing and collection charge per residential account. The Test Year-1 (FY 2017) uniform monthly GA & IA charge is estimated at $11.97 per month. To this GA and IA charge, a monthly billing and collection charge of $2.20 is added to derive the total residential monthly stormwater charge of $14.17 for FY 2017. Table SW-19A in Exhibit BV-E3, presents the proposed stormwater rate schedules applicable to Test Year-1 (FY 2017) and Test Year-2 (FY 2018), for the Residential class.
- *Non-Residential Stormwater Charges:* The Water Department proposes to retain the current non- residential rate structure which consists of a monthly GA and IA charge

that is individually calculated for each parcel based on the Non-Residential GA and IA rate and the parcel's specific billable GA and IA square footage, and a monthly billing and collection charge per non-residential account. Table SW-19B in Exhibit BV-E3 presents the proposed stormwater rate schedules applicable to Test Year-1 (FY 2017) and Test Year-2 (FY 2018), for the Non-residential class.

Q64. IN DESIGNING THE COST OF SERVICE RATE SCHEDULE SHOWN IN TABLE WW-18, IN EXHIBIT BV-1, WERE THERE OTHER FACTORS, IN ADDITION TO THE UNIT COSTS OF SERVICE RESULTING FROM THE COST OF SERVICE ANALYSES, WHICH HAD TO BE CONSIDERED?

A. Yes. The proposed charges for water service shown in Table W-19 and wastewater service shown in Table WW-18 applicable to general service retail customers recognize that certain retail customer types, including senior citizens, charities and schools, which receive a 25 percent discount, and the Philadelphia Housing Authority, which receives a 5 percent discount, are provided service on a discounted basis. It is anticipated that during Test Year-1 (FY 2017) and Test Year-2 (FY 2018) for the proposed rates, the existing discounts for these customers will continue to be applicable.

In designing the proposed rates, the retail water, sanitary sewer, and stormwater costs of service determined for each customer type, is adjusted to reflect the fact that these named customer types will not pay full cost of service. Accordingly, the proposed retail water, sewer, and stormwater rates are increased to recover this cost of service revenue reduction due to discounts.

In addition, in the case of the non-residential stormwater class, their stormwater rates are not only adjusted for discounts but also to recover the reduction in revenue due to

the existing stormwater CAP. For additional details on this adjustment, please refer to BV-T2, the "*Supplemental Direct Testimony of Black & Veatch.*"

Q65. BASED UPON THE PROPOSED SCHEDULES OF RETAIL WASTEWATER RATES, WHAT IS THE INCREASE TO THE AVERAGE RESIDENTIAL CUSTOMER'S COMBINED WATER AND WASTEWATER BILL RELATIVE TO THE BILL UNDER EXISTING RATES?

A. Table C-4, in Exhibit BV-1, presents a series of typical or representative combined residential water, sanitary sewer, and stormwater monthly bills under existing and proposed rates for Test Year-1 (FY 2017) and Test Year-2 (FY 2018) for the 5/8 inch meter size. In the City of Philadelphia, the average residential customer has a 5/8 inch meter and uses about 7.24 Mcf (thousand cubic feet) annually (approximately 600 cubic feet monthly). Under the proposed schedules of water and wastewater rates for Test Year-1 (FY 2017), this customer's monthly bill would increase from $67.43 to $71.59, an increase of $4.16 or about 6.2 percent and in Fiscal Year 2018 the bill would increase to $75.51, an increase of $3.91, or about 5.5 percent.

Q66. DOES THIS COMPLETE YOUR DIRECT TESTIMONY IN THIS MATTER?

A. Yes, it does.

PUBLIC HEARING ON PROPOSED WATER AND WASTEWATER RATES 2015

WATER DEPARTMENT PHILADELPHIA, PENNSYLVANIA

EXHIBIT BV-E1

DECEMBER 2015

BLACK & VEATCH
building a world of difference™

Exhibit REF #		Exhibit Name
BV-E1	**Black & Veatch Exhibits**	
1	**TABLE C-1**	COMBINED UTILITY: PROJECTED REVENUE AND REVENUE REQUIREMENTS
2	**TABLE C-2**	COMBINED UTILITY: PROJECTED RATE STABILIZATION FUND AND COVENANTS METRICS PERFORMANCE
3	**TABLE C-3**	COMBINED UTILITY: PROJECTED RECEIPTS UNDER EXISTING RATES
4	**TABLE C-4**	COMBINED UTILITY: COMPARISON OF TYPICAL BILL FOR RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES
5	**TABLE C-5**	COMBINED UTILITY: COMPARISON OF EXAMPLE BILL FOR NON-RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES
6	**TABLE W-1**	WATER: PROJECTED RECEIPTS UNDER EXISTING RATES
7	**TABLE W-1A**	WATER: OTHER REVENUE PROJECTED RECEIPTS
8	**TABLE W-2**	WATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
9	**TABLE W-3**	WATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
10	**TABLE W-4**	WATER: PROJECTED FLOW OF FUNDS - CAPITAL IMPROVEMENTS FUND
11	**TABLE W-5**	WATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
12	**TABLE W-6**	WATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS
13	**TABLE W-7**	WATER: ESTIMATED TEST YEAR COST OF SERVICE
14	**TABLE W-8**	WATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT TO FUNCTIONAL COST COMPONENTS
15	**TABLE W-9**	WATER: ALLOCATION OF TEST YEAR PLANT DEPRECIATION EXPENSE
16	**TABLE W-10**	WATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE
17	**TABLE W-11**	WATER: ESTIMATED RETAIL UNITS OF SERVICE

Exhibit REF #		Exhibit Name
BV-E1	Black & Veatch Exhibits	
18	TABLE W-12	WATER: EQUIVALENT METER, BILL AND SERVICE RATIOS
19	TABLE W-13	WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES TEST YEAR 2017
20	TABLE W-14	WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES FY 2018
21	TABLE W-15	WATER: TEST YEAR RETAIL UNIT COSTS OF SERVICE
22	TABLE W-16	WATER: TEST YEAR COST OF SERVICE BY FUNCTIONAL COST COMPONENTS
23	TABLE W-17	WATER: TEST YEAR ADJUSTED COST OF SERVICE
24	TABLE W-18	WATER: COMPARISON OF TEST YEAR COSTS OF SERVICE AND ADJUSTED COST OF SERVICE WITH REVENUES UNDER EXISTING RATES
25	TABLE W-19	WATER: PROPOSED RATES FOR GENERAL SERVICE
26	TABLE W-20	WATER: PROPOSED RATES FOR FIRE PROTECTION
27	TABLE W-20A	WATER: PROPOSED RATES FOR FIRE PROTECTION RESIDENTIAL PRIVATE FIRE PROTECTION
27	TABLE WW-1	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING RATES
28	TABLE WW-1A	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING SANITARY RATES
29	TABLE WW-1B	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING STORMWATER RATES
30	TABLE WW-1C	WASTEWATER: OTHER REVENUE PROJECTED RECEIPTS
30	TABLE WW-2	WASTEWATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
31	TABLE WW-3	WASTEWATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
32	TABLE WW-4	WASTEWATER: PROJECTED FLOW OF FUNDS - CAPITAL IMPROVEMENTS FUND
33	TABLE WW-5	WASTEWATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE

Exhibit REF #		Exhibit Name
BV-E1	Black & Veatch Exhibits	
34	TABLE WW-6	WASTEWATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS
35	TABLE WW-7	WASTEWATER: ESTIMATED TEST YEAR COST OF SERVICE
36	TABLE WW-8	WASTEWATER: TEST YEAR UNITS OF WASTEWATER SERVICE BY CUSTOMER TYPE
37	TABLE WW-9	WASTEWATER: TEST YEAR INVESTMENT SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS
38	TABLE WW-9A	WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE NORTHEAST WATER POLLUTION CONTROL PLANT
39	TABLE WW-9B	WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE SOUTHWEST WATER POLLUTION CONTROL PLANT
40	TABLE WW-9C	WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE SOUTHEAST WATER POLLUTION CONTROL PLANT
41	TABLE WW-10	WASTEWATER: RETAIL OPERATION AND MAINTENANCE EXPENSE SUMMARY OF ALLOCATIONS TO FUNCTION COST COMPONENTS
42	TABLE WW-10A	WASTEWATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE COLLECTION SYSTEM
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45	TABLE WW-10D	WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHEAST WPC PLANT
46	TABLE WW-11	WASTEWATER: RETAIL UNIT COSTS OF SERVICE (FY 2017) - (Part I)
47	TABLE WW-12	WASTEWATER: RETAIL UNIT COSTS OF SERVICE (FY 2017) - (Part 2)
48	TABLE WW-13	WASTEWATER: RETAIL COST OF SERVICE
49	TABLE WW-14	WASTEWATER: ADJUSTED COST OF SERVICE (AFTER ALLOCATION OF I/I AND DISCOUNTS)

Exhibit REF #		Exhibit Name
BV-E1	**Black & Veatch Exhibits**	
50	**TABLE WW-15**	WASTEWATER: RETAIL SERVICE UNIT COSTS OF SERVICE FOR RATE DESIGN
51	**TABLE WW-16**	WASTEWATER: DEVELOPMENT OF COST OF SERVICE MONTHLY SERVICE CHARGE FOR CUSTOMERS WITH 5/8-INCH METERS
52	**TABLE WW-17**	WASTEWATER: DEVELOPMENT OF COST OF SERVICE VOLUME CHARGE PER MCF OF NORMAL STRENGTH SANITARY WASTEWATER
53	**TABLE WW-18**	WASTEWATER: PROPOSED WASTEWATER RATES FOR GENERAL SERVICE SANITARY SEWER

TABLE C-1

COMBINED UTILITY: PROJECTED REVENUE AND REVENUE REQUIREMENTS
(in thousands of dollars)

Line No.	Description			Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	OPERATING REVENUE									
1	Water Service - Existing Rates			258,012	255,999	254,550	252,888	251,468	250,283	249,096
2	Wastewater Service - Existing Rates			390,651	388,102	386,091	383,669	381,385	379,270	377,144
3	Total Service Revenue - Existing Rates			648,663	644,101	640,641	636,557	632,853	629,553	626,240
	Additional Service Revenue Required									
	Year	Percent Increase	Months Effective							
4	FY 2016	0.00%	12		0	0	0	0	0	0
5	FY 2017	5.42%	12			34,735	34,514	34,312	34,133	33,952
6	FY 2018	5.42%	12				36,392	36,180	35,991	35,800
7	FY 2019	4.73%	12					33,247	33,072	32,896
8	FY 2020	4.73%	12						34,659	34,475
9	FY 2021	5.56%	12							42,451
10	Total Additional Service Revenue Required			0	0	34,735	70,906	103,740	137,854	179,574
11	Total Water & Wastewater Service Revenue			648,663	644,101	675,376	707,463	736,593	767,407	805,815
	Other Income (a)									
12	Other Operating Revenue			27,068	22,874	22,293	6,133	24,160	4,531	3,682
13	Debt Reserve Fund Interest Income			0	0	0	0	0	0	0
14	Operating Fund Interest Income			374	280	310	286	398	380	390
15	Rate Stabilization Interest Income			704	676	575	470	422	444	442
16	Total Revenues			676,809	667,931	698,553	714,352	761,572	772,763	810,329
	OPERATING EXPENSES									
17	Water & Wastewater Operations			(251,514)	(266,640)	(285,741)	(293,383)	(298,158)	(306,415)	(314,524)
18	Direct Interdepartmental Charges			(151,394)	(164,433)	(172,430)	(178,074)	(185,164)	(189,867)	(195,930)
19	Total Operating Expenses			(402,908)	(431,074)	(458,171)	(471,457)	(483,322)	(496,282)	(510,454)
20	Transfer From/(To) Rate Stabilization Fund			(21,410)	36,900	19,300	39,000	(12,300)	(100)	1,200
21	**NET REVENUES AFTER OPERATIONS**			252,491	273,757	259,683	281,895	265,950	276,381	301,075
	DEBT SERVICE									
	Senior Debt Service									
	Revenue Bonds									
22	Outstanding Bonds			(192,927)	(198,602)	(181,580)	(182,769)	(133,274)	(122,358)	(122,545)
23	Pennvest Parity Bonds			(12,343)	(12,343)	(12,343)	(12,927)	(13,120)	(13,074)	(13,074)
24	Projected Future Bonds			0	(9,769)	(13,791)	(27,966)	(50,525)	(69,262)	(87,329)
25	Total Senior Debt Service			(205,270)	(220,713)	(207,715)	(223,661)	(196,920)	(204,693)	(222,948)
26	**TOTAL SENIOR DEBT SERVICE COVERAGE (L2**			1.23 x	1.24 x	1.25 x	1.26 x	1.35 x	1.35 x	1.35 x
27	Subordinate Debt Service			0	0	0	0	0	0	0
28	Total Debt Service on Bonds			(205,270)	(220,713)	(207,715)	(223,661)	(196,920)	(204,693)	(222,948)
29	**CAPITAL ACCOUNT DEPOSIT**			(20,697)	(21,215)	(21,745)	(22,289)	(22,846)	(23,417)	(24,003)
30	**TOTAL COVERAGE (L21/(L28+L29))**			1.11 x	1.13 x	1.13 x	1.14 x	1.21 x	1.21 x	1.21 x
	RESIDUAL FUND									
31	Beginning of Year Balance			25,275	15,172	15,255	15,132	15,232	15,170	15,194
32	Interest Income			73	55	55	55	55	55	55
	Plus:									
33	End of Year Revenue Fund Balance			26,524	31,829	30,223	35,945	46,184	48,270	54,124
34	Deposit for Transfer to City General Fund (b)			776	789	794	799	766	764	813
	Less:									
35	Transfer to Construction Fund			(36,700)	(31,800)	(30,400)	(35,900)	(46,300)	(48,300)	(54,200)
36	Transfer to City General Fund			(776)	(789)	(794)	(799)	(766)	(764)	(813)
37	Transfer to Debt Service Reserve Fund			0	0	0	0	0	0	0
38	End of Year Balance			15,172	15,255	15,132	15,232	15,170	15,194	15,173
	RATE STABILIZATION FUND									
39	Beginning of Year Balance			184,796	206,206	169,306	150,006	111,006	123,306	123,406
40	Deposit From/(To) Revenue Fund			21,410	(36,900)	(19,300)	(39,000)	12,300	100	(1,200)
41	End of Year Balance			206,206	169,306	150,006	111,006	123,306	123,406	122,206

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund. Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(b) Transfer of interest earnings from the Bond Reserve Account to the Residual Fund as shown in Line 34 to satisfy the requirements for the transfer to the City General Fund shown on Line 36.

TABLE C-2
COMBINED UTILITY: PROJECTED RATE STABILIZATION FUND AND COVENANTS METRICS PERFORMANCE

Line #	Description	2016	2017	2018	2019	2020	2021
	RATE STABILIZATION FUND	in thousand dollars (1,000 dollars)					
1	Beginning Balance: Rate Stabilization Fund	206,206	169,306	150,006	111,006	123,306	123,406
2	Transfers **From (To)** Revenue Fund (a)	(36,900)	(19,300)	(39,000)	12,300	100	(1,200)
3	Year-End Rate Stabilization Fund Balance (Line 1 + Line 2)	169,306	150,006	111,006	123,306	123,406	122,206
1989 General Ordinance Covenants							
4	Senior Debt Coverage (b)	1.24	1.25	1.26	1.35	1.35	1.35
5	Total Debt Coverage (c)	1.13	1.13	1.15	1.21	1.21	1.22
Insurance Covenants							
6	Senior Debt Coverage from Current Revenues (d)	1.07	1.15	1.08	1.35	1.35	1.34
O&M Actual to Budget Ratio							
7	Projected O&M Budget (e)	486,541	517,201	531,837	545,402	560,083	576,050
8	O&M Actual to Budget Ratio	88.6%	88.6%	88.6%	88.6%	88.6%	88.6%
Rate Board Ordinance Requirement							
9	Projected Total Revenues (f)	667,931	698,553	714,352	761,572	772,763	810,329
10	Projected Total Appropriations (g)	760,298	776,884	813,732	823,652	836,563	877,126
11	Ordinance Requirement Compliance (h)	Yes	Yes	Yes	Yes	Yes	Yes
Cash Funding							
12	Cash Funded Capital (i)	0.22	0.18	0.19	0.23	0.24	0.26

(a) See Line 20 in Table C-1.

(b) Senior Debt Coverage = (Total Revenues - Operating Expenses + Transfer From (to) Rate Stabilization) divided by Senior Debt. The 1989 General Ordinance requires the minimum Senior Debt Service Coverage of 1.20.

(c) Total Debt Coverage = (Total Revenues - Operating Expenses + Rate Stabilization Transfer) divided by (Senior Debt + Subordinate Debt + Capital Account Deposit). The 1989 General Ordinance requires the minimum Total Debt Service Coverage of 1.00.

(d) Senior Debt Coverage from Current Revenues = (Total Revenues - Operating Expenses - Transfer to Rate Stabilization Fund) divided by Senior Debt. Transfers from Rate Stabilization are excluded from the Total Revenues. The insurance covenants with Assured Guaranty Municipal Corporation require a minimum Senior Debt Service Coverage of 0.90 from current revenues.

(e) FY 2016 budget reflects the PWD adopted budget; FY 2017 through FY 2021 budget reflects annual cost escalation factors.

(f) Total Revenues includes service the City as required by the 1989 General Ordinance rate covenants.

(g) Total Appropriation = Total O&M Budget + Senior Debt + Subordinate Debt + Capital Account Deposit + Transfer to Rate Stabilization Fund + Transfer to Residual Fund. Costs to service the City included as required by the 1989 General Ordinance rate covenants.

(h) Rate Board Ordinance requires that Total Revenues not exceed Total Appropriations.

(i) Cash Funded Capital Ratio = (Capital Account Deposit + Residual Transfer to Construction Fund) divided by Capital Improvement Program annual expenses.

TABLE C-3

COMBINED UTILITY: PROJECTED RECEIPTS UNDER EXISTING RATES (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Water Sales Receipts	258,012	255,999	254,550	252,888	251,468	250,283	249,096
2	Sanitary Sewer Receipts	237,036	235,088	233,987	232,719	231,663	230,789	229,911
3	Stormwater Receipts	153,619	153,014	152,103	150,949	149,721	148,481	147,233
4	Total Wastewater Service Receipts	390,654	388,102	386,090	383,668	381,384	379,270	377,144
5	Total Water & Wastewater Receipts	648,667	644,101	640,640	636,557	632,852	629,552	626,240
6	Other Operating Revenues (a)	27,068	22,874	22,293	6,133	24,160	4,531	3,682
	Nonoperating Income							
7	Interest Income on Debt Service Reserve Fund (b)	0	0	0	0	0	0	0
8	Other (c)	1,078	956	885	756	819	824	832
9	Total Nonoperating Income	1,078	956	885	756	819	824	832
10	**Total Receipts**	**676,812**	**667,931**	**663,818**	**643,445**	**657,832**	**634,908**	**630,754**

(a) Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(b) Excludes deposit into Residual Fund for Transfer to City General Fund.

(c) Includes interest income on Operating and Rate Stabilization Funds.

TABLE C-4

COMBINED UTILITY: COMPARISON OF TYPICAL BILL FOR RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES

(1)	(2)	(3)	(4)	(5)	(6)	(7)
		FY 2016	FY 2017		FY 2018	
Meter Size	Monthly Use	Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2017
Inches	Mcf	$	$	%	$	%
5/8	0.0	27.16	28.01	3.1	29.14	4.0
5/8	0.3	47.30	49.80	5.3	52.32	5.1
5/8	0.5	60.72	64.33	5.9	67.78	5.4
5/8	**0.6**	**67.43**	**71.59**	**6.2**	**75.51**	**5.5**
5/8	0.7	74.14	78.86	6.4	83.24	5.6
5/8	0.8	80.86	86.12	6.5	90.96	5.6
5/8	1.7	141.26	151.50	7.2	160.52	6.0
5/8	2.7	203.13	220.44	8.5	233.87	6.1
5/8	3.3	238.89	260.85	9.2	276.87	6.1

Mcf - Thousand cubic feet

TABLE C-5

COMBINED UTILITY: COMPARISON OF EXAMPLE BILLS FOR NON-RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				FY 2016	FY 2017		FY 2018	
Meter Size	Monthly Use	Impervious Area	Gross Area	Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2017
Inches	Mcf	sf	sf	$	$	%	$	%
5/8	0.0	1,794	2,110	37.13	38.62	4.0	40.28	4.3
5/8	0.3	1,794	2,110	57.27	60.41	5.5	63.46	5.1
5/8	0.5	1,794	2,110	70.69	74.94	6.0	78.92	5.3
5/8	0.6	4,000	5,500	99.93	104.73	4.8	110.42	5.4
5/8	0.7	4,000	5,500	106.64	112.00	5.0	118.15	5.5
5/8	0.8	26,000	38,000	360.53	366.46	1.6	386.73	5.5
5/8	1.7	26,000	38,000	420.94	431.84	2.6	456.28	5.7
5/8	2.7	4,000	5,500	235.63	253.57	7.6	268.78	6.0
5/8	3.3	4,000	5,500	271.39	293.98	8.3	311.78	6.1
5/8	11.0	7,000	11,000	765.35	847.59	10.7	900.58	6.3
1	1.7	7,700	7,900	223.04	233.95	4.9	247.44	5.8
1	5.0	22,500	24,000	578.52	614.12	6.2	650.60	5.9
1	8.0	7,700	7,900	600.84	659.84	9.8	700.64	6.2
1	17.0	22,500	24,000	1,293.84	1,422.32	9.9	1,510.64	6.2
2	7.6	1,063	1,250	538.61	595.19	10.5	632.02	6.2
2	16.0	22,500	24,000	1,265.22	1,386.53	9.6	1,472.10	6.2
2	33.0	66,500	80,000	2,762.32	3,014.94	9.1	3,200.63	6.2
2	100.0	7,700	7,900	6,115.95	6,887.60	12.6	7,327.41	6.4
4	30.0	7,700	7,900	2,049.04	2,281.65	11.4	2,424.16	6.2
4	170.0	10,500	12,000	10,241.59	11,174.21	9.1	11,890.20	6.4
4	330.0	26,000	38,000	19,542.59	20,836.95	6.6	22,178.76	6.4
4	500.0	140,000	160,000	30,462.04	32,139.06	5.5	34,202.95	6.4
6	150.0	10,500	12,000	9,251.41	10,142.33	9.6	10,788.70	6.4
6	500.0	41,750	45,500	29,546.93	31,228.43	5.7	33,240.95	6.4
6	1,000.0	26,000	38,000	57,896.21	60,708.27	4.9	64,636.96	6.5
6	1,500.0	140,000	160,000	87,632.26	91,572.78	4.5	97,494.05	6.5
8	750.0	10,500	12,000	43,638.89	45,889.57	5.2	48,854.69	6.5
8	1,500.0	66,500	80,000	87,015.68	90,960.90	4.5	96,847.26	6.5
8	2,000.0	26,000	38,000	115,091.69	120,167.51	4.4	127,954.95	6.5
8	3,000.0	140,000	160,000	166,367.74	179,852.02	8.1	191,507.04	6.5
10	600.0	22,500	24,000	35,430.60	37,347.63	5.4	39,752.78	6.4
10	1,700.0	41,750	45,500	98,363.06	102,765.86	4.5	109,417.60	6.5
10	3,300.0	26,000	38,000	180,373.34	196,387.70	8.9	209,125.61	6.5
10	6,000.0	140,000	160,000	316,734.39	355,454.21	12.2	378,519.70	6.5

(a) Examples with gross area less than 5,000 square feet reflect an impervious area of 85% of the gross area consistent with PWD Regulations section 304.3.

Mcf - Thousand cubic feet
sf - square feet

TABLE W-1

WATER: PROJECTED RECEIPTS UNDER EXISTING RATES (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Residential	149,026	147,611	146,313	144,859	143,549	142,404	141,273
2	Senior Citizens	4,333	4,265	4,224	4,178	4,133	4,089	4,044
3	Commercial	45,199	44,474	44,325	44,165	44,097	44,095	44,078
4	Industrial	2,947	2,937	2,935	2,932	2,935	2,942	2,948
5	Public Utilities	366	343	341	340	340	340	340
6	Subtotal General Customers	201,870	199,630	198,137	196,475	195,055	193,869	192,682
7	Housing Authority	5,944	5,756	5,744	5,739	5,739	5,739	5,739
8	Charities and Schools	5,165	5,235	5,244	5,247	5,247	5,247	5,247
9	Hospitals and Universities	6,252	6,605	6,656	6,664	6,664	6,664	6,664
10	Hand Billed	15,818	15,619	15,616	15,611	15,611	15,611	15,611
11	Scheduled (Flat Rate)	1	1	1	1	1	1	1
12	City Leased Properties	271	264	264	264	264	264	264
13	City	8,046	7,528	7,528	7,528	7,528	7,528	7,528
	Fire Protection							
14	Public	2,727	3,505	3,505	3,505	3,505	3,505	3,505
15	Private	8,162	8,162	8,162	8,162	8,162	8,162	8,162
16	Subtotal Retail Customers	254,257	252,307	250,858	249,196	247,776	246,590	245,404
17	Aqua Pennsylvania	3,756	3,692	3,692	3,692	3,692	3,692	3,692
18	**Total Water Sales**	**258,012**	**255,999**	**254,550**	**252,888**	**251,468**	**250,283**	**249,096**
19	Other Operating Revenues (a)	14,341	12,119	11,834	4,726	11,145	4,027	3,669
	Interest Income							
20	Interest Income on Debt Service Reserve Fund (b)	0	0	0	0	0	0	0
21	Other (c)	413	329	329	304	319	331	339
22	Total Interest Income	413	329	329	304	319	331	339
23	**Total Receipts**	**272,767**	**268,448**	**266,713**	**257,918**	**262,933**	**254,640**	**253,104**

(a) Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(b) Excludes deposit into Residual Fund for Transfer to City General Fund.

(c) Includes interest income on Operating and Rate Stabilization Funds.

TABLE W-1A

WATER: OTHER REVENUE PROJECTED RECEIPTS
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Other Income							
1	Penalties	3,454	3,509	3,484	3,460	3,439	3,421	3,403
2	Other	5,611	4,000	4,000	4,000	4,000	4,000	4,000
3	State & Federal Grants	1,083	1,000	1,000	1,000	1,000	1,000	1,000
4	Permits Issued by L&I	1,920	1,500	1,240	1,240	1,240	1,240	1,240
5	Miscellaneous (Procurement)	164	150	150	150	150	150	250
6	Affordability Program Discount Cost (a)	0	0	0	(7,084)	(7,392)	(7,744)	(8,184)
7	Release from Debt Service Reserve (b)	0	0	0	0	6,749	0	0
8	Total Water Other Income	14,341	12,119	11,834	4,726	11,145	4,027	3,669
	Interest Income							
9	Debt Reserve Fund (c)	0	0	0	0	0	0	0
10	Other (d)	413	329	329	304	319	331	339
11	Total Water Operations	14,754	12,449	12,163	5,029	11,465	4,358	4,008

(a) Affordability Program Discounts are estimated based on $14.3 Million / Year using FY 2015 Rates adjusted for projected overall system annual revenue increases and a general service cost of service adjustment factor of 1.01.

(b) Projected Release from Debt Reserve Fund based on outstanding and proposed debt service payments.

(c) Excludes deposit into Residual Fund for Transfer to City General Fund.

(d) Includes interest income on Operating and Rate Stabilization Funds.

TABLE W-2

WATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Personal Services	40,596	42,422	44,334	45,741	47,450	48,808	50,123
	Purchase of Services (a)							
2	Power	8,442	9,534	9,500	9,736	9,985	10,235	10,491
3	Other	22,215	24,760	26,835	26,574	27,259	27,950	28,584
4	Subtotal	30,657	34,294	36,335	36,310	37,244	38,186	39,076
	Materials and Supplies (a)							
5	Chemicals	16,259	16,573	17,060	17,585	18,139	18,700	19,315
6	Other	6,106	6,827	7,110	7,330	7,522	7,716	7,872
7	Subtotal	22,365	23,400	24,170	24,915	25,661	26,416	27,187
8	Equipment	935	1,112	1,211	1,237	1,266	1,296	1,326
9	Indemnities	2,248	2,356	2,427	2,500	2,575	2,652	2,732
10	Subtotal Water Operations	96,801	103,585	108,477	110,702	114,196	117,357	120,443
11	Interdepartmental Charges	62,112	67,525	70,610	72,880	75,794	77,701	80,171
12	**Total Expenses**	**158,913**	**171,110**	**179,087**	**183,581**	**189,990**	**195,057**	**200,614**

(a) Net of Liquidated Encumbrances.

TABLE W-3

WATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Engineering and Administration	12,251	13,859	15,790	16,263	16,751	17,254	17,771
2	Water Treatment Plant Improvements	52,800	43,073	43,120	43,120	43,120	43,120	43,120
3	Distribution System Rehabilitation	34,060	44,060	46,060	46,060	46,060	46,060	46,060
4	Large Meter Replacement	2,000	5,000	5,000	25,000	25,000	25,000	5,000
5	Vehicles	1,000	5,000	4,000	4,000	4,000	4,000	4,000
6	Total Improvements	102,111	110,992	113,970	134,443	134,931	135,434	115,951
7	Inflation Adjustment (a)	0	0	0	4,727	9,644	14,756	16,677
8	Inflated Total	102,111	110,992	113,970	139,171	144,574	150,190	132,628
9	Cash Flow Adjustment	(33,825)	(16,212)	(6,975)	(13,738)	(19,155)	(24,783)	(24,430)
10	**Net Cash Financing Required**	**68,286**	**94,780**	**106,994**	**125,433**	**125,420**	**125,407**	**108,198**

(a) Allowance for inflation of 4.0 percent per year after 2017.

TABLE W-4

WATER: PROJECTED FLOW OF FUNDS - CAPITAL IMPROVEMENTS FUND
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	129,628	0	116,100	113,000	125,000	105,000	105,000
	Transfers:							
2	Debt Reserve Fund (a)	2,962	0	1,268	0	0	7,026	3,401
3	Cost of Bond Issuance (b)	666	0	1,742	1,695	1,875	1,575	1,575
4	Construction Fund (c)	126,000	0	113,091	111,305	123,125	96,399	100,024
5	Total Issue	129,628	0	116,100	113,000	125,000	105,000	105,000
	Construction Fund							
6	Beginning Balance	94,426	175,123	102,452	129,219	135,519	158,634	153,802
7	Transfer From Bond Proceeds	126,000	0	113,091	111,305	123,125	96,399	100,024
8	Capital Account Deposit, Grants, and Assessments	8,498	8,711	11,554	9,152	9,381	9,615	9,856
9	Penn Vest Loan	0	0	0	0	0	0	0
10	Transfer from Residual Fund	14,000	12,900	8,700	10,800	15,500	14,000	16,600
11	Interest Income on Construction Fund	484	499	416	476	529	561	587
12	Total Available	243,408	197,232	236,213	260,952	284,053	279,209	280,869
13	Net Cash Financing Required	68,286	94,780	106,994	125,433	125,420	125,407	108,198
14	Ending Balance	**175,123**	**102,452**	**129,219**	**135,519**	**158,634**	**153,802**	**172,671**
	Debt Reserve Fund							
15	Beginning Balance	84,088	87,050	87,050	88,317	88,317	81,568	88,595
16	Transfer From Bond Proceeds	2,962	0	1,268	0	0	7,026	3,401
17	Debt Service Reserve Release	0	0	0	0	(6,749)	0	0
18	Ending Balance	87,050	87,050	88,317	88,317	81,568	88,595	91,995
19	Interest Income on Debt Reserve Fund	308	313	316	318	306	306	325

(a) Amount of Debt Reserve Fund estimated based on outstanding and proposed debt service payments.

(b) Cost of bonds issuance assumed at 1.5 percent of issue amount. FY 2015 based on actual issuance costs.

(c) Deposits equal proceeds from sale of bonds less transfers to Debt Reserve Fund and Costs of Issuance.

TABLE W-5

WATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Revenue Bonds							
1	Existing (a)	75,345	80,287	58,467	58,726	43,435	31,824	32,765
	Proposed							
2	Fiscal Year 2015 (b)	0	4,103	5,792	5,792	5,792	5,792	5,792
3	Fiscal Year 2016		0	0	0	0	0	0
4	Fiscal Year 2017 (c)			0	6,095	7,883	7,883	7,883
5	Fiscal Year 2018 (d)				0	7,562	7,562	7,562
6	Fiscal Year 2019 (d)					0	8,365	8,365
7	Fiscal Year 2020 (d)						0	7,026
8	Fiscal Year 2021 (e)							
9	Total Proposed	0	4,103	5,792	11,887	21,237	29,601	36,627
10	Total Revenue Bonds	75,345	84,390	64,259	70,614	64,672	61,426	69,392
	Pennvest Loans							
11	Pennvest Loans - Parity Pennvest	5,722	5,722	5,722	6,065	6,091	6,016	6,016
12	**Total Debt Service**	**81,067**	**90,112**	**69,981**	**76,679**	**70,763**	**67,441**	**75,408**

(a) Assumes the average interest rates of 3.0 % for the Variable Rate Series 1997B Bonds and 4.53% for the Variable Rate Series 2005B Bonds.

(b) Reflects actual Series 2015A Bonds debt service

(c) Assumes interest only payments through FY 2018 based on 5.25% interest. Assumed to be issued during the second half of the fiscal year.

(d) Assumes 5.25% interest rate. Assumed to be issued during the second half of the fiscal year.

(e) Assumes 5.50% interest rate. Assumed to be issued during the second half of the fiscal year.

TABLE W-6

WATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS
(in thousands of dollars)

Line No.	Description			Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	OPERATING REVENUE									
1	Water Service - Existing Rates (a)			258,012	255,999	254,550	252,888	251,468	250,283	249,096
	Additional Service Revenue Required									
	Year	Percent Increase	Months Effective							
2	FY 2016	0.00%	12		0	0	0	0	0	0
3	FY 2017	5.00%	12			12,727	12,644	12,573	12,514	12,455
4	FY 2018	5.00%	12				13,277	13,202	13,140	13,078
5	FY 2019	4.00%	12					11,090	11,037	10,985
6	FY 2020	4.00%	12						11,479	11,425
7	FY 2021	5.50%	12							16,337
8	Total Additional Service Revenue Required			0	0	12,727	25,921	36,865	48,170	64,279
9	Total Water Service Revenue			258,012	255,999	267,277	278,809	288,333	298,453	313,375
	Other Income (b)									
10	Other Operating Revenue			14,341	12,119	11,834	4,726	11,145	4,027	3,669
11	Debt Reserve Fund Interest Income			0	0	0	0	0	0	0
12	Operating Fund Interest Income			141	95	135	122	149	150	150
13	Rate Stabilization Interest Income			273	235	193	182	171	181	189
14	Total Revenues			272,767	268,448	279,440	283,839	299,798	302,811	317,383
	OPERATING EXPENSES									
15	Water Operations			(96,801)	(103,585)	(108,477)	(110,702)	(114,196)	(117,357)	(120,443)
16	Direct Interdepartmental Charges			(62,112)	(67,525)	(70,610)	(72,880)	(75,794)	(77,701)	(80,171)
17	Water Treatment Plant Sludge			(10,448)	(10,453)	(10,952)	(11,678)	(12,309)	(12,998)	(14,041)
18	Total Operating Expenses			(169,361)	(181,563)	(190,039)	(195,259)	(202,298)	(208,055)	(214,655)
19	Transfer From/(To) Rate Stabilization Fund			(3,690)	24,900	(1,900)	8,100	(1,900)	(3,700)	(900)
20	**NET REVENUES AFTER OPERATIONS**			99,716	111,784	87,502	96,679	95,600	91,055	101,828
	DEBT SERVICE									
	Senior Debt Service									
	Revenue Bonds									
21	Outstanding Bonds			(75,345)	(80,287)	(58,467)	(58,726)	(43,435)	(31,824)	(32,765)
22	Pennvest Parity Bonds			(5,722)	(5,722)	(5,722)	(6,065)	(6,091)	(6,016)	(6,016)
23	Projected Future Bonds			0	(4,103)	(5,792)	(11,887)	(21,237)	(29,601)	(36,627)
24	Total Senior Debt Service			(81,067)	(90,112)	(69,981)	(76,679)	(70,763)	(67,441)	(75,408)
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L20/L24)**			1.23 x	1.24 x	1.25 x	1.26 x	1.35 x	1.35 x	1.35 x
26	Subordinate Debt Service			0	0	0	0	0	0	0
27	Total Debt Service on Bonds			(81,067)	(90,112)	(69,981)	(76,679)	(70,763)	(67,441)	(75,408)
28	**CAPITAL ACCOUNT DEPOSIT**			(8,498)	(8,711)	(8,929)	(9,152)	(9,381)	(9,615)	(9,856)
29	**TOTAL COVERAGE (L20/(L27+L28))**			1.11 x	1.13 x	1.10 x	1.12 x	1.19 x	1.18 x	1.19 x
	RESIDUAL FUND									
30	Beginning of Year Balance			9,876	6,056	6,139	6,053	6,124	6,102	6,123
31	Interest Income			29	22	22	22	22	22	22
	Plus:									
32	End of Year Revenue Fund Balance			10,151	12,962	8,592	10,849	15,456	13,999	16,564
33	Deposit for Transfer to City General Fund (c)			308	313	316	318	306	306	325
	Less:									
34	Transfer to Construction Fund			(14,000)	(12,900)	(8,700)	(10,800)	(15,500)	(14,000)	(16,600)
35	Transfer to City General Fund (c)			(308)	(313)	(316)	(318)	(306)	(306)	(325)
36	Transfer to Debt Service Reserve Fund			0	0	0	0	0	0	0
37	End of Year Balance			6,056	6,139	6,053	6,124	6,102	6,123	6,109
	RATE STABILIZATION FUND									
38	Beginning of Year Water Utility Balance			73,918	77,608	52,708	54,608	46,508	48,408	52,108
39	Deposit From/(To) Revenue Fund			3,690	(24,900)	1,900	(8,100)	1,900	3,700	900
40	End of Year Water Utility Balance			77,608	52,708	54,608	46,508	48,408	52,108	53,008

(a) Revenue from rates effective July 1, 2014.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund. Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(c) Transfer of interest earnings from the Bond Reserve Account to the Residual Fund as shown in Line 33 to satisfy the requirements for the transfer to the City General Fund shown on Line 35.

TABLE W-7

WATER: ESTIMATED TEST YEAR COST OF SERVICE
Test Year 2017

Line No.		(1) Operating Expense	(2) Capital Cost	(3) Total
		$	$	$
	REVENUE REQUIREMENTS			
1	Operations & Maintenance Expense	108,477		108,477
2	Direct Interdepartmental Charges	70,610		70,610
3	Water Treatment Plant Sludge	10,952		10,952
	Existing Bond Debt Service			
4	Revenue Bonds		64,189	64,189
	Subordinate Bonds		0	0
5	Proposed Bond Debt Service		5,792	5,792
6	Capital Account Deposit		8,929	8,929
7	Residual Fund Deposit	6,071	2,521	8,592
8	Deposit (From)/To Rate Stabilization Fund	1,343	557	1,900
9	Total	197,453	81,988	279,440
	DEDUCTIONS OF FUNDS FROM OTHER SOURCES			
10	Other Operating Revenue	(11,834)	0	(11,834)
11	Interest Income	(232)	(97)	(329)
12	**COST OF SERVICE TO BE DERIVED FROM RATES**	**185,386**	**81,891**	**267,277**

TABLE W-8

WATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT TO FUNCTIONAL COST COMPONENTS
TEST YEAR 2017

Line No.	Description	(1) Estimated Test Year Plant Investment $	(2) Base $	(3) Extra Capacity Maximum Day $	(4) Extra Capacity Maximum Hour In Excess of Maximum Day $	(5) Customer Meters $	(6) Public Fire Protection - Direct Standard Pressure $	(7) Public Fire Protection - Direct High Pressure $	(8) Wholesale Direct $
	Raw Water Supply and Pumping								
	Source of Supply								
1	Land	200,000	200,000						
2	Buildings and Equipment	7,596,000	7,596,000						
	Power and Pumping								
3	Land	31,000	24,000	7,000					0
4	Buildings and Equipment	19,271,000	14,669,000	4,381,000					221,000
5	Total Raw Water Supply and Pumping	27,098,000	22,489,000	4,388,000	0	0	0	0	221,000
	Purification and Treatment								
	Power and Pumping (a)								
6	Land	71,000	41,000	10,000	19,000				1,000
7	Buildings and Equipment	85,194,000	48,574,000	11,725,000	23,449,000				1,446,000
	Treatment								
8	Land	1,325,000	1,003,000	299,000					23,000
9	Buildings and Equipment	345,301,000	261,256,000	78,037,000					6,008,000
10	Total Purification and Treatment	431,891,000	310,874,000	90,071,000	23,468,000	0	0	0	7,478,000
	Transmission and Distribution								
11	Mains	704,548,000	406,729,000	98,176,000	196,352,000				3,291,000
12	Meters	75,015,000				75,015,000			0
13	Hydrants	9,200,000					9,200,000		0
	Filtered Water Storage								
14	Land	182,000	104,000	25,000	50,000				3,000
15	Buildings and Equipment	29,332,000	16,717,000	4,035,000	8,070,000				510,000
	High Pressure Fire System								
16	Land	0						0	0
17	Mains	0						0	0
18	Buildings and Equipment	7,000						7,000	0
19	Total Transmission and Distribution	818,284,000	423,550,000	102,236,000	204,472,000	75,015,000	9,200,000	7,000	3,804,000
20	Subtotal	1,277,273,000	756,913,000	196,695,000	227,940,000	75,015,000	9,200,000	7,000	11,503,000
	Administrative and General (b)								
21	Land	205,000	121,000	32,000	37,000	12,000	1,000	0	2,000
22	Buildings and Equipment	149,238,000	88,434,000	22,981,000	26,631,000	8,764,000	1,075,000	1,000	1,352,000
23	Total Administrative and General	149,443,000	88,555,000	23,013,000	26,668,000	8,776,000	1,076,000	1,000	1,354,000
24	**Total Water Plant Investment**	**1,426,716,000**	**845,468,000**	**219,708,000**	**254,608,000**	**83,791,000**	**10,276,000**	**8,000**	**12,857,000**

(a) Includes booster pumping
(b) Administrative and General allocated based on allocation of system investment.

TABLE W-9

WATER: ALLOCATION OF TEST YEAR PLANT DEPRECIATION EXPENSE
TEST YEAR 2017

Line No.	Description	(1) Total Test Year Depreciation Expense $	(2) Base $	(3) Extra Capacity Maximum Day $	(4) Extra Capacity Maximum Hour In Excess of Maximum Day $	(5) Customer Meters $	(6) Public Fire Protection - Direct Standard Pressure $	(7) Public Fire Protection - Direct High Pressure $	(8) Wholesale Direct $
	Raw Water Supply and Pumping								
1	Source of Supply	190,000	190,000	0					
2	Power and Pumping	397,000	302,000	90,000					5,000
3	Total Supply and Pumping	587,000	492,000	90,000	0	0	0	0	5,000
	Purification and Treatment								
4	Power and Pumping (a)	1,691,000	964,000	233,000	465,000				29,000
5	Treatment	7,850,000	5,939,000	1,774,000					137,000
6	Total Purification and Treatment	9,541,000	6,903,000	2,007,000	465,000	0	0	0	166,000
	Transmission and Distribution								
7	Mains	13,043,000	7,530,000	1,817,000	3,635,000				61,000
8	Meters	5,251,000				5,251,000			0
9	Hydrants	230,000					230,000		0
10	Filtered Water Storage	1,079,000	615,000	148,000	297,000				19,000
11	High Pressure Fire System	0						0	0
12	Total Transmission and Distribution	19,603,000	8,145,000	1,965,000	3,932,000	5,251,000	230,000	0	80,000
13	Subtotal	29,731,000	15,540,000	4,062,000	4,397,000	5,251,000	230,000		251,000
14	**Administrative and General**	4,095,000	2,427,000	631,000	731,000	240,000	29,000	0	37,000
15	**Total Water Plant Depreciation Expense**	**33,826,000**	**17,967,000**	**4,693,000**	**5,128,000**	**5,491,000**	**259,000**	**0**	**288,000**

(a) Includes booster pumping

TABLE W-10

WATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE
TEST YEAR 2017

Line No.	Description	(1) Test Year Operation & Maintenance Expense $	(2) Base $	(3) Extra Capacity Maximum Day $	(4) Extra Capacity Maximum Hour In Excess of Maximum Day $	(5) Customer Costs Meters $	(6) Customer Costs Billing $	(7) Public Fire Protection Direct Standard Pressure $	(8) Public Fire Protection High Pressure $	(9) Wholesale Direct $
	Raw Water Pumping									
1	Purchased Power	2,961,000	2,773,000	146,000						42,000
2	Other	2,450,000	1,856,000	554,000						40,000
3	Total Raw Water Pumping	5,411,000	4,629,000	700,000	0	0	0	0	0	82,000
	Purification and Treatment									
	Power and Pumping (a)									
4	Purchased Power	4,905,000	4,352,000	242,000	242,000					69,000
5	Other	10,817,000	6,171,000	1,489,000	2,979,000					178,000
	Treatment									
6	Purchased Power	1,634,000	1,450,000	81,000	80,000					23,000
7	Chemicals	17,012,000	16,772,000							240,000
	Other									
8	Other	42,598,000	32,260,000	9,636,000						702,000
9	Water Treatment Plant Sludge	10,952,000	10,759,000							193,000
10	Subtotal Other (b)	53,550,000	43,019,000	9,636,000	0	0	0	0	0	895,000
11	Total Purification and Treatment	87,918,000	71,764,000	11,448,000	3,301,000	0	0	0	0	1,405,000
	Transmission and Distribution									
12	Mains	44,860,000	25,937,000	6,261,000	12,521,000					141,000
13	Meters	4,397,000				4,397,000				0
14	Hydrants	2,685,000						2,685,000		0
15	Filtered Water Storage	1,881,000	1,078,000	260,000	521,000					22,000
16	High Pressure Fire System (c)	2,000							2,000	0
17	Total Transmission and Distribution	53,825,000	27,015,000	6,521,000	13,042,000	4,397,000	0	2,685,000	2,000	163,000
18	**Customer Accounting and Collection**	25,102,000					25,102,000			0
19	**Warranty Program**	0								
20	Subtotal	172,256,000	103,408,000	18,669,000	16,343,000	4,397,000	25,102,000	2,685,000	2,000	1,650,000
21	**Administrative and General**	17,783,000	8,879,000	2,401,000	2,114,000	580,000	3,312,000	354,000	0	143,000
22	Subtotal Water Operating Expense	190,039,000	112,287,000	21,070,000	18,457,000	4,977,000	28,414,000	3,039,000	2,000	1,793,000
23	**Residual Fund Deposit**	6,071,000	3,587,000	673,000	590,000	159,000	908,000	97,000	0	57,000
24	**Deposit (from) to RSF**	1,343,000	794,000	149,000	130,000	35,000	201,000	21,000	0	13,000
25	**Total Water Operating Expense**	197,453,000	116,668,000	21,892,000	19,177,000	5,171,000	29,523,000	3,157,000	2,000	1,863,000
26	**Other Operating Revenue**	11,834,435	7,035,435	1,319,000	1,156,000	311,000	1,780,000	190,000	0	43,000
27	**Non-Operating Income**	232,000	136,000	26,000	23,000	6,000	35,000	4,000	0	2,000
28	**Total Operating Expense Less Other Operating Revenue**	**185,386,565**	**109,496,565**	**20,547,000**	**17,998,000**	**4,854,000**	**27,708,000**	**2,963,000**	**2,000**	**1,818,000**

(a) Includes booster pumping.
(b) Includes wastewater utility cost of treating water treatment plant sludge of $10,952,000.

TABLE W-11

WATER: ESTIMATED RETAIL UNITS OF SERVICE
TEST YEAR 2017

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				Maximum Day Extra Capacity			Maximum Hour Extra Capacity			Customer Cost	
Line No.	Customer Type	Total Test Year Water Use Mcf	Average Daily Water Use Mcf/day (1) / 365	Capacity Factor %	Total Capacity Mcf/day (2) x (3) /100	Extra Capacity (a) Mcf/day (4) - (2)	Capacity Factor %	Total Capacity Mcf/day (2) x (6) / 100	Extra Capacity (b) Mcf/day (7) - (4)	Equiv. Meters	Equiv. Bills
1	Residential	3,169,700	8,680	200	17,360	8,680	360	31,250	13,890	431,503	4,928,471
2	Senior Citizens	111,700	310	200	620	310	360	1,120	500	20,208	242,316
3	Commercial	1,264,700	3,460	180	6,230	2,770	270	9,340	3,110	90,839	478,441
4	Industrial	91,200	250	160	400	150	200	500	100	5,413	17,793
5	Public Utilities	9,700	30	160	50	20	200	60	10	1,193	2,781
6	Total General Service	4,647,000	12,730		24,660	11,930		42,270	17,610	549,156	5,669,802
7	Housing Authority	171,000	470	190	890	420	315	1,480	590	9,514	75,275
8	Charities & Schools	199,700	550	180	990	440	270	1,490	500	21,984	55,858
9	Hospital/University	291,200	800	180	1,440	640	235	1,880	440	11,460	20,742
11	Hand Billed	567,000	1,550	180	2,790	1,240	270	4,190	1,400	6,346	12
12	Scheduled (Flat Rate)	0	0	200	0	0	360	0	0	2	24
13	City Leased Properties	8,600	20	180	40	20	235	50	10	1,126	2,200
14	City	237,500	650	180	1,170	520	235	1,530	360	12,908	26,511
	Fire Protection										
15	Public		0		920	920		2,390	1,470		
16	Private	11,100	30		220	190		530	310	5,335	454,321
17	Total Retail Customers	6,133,100	16,800		33,120	16,320		55,810	22,690	617,831	6,304,745

(a) Capacity in excess of average daily use.
(b) Capacity in excess of maximum day.

Mcf - thousand cubic feet

TABLE W-12

WATER: EQUIVALENT METER, BILL AND SERVICE RATIOS

	Equivalent Factors	
Meter Size (Inches)	Meters Capacity Basis	Bills
5/8	1.0	1.0
3/4	1.5	1.0
1	2.5	1.1
1-1/2	5.0	1.2
2	8.0	1.5
3	15.0	2.0
4	25.0	4.0
6	50.0	7.0
8	80.0	10.0
10	115.0	15.0
12	215.0	20.0

TABLE W-13

WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES Test Year 2017

COST OF SERVICE

Operating Expense		$1,818,000
Depreciation Expense		288,000
Return on Investment		
Allocated Investment	$12,857,000	
Return @ 7.50%		964,000
Total Allocated Cost of Service		3,070,000

CONTRACTUAL RATES

Commodity Charge ($/Mg)	0.455
Lump Sum Payment ($/year)	2,695,000

Mg - Thousand gallons

TABLE W-14

WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES Test Year 2018

COST OF SERVICE

Operating Expense		$1,842,000
Depreciation Expense		288,000
Return on Investment		
Allocated Investment	$12,857,000	
Return @ 7.50%		964,000
Total Allocated Cost of Service		3,094,000

CONTRACTUAL RATES

Commodity Charge ($/Mg)	0.469
Lump Sum Payment ($/year)	2,707,000

Mg - Thousand gallons

TABLE W-15

WATER: TEST YEAR RETAIL UNIT COSTS OF SERVICE
TEST YEAR 2017

Line No.	Description	(1) Total Test Year Retail Costs $	(2) Base	(3) Extra Capacity: Maximum Day	(4) Extra Capacity: Maximum Hour In Excess of Maximum Day	(5) Customer Costs: Meters	(6) Customer Costs: Billing	(7) Direct Public Fire Protection
	Total Retail Customer Units of Service							
1	Number		6,133,100	16,320	22,690	617,831	6,304,745	
2	Units		Mcf	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills	Total
	Operating Expense							
3	Total Expense - $	183,568,565	109,496,565	20,547,000	17,998,000	4,854,000	27,708,000	2,965,000
4	Unit Expense - $/Unit		17.8534	1,259.0074	793.2129	7.8565	4.3948	
	Depreciation Expense							
5	Total Expense - $	33,538,000	17,967,000	4,693,000	5,128,000	5,491,000		259,000
6	Unit Expense - $/Unit		2.9295	287.5613	226.0026	8.8875		
	Plant Investment							
7	Total Investment - $	1,413,859,000	845,468,000	219,708,000	254,608,000	83,791,000		10,284,000
8	Unit Investment - $/Unit		137.8533	13,462.5000	11,221.1547	135.6212		
	Unit Return on Investment							
9	Total Return - $	47,101,000	28,166,000	7,319,000	8,482,000	2,791,000		343,000
10	Inside City - $/Unit (a)		4.5924	448.4897	373.8215	4.5181		
	Total Unit Costs of Service							
11	Inside City - $/Unit		25.3753	1,995.0584	1,393.0370	21.2621	4.3948	

(a) Retail rate of return =3.3314%
Mcf - thousand cubic feet

TABLE W-16

WATER: TEST YEAR COST OF SERVICE BY FUNCTIONAL COST COMPONENTS
TEST YEAR 2017

Line No.	Customer Type	(1) Total Allocated Cost Of Service	(2) Base	(3) Extra Capacity Maximum Day	(4) Extra Capacity Maximum Hour In Excess of Maximum Day	(5) Customer Costs Meters	(6) Customer Costs Billing	(7) Direct Public Fire Protection
	Retail							
	General Service							
1	Senior Citizens	5,644,000	2,834,000	618,000	697,000	430,000	1,065,000	0
2	Residential	147,936,000	80,435,000	17,317,000	19,349,000	9,175,000	21,660,000	0
3	Commercial	45,984,000	32,092,000	5,526,000	4,332,000	1,931,000	2,103,000	0
4	Industrial	2,945,000	2,314,000	299,000	139,000	115,000	78,000	0
5	Public Utilities	337,000	246,000	40,000	14,000	25,000	12,000	0
6	Subtotal General Service	202,846,000	117,921,000	23,800,000	24,531,000	11,676,000	24,918,000	0
7	Housing Authority	6,532,000	4,339,000	838,000	822,000	202,000	331,000	0
8	Charities & Schools	7,354,000	5,067,000	878,000	697,000	467,000	245,000	0
9	Hospitals & University	9,614,000	7,389,000	1,277,000	613,000	244,000	91,000	0
10	Hand Billed	18,947,000	14,388,000	2,474,000	1,950,000	135,000	0	0
11	City Leased	306,000	218,000	40,000	14,000	24,000	10,000	0
12	Scheduled (Flat Rate)	0	0	0	0	0	0	0
13	City	7,956,000	6,027,000	1,037,000	501,000	274,000	117,000	0
	Fire Protection							
14	Private	3,203,000	282,000	379,000	432,000	113,000	1,997,000	0
	Public							
15	Standard Pressure	7,448,000	0	1,835,000	2,048,000	0	0	3,565,000
16	High Pressure	2,000	0	0	0	0	0	2,000
17	Subtotal Public Fire Protection	7,450,000	0	1,835,000	2,048,000	0	0	3,567,000
18	**Total Retail Service**	264,208,000	155,631,000	32,558,000	31,608,000	13,135,000	27,709,000	3,567,000

TABLE W-17

WATER: TEST YEAR ADJUSTED COST OF SERVICE
TEST YEAR 2017

Line No.	Customer Type	(1) Allocated Cost of Service $	(2) Reallocation of HP Fire System $	(3) Discount $	(4) Cost of Service w Discount $	(5) Recovery of Discount $	(6) Adjusted Cost of Service $	(7) Percent Change %
1	Residential	147,936,000	2,000	0	147,938,000	3,426,000	151,364,000	2.32%
2	Senior Citizens	5,644,000	0	1,411,000	4,233,000	98,000	4,331,000	-23.26%
3	Commercial	45,984,000	0	0	45,984,000	1,065,000	47,049,000	2.32%
4	Industrial	2,945,000	0	0	2,945,000	68,000	3,013,000	2.31%
5	Public Utilities	337,000	0	0	337,000	8,000	345,000	2.37%
6	Housing Authority	6,532,000	0	327,000	6,205,000	144,000	6,349,000	-2.80%
	Charities and Schools	0	0	0	0	0	0	0.00%
7	Charities & Schools	7,354,000	0	1,839,000	5,515,000	128,000	5,643,000	-23.27%
8	Hospital/University	9,614,000	0	2,404,000	7,210,000	167,000	7,377,000	-23.27%
9	Subtotal Charities and Schools	16,968,000	0	4,243,000	12,725,000	295,000	13,020,000	-23.27%
10	Hand Billed	18,947,000	0	0	18,947,000	439,000	19,386,000	0.00%
11	Scheduled (Flat Rate)	0	0	0	0	0	0	0.00%
12	City Leased Properties	306,000	0	0	306,000	7,000	313,000	2.29%
13	City	7,956,000	0	0	7,956,000	184,000	8,140,000	2.31%
	Fire Protection	0	0	0	0	0	0	0.00%
14	Private	3,203,000	0	0	3,203,000	74,000	3,277,000	2.31%
	Public	0	0	0	0	0	0	0.00%
15	Standard Pressure	7,448,000	0	0	7,448,000	173,000	7,621,000	2.32%
16	High Pressure (a)	2,000	(2,000)	0	0	0	0	
17	Subtotal Public Fire Protection	7,450,000	(2,000)	0	7,448,000	173,000	7,621,000	2.30%
18	Subtotal Retail Service	264,208,000	0	5,981,000	258,227,000	5,981,000	264,208,000	0.00%
19	Wholesale	3,070,000	0	0	3,070,000	0	3,070,000	0.00%
20	Total System	267,278,000	0	5,981,000	261,297,000	5,981,000	267,278,000	0.00%

(a) O&M costs reallocated to Retail customers.
HP = High Pressure

TABLE W-18

WATER: COMPARISON OF TEST YEAR COSTS OF SERVICE AND ADJUSTED COST OF SERVICE WITH REVENUES UNDER EXISTING RATES TEST YEAR 2017

Line No.	Customer Type	(1) Revenue Under Existing Rates (a) $	(2) Allocated Cost of Service $	(3) Adjusted Cost of Service $	(4) Indicated Increase (Decrease) Required %
	Retail				
	General Service				
1	Senior Citizens	4,223,632	5,644,000	4,331,000	2.5%
2	Residential	146,313,385	147,936,000	151,364,000	3.5%
3	Commercial	44,324,619	45,984,000	47,049,000	6.1%
4	Industrial	2,934,619	2,945,000	3,013,000	2.7%
5	Public Utilities	341,172	337,000	345,000	1.1%
6	Subtotal General Service	198,137,427	202,846,000	206,102,000	4.0%
7	Housing Authority	5,743,830	6,532,000	6,349,000	10.5%
8	Charities & Schools	5,244,056	7,354,000	5,643,000	7.6%
9	Hospitals & University	6,656,340	9,614,000	7,377,000	10.8%
10	Hand Billed	15,615,702	18,947,000	19,386,000	24.1%
11	City Leased	263,952	306,000	313,000	18.6%
12	Scheduled (Flat Rate)	949	0	0	-100.0%
13	City	7,528,147	7,956,000	8,140,000	8.1%
	Fire Protection				
14	Private	3,359,951	3,203,000	3,277,000	-2.5%
	Public				
15	Standard Pressure	8,162,000	7,448,000	7,621,000	-6.6%
16	High Pressure (a)	0	2,000	0	NA
17	Subtotal Public Fire Protection	8,162,000	7,450,000	7,621,000	-6.6%
18	Total Retail Service	250,712,354	264,206,000	264,208,000	5.4%
	Wholesale				
19	Aqua Pennsylvania	3,556,897	3,070,000	3,070,000	-13.7%
20	Total Wholesale	3,556,897	3,070,000	3,070,000	-13.7%
21	**Total System**	**254,269,251**	**267,276,000**	**267,278,000**	**5.1%**

(a) Public high pressure fire system decommissioned and charged discontinued in FY 2008.

TABLE W-19

WATER: PROPOSED RATES FOR GENERAL SERVICE

SERVICE CHARGE

Meter Size	FY 2017 Monthly Charge	FY 2018 Monthly Charge
Inches	$	$
5/8	6.62	6.71
3/4	7.57	7.70
1	9.94	10.15
1-1/2	15.17	15.56
2	22.29	22.89
3	37.96	39.06
4	66.41	68.28
6	128.10	131.81
8	199.31	205.19
10	289.45	297.93
12	503.22	518.82

QUANTITY CHARGE

Monthly Water Usage	FY 2017 Charge per Mcf	FY 2018 Charge per Mcf
	$	$
First 2 Mcf	41.65	44.06
Next 98 Mcf	36.36	38.45
Next 1,900 Mcf	28.29	29.91
Over 2,000 Mcf	27.47	29.04

Mcf - Thousand cubic feet

TABLE W-20

WATER: PROPOSED RATES FOR FIRE PROTECTION

PRIVATE FIRE PROTECTION

Size of Meter or Connection	FY 2017 Monthly Charge	FY 2018 Monthly Charge
Inches	$	$
4" or less	25.57	26.11
6	46.63	47.66
8	69.16	70.78
10	102.25	104.59
12	154.71	158.85

PUBLIC FIRE PROTECTION

	FY 2017 Annual Charge	FY 2018 Annual Charge
	$	$
Standard Pressure	7,621,000	7,944,000
High Pressure	0	0

TABLE W-20A

PROPOSED RATES FOR FIRE PROTECTION

RESIDENTIAL PRIVATE FIRE PROTECTION

Size of Meter or Connection	FY 2017 Monthly Charge	FY 2018 Monthly Charge
Inches	$	$
Water Service Charge Including Fire Protection		
3/4	9.75	10.00
1	12.12	12.45
1-1/2	17.35	17.86
2	24.47	25.19
Sewer Service Charge		
3/4	7.22	7.54
1	7.22	7.54
1-1/2	7.22	7.54
2	7.22	7.54

TABLE WW-1

WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING RATES (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Sanitary Sewer Receipts	237,036	235,088	233,987	232,719	231,663	230,789	229,911
2	Stormwater Receipts	153,619	153,014	152,103	150,949	149,721	148,481	147,233
3	Total Wastewater Service Receipts	390,654	388,102	386,090	383,668	381,384	379,270	377,144
4	Other Operating Revenues (a)	12,727	10,754	10,459	1,407	13,014	504	13
	Nonoperating Income							
5	Interest Income on Debt Service Reserve Fund (b)	0	0	0	0	0	0	0
6	Other (c)	665	627	556	452	500	494	493
7	Total Nonoperating Income	665	627	556	452	500	494	493
8	**Total Receipts**	**404,046**	**399,483**	**397,105**	**385,528**	**394,899**	**380,267**	**377,650**

(a) Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(b) Excludes deposit into Residual Fund for Transfer to City General Fund.

(c) Includes interest income on Operating and Rate Stabilization Fund.

TABLE WW-1A

WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING SANITARY SEWER RATES (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Residential	117,768	116,738	115,791	114,710	113,741	112,895	112,059
2	Senior Citizens	3,464	3,416	3,387	3,353	3,321	3,288	3,256
3	Commercial	37,932	37,296	37,172	37,035	36,979	36,977	36,962
4	Industrial	2,460	2,466	2,467	2,465	2,468	2,474	2,479
5	Public Utilities	326	306	305	304	304	304	304
6	Sewer Only	1,263	1,179	1,162	1,162	1,162	1,162	1,162
7	Groundwater	2,264	1,977	1,966	1,953	1,953	1,953	1,953
8	Subtotal General Customers	165,477	163,378	162,251	160,983	159,928	159,053	158,176
9	Housing Authority	5,021	4,867	4,857	4,853	4,853	4,853	4,853
10	Charities and Schools	4,492	4,557	4,567	4,570	4,570	4,570	4,570
11	Hospitals and University	5,732	6,057	6,104	6,111	6,111	6,111	6,111
12	Hand Bill	13,683	13,400	13,378	13,372	13,372	13,372	13,372
13	City Leased Properties	141	132	131	131	131	131	131
14	Scheduled	1	1	1	1	1	1	1
15	City	5,787	6,914	6,914	6,914	6,914	6,914	6,914
16	Fire Service	74	78	78	78	78	78	78
17	Contract Service	33,221	31,706	31,706	31,706	31,706	31,706	31,706
18	Surcharge	3,407	4,000	4,000	4,000	4,000	4,000	4,000
19	**Total Sanitary Sewer Receipts**	**237,036**	**235,088**	**233,987**	**232,719**	**231,663**	**230,789**	**229,911**

TABLE WW-1B

WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING STORMWATER RATES (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Residential							
2	Non Discount	70,501	70,506	70,587	70,582	70,574	70,567	70,560
3	Discount Non-PHA	2,534	2,543	2,547	2,547	2,547	2,547	2,547
4	Discount PHA	672	675	676	676	676	676	676
5	Non Residential							
6	Non Discount	56,708	56,535	55,754	54,832	53,849	52,856	51,856
7	Discount Non-PHA	8,824	8,799	8,750	8,686	8,617	8,548	8,478
8	Discount PHA	1,004	1,041	1,047	1,048	1,048	1,048	1,047
9	Condominium							
10	Non Discount	2,120	1,916	1,867	1,830	1,797	1,763	1,728
11	Discount Non-PHA	76	74	72	69	66	64	61
12	Discount PHA	1	1	1	1	1	1	1
13	City Owned							
14	Water & Sewer	9,534	9,302	9,176	9,048	8,912	8,774	8,636
15	Stormwater Only	1,643	1,622	1,626	1,631	1,635	1,639	1,643
16	Total Receipts	153,619	153,014	152,103	150,949	149,721	148,481	147,233

TABLE WW-1C

WASTEWATER: OTHER REVENUE PROJECTED RECEIPTS
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Other Income							
1	Penalties	5,032	5,104	5,069	5,033	5,000	4,970	4,939
2	Other	5,611	4,000	4,000	4,000	4,000	4,000	4,000
3	State & Federal Grants	0	0	0	0	0	0	0
4	Permits Issued by L&I	1,920	1,500	1,240	1,240	1,240	1,240	1,240
5	Miscellaneous (Procurement)	164	150	150	150	150	150	250
6	Affordability Program Discount Cost (a)	0	0	0	(9,016)	(9,408)	(9,856)	(10,416)
7	Release from Debt Service Reserve (b)	0	0	0	0	12,032	0	0
8	Total Water Other Income	12,727	10,754	10,459	1,407	13,014	504	13
	Interest Income							
9	Debt Reserve Fund (c)	0	0	0	0	0	0	0
10	Other (d)	665	627	556	452	500	494	493
11	Total Water Operations	13,392	11,381	11,015	1,859	13,514	998	506

(a) Affordability Program Discounts are estimated based on $14.3 Million / Year using FY 2015 Rates adjusted for projected overall system annual revenue increases and a general service cost of service adjustment factor of 1.01.

(b) Projected Release from Debt Reserve Fund based on outstanding and proposed debt service payments.

(c) Excludes deposit into Residual Fund for Transfer to City General Fund.

(d) Includes interest income on Operating and Rate Stabilization Funds.

TABLE WW-2

WASTEWATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
1	Personal Services	57,847	60,540	63,518	65,555	68,013	70,055	72,015
	Purchase of Services (a)							
2	Power	9,104	10,214	10,232	10,489	10,748	11,017	11,292
3	Other	71,825	74,886	83,568	84,407	85,922	88,135	90,426
4	Subtotal	80,929	85,099	93,801	94,897	96,670	99,152	101,718
	Materials and Supplies (a)							
5	Chemicals	2,771	2,806	2,904	3,035	3,172	3,316	3,428
6	Other	8,255	9,167	9,592	9,888	10,136	10,395	10,605
7	Subtotal	11,026	11,973	12,496	12,923	13,308	13,711	14,032
8	Equipment	914	1,254	1,334	1,363	1,394	1,427	1,459
9	Indemnities	3,997	4,189	6,115	7,944	4,577	4,715	4,856
10	Subtotal Wastewater Operations	154,712	163,056	177,263	182,681	183,963	189,058	194,081
11	Interdepartmental Charges	89,282	96,908	101,820	105,194	109,370	112,166	115,758
12	**Total Expenses**	**243,995**	**259,964**	**279,084**	**287,875**	**293,333**	**301,225**	**309,839**

(a) Net of Liquidated Encumbrances.

TABLE WW-3

WASTEWATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Wastewater Collection and Treatment							
1	Engineering and Administration	14,382	16,269	18,536	19,092	19,664	20,254	20,862
2	Water Pollution Control Plant	72,200	66,820	66,880	66,880	66,880	66,880	66,880
3	Storm Flood Relief	0	15,000	15,000	10,000	10,000	10,000	15,000
4	Reconstruction of Old Sewers	30,660	34,960	35,000	35,000	35,000	35,000	35,260
5	Green Infrastructure	40,000	35,000	47,000	52,000	52,000	52,000	62,000
6	Vehicles	1,000	5,000	4,000	4,000	4,000	4,000	4,000
7	Total Improvements	158,242	173,049	186,416	186,972	187,544	188,134	204,002
8	Inflation Adjustment (a)	0	0	0	6,715	13,699	20,962	31,108
9	Inflated Total	158,242	173,049	186,416	193,687	201,243	209,097	235,110
10	Cash Flow Adjustment	(52,419)	(25,276)	(11,410)	(19,119)	(26,663)	(34,503)	(43,307)
11	**Net Cash Financing Required**	**105,823**	**147,773**	**175,006**	**174,567**	**174,580**	**174,593**	**191,802**

(a) Allowance for inflation of 4.0 percent per year after 2017.

TABLE WW-4

WASTEWATER: PROJECTED FLOW OF FUNDS - CAPITAL IMPROVEMENTS FUND
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	179,010	0	153,900	162,000	155,000	165,000	180,000
	Transfers:							
2	Debt Reserve Fund (a)	4,090	0	1,680	0	0	11,041	5,830
3	Cost of Bond Issuance (b)	920	0	2,309	2,430	2,325	2,475	2,700
4	Construction Fund (c)	174,000	0	149,911	159,570	152,675	151,484	171,470
5	Total Issue	179,010	0	153,900	162,000	155,000	165,000	180,000
	Construction Fund							
6	Beginning Balance	147,221	251,385	135,711	150,177	173,999	197,026	222,773
7	Transfer From Bond Proceeds	174,000	0	149,911	159,570	152,675	151,484	171,470
8	Capital Account Deposit, Grants, and Assessments	12,570	12,504	17,347	13,137	13,466	13,802	14,147
9	Penn Vest Loan	0	0	0	0	0	0	0
10	Transfer from Residual Fund	22,700	18,900	21,700	25,100	30,800	34,300	37,600
11	Interest Income on Construction Fund	716	696	514	582	667	754	859
12	Total Available	357,207	283,484	325,183	348,567	371,606	397,366	446,849
13	Net Cash Financing Required	105,823	147,773	175,006	174,567	174,580	174,593	191,802
14	**Ending Balance**	**251,385**	**135,711**	**150,177**	**173,999**	**197,026**	**222,773**	**255,047**
	Debt Reserve Fund							
15	Beginning Balance	127,980	132,070	132,070	133,750	133,750	121,719	132,760
16	Transfer From Bond Proceeds	4,090	0	1,680	0	0	11,041	5,830
17	Debt Service Reserve Release	0	0	0	0	(12,032)	0	0
18	Ending Balance	132,070	132,070	133,750	133,750	121,719	132,760	138,589
19	Interest Income on Debt Reserve Fund	468	475	478	482	460	458	488

(a) Amount of Debt Reserve Fund estimated based on outstanding and proposed debt service payments.

(b) Cost of bonds issuance assumed at 1.5 percent of issue amount. FY 2015 based on actual issuance costs.

(c) Deposits equal proceeds from sale of bonds less transfers to Debt Reserve Fund and Costs of Issuance.

TABLE WW-5

WASTEWATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	Revenue Bonds							
1	Existing (a)	117,582	118,314	123,113	124,043	89,839	90,533	89,780
	Proposed							
2	Fiscal Year 2015 (b)	0	5,666	7,999	7,999	7,999	7,999	7,999
3	Fiscal Year 2016		0	0	0	0	0	0
4	Fiscal Year 2017 (c)			0	8,080	10,449	10,449	10,449
5	Fiscal Year 2018 (d)				0	10,841	10,841	10,841
6	Fiscal Year 2019 (d)					0	10,372	10,372
7	Fiscal Year 2020 (d)						0	11,041
8	Fiscal Year 2021 (e)							
9	Total Proposed	0	5,666	7,999	16,079	29,288	39,661	50,702
10	Total Revenue Bonds	117,582	123,980	131,112	140,121	119,128	130,194	140,482
	Pennvest Loans							
11	Parity Pennvest	6,621	6,621	6,621	6,862	7,029	7,058	7,058
12	**Total Debt Service**	**124,204**	**130,601**	**137,733**	**146,983**	**126,157**	**137,252**	**147,540**

(a) Assumes the average interest rates of 3.0 % for the Variable Rate Series 1997B Bonds and 4.53% for the Variable Rate Series 2005B Bonds.

(b) Reflects actual Series 2015A Bonds debt service

(c) Assumes interest only payments through FY 2018 based on 5.25% interest. Assumed to be issued during the second half of the fiscal year.

(d) Assumes 5.25% interest rate. Assumed to be issued during the second half of the fiscal year.

(e) Assumes 5.50% interest rate. Assumed to be issued during the second half of the fiscal year.

TABLE WW-6

WASTEWATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS
(in thousands of dollars)

Line No.	Description			Fiscal Year Ending June 30, 2015	2016	2017	2018	2019	2020	2021
	OPERATING REVENUE									
1	Wastewater Service - Existing Rates (a)			390,651	388,102	386,091	383,669	381,385	379,270	377,144
	Additional Service Revenue Required									
	Year	Percent Increase	Months Effective							
2	FY 2016	0.00%	12		0	0	0	0	0	0
3	FY 2017	5.70%	12			22,007	21,869	21,739	21,618	21,497
4	FY 2018	5.70%	12				23,116	22,978	22,851	22,723
5	FY 2019	5.20%	12					22,157	22,034	21,911
6	FY 2020	5.20%	12						23,180	23,050
7	FY 2021	5.60%	12							26,114
8	Total Additional Service Revenue Required			0	0	22,007	44,985	66,874	89,684	115,295
9	Total Wastewater Service Revenue			390,651	388,102	408,098	428,654	448,260	468,954	492,440
	Other Income (b)									
10	Other Operating Revenue			12,727	10,754	10,459	1,407	13,014	504	13
11	Debt Reserve Fund Interest Income			0	0	0	0	0	0	0
12	Operating Fund Interest Income			234	185	174	164	249	231	240
13	Rate Stabilization Interest Income			431	441	382	288	251	263	253
14	Total Revenues			404,042	399,483	419,113	430,513	461,774	469,952	492,946
	OPERATING EXPENSES									
15	Wastewater Operations			(154,712)	(163,056)	(177,263)	(182,681)	(183,963)	(189,058)	(194,081)
16	Direct Interdepartmental Charges			(89,282)	(96,908)	(101,820)	(105,194)	(109,370)	(112,166)	(115,758)
17	Water Treatment Plant Sludge			10,448	10,453	10,952	11,678	12,309	12,998	14,041
18	Total Operating Expenses			(233,547)	(249,510)	(268,132)	(276,197)	(281,024)	(288,227)	(295,798)
19	Transfer From/(To) Rate Stabilization Fund			(17,720)	12,000	21,200	30,900	(10,400)	3,600	2,100
20	**NET REVENUES AFTER OPERATIONS**			152,775	161,973	172,181	185,216	170,350	185,325	199,247
	DEBT SERVICE									
	Senior Debt Service									
	Revenue Bonds									
21	Outstanding Bonds			(117,582)	(118,314)	(123,113)	(124,043)	(89,839)	(90,533)	(89,780)
22	Pennvest Parity Bonds			(6,621)	(6,621)	(6,621)	(6,862)	(7,029)	(7,058)	(7,058)
23	Projected Future Bonds			0	(5,666)	(7,999)	(16,079)	(29,288)	(39,661)	(50,702)
24	Total Senior Debt Service			(124,204)	(130,601)	(137,733)	(146,983)	(126,157)	(137,252)	(147,540)
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L20/L24)**			1.23 x	1.24 x	1.25 x	1.26 x	1.35 x	1.35 x	1.35 x
26	Subordinate Debt Service			0	0	0	0	0	0	0
27	Total Debt Service on Bonds			(124,204)	(130,601)	(137,733)	(146,983)	(126,157)	(137,252)	(147,540)
28	**CAPITAL ACCOUNT DEPOSIT**			(12,199)	(12,504)	(12,817)	(13,137)	(13,466)	(13,802)	(14,147)
29	**TOTAL COVERAGE (L20/(L27+L28))**			1.12 x	1.13 x	1.14 x	1.15 x	1.22 x	1.22 x	1.23 x
	RESIDUAL FUND									
30	Beginning of Year Balance			15,399	9,116	9,116	9,079	9,108	9,068	9,071
31	Interest Income			44	33	33	33	33	33	33
	Plus:									
32	End of Year Revenue Fund Balance			16,373	18,867	21,631	25,096	30,727	34,271	37,560
33	Deposit for Transfer to City General Fund (c)			468	475	478	482	460	458	488
	Less:									
34	Transfer to Construction Fund			(22,700)	(18,900)	(21,700)	(25,100)	(30,800)	(34,300)	(37,600)
35	Transfer to City General Fund (c)			(468)	(475)	(478)	(482)	(460)	(458)	(488)
36	Transfer to Debt Service Reserve Fund			0	0	0	0	0	0	0
37	End of Year Balance			9,116	9,116	9,079	9,108	9,068	9,071	9,064
	RATE STABILIZATION FUND									
38	Beginning of Year Balance for Sewer Utility			110,878	128,598	116,598	95,398	64,498	74,898	71,298
39	Deposit From/(To) Revenue Fund			17,720	(12,000)	(21,200)	(30,900)	10,400	(3,600)	(2,100)
40	End of Year Sewer Utility Balance			128,598	116,598	95,398	64,498	74,898	71,298	69,198

(a) Revenue from rates effective July 1, 2014.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund. Includes Debt Service Reserve Fund Release in FY 2019 and projected contra revenue credits for Affordability Program Discounts in FY 2018 to FY 2021.

(c) Transfer of interest earnings from the Bond Reserve Account to the Residual Fund as shown in Line 33 to satisfy the requirements for the transfer to the City General Fund shown on Line 35.

TABLE WW-7

WASTEWATER: ESTIMATED TEST YEAR COST OF SERVICE
Test Year 2017

Line No.		(1) Operating Expense	(2) Capital Cost	(3) Total
		$	$	$
	REVENUE REQUIREMENTS			
1	Operations & Maintenance Expense	177,263		177,263
2	Direct Interdepartmental Charges	101,820		101,820
3	Water Treatment Plant Sludge	(7,377)	(3,575)	(10,952)
	Existing Bond Debt Service			
4	Revenue Bonds		129,734	129,734
	Subordinate Bonds		0	0
5	Proposed Bond Debt Service		7,999	7,999
6	Capital Account Deposit		12,817	12,817
7	Residual Fund Deposit	14,038	7,593	21,631
8	Deposit (From)/To Rate Stabilization Fund	(13,758)	(7,442)	(21,200)
9	Total	271,986	147,127	419,113
	DEDUCTIONS OF FUNDS FROM OTHER SOURCES			
10	Other Operating Revenue	(10,459)	0	(10,459)
11	Interest Income	(361)	(195)	(556)
12	**COST OF SERVICE TO BE DERIVED FROM RATES**	**261,167**	**146,932**	**408,098**

TABLE WW - 8

WASTEWATER: TEST YEAR UNITS OF SERVICE BY CUSTOMER TYPE
Test Year 2017

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Capacity Flow Rate						
		FY 2017		Pumping	Strength		Customer Costs		
Line No.	Customer Type	Test Year Volume	Collection System	and Treatment	Suspended Solids	BOD	Equiv. Meters	Equiv. Bills	Bills
		Mcf	Mcf/day	Mcf/day	1,000 lbs	1,000 lbs			
1	Residential	2,998,153	32,858	12,321	56,125	52,384	421,071	4,892,702	4,880,004
2	Commercial	1,175,524	12,882	4,831	22,006	20,539	71,996	444,908	405,540
3	Industrial	80,974	887	333	1,516	1,415	3,711	15,023	12,444
4	Public Utilities	9,205	101	38	172	161	989	2,498	1,488
5	Senior Citizens	106,023	1,162	436	1,985	1,852	20,181	242,093	242,088
6	Sewer Only	40,530	444	167	759	708	374	1,238	792
7	Groundwater	190,000	4,164	1,301	830	119	0	0	0
8	Surcharge	0	0	0	2,577	12,688	0	0	0
9	Water Treatment Plant Sludge	341,600	3,744	1,404	15,000	0	0	0	0
10	Housing Authority	162,408	1,780	667	3,040	2,838	8,142	72,122	69,132
11	Charities & Schools	188,510	2,066	775	3,529	3,294	17,711	48,530	30,000
12	Hospital/University	276,560	3,031	1,137	5,177	4,832	8,404	15,675	5,172
13	Hand Bill	466,334	5,111	1,916	8,730	8,148	5,134	9,378	2,964
14	Scheduled (Flat Rate)	20	0	0	0	0	2	24	24
15	Fire Meters	2,660	29	11	50	46	297	1,134	888
16	City Leased Properties	4,099	45	17	77	72	353	840	480
17	City	220,400	2,415	906	4,126	3,851	10,561	21,998	10,344
18	Subtotal Retail Service	6,263,000	70,719	26,260	125,699	112,947	568,926	5,768,163	5,661,360
19	Infiltration/Inflow	10,831,100	237,395	74,186	47,298	6,757	0	0	0
20	Total Retail Service	17,094,100	308,114	100,446	172,997	119,704	568,926	5,768,163	5,661,360
	Contract Service								
21	Sanitary	4,032,000	31,627	31,627	42,691	38,607			
22	Infiltration/Inflow	99,900	400	400	436	62			
23	Total Contract Service	4,131,900	32,027	32,027	43,127	38,669			
24	**Total System**	**21,226,000**	**340,141**	**132,473**	**216,124**	**158,373**	**568,926**	**5,768,163**	**5,661,360**

Mcf - Thousand cubic feet
lbs - pounds

TABLE WW - 9

WASTEWATER: TEST YEAR PLANT INVESTMENT SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS Test Year 2017

Line No.	Cost Component	(1) Total Direct Investment	(2) Investment Allocated to Contract Service	(3) Investment Allocated to Retail Service
		$	$	$
	Collection System:			
1	Sewers-Capacity	1,353,850,000	17,818,000	1,336,032,000
2	Pumping Stations Capacity	32,011,000	252,000	31,759,000
3	LTCP Investment	37,079,000	4,501,000	32,578,000
4	Total Collection System	1,422,940,000	22,571,000	1,400,369,000
	Water Pollution Control Plants			
	Northeast Plant			
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Cheltenham, Lower Moreland, & Lower Southampton			
5	Volume	73,476,000	20,424,000	53,052,000
6	Capacity	35,583,000	7,669,000	27,914,000
7	Suspended Solids	79,566,000	15,014,000	64,552,000
8	BOD	99,436,000	25,166,000	74,270,000
9	Total Northeast Plant	288,061,000	68,273,000	219,788,000
	Southwest Plant			
	Retail, DELCORA, Lower Merion, Springfield (excluding Wyndmoor), & Upper Darby			
10	Volume	77,203,000	32,964,000	44,239,000
11	Capacity	44,514,000	9,551,000	34,963,000
12	Suspended Solids	65,439,000	17,461,000	47,978,000
13	BOD	59,490,000	27,439,000	32,051,000
14	Total Southwest Plant	246,646,000	87,415,000	159,231,000
	Southeast Plant			
	Retail & Springfield (Wyndmoor)			
15	Volume	53,656,000	488,000	53,168,000
16	Capacity	51,242,000	286,000	50,956,000
17	Suspended Solids	28,912,000	90,000	28,822,000
18	BOD	29,504,000	81,000	29,423,000
19	Total Southeast Plant	163,314,000	945,000	162,369,000
20	Total Allocated Treatment Plants	698,021,000	156,633,000	541,388,000
21	**Total Allocated System Investment**	**2,120,961,000**	**179,204,000**	**1,941,757,000**

(a) Plant Investment as of 6/30/2015. Includes Administration & General Costs

TABLE WW - 9A

WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE NORTHEAST WATER POLLUTION CONTROL PLANT
Test Year 2017

Line No.	Description	(1) Total Investment (a)	(2) Retail, Abington, Bensalem, Bucks Cty W&SA, & Lower Southampton Capacity	(3) Volume	(4) Capacity	(5) Suspended Solids	(6) BOD
				Retail, Abington, Bensalem, Bucks Cty W&SA, Cheltenham, Lower Moreland, and Lower Southampton			
		$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Primary Sedimentation Basins	6,745		6,745			
2	Pumping Station	1,672			1,672		
3	Aeration Facilities	22,289					22,289
4	Primary Sludge Pumps	1,496				1,496	
5	Scum Ejectors	235				235	
6	Effluent Conduit	10			10		
7	Final Sedimentation Basins	11,731		11,731			
8	Recirculation Pumps	2,112		2,112			
9	Digesters	22,962				17,222	5,740
10	Sludge Dewatering	4,307				3,230	1,077
11	Frankford Grit Chamber	0			0		
12	Chlorination Facilities	5,753			5,753		
13	Aeration Tank No. 1	1,205					1,205
14	Sludge Thickener Building	5,095				2,548	2,547
15	Sludge Transfer Station	930				698	232
16	Subtotal All Above	86,542		20,588	7,435	25,429	33,090
	Administrative and General Facilities						
17	Administrative and General Plant	58,926					
18	Land	1,014					
19	Subtotal	59,940	1,641	15,605	6,398	16,204	20,092
20	Total Non-Water Pollution Abatement Program Facilities	146,482	1,641	36,193	13,833	41,633	53,182
	WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
21	New Preliminary Treatment Building	44,033	11,008		33,025		
22	Primary Sedimentation Tanks Modifications	56,655		56,655			
23	Blower Building	17,767					17,767
24	Aeration Tank No. 1	41,424					41,424
25	Chlorination Facilities	0			0		
26	New Sludge Thickener Building	44,277				22,139	22,138
27	Effluent Conduits	2,460			2,460		
28	New Final Sedimentation Tanks	27,451		27,451			
29	Sludge Digestion System Modifications	36,967				27,725	9,242
30	Composting Facilities	0				0	
31	Sludge Dewatering	12,424				9,318	3,106
32	Sludge Transfer Station	26,252				19,689	6,563
33	Loading Terminal/Barges	5,876				4,407	1,469
34	Subtotal	315,586	11,008	84,106	35,485	83,278	101,709
35	Admin. and General Facilities	51,094	1,399	13,302	5,453	13,812	17,128
36	Adjustment for Joint Use Facilities	1,839				1,379	460
37	Total Water Pollution Abatement Program Facilities	368,519	12,407	97,408	40,938	98,469	119,297
38	TOTAL NORTHEAST WPC PLANT BOOK COST	515,001	14,048	133,601	54,771	140,102	172,479
39	Less Federal Grants	226,940	7,870	60,125	25,366	60,536	73,043
40	**ADJUSTED TOTAL NORTHEAST WPC PLANT INVESTMENT**	**288,061**	**6,178**	**73,476**	**29,405**	**79,566**	**99,436**

(a) Plant Investment as of 6/30/2015.

TABLE WW - 9B

WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE SOUTHWEST WATER POLLUTION CONTROL PLANT
Test Year 2017

Line No.	Description	(1) Total Investment (a)	(2) Retail Capacity	(3) Retail, DELCORA, Lower Merion, Springfield (excluding Wyndmoor), and Upper Darby: Volume	(4) Capacity	(5) Suspended Solids	(6) BOD
		$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Raw Wastewater Pumping Station	9,038	9,038				
2	Sludge Digestion Facilities	5,459				3,983	1,476
3	Scum Incineration	2,090				2,090	
4	Settling Tanks	30,081		30,081			
5	Sludge Handling	8,442				6,332	2,110
6	Chlorination Facilities	1,307			1,307		
7	Aeration Tanks	752					752
8	Oxygen Supply	3,418					3,418
9	Effluent Pump Station	218			218		
10	Sludge Thickener Building	2,060				1,030	1,030
11	Composting Facilities	1,099				824	275
12	Sludge Gas Facilities	9,491				7,118	2,373
13	Subtotal	73,455	9,038	30,081	1,525	21,377	11,434
	Administrative and General Facilities						
14	Administrative and General Plant	96,226					
15	Land	738					
16	Subtotal	96,964	5,753	26,740	12,345	26,433	25,693
17	Adjustment for Joint Use Facilities	(3,359)				(2,661)	(698)
18	Total Non-Water Pollution Abatement Program Facilities	167,060	14,791	56,821	13,870	45,149	36,429
	WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
19	Influent Pumping Station	6,793	6,793				
20	Preliminary Treatment Building	26,075			26,075		
21	Primary Sedimentation Tanks	11,964		11,964			
22	Aeration Tanks	17,621					17,621
23	Oxygen Supply System	15,155					15,155
24	Compressor Building	4,011					4,011
25	Final Tanks	31,540		31,540			
26	Scum Concentration Building	1,475				1,475	
27	Sludge Thickener Building	13,490				6,745	6,745
28	Sludge Digestion Facilities	33,444				24,402	9,042
29	Effluent Pumping Station	6,371			6,371		
30	New Centrifuges	8,694				6,343	2,351
31	Composting Facilities	0				0	0
32	Sludge Dewatering	8,949				6,712	2,237
33	Sludge Gas Facilities	7,791				5,685	2,106
34	Subtotal	193,373	6,793	43,504	32,446	51,362	59,268
35	Admin. and Gen'l. Facilities	36,542	2,168	10,077	4,652	9,962	9,683
36	Adjust. for Joint Use Facilities	(7,451)			(656)	(5,061)	(1,734)
37	Total Water Pollution Abatement Program Facilities	222,464	8,961	53,581	36,442	56,263	67,217
38	TOTAL SOUTHWEST WPC PLANT BOOK COST	389,524	23,752	110,402	50,312	101,412	103,646
39	Less Federal Grants	142,878	5,189	33,199	24,361	35,973	44,156
40	**ADJUSTED TOTAL SOUTHWEST WPC PLANT INVESTMENT**	**246,646**	**18,563**	**77,203**	**25,951**	**65,439**	**59,490**

(a) Plant Investment as of 6/30/2015.

TABLE WW - 9C

WASTEWATER: ALLOCATION OF TEST YEAR INVESTMENT FOR THE SOUTHEAST WATER POLLUTION CONTROL PLANT
Test Year 2017

Line No.	Description	(1) Total Investment (a)	(2) Volume	(3) Capacity	(4) Suspended Solids	(5) BOD
		Retail and Springfield (Wyndmoor)				
		$1,000	$1,000	$1,000	$1,000	$1,000
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES					
1	Main Pumping Station	2,342		2,342		
2	Grit Chambers	9,993		9,993		
3	Outfall Line	612		612		
4	Sludge Digestion Facilities	2,636			2,088	548
5	Settling Tanks & Floc. Channel	17,722	17,722			
6	Sludge Force Main	5,390			4,043	1,347
7	Subtotal	38,695	17,722	12,947	6,131	1,895
8	Administrative and General Facilities					
9	Administrative and General Plant	34,157				
10	Land	168				
11	Subtotal	34,325	10,625	10,945	5,523	7,232
12	Adjustment for Joint Use Facilities	3,359			2,661	698
13	Total Non-Water Pollution Abatement Program Facilities	76,379	28,347	23,892	14,315	9,825
14	WATER POLLUTION ABATEMENT PROGRAM FACILITIES					
15	Influent Pump. Stat. and Screen & Grit Chamber	26,829		26,829		
16	Primary Sedimentation Tanks	22,738	22,738			
17	Compressor Building	10,670				10,670
18	Air Supply Facilities	24,920				24,920
19	Final Sedimentation	28,034	28,034			
20	Effluent Pumping Station	13,873		13,873		
21	Effluent Conduit	12,473		12,473		
22	Scum Concentration Facilities	3,030			3,030	
23	Sludge Force Main	2,091			1,568	523
24	Preliminary Treatment Bldg.	4,436		4,436		
25	Sludge Thickeners	5,010			2,505	2,505
26	Sludge Digesters	16,147			12,791	3,356
27	Sludge Disposal Facilities	4,197			3,325	872
28	Composting Facilities					
29	Sludge Dewatering	4,365			3,274	1,091
30	Sludge Gas Facilities	3,762			2,980	782
31	Subtotal	182,575	50,772	57,611	29,473	44,719
32	Admin. and Gen'l. Facilities	46,552	14,410	14,844	7,491	9,807
33	Adjustment for Joint Use Facilities	5,612		656	3,682	1,274
34	Total Water Pollution Abatement Program Facilities	234,739	65,182	73,111	40,646	55,800
35	TOTAL SOUTHEAST WPC PLANT BOOK COST	311,118	93,529	97,003	54,961	65,625
36	Less Federal Grants	147,804	39,873	45,761	26,049	36,121
37	**ADJUSTED TOTAL SOUTHEAST WPC PLANT INVESTMENT**	**163,314**	**53,656**	**51,242**	**28,912**	**29,504**

(a) Plant Investment as of 6/30/2015.

TABLE WW - 10

WASTEWATER: OPERATION AND MAINTENANCE EXPENSE
SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS
Test Year 2017

Line No.	Cost Component	(1) Net Operation and Maintenance Expense	(2) Less Operation and Maintenance Expense Allocated to Contract Service	(3) Operation and Maintenance Expense Allocated to Retail Service	(4) Less Retail Operation & Maintenance Expense Deductions: Other Operating Revenue	(5) Net Operation and Maintenance Expense To Be Allocated To Retail Service
		$1,000	$1,000	$1,000	$1,000	$1,000
	COLLECTION SYSTEM					
	Sewer Maintenance					
1	All Customers - Capacity	65,887	767	65,120	2,613	62,507
	Inlet Cleaning					
2	Retail - Storm Capacity	16,277	0	16,277	653	15,624
	Neill Drive Pumping Station					
	Retail and Lower Merion					
3	Total Volume	56	12	44	2	42
4	Total Capacity	43	13	30	1	29
	Central Schuylkill Pumping Station					
	Retail and Springfield (excl. Wyndmoor)					
5	Total Volume	1,159	69	1,090	44	1,046
6	Total Capacity	1,441	27	1,414	57	1,357
	All Other Pumping Stations					
	Retail					
7	Total Volume	3,094	0	3,094	124	2,970
8	Total Capacity	16,133	0	16,133	647	15,486
9	Total Collection Systems	104,090	888	103,202	4,141	99,061
	WATER POLLUTION CONTROL PLANTS					
	Northeast Plant:					
	Retail and Cheltenham					
10	Volume	0	0	0	0	0
11	Capacity	0	0	0	0	0
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
12	Volume	568	141	427	17	410
13	Capacity	2,371	640	1,731	69	1,662
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
14	Volume	11,949	2,720	9,229	370	8,859
15	Capacity	3,826	900	2,926	117	2,809
16	Suspended Solids	22,415	4,194	18,221	732	17,489
17	BOD	17,713	4,433	13,280	533	12,747
	Southwest Plant:					
	Retail					
18	Volume	28	0	28	1	27
19	Capacity	442	0	442	18	424
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
20	Volume	11,886	3,095	8,791	353	8,438
21	Capacity	3,955	1,461	2,494	100	2,394
22	Suspended Solids	16,459	5,022	11,437	459	10,978
23	BOD	9,513	3,474	6,039	242	5,797
	Southeast Plant:					
	Retail and Springfield (Wyndmoor)					
24	Volume	8,051	36	8,015	322	7,693
25	Capacity	4,306	26	4,280	172	4,108
26	Suspended Solids	10,323	42	10,281	413	9,868
27	BOD	3,193	11	3,182	128	3,054
28	Total Water Pollution Control Plants	126,998	26,195	100,803	4,046	96,757
	CUSTOMER COSTS					
	All Customers					
29	Equivalent Bills	37,083	228	36,855	1,479	35,376
	Equivalent Meters					
30	Industrial Waste Unit	2,527	68	2,459	99	2,360
31	Other	4,041	0	4,041	162	3,879
32	Stormwater - Direct	3,018	0	3,018	121	2,897
33	Excess Strength Wastewater - Direct	1,244	0	1,244	50	1,194
34	Total Customer Costs	47,913	296	47,617	1,911	45,706
35	**Total Operation and Maintenance Expense**	**279,001**	**27,379**	**251,622**	**10,098**	**241,524**

TABLE WW - 10A

WASTEWATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE COLLECTION SYSTEM
Test Year 2017

Line No.	Description	(1) Total	(2) All Customers Capacity	(3) Retail Volume	(4) Retail Capacity	(5) Storm Capacity	(6) Retail & Lower Merion Volume	(7) Retail & Lower Merion Capacity	(8) Retail & Springfield (excluding Wyndmoor) Volume	(9) Retail & Springfield (excluding Wyndmoor) Capacity
		$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
1	Sewer Maintenance	27,307	27,307							
2	Inlet Cleaning	10,697				10,697				
	Pump Stations									
	Neill Drive									
3	Power	66					56	10		
4	Other	17						17		
	Central Schuylkill									
5	Power	1,365							1,160	205
6	Other	831								831
	All Other Pumping Stations									
7	Power	3,645		3,098	547					
8	Other	10,930			10,930					
9	Total Collection System	54,858	27,307	3,098	11,477	10,697	56	27	1,160	1,036

TABLE WW - 10B

WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE NORTHEAST WPC PLANT
Test Year 2017

Line No.	Description	(1) Total Operation & Maintenance Expense	(2) Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Volume	(3) Capacity	(4) Retail, Cheltenham, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Volume	(5) Capacity	(6) Suspended Solids	(7) BOD
		$	$	$	$	$	$	$
	Personal Services:							
1	Raw Wastewater Pumping	743,313		743,313				
2	Preliminary Treatment	1,445,330			1,026,184	419,146		
3	Primary Sedimentation	583,294			583,294			
4	Aeration	2,410,604						2,410,604
5	Secondary Sedimentation	588,456			588,456			
6	Recirculating Pumping	433,599			433,599			
7	Chlorination	407,790			248,752	159,038		
8	Primary Sludge Pumping	118,724					118,724	
9	Secondary Sludge Thickening	289,066					144,533	144,533
10	Sludge Digestion	2,271,233					1,703,425	567,808
11	Sludge Holding Tanks	165,181					123,886	41,295
12	Sludge Dewatering	418,113					313,585	104,528
13	Grit and Screening Incineration	929,141			622,524	306,617		
14	Scum and Grease Incineration	221,961					221,961	
15	Laboratory	769,122					384,561	384,561
16	Subtotal Personal Services	11,794,927		743,313	3,502,809	884,801	3,010,675	3,653,329
	Purchase of Services, Materials, Supplies, and Equipment:							
17	Raw Wastewater Pumping	578,119		578,119				
18	Preliminary Treatment	913,571				913,571		
19	Primary Sedimentation	428,236			428,236			
20	Aeration	642,354						642,354
21	Secondary Sedimentation	492,472			492,472			
22	Recirculating Pumping	185,569			185,569			
23	Chlorination	2,088,994			2,088,994			
24	Primary Sludge Pumping	78,510					78,510	
25	Secondary Sludge Thickening	92,785					46,393	46,392
26	Sludge Digestion	1,206,199					904,649	301,550
27	Sludge Holding Tanks	171,295					128,471	42,824
28	Sludge Dewatering	135,608					101,706	33,902
29	Grit and Screening Incineration	385,413				385,413		
30	Scum and Grease Incineration	107,059					107,059	
31	Laboratory	827,923					413,962	413,961
32	Subtotal Purchase of Services, Materials, Supplies & Equipment	8,334,107		578,119	3,195,271	1,298,984	1,780,750	1,480,983
33	Subtotal All Above	20,129,034		1,321,432	6,698,080	2,183,785	4,791,425	5,134,312
	Administrative and General:							
34	Personal Services	3,035,190		191,277	901,378	227,686	774,737	940,112
35	Other	1,040,582		72,183	398,956	162,189	222,341	184,913
36	Subtotal Administration & General	4,075,772		263,460	1,300,334	389,875	997,078	1,125,025
	Power Requirements:							
37	Raw Wastewater Pumping	669,730	569,271	100,459				
38	Preliminary Treatment	5,535			4,705	830		
39	Primary Sedimentation	44,280			37,638	6,642		
40	Aeration	3,669,679						3,669,679
41	Secondary Sedimentation	44,280			37,638	6,642		
42	Recirculating Pumping	154,979			131,732	23,247		
43	Chlorination	11,070			9,410	1,660		
44	Primary Sludge Pumping	5,535					5,535	
45	Secondary Sludge Thickening	415,122					207,561	207,561
46	Sludge Digestion	94,094					70,571	23,523
47	Sludge Dewatering	99,629					74,722	24,907
48	Grit and Screening Incineration	88,559			75,275	13,284		
49	Scum and Grease Incineration	5,535					5,535	
50	Subtotal Power Requirements	5,308,027	569,271	100,459	296,398	52,305	363,924	3,925,670
51	Sludge Disposal	12,592,855					9,444,641	3,148,214
52	**Total Northeast WPC Plant Expense**	**42,105,687**	**569,271**	**1,685,351**	**8,294,812**	**2,625,965**	**15,597,068**	**13,333,221**

TABLE WW - 10C

WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHWEST WPC PLANT
Test Year 2017

Line No.	Description	(1) Total Operation & Maintenance Expense	(2) Retail Volume	(3) Retail Capacity	(4) Retail, DELCORA, Lower Merion, Springfield (w/o Wyndmoor) and Upper Darby Volume	(5) Capacity	(6) Suspended Solids	(7) BOD
		$	$	$	$	$	$	$
	Personal Services							
1	Raw Wastewater Pumping	147,614		147,614				
2	Preliminary Treatment	1,948,507			1,422,410	526,097		
3	Flocculation	354,274			354,274			
4	Primary Sedimentation	513,697			513,697			
5	Aeration	1,045,108						1,045,108
6	Secondary Sedimentation	885,685			885,685			
7	Recirculating Pumping	330,656			330,656			
8	Chlorination	501,888			296,114	205,774		
9	Effluent Pumping	413,320				413,320		
10	Primary Sludge Pumping	377,892					377,892	
11	Secondary Sludge Thickening	312,942					153,342	159,600
12	Sludge Digestion	1,195,675					896,756	298,919
13	Sludge Holding Tanks	203,707					152,780	50,927
14	Sludge Dewatering	929,969					697,477	232,492
15	Sludge Lagoon	8,857					6,643	2,214
16	Grit and Screening Incineration	819,259			557,096	262,163		
17	Scum and Grease Incineration	208,136					208,136	
18	Laboratory	755,785					377,893	377,892
19	Subtotal Personal Services	10,952,971		147,614	4,359,932	1,407,354	2,870,919	2,167,152
	Purchase of Services, Materials, Supplies, and Equipment:							
20	Raw Wastewater Pumping	58,496		58,496				
21	Preliminary Treatment	669,645				669,645		
22	Flocculation	347,079			347,079			
23	Primary Sedimentation	195,545			195,545			
24	Aeration	381,063						381,063
25	Secondary Sedimentation	410,589			410,589			
26	Recirculating Pumping	171,033			171,033			
27	Chlorination	1,260,135			1,260,135			
28	Effluent Pumping	19,499				19,499		
29	Primary Sludge Pumping	220,058					220,058	
30	Secondary Sludge Thickening	38,998					19,109	19,889
31	Sludge Digestion	384,823					288,617	96,206
32	Sludge Holding Tanks	135,795					101,846	33,949
33	Sludge Dewatering	813,519					610,139	203,380
34	Sludge Lagoon	7,521					5,641	1,880
35	Grit and Screening Incineration	172,147				172,147		
36	Scum and Grease Incineration	55,153					55,153	
37	Laboratory	439,559					219,780	219,779
38	Subtotal Purchase of Services, Materials, Supplies & Equipment	5,780,657		58,496	2,384,381	861,291	1,520,343	956,146
39	Subtotal All Above	16,733,628		206,110	6,744,313	2,268,645	4,391,262	3,123,298
	Administrative & General							
40	Personal Services	2,650,400		35,720	1,055,016	340,552	694,705	524,407
41	Other	481,000		4,867	198,401	71,667	126,505	79,560
42	Subtotal Administration & General	3,131,400		40,587	1,253,417	412,219	821,210	603,967
	Power Requirements							
43	Raw Wastewater Pumping	32,479	27,607	4,872				
44	Preliminary Treatment	2,165			1,840	325		
45	Flocculation	104,086			88,473	15,613		
46	Primary Sedimentation	8,197			6,967	1,230		
47	Aeration	1,014,103						1,014,103
48	Secondary Sedimentation	20,879			17,747	3,132		
49	Recirculating Pumping	55,368			47,063	8,305		
50	Chlorination	4,485			3,812	673		
51	Effluent Pumping	13,610			11,569	2,041		
52	Primary Sludge Pumping	1,237					1,237	
53	Secondary Sludge Thickening	135,482					66,386	69,096
54	Sludge Digestion	31,666					23,750	7,916
55	Sludge Dewatering	23,199					17,399	5,800
56	Grit and Screening Incineration	14,383			12,226	2,157		
57	Scum and Grease Incineration	2,204					2,204	
58	Subtotal Power Requirements	1,463,543	27,607	4,872	189,697	33,476	110,976	1,096,915
59	Sludge Disposal	8,051,269					6,038,452	2,012,817
60	**Total Southwest WPC Plant Expense**	**29,379,840**	**27,607**	**251,569**	**8,187,427**	**2,714,340**	**11,361,900**	**6,836,997**

TABLE WW - 10D

WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHEAST WPC PLANT
Test Year 2017

Line No.	Description	(1) Total Operation & Maintenance Expense	(2) Retail and Springfield (Wyndmoor) Volume	(3) Capacity	(4) Suspended Solids	(5) BOD
		$	$	$	$	$
	Personal Services					
1	Raw Wastewater Pumping	796,018		796,018		
2	Preliminary Treatment	1,130,576	814,015	316,561		
3	Flocculation	346,095	346,095			
4	Primary Sedimentation	403,777	403,777			
5	Aeration	403,777				403,777
6	Secondary Sedimentation	501,838	501,838			
7	Recirculating Pumping	242,266	242,266			
8	Chlorination	386,473	243,478	142,995		
9	Effluent Pumping	305,717		305,717		
10	Primary Sludge Pumping	323,022			323,022	
11	Waste Sludge Pumping	236,498			201,023	35,475
12	Sludge Digestion	398,558			338,774	59,784
13	Sludge Holding Tanks	235,182			199,905	35,277
14	Sludge Dewatering	309,990			263,492	46,498
15	Sludge Lagoon	2,952			2,509	443
16	Grit and Screening Incineration	273,086	185,698	87,388		
17	Scum and Grease Incineration	69,379			69,379	
18	Scum Pumping	323,022			323,022	
19	Primary Sludge Transfer Pumping	167,279			167,279	
20	Waste Activated Sludge Xfer Pumping	155,743			132,382	23,361
21	Laboratory	553,752			276,876	276,876
22	Subtotal Personal Services	7,565,000	2,737,167	1,648,679	2,297,663	881,491
	Purchase of Services, Materials, Supplies, and Equipment:					
23	Raw Wastewater Pumping	139,506		139,506		
24	Preliminary Treatment	407,268		407,268		
25	Flocculation	171,008	171,008			
26	Primary Sedimentation	110,255	110,255			
27	Aeration	171,008				171,008
28	Secondary Sedimentation	139,506	139,506			
29	Recirculating Pumping	83,254	83,254			
30	Chlorination	1,196,628	1,196,628			
31	Effluent Pumping	72,003		72,003		
32	Primary Sludge Pumping	130,506			130,506	
33	Waste Sludge Pumping	83,254			70,766	12,488
34	Sludge Digestion	128,275			109,034	19,241
35	Sludge Holding Tanks	110,518			93,940	16,578
36	Sludge Dewatering	271,173			230,497	40,676
37	Sludge Lagoon	2,507			2,131	376
38	Grit and Screening Incineration	57,382		57,382		
39	Scum and Grease Incineration	18,385			18,385	
40	Scum Pumping	130,506			130,506	
41	Primary Sludge Transfer Pumping	47,252			47,252	
42	Waste Activated Sludge Xfer Pumping	45,002			38,252	6,750
43	Laboratory	182,258			91,129	91,129
44	Subtotal Purchase of Services, Materials, Supplies & Equipment	3,697,454	1,700,651	676,159	962,398	358,246
45	Subtotal All Above	11,262,454	4,437,818	2,324,838	3,260,061	1,239,737
	Administrative & General					
46	Personal Services	2,117,929	766,309	461,571	643,263	246,786
47	Other	285,830	131,468	52,270	74,398	27,694
48	Subtotal Administration & General	2,403,759	897,777	513,841	717,661	274,480
	Power Requirements					
49	Raw Wastewater Pumping	92,691	78,787	13,904		
50	Flocculation	142,696	121,292	21,404		
51	Primary Sedimentation	5,692	4,838	854		
52	Aeration	123,589				123,589
53	Secondary Sedimentation	4,065	3,455	610		
54	Recirculating Pumping	9,757	8,293	1,464		
55	Chlorination	1,220	1,037	183		
56	Effluent Pumping	10,977	9,330	1,647		
57	Primary Sludge Pumping	407			407	
58	Waste Sludge Pumping	1,220			1,037	183
59	Sludge Digestion	10,556			8,973	1,583
60	Sludge Dewatering	7,733			6,573	1,160
61	Grit and Screening Incineration	4,795	4,076	719		
62	Scum and Grease Incineration	735			735	
63	Scum Pumping	1,220			1,220	
64	Primary Sludge Transfer Pumping	8,537			8,537	
65	Waste Activated Sludge Xfer Pumping	4,472			3,801	671
66	Subtotal Power Requirements	430,362	231,108	40,785	31,283	127,186
67	Sludge Disposal	3,667,046			3,116,989	550,057
68	**Total Southeast WPC Plant Expense**	**17,763,621**	**5,566,703**	**2,879,464**	**7,125,994**	**2,191,460**

TABLE WW - 11

WASTEWATER: RETAIL UNIT COSTS OF SERVICE (FY 2017) - (Part I)
Test Year 2017

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Collection System				Water Pollution Control Plants			
Line			Pumping Station		Sanitary Sewers				Suspended	
No.	Description	Total	Volume	Capacity	Capacity	Storm Costs	Volume	Capacity	Solids	BOD
	Total Units of Service									
1	Units	$	Mcf	Mcf/day	Mcf/day	Meters	Mcf	Mcf/day	1,000 lbs.	1,000 lbs.
2	Quantity		17,094,100	100,446	308,114	568,629	17,094,100	100,446	172,997	119,704
	Operation and Maintenance Expense									
3	Total Expense - $	195,518,531	4,053,000	16,848,500	24,968,800	53,056,200	25,386,000	11,377,000	38,270,031	21,559,000
4	Unit Expense - $/unit		0.2371	167.7369	81.0375	93.3055	1.4851	113.2648	221.2176	180.1026
	Capital Costs									
5	Total Plant Investment - $	1,941,757,000		31,759,000	492,699,600	875,910,400	150,459,000	113,833,000	141,352,000	135,744,000
6	Unit Plant Investment - $/unit			316.1798	1,599.0822	1,540.3900	8.8018	1,133.2756	817.0766	1,133.9972
7	Depreciable Plant Investment - $	1,938,524,000		31,759,000	492,045,800	874,748,200	150,075,000	113,583,000	140,956,000	135,357,000
8	Unit Depreciable Plant Investment - $/unit			316.1798	1,596.9602	1,538.3461	8.7793	1,130.7867	814.7875	1,130.7642
9	Depreciation Expense - $	41,629,100		793,900	9,840,900	17,495,000	3,751,900	2,839,600	3,523,900	3,383,900
10	Unit Depreciation Expense - $/unit			7.9045	31.9392	30.7669	0.2195	28.2697	20.3697	28.2691
	Unit Return on Investment									
11	Total Return - $	100,250,200		1,639,700	25,437,400	45,222,000	7,768,000	5,877,000	7,297,800	7,008,300
12	Inside City - $/Unit (a)			16.3239	82.5584	79.5282	0.4544	58.5094	42.1845	58.5467
	Total Unit Capital Costs									
13	(Line 10 + Line 12) - $/unit			24.2284	114.4976	110.2951	0.6739	86.7791	62.5542	86.8158
	Total Unit Costs of Service									
14	Inside City (Line 4 + Line 13) - $/unit		0.2371	191.9653	195.5351	203.6006	2.1590	200.0439	283.7718	266.9184

(a) Retail rate of return = 5.1629 %.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WW - 12

WASTWATER: RETAIL UNIT COSTS OF SERVICE (FY 2017) - (Part 2)
Test Year 2017

		(10)	(11)	(12)	(13)	(14)	(15)
		Customer Costs					
					Industrial Waste Unit		
			Billing			Direct Excess	
Line					Retail	Strength	Direct
No.	Description	Meter Costs	Sanitary	Stormwater	Customers	Wastewater	Stormwater
	Total Units of Service						
1	Units	Eq. Meters	Eq. Bills	Eq. Bills	Eq. Meters		Eq. Meters
2	Quantity	568,924	5,768,163	5,768,163	568,926		568,926
	Operation and Maintenance Expense						
3	Total Expense - $	3,874,000	21,370,000	13,958,144	2,357,000	1,192,000	2,893,000
4	Unit Expense - $/unit	6.8093	3.7048	2.4199	4.1429		5.0850
	Capital Costs						
5	Total Plant Investment - $						
6	Unit Plant Investment - $/unit						
7	Depreciable Plant Investment - $						
8	Unit Depreciable Plant Investment - $/unit						
9	Depreciation Expense - $						
10	Unit Depreciation Expense - $/unit						
	Unit Return on Investment						
11	Total Return - $						
12	Inside City - $/Unit (a)						
	Total Unit Capital Costs						
13	(Line 10 + Line 12) - $/unit						
	Total Unit Costs of Service						
14	Inside City (Line 4 + Line 13) - $/unit	6.8093	3.7048	2.4199	4.1429	0.0000	5.0850

(a) Retail rate of return = 5.1628 %.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WW - 13
WASTEWATER: RETAIL COSTS OF SERVICE (a)
(in thousands of dollars)
Test Year 2017

			Collection System			Treatment				Customer		Industrial Waste	
Line #	Customer Type	Allocated Cost of Service	Pumping Volume	Pumping Capacity	Sewer Capacity	Volume	Capacity	TSS	BOD	Meter	Billing & Collection	Surcharge	Meter
1	Residential	$ 71,086	$ 711	$ 2,365	$ 6,425	$ 6,473	$ 2,465	$ 15,927	$ 13,982	$ 2,867	$ 18,127	$ -	$ 1,744
2	Commercial	21,393	279	927	2,519	2,538	966	6,245	5,482	490	1,648	-	298
3	Industrial	1,402	19	64	173	175	67	430	378	25	56	-	15
4	Public Utilities	169	2	7	20	20	8	49	43	7	9	-	4
5	Senior Citizens	2,828	25	84	227	229	87	563	494	137	897	-	84
6	Wastewater Only	662	10	32	87	88	33	215	189	3	5	-	2
7	Groundwater	2,047	45	250	814	410	260	236	32	-	-	-	-
8	Surcharge	5,312	-	-	-	-	-	731	3,387	-	-	1,194	-
9	Housing Authority	2,975	39	128	348	351	133	863	758	55	267	-	34
10	Charities & Schools	3,414	45	149	404	407	155	1,001	879	121	180	-	73
11	Hospital/University	4,610	66	218	593	597	227	1,469	1,290	57	58	-	35
12	Hand Bill	7,611	111	368	999	1,007	383	2,477	2,175	35	35	-	21
13	Scheduled (Flat Rate)	0	0	-	-	0	-	-	-	-	0	-	0
14	Water Treatment Plant Sludge	6,358	81	270	732	738	281	4,257	-	-	-	-	-
15	Private Fire Connections	50	1	2	6	6	2	14	12	2	4	-	1
16	City Leased Properties	73	1	3	9	9	3	22	19	2	3	-	1
17	City	3,751	52	174	472	476	181	1,171	1,028	72	81	-	44
	Infiltration/Inflow												
18	Conveyance	46,419	-	-	46,419	-	-	-	-	-	-	-	-
19	Pumping & Treatment	70,260	2,568	14,241	-	23,384	14,841	13,422	1,803	-	-	-	-
20	Total	$ 250,421	$ 4,053	$ 19,283	$ 60,247	$ 36,906	$ 20,094	$ 49,092	$ 31,951	$ 3,874	$ 21,370	$ 1,194	$ 2,357

Notes: (a) Annual Cost of Service by component for each customer type based on the customer type units of service (Table WW-8) and the total unit cost for each component (Tables WW-11 and WW-12).

TABLE WW - 14
WASTEWATER: ADJUSTED COSTS OF SERVICE (AFTER ALLOCATION OF I/I AND DISCOUNTS)
(in thousands of dollars)
Test Year 2017

			Re-allocation of I/I (a)						
Line #	Customer Type	Allocated Cost of Service	Sanitary Sewer	Stormwater	Adjusted Cost of Service	Discounts	Adjusted Cost of Service with Discounts	Recovery of Discounts (b)	Adjusted Cost of Service
1	Residential	$ 71,086	$ 50,628		$ 121,714		$ 121,714	$ 2,960	$ 124,674
2	Commercial	21,393	17,572		38,965		38,965	947	39,912
3	Industrial	1,402	1,180		2,582		2,582	63	2,645
4	Public Utilities	169	148		317		317	8	324
5	Senior Citizens	2,828	1,920		4,748	(1,187)	3,561	87	3,647
6	Wastewater Only	662	554		1,217		1,217	30	1,246
7	Groundwater	2,047	-		2,047		2,047	50	2,097
8	Surcharge	5,312	-		5,312		5,312	129	5,441
9	Housing Authority	2,975	2,384		5,359	(268)	5,091	124	5,215
10	Charities & Schools	3,414	2,969		6,383	(1,596)	4,787	116	4,903
11	Hospital/University	4,610	3,925		8,535	(2,134)	6,401	156	6,557
12	Hand Bill	7,611	6,397		14,008		14,008	341	14,349
13	Scheduled (Flat Rate)	0	0		0		0	0	0
14	Water Treatment Plant Sludge	6,358	4,594		10,952		10,952		10,952
15	Private Fire Connections	50	43		93		93	2	96
16	City Leased Properties	73	64		137		137	3	140
17	City	3,751	3,223		6,974		6,974	170	7,144
	Infiltration/Inflow								
18	Conveyance	46,419	(46,419)	-	-				
19	Pumping & Treatment	70,260	(49,182)	(21,078)	-				
20	Total	250,421	-	(21,078)	229,343	(5,184)	224,158	5,184	229,343
	Allocation of I/I								
21	Sanitary Sewer	250,421	-	(21,078)	229,343				
22	Stormwater		-	21,078	21,078				
23	Total	250,421	-	-	250,421				

Notes: (a) 70% of allocated I/I costs are recovered by sanitary sewer rates and charges. 30% of allocated I/I costs are recovered by stormwater rates and charges.

(b) Reflects current policy of recovering discounts from all customer types.

TABLE WW - 15

WASTEWATER: INSIDE CITY RETAIL SERVICE UNIT COSTS OF SERVICE FOR RATE DESIGN
Test Year 2017

Line No.	Cost Component	(1) Units	(2) Unadjusted Unit Cost	(3) COS Deficit Recovery Factor	(4) Billing Units Conversion Factor	(5) Total Adjustment Factor	(6) Adjusted Unit Cost	
			$/Unit				$/Unit	
	Collection System							
	Pumping Station							
1	Volume	Mcf	0.2371	1.0243	0.95	0.9731	0.2307	/Mcf
2	Capacity	Mcf/day	191.9653	1.0243	0.95	0.9731	186.8014	Mcf/day
3	Sanitary Sewers - Capacity	Mcf/day	195.5351	1.0243	0.95	0.9731	190.2752	Mcf/day
	WPC Plants							
4	Volume	Mcf	2.1590	1.0243	0.95	0.9731	2.1009	/Mcf
5	Capacity	Mcf/day	200.0439	1.0243	0.95	0.9731	194.6627	Mcf/day
6	Suspended Solids	1,000 lbs	283.7718	1.0243	1.00	1.0243	290.6675	/1,000 lbs
7	BOD	1,000 lbs	266.9184	1.0243	1.00	1.0243	273.4045	/1,000 lbs
	Customer Costs							
8	Meter Costs	Eq. Meters	6.8093	1.0243	1.00	1.0243	6.9748	/year
	Billing Costs							
9	Sanitary	Eq. Bills	3.7048	1.0243	1.00	1.0243	3.7948	/monthly bill
10	Industrial Waste Unit - Retail	Eq. Meters	4.1429	1.0243	1.00	1.0243	4.2436	/year
11	Infiltration/Inflow - Customer Related	Eq. Meters	24.4770	1.0243	1.00	1.0243	25.0718	/year
12	Infiltration/Inflow - Volume Related	Volume	13.4489	1.0243	0.95	0.9731	13.0871	/Mcf

Mcf - Thousand cubic feet
lbs - pounds

TABLE WW - 16

WASTEWATER: DEVELOPMENT OF COST OF SERVICE
MONTHLY SERVICE CHARGE FOR CUSTOMERS WITH 5/8-INCH METERS
Test Year 2017

Line No.	Cost Component	(1) Units	(2) Unit Cost	(3) Number of Units	(4) Total Cost
			$/Unit		$
	Customer Costs				
1	Meter Costs	Eq. Meter	0.5812	1.0	0.5812
2	Billing Costs	Eq. Bills	3.7948	1.0	3.7948
3	Industrial Waste Unit	Eq. Meter	0.3536	1.0	0.3536
4	Infiltration/Inflow Costs - Sanitary	Eq. Meter	2.0893	1.0	2.0893
5	Total Service Charge (a)				6.8189
6	Total Service Charge - Rounded (a)				6.82

(a) Prior to lag factor.

TABLE WW - 17

WASTEWATER: DEVELOPMENT OF COST OF SERVICE
VOLUME CHARGE PER MCF
OF NORMAL STRENGTH SANITARY WASTEWATERS
Test Year 2017

Line No.	Cost Component	(1) Units	(2) Adjusted Unit Cost	(3) Number of Units	(4) Total Cost
			$/Unit		$
	Collection System				
	Pumping Stations				
1	Volume	Mcf	0.2307	1.0000	0.2307
2	Capacity	Mcf/day/mo.	15.5668	(a) 0.0493	0.7674
3	Sanitary Sewers: Capacity	Mcf/day/mo.	15.8563	(b) 0.1316	2.0867
	Water Pollution Control Plants				
4	Volume	Mcf	2.1009	1.0000	2.1009
5	Capacity	Mcf/day/mo.	16.2219	(a) 0.0493	0.7997
6	Suspended Solids	1,000 lbs	290.6675	(c) 0.0187	5.4355
7	BOD	1,000 lbs	273.4045	(d) 0.0175	4.7846
8	Total Cost per Mcf				16.2055
9	Infiltration/Inflow Cost	Mcf	13.0871	1.0000	13.0871
10	Total Cost + Infiltration/Inflow per Mcf (e)				29.2926
11	Total Cost per Mcf - Rounded (e)				29.29

(a) (1.0 Mcf * 1 month/30.4 days) * 1.5
(b) (1.0 Mcf * 1 month/30.4 days) * 4.0
(c) 1.0 Mcf @ 235 mg/l
(d) 1.0 Mcf @ 230 mg/l
(e) Prior to lag factor.

Mcf - Thousand cubic feet
Mcf/day - Thousand cubic feet/day
lbs - pounds
mg/l - milligram per liter

TABLE WW - 18

WASTEWATER: PROPOSED RATES FOR GENERAL SERVICE SANITARY SEWER

METER BASED SERVICE CHARGE

Meter Size	FY 2017 Monthly Charge	FY 2018 Monthly Charge
Inches	$	$
5/8	7.22	7.54
3/4	8.81	9.24
1	12.41	13.06
1 1/2	20.81	21.99
2	31.62	33.45
3	56.02	59.37
4	96.05	101.71
6	188.08	199.28
8	296.11	313.89
10	428.16	453.81
12	768.19	815.18

QUANTITY CHARGE

	FY 2017 Charge per Mcf	FY 2018 Charge per Mcf
	$	$
All billable water usage	30.99	33.22
Groundwater Charge	11.41	12.12

SURCHARGE RATES

	FY 2017 Charge per lb	FY 2018 Charge per lb
	$	$
BOD (excess of 250 mg/l)	0.354	0.379
SS (excess of 350 mg/l)	0.377	0.404

Mcf-Thousand cubic feet
mg/l-milligrams per liter

PUBLIC HEARING ON PROPOSED WATER AND WASTEWATER RATES 2015

WATER DEPARTMENT PHILADELPHIA, PENNSYLVANIA

EXHIBIT BV-E2

DECEMBER 2015

BLACK & VEATCH
building a world of difference™

Exhibit REF #		Exhibit Name
BV-E2	Black & Veatch Exhibits	
1	TABLE WH-1	WASTEWATER WHOLESALE: ALLOCATION OF TEST YEAR PLANT INVESTMENT AND DEPRECIATION
2	TABLE WH-2	WASTEWATER: TEST YEAR OPERATION AND MAINTENANCE EXPENSE SUMMARY OF ALLOCATIONS
3	TABLE WH-3	WASTEWATER WHOLESALE: OUTSIDE CITY CONTRACT SERVICE UNITS OF SERVICE
4	TABLE WH-4	WASTEWATER: ESTIMATED AVERAGE WASTEWATER STRENGTH CONCENTRATIONS
5	TABLE WH-5	WASTEWATER WHOLESALE: WATER POLLUTION CONTROL PLANT INVESTMENT PER UNIT OF CAPACITY
6	TABLE WH-6	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO ABINGTON TOWNSHIP
7	TABLE WH-7	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO BENSALEM TOWNSHIP
8	TABLE WH-8	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO BUCKS COUNTY
9	TABLE WH-9	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO CHELTENHAM TOWNSHIP
10	TABLE WH-10	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO DELCORA
11	TABLE WH-11	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO LOWER MERION TOWNSHIP
12	TABLE WH-12	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO LOWER MORELAND TOWNSHIP
13	TABLE WH-13	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO LOWER SOUTHAMPTON TOWNSHIP
14	TABLE WH-14	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO SPRINGFIELD (EXCL. WYNDMOOR) TOWNSHIP
15	TABLE WH-15	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO SPRINGFIELD (WYNDMOOR) TOWNSHIP
16	TABLE WH-16	WASTEWATER WHOLESALE: SYSTEM INVESTMENT ALLOCATED TO UPPER DARBY
17	TABLE WH-17	WASTEWATER WHOLESALE: UNIT PUMPING AND TREATMENT OPERATION AND MAINTENANCE EXPENSE APPLICABLE TO CONTRACT SERVICE

Exhibit REF #		Exhibit Name
BV-E2	**Black & Veatch Exhibits**	
18	**TABLE WH-18**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO ABINGTON TOWNSHIP
19	**TABLE WH-19**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO BENSALEM TOWNSHIP
20	**TABLE WH-20**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO BUCKS COUNTY W&SA
21	**TABLE WH-21**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO CHELTENHAM TOWNSHIP
22	**TABLE WH-22**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO DELCORA
23	**TABLE WH-23**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO LOWER MERION TOWNSHIP
24	**TABLE WH-24**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO LOWER MORELAND TOWNSHIP
25	**TABLE WH-25**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO LOWER SOUTHAMPTON TOWNSHIP
26	**TABLE WH-26**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO SPRINGFIELD (EXCLUDING WYNDMOOR) TOWNSHIP
27	**TABLE WH-27**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO SPRINGFIELD (INCLUDING WYNDMOOR) TOWNSHIP
28	**TABLE WH-28**	WASTEWATER WHOLESALE: OPERATING EXPENSE ALLOCATED TO UPPER DARBY TOWNSHIP
29	**TABLE WH-29**	WASTEWATER WHOLESALE: SUMMARY OF ALLOCATED COST OF SERVICE FOR CONTRACT CUSTOMERS
30	**TABLE WH-30**	WASTEWATER WHOLESALE: SUMMARY OF TEST YEAR CHARGES FOR WHOLESALE CONTRACT CUSTOMERS
31	**TABLE WH-31**	WASTEWATER WHOLESALE: SUMMARY OF PROJECTED FY2018 CHARGES FOR WHOLESALE CONTRACT CUSTOMERS

TABLE WH - 1

WASTEWATER WHOLESALE: ALLOCATION OF TEST YEAR PLANT INVESTMENT AND DEPRECIATION
Test Year 2017

Line No.	Cost Component	Total Direct Investment (a)	Annual Depreciation Expense (b)
		$	$
	COLLECTION SYSTEM		
1	Sewers - Capacity	1,353,850,000	26,754,000
2	Pumping Stations - Capacity	32,011,000	796,000
3	LTCP Investment	37,079,000	742,000
4	Total Collection System	1,422,940,000	28,292,000
	WATER POLLUTION CONTROL PLANTS		
	Northeast Plant:		
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Lower Moreland, and Lower Southampton		
5	Capacity	6,178,000	
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Cheltenham, Lower Moreland, & Lower Southampton		
6	Volume	73,476,000	
7	Capacity	29,405,000	
8	Suspended Solids	79,566,000	
9	BOD	99,436,000	
10	Total Northeast Plant	288,061,000	6,099,000
	Southwest Plant:		
	Retail		
11	Capacity	18,563,000	
	Retail, DELCORA, Lower Merion, Springfield excl. Wyndmoor), & Upper Darby		
12	Volume	77,203,000	
13	Capacity	25,951,000	
14	Suspended Solids	65,439,000	
15	BOD	59,490,000	
16	Total Southwest Plant	246,646,000	4,172,000
	Southeast Plant:		
	Retail and Springfield (Wyndmoor)		
17	Volume	53,656,000	
18	Capacity	51,242,000	
19	Suspended Solids	28,912,000	
20	BOD	29,504,000	
21	Total Southeast Plant	163,314,000	4,079,000
22	Total Water Pollution Control Plants	698,021,000	14,350,000
23	**Total Investment**	**2,120,961,000**	**42,642,000**

(a) Plant Investment as of 6/30/2015. Includes Administration & General Costs.

(b) Based upon 2 percent of the depreciable investment in the collection system and 2.5 percent of the depreciable investment in treatment and pumping facilities.

TABLE WH - 2

WASTEWATER: TEST YEAR OPERATION AND MAINTENANCE EXPENSE
SUMMARY OF ALLOCATIONS
Test Year 2017

Line No.	Cost Component	(1) Direct Operation & Maintenance Expense	(2) Administrative & General Expense	(3) Total Operation & Maintenance Expense	(4) O&M Expense Deductions Less Interest Income	(5) O&M Expense Deductions Less Grants	(6) Net Operation & Maintenance Expense
		$1,000	$1,000	$1,000	$1,000	$1,000	$1,000
	COLLECTION SYSTEM						
	Sewer Maintenance						
1	All Customers - Capacity	41,852	24,120	65,972	85	0	65,887
	Inlet Cleaning						
2	Retail - Storm Capacity	11,476	4,822	16,298	21	0	16,277
	Neill Drive Pumping Station						
	Retail and Lower Merion						
3	Total Volume	56	0	56	0	0	56
4	Total Capacity	27	16	43	0	0	43
	Central Schuykill Pumping Station						
	Retail and Springfield (excl. Wyndmoor)						
5	Total Volume	1,160	0	1,160	1	0	1,159
6	Total Capacity	1,036	407	1,443	2	0	1,441
	All Other Pumping Stations						
	Retail						
7	Total Volume	3,098	0	3,098	4	0	3,094
8	Total Capacity	11,477	4,677	16,154	21	0	16,133
9	Total Collection Systems	70,182	34,042	104,224	134	0	104,090
	WATER POLLUTION CONTROL PLANTS						
	Northeast Plant:						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland & Lower Southampton						
10	Volume	569	0	569	1	0	568
11	Capacity	1,685	689	2,374	3	0	2,371
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
12	Volume	8,295	3,669	11,964	15	0	11,949
13	Capacity	2,626	1,205	3,831	5	0	3,826
14	Suspended Solids	15,662	6,782	22,444	29	0	22,415
15	BOD	13,333	4,403	17,736	23	0	17,713
	Southwest Plant:						
	Retail						
16	Volume	28	0	28	0	0	28
17	Capacity	252	191	443	1	0	442
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby						
18	Volume	8,187	3,714	11,901	15	0	11,886
19	Capacity	2,714	1,246	3,960	5	0	3,955
20	Suspended Solids	11,429	5,053	16,482	23	0	16,459
21	BOD	6,837	2,688	9,525	12	0	9,513
	Southeast Plant:						
	Retail and Springfield (Wyndmoor)						
22	Volume	5,567	2,494	8,061	10	0	8,051
23	Capacity	2,879	1,433	4,312	6	0	4,306
24	Suspended Solids	7,191	3,145	10,336	13	0	10,323
25	BOD	2,191	1,006	3,197	4	0	3,193
26	Total Water Pollution Control Plants	89,445	37,718	127,163	165	0	126,998
	CUSTOMER COSTS						
	All Customers						
27	Equivalent Bills	27,293	9,838	37,131	48	0	37,083
	Equivalent Meters						
28	Industrial Waste Unit	1,860	670	2,530	3	0	2,527
29	Other	2,974	1,072	4,046	5	0	4,041
30	Excess Strength Wastewater - Direct	916	330	1,246	2	0	1,244
31	Stormwater Incentive Programs	2,221	801	3,022	4	0	3,018
32	Total Customer Costs	35,264	12,711	47,975	62	0	47,913
33	**Total Operation & Maintenance Expense**	**194,891**	**84,471**	**279,362**	**361**	**0**	**279,001**

TABLE WH - 3

WASTEWATER WHOLESALE: OUTSIDE CITY CONTRACT SERVICE UNITS OF SERVICE
Test Year 2017

		(1)	(2)	(3)	(4)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			Northeast WPC Plant						Southwest WPC Plant					Southeast WPC Plant	
Line No.		Units	Abington	Bensalem	Bucks County	Lower Moreland	Lower Southhampton	Total Northeast	DELCORA	Lower Merion	Springfield (Excluding Wyndmoor)	Upper Darby	Total Southwest	Springfield (Wyndmoor)	Total
	FY 2017 Test Year														
	Volume														
1	Sanitary Wastewater	(Mcf)	100,000	175,000	870,000	58,000	270,000	1,823,000	1,200,000	360,000	160,000	470,000	2,190,000	19,000	4,032,000
2	Infiltration	(Mcf)	4,500	5,600	35,100	2,800	7,500	65,300	0	14,900	2,200	16,600	33,700	900	99,900
3	Total	(Mcf)	104,500	180,600	905,100	60,800	277,500	1,888,300	1,200,000	374,900	162,200	486,600	2,223,700	19,900	4,131,900
	Suspended Solids														
4	Sanitary Wastewater	(1,000 lbs)	1,098	2,239	9,718	597	2,696	19,449	13,104	3,707	1,697	4,604	23,112	130	42,691
5	Infiltration	(1,000 lbs)	28	35	219	17	47	407	0	93	14	104	211	6	624
6	Total	(1,000 lbs)	1,126	2,274	9,937	614	2,743	19,856	13,104	3,800	1,711	4,708	23,323	136	43,315
	BOD														
7	Sanitary Wastewater	(1,000 lbs)	1,098	2,479	9,609	449	2,106	18,449	11,082	3,190	1,797	3,989	20,058	100	38,607
8	Infiltration	(1,000 lbs)	7	9	55	4	12	102	0	23	3	26	52	1	155
9	Total	(1,000 lbs)	1,105	2,488	9,664	453	2,118	18,551	11,082	3,213	1,800	4,015	20,110	101	38,762
	Contract Maximum Units														
	Capacity														
10	Sanitary Wastewater	(Mcf/day)	824	1,014	6,416	508	1,364	11,919	13,392	2,728	397	3,024	19,541	167	31,627
11	Infiltration	(Mcf/day)	20	20	140	10	30	260	0	60	10	70	140	0	400
12	Total	(Mcf/day)	844	1,034	6,556	518	1,394	12,179	13,392	2,788	407	3,094	19,681	167	32,027
	Volume														
13	Sanitary Wastewater	(Mcf)	217,292	299,271	1,171,123	92,714	348,409	2,783,179	2,439,840	707,553	156,150	829,545	4,133,088	48,797	6,965,064
14	Infiltration	(Mcf)	4,500	5,600	35,100	2,800	7,500	65,300	0	14,900	2,200	16,600	33,700	900	99,900
15	Total	(Mcf)	221,792	304,871	1,206,223	95,514	355,909	2,848,479	2,439,840	722,453	158,350	846,145	4,166,788	49,697	7,064,964
	Suspended Solids														
16	Sanitary Wastewater	(1,000 lbs)	2,386	3,734	13,400	966	6,000	32,284	19,487	7,250	1,200	7,349	35,286	200	67,770
17	Infiltration	(1,000 lbs)	28	35	219	17	47	407	0	93	14	104	211	6	624
18	Total	(1,000 lbs)	2,414	3,769	13,619	983	6,047	32,691	19,487	7,343	1,214	7,453	35,497	206	68,394
	BOD														
19	Sanitary Wastewater	(1,000 lbs)	2,386	5,340	13,400	729	5,500	32,418	21,771	6,871	1,050	6,831	36,523	155	69,096
20	Infiltration	(1,000 lbs)	7	9	55	4	12	102	0	23	3	26	52	1	155
21	Total	(1,000 lbs)	2,393	5,349	13,455	733	5,512	32,520	21,771	6,894	1,053	6,857	36,575	156	69,251

Mcf - thousand cubic feet
Mcf/day - thousand cubic feet per day
lbs - pounds

TABLE WH - 4

WASTEWATER: ESTIMATED AVERAGE WASTEWATER STRENGTH CONCENTRATIONS
Test Year 2017

Customer	Average Wastewater Strength Concentration	
	Suspended Solids	BOD
	mg/l	mg/l
Abington	176	176
Bensalem	205	227
Bucks County	179	177
Cheltenham	142	124
DELCORA	175	148
Lower Merion	165	142
Lower Moreland	165	124
Lower Southhampton	160	125
Springfield (excluding Wyndoor)	170	180
Springfield (Wyndoor)	110	84
Upper Darby	157	136

mg/l - milligram per liter

TABLE WH - 5

WATER POLLUTION CONTROL PLANT INVESTMENT PER UNIT OF CAPACITY
Test Year 2017

Line No.	Cost Component	(1) Direct Investment	(2) Units of Capacity	(3) Unit Investment	
		$		$	
	Northeast Water Pollution Control Plant				
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
1	- Capacity	6,178,000	370 mgd = 49,470 Mcf/day	124.8838	/Mcf/day
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
2	Volume	73,476,000	76,650 mg = 10,247,000 Mcf	7.1705	/Mcf
3	Capacity	29,405,000	420 mgd = 56,150 Mcf/day	523.6866	/Mcf/day
4	Suspended Solids	79,566,000	173,240,000 lbs	459.2819	/1,000 lbs
5	BOD	99,436,000	128,491,000 lbs	773.8752	/1,000 lbs
	Southwest Water Pollution Control Plant				
6	Retail - Capacity	18,563,000	50 mgd = 6,684 Mcf/day	2,777.2292	/Mcf/day
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby				
7	Volume	77,203,000	73,000 mg = 9,759,000 Mcf	7.9110	/Mcf
8	Capacity	25,951,000	400 mgd = 53,476 Mcf/day	485.2831	/Mcf/day
9	Suspended Solids	65,439,000	133,024,000	491.9337	/1,000 lbs
10	BOD	59,490,000	79,297,000	750.2218	/1,000 lbs
	Southeast Water Pollution Control Plant				
	Retail and Springfield (Wyndmoor)				
11	Volume	53,656,000	40,880 mg = 5,465,000 Mcf	9.8181	/Mcf
12	Capacity	51,242,000	224 mgd = 29,947 Mcf/day	1,711.0896	/Mcf/day
13	Suspended Solids	28,912,000	66,065,000 lbs	437.6296	/1,000 lbs
14	BOD	29,504,000	56,940,000 lbs	518.1595	/1,000 lbs

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

mg - million gallons
mgd - million gallons per day
Mcf - thousand cubic feet
Mcf/day - thousand cubic feet per day
lbs - pounds

TABLE WH - 6

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO ABINGTON TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day	124.8838	844		105,402	105,000
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7.1705	221,792		1,590,360	1,590,000
3	Capacity	Mcf/day	523.6866	844		441,991	442,000
4	SS	1,000 lbs	459.2819	2,414		1,108,707	1,109,000
5	BOD	1,000 lbs	773.8752	2,393		1,851,883	1,852,000
6	Total Treatment					5,098,343	5,098,000
	Conveyance						
7	Shady Lane & City Line	cfs	58,421	1.3680	1.02250	81,718	82,000
8	Pennypack & City Line	cfs	49,045	7.6940	1.02250	385,843	386,000
9	Cottman and Orville	cfs	45,328	0.4800	1.02250	22,247	22,000
10	Total Conveyance					489,808	490,000
		System Investment		Allocation			
		$					
7	LTCP Infrastructure Investment	37,078,807		0.58244%		215,960	216,000
						215,960	216,000
11	**Total Allocated System Investment**					**5,804,111**	**5,804,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 7

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO BENSALEM TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day	124.8838	1,034		129,130	129,000
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7	304,871		2,186,078	2,186,000
3	Capacity	Mcf/day	524	1,034		541,492	541,000
4	SS	1,000 lbs	459	3,769		1,731,033	1,731,000
5	BOD	1,000 lbs	774	5,349		4,139,458	4,139,000
6	Total Treatment					8,727,191	8,726,000
	Conveyance						
7	A-1	cfs	84,833	0.3700	1.02250	32,094	32,000
8	A-2	cfs	105,688	0.8800	1.02250	95,098	95,000
9	A-3	cfs	117,743	0.1200	1.02250	14,447	14,000
10	A-4	cfs	115,847	0.0800	1.02250	9,476	9,000
11	B	cfs	131,354	0.8400	1.02250	112,820	113,000
12	C	cfs	72,634	0.7500	1.02250	55,701	56,000
13	D	cfs	67,910	0.4600	1.02250	31,941	32,000
14	E	cfs	204,911	0.3800	1.02250	79,618	80,000
15	F	cfs	49,726	0.5800	1.02250	29,490	29,000
16	G-1	cfs	48,680	0.2700	1.02250	13,439	13,000
17	G-2	cfs	48,680	0.5100	1.02250	25,385	25,000
18	H	cfs	64,044	2.7200	1.02250	178,119	178,000
19	J-1	cfs	133,427	0.6760	1.02250	92,226	92,000
20	J-2	cfs	38,820	0.1610	1.02250	6,391	6,000
21	J-3	cfs	258,008	0.3830	1.02250	101,040	101,000
22	K-1	cfs	204,907	0.4300	1.02250	90,092	90,000
23	K-2	cfs	66,776	2.1300	1.02250	145,433	145,000
24	Total Conveyance					1,112,810	1,110,000
25	**Total Allocated System Investment**					**9,840,001**	**9,836,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 8

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO BUCKS COUNTY Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day	124.8838	6,556		818,738	819,000
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7.1705	1,206,223		8,649,222	8,649,000
3	Capacity	Mcf/day	523.6866	6,556		3,433,289	3,433,000
4	SS	1,000 lbs	459.2819	13,619		6,254,960	6,255,000
5	BOD	1,000 lbs	773.8752	13,455		10,412,491	10,412,000
6	Total Treatment					29,568,700	29,568,000
	Conveyance						
7	Large Sewers	cfs	18,000	85.08	1.02250	1,565,897	1,566,000
8	Total Conveyance					1,565,897	1,566,000
9	**Total Allocated System Investment**					**31,134,597**	**31,134,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 9

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO CHELTENHAM TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day		1,833			
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7.1705	664,170		4,762,431	4,762,000
3	Capacity	Mcf/day	523.6866	1,833		959,918	960,000
4	SS	1,000 lbs	459.2819	5,859		2,690,933	2,691,000
5	BOD	1,000 lbs	773.8752	5,078		3,929,738	3,930,000
6	Total Treatment					12,343,020	12,343,000
	Conveyance						
7	Cheltenham and Tacony Creek	cfs	15,378	18.00	1.02250	283,032	283,000
8	Bouvier Street	cfs	23,315	2.75	1.02250	65,559	66,000
9	Total Conveyance					348,591	349,000
10	**Total Allocated System Investment**					**12,691,611**	**12,692,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 10

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO DELCORA Fiscal Year 2017

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Allocated Investment (a)	(5) Allocated Investment Rounded (a)
			$		$	$
	SW Treatment Plant:					
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby					
1	Volume	Mcf	7.9110	2,439,840	19,301,574	19,302,000
2	Capacity	Mcf/day	485.2831	13,392	6,498,911	6,499,000
3	SS	1,000 lbs	491.9337	19,487	9,586,312	9,586,000
4	BOD	1,000 lbs	750.2218	21,771	16,333,079	16,333,000
5	Total Treatment				51,719,876	51,720,000
6	Conveyance				0	0
		System Investment		Allocation		
		$				
7	LTCP Infrastructure Investment	37,078,807		9.44287%	3,501,304	3,501,000
8	**Total Allocated System Investment**				**55,221,180**	**55,221,000**

(a) Estimated Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 11

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO LOWER MERION TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.9110	722,453		5,715,326	5,715,000
2	Capacity	Mcf/day	485.2831	2,788		1,352,969	1,353,000
3	SS	1,000 lbs	491.9337	7,343		3,612,269	3,612,000
4	BOD	1,000 lbs	750.2218	6,894		5,172,029	5,172,000
5	Total Treatment					15,852,593	15,852,000
	Conveyance						
6	City Avenue & 73rd Street	cfs	30,189	2.860	1.0225	88,283	88,000
7	City Avenue & 66th Street	cfs	35,407	15.880	1.0225	574,914	575,000
8	City Avenue & Overbrook Station	cfs	69,259	2.290	1.0225	162,172	162,000
9	City Avenue & 59th Street	cfs	132,481	0.330	1.0225	44,702	45,000
10	City Avenue & 54th Street	cfs	57,917	0.050	1.0225	2,961	3,000
11	City Avenue & 51st Street	cfs	60,355	8.470	1.0225	522,709	523,000
12	City Avenue & Conshohocken Avenue	cfs	103,583	0.390	1.0225	41,306	41,000
	City Avenue & Presidential Boulevard						
13	Sewers and Meter Station	cfs	134,831	1.300	1.0225	179,224	179,000
14	Neill Drive Pump Station	cfs	143,297	1.300	1.0225	190,478	190,000
	Barclay Building & Friends Central School						
15	Charged Inside Rates	cfs	43,227	0.052	1.0225	2,298	2,000
16	Total Conveyance					1,809,047	1,808,000
17	**Total Allocated System Investment**					**17,661,640**	**17,660,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 12

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO LOWER MORELAND TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day	124.8838	518		64,690	65,000
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7.1705	95,514		684,883	685,000
3	Capacity	Mcf/day	523.6866	518		271,270	271,000
4	SS	1,000 lbs	459.2819	983		451,474	451,000
5	BOD	1,000 lbs	773.8752	733		567,251	567,000
6	Total Treatment					2,039,568	2,039,000
	Conveyance						
7	Woodhaven Road and City Line	cfs	195,719	0.4140	1.0225	82,851	83,000
8	Erwin Street and County Line	cfs	94,589	0.0650	1.0225	6,287	6,000
9	Moreland Road and Pine Road	cfs	64,910	0.0350	1.0225	2,323	2,000
10	Pine Road and Radburn Road	cfs	66,406	0.0380	1.0225	2,580	3,000
11	Welsh Road and County Line	cfs	66,860	0.6060	1.0225	41,429	41,000
12	City Line and Red Lion	cfs	66,860	0.0170	1.0225	1,162	1,000
13	Conveyance Line	cfs	62,555	7.7960	1.0225	498,652	499,000
14	PC-30 Improvements (b)					70,102	70,000
15	Total Conveyance					705,386	705,000
			System Investment	Allocation			
			$				
16	LTCP Infrastructure Investment		37,078,807	0.35883%		133,050	133,000
17	**Total Allocated System Investment**					2,878,004	2,877,000

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.
(b) Allocated 0.15 percent of the Sewer Fund's share of the project funding ($46,734,645).

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 13

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO LOWER SOUTHAMPTON TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
1	Capacity	Mcf/day	124.8838	1,394		174,088	174,000
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
2	Volume	Mcf	7.1705	355,909		2,552,045	2,552,000
3	Capacity	Mcf/day	523.6866	1,394		730,019	730,000
4	SS	1,000 lbs	459.2819	6,047		2,777,278	2,777,000
5	BOD	1,000 lbs	773.8752	5,512		4,265,600	4,266,000
6	Total Treatment					10,499,030	10,499,000
	Conveyance						
7	Trevose and City Line	cfs	92,315	15.79	1.0225	1,490,451	1,490,000
8	PC-30 Improvements (b)					8,730,032	8,730,000
9	Total Conveyance					10,220,483	10,220,000
			System Investment	Allocation			
			$				
10	LTCP Infrastructure Investment		37,078,807	0.96412%		357,483	357,000
11	**Total Allocated System Investment**					**21,076,996**	**21,076,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.
(b) Allocated 18.68 percent of the Sewer Fund's share of the project funding ($4,6734,645).

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 14

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO SPRINGFIELD (EXCL. WYNDMOOR) TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.9110	158,350		1,252,707	1,253,000
2	Capacity	Mcf/day	485.2831	407		197,510	198,000
3	SS	1,000 lbs	491.9337	1,214		597,208	597,000
4	BOD	1,000 lbs	750.2218	1,053		789,984	790,000
5	Total Treatment					2,837,409	2,838,000
	Conveyance (b)						
	Erdenheim and Stenton						
6	Sewers	cfs	139,780	2.00	1.0225	285,850	286,000
7	Central Schuylkill Pump Station	cfs	13,211	2.00	1.0225	27,016	27,000
8	Meter Station	ea	35,702	1.00	1.0225	36,505	37,000
9	Total					349,371	350,000
	Northwestern and Stenton						
10	Sewers	cfs	139,780	2.60	1.0225	371,605	372,000
11	Central Schuylkill Pump Station	cfs	13,211	2.60	1.0225	35,121	35,000
12	Meter Station	ea	10,270	1.00	1.0225	10,501	11,000
13	Total					417,227	418,000
14	Total Conveyance					766,598	768,000
			System Investment	Allocation			
			$				
16	LTCP Infrastructure Investment		37,078,807	0.79320%		294,109	294,000
15	**Total Allocated System Investment**					**3,898,116**	**3,900,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.
(b) Excludes connection at Northwestern and Thomas which accounts for less than one half of one percent of township flow.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 15

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO SPRINGFIELD (WYNDMOOR) TOWNSHIP Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail and Springfield (Wyndmoor)						
1	Volume	Mcf	9.8181	49,697		487,930	488,000
2	Capacity	Mcf/day	1,711.0896	167		285,752	286,000
3	SS	1,000 lbs	437.6296	206		90,152	90,000
4	BOD	1,000 lbs	518.1595	156		80,833	81,000
5	Total Treatment					944,667	945,000
	Conveyance						
6		cfs	167,854	1.93	1.0225	331,247	331,000
7	Total Conveyance					331,247	331,000
8	**Total Allocated System Investment**					**1,275,914**	**1,276,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 16

WASTEWATER SYSTEM INVESTMENT ALLOCATED TO UPPER DARBY Test Year 2017

Line No.	Cost Component	Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.9110	846,145		6,693,853	6,694,000
2	Capacity	Mcf/day	485.2831	3,094		1,501,466	1,501,000
3	SS	1,000 lbs	491.9337	7,453		3,666,136	3,666,000
4	BOD	1,000 lbs	750.2218	6,857		5,144,271	5,144,000
5	Total Treatment					17,005,726	17,005,000
	Conveyance						
6	60th Street and Cobbs Creek Parkway	cfs	20,191	35.00	1.0225	722,585	723,000
7	Total Conveyance					722,585	723,000
8	**Total Allocated System Investment**					**17,728,311**	**17,728,000**

(a) Plant Investment as of 6/30/2015. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 17

WASTEWATER WHOLESALE: UNIT PUMPING AND TREATMENT OPERATION AND MAINTENANCE EXPENSE APPLICABLE TO CONTRACT SERVICE
Test Year 2017

Line No.	Cost Component	(1) Net Operating Expense	(2) Projected TY Units of Service		(3) Unit Operating Expense
		$			$/Unit
	PUMPING STATIONS				
	Neill Drive Pumping Station				
	Retail and Lower Merion				
1	Total Volume	56,000	69,650	Mcf	0.8040
2	Total Capacity	42,500	370	Mcf/day	114.8649
	Central Schuykill Pumping Station				
	Retail and Springfield (excl. Wyndmoor)				
3	Total Volume	1,159,000	2,715,700	Mcf	0.4268
4	Total Capacity	1,441,000	22,110	Mcf/day	65.1741
	WATER POLLUTION CONTROL PLANTS				
	Northeast Plant				
	Retail and Cheltenham				
5	Volume	0	NA	Mcf	0.0000
6	Capacity	0	NA	Mcf/day	0.0000
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
7	Volume	568,000	6,138,000	Mcf	0.0925
8	Capacity	2,371,000	38,310	Mcf/day	61.8898
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
9	Volume	11,949,000	8,295,000	Mcf	1.4405
10	Capacity	3,826,000	51,770	Mcf/day	73.9038
11	Suspended Solids	22,415,000	106,130	1,000 lbs	211.2027
12	BOD	17,713,000	74,123	1,000 lbs	238.9677
	Southwest Plant:				
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby				
13	Volume	11,886,000	8,539,000	Mcf	1.3920
14	Capacity	3,955,000	53,293	Mcf/day	74.2124
15	Suspended Solids	16,459,031	76,444	1,000 lbs	215.3083
16	BOD	9,513,000	55,069	1,000 lbs	172.7469
	Southeast Plant:				
	Retail and Springfield (Wyndmoor)				
17	Volume	8,051,000	4,392,000	Mcf	1.8331
18	Capacity	4,306,000	27,410	Mcf/day	157.0960
19	Suspended Solids	10,323,000	33,550	1,000 lbs	307.6900
20	BOD	3,193,000	29,181	1,000 lbs	109.4205

NA - Not Applicable
Mcf - thousand cubic feet
Mcf/day - thousand cubic feet per day
lbs - pounds

TABLE WH - 18

OPERATING EXPENSE ALLOCATED TO ABINGTON TOWNSHIP Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	490,000	x	3.80%		18,620
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0925	$/Mcf	104,500	Mcf	9,666
3	Capacity	61.8898	$/Mcf/day	844	Mcf/day	52,235
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.4405	$/Mcf	104,500	Mcf	150,532
5	Capacity	73.9038	$/Mcf/day	844	Mcf/day	62,375
6	Suspended Solids	211.2027	$/1,000 lbs	1,126	1,000 lbs	237,814
7	BOD	238.9677	$/1,000 lbs	1,105	1,000 lbs	264,059
8	Customer Costs					13,800
9	Total Treatment					809,101
	SMIP/GARP O&M Costs			System Amortized Cost	Allocation	
10	Amortization of SMIP/GARP Expenses (b)			653,622	0.58244%	3,807
11	Total - Rounded					813,000

(a) Based on investment in sewers serving Abington.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 19

OPERATING EXPENSE ALLOCATED TO BENSALEM TOWNSHIP Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	1,110,000	x	3.80%		42,180
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0925	$/Mcf	180,600	Mcf	16,706
3	Capacity	61.8898	$/Mcf/day	1,034	Mcf/day	63,994
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.4405	$/Mcf	180,600	Mcf	260,154
5	Capacity	73.9038	$/Mcf/day	1,034	Mcf/day	76,417
6	Suspended Solids	211.2027	$/1,000 lbs	2,274	1,000 lbs	480,275
7	BOD	238.9677	$/1,000 lbs	2,488	1,000 lbs	594,552
8	Customer Costs					49,400
9	Total					1,583,678
10	Total - Rounded					1,584,000

(a) Based on investment in sewers serving Bensalem.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 20

OPERATING EXPENSE ALLOCATED TO BUCKS COUNTY W&SA Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	1,566,000	x	3.80%		59,508
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0925	$/Mcf	905,100	Mcf	83,722
3	Capacity	61.8898	$/Mcf/day	6,556	Mcf/day	405,750
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.4405	$/Mcf	905,100	Mcf	1,303,797
5	Capacity	73.9038	$/Mcf/day	6,556	Mcf/day	484,513
6	Suspended Solids	211.2027	$/1,000 lbs	9,937	1,000 lbs	2,098,721
7	BOD	238.9677	$/1,000 lbs	9,664	1,000 lbs	2,309,384
8	Customer Costs					16,200
9	Total					6,761,595
10	Total - Rounded					6,762,000

(a) Based on investment in sewers serving Bucks County W&SA.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 21

OPERATING EXPENSE ALLOCATED TO CHELTENHAM TOWNSHIP Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	349,000	x	3.80%		13,262
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
11	Volume	NA	$/Mcf	359,800	Mcf	0
12	Capacity	NA	$/Mcf/day	1,833	Mcf/day	0
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
13	Volume	1.4405	$/Mcf	359,800	Mcf	518,292
14	Capacity	73.9038	$/Mcf/day	1,833	Mcf/day	135,466
15	Suspended Solids	211.2027	$/1,000 lbs	3,162	1,000 lbs	667,823
16	BOD	238.9677	$/1,000 lbs	2,723	1,000 lbs	650,709
17	Customer Costs					33,700
18	Total					2,019,252
19	Total - Rounded					2,019,000

(a) Based on investment in sewers serving Cheltenham.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 22

OPERATING EXPENSE ALLOCATED TO DELCORA Fiscal Year 2017

Line No.	Cost Component	(1) Operating Expense Per Unit	(2)	(3) Test Yr. No. of Units	(4)	(5) Allocated Operating Expense
		$				$
	SW Treatment Plant:					
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
1	Volume	1.3920	$/Mcf	1,200,000	Mcf	1,670,400
2	Capacity	74.2124	$/Mcf/day	13,392	Mcf/day	993,852
3	Suspended Solids	215.3083	$/1,000 lbs	13,104	1,000 lbs	2,821,400
4	BOD	172.7469	$/1,000 lbs	11,082	1,000 lbs	1,914,381
5	Customer Costs					43,000
6	Total Treatment					7,443,033
				System Amortized Cost	Allocation	
	SMIP/GARP O&M Costs					
7	Amortization of SMIP/GARP Expenses (a)			653,622	9.44287%	61,721
8	Total Annual Operating Expense					7,504,754
9	Total - Rounded					7,505,000

(a) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 23

OPERATING EXPENSE ALLOCATED TO LOWER MERION TOWNSHIP Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	1,808,000	x	3.80%		68,704
		Operating Expense Per Unit		Test Yr. No. of Units		
	Neill Drive Pump Station					
	Retail and Lower Merion					
2	Volume	0.8040	$/Mcf	14,700	Mcf	11,819
3	Capacity	114.8649	$/Mcf/day	115	Mcf/day	13,209
	SW Treatment Plants:					
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
4	Volume	1.3920	$/Mcf	374,900	Mcf	521,861
5	Capacity	74.2124	$/Mcf/day	2,788	Mcf/day	206,904
6	Suspended Solids	215.3083	$/1,000 lbs	3,800	1,000 lbs	818,172
7	BOD	172.7469	$/1,000 lbs	3,213	1,000 lbs	555,036
8	Customer Costs					53,900
9	Total					2,249,605
10	Total - Rounded					2,250,000

(a) Based on investment in sewers serving Lower Merion.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 24

OPERATING EXPENSE ALLOCATED TO LOWER MORELAND TOWNSHIP Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	705,000	x	3.80%		26,790
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0925	$/Mcf	60,800	Mcf	5,624
3	Capacity	61.8898	$/Mcf/day	518	Mcf/day	32,059
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.4405	$/Mcf	60,800	Mcf	87,582
5	Capacity	73.9038	$/Mcf/day	518	Mcf/day	38,282
6	Suspended Solids	211.2027	$/1,000 lbs	614	1,000 lbs	129,678
7	BOD	238.9677	$/1,000 lbs	453	1,000 lbs	108,252
8	Customer Costs					20,700
9	Total Treatment					448,967
	SMIP/GARP O&M Costs			System Amortized Cost	Allocation	
10	Amortization of SMIP/GARP Expenses (b)			653,622	0.35883%	2,345
11	Total - Rounded					451,000

(a) Based on investment in sewers serving Lower Moreland.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 25

OPERATING EXPENSE
ALLOCATED TO
LOWER SOUTHAMPTON TOWNSHIP
Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	10,220,000	x	3.80%		388,360
		Operating Expense Per Unit		Test Yr. No. of Units		
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0925	$/Mcf	277,500	Mcf	25,669
3	Capacity	61.8898	$/Mcf/day	1,394	Mcf/day	86,274
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.4405	$/Mcf	277,500	Mcf	399,739
5	Capacity	73.9038	$/Mcf/day	1,394	Mcf/day	103,022
6	Suspended Solids	211.2027	$/1,000 lbs	2,743	1,000 lbs	579,329
7	BOD	238.9677	$/1,000 lbs	2,118	1,000 lbs	506,134
8	Customer Costs					16,200
9	Total Treatment					2,104,727
	SMIP/GARP O&M Costs			System Amortized Cost	Allocation	
10	Amortization of SMIP/GARP Expenses (b)			653,622	0.96412%	6,302
11	Total - Rounded					2,111,000

(a) Based on investment in sewers serving Lower Southampton.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 26

OPERATING EXPENSE
ALLOCATED TO
SPRINGFIELD (EXCL. WYNDMOOR) TOWNSHIP
Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	768,000	x	3.80%		29,184
		Operating Expense Per Unit		Test Yr. No. of Units		
	Central Schuylkill Pump Station					
	Retail and Springfield (excluding Wyndmoor)					
2	Volume	0.4268	$/Mcf	162,200	Mcf	69,227
3	Capacity	65.1741	$/Mcf/day	407	Mcf/day	26,526
	SW Treatment Plants:					
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
4	Volume	1.3920	$/Mcf	162,200	Mcf	225,782
5	Capacity	74.2124	$/Mcf/day	407	Mcf/day	30,204
6	Suspended Solids	215.3083	$/1,000 lbs	1,711	1,000 lbs	368,393
7	BOD	172.7469	$/1,000 lbs	1,800	1,000 lbs	310,944
8	Customer Costs					27,200
9	Total Treatment					1,087,460
	SMIP/GARP O&M Costs			System Amortized Cost	Allocation	
10	Amortization of SMIP/GARP Expenses (b)			653,622	0.79320%	5,185
11	Total - Rounded					1,093,000

(a) Based on investment in sewers serving Springfield (excluding Wyndmoor).
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 27

OPERATING EXPENSE
ALLOCATED TO
SPRINGFIELD (WYNDMOOR) TOWNSHIP
Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	331,000	x	3.80%		12,578
		Operating Expense Per Unit		Test Yr. No. of Units		
	SE Treatment Plants:					
	Retail, Springfield (Wyndmoor)					
2	Volume	1.8331	$/Mcf	19,900	Mcf	36,479
3	Capacity	157.0960	$/Mcf/day	167	Mcf/day	26,235
4	Suspended Solids	307.6900	$/1,000 lbs	136	1,000 lbs	41,846
5	BOD	109.4205	$/1,000 lbs	101	1,000 lbs	11,051
6	Customer Costs					7,700
7	Total					135,889
8	Total - Rounded					136,000

(a) Based on investment in sewers serving Springfield (Wyndmoor).

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 28

OPERATING EXPENSE
ALLOCATED TO
UPPER DARBY TOWNSHIP
Test Year 2017

Line No.	Cost Component	(1) Allocated Investment		(2)		(3) Allocated Operating Expense
		$				$
	Collection System:					
1	Sewer Maintenance (a)	723,000	x	3.80%		27,474
		Operating Expense Per Unit		Test Yr. No. of Units		
	SW Treatment Plants: Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
2	Volume	1.3920	$/Mcf	486,600	Mcf	677,347
3	Capacity	74.2124	$/Mcf/day	3,094	Mcf/day	229,613
4	Suspended Solids	215.3083	$/1,000 lbs	4,708	1,000 lbs	1,013,671
5	BOD	172.7469	$/1,000 lbs	4,015	1,000 lbs	693,579
6	Customer Costs					13,800
7	Total					2,655,484
8	Total - Rounded					2,655,000

(a) Based on investment in sewers serving Upper Darby.

Mcf - Thousand cubic feet
lbs - pounds

TABLE WH - 29

WASTEWATER WHOLESALE: SUMMARY OF ALLOCATED COST OF SERVICE FOR CONTRACT CUSTOMERS
Test Year 2017

Line No.	Customer	(1) Allocated Investment (a)	(2) Allocated Depreciable Investment (a)	(3) O&M Expense	(4) Depreciation Expense	(5) Return on Investment	(6) Allocated Cost of Service
		$	$	$	$	$	$
1	Abington	5,804,000	5,786,000	813,000	141,120	435,300	1,389,420
2	Bensalem	9,836,000	9,805,000	1,584,000	(a)	(a)	1,584,000
3	Bucks County (b)	31,134,000	31,030,000	6,762,000	121,900	483,600	7,367,500
4	Cheltenham	12,692,000	12,649,000	2,019,000	314,480	951,900	3,285,380
5	DELCORA (c)	55,221,000	55,066,000	7,505,000	174,125	613,350	8,292,475
6	Lower Merion	17,660,000	17,613,000	2,250,000	(a)	(a)	2,250,000
7	Lower Moreland	2,877,000	2,870,000	451,000	67,560	215,775	734,335
8	Lower Southampton (d)	21,076,000	21,039,000	2,111,000	289,110	965,983	3,366,093
9	Springfield (less Wyndmoor)	3,900,000	3,891,000	1,093,000	92,275	292,500	1,477,775
10	Springfield (Wyndmoor)	1,276,000	1,275,000	136,000	30,220	95,700	261,920
11	Upper Darby	17,728,000	17,677,000	2,655,000	(a)	(a)	2,655,000
12	Total	179,204,000	178,701,000	27,379,000	1,230,790	4,054,108	32,663,898

(a) It is assumed that Bensalem, Lower Merion and Upper Darby contribute their entire allocated plant investment, and therefore, are not allocated any depreciation expense or return on investment.

(b) Bucks County allocated Return on Investment and Depreciation Expense based on assets in service after 6/30/2007.

(c) DELCORA allocated Return on Investment and Depreciation Expense based on assets in service after 7/1/2011.

(d) Lower Southampton phased into Return on Investment and Depreciation Expense on total rate base uniformly over18 years staring in FY 2007.

TABLE WH - 30

WASTEWATER WHOLESALE: SUMMARY OF TEST YEAR CHARGES FOR WHOLESALE CONTRACT CUSTOMERS
Test Year 2017

		(1)	(2)	(3)	(4)	(5)
			Unit Costs			
Line No.	Customer	Annual Lump Sum	Volume	Capacity (a)	Suspended Solids	BOD
		$	$/Mcf	$/cfs	$/1,000 lbs	$/1,000 lbs
1	Abington	612,000	1.5881	11,988	215.6224	240.2889
2	Bensalem	91,000	1.5881	11,988	215.6224	240.2889
3	Bucks County (b)	682,000	1.5881	11,988	215.6224	240.2889
4	Cheltenham	1,313,000	1.4921	6,525	215.6224	240.2889
5	Lower Moreland	333,000	1.5881	11,988	215.6224	240.2889
6	Lower Southampton	1,666,000	1.5881	11,988	215.6224	240.2889
7	DELCORA	892,000	1.3920	6,412	215.3083	172.7469
8	Lower Merion (c)(d)	123,000	1.4394	6,558	219.8477	173.7477
9	Springfield (less Wyndmoor)	446,000	1.8721	12,331	219.8477	173.7477
10	Upper Darby	41,000	1.4394	6,558	219.8477	173.7477
11	Springfield (Wyndmoor)	147,000	1.9199	13,573	321.8911	110.5147
12	Total	6,346,000				

(a) Annual Cost.

(b) Charges for recovery of costs associated with odor control of Bucks County W&SA wastewater are in addition to the charges shown herein.

(c) For flow through City Line Avenue and Presidential Drive connection, an additional cost of $0.8373 per Mcf is applicable for costs related to the Neill Drive Pump Station.

(d) For contract capacity at the City Line Avenue and Presidential Drive connection, an additional charge of $117.39 per Mcf/day ($10,143 per cfs) is applicable to costs related to Neill Drive Pump Station.

Mcf - Thousand cubic feet
cfs - cubic feet per second
lbs - pounds

TABLE WH-31

WASTEWATER WHOLESALE: SUMMARY OF TEST YEAR CHARGES FOR WHOLESALE CONTRACT CUSTOMERS
Test Year 2018

		(1)	(2)	(3)	(4)	(5)
			Unit Costs			
Line No.	Customer	Annual Lump Sum	Volume	Capacity (a)	Suspended Solids	BOD
		$	$/Mcf	$/cfs	$/1,000 lbs	$/1,000 lbs
1	Abington	612,000	1.6228	12,365	223.0214	249.0890
2	Bensalem	91,000	1.6228	12,365	223.0214	249.0890
3	Bucks County (b)	682,000	1.6228	12,365	223.0214	249.0890
4	Cheltenham	1,313,000	1.5229	6,735	223.0214	249.0890
5	Lower Moreland	333,000	1.6228	12,365	223.0214	249.0890
6	Lower Southampton	1,780,000	1.6228	12,365	223.0214	249.0890
7	DELCORA	892,000	1.4143	6,490	221.2842	178.1974
8	Lower Merion (c)(d)	123,000	1.4624	6,638	225.9496	179.2297
9	Springfield (less Wyndmoor)	446,000	1.8323	12,415	225.9496	179.2297
10	Upper Darby	41,000	1.4624	6,638	225.9496	179.2297
11	Springfield (Wyndmoor)	147,000	1.9645	13,985	332.4449	114.5522
12	Total	6,460,000				

(a) Annual Cost.

(b) Charges for recovery of costs associated with odor control of Bucks County W&SA wastewater are in addition to the charges shown herein.

(c) For flow through City Line Avenue and Presidential Drive connection, an additional cost of $0.7177 per Mcf is applicable for costs related to the Neill Drive Pump Station.

(d) For contract capacity at the City Line Avenue and Presidential Drive connection, an additional charge of $112.97 per Mcf/day ($9,761 per cfs) is applicable to costs related to Neill Drive Pump Station.

Mcf - Thousand cubic feet
cfs - cubic feet per second
lbs - pounds

PUBLIC HEARING ON PROPOSED WATER AND WASTEWATER RATES 2015

WATER DEPARTMENT PHILADELPHIA, PENNSYLVANIA

EXHIBIT BV-E3

DECEMBER 2015

BLACK & VEATCH
building a world of difference™

Exhibit REF #		Exhibit Name
BV-E3	Black & Veatch Exhibits	
1	TABLE SW-1	STORMWATER: NON RESIDENTIAL MEAN GROSS AREA AND IMPERVIOUS AREA
2	TABLE SW-2	STORMWATER: DETERMINATION OF BILLABLE PARCELS
3	TABLE SW-3	STORMWATER: DETERMINATION OF BILLABLE GROSS AREA
4	TABLE SW-4	STORMWATER: DETERMINATION OF BILLABLE IMPERVIOUS AREA
5	TABLE SW-5	STORMWATER: CREDIT PROJECTIONS
6	TABLE SW-6	STORMWATER: SMIP/GARP PROGRAM ANNUAL COST ESTIMATES
7	TABLE SW-7	STORMWATER: SMIP/GARP PROGRAM AWARDED PROJECT PROJECTIONS
8	TABLE SW-8	STORMWATER: SMIP/GARP PROGRAM AS-BUILT & VERIFIED PROJECT PROJECTIONS
9	TABLE SW-9	STORMWATER: SMIP/GARP PROGRAM PROJECTED CREDIT IMPACT
10	TABLE SW-10	STORMWATER: PROJECTIONS OF BILLABLE PARCELS, GROSS AREA AND IMPERVIOUS AREA
11	TABLE SW-11	STORMWATER: GA AND IA MANAGED CREDIT PROJECTION FACTORS
12	TABLE SW-12	STORMWATER: PROJECTED NUMBER OF BILLABLE ACCOUNTS
13	TABLE SW-13	STORMWATER: SUMMARY OF STORMWATER COSTS
14	TABLE SW-14	STORMWATER: ESTIMATE OF GROSS AREA (GA) AND IMPERVIOUS AREA (IA) UNIT COSTS ADJUSTED FOR CUSTOMER ASSISTANCE PROGRAM (CAP)
15	TABLE SW-15	STORMWATER: ESTIMATE OF CUSTOMER CLASS GA AND IA COST OF SERVICE ADJUSTED FOR CUSTOMER ASSISTANCE PROGRAM (CAP)
16	TABLE SW-16	STORMWATER: GA AND IA COST OF SERVICE RATES PRIOR TO DISCOUNT AND LAG FACTOR ADJUSTMENTS
17	TABLE SW-17	STORMWATER: STORMWATER BILLING and COLLECTION UNIT COSTS

Exhibit REF #		Exhibit Name
BV-E3	**Black & Veatch Exhibits**	
18	**TABLE SW-18**	STORMWATER: STORMWATER ADJUSTED COSTS OF SERVICE (AFTER DISCOUNTS)
19	**TABLE SW-19**	STORMWATER: STORMWATER FINAL COST OF SERVICE RATES
20	**TABLE SW-19A**	STORMWATER: PROPOSED RATES FOR RESIDENTIAL SERVICES
21	**TABLE SW-19B**	STORMWATER: PROPOSED RATES FOR NON-RESIDENTIAL SERVICES

TABLE SW-1: NON-RESIDENTIAL MEAN GROSS AREA & IMPERVIOUS AREA (SF)		
	FY 2015 MEAN GA	FY 2015 MEAN IA
Non-Residential Sub-Classes		
Non-Discount		
Water & Sewer	22,411	14,128
SW Only	6,940	2,295
Discount: Non-PHA		
Water & Sewer	90,856	46,926
SW Only	21,591	12,580
Discount: PHA		
Water & Sewer	46,130	23,030
SW Only	4,210	1,088
City Owned		
Water & Sewer	482,118	144,603
SW Only	95,329	14,557
Condominiums Sub-Classes		
Non-Discount		
Water & Sewer	15,060	10,136
SW Only	10,697	6,821
Discount: Non-PHA		
Water & Sewer	55,948	26,439
SW Only	24,687	20,647
Discount: PHA		
Water & Sewer	9,358	6,158
SW Only	0	0
City Owned		
Water & Sewer	8,543	7,842
SW Only	0	0

TABLE SW-2: DETERMINATION OF BILLABLE PARCELS						
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential						
Initial Parcel Count	460,311	460,311	460,311	460,311	460,311	460,311
Less Stormwater Appeals/Data Adjustments[1]	96	185	268	347	422	494
Subtotal Residential	460,215	460,126	460,043	459,964	459,889	459,817
Non-Residential						
Initial Parcel Count	73,805	73,805	73,805	73,805	73,805	73,805
Less Stormwater Appeals/Data Adjustments[2]	(17)	(34)	(51)	(68)	(85)	(102)
Subtotal Non Residential	73,822	73,839	73,856	73,873	73,890	73,907
Condominium						
Initial Parcel Count	1,671	1,671	1,671	1,671	1,671	1,671
Less Stormwater Appeals/Data Adjustments	-	-	-	-	-	-
Subtotal Condominium	1,671	1,671	1,671	1,671	1,671	1,671
TOTAL: System Billable Parcels	**535,708**	**535,636**	**535,570**	**535,508**	**535,450**	**535,395**

1: Comprises Residential Sideyards

2: Comprises City owned vacant lots transitioning to private ownership; the values reflect the cumulative GAIN each year.

TABLE SW-3: DETERMINATION OF BILLABLE GROSS AREA (sf)						
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential						
Initial GA	971,256,210	971,256,210	971,256,210	971,256,210	971,256,210	971,256,210
Less Stormwater Appeals/Data Adjustments[1]	444,000	853,000	1,237,000	1,602,000	1,948,000	2,278,000
Subtotal Residential Billable GA (sf)	970,812,210	970,403,210	970,019,210	969,654,210	969,308,210	968,978,210
Non-Residential						
Initial GA	1,448,677,889	1,448,677,889	1,448,677,889	1,448,677,889	1,448,677,889	1,448,677,889
Less Credits Adjustments	252,891,702	268,790,989	284,787,225	301,276,374	317,765,532	334,254,681
Less Stormwater Appeals/Data Adjustments[2]	971,000	1,851,000	2,671,000	3,443,000	4,169,000	4,851,000
Subtotal Non Residential Billable GA (sf)	1,194,815,187	1,178,035,900	1,161,219,663	1,143,958,515	1,126,743,356	1,109,572,208
Condominium						
Initial GA	26,387,654	26,387,654	26,387,654	26,387,654	26,387,654	26,387,654
Less Credits Adjustments	5,682,878	6,040,531	6,400,365	6,771,286	7,142,208	7,513,129
Subtotal Condominium Billable GA (sf)	20,704,776	20,347,123	19,987,289	19,616,368	19,245,446	18,874,525
TOTAL: System Billable GA (sf)	**2,186,332,173**	**2,168,786,233**	**2,151,226,163**	**2,133,229,093**	**2,115,297,013**	**2,097,424,943**

1: Comprises Residential Sideyards

2: Includes adjustments for GA and IA data inaccuracies & City owned vacant lots transitioning to private ownership. This line reflects the net impact from these two adjustments.

TABLE SW-4: DETERMINATION OF BILLABLE IMPERVIOUS AREA (sf)						
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential						
Initial IA	483,325,000	483,325,000	483,325,000	483,325,000	483,325,000	483,325,000
Less Stormwater Appeals/Data Adjustments[1]	35,000	68,000	99,000	128,000	155,000	182,000
Subtotal Residential Billable IA (sf)	483,290,000	483,257,000	483,226,000	483,197,000	483,170,000	483,143,000
Non-Residential						
Initial IA	715,073,000	715,073,000	715,073,000	715,073,000	715,073,000	715,073,000
Less Credits Adjustments	86,253,329	95,028,393	103,981,020	113,517,356	123,162,288	132,929,388
Less Stormwater Appeals/Data Adjustments[2]	959,000	1,840,000	2,668,000	3,452,000	4,197,000	4,903,000
Subtotal Non Residential Billable IA (sf)	627,860,671	618,204,607	608,423,980	598,103,644	587,713,712	577,240,612
Condominium						
Initial IA	17,387,695	17,387,695	17,387,695	17,387,695	17,387,695	17,387,695
Less Credits Adjustments	2,703,141	2,978,267	3,258,960	3,557,954	3,860,352	4,166,582
Subtotal Condominium Billable IA (sf)	14,684,554	14,409,428	14,128,735	13,829,741	13,527,343	13,221,113
TOTAL: System Billable IA (sf)	**1,125,835,225**	**1,115,871,035**	**1,105,778,715**	**1,095,130,385**	**1,084,411,055**	**1,073,604,725**

1: Comprises Residential Sideyards

2: Includes adjustments for GA and IA data inaccuracies & City owned vacant lots transitioning to private ownership. This line reflects the net impact from these two adjustments.

TABLE SW-5: CREDITS PROJECTIONS						
	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
PARCELS (#)						
IAR Practices	366	414	468	529	598	676
GA/IA Management Practices [1]	574	609	638	660	674	679
SMIP/GARP	20	30	40	50	60	70
Subtotal	960	1,053	1,146	1,239	1,332	1,425
IMPERVIOUS AREA (sf)						
IAR Practices	5,124,000	5,796,000	6,552,000	7,406,000	8,372,000	9,464,000
GA/IA Management Practices [1]	75,010,128	78,982,255	82,954,382	86,926,509	90,898,636	94,870,763
SMIP/GARP	8,822,340	13,228,412	17,733,605	22,742,807	27,752,010	32,761,212
Subtotal	88,956,468	98,006,667	107,239,987	117,075,316	127,022,646	137,095,975
GROSS AREA (sf)						
IAR Practices	-	-	-	-	-	-
GA/IA Management Practices [1]	250,965,971	262,816,843	274,667,715	286,518,587	298,369,459	310,220,331
SMIP/GARP	7,608,605	12,014,677	16,519,870	21,529,072	26,538,275	31,547,477
Subtotal	258,574,576	274,831,520	291,187,585	308,047,659	324,907,734	341,767,808

Notes

1: GA/IA Management Practices Credits include Surface and Non-Surface Discharge credits for IA managed and open space

TABLE SW-6: SMIP/GARP PROGRAM - ANNUAL COST ESTIMATES

Line #	Fiscal Year	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
1	**Annual Grant Budget**	$ 11,450,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000	$ 15,000,000
2	**PIDC Annual Administration Fee (a)**	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
3	**Service Fee % (b)**	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
4	**PIDC Estimated Service Fee Cost** (Line 1 - Line 2) X Line 3	$ 170,625	$ 223,875	$ 223,875	$ 223,875	$ 223,875	$ 223,875
5	**TOTAL PIDC SMIP/GARP FEE** (Line 2 + Line 4)	**$ 245,625**	**$ 298,875**	**$ 298,875**	**$ 298,875**	**$ 298,875**	**$ 298,875**
6	**Available Award Amount** (Line 1 - Line 5)	**$ 11,204,375**	**$ 14,701,125**	**$ 14,701,125**	**$ 14,701,125**	**$ 14,701,125**	**$ 14,701,125**

Notes:

(a) Annual Administration Fee for SMIP/GARP Program is $75K. Paid to PIDC each fiscal year.

(b) Service Fee is calculated as 1.5% of annual grant budget less the annual administration fee paid to PIDC.

TABLE SW-7: SMIP/GARP PROGRAM -AWARDED PROJECT PROJECTIONS

Line #	Fiscal Year	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
	INPUT PARAMETERS						
1	Available Award Amount (a)	$ 11,204,375	$ 14,701,125	$ 14,701,125	$ 14,701,125	$ 14,701,125	$ 14,701,125
2	**$/Greened Acre** **Group 1** Projects (b)	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000	$ 90,000
3	**$/Greened Acre** **Group 2** Projects (c)	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000
4	Group 1 - % of Award Amount	80%	70%	70%	70%	70%	70%
5	Group 2 - % of Award Amount	20%	30%	30%	30%	30%	30%
7	Acre conversion to square feet	43,560	43,560	43,560	43,560	43,560	43,560
Stormwater GA/IA Managed Area Projections (FY 2015 - FY 2021) - Anticipated Awards							
	Group 1 - Projects						
8	Anticipated Award Amount (Line 1 x Line 4)	$ 8,963,500	$ 10,290,788	$ 10,290,788	$ 10,290,788	$ 10,290,788	$ 10,290,788
9	**Greened Acres** (Line 8 / Line 2)	99.6	114.3	114.3	114.3	114.3	114.3
10	Gross Area to be Managed (sf)	4,338,334	4,980,741	4,980,741	4,980,741	4,980,741	4,980,741
11	Impervious Area to be Managed (sf)	4,338,334	4,980,741	4,980,741	4,980,741	4,980,741	4,980,741
	Group 2 - Projects						
12	Anticipated Award Amount (Line 1 x Line 5) x (1 - Line 6)	$ 2,240,875	$ 4,410,338	$ 4,410,338	$ 4,410,338	$ 4,410,338	$ 4,410,338
13	**Greened Acres** (Line 12 / Line 3)	14.9	29.4	29.4	29.4	29.4	29.4
14	Gross Area to be Managed (sf)	650,750	1,280,762	1,280,762	1,280,762	1,280,762	1,280,762
15	Impervious Area to be Managed (sf)	650,750	1,280,762	1,280,762	1,280,762	1,280,762	1,280,762
	Annual Totals						
16	**GA to be Managed (sf)**	4,989,084	6,261,503	6,261,503	6,261,503	6,261,503	6,261,503
17	**IA to be Managed (sf)**	4,989,084	6,261,503	6,261,503	6,261,503	6,261,503	6,261,503
18	**Total Greened Acres**	114.5	143.7	143.7	143.7	143.7	143.7

Notes:

(a) See Line 6 - Table 6: SMIP/GARP Program - Annual Cost Estimates

(b) Group 1 Projects - Projects with a cost of $90,000 per greened acre and with a 12 months or less project completion time.

(c) Group 2 Projects - Projects with a cost of $150,000 per greened acre and with an average 24 months of project completion time.

TABLE SW-8: SMIP/GARP PROGRAM AS-BUILT & VERIFIED PROJECT PROJECTIONS

		As-Built & Verified Projections (FY 2016 - FY 2021)					
Line #	**Fiscal Year**	**FY2016**	**FY2017**	**FY2018**	**FY2019**	**FY2020**	**FY2021**
	Awarded Projects Pre-FY2015 (a)						
1	**Greened Acres**	27.6	9.3	-	-	-	-
2	Gross Area Managed (sf)	1,201,927	403,801				
3	Impervious Area Managed (sf)	1,201,927	403,801				
	Estimated Awarded Projects Post FY2015						
	Group 1 - Projects (b)						
4	**Greened Acres**	117.1	99.6	114.3	114.3	114.3	114.3
5	Gross Area Managed (sf)	5,103,025	4,338,334	4,980,741	4,980,741	4,980,741	4,980,741
6	Impervious Area Managed (sf)	5,103,025	4,338,334	4,980,741	4,980,741	4,980,741	4,980,741
	Group 2 - Projects (c)						
7	**Greened Acres**	-	17.6	14.9	29.4	29.4	29.4
8	Gross Area Managed (sf)	-	765,454	650,750	1,280,762	1,280,762	1,280,762
9	Impervious Area Managed (sf)	-	765,454	650,750	1,280,762	1,280,762	1,280,762
	Annual Totals						
8	**Greened Acres** (Line 1 + Line 4 + Line 7)	144.7	126.4	129.3	143.7	143.7	143.7
9	**Gross Area Managed (sf)**	6,304,952	5,507,589	5,631,491	6,261,503	6,261,503	6,261,503
10	**Impervious Area Managed (sf)**	6,304,952	5,507,589	5,631,491	6,261,503	6,261,503	6,261,503

Notes:

(a)Completed Greened Acres based upon actuals from PWD SMIP/GARP Grant Tracking.
FY2016 - FY 2017 estimated based upon projects awarded prior to FY15 but not yet completed/verified.

(b) From Table 2: SMIP/GARP Program - Project Projections. Group 1 - projects are expected to be completed and verified within 12 months.

(c) From Table 2: SMIP/GARP Program - Project Projections. Group 2 - are expected to be completed and verified within 24 months.

TABLE SW-9: SMIP/GARP PROGRAM PROJECTED CREDIT IMPACTS

Credit Impact Projections (FY 2016 - FY 2021)							
Line #	Fiscal Year	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
	INPUT PARAMETERS						
1	% of GA and IA Credits (a)	80%	80%	80%	80%	80%	80%
		Credit Impact					
	Annual Total Credits						
2	GA Managed Credit (sf) (Line 1 X Table 8: Line 9)	5,043,961	4,406,071	4,505,193	5,009,203	5,009,203	5,009,203
3	IA Managed Credit (sf) (Line 1 X Table 8: Line 10)	5,043,961	4,406,071	4,505,193	5,009,203	5,009,203	5,009,203
	Cumulative Total Credits						
4	GA Managed Credit (sf)	5,043,961	9,450,033	13,955,226	18,964,428	23,973,631	28,982,833
5	IA Managed Credit (sf)	5,043,961	9,450,033	13,955,226	18,964,428	23,973,631	28,982,833

Notes:

(a) Assumes all SMIP/GARP projects will be granted Non-Surface Discharge Credit based upon 80% of managed IA and 80% of managed GA.

TABLE SW-10: PROJECTIONS OF BILLABLE PARCELS, GROSS AREA, AND IMPERVIOUS AREA

SECTION A: NUMBER OF BILLABLE PARCELS (PROJECTED)

CUSTOMER CLASS	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential	460,215	460,126	460,043	459,964	459,889	459,817
Non-Residential	73,822	73,839	73,856	73,873	73,890	73,907
Condominium	1,671	1,671	1,671	1,671	1,671	1,671
Total: Number of Billable Parcels	535,708	535,636	535,570	535,508	535,450	535,395

SECTION B: BILLABLE GROSS AREA (PROJECTED - sf)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential	970,812,210	970,403,210	970,019,210	969,654,210	969,308,210	968,978,210
Non-Residential	1,194,815,187	1,178,035,900	1,161,219,663	1,143,958,515	1,126,743,356	1,109,572,208
Condominium	20,704,776	20,347,123	19,987,289	19,616,368	19,245,446	18,874,525
Total: Billable Gross Area	2,186,332,173	2,168,786,233	2,151,226,163	2,133,229,093	2,115,297,013	2,097,424,943

SECTION C: BILLABLE IMPERVIOUS AREA (PROJECTED - sf)

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential	483,290,000	483,257,000	483,226,000	483,197,000	483,170,000	483,143,000
Non-Residential	627,860,671	618,204,607	608,423,980	598,103,644	587,713,712	577,240,612
Condominium	14,684,554	14,409,428	14,128,735	13,829,741	13,527,343	13,221,113
Total: Billable Impervious Area	1,125,835,225	1,115,871,035	1,105,778,715	1,095,130,385	1,084,411,055	1,073,604,725

TABLE SW-11: GA AND IA MANAGED CREDIT PROJECTION FACTORS			
	FY 2015 Increase in Parcels	FY 2015 Average GA Credit	FY 2015 Average IA Credit
Discharge Type: Non-Surface Discharge		(sf)	(sf)
Impervious Area Managed	66	14,722	14,722
Open Space	66	31,987	
Discharge Type: Surface Discharge		(sf)	(sf)
Impervious Area Managed	29	103,464	103,464
Open Space	29	198,884	

TABLE SW-12: PROJECTED NUMBER OF BILLABLE ACCOUNTS						
CUSTOMER CLASS	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021
Residential	461,580	461,580	461,580	461,580	461,580	461,580
Non-Residential	80,193	80,193	80,193	80,193	80,193	80,193
Condominium	4,043	4,043	4,043	4,043	4,043	4,043
Residential-City	136	136	136	136	136	136
Non-Residential-City	1,314	1,314	1,314	1,314	1,314	1,314
Condominium-City	3	3	3	3	3	3
Total	547,269	547,269	547,269	547,269	547,269	547,269

TABLE SW-13: SUMMARY OF STORMWATER COSTS
(in thousands of dollars)
Test Year 2017

Line #	Cost Component	Allocated Cost of Service
1	Billing & Collection Costs	$ 13,953
2	Impervious Area and Gross Area Costs *(Excludes CAP Costs)*	139,736
3	Total	$ 153,690

TABLE SW-14: ESTIMATE OF GROSS AREA (GA) AND IMPERVIOUS AREA (IA) UNIT COSTS ADJUSTED FOR CUSTOMER ASSISTANCE PROGRAM (CAP)

Line No	DESCRIPTION	FY 2017 GA	FY 2017 IA	FY 2017 Total
1	Annual Cost of Service ($ 1000) from GA & IA **(Excluding CAP)**	$ 27,947	$ 111,789	$ 139,736
2	Stormwater Units of Service (500 Square Feet)	4,337,572	2,231,742	
3	System **Annual** Unit Cost ($/500 Square Feet)	6.443	50.090	
4	System **Monthly** Unit Cost ($/500 Square Feet)	0.537	4.174	

TABLE SW-15: ESTIMATE OF CUSTOMER CLASS GA AND IA COST OF SERVICE ADJUSTED FOR CUSTOMER ASSISTANCE PROGRAM (CAP) (in thousands of dollars)

Line No	DESCRIPTION	FY 2017 GA	FY 2017 IA	FY 2017 Total
	RESIDENTIAL			
1	Residential Cost of Service (a)	$ 12,504	$ 48,413	$ 60,917
	NON-RESIDENTIAL			
2	Initial Non-Residential Cost of Service (b)	15,443	63,376	78,819
3	(Add): Adjustment for CAP (c)	683	2,734	3,417
4	Adjusted Non-Residential Cost of Service	16,126	66,110	82,236
5	**Total GA & IA Cost of Service**	**28,630**	**114,523**	**143,153**

(a) Calculated as Residential GA and IA square footage times the GA and IA unit cost.
(b) Total GA and IA Cost of Service LESS Residential cost of service.
(c) To recover Non-residential CAP Loss from the Non-residential stormwater customer class.

TABLE SW-16: GA AND IA COST OF SERVICE RATES PRIOR TO DISCOUNT AND LAG FACTOR ADJUSTMENTS

Line No	DESCRIPTION	FY 2017 GA	FY 2017 IA	FY 2017 Total
1	Residential **Monthly** GA & IA Charge (a)	$ 2.27	$ 8.77	$ 11.04
2	Non-Residential **Monthly** GA & IA Unit Cost (Adjusted for CAP)	0.561	4.354	
3	Impact of CAP on Non-Residential GA & IA Rate	0.024	0.180	

(a) Calculated based on Residential Mean GA (2,110 sf) and Mean IA (1,050 sf).

TABLE SW-17: STORMWATER BILLING and COLLECTION UNIT COSTS		
LINE	Description	FY 2017
1	Stormwater Billing & Collection Annual Revenue Requirements	$ 13,953,440
2	Monthly Billable Accounts: Residential	461,716
3	Non-Residential Cost Weighting Factor (a)	1.3
4	Weighted Monthly Billable Accounts: Non-Residential	111,219
5	Total Weighted Monthly Billable Accounts (Line 2+ Line 4)	572,935
6	Annual Billable Accounts: Residential (Line 2 X 12)	5,540,592
7	Weighted Annual Billable Accounts: Non-Residential (Line 4 X 12)	1,334,627
8	Total Weighted Annual Billable Accounts (Line 6 + Line 7)	6,875,219
9	Residential Billing & Collection Unit Cost (per Billing Cycle)	$ 2.03
10	Non-Residential Billing & Collection Unit Cost (per Billing Cycle) (Line 9 x Line 3)	$ 2.64

(a) A higher weighting factor is assigned to non-residential due to the additional time and effort needed to address billing issues and parcel data issues for non-residential class, as the charges are individually calculated for each parcel.

TABLE SW-18: STORMWATER ADJUSTED COSTS OF SERVICE (AFTER DISCOUNTS)
(in thousands of dollars)
Test Year 2017

					Recovery of Discounts (b)			
Line #	Customer Class	Allocated Cost of Service (a)	Discounts	Adjusted Cost of Service with Discounts	Residential	Non-Residential	All (b)	Adjusted Cost of Service
	Residential							
1	Non-Discount	$ 68,233,204		$ 68,233,204			$ 1,676,559	$ 69,909,763
2	Discount - Non-PHA	3,259,726	(814,931)	2,444,794			60,071	2,504,865
3	Discount - PHA	692,238	(34,612)	657,626			16,159	673,785
4	City Owned	19,740		19,740			485	20,226
	Non-Residential							
5	Non-Discount	60,532,968		60,532,968			1,487,357	62,020,325
6	Discount - Non-PHA	11,352,320	(2,838,080)	8,514,240			209,204	8,723,444
7	Discount - PHA	1,144,400	(57,220)	1,087,180			26,713	1,113,893
8	City Owned	10,012,459		10,012,459			246,016	10,258,475
	Condominiums							
9	Non-Discount	1,809,177		1,809,177			44,453	1,853,630
10	Discount - Non-PHA	95,868	(23,967)	71,901			1,767	73,668
11	Discount - PHA	801	(40)	761			19	780
12	City Owned	1,964		1,964			48	2,012
13	Total	157,154,866	(3,768,850)	153,386,015	-	-	3,768,850	157,154,866

Notes:
(a) Non-Residential Customer cost of service includes the cost of CAP.
(b) Reflects current policy of recovering discounts from all customer classes.

TABLE SW-19: STORMWATER FINAL COST OF SERVICE RATES
Test Year 2017

Line #	Service Type	Cost of Service Rate	Discount Recovery Factor	Cost of Service Rate	Lag Factor Adjustment	Proposed Rate
	Billing & Collection Charge					
1	Residential	$ 2.03	1.025	$ 2.08	1.058	$ 2.20
2	Non-Residential	2.64	1.025	2.70	1.058	2.86
3	Condominiums	2.64	1.025	2.70	1.058	2.86
	IA/GA Charge					
4	Residential	11.04	1.025	11.31	1.058	11.97
	Non-Residential					
5	IA Charge	4.3540	1.025	4.4610	1.058	4.7197
6	GA Charge	0.5610	1.025	0.5748	1.058	0.6081
	Condominiums					
7	IA Charge	4.3540	1.025	4.4610	1.058	4.7197
8	GA Charge	0.5610	1.025	0.5748	1.058	0.6081

Notes: Non-Residential and Condominium have the same Billing & Collection and GA/IA rate

TABLE SW - 19A
STORMWATER: PROPOSED RATES FOR RESIDENTIAL SERVICE

Line #	DESCRIPTION	FY 2017 Monthly Charge	FY 2018 Monthly Charge
STORMWATER MANAGEMENT SERVICE CHARGE			
1	Charge Per Parcel	$ 11.97	$ 12.66
BILLING AND COLLECTION CHARGE			
2	Charge Per Bill	$ 2.20	$ 2.23

TABLE SW-19B
STORMWATER: PROPOSED RATES FOR NON-RESIDENTIAL SERVICE

Line #	DESCRIPTION	FY 2017 Monthly Charge	FY 2018 Monthly Charge
STORMWATER MANAGEMENT SERVICE CHARGE			
1	Min Charge	$ 11.97	$ 12.66
2	GA (per 500 sf)	$ 0.608	$ 0.642
3	IA (per 500 sf)	$ 4.720	$ 4.980
BILLING AND COLLECTION CHARGE			
4	Charge Per Bill	$ 2.86	$ 2.90