

PHILADELPHIA WATER DEPARTMENT
STATEMENT NO. 7A

BEFORE THE
PHILADELPHIA WATER, SEWER AND STORM WATER RATE BOARD

In the Matter of the Philadelphia Water Department's Proposed Change in Water, Wastewater, and Stormwater Rates and Related Charges	Fiscal Years 2022 – 2023 Rates and Charges to Become Effective September 1, 2021 and September 1, 2022
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Direct Testimony

of

Black & Veatch Management Consulting, LLC

on behalf of

The Philadelphia Water Department

Dated: January 2021

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I. INTRODUCTION AND QUALIFICATIONS

Q1. PLEASE STATE YOUR NAME AND BUSINESS AFFILIATION.

A1. Our names are Ann Bui, Dave Jagt, and Brian Merritt. We are employed by the firm of Black & Veatch Management Consulting LLC (“Black & Veatch”), 11041 Lamar Avenue, Overland Park, Kansas. We will be presenting our collective testimony on behalf of the City of Philadelphia (the “City”) Water Department (“Water Department” or “PWD”) in this proceeding as a panel. Appended to this Direct Testimony are our respective resumes of experience.

Q2. PLEASE DESCRIBE THE FIRM OF BLACK & VEATCH MANAGEMENT CONSULTING, LLC (BLACK & VEATCH).

A2. A firm description of Black & Veatch is provided in Schedule BV-7.

Q3. PLEASE IDENTIFY THE MEMBERS OF THE BLACK & VEATCH TEAM PROVIDING TESTIMONY, PROVIDE THEIR RESPECTIVE PROJECT RESPONSIBILITIES AS WELL AS THEIR EDUCATIONAL AND PROFESSIONAL EXPERIENCE.

A3. The members of the Black & Veatch team providing testimony are Ms. Ann Bui, Mr. Dave Jagt, and Mr. Brian Merritt. A summary of the team’s educational background and professional experience are provided in Schedule BV-7. The respective project responsibilities for team members are described below.

Ms. Bui is a Managing Director with Black & Veatch and provided overall technical review of the Cost of Service Study, the design of rate schedules, and monthly bill impacts. Mr.

Jagt is a Manager with Black & Veatch and served as the senior technical lead for all the financial and cost of service analysis for this study. Mr. Merritt is a Manager with Black & Veatch and served as Project Manager for this water and wastewater Cost of Service Study.

II. PURPOSE OF TESTIMONY

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A4. The purpose of our testimony is to (1) provide a cost of service overview; (2) describe the analytical approach and results of the Cost of Service Study; (3) outline the miscellaneous fee updates; and (4) discuss the proposed adjustment to the senior citizen income threshold. Please note that updates to the Tiered Assistance Program (TAP) Rate Rider formula prepared for the Water Department are addressed in PWD Statement 7B.

Q5. PLEASE DESCRIBE THE STUDY PERIOD USED IN THE COST OF SERVICE STUDY.

A5. The study period used in the Cost of Service Study is fiscal year (“FY”) 2021 to FY 2026 (the “Study Period”). The revenue and revenue requirements projections and the associated revenue adjustment projections span this six-year period.

Q6. WHAT IS THE PERIOD FOR WHICH RATES ARE BEING PROPOSED?

A6. In this rate proceeding, the Water Department is proposing retail rate schedules for the following fully forecasted fiscal years (hereinafter called “Test Years”):

1. ‘Test Year-1’, which reflects FY 2022 (ending June 30, 2022); and
2. ‘Test Year-2’, which reflects FY 2023 (ending June 30, 2023).

1 The Cost of Service rates are proposed for two distinct test years to assure that the Water
2 Department can, in each year, meet all of the requirements prescribed by the General
3 Water and Wastewater Revenue Bond Ordinance of 1989 (General Bond Ordinance) and
4 the Philadelphia Code, Section 13-101 (Rate Ordinance).

5
6 *The Water Department is proposing rate increases that will go into effect on September 1st*
7 *of each respective fiscal year. Moreover, the Cost of Service Study and proposed rates*
8 *described herein apply only to PWD's "Base Rates," which exclude revenue loss*
9 *associated with providing TAP discounts and TAP Rate Rider Surcharge (TAP-R)*
10 *revenues.*

11
12 TAP discounts and TAP-R revenues are presented separately to show the derivation of the
13 overall Water Fund cashflow and to evaluate overall performance metrics as required by
14 the General Bond Ordinance and the Rate Ordinance.

15
16 **Q7. PLEASE IDENTIFY THE SUPPORTING SCHEDULES PROVIDED WITH YOUR**
17 **TESTIMONY.**

18 A7. **Schedule BV-1:** Summary tables relating to the comprehensive Cost of Service Study,
19 including the projection of revenue and revenue requirements, cost of service analysis, and
20 rate schedules for water, sanitary sewer, and stormwater service.

21 **Schedule BV-2:** Summary tables relating to the allocation of wastewater costs to the ten
22 (10) contract customers.

23 **Schedule BV-3:** Summary tables relating to the development of stormwater billable Gross
24 Area ("GA") and Impervious Area ("IA") units of service; development of GA and IA
25 rates; and the determination of the stormwater Billing & Collection charges.

Schedule BV-4: Summary tables relating to the miscellaneous fees analysis.

Schedule BV-5: Cost of Service Report.

Schedule BV-6: Assumptions and white papers.

Schedule BV-7: Resumes and Black & Veatch firm description.

III. COST OF SERVICE STUDY OVERVIEW

Q8. WAS THE COST OF SERVICE STUDY IN THIS PROCEEDING PERFORMED CONSISTENT WITH GENERALLY ACCEPTED INDUSTRY GUIDELINES?

A8. Yes. Black & Veatch utilized the principles and guidelines from the following industry manuals in performing its Cost of Service Study in this proceeding:

1. AWWA's "Principles of Water Rates, Fees, and Charges" Manual of Water Supply Practices M1 (M1 Manual);
2. WEF's "Financing and Charges for Wastewater Systems" Manual of Practice M27, (MoP 27); and
3. WEF's "User Fee Funded Stormwater Programs."

These manuals serve as the generally accepted industry guidelines used by rate practitioners. Furthermore, the analysis and methodology used in this Cost of Service Study are consistent with that used in analogous studies performed by Black & Veatch in support of prior PWD rate proceedings.

Q9. PLEASE DESCRIBE THE VARIOUS COMPONENTS OF A COST OF SERVICE STUDY.

1 A9. Consistent with the principles and guidelines in the above-referenced manuals, the Cost of
2 Service Study, undertaken in this proceeding consist of three parts:

- 3 1. Revenue & Revenue Requirements;
- 4 2. Cost of Service Analysis; and
- 5 3. Rate Design.

6
7 As a general proposition, the cost of service analysis provides the basis for designing a rate
8 structure that allows the utility to recover costs from its customers equitably. As a part of
9 this analysis, the costs of providing service to various customer types are matched with
10 their associated service demands. As it is not practical to perform this matching of costs of
11 service at an individual customer level, the cost of service is determined by customer type.
12 The three components of the Cost of Service Study are discussed below.

13
14 Revenue & Revenue Requirements: The first step in the Cost of Service Study, the Revenue
15 & Revenue Requirements, establishes how much money the utility needs to meet its fiscal
16 year operating and capital obligations; this step includes a review of operations and
17 maintenance (“O&M”) expenses, debt service payments, funding for specific deposits and
18 reserves, and the cost of capital improvement projects that the utility does not fund via debt
19 or contributions from third parties.

20
21 When the revenues generated from existing user rates and charges and other sources of
22 revenue are insufficient to cover operating and capital costs, the utility may require one or
23 more revenue adjustments as part of the revenue requirements analysis. As previously
24 noted, the Water Department has legal requirements and bond covenants that prescribe the
25

1 use of receipt-based¹ revenue projections (i.e., “cash-basis” or “legally enacted basis”) in
2 the revenue requirements analysis.

3
4 Black & Veatch reviewed the revenue requirements of the Water and Wastewater Systems
5 to determine whether system revenues are sufficient to cover all the cash expenditures for
6 the Study Period. Section III of this testimony, which provides a summary of the cost of
7 service study, gives additional details regarding the development of the revenue and
8 revenue requirement projections.

9
10 Cost of Service Analysis: The cost of service analysis begins after determining the revenue
11 requirements for the utility over the Study Period. In this rate proceeding, the cost of service
12 analysis is performed for specific prospective fiscal years (or “test years”). We use the test
13 years to illustrate the allocation of costs to customer types and the design of rate schedules
14 to recover those costs from the various customer types.

15
16 The term annual cost of service refers to the “net” revenue requirement (less any other
17 operating and or non-operating revenues) that need to be recovered from rates and charges.

18 The cost of service analysis involves multiple levels of cost allocation, namely:

- 19 (i) Allocation of identified costs (e.g., O&M expense debt service, reserves, cash-
20 funded capital) to functional cost centers and then to cost components;
21 (ii) Calculation of unit cost for each cost component; and
22
23
24

25 ¹ Under this basis, revenues are recorded on a receipts basis, except revenues from other governments and interest, which are accrued as earned.

(iii) Determination of the cost for each customer type by multiplying the unit cost of each component by the number of units of service associated with each customer type.

Schedule BV-5: *Cost of Service Report* 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. Because the Water Department uses receipts as the basis for calculating revenues, its “collection lag factor” must be evaluated. 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 not all of the fiscal year billings are fully collected within that fiscal year.

Additional details on the final cost of service rate design are provided in the “*Cost of Service Report*” (Schedule BV-5).

Q10. PLEASE SUMMARIZE THE OVERALL REVENUE REQUIREMENTS AND REVENUE INCREASES PROJECTED IN THE STUDY.

A10. For the combined Water and Wastewater Systems, the revenue requirements are projected for the two test years of FY 2022 and FY 2023 (the “Rate Period”), for which rates are proposed in this proceeding. The revenue requirements analysis indicates the need for the following overall annual increases in water and wastewater revenues:

- FY 2022: An increase of \$48,864,000; and

- FY 2023: An increase of \$31,543,000.

These levels of increase reflect an overall annual increase in revenues from the existing levels (based on FY 2021 base rates) of approximately 8.70% in FY 2022; and 5.10% in FY 2023. The annual revenue increase projections for FY 2022 through FY 2026 reflect only ten (10) months of additional base rate revenues in each of those fiscal years. Table C-1A (Schedule BV-1) presents a summary of the series of revenue adjustments projected for the combined Water and Wastewater Systems for the Study Period.

The requested relief, with respect to base rate revenues, can be broken down as follows:

	<u>FY 2022</u>		<u>FY 2023</u>	
	(%)	(\$)	(%)	(\$)
Water	8.25%	17,779,000	6.10%	14,400,000
Wastewater	8.98%	31,084,000	4.48%	17,143,000
Annual Increase	8.70%	48,864,000	5.10%	31,543,000

*Slight differences in separate system totals versus combined are due to rounding.

In the context of the overall estimated revenues, including both revenues derived from base rates and TAP-R, the adjustments for the combined (Water and Wastewater) system, as presented in Table C-1 (Schedule BV-1) are as follows:

	<u>FY 2022</u>		<u>FY 2023</u>	
	(%)	(\$)	(%)	(\$)
Annual Increase	8.61%	48,864,000	5.05%	31,543,000

The cumulative increases in base rate revenues will generate approximately \$141 Million from September 1, 2021 through June 30, 2023. The requested increases, as well as the accompanying TAP-R surcharge revenues, will allow the Water Department to meet financial minimum metrics and maintain existing levels of service through FY 2022 and FY 2023.

Q11. PLEASE SUMMARIZE THE PROJECTION OF WATER AND WASTEWATER SYSTEM REVENUES UNDER EXISTING RATES, AND LIST THE KEY COMPONENTS OF THE REVENUES.

A11. The total revenue projections for the Study Period for the Water and Wastewater Systems include three categories of revenues, namely, “Water and Wastewater Operating Revenues,” “Other Operating Revenues,” and “Non-Operating Income.” Table C-3 (Schedule BV-1) presents the projection of these three categories of revenues for the Study Period.

Water Sales Receipts:

FY 2022: \$263.6 Million

FY 2023: \$266.7 Million

Sanitary Sewer Sales Receipts:

FY 2022: \$254.0 Million

FY 2023: \$257.0 Million

Stormwater Sales Receipts:

FY 2022: \$169.4 Million

FY 2023: \$172.3 Million

Q12. PLEASE BRIEFLY DESCRIBE THE PROJECTIONS OF WATER AND WASTEWATER SYSTEM OPERATING REVENUES UNDER EXISTING RATES.

A12. The total **operating revenues** for the Water and Wastewater Systems include the following sources of revenues:

- a. Retail Water and Sanitary Sewer Service and Quantity charges, Stormwater Management Service Charges, and Extra-Strength surcharge.

b. Wholesale contract customer water and sewer charges.

a. Retail Operating Revenues

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

Step 1: Projection of Gross Billings

- First, to project water and sewer *gross billings*, for each fiscal year of the Study Period, we apply the FY 2021² schedules of water and sewer quantity and service charges to the projections of annual water sales and number of customer accounts, respectively.

- To project the fiscal year water sales and number of customer accounts, we use the average of the FY 2018 and FY 2019 sales volume per account and the FY 2020 number of accounts as the initial basis for the projection.
- To account for the impacts of the COVID-19 pandemic (“pandemic”) on customer demands, we apply escalation factors based upon customer usage for months prior to the pandemic with those observed since the initial shut-down³.

Customer Types
General Customers
• Residential
• Senior Citizens
• Commercial
• Industrial
• Public Utilities
Others
• Housing Authority
• Charities & Schools
• Hospital & Universities
• Hand Billed
• Scheduled (Flat Rate)
Fire Protection
• Public & Private
Groundwater

² To project the FY 2021 through FY 2026 water and sewer gross billings, Black & Veatch applied the FY 2021 (effective October 1, 2020) schedules to the projected annual water and sewer sales and number of customer accounts. The base rates for FY 2021 remain unchanged from the FY 2020 rates (effective September 1, 2019), only the TAP-R rates were adjusted in FY 2021.

³ FY 2021 usages per account factors are based upon a comparison of usage from July 2019 to February 2020 (prior the pandemic) and April to November 2020. Additional information regarding usages per account factors is provided in Schedule BV-6: WP-1 “Philadelphia Water Department Financial Plan: Revenue and Revenue Requirement Assumptions.”

1 ▪ After FY 2021, with the exception of 5/8-inch meter residential service
2 customers, consumption is assumed to remain at levels similar to those
3 experienced during the pandemic. This is primarily due to the uncertainty
4 associated with the overall recovery of customer demand.

- 5 • Prior to the pandemic, 5/8-inch meter General Service customers,
6 generally exhibited a 2.0% annual decrease over time. While
7 residential usage has increased in recent months, a resumption of the
8 historical decline in consumption is anticipated beginning in
9 FY 2023.

- 10 • To project stormwater billings, for each fiscal year of the Study Period, we apply
11 the FY 2021 GA and IA rates to the projected billable GA and IA respectively and
12 apply the Billing & Collection charge to the projected number of billable accounts.
- 13 • Existing schedules of charges also include a charge for private fire protection
14 connections to the Water System.
- 15 • The Water Department assesses an extra-strength surcharge to all retail customers
16 that contribute high strength wastewater based upon their monitored strength.

17
18 Note - TAP discounts and TAP-R surcharge billings are excluded from the cost of service
19 analysis.

20
21 Step 2: Application of Collection Factors

- 22 • Next, we apply receipt factors (“collection factors”) to the corresponding gross
23 billings to determine the operating retail cash receipts. The historical collection
24 factors are based on nine fiscal years (FY 2012 through FY 2020) of billing and
25

1 associated collections. PWD Statement No. 6 – Direct Testimony of Raftelis
2 provides additional details regarding the derivation of the collection factors.

- 3 ▪ Since the Governor’s initial disaster declaration in March of 2020 and
4 consistent with Pennsylvania Public Utility Commission (PUC) orders
5 suspending shut-off and enforcement practices, the Water Department has
6 operated under a de facto moratorium. While enforcement activities are
7 anticipated to resume in April of 2021, overall collections are anticipated to
8 be impacted for the foreseeable future.
- 9 ▪ Current monthly collection data imply that collection rates are lower by
10 10% in comparison to the average historical data.
- 11 ▪ Based upon recent Water Department experience, and to account for
12 reduced collections anticipated during the remainder of the economic
13 downturn and the anticipated recovery, the following adjustments to the
14 projected collection factors are applied:
 - 15 • FY 2021 Billing Year Collection Factors – Reduce by 8%.
 - 16 • FY 2022 Billing Year Collection Factors – Reduce by 4%.
 - 17 • FY 2023 Billing Year Collection Factors – Reduce by 2%.
- 18 ▪ The above factors assume some level of recovery in collections from the
19 current monthly trend and anticipate continued improvement over the Rate
20 Period.

21
22 *b. Wholesale Operating Revenues*

23 Water: Currently, Aqua Pennsylvania is the Water Department’s only wholesale
24 water customer.

1 Aqua Pennsylvania: The Water Department's service
2 to Aqua Pennsylvania commenced in Fiscal Year
3 2002. Water charges for this service include a
4 commodity charge designed to recover power and
5 chemical costs and a fixed charge designed to recover allocated capital costs and
6 all other allocated operation and maintenance expenses, excluding power and
7 chemical costs.

Projected Aqua Receipts:

FY 2022: \$3.82 Million

FY 2023: \$3.82 Million

8
9 Wastewater: The Water Department provides wholesale
10 wastewater service to ten (10) suburban customers on a
11 contractual basis. Contractual rates for wastewater service
12 generally consist of charges for operation and maintenance
13 expenses and certain capital costs associated with the collection
14 and treatment facilities used in providing the service.

Projected Wastewater

Contract Receipts:

FY 2022: \$38.9 Million

FY 2023: \$38.9 Million

15
16 **Q13. ARE THERE ANY CHANGES TO OPERATING REVENUE PROJECTIONS**
17 **UNDER EXISTING RATES DURING THE STUDY PERIOD?**

18 A13. No. However, as previously noted, TAP-R surcharge revenues are presented separately
19 from Base Rate related revenues.

20
21 **Q14. PLEASE BRIEFLY DESCRIBE THE PROJECTIONS OF WATER AND**
22 **WASTEWATER SYSTEM "OTHER OPERATING" AND "NON-OPERATING"**
23 **REVENUES.**

24 A14. The Projection of "Other Operating" and "Non-Operating" Revenues are discussed below.
25

1 a. Other Operating Revenue - Other Operating Revenue consists of penalties on
2 overdue bills for retail service customers and other income from miscellaneous
3 fees, fines, operating grants, permit fees, and transfers from the Debt Reserve Fund
4 to the Revenue Fund.

5
6 b. Non-operating Income - Non-operating Income of the Water Department consists
7 primarily of interest earnings on the amounts within certain funds and accounts. In
8 accordance with the General Bond Ordinance, the analysis credits interest earnings
9 in the Debt Reserve Fund, Revenue Fund, and the Rate Stabilization Fund as
10 revenue to the Revenue Fund. Interest Earnings in the Debt Reserve Fund are first
11 credited to the extent that they are needed to fulfill the Debt Service Reserve
12 Requirement and then amounts in excess of fulfilling the Debt Service Reserve
13 Requirement are permitted to be transferred to the City's General Fund (up to
14 \$4,994,000 per annum).

15
16 Actual annual fund valuations and interest earnings are based on a mark-to-market
17 valuation which the City performs at the end of the fiscal year. The differential
18 between mark-to-market and the Debt Reserve Fund requirement results in either a
19 transfer from the Water Department's Operating Fund to the Debt Reserve Fund, if
20 there is a deficiency in the Debt Reserve Fund, or a transfer from the Debt Reserve
21 Fund to the Operating Fund if there is an excess in the Debt Reserve Fund. As noted
22 above, projected transfers from the Debt Reserve Fund to the Operating Fund are
23 included as *Other Operating Revenue*.

1 **Q15. PLEASE BRIEFLY DESCRIBE HOW THE REVENUE LOSS ASSOCIATED**
2 **WITH THE TIERED ASSISTANCE PROGRAM (“TAP”) AND ASSOCIATED**
3 **REVENUE FROM THE TAP RATE RIDER ARE INCORPORATED INTO THE**
4 **COST OF SERVICE ANALYSIS.**

5 A15. For the purposes of evaluating Base Rates, revenue loss associated with the *Tiered*
6 *Assistance Program* (“TAP”) is not included. Schedule BV-1: Table C-1A: Base Rates
7 excludes revenue loss associated with TAP discounts as well as revenues associated with
8 TAP-R surcharge rates. The exclusion of the TAP discounts from the analysis of Base
9 Rates is also illustrated on Line 13 of Schedule BV-1: Table C-3: Projected Revenue Under
10 Existing Rates.

11
12 The key financial and performance metrics apply to the overall Water Fund. As such, to
13 determine whether these metrics are met, Black & Veatch has included a separate Schedule
14 BV-1: Table C-1B: TAP-R Surcharge Rates Excluding Base Rates to show the derivation
15 of the overall combined cashflow in Schedule BV-1: Table C-1: Base and TAP-R
16 Surcharge Rates (“Combined”) and to evaluate the Rate Stabilization Fund and Covenant
17 Metrics Performance for the overall system as presented in Schedule BV-1: Table C-2.

18
19 The TAP revenue loss and the TAP-R surcharge rates are subject to annual reconciliation
20 in accordance with the adopted TAP Rate Rider as defined in Section 10.0 of the Water
21 Department’s Rates and Charges. The TAP-R reconciliation will be addressed via a
22 subsequent filing with the Philadelphia Water, Sewer and Storm Water Rate Board (“Rate
23 Board”). Consequently, no changes to the TAP-R surcharge rates are proposed as part of
24 this proceeding and thus, the TAP-R surcharge rates and revenue loss associated with
25

1 providing TAP discounts are held constant at current FY 2021 levels in Schedule BV-1:
2 Table C-1B: TAP-R Surcharge Rates and Schedule BV-1: Table C-1: Combined.

3
4 Proposed changes to the TAP-R Formula are discussed in Black & Veatch's supplemental
5 direct testimony (PWD Statement No. 7B). Any updates adopted by the Rate Board as a
6 result of this proceeding would be reflected in future TAP-R reconciliation filings after
7 September 1, 2021.

8
9 **Q16. PLEASE BRIEFLY DESCRIBE THE PROJECTIONS OF OPERATION AND**
10 **MAINTENANCE EXPENSE FOR THE STUDY PERIOD.**

11 A16. The Water Fund's FY 2021 budget (approved as of December 2020) is used as the
12 beginning base budget for the projections of Operation and Maintenance (O&M) expenses
13 for the Study Period.–The base budget is then adjusted to reflect the actual to budget
14 spending factors. These adjusted FY 2021 O&M expenditures serve as the basis for
15 projecting O&M expenses for FY 2022 through FY 2026. Additional information
16 regarding O&M adjustments is provided in Schedule BV-6: WP-1 "*Philadelphia Water*
17 *Department Financial Plan: Revenue and Revenue Requirement Assumptions.*"

18
19 **Summary Discussion on the FY 2021 O&M Budget Adjustment**

20 Black & Veatch used the following steps in adjusting the FY 2021 O&M Budget, to reflect
21 the actual spend levels:

- 22 • First, we evaluated the historical actual expenditures versus budgeted expenses to
23 determine the expected spend factors for each of the object classes such as personal
24 services, pension obligations, pension, benefits, purchases of services, materials
25 and supplies, equipment, transfers, and contributions, indemnities, and taxes.

- 1 • From the analysis, we determined the average spend factors by cost classification
2 for each division within the Water Department and the City Department (for those
3 costs that are funded by the Water Department) based on the two-year average
4 actual spending levels of FY 2019 and FY 2020.
- 5 • The spend factors were then utilized to adjust the majority of the Fiscal Year 2021
6 approved O&M budget cost classes to a likely expenditure level for Fiscal Year
7 2021 for each, with the exception of the following:
 - 8 ▪ The FY 2021 budgets for Operations - Equipment, Planning &
9 Environmental Services - Services and Public Affairs - Services were
10 reduced below FY 2020 spending levels; therefore a 100% spend factor is
11 applied (as the budget for these costs is expected to be fully expended);
 - 12 ▪ The 2-year average historical spend factors for Planning & Environmental
13 Services and Public Affairs Personnel Costs are greater than 100%; a 100%
14 spend factor is applied (as the budget for these costs is expected to be fully
15 expended);
 - 16 ▪ Rate Board Personnel, Services Costs, and Materials and Supplies for which
17 a 100% spend factor is applied (as the budget for these costs is expected to
18 be fully expended);
 - 19 ▪ Fleet Management Materials and Supplies costs, for which a 77% spend
20 factor, adjusted to reflect the reduced FY 2021 budget, is applied;
 - 21 ▪ Finance Department Transfers, for which a 77.2% spend factor, adjusted to
22 reflect the average FY 2016, FY 2018 and FY 2019 actual to budget factors,
23 as FY 2020 and FY 2017 included non-typical expenses related to General
24 Fund Reimbursement.
- 25

- Pension, Pension Obligations and Benefits, for which a 100% spend factor is applied, to reflect FY 2021 estimated actuals as provided by City Finance.

Summary Discussion on the O&M Cost Projections

The O&M expenses for each year of the Study Period are projected as follows:

Black & Veatch assumed escalation factors for the various cost categories identified in the FY 2020 budget based upon the Water Department's historical experience and/or recognized cost indices; the escalation factors are applied to the projected FY 2021 expenses (for each of the respective cost categories) beginning in FY 2022. The escalation factors used in the projection of the O&M expenses are discussed in detail in Schedule BV-6: WP-1, "*Philadelphia Water Department Financial Plan: Revenue and Revenue Requirement Assumptions.*"

Personal Services: The personal services costs are projected taking into consideration the following factors: (i) the actual to budget spend levels; (ii) the annual escalation factor for labor costs based on the prior average annual salary increases under the current labor agreement, and (iii) the projection of Pensions, Pension Obligation, and Benefits based on the City's current projections; and (iv) additional staffing during the Study Period as anticipated by the Water Department.

- An annual escalation factor of 2.0% for FY 2022 through FY 2026 is used to project labor (i.e., salary) expenses; and
- 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 rates reflected in the City's current projections; Pension and benefits

1 expenses are estimated to increase from \$148.9 Million in FY 2021 to \$175.6
2 Million in FY 2026.

- 3 ▪ The Water Department participates in a City-wide pension program and
4 does not have direct control over this expense.
- 5 ▪ PWD's portion of the overall City's pension program continue increase
6 encompasses roughly 10% of the Water Department's annual obligations in
7 FY 2020.
- 8 ▪ In context of overall personal services expenses, pension, pension
9 obligations and benefits accounts for almost 50% of the total.
- 10 ▪ Please see PWD Statement No. 2 – Direct Testimony of Melissa La Buda
11 for additional information.
- 12 • Additional staffing costs in the Operations as well as the Planning & Environmental
13 Services divisions accounts for the added staff to support regulatory compliance
14 efforts beginning in FY 2022 through FY 2026; and
- 15 • Per City policy, personnel salaries supporting the capital program can no longer be
16 funded via capital financing. Therefore, the Water Department has begun to
17 transition staff salaries from Capital funded positions to O&M funded positions.
18 This staff includes engineers, inspectors, planners and other positions supporting
19 the capital program but not involved in the actual construction of the assets. PWD
20 Statement No. 2 – Direct Testimony of Melissa La Buda provides additional
21 information regarding the City's policy.

22
23 The phased transition of salaries has already commenced and is expected to
24 continue over the next ten years until all positions are fully transitioned. This shift
25 in funding is reflected in the projected personal services costs as follows:

- In FY 2022, \$1.7 million of salary costs are planned to be shifted from Capital expenses to the projected O&M expenses; and
- By FY 2026, the total salary costs associated with the shift in funding will amount to nearly \$9.4 million.

Power and Gas Costs: Per the estimates provided by the City Energy Office, the following escalation factors are assumed:

- Power: 0.0% in FY 2022, 0.5% in FY 2023, 1.0% thereafter.
- Gas: 5.5% in FY 2022, 1.5% in FY 2023 and FY 2024, and 1.0% thereafter.

Chemical Costs: Based upon the Water Department's recent experience, an escalation factor of 2.5% is applied annually to chemical expenses beginning in FY 2022 through FY 2026.

SMIP/GARP Costs: The Water Department reduced the Stormwater Management Incentive Program and Greened Acres Retrofit Program ("SMIP/GARP") budget from \$25.0 million for FY 2020 to \$15.0 million for FY 2021 in response to the pandemic. The Water Department proposes to reinstate the full budget to provide a total annual combined budget of \$25.0 Million for SMIP/GARP for FY 2022 through FY 2026. The restoration of the budget is necessary to allow the Water Department to continue to make progress toward the requirements of the City's Consent Order Agreement ("COA") and Long-term Control Plan ("LTCP").

Maintenance Items: The Water Department FY 2021 budget includes operational costs associated with maintenance activities. A slightly reduced level of spending is anticipated

1 during the Study Period and therefore these expenses are reduced by \$6.8 million beginning
2 in FY 2022 and escalated thereafter. PWD Statement No. 5 – Direct Testimony of Donna
3 Schwartz, Benjamin Jewell, Brendan Reilly and Mary Ellen Senss provides additional
4 information regarding the Water Department’s ongoing maintenance activities.

5
6 *Water Department Vehicles:* The Water Department’s vehicle budget was reduced in
7 FY 2021. A portion will be reinstated beginning in FY 2022, as vehicles will need to be
8 routinely replaced.

9
10 *Indemnities and Transfers:* Per discussions with the Water Department, no escalation in
11 indemnities and transfers are expected during FY 2022 and FY 2026.

12
13 **Q17. PLEASE DESCRIBE THE WATER DEPARTMENT’S PROJECTED CAPITAL**
14 **IMPROVEMENT PROGRAM (“CIP”) OVER THE STUDY PERIOD.**

15 A17. Schedule BV-1: Tables W-3 and WW-3 summarize the Water Department's Capital
16 Improvement Program (“CIP”) for FY 2021 through FY 2026 on an encumbrance basis.
17 An encumbrance reflects the total cost of a given project in the year construction is
18 scheduled to commence. Costs shown in Schedule BV-1: Tables W-3 and WW-3 reflect
19 the estimated total costs of the various projects, which will be financed with amounts
20 available in the Construction Fund, the annual Capital Account Deposit, amounts
21 transferred from the Residual Fund to the Construction Fund, proceeds from the issuance
22 and sale of revenue bonds, and the issuance from the Water Department’s commercial
23 paper program⁴ (“CP Program”). See also PWD Statement No. 2 – Direct Testimony of

24
25 ⁴ The Philadelphia City Council enacted the Twenty-Fifth Supplemental Ordinance to the General Ordinance on November 19, 2020. The supplemental ordinance establishes a revolving CP Program intended to provide interim, short-term financing to meet immediate capital spending needs between long-term debt issuances.

Melissa La Buda.

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

The Water Department's CIP Budget is an appropriation-based budget. The FY 2021 CIP costs reflect the Water Department's adopted FY 2021 budget appropriation. The FY 2022 CIP costs reflect the Water Department's proposed FY 2022 budget appropriation. The figures for FY 2023 to FY 2026 reflect the Water Department's submitted capital program and do not include any allowance for inflation. As noted previously, the Water Department is shifting the funding source for positions from Capital to Operations. As such, Black & Veatch adjusts the Engineering and Administration portion of the CIP budget accordingly.

Based upon a change in City funding policy, the Water Department's outstanding CIP commitments may not exceed available Construction Funds in any given fiscal year. Beginning with the respective CIP budget for the Water and Wastewater Systems as presented in Line 6 of Table W-3 and Line 7 of Table WW-3, Black & Veatch has utilized the following approach to project anticipated annual project encumbrances:

- As the CIP Budget does not include inflation, an annual inflation allowance of 3.0% is applied to the CIP costs beginning with FY 2023 as summarized on Lines 7 and 8 of Tables W-3 and WW-3, respectively.
 - The inflation allowance is based upon Black & Veatch's review of industry cost indices, including the Engineering News Record ("ENR") Construction Cost Index and the Handy-Whitman Construction Cost Index.
- Line 9 of Table W-3 and Line 10 of WW-3 (Schedule BV-1) shows:
 - The rollforward of remaining FY 2020 budget appropriations associated with vehicle purchases;

- The rollforward of remaining FY 2021 budget appropriation due to bidding and project-related delays⁵, as provided by the Water Department.
- The contingency adjustment indicated in Line 11 of Table W-3 and Line 12 of Table WW-3 (Schedule BV-1) shows the removal of assumed contingencies associated with the appropriation based budget by applying an adjustment factor of 85% to planned improvements, excluding Engineering and Administration and Vehicles.

Line 12 of Table W-3 and Line 13 of Table WW-3 shows the total anticipated additional encumbrances (or project commitments) made within a given fiscal year.

To estimate the annual drawdown of the Construction Fund, Black & Veatch estimated annual project expenses by adjusting the total annual encumbrances to account for the following:

- Anticipated program level project durations as follows: Water Conveyance – 2 years; Sewer Collection – 3 years; and Facilities Improvements – 5 years; and
- A two-month temporary shut-down of the capital program resulting in a shift in spending from FY 2020 to FY 2021 due to the pandemic.

The result of the above adjustments is summarized on Line 13 of Table W-3 and Line 14 of WW-3.

Q18. PLEASE DESCRIBE THE WATER DEPARTMENT'S PROPOSED CIP FINANCING APPROACH OVER THE STUDY PERIOD.

⁵ Delays in bidding of FY 2021 projects resulted in a rollforward of appropriations into FY 2022. See PWD Statement No. 3 – Direct Testimony of Stephen J. Furtek and Trisha Grace for further information.

A18. The financing approach is summarized in the Capital Improvement Flow of Funds tables.

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

Tables W-4 and WW-4 (Schedule BV-1) present an estimate of the flow of funds in the Construction Fund of the Water Department. Schedule BV-1: Table C-8 presents the combined Capital Improvement Flow of Funds.

- Bond Proceeds: Line 1 indicates the projected total revenue bond principal amounts projected to be issued 2021 through 2026, to finance the proposed capital improvements of the Water and Wastewater Systems.
- Debt Service Reserve: As shown in Lines 2 through 4, in addition to funding capital construction costs, the bond issuance proceeds are also used to fund required deposits into the Debt Reserve Fund, pay the costs of bond issuance and beginning in FY 2023 - the repayment of the CP Program. The annual Debt Reserve Fund balance must equal the maximum future annual debt service estimated for the outstanding and proposed bonds.
- Projected Debt Service: The debt service is estimated based on a 30-year amortization schedule and an annual interest rate of 5.0% for FY 2022 and an annual interest rate of 5.25% for FY 2023 through FY 2026. The projected debt service for each proposed bond issue (FY 2022 through FY 2026), reflects interest-only payments for the first year of the bond amortization.
- CP Program: Anticipated proceeds from the recently authorized CP program are reflected on Line 7 of Table C-8, with Line 8 presenting the required Debt Reserve Fund Deposit as related to the CP program. Line 9 represents the CP Program

Bond Issuance Projection:

FY 2022: \$240 Million

FY 2023: \$500 Million

FY 2024: \$585 Million

FY 2025: \$420 Million

FY 2026: \$600 Million

1 issuance costs, while Line 10 indicates the resulting amount transferred to the
2 construction fund. The CP Program is authorized up to \$400 million to aid in
3 funding PWD's capital program. The CIP Financing approach assumes CP
4 issuances in the amount of \$200 million annually beginning in FY 2022, with
5 repayment included in the issuance of revenue bonds (as referenced above) in the
6 subsequent fiscal year. In accordance with the General Bond Ordinance, interest
7 payments on CP issuances, are included in the senior debt service coverage
8 requirements at an assume a 2% annual interest rate.

- 9 • Cash Funding: In addition to funds from bond proceeds, Line 16 shows that during
10 the Study Period, a total of approximately \$193.2 Million of Capital Account
11 Deposits will be available to finance water and wastewater capital improvements.
12 The capital account deposit amount for FY 2021 through FY 2026 is estimated
13 based on 1.0% of the prior year depreciated value of plant investment (original cost
14 less depreciation). In addition, Line 17 indicates that \$95.2 Million will be available
15 from the Residual Fund as another source of funding for the Capital Improvement
16 Program.
- 17 • Interest Income: Interest income on annual average balances in the Construction
18 Fund and the Debt Reserve Fund are shown in Lines 18 and 32. The interest
19 earnings in the Construction Fund, which primarily consist of bond proceeds, are
20 not available to the Revenue Fund as a part of the overall project revenues available
21 for meeting the annual revenue requirements of the Water Department. An interest
22 rate of 1.0% was assumed to determine the interest income for FY 2021 through
23 FY 2026.

Q19. HOW IS THE CHANGE IN FUNDING POLICY REFLECTED IN THE PROJECTED FLOW OF FUNDS FOR THE CONSTRUCTION FUND AND DEBT RESERVE ACCOUNT?

A19. In response to the change in the City's funding policy, the Water Department intends to provide sufficient CIP funding (including revenue sources from current year rates, bond proceeds, CP proceeds, other loans, and accumulated interest), so that the estimated outstanding project commitments will not exceed available funding in any given fiscal year.

The previously discussed projection of annual project encumbrances (or project commitments) and annual expenditures (or drawdown of the Construction Fund) are summarized in Lines 22 to 27 of Table C-8 (Schedule BV-1). The Target Balance shown in Line 27 represents the overall outstanding encumbrances for each respective fiscal year. With the updated funding policy, the overall ending balance for the Construction Fund as presented on Line 21 of Table C-8 should be greater than the overall outstanding encumbrance reflected in the Target Balance presented on Line 27.

Q20. IS THE WATER DEPARTMENT ABLE TO ADHERE TO THE NEW FUNDING POLICY DURING THE STUDY PERIOD?

A20. Yes. Based upon the overall revenue and revenue requirements including the proposed revenue adjustments, the Water Department will adhere to the policy beginning in FY 2021.

Q21. WOULD YOU PLEASE SUMMARIZE THE ANNUAL DEBT SERVICE REQUIREMENTS OF THE WATER DEPARTMENT?

1 A21. Tables W-5 and WW-5 (Schedule BV-1) summarize the annual debt service payments for
2 the Water and Wastewater Systems, respectively. Line 1 shows the annual debt service on
3 existing revenue bonds, while Lines 2 through 7 show the projected debt service on the
4 proposed revenue bond issues reflected in Tables W-4 and WW-4 (Schedule BV-1). The
5 projected debt service on the proposed bonds issued in each of the years FY 2022 through
6 FY 2026 reflects interest-only payments during the first year of the bond amortization. Line
7 9 shows the applicable debt service on PennVest Loans allocable to the Water and
8 Wastewater Systems. Line 10 presents the applicable interest payment on the CP program
9 issuance.

10
11 **Q22. CAN YOU PLEASE SUMMARIZE THE INTEREST EARNINGS PAYMENT AND**
12 **CAPITAL ACCOUNT DEPOSIT THAT MUST BE MET FROM WATER AND**
13 **WASTEWATER REVENUES?**

14 A22. Yes, in addition to the aforementioned revenue requirements, there are two transfers
15 required by the General Bond Ordinance that impact net revenue requirements.

16
17 Interest Earnings Payment: The first is interest earnings paid to the City. This payment
18 reflects application of the General Bond Ordinance, as amended and supplemented, that
19 in any fiscal year in which a balance exists in the Department's Operating Fund, a
20 payment may be made to the City's General Fund which does not exceed the lowest of (i)
21 the amount of interest earnings in the Debt Reserve Fund transferred to the Operating
22 Fund during the fiscal year or (ii) \$4,994,000. Projected interest earnings transferred to
23 the General Fund, to satisfy this ordinance requirement, over the Study Period are not
24 available to meet other system revenue requirements.

1 Tables W-6 and WW-6 present an estimate of the interest earnings payment for the Water
2 and Wastewater Systems.

3
4 Capital Account Deposit: The second transfer is the required Capital Account Deposit.
5 This amount is also a revenue requirement of the Water Fund. Under the General Bond
6 Ordinance, the City covenants to make a deposit to the Capital Account of the
7 Construction Fund in each fiscal year, in an amount not less than 1% of the total value of
8 the net assets of the Water Department (the “Capital Account Deposit”). The amounts
9 accumulated in the Capital Account are to be used by the Water Department to finance
10 capital improvements to the Water and Wastewater Systems. In accordance with the Rate
11 Board’s determination in the last general rate proceeding for FY 2019 and FY 2020 (2018
12 Rate Determination), the Capital Account Deposit is held at the 1% level.

13
14 Tables W-6 and WW-6 (Schedule BV-1) present an estimate of the Capital Account
15 Deposit, for the Water and Wastewater Systems. Further information is provided in
16 Schedule BV-5: “*Cost of Service Report*.”

17
18 **Q23. PLEASE DESCRIBE ANY FURTHER REQUIREMENTS THAT MUST BE**
19 **ADDRESSED IN DETERMINING THE OVERALL LEVELS OF WATER AND**
20 **WASTEWATER REVENUES NEEDED.**

21 A23. In addition to the foregoing cash revenue requirements, the Water Department’s annual
22 revenues must be sufficient to satisfy the requirements prescribed by the General Bond
23 Ordinance and Rate Ordinance. These two ordinances must be addressed in determining
24 the overall level water and wastewater revenues requirements.

- i. General Bond Ordinance Requirement: In addition to meeting cash revenue requirements (effectively the operation and maintenance expenses and annual capital costs), the General Bond Ordinance requires that, during any given fiscal year, the Water Department's revenues (for both water and wastewater service combined), must be sufficient to satisfy (1) debt service coverage obligations as specified by the ordinance and (2) yield Net Revenues at least equal to 90% of the Debt Service Requirements (exclusive of debt service on subordinate bond and any transfers from the Rate Stabilization Fund) in such fiscal year; referred to as the "90% Test."

In the first instance, the General Bond 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

Bond Coverage Minimum:

Senior Debt Coverage: 1.2x

Total Coverage: 1.0x

Senior Coverage from
Current Revenues: 0.9x

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). In accordance with the General Bond Ordinance, interest due on commercial paper is considered on par with senior debt and included in the determination of senior debt service coverage.

Line 4 in Table C-2 (Schedule BV-1) presents the projected Senior Debt Coverage⁶ for the Study Period.

⁶ A 1.30 senior debt service coverage ratio was approved as a reasonable target in the 2018 Rate Determination.

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:

- the debt service requirements⁷ for such fiscal year (including debt service requirements in respect of Subordinated Bonds);
- amounts required to be deposited into the Debt Reserve Fund during such fiscal year;
- the principal or redemption price of and interest on General Obligation Bonds issued to fund capital expenditures of the Water and Wastewater Systems payable during such fiscal year;
- debt service requirements on any interim debt payable during such fiscal year; and
- the Capital Account Deposit 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 (Schedule BV-1) presents the projected Total Coverage for the Study Period.

In the second instance, the General Bond Ordinance requires that the City 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% of the Debt Service Requirements (excluding debt service due on any Subordinated Bonds) in

⁷ In accordance with the General Bond Ordinance, interest due on commercial paper is considered on par with senior debt and included in the debt service requirement.

1 such fiscal year. Line 6 in Table C-2 (Schedule BV-1) presents the projected Senior Debt
2 Coverage from current revenues, also referred to as the 90% Test, for the Study Period.

3
4 ii. Rate Ordinance Requirements: Section 13-101(4)(a) of the Philadelphia Code sets the
5 floor for the amounts that rates and charges must generate to support the System. The
6 rates and charges must yield to the City at least an amount equal to the sum of:

- 7 1. Operating expenses of the City in respect of the water, sewer, stormwater
8 systems;
- 9 2. Debt service on all obligations of the City in respect of the water, sewer,
10 stormwater systems;
- 11 3. In respect of water, sewer and stormwater revenue obligations of the City, such
12 additional amounts as will be required to comply with any rate covenant and
13 sinking fund reserve requirements approved by ordinance of City Council in
14 connection with the authorization or issuance of water, sewer and stormwater
15 revenue bonds; and
- 16 4. Proportionate charges for all services performed for the Water Department by
17 all officers, departments, boards, or commissions of the City.

18
19 In addition, Section 13-101(4)(b) of the Philadelphia Code states that the rates and
20 charges must not exceed (“ceiling”) the total appropriations from the Water Fund and
21 provides considerations of the elements that are to be included in the calculation of the
22 ceiling. The rates and charges projected for FY 2022 and FY 2023 do not exceed the
23 Water Fund’s projected appropriations for the above years. Line 11 in Table C-2
24 (Schedule BV-1) reflects the compliance with the Rate Ordinance requirement during
25 the Study Period.

Q24. PLEASE DESCRIBE HOW THE GENERAL BOND ORDINANCE COVENANTS ARE RECOGNIZED IN THE REVENUE REQUIREMENT PROJECTIONS.

A24. Since the outstanding revenue bonds are combined water and wastewater bonds, compliance with the debt service coverage obligations is estimated using a combined projected cash flow schedule for the Water and Wastewater Systems. Due to the current conditions and the Water Department's financial position, the minimum senior debt service coverage of 1.20 is proposed for the Study Period, lower than the approved coverage target of 1.30.

Q25. WHAT WERE YOUR CONCLUSIONS REGARDING THE WATER FUND'S COMPLIANCE WITH THE STATED DEBT SERVICE COVERAGE OBLIGATIONS?

A25. With the inclusion of the overall additional service revenues proposed in this rate proceeding for the combined Water and Wastewater Systems, the Water Fund is able to meet the minimum annual debt service coverage requirements for the Study Period.

Q26. ARE THERE ANY OTHER CONSIDERATIONS THAT WERE REFLECTED IN EXAMINING THE OVERALL NEED FOR AN INCREASE IN WATER AND WASTEWATER REVENUES?

A26. Yes. The requested rate relief is needed to improve the Department's financial position, to pay for day-to-day operating needs and support its ongoing capital improvement program. Additionally, it is essential to meet enumerated goals and metrics related to (i) maintaining senior debt service coverage at 1.20 times or higher, (ii) meeting additional rate covenant

1 requirements (90% Test); and (iii) maintaining at least minimally sustainable liquidity
2 levels for FY 2022 and FY 2023.

3
4 With respect to financial policy goals, the 2018 Rate Determination approved a target Rate
5 Stabilization Fund (RSF) balance of approximately \$135 million, a senior debt service
6 coverage ratio of 1.30, funding 20% of capital improvements via current system revenues
7 and a target residual fund balance of \$15 million. Although, the Water Department has
8 decided to temporarily defer the Rate Stabilization Fund, senior debt service coverage, and
9 cash-funded capital targets, on an interim basis. A return to these metrics in future years
10 will be necessary to improve the Water Department's financial position, restore reserves
11 and help manage through future emergencies and strains on the system. At this point in
12 time, it is critical that the RSF not be significantly further drawn down. A withdrawal of
13 \$33 million was necessitated in FY 2020. An additional withdrawal is projected in FY
14 2021, as well. The RSF would be depleted by the end of FY 2023, if all other factors remain
15 unchanged.

16
17 As shown on line 2 of Table C-2, the projected RSF withdrawal is an additional \$41.5
18 million in FY 2021, resulting in a FY 2022 beginning year balance of \$109 million, well
19 below the target level of \$135 million. In addition, the 90% Test will be marginally met in
20 FY 2021 with 97% of senior debt service being paid from current revenues. Without
21 proposed increased revenues, PWD will fail to meet the 90% test in FY 2023. This would
22 result in a technical default.

23
24 The lack of available Rate Stabilization Fund balance will limit the Water Department's
25 ability to: 1) address emergencies; 2) mitigate other system risks; and 3) manage future

1 revenue adjustments. As the primary source of reserves, the Rate Stabilization Fund will
2 need to be restored overtime. However, only an additional \$3.2 million increase in Rate
3 Stabilization Fund balance is projected for the overall Study Period. The projected
4 performance against the 90% Test requirement further illustrates the need for future
5 revenue adjustments. Otherwise, the Water Department cannot meet its projected revenue
6 requirements and associated financial metrics over the requested Rate Period.

7
8 The FY 2021 budget already reflects budget reductions and delays in the CIP. To avoid
9 further impacts on the CIP in FY 2022, PWD needs additional resources to support its
10 capital program. Further reductions to O&M activities and delay in CIP spending may
11 result in a reduced level of service for customers and negatively impact the system.

12
13 Please refer to PWD Statement No. 2 – Direct Testimony of Melissa La Buda, for further
14 discussion of financial metrics and overall risks.

15
16 **Q27. WOULD YOU PLEASE SUMMARIZE THE ALIGNMENT BETWEEN THE**
17 **PROJECTION OF REVENUES UNDER EXISTING RATES AND REVENUE**
18 **REQUIREMENTS FOR THE STUDY PERIOD?**

19 A27. Table C-1 (Schedule BV-1) presents a cash flow statement of projected revenues, revenue
20 requirements and rate covenant requirements for Water and Wastewater System operations
21 for the projected period of FY 2021 through FY 2026. The financial projections provide a
22 clear indication of the inadequacy of the Department's current revenues to comply with the
23 requirements of the General Bond Ordinance. As indicated on Lines 4 through 9 in Table
24 C-1, annual increases in revenue are required beginning in FY 2022 in order to meet the
25 revenue requirements

1
2 For the proposed Rate Period, an 8.61% revenue adjustment is necessary for FY 2022,
3 followed by a 5.05% increase in FY 2023. As stated previously, for this rate proceeding,
4 the increase in each of these two fiscal years is assumed to be effective on September 1 of
5 that fiscal year. As indicated in Lines 25 and 30 in Table C-1, the debt service coverage
6 requirements discussed previously would be met with these overall levels of increase in
7 revenues. Annual cash requirements for the combined Water and Wastewater Systems
8 would also be met with these levels of increase as indicated by the positive balances shown
9 in Line 31 of Table C-1A and Line 33 of Table C-1.

10
11 The percentage revenue increases presented on Lines 4 to 9 of Table C-1A reflect the
12 overall increase to the base rates. These percentage increases are slightly higher than the
13 percentage increases presented on Lines 4 to 9 of Table C-1 since Table C-1 presents the
14 level of increase relative to the total revenues, including TAP-R surcharge revenues.

15 Tables W-6 and WW-6 show the projected cash flow of base rates for the Water and
16 Wastewater Systems, broken down separately. The revenue requirements projected for
17 FY 2022 and FY 2023, respectively, for the Water and Wastewater Systems, are then used
18 in the development of the test year annual cost of service to be allocated for each system.

19
20 As indicated in Table W-6, an overall increase in revenue of 8.25% (or \$17.8 Million) in
21 FY 2022; and 6.10% (or \$14.4 Million) in FY 2023 are proposed for the Water System.
22 For the Wastewater System, an overall increase in revenue of 8.98% (or \$31.1 Million) in
23 FY 2022; and 4.48% (or \$17.1 Million) in FY 2023 are proposed as shown in Table
24 WW- 6.

1 The above-referenced percentage increase in revenues is calculated in relation to the Water
2 and Wastewater System service revenues from the immediate prior year.

3
4 **Q28. PLEASE EXPLAIN THE EXPECTED IMPACT OF UPDATED STORMWATER**
5 **BILLING DATA ON THE SYSTEM-WIDE BILLABLE GROSS AREA (GA) AND**
6 **IMPERVIOUS AREA (IA).**

7 A28. The Water Department received updated Stormwater Billing Data based upon aerial and
8 infrared imagery, which provides new IA and GA information for properties city-wide
9 (prior to adjusting for credits). Based on the updated Stormwater Billing Data, the overall
10 impervious area has increased by approximately 87.5 million square feet compared to the
11 prior data set. Most of this increase in IA is attributable to residential parcels, which reflect
12 a total increase in IA of 72.5 million square feet. Overall non-residential impervious area
13 (including condominiums) increased 15 million square feet. Residential GA has increased
14 2.1 million square feet, while Non-residential GA increased 2 million square feet.

15 The methodology used in developing projections of billable GA and IA for the Cost of
16 Service Study (collectively, the Stormwater Units of Service) is discussed in Schedule
17 BV- 6: WP-2 "*Stormwater Units of Service*."

18
19 **Q29. ARE THERE ANY IMPACTS TO THE MEAN RESIDENTIAL GA AND IA**
20 **RESPECTIVELY?**

21 A29. The updated data set does not have an impact on the mean residential GA square footage,
22 which remains unchanged from the prior study at 2,110 square feet. The mean residential
23 IA has increased to 1,200 square feet as compared to the mean residential IA of 1,050
24 square feet from the prior study.

Q30. HOW WILL THE UPDATED STORMWATER BILLING DATA INFLUENCE THE ALLOCATION OF COSTS BETWEEN RESIDENTIAL AND NON-RESIDENTIAL STORMWATER CUSTOMERS?

A30. The updated analysis shows an increase in the overall annual cost of service allocated to stormwater from the Wastewater System, after accounting for credits and appeals, the system-wide IA unit rate used in establishing stormwater billing rates and charges for both residential and non-residential customers (including condominiums) also increase.

The updated billing data indicates the IA associated with the residential stormwater class now represents a greater portion of the overall city-wide impervious area. As a result, residential customers will also bear an increased portion of the revenue requirements allocated to IA. This is further influenced by the impact of stormwater credits, in which only non-residential and condominiums customers are eligible. Credits reduce the overall amount of billable IA and GA.

Prior to adjusting for discounts and lag factor, the residential stormwater management service charge as presented in Schedule BV-3: Table SW-16, is determined by applying the system-wide IA and GA unit rates (see Schedule BV-3: Table SW-14) to the residential mean IA and GA square footage as discussed in the previous response. The resulting rate is applied as a uniform flat fee per parcel for all residential properties.

If the stormwater revenue requirements from the prior proceeding were held constant (i.e., assuming no change in stormwater revenue needs), residential stormwater customers would still see an increase in their monthly stormwater fees due to the increase in the residential mean IA square footage.

Q31. ARE ANY CHANGES PROPOSED TO THE EXISTING STORMWATER CREDIT PROGRAM?

A31. Yes. As discussed in PWD Statement No. 2 – Direct Testimony of Melissa La Buda, two changes are proposed to the stormwater credit program:

- (i) The Water Department is proposing to update the required depth of stormwater run-off that customer must manage in order to be eligible for IA Managed Credit under Section 4.5 (c)(1)(ii) of the Water Department’s Rate and Charges from the first inch of stormwater run-off to the first inch and a half of stormwater run-off. This change will align the Water Department’s current stormwater management requirements as stated in Chapter 6 section 600.5(a)(1) of the Water Department’s Regulations. The Water Department is proposing to grandfather any credit applications received before September 1, 2021.
- (ii) The Water Department is proposing to align stormwater practices eligible for Impervious Area Reduction (“IAR”) adjustments under Section 4.5(c)(1)(i) of Rates and Charges with those noted in the Stormwater Management Service Charge Credits and Appeals Manual, namely tree canopy cover, roof leader/downspout disconnection and pavement disconnection.

Q32. PLEASE EXPLAIN THE EXPECTED IMPACT OF THE STORMWATER CREDIT PROGRAM ON THE SYSTEM-WIDE BILLABLE GA AND IA.

A32. There is no impact anticipated from the change in the stormwater credit program on the system-wide billable GA and IA.

**Q33. ARE ANY OTHER CHANGES PROPOSED TO THE WATER, SEWER, AND
STORMWATER RATE STRUCTURE?**

A33. No. There are no other changes proposed to the water, sewer, and stormwater rate structure. As previously noted, the discussion of revenue and revenue requirements, cost of service analysis, and resulting rates included in this testimony apply to the Water Department's "Base Rates."

As with the 2018 general rate proceeding, PWD is proposing rate increases that will go into effect on September 1st of each respective fiscal year. However, rates are designed based upon a 12-month period. Because the proposed revenue increase will not go into effect until September 1st of each fiscal year, the proposed rates are designed based on annualizing the 10-month period for which rates are effective. Tables W-6A and WW-6A show the projected cash flow of base rates for the Water and Wastewater Systems, based on the annualizing the proposed revenue increases.

**Q34. IN DESIGNING THE RETAIL WATER, SEWER, AND STORMWATER COST
OF SERVICE RATE SCHEDULES ARE THERE ANY ADDITIONAL FACTORS
THAT HAVE BEEN TAKEN INTO ACCOUNT?**

A34. Yes. The proposed charges for water and wastewater service applicable to general service retail customers, as shown in Schedule BV-1: Table W-18 and Table WW-18, respectively, recognize that certain retail customer types, including senior citizens, charities and schools, and the Philadelphia Housing Authority, receive services at a discounted rate. The Water Department anticipates that the existing discounts (25% for senior citizens, charities, and schools and 5% for the Philadelphia Housing Authority) will continue to be applicable during the Rate Period.

1
2 In designing proposed rates, the retail water, sanitary sewer, and stormwater annual costs
3 of service determined for each customer type are adjusted to reflect the fact that these
4 customer types will not pay the full cost of service. Accordingly, we increase the proposed
5 retail water, sewer, and stormwater rates to recover this cost of service revenue reduction
6 due to discounts.

7
8 In addition, in the case of the non-residential stormwater class, we adjust their stormwater
9 rates to address the discounts as well as to recover the reduction in revenue due to the
10 existing stormwater customer assistance program (“CAP”). Anticipated revenue reductions
11 due to stormwater CAP are shown in Schedule BV-6: WP-1 *“Philadelphia Water*
12 *Department Financial Plan: Revenue and Revenue Requirement Assumptions”* as well as
13 Schedule BV-5: *“Cost of Service Report.”*

14
15 As previously noted, revenue loss due to providing TAP discounts and TAP-R surcharge
16 revenues were excluded from the analysis of Base Rates.

17
18 The cost recovery approach used for billing discounts, stormwater credits, incentives, and
19 grant programs are outlined in Schedule BV-6: WP-3 *“Cost Recovery of Discounts,*
20 *Credits, Grants and TAP.”* Additional details regarding these items are also further
21 discussed in Schedule BV-6: WP-1 *“Philadelphia Water Department Financial Plan:*
22 *Revenue and Revenue Requirement Assumptions.”*

1 **Q35. PLEASE EXPLAIN WHY THE COST OF SERVICE BASED PROPOSED PUBLIC**
2 **FIRE PROTECTION CHARGES REFLECT A DECREASE FROM THE**
3 **EXISTING WATER PUBLIC FIRE PROTECTION CHARGE.**

4 A35. The FY 2022 and FY 2023 costs of service and resulting water public fire protection
5 charges reflect the results of the current Cost of Service Study. The allocation of water
6 distribution-related operating and maintenance expenses to water distribution-related
7 functional components (treated water storage, transmission and distribution mains, meters,
8 and fire hydrants) was revised to be solely based on the distribution of plant investment for
9 these components. Prior cost of service studies included a direct allocation of a portion of
10 distribution-related operating and maintenance expenses to hydrants, to mitigate the impact
11 of the changes in the cost allocation distribution as a result of a reorganization of water
12 distribution related cost centers within the Operations division. The current Cost of Service
13 Study eliminates this adjustment, as it no longer applies to the organization of Operations
14 division.

15
16 **Q36. BASED UPON THE PROPOSED SCHEDULES OF RETAIL RATES, WHAT IS**
17 **THE IMPACT ON THE TYPICAL RESIDENTIAL CUSTOMER'S BILL?**

18 A36. Table C-4, in Schedule BV-1, presents a series of typical or representative combined
19 monthly residential water, sanitary sewer, and stormwater bills under existing and proposed
20 rates for Test Year-1 (FY 2022) and Test Year-2 (FY 2023) for the 5/8-inch meter size.
21 The typical PWD residential customer has a 5/8-inch meter and uses about 0.5 Mcf
22 (thousand cubic feet), approximately 500 cubic feet, monthly. Under the proposed
23 schedules of water and wastewater rates for Test Year-1 (FY 2022), this customer's
24 monthly bill would increase from \$66.73 to \$74.47, an increase of \$7.74 or about 11.6%.

1 In FY 2023, the bill increases to \$78.45, an increase of \$3.98 over FY 2022 rates, or about
2 5.3%.

3
4 **Q37. BASED UPON THE PROPOSED SCHEDULES OF RETAIL RATES, WHAT IS**
5 **THE IMPACT ON THE TYPICAL SENIOR RESIDENTIAL CUSTOMER'S**
6 **BILL?**

7 A37. Table C-4, in Schedule BV-1, presents a series of typical or representative combined
8 monthly residential water, sanitary sewer, and stormwater bills under existing and proposed
9 rates for Test Year-1 (FY 2022) and Test Year-2 (FY 2023) for the 5/8-inch meter size. A
10 typical PWD senior residential customer has a 5/8-inch meter and uses about 0.3 Mcf
11 (thousand cubic feet), approximately 300 cubic feet, monthly. Under the proposed
12 schedules of water and wastewater rates for Test Year-1 (FY 2022), this customer's
13 monthly bill would increase from \$51.24 to \$57.26, an increase of \$6.02 or about 11.7%.
14 In FY 2023, the bill increases to \$60.18, an increase of \$2.92 over FY 2022 rates, or about
15 5.1%.

16
17 Eligible senior citizens may receive a 25% discount on their entire bill. The total monthly
18 bills presented above do not reflect this discount. Accounting for the discount for
19 qualifying senior citizens, the typical senior residential customer's monthly bill (based
20 upon the previously stated billing parameters) would increase from \$38.43 to \$42.94, an
21 increase of \$4.51 or about 11.7 %. In FY 2023, the bill increases to \$45.13, an increase of
22 \$2.19 over FY 2022 rates, or about 5.1%.

23
24 **Q38. BASED UPON THE PROPOSED SCHEDULES OF RETAIL RATES, WHAT IS**
25 **THE IMPACT ON THE TYPICAL SMALL BUSINESS CUSTOMER'S BILL?**

1 A38. Table C-5, in Schedule BV-1, presents a series of typical or representative combined
2 monthly non-residential water, sanitary sewer, and stormwater bills under existing and
3 proposed rates for Test Year-1 (FY 2022) and Test Year-2 (FY 2023) for multiple meter
4 sizes and various parcel characteristics (i.e., GA and IA). A typical PWD small commercial
5 business customer has a 5/8-inch meter and uses about 0.6 Mcf (thousand cubic feet),
6 approximately 600 cubic feet, monthly. A parcel with a gross area of 5,500 square feet and
7 an impervious area of 4,000 square feet was assumed for the development of the typical
8 bill comparison.

9
10 Under the proposed schedules of water and wastewater rates for Test Year-1 (FY 2022),
11 this customer's monthly bill would increase from \$112.13 to \$120.24, an increase of \$8.11
12 or about 7.2%. In FY 2023, the bill increases to \$127.03, an increase of \$6.79 over FY
13 2022 rates, or about 5.7%.

14
15 **Q39. PLEASE EXPLAIN WHY, UNDER THE PROPOSED RATES AND CHARGES,**
16 **THE TYPICAL RESIDENTIAL AND SENIOR CITIZEN CUSTOMERS WOULD**
17 **SEE BILL INCREASES THAT ARE HIGHER THAN THE OVERALL**
18 **ADJUSTMENTS TO SERVICE REVENUES SOUGHT AS A PART OF THIS**
19 **PROCEEDING.**

20 A39. Typical residential and senior citizen customers will see bill impacts higher than the
21 proposed service revenue increases due to:

- 22 (i) cost of service allocations;
- 23 (ii) projected declines in system billed water and sewer volumes and system-wide
24 collections; and

- (iii) increase in portion of overall billable stormwater units of service associated with residential customers compared to prior studies.

IV. MISCELLANEOUS CHARGES

Q40. ARE ANY CHANGES BEING PROPOSED TO THE DEPARTMENT'S MISCELLANEOUS WATER, SEWER, AND STORMWATER CHARGES?

A40. Yes. The Water Department is proposing to update miscellaneous charges in the following sections of PWD's Rates and Charges:

<u>Rates & Charges</u>	
<u>Section Reference</u> ⁸	<u>Miscellaneous Charge Section</u>
	<u>6.0 - Miscellaneous Water Charges</u>
6.1	Meter Test Charges
6.2	Charges for Furnishing and Installation of Water Meters
6.3	Tampering of Meter
6.4	Shut-off and Restoration of Water Service
6.6	Charges for Water Main Shutdown Service
6.7	Water Connection Charges
6.9	Hydrant Permits
6.10	Flow Tests
	<u>7.0 - Miscellaneous Sewer Charges</u>
7.5	Manhole Pump-out Permit
7.6	Trucked or Hauled Wastewater Permit
	<u>8.0 - Miscellaneous Sewer Charges</u>

⁸ Miscellaneous Charges in Sections 7.1 and 7.2 are based upon and included in the Cost of Service Study.

<u>Rates & Charges</u>	
<u>Section Reference</u> ⁸	<u>Miscellaneous Charge Section</u>
8.1	Stormwater Plan Review Fees
8.2	Stormwater Fee In Lieu
	<u>Other Charges</u>
3.5	Sewer Credits
4.5	Stormwater Credits

The proposed miscellaneous charges are detailed in the following tables included in Schedule BV-4:

- Table M-1: Summary of Miscellaneous Charges (Regular Hours)
- Table M-2: Summary of Miscellaneous Charges (Overtime Hours)

Please refer to Section 6 of PWD Exhibit No. 3 for additional information regarding the Miscellaneous Charges.

Q41. PLEASE BRIEFLY DESCRIBE THE APPROACH FOR DEVELOPING THE PROPOSED MISCELLANEOUS CHARGES.

A41. Black & Veatch performed a review of the miscellaneous charges in order to determine the updated cost of service rates. To accomplish this, the miscellaneous fees analysis was updated to reflect current cost inputs including: Labor, Equipment Materials, and Contractor Costs. The methodology used to calculate the miscellaneous fees is consistent with the methodology from prior general rate proceeding. No changes are proposed to the fees for which the calculated cost of service was in alignment with the existing charges. The proposed fees were developed using the following approach:

- (i) For fees with a calculated cost of service less than the existing charge, the proposed fee is transitioned in FY 2022 to reflect the calculated cost of service.
- (ii) For fees with a calculated cost of service higher than the existing charge, the proposed fees are phased-in by 40% each fiscal year or until the cost of service rate is achieved.
- (iii) Proposed miscellaneous charges are rounded to the nearest five or ten dollars.

All proposed miscellaneous charges follow this approach except for the three fees as follows:

- (i) Restoration of Water Service for Operating Service Valve 2-inch and Smaller Service Lines. With respect to the Restoration of Water Service for Operating Service Valve 2-inch and Smaller Service Lines [Section 6.4(c)(1)(i)], as a result of the 2018 Rate Determination, this fee was set to \$60 (see Page 92 to 93 of the 2018 Rate Determination). The Water Department is proposing to increase this fee to the calculated cost of service in FY 2022, rather than phase-in by 40%. This is being proposed in order to align with the Site Visit for Non-Payment as stated in Section 6.4 (a) of PWD Regulations.
- (ii) Stormwater Management Fee In Lieu – Exemption to Water Quality Requirement. With respect to the Exemption to the Water Quality Requirement [Section 8.2 (c)(1)], the Water Department is proposing to increase the fee for FY 2022 by 40%, and round to the nearest five dollar, and round the proposed FY 2023 fee to the nearest dollar based on the calculated costs.

(iii) In addition, the Water Department is proposing to implement a special restoration of service fee and visitation and shut-off specifically for TAP customers⁹. These fees are proposed to be set at \$12.00, based upon the minimum allowable bill for customers enrolled in TAP. These fees, included under proposed Section 6.4(e) in the proposed Rates and Charges (see PWD Exhibit 3), are listed below:

- a. Shut-off of service / payment tendered at the time of shut-off;
- b. Restoration of service after termination for non-payment or violation of service requirements.

The methodology used to update the Miscellaneous Charges is outlined in Schedule BV- 6: WP-5 “*Miscellaneous Fees Methodology*” with supporting calculations provided in the appendix.

V. SENIOR DISCOUNT THRESHOLD

Q42. PLEASE DESCRIBE THE PROPOSED ADJUSTMENT TO THE SENIOR CITIZEN INCOME ELIGIBILITY THRESHOLD.

A42. Per Section 19-1901 of the Philadelphia Code, the senior citizen income eligibility threshold was established at \$14,000 in fiscal year (FY) 1987 and adjusted to reflect the net change in the Consumer Price Index (All Urban Consumers (“CPI-U”) for Philadelphia (All Items)). Based upon the 2018 Rate Determination, the current senior citizen income threshold, as stated in Section 5.2(b)(1)(iii) of the Water Department’s Rates and Charges (Effective September 1, 2019), is \$32,300.

⁹ Also referred to in PWD’s Rates and Charges as Income-Based Water Revenue Assistance Program (“IWRAP”).

1 Black & Veatch developed a projection of the senior citizen income threshold, per the
2 Philadelphia Code requirements, for the proposed Rate Period of FY 2022 and FY 2023.
3 The approach used to determine the income eligibility threshold for the senior citizens
4 discount is the same as used in prior rate proceedings, and further detailed in Schedule
5 BV- 6: WP-4 “*Senior Citizen Discount Threshold Adjustment.*” Based on this analysis, the
6 senior income threshold is proposed to be adjusted from \$32,300 to \$33,300 for the period
7 of FY 2022 to FY 2023.

8
9 **VI. CONCLUSION**

10
11 **Q43. DOES THIS COMPLETE YOUR DIRECT TESTIMONY IN THIS MATTER?**

12 A43. Yes, it does.
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25

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-1

Dated: January 15, 2021

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Schedule REF #		Schedule Name
BV-1 Black & Veatch Schedule		
1	TABLE C-1	COMBINED UTILITY: PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE AND TAP-R SURCHARGE RATES
3	TABLE C-1A	PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE RATES EXCLUDING TAP-R SURCHARGE RATES
4	TABLE C-1B	PROJECTED REVENUE AND REVENUE REQUIREMENTS - TAP-R SURCHARGE RATES EXCLUDING BASE RATES
5	TABLE C-2	COMBINED UTILITY: PROJECTED RATE STABILIZATION FUND AND COVENANTS METRICS PERFORMANCE
6	TABLE C-3	COMBINED UTILITY: PROJECTED RECEIPTS UNDER EXISTING RATES
7	TABLE C-4	COMBINED UTILITY: COMPARISON OF TYPICAL BILL FOR RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES
8	TABLE C-5	COMBINED UTILITY: COMPARISON OF EXAMPLE BILLS FOR NON-RESIDENTIAL CUSTOMERS UNDER EXISTING AND PROPOSED RATES
9	TABLE C-6	COMBINED UTILITY: PROJECTED OPERATION AND MAINTENANCE EXPENSE
10	TABLE C-7	COMBINED UTILITY: PROJECTED CAPITAL IMPROVEMENT PROGRAM
11	TABLE C-8	COMBINED UTILITY: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE ACCOUNT
12	TABLE C-9	COMBINED UTILITY: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
13	TABLE W-1	WATER: PROJECTED RECEIPTS UNDER EXISTING RATES
14	TABLE W-1A	WATER: OTHER REVENUE PROJECTED RECEIPTS
15	TABLE W-2	WATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
16	TABLE W-3	WATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
17	TABLE W-4	WATER: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE ACCOUNT
18	TABLE W-5	WATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE

Schedule REF #		Schedule Name
BV-1 Black & Veatch Schedule		
19	TABLE W-6	WATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE RATES
20	TABLE W-6A	WATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE RATES ANNUALIZED FOR TEST YEAR 2022 RATES
21	TABLE W-7	WATER: ESTIMATED TEST YEAR COST OF SERVICE
22	TABLE W-8	WATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT TO FUNCTIONAL COST COMPONENTS
23	TABLE W-9	WATER: ALLOCATION OF TEST YEAR PLANT DEPRECIATION EXPENSE
24	TABLE W-10	WATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE
25	TABLE W-11	WATER: ESTIMATED RETAIL UNITS OF SERVICE
26	TABLE W-12	WATER: EQUIVALENT METER AND BILL RATIOS
27	TABLE W-13A	WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES TEST YEAR 2022
28	TABLE W-13B	WATER: SUMMARY OF COST OF SERVICE ALLOCATED TO AQUA PA AND PROPOSED RATES TEST YEAR 2023
29	TABLE W-14	WATER: TEST YEAR RETAIL UNIT COSTS OF SERVICE
30	TABLE W-15	WATER: TEST YEAR COST OF SERVICE BY FUNCTIONAL COST COMPONENTS
31	TABLE W-16	WATER: TEST YEAR ADJUSTED COST OF SERVICE
32	TABLE W-17	WATER: COMPARISON OF TEST YEAR COSTS OF SERVICE AND ADJUSTED COST OF SERVICE WITH REVENUES UNDER EXISTING RATES
33	TABLE W-18	WATER: PROPOSED RATES FOR GENERAL SERVICE
34	TABLE W-19	WATER: PROPOSED RATES FOR PRIVATE FIRE PROTECTION
35	TABLE W-19A	WATER: PROPOSED RATES FOR PRIVATE FIRE PROTECTION RESIDENTIAL PRIVATE FIRE PROTECTION
36	TABLE WW-1	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING RATES

Schedule REF #		Schedule Name
BV-1 Black & Veatch Schedule		
37	TABLE WW-1A	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING SANITARY SEWER RATES
38	TABLE WW-1B	WASTEWATER: PROJECTED RECEIPTS UNDER EXISTING STORMWATER RATES
39	TABLE WW-1C	WASTEWATER: OTHER REVENUE PROJECTED RECEIPTS
40	TABLE WW-2	WASTEWATER: PROJECTED OPERATION AND MAINTENANCE EXPENSE
41	TABLE WW-3	WASTEWATER: PROJECTED CAPITAL IMPROVEMENT PROGRAM
42	TABLE WW-4	WASTEWATER: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE
43	TABLE WW-5	WASTEWATER: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
44	TABLE WW-6	WASTEWATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE RATES
45	TABLE WW-6A	WASTEWATER: PROJECTED REVENUE AND REVENUE REQUIREMENTS - BASE RATES ANNUALIZED FOR TEST YEAR 2022 RATES
46	TABLE WW-7	WASTEWATER: ESTIMATED TEST YEAR COST OF SERVICE
47	TABLE WW-8	WASTEWATER: TEST YEAR UNITS OF SERVICE BY CUSTOMER TYPE
48	TABLE WW-9	WASTEWATER: TEST YEAR PLANT INVESTMENT SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS
49	TABLE WW-9A	WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE NORTHEAST WATER POLLUTION CONTROL PLANT
50	TABLE WW-9B	WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE SOUTHWEST WATER POLLUTION CONTROL PLANT
51	TABLE WW-9C	WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE SOUTHEAST WATER POLLUTION CONTROL PLANT
52	TABLE WW-10	WASTEWATER: OPERATION AND MAINTENANCE EXPENSE SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS
53	TABLE WW-10A	WASTEWATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE COLLECTION SYSTEM

Schedule REF #		Schedule Name
BV-1 Black & Veatch Schedule		
54	TABLE WW-10B	WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE NORTHEAST WPC PLANT
55	TABLE WW-10C	WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHWEST WPC PLANT
56	TABLE WW-10D	WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHEAST WPC PLANT
57	TABLE WW-10E	WASTEWATER: TEST YEAR OPERATION AND MAINTENANCE EXPENSE SUMMARY NET OPERATION & MAINTENANCE EXPENSE
58	TABLE WW-11	WASTEWATER: RETAIL UNIT COSTS OF SERVICE - (Part 1)
59	TABLE WW-12	WASTEWATER: RETAIL UNIT COSTS OF SERVICE - (Part 2)
60	TABLE WW-13	WASTEWATER: RETAIL COSTS OF SERVICE
61	TABLE WW-14	WASTEWATER: ADJUSTED COST OF SERVICE (AFTER ALLOCATION OF I/I AND DISCOUNTS)
62	TABLE WW-15	WASTEWATER: INSIDE CITY RETAIL SERVICE UNIT COSTS OF SERVICE FOR RATE DESIGN
63	TABLE WW-16	WASTEWATER: DEVELOPMENT OF COST OF SERVICE MONTHLY SERVICE CHARGE FOR CUSTOMERS WITH 5/8-INCH METERS
64	TABLE WW-17	WASTEWATER: DEVELOPMENT OF COST OF SERVICE VOLUME CHARGE PER MCF OF NORMAL STRENGTH SANITARY WASTEWATERS
65	TABLE WW-18	WASTEWATER: PROPOSED RATES FOR GENERAL SERVICE SANITARY SEWER

TABLE C-1: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base and TAP-R Surcharge Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
OPERATING REVENUE							
1	Water Service - Existing Rates	256,215	266,656	269,813	272,813	270,500	268,191
2	Wastewater Service - Existing Rates	411,294	427,613	433,417	438,954	436,238	433,537
3	Total Service Revenue - Existing Rates	667,509	694,269	703,229	711,766	706,738	701,727
	Additional Service Revenue Required						
	Percent Increase						
	Months Effective						
4	FY 2021	0.00%	10	-	-	-	-
5	FY 2022	8.61%	10	48,864	60,553	61,290	60,429
6	FY 2023	5.05%	10	31,543	39,054	38,780	38,506
7	FY 2024	5.05%	10		33,556	40,757	40,469
8	FY 2025	7.24%	10			50,125	60,881
9	FY 2026	7.54%	10				55,599
10	Total Additional Service Revenue Required	-	48,864	92,096	133,900	190,520	255,884
11	Total Water & Wastewater Service Revenue	667,509	743,132	795,325	845,666	897,258	957,611
	Other Income (a)						
12	Other Operating Revenue	38,160	21,719	21,638	21,561	21,484	21,408
13	Debt Reserve Fund Interest Income	-	-	-	-	-	-
14	Operating Fund Interest Income	1,071	1,280	1,316	1,354	1,376	1,413
15	Rate Stabilization Interest Income	1,298	1,089	1,092	1,110	1,127	1,132
16	Total Revenues	708,038	767,220	819,371	869,691	921,245	981,564
OPERATING EXPENSES							
17	Total Operating Expenses	(525,844)	(543,868)	(558,009)	(572,357)	(586,998)	(602,222)
NET REVENUES							
18	Transfer From/(To) Rate Stabilization Fund	41,464	331	(446)	(2,611)	(340)	(170)
19	NET REVENUES AFTER OPERATIONS	223,658	223,683	260,916	294,723	333,907	379,172
DEBT SERVICE							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(175,726)	(163,516)	(164,558)	(151,302)	(151,438)	(152,439)
21	Pennvest Parity Bonds	(10,651)	(10,885)	(11,067)	(14,864)	(14,864)	(15,182)
22	Projected Future Bonds	-	(10,000)	(37,726)	(75,393)	(107,893)	(144,284)
23	Commercial Paper	-	(2,000)	(4,000)	(4,000)	(4,000)	(4,000)
24	Total Senior Debt Service	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
29	CAPITAL ACCOUNT DEPOSIT	(27,833)	(29,447)	(31,155)	(32,962)	(34,874)	(36,896)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.04 x	1.03 x	1.04 x	1.05 x	1.06 x	1.07 x

TABLE C-1: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base and TAP-R Surcharge Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
RESIDUAL FUND							
31	Beginning of Year Balance	16,261	15,064	15,049	15,009	15,062	15,051
32	Interest Income	156	150	150	150	150	150
	Plus:						
33	End of Year Revenue Fund Balance	9,448	7,835	12,410	16,203	20,839	26,370
34	Deposit for Transfer to City General Fund (b)	1,855	1,847	2,076	2,413	2,756	3,104
	Less:						
35	Transfer to Construction Fund	(10,800)	(8,000)	(12,600)	(16,300)	(21,000)	(26,500)
36	Transfer to City General Fund	(1,855)	(1,847)	(2,076)	(2,413)	(2,756)	(3,104)
37	Transfer to Debt Service Reserve Fund	-	-	-	-	-	-
38	End of Year Balance	15,064	15,049	15,009	15,062	15,051	15,071
RATE STABILIZATION FUND							
39	Beginning of Year Balance (c)	150,652	109,188	108,857	109,303	111,914	112,254
40	Deposit From/(To) Revenue Fund	(41,464)	(331)	446	2,611	340	170
41	End of Year Balance	109,188	108,857	109,303	111,914	112,254	112,424

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

(c) FY 2021 beginning balance is estimated based on preliminary FY 2020 results.

TABLE C-1A: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base Rates Excluding TAP-R Surcharge
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
OPERATING REVENUE							
1	Water Service - Existing Rates	253,071	263,593	266,743	269,713	267,430	265,151
2	Wastewater Service - Existing Rates	406,729	423,433	429,267	434,770	432,095	429,434
3	Total Service Revenue - Existing Rates	659,800	687,026	696,010	704,483	699,525	694,584
	Additional Service Revenue Required						
	Percent	Months					
	Year	Increase	Effective				
4	FY 2021	0.00%	10	-	-	-	-
5	FY 2022	8.70%	10	48,864	60,553	61,290	60,429
6	FY 2023	5.10%	10		31,543	39,054	38,780
7	FY 2024	5.10%	10			33,556	40,757
8	FY 2025	7.30%	10				50,125
9	FY 2026	7.60%	10				
							55,599
10	Total Additional Service Revenue Required	-	48,864	92,096	133,900	190,520	255,884
11	Total Water & Wastewater Service Revenue	659,800	735,890	788,107	838,383	890,045	950,468
	Other Income (a)						
12	Other Operating Revenue	45,633	29,192	29,111	29,034	28,957	28,881
13	Debt Reserve Fund Interest Income	-	-	-	-	-	-
14	Operating Fund Interest Income	1,071	1,280	1,316	1,354	1,376	1,413
15	Rate Stabilization Interest Income	1,298	1,089	1,092	1,110	1,127	1,132
16	Total Revenues	707,802	767,451	819,625	869,881	921,505	981,894
OPERATING EXPENSES							
17	Total Operating Expenses	(525,844)	(543,868)	(558,009)	(572,357)	(586,998)	(602,222)
NET REVENUES							
18	Transfer From/(To) Rate Stabilization Fund	41,700	100	(700)	(2,800)	(600)	(500)
19	NET REVENUES AFTER OPERATIONS	223,658	223,683	260,916	294,723	333,907	379,172
DEBT SERVICE							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(175,726)	(163,516)	(164,558)	(151,302)	(151,438)	(152,439)
21	Pennvest Parity Bonds	(10,651)	(10,885)	(11,067)	(14,864)	(14,864)	(15,182)
22	Projected Future Bonds	-	(10,000)	(37,726)	(75,393)	(107,893)	(144,284)
23	Commercial Paper	-	(2,000)	(4,000)	(4,000)	(4,000)	(4,000)
24	Total Senior Debt Service	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
29	CAPITAL ACCOUNT DEPOSIT	(27,833)	(29,447)	(31,155)	(32,962)	(34,874)	(36,896)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.04 x	1.03 x	1.04 x	1.05 x	1.06 x	1.07 x
31	End of Year Revenue Fund Balance	9,448	7,835	12,410	16,203	20,839	26,370

(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 2021.

TABLE C-1B: PROJECTED REVENUE AND REVENUE REQUIREMENTS
TAP-R Surcharge Rates Excluding Base Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
OPERATING REVENUE							
1	Water Service - Existing Rates	3,144	3,063	3,069	3,099	3,070	3,040
2	Wastewater Service - Existing Rates	4,565	4,179	4,150	4,184	4,143	4,103
3	Total Service Revenue - Existing Rates	7,709	7,242	7,219	7,284	7,213	7,143
	Additional Service Revenue Required						
	Year	Percent Increase	Months Effective				
4	FY 2021	0.00%	10	-	-	-	-
5	FY 2022	0.00%	10	-	-	-	-
6	FY 2023	0.00%	10	-	-	-	-
7	FY 2024	0.00%	10		-	-	-
8	FY 2025	0.00%	10			-	-
9	FY 2026	0.00%	10				-
10	Total Additional Service Revenue Required	-	-	-	-	-	-
11	Total Water & Wastewater Service Revenue	7,709	7,242	7,219	7,284	7,213	7,143
	Other Income						
12	Other Operating Revenue (a)	(7,473)	(7,473)	(7,473)	(7,473)	(7,473)	(7,473)
13	Debt Reserve Fund Interest Income	-	-	-	-	-	-
14	Operating Fund Interest Income	-	-	-	-	-	-
15	Rate Stabilization Interest Income	-	-	-	-	-	-
16	Total Revenues	236	(231)	(254)	(189)	(260)	(330)
OPERATING EXPENSES							
17	Total Operating Expenses	-	-	-	-	-	-
NET REVENUES							
18	Transfer From/(To) Rate Stabilization Fund (b)	(236)	231	254	189	260	330
19	NET REVENUES AFTER OPERATIONS	-	-	-	-	-	-
DEBT SERVICE							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	-	-	-	-	-	-
21	Pennvest Parity Bonds	-	-	-	-	-	-
22	Projected Future Bonds	-	-	-	-	-	-
23	Commercial Paper	-	-	-	-	-	-
24	Total Senior Debt Service	-	-	-	-	-	-
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	NA	NA	NA	NA	NA	NA
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	-	-	-	-	-	-
29	CAPITAL ACCOUNT DEPOSIT	-	-	-	-	-	-
30	TOTAL COVERAGE (L19/(L24+L26+L29))	NA	NA	NA	NA	NA	NA
31	End of Year Revenue Fund Balance	-	-	-	-	-	-

(a) Reflects net recoverable costs for TAP-R based on the 2020 Annual Adjustment Proceeding.

(b) Rate Stabilization Fund transfers necessary to meet over or under recovery of TAP costs until recovery is reconciled via TAP-R reconciliation.

TABLE C-2
Base and TAP-R Surcharge Rates
COMBINED SYSTEM: PROJECTED RATE STABILIZATION FUND
AND COVENANTS METRICS PERFORMANCE

Line #	Description	2021	2022	2023	2024	2025	2026
RATE STABILIZATION FUND		in thousand dollars (1,000 dollars)					
1	Beginning Balance: Rate Stabilization Fund (a)	150,652	109,188	108,857	109,303	111,914	112,254
2	Transfers From (To) Revenue Fund (b)	(41,464)	(331)	446	2,611	340	170
3	Year-End Rate Stabilization Fund Balance (Line 1 + Line 2)	109,188	108,857	109,303	111,914	112,254	112,424
General Bond Ordinance Covenants							
4	Senior Debt Coverage (c)	1.20	1.20	1.20	1.20	1.20	1.20
5	Total Debt Coverage (d)	1.04	1.03	1.04	1.05	1.06	1.07
6	90% Test - Senior Debt Coverage from Current Revenues (e)	0.97	1.19	1.20	1.20	1.20	1.20
O&M Actual to Budget Ratio							
7	Projected O&M Budget (f)	604,361	621,837	637,910	653,595	669,589	686,195
8	O&M Actual to Budget Ratio	87.0%	87.5%	87.5%	87.6%	87.7%	87.8%
Rate Ordinance Requirements							
9	Projected Total Revenues	708,038	767,220	819,371	869,691	921,245	981,564
10	Projected Total Appropriations (g)	828,019	845,520	899,527	951,118	1,004,096	1,065,867
11	Rate Ordinance Requirement Compliance (h)	Yes	Yes	Yes	Yes	Yes	Yes
Cash Funding							
12	Cash Funded Capital (i)	38,633	37,447	43,755	49,262	55,874	63,396
13	Capital Improvement Program annual expenses	324,964	345,303	426,730	535,538	545,260	562,222
14	Cash Funded Capital Ratio (j)	11.9%	10.8%	10.3%	9.2%	10.2%	11.3%

(a) FY 2021 beginning balance is estimated based on FY 2020 preliminary financial results.

(b) See Line 18 in Table C-1.

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

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

(e) 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 General Bond Ordinance requires a minimum Senior Debt Service Coverage of 0.90 from Current Revenues.

(f) FY 2021 budget reflects the PWD adopted budget; FY 2022 through FY 2026 budget reflects annual cost escalation factors.

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

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

(i) Cash Funded Capital = Capital Account Deposit + Residual Transfer to Construction Fund

(j) Cash Funded Capital Ratio = Cash Funded Capital divided by Capital Improvement Program annual expenses.

TABLE C-3: PROJECTED RECEIPTS UNDER EXISTING RATES
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Water Sales Receipts	253,071	263,593	266,743	269,713	267,430	265,151
	Wastewater Sales Receipts						
2	Sanitary Sewer	245,058	253,995	256,956	259,796	258,165	256,537
3	Stormwater	161,671	169,438	172,311	174,974	173,929	172,897
4	Subtotal Wastewater Service Receipts	406,729	423,433	429,267	434,770	432,095	429,434
5	Total Water & Wastewater Receipts	659,800	687,026	696,010	704,483	699,525	694,584
Other Income							
6	Penalties	6,722	10,089	10,008	9,931	9,854	9,778
7	Miscellaneous City Revenue	1,650	1,650	1,650	1,650	1,650	1,650
8	Other	9,963	9,963	9,963	9,963	9,963	9,963
9	State & Federal Grants	1,000	1,000	1,000	1,000	1,000	1,000
10	Permits Issued by L&I	5,800	5,800	5,800	5,800	5,800	5,800
11	Miscellaneous (Procurement)	390	390	390	390	390	390
12	City & UESF Grants	300	300	300	300	300	300
13	Affordability Program Discount Cost (a)	-	-	-	-	-	-
14	Release from Debt Service Reserve (b)	19,808	-	-	-	-	-
15	Other Operating Revenues	45,633	29,192	29,111	29,034	28,957	28,881
Interest Income							
16	Interest Income on Debt Service Reserve Fund (c)	-	-	-	-	-	-
17	Operating Fund	1,071	1,280	1,316	1,354	1,376	1,413
18	Rate Stabilization Fund	1,298	1,089	1,092	1,110	1,127	1,132
19	Total Nonoperating Income	2,369	2,369	2,408	2,464	2,502	2,545
20	Total Receipts	707,802	718,587	727,529	735,981	730,984	726,010

(a) Affordability Program Discounts represent anticipated lost revenue due to the Tiered Assistance Program (TAP).

Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

TABLE C-4

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)
		FY 2021	FY 2022		FY 2023	
Meter Size	Monthly Use	Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2022
Inches	Mcf	\$	\$	%	\$	%
5/8	0.0	28.02	31.45	12.2	32.79	4.3
5/8	0.2	43.50	48.66	11.9	51.05	4.9
5/8	0.3	51.24	57.26	11.7	60.18	5.1
5/8	0.4	58.98	65.86	11.7	69.31	5.2
5/8	0.5	66.73	74.47	11.6	78.45	5.3
5/8	0.6	74.46	83.07	11.6	87.58	5.4
5/8	0.7	82.20	91.67	11.5	96.71	5.5
5/8	0.8	89.94	100.27	11.5	105.84	5.6
5/8	1.7	159.60	177.70	11.3	188.02	5.8
5/8	2.7	232.63	260.99	12.2	276.32	5.9
5/8	3.3	275.33	310.25	12.7	328.52	5.9

Notes:

The above figures reflect the current TAP-R rates, of \$0.57 MCF for water and \$0.78/MCF for sewer. The TAP-R rates are subject to annual reconciliation.

Mcf - Thousand cubic feet

TABLE C-5

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

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
				FY 2021	FY 2022		FY 2023	
Meter Size	Monthly Use	Impervious Area	Gross Area	Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2021
Inches	Mcf	sf	sf	\$	\$	%	\$	%
5/8	0.0	1,794	2,110	39.75	41.80	5.2	43.74	4.6
5/8	0.2	1,794	2,110	55.23	59.01	6.9	62.00	5.1
5/8	0.3	1,794	2,110	62.97	67.61	7.4	71.13	5.2
5/8	0.4	1,794	2,110	70.71	76.21	7.8	80.26	5.3
5/8	0.5	1,794	2,110	78.46	84.82	8.1	89.40	5.4
5/8	0.6	4,000	5,500	112.13	120.24	7.2	127.03	5.7
5/8	0.7	4,000	5,500	119.87	128.84	7.5	136.16	5.7
5/8	0.8	26,000	38,000	412.25	431.61	4.7	457.98	6.1
5/8	1.7	26,000	38,000	481.91	509.04	5.6	540.16	6.1
5/8	2.7	4,000	5,500	270.30	298.16	10.3	315.77	5.9
5/8	3.3	4,000	5,500	313.00	347.42	11.0	367.97	5.9
5/8	11.0	7,000	11,000	901.27	1,021.45	13.3	1,082.37	6.0
1	1.7	7,700	7,900	251.68	271.40	7.8	287.40	5.9
1	5.0	22,500	24,000	668.22	728.94	9.1	772.88	6.0
1	8.0	7,700	7,900	701.86	789.87	12.5	836.85	5.9
1	17.0	22,500	24,000	1,522.14	1,714.26	12.6	1,817.00	6.0
2	7.6	1,063	1,250	621.72	706.07	13.6	747.27	5.8
2	16.0	22,500	24,000	1,478.95	1,663.24	12.5	1,762.42	6.0
2	33.0	66,500	80,000	3,245.05	3,633.36	12.0	3,851.98	6.0
2	100.0	7,700	7,900	7,276.55	8,375.08	15.1	8,874.20	6.0
4	30.0	7,700	7,900	2,391.49	2,733.73	14.3	2,894.04	5.9
4	170.0	10,500	12,000	11,779.08	13,544.84	15.0	14,339.39	5.9
4	330.0	26,000	38,000	21,980.87	25,252.96	14.9	26,721.66	5.8
4	500.0	140,000	160,000	34,010.90	38,919.12	14.4	41,181.24	5.8
6	150.0	10,500	12,000	10,665.70	12,258.76	14.9	12,976.84	5.9
6	500.0	41,750	45,500	32,922.57	37,807.05	14.8	39,995.84	5.8
6	1,000.0	26,000	38,000	63,978.69	73,543.38	14.9	77,785.31	5.8
6	1,500.0	140,000	160,000	96,627.12	110,920.04	14.8	117,318.29	5.8
8	750.0	10,500	12,000	48,312.53	55,544.98	15.0	58,748.40	5.8
8	1,500.0	66,500	80,000	95,875.96	110,158.22	14.9	116,504.80	5.8
8	2,000.0	26,000	38,000	126,617.52	145,569.60	15.0	153,948.87	5.8
8	3,000.0	140,000	160,000	189,685.95	217,921.26	14.9	230,451.85	5.8
10	600.0	22,500	24,000	39,284.40	45,136.76	14.9	47,738.81	5.8
10	1,700.0	41,750	45,500	108,254.22	124,421.06	14.9	131,581.80	5.8
10	3,300.0	26,000	38,000	206,972.34	237,957.39	15.0	251,623.27	5.7
10	6,000.0	140,000	160,000	374,862.77	430,839.05	14.9	455,558.25	5.7

(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.

(b) Figures reflect the current TAP-R rates, of \$0.57 MCF for water and \$0.78/MCF for sewer. The TAP-R rates are subject to annual reconciliation.

Mcf - Thousand cubic feet

sf - square feet

TABLE C-6: PROJECTED OPERATION AND MAINTENANCE EXPENSE
(in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Water and Wastewater Operations							
1	Personal Services	157,513	163,064	168,411	173,987	179,719	185,610
2	Pension and Benefits	148,940	153,915	159,305	164,544	169,871	175,552
3	Subtotal	306,453	316,979	327,715	338,531	349,589	361,162
Purchase of Services							
4	Power	14,800	14,800	14,874	15,023	15,173	15,325
5	Gas	4,362	4,602	4,671	4,741	4,788	4,836
6	SMIP/GARP	15,000	25,000	25,000	25,000	25,000	25,000
7	Other	151,471	144,781	147,147	149,552	151,995	154,478
8	Subtotal	185,632	189,183	191,692	194,315	196,956	199,639
Materials and Supplies							
9	Chemicals	25,317	25,950	26,599	27,264	27,946	28,644
10	Other	25,175	25,837	26,516	27,214	27,929	28,664
11	Subtotal	50,492	51,787	53,115	54,478	55,875	57,308
12	Equipment	2,969	4,686	4,817	4,952	5,091	5,233
13	Indemnities and Transfers	13,044	13,044	13,044	13,044	13,044	13,044
14	Subtotal Expenses	558,590	575,678	590,383	605,319	620,555	636,386
15	Liquidated Encumbrances	(32,746)	(31,810)	(32,374)	(32,962)	(33,557)	(34,163)
16	Total Expenses	525,844	543,868	558,009	572,357	586,998	602,222

TABLE C-7: PROJECTED CAPITAL IMPROVEMENT PROGRAM
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Engineering and Administration (a)	14,000	13,595	11,871	10,147	8,423	6,699
2	Plant Improvements	328,000	250,550	309,300	306,600	190,300	301,300
3	Distribution System Rehabilitation	93,060	30,760	106,760	177,860	118,160	108,760
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Storm Flood Relief	15,000	-	15,000	15,000	15,000	15,000
6	Reconstruction of Sewers	72,460	45,260	68,360	68,360	68,360	68,360
7	Green Infrastructure	72,000	20,000	72,000	72,000	72,000	134,000
8	Vehicles	12,000	12,000	12,000	12,000	12,000	12,000
9	Total Improvements	611,520	377,165	600,291	666,967	489,243	651,119
10	Inflation Adjustment (b)	-	-	18,009	40,618	45,366	81,721
11	Inflated Total	611,520	377,165	618,300	707,585	534,609	732,840
12	Rollforward Adjustments	(344,975)	352,000	-	-	-	-
13	Total Inflated Adjusted CIP Budget	266,545	729,165	618,300	707,585	534,609	732,840
14	Contingency Adjustment	(35,028)	(105,536)	(89,057)	(102,613)	(76,844)	(106,769)
15	Annual Encumbrances	231,517	623,630	529,243	604,972	457,765	626,071
16	Project Expenses (c)	324,964	345,303	426,730	535,538	545,260	562,222
17	Annual Net Encumbrances	(93,448)	278,327	102,513	69,434	(87,494)	63,849

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0 percent per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

TABLE C-8: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE ACCOUNT
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Disposition of Revenue Bond Proceeds							
1	Proceeds From Sale of Bonds	-	240,000	500,000	585,000	420,000	600,000
	Transfers:						
2	Debt Reserve Fund (a)	-	16,184	25,644	39,719	28,816	40,771
3	Cost of Bond Issuance (b)	-	1,560	3,250	3,803	2,730	3,900
4	Refund Commercial Paper	-	-	200,000	200,000	200,000	200,000
5	Construction Fund (c)	-	222,256	271,106	341,478	188,454	355,329
6	Total Issue	-	240,000	500,000	585,000	420,000	600,000
Disposition of Commercial Paper							
7	Proceeds From Commercial Paper	-	200,000	200,000	200,000	200,000	200,000
	Transfers:						
8	Debt Reserve Fund (a)	-	2,000	2,000	-	-	-
9	Cost of Issuance	-	250	-	-	250	-
10	Construction Fund (c)	-	197,750	198,000	200,000	199,750	200,000
11	Total Issue	-	200,000	200,000	200,000	200,000	200,000
Construction Fund							
12	Beginning Balance	643,908	377,543	518,045	620,231	690,001	601,362
13	Transfer From Revenue Bond Proceeds	-	222,256	271,106	341,478	188,454	355,329
14	Transfer From Commercial Paper Proceeds	-	197,750	198,000	200,000	199,750	200,000
15	Penn Vest Loan	14,884	23,897	10,391	8,048	6,119	2,811
16	Capital Account Deposit	27,833	29,447	31,155	32,962	34,874	36,896
17	Transfer from Residual Fund	10,800	8,000	12,600	16,300	21,000	26,500
18	Interest Income on Construction Fund	5,082	4,456	5,663	6,519	6,425	6,310
19	Total Available	702,507	863,348	1,046,961	1,225,538	1,146,622	1,229,209
20	Net Cash Financing Required	324,964	345,303	426,730	535,538	545,260	562,222
21	Ending Balance	377,543	518,045	620,231	690,001	601,362	666,987
Capital Program Net Encumbrances							
22	Beginning Balance	327,821	234,373	512,700	615,213	684,647	597,153
23	Annual Encumbrances	231,517	623,630	529,243	604,972	457,765	626,071
24	Project Expenses	(324,964)	(345,303)	(426,730)	(535,538)	(545,260)	(562,222)
25	Ending Balance	234,373	512,700	615,213	684,647	597,153	661,002
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	234,373	512,700	615,213	684,647	597,153	661,002
Debt Reserve Fund							
28	Beginning Balance	195,433	175,625	193,809	221,453	261,172	289,988
29	Transfer From Bond Proceeds	-	18,184	27,644	39,719	28,816	40,771
30	Debt Service Reserve Release	(19,808)	-	-	-	-	-
31	Ending Balance	175,625	193,809	221,453	261,172	289,988	330,759
32	Interest Income on Debt Reserve Fund	1,855	1,847	2,076	2,413	2,756	3,104

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

(b) Cost of bonds issuance assumed at 0.65 percent of issue amount.

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

TABLE C-9: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Revenue Bonds							
1	Existing (a)	175,726	163,516	164,558	151,302	151,438	152,439
Proposed							
2	Fiscal Year 2022 (b)		10,000	15,851	15,851	15,851	15,851
3	Fiscal Year 2023 (c)			21,875	33,948	33,948	33,948
4	Fiscal Year 2024 (c)				25,594	39,719	39,719
5	Fiscal Year 2025 (c)					18,375	28,516
6	Fiscal Year 2026 (c)						26,250
7	Total Proposed	-	10,000	37,726	75,393	107,893	144,284
8	Total Revenue Bonds	175,726	173,516	202,284	226,694	259,331	296,723
Pennvest Loans							
9	Pennvest Loans - Parity Pennvest (d)	10,651	10,885	11,067	14,864	14,864	15,182
Commercial Paper							
10	Commercial Paper	-	2,000	4,000	4,000	4,000	4,000
11	Total Senior Debt Service	186,377	186,401	217,351	245,558	278,195	315,905

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and
(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Includes projected Pennvest Loan for the Torresdale Pump Station Rehabilitation.

TABLE W-1: PROJECTED RECEIPTS UNDER EXISTING RATES
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Residential	149,735	157,334	158,769	159,846	157,563	155,283
2	Senior Citizens	4,967	5,207	5,323	5,435	5,435	5,435
3	Commercial	53,098	55,099	56,196	57,375	57,375	57,375
4	Industrial	3,176	3,255	3,320	3,390	3,390	3,390
5	Public Utilities	314	325	331	338	338	338
6	Subtotal General Customers	211,290	221,219	223,939	226,383	224,100	221,821
7	Housing Authority	5,366	5,633	5,762	5,883	5,883	5,883
8	Charities and Schools	3,234	3,303	3,360	3,431	3,431	3,431
9	Hospitals and Universities	2,978	2,805	2,806	2,865	2,865	2,865
10	Hand Billed	12,442	12,872	13,114	13,389	13,389	13,389
11	Scheduled (Flat Rate)	1	1	1	1	1	1
Fire Protection							
12	Private	4,701	4,701	4,701	4,701	4,701	4,701
13	Public	9,235	9,235	9,235	9,235	9,235	9,235
14	Subtotal Retail Customers	249,247	259,769	262,919	265,889	263,606	261,327
15	Aqua Pennsylvania	3,824	3,824	3,824	3,824	3,824	3,824
16	Total Water Sales	253,071	263,593	266,743	269,713	267,430	265,151
17	Other Operating Revenues (a)	19,957	14,811	14,773	14,738	14,703	14,668
Interest Income							
18	Interest Income on Debt Service Reserve Fund (b)	-	-	-	-	-	-
19	Operating Fund	399	498	512	536	553	574
20	Rate Stabilization Fund	503	404	405	407	408	411
21	Total Interest Income	902	902	917	943	961	984
22	Total Receipts	273,930	279,306	282,433	285,394	283,094	280,802

(a) Includes Debt Service Reserve Fund Release in FY 2021.

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

TABLE W-1A: OTHER REVENUE PROJECTED RECEIPTS
(in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Other Income							
1	Penalties	2,635	3,953	3,915	3,880	3,844	3,809
2	Miscellaneous City Revenue	1,650	1,650	1,650	1,650	1,650	1,650
3	Other	4,982	4,982	4,982	4,982	4,982	4,982
4	State & Federal Grants	1,000	1,000	1,000	1,000	1,000	1,000
5	Permits Issued by Licenses & Inspections	2,900	2,900	2,900	2,900	2,900	2,900
6	Miscellaneous (Procurement)	195	195	195	195	195	195
7	City & UESF Grants	132	132	132	132	132	132
8	Affordability Program Discount Cost (a)	-	-	-	-	-	-
9	Release from Debt Service Reserve (b)	6,463	-	-	-	-	-
10	Total Water Other Income	19,957	14,811	14,773	14,738	14,703	14,668
Interest Income							
11	Debt Reserve Fund (c)	-	-	-	-	-	-
12	Operating Fund	399	498	512	536	553	574
13	Rate Stabilization Fund	503	404	405	407	408	411
14	Total Water Operations	20,859	15,713	15,690	15,681	15,664	15,652

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

TABLE W-2: PROJECTED OPERATION AND MAINTENANCE EXPENSE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Water Operations							
1	Personal Services	65,037	67,088	68,959	70,960	73,012	75,119
2	Pension and Benefits	61,498	63,324	65,231	67,109	69,012	71,048
3	Subtotal	126,535	130,411	134,190	138,068	142,024	146,167
Purchase of Services							
4	Power	7,770	7,770	7,809	7,887	7,966	8,045
5	Gas	670	706	717	728	735	742
6	Other	48,308	44,953	45,695	46,450	47,217	47,997
7	Subtotal	56,748	53,429	54,221	55,065	55,918	56,785
Materials and Supplies							
8	Chemicals	21,899	22,446	23,007	23,582	24,172	24,776
9	Other	10,282	10,553	10,830	11,115	11,407	11,707
10	Subtotal	32,181	32,999	33,837	34,697	35,579	36,484
11	Equipment	1,246	2,098	2,156	2,217	2,279	2,343
12	Indemnities and Transfers	4,800	4,800	4,800	4,800	4,800	4,800
13	Subtotal Expenses	221,510	223,737	229,206	234,848	240,601	246,579
14	Liquidated Encumbrances	(12,983)	(12,532)	(12,771)	(13,022)	(13,278)	(13,539)
15	Total Expenses	208,527	211,205	216,434	221,826	227,323	233,040

TABLE W-3: PROJECTED CAPITAL IMPROVEMENT PROGRAM
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Engineering and Administration (a)	6,440	6,254	5,461	4,668	3,875	3,082
2	Water Treatment Plant Improvements	128,000	62,550	149,300	196,600	80,300	241,300
3	Distribution System Rehabilitation	93,060	30,760	106,760	177,860	118,160	108,760
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
6	Total CIP Budget	238,500	110,564	272,521	390,128	213,335	364,142
7	Inflation Adjustment (b)	-	-	8,176	23,759	19,782	45,703
8	Total Inflated CIP Budget	238,500	110,564	280,696	413,886	233,117	409,845
9	Rollforward Adjustments	(80,488)	84,000	-	-	-	-
10	Total Inflated Adjusted CIP Budget	158,012	194,564	280,696	413,886	233,117	409,845
11	Contingency Adjustment	(21,309)	(27,347)	(40,334)	(60,385)	(33,349)	(59,943)
12	Annual Encumbrances	136,703	167,217	240,363	353,501	199,768	349,901
13	Project Expenses (c)	191,881	92,588	193,805	312,929	237,950	314,217
14	Annual Net Encumbrances	(55,178)	74,629	46,558	40,572	(38,182)	35,684

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0 percent per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

TABLE W-4: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE ACCOUNT
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	-	45,000	226,000	350,000	182,000	345,000
	Transfers:						
2	Debt Reserve Fund (a)	-	3,035	11,591	23,764	12,487	23,443
3	Cost of Bond Issuance (b)	-	293	1,469	2,275	1,183	2,243
4	Refund Commercial Paper	-	-	80,000	80,000	80,000	80,000
5	Construction Fund (c)	-	41,673	132,940	243,961	88,330	239,314
6	Total Issue	-	45,000	226,000	350,000	182,000	345,000
Disposition of Commercial Paper Proceeds							
7	Proceeds From Commercial Paper	-	80,000	80,000	80,000	80,000	80,000
	Transfers:						
8	Debt Reserve Fund	-	800	800	-	-	-
9	Cost of Issuance	-	100	-	-	100	-
10	Construction Fund (c)	-	79,100	79,200	80,000	79,900	80,000
11	Total Issue	-	80,000	80,000	80,000	80,000	80,000
Construction Fund							
12	Beginning Balance	251,132	88,251	153,628	198,699	239,594	201,005
13	Transfer From Revenue Bond Proceeds	-	41,673	132,940	243,961	88,330	239,314
14	Transfer From Commercial Paper Proceeds	-	79,100	79,200	80,000	79,900	80,000
15	Penn Vest Loan Proceeds	14,884	23,897	10,391	8,048	6,119	2,811
16	Capital Account Deposit	11,428	12,091	12,792	13,534	14,319	15,150
17	Transfer from Residual Fund	1,000	-	1,800	6,100	8,500	11,700
18	Interest Income on Construction Fund	1,688	1,203	1,753	2,181	2,192	2,184
19	Total Available	280,132	246,215	392,504	552,523	438,954	552,164
20	Net Cash Financing Required	191,881	92,588	193,805	312,929	237,950	314,217
21	Ending Balance	88,251	153,628	198,699	239,594	201,005	237,947
Capital Program Net Encumbrances							
22	Beginning Balance	131,128	75,950	150,580	197,137	237,710	199,527
23	Annual Encumbrances	136,703	167,217	240,363	353,501	199,768	349,901
24	Project Expenses	(191,881)	(92,588)	(193,805)	(312,929)	(237,950)	(314,217)
25	Ending Balance	75,950	150,580	197,137	237,710	199,527	235,212
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	75,950	150,580	197,137	237,710	199,527	235,212
Debt Reserve Fund							
28	Beginning Balance	65,193	58,730	62,564	74,955	98,719	111,206
29	Transfer From Bond Proceeds	-	3,835	12,391	23,764	12,487	23,443
30	Debt Service Reserve Release	(6,463)	-	-	-	-	-
31	Ending Balance	58,730	62,564	74,955	98,719	111,206	134,649
32	Interest Income on Debt Reserve Fund	620	606	688	868	1,050	1,229

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

(b) Cost of bonds issuance assumed at 0.59 percent of issue amount.

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

TABLE W-5: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Revenue Bonds							
1	Existing (a)	56,440	52,533	53,465	53,482	53,738	53,947
	Proposed						
2	Fiscal Year 2022 (b)		1,875	2,972	2,972	2,972	2,972
3	Fiscal Year 2023 (c)			9,888	15,344	15,344	15,344
4	Fiscal Year 2024 (c)				15,313	23,764	23,764
5	Fiscal Year 2025 (c)					7,963	12,357
6	Fiscal Year 2026 (c)						15,094
7	Total Proposed	-	1,875	12,860	33,629	50,043	69,531
8	Total Revenue Bonds	56,440	54,408	66,324	87,111	103,781	123,478
Pennvest Loans							
9	Pennvest Loans - Parity Pennvest (d)	4,374	4,607	4,790	8,586	8,586	8,905
Commercial Paper							
10	Commercial Paper	-	800	1,600	1,600	1,600	1,600
11	Total Senior Debt Service	60,814	59,815	72,714	97,297	113,967	133,983

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and
(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Includes projected Pennvest Loan for the Torresdale Pump Station Rehabilitation.

TABLE W-6: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
OPERATING REVENUE							
1	Water Service - Existing Rates (a)	253,071	263,593	266,743	269,713	267,430	265,151
	Additional Service Revenue Required						
	Year	Percent Increase	Months Effective				
2	FY 2021	0.00%	10	-	-	-	-
3	FY 2022	8.25%	10	17,779	22,006	22,063	21,875
4	FY 2023	6.10%	10		14,400	17,810	17,509
5	FY 2024	11.30%	10			28,619	34,708
6	FY 2025	8.25%	10				23,058
7	FY 2026	9.60%	10				28,798
8	Total Additional Service Revenue Required	-	17,779	36,407	68,680	97,489	130,557
9	Total Water Service Revenue	253,071	281,372	303,150	338,393	364,919	395,707
	Other Income (b)						
10	Other Operating Revenue	19,957	14,811	14,773	14,738	14,703	14,668
11	Debt Reserve Fund Interest Income	-	-	-	-	-	-
12	Operating Fund Interest Income	399	498	512	536	553	574
13	Rate Stabilization Interest Income	503	404	405	407	408	411
14	Total Revenues	273,930	297,085	318,840	354,074	380,583	411,359
OPERATING EXPENSES							
15	Water Operations	(208,527)	(211,205)	(216,434)	(221,826)	(227,323)	(233,040)
16	Water Treatment Plant Sludge (c)	(12,308)	(14,078)	(14,913)	(15,341)	(16,289)	(17,214)
17	Total Operating Expenses	(220,836)	(225,282)	(231,348)	(237,167)	(243,613)	(250,254)
18	Transfer From/(To) Rate Stabilization Fund	19,885	(25)	(200)	(100)	(200)	(300)
19	NET REVENUES AFTER OPERATIONS	72,979	71,778	87,293	116,807	136,770	160,805
DEBT SERVICE							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(56,440)	(52,533)	(53,465)	(53,482)	(53,738)	(53,947)
21	Pennvest Parity Bonds	(4,374)	(4,607)	(4,790)	(8,586)	(8,586)	(8,905)
22	Projected Future Bonds	-	(1,875)	(12,860)	(33,629)	(50,043)	(69,531)
23	Commercial Paper	-	(800)	(1,600)	(1,600)	(1,600)	(1,600)
24	Total Senior Debt Service	(60,814)	(59,815)	(72,714)	(97,297)	(113,967)	(133,983)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(60,814)	(59,815)	(72,714)	(97,297)	(113,967)	(133,983)
29	CAPITAL ACCOUNT DEPOSIT	(11,428)	(12,091)	(12,792)	(13,534)	(14,319)	(15,150)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.01 x	1.00 x	1.02 x	1.05 x	1.07 x	1.08 x
31	End of Year Revenue Fund Balance	737	(128)	1,787	5,976	8,484	11,672

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

TABLE W-6A: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base Rates
Annualized for Test Year 2022 Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2022
OPERATING REVENUE		
1	Water Service - Existing Rates (a)	263,593
	Additional Service Revenue Required	
	<div> <div>Percent Increase</div> <div>Months Effective</div> </div>	
2	<div> <div>FY 2022</div> <div>8.25%</div> <div>12</div> </div>	21,746
3	Total Additional Service Revenue Required	21,746
4	Total Water Service Revenue	285,340
	Other Income (b)	
5	Other Operating Revenue	14,811
6	Debt Reserve Fund Interest Income	-
7	Operating Fund Interest Income	498
8	Rate Stabilization Interest Income	404
9	Total Revenues	301,052
OPERATING EXPENSES		
10	Water Operations	(211,205)
11	Water Treatment Plant Sludge (c)	(14,078)
12	Total Operating Expenses	(225,282)
13	Transfer From/(To) Rate Stabilization Fund	(3,992)
14	NET REVENUES AFTER OPERATIONS	71,778
DEBT SERVICE		
	Senior Debt Service	
	Revenue Bonds	
15	Outstanding Bonds	(52,533)
16	Pennvest Parity Bonds	(4,607)
17	Projected Future Bonds	(1,875)
18	Commercial Paper	(800)
19	Total Senior Debt Service	(59,815)
20	TOTAL SENIOR DEBT SERVICE COVERAGE (L14/L19)	1.20 x
21	Subordinate Debt Service	-
22	Transfer to Escrow	-
23	Total Debt Service on Bonds	(59,815)
24	CAPITAL ACCOUNT DEPOSIT	(12,091)
25	TOTAL COVERAGE (L14/(L19+L21+L24))	1.00 x
26	End of Year Revenue Fund Balance	(128)

(a) Revenue from rates effective September 1, 2020.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

TABLE W-7: ESTIMATED TEST YEAR COST OF SERVICE
(in thousands of dollars)
Test Year 2022

Line No.		(1)	(2)	(3)
		Operating Expense	Capital Cost	Total
		\$	\$	\$
REVENUE REQUIREMENTS				
1	Operations & Maintenance Expense	122,302		122,302
2	Direct Interdepartmental Charges	88,902		88,902
3	Water Treatment Plant Sludge	14,078		14,078
	Existing Bond Debt Service			
4	Revenue Bonds		57,140	57,140
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service		2,675	2,675
7	Capital Account Deposit		12,091	12,091
8	Residual Fund Deposit	(97)	(31)	(128)
9	Deposit (From)/To Rate Stabilization Fund	3,026	966	3,992
10	Total	228,211	72,841	301,052
DEDUCTIONS OF FUNDS FROM OTHER SOURCES				
11	Other Operating Revenue	(14,811)	-	(14,811)
12	Interest Income	(684)	(218)	(902)
13	COST OF SERVICE TO BE DERIVED FROM RATES	212,716	72,623	285,340

TABLE W-8
WATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT TO FUNCTIONAL COST COMPONENTS
TEST YEAR 2022

Line No.	Description	(1) Estimated Test Year Plant Investment	(2) Base	(3) Extra Capacity		(5) Customer Meters	(6) Public Fire Protection - Direct Standard Pressure	(7) Wholesale Direct
				Maximum Day In Excess of Base	Maximum Hour In Excess of Maximum Day			
		\$	\$	\$	\$	\$	\$	\$
Raw Water Supply and Pumping								
	Source of Supply							
1	Land	200,000	200,000					
2	Buildings and Equipment	4,218,000	4,218,000					
	Power and Pumping							
3	Land	31,000	22,000	9,000				-
4	Buildings and Equipment	21,202,000	14,880,000	6,078,000				244,000
5	Total Raw Water Supply and Pumping	25,651,000	19,320,000	6,087,000	-	-	-	244,000
Purification and Treatment								
	Power and Pumping (a)							
6	Land	71,000	36,000	11,000	23,000			1,000
7	Buildings and Equipment	80,682,000	41,247,000	12,691,000	25,383,000			1,361,000
	Treatment							
8	Land	1,325,000	924,000	378,000				23,000
9	Buildings and Equipment	307,877,000	214,789,000	87,731,000				5,357,000
10	Total Purification and Treatment	389,955,000	256,996,000	100,811,000	25,406,000	-	-	6,742,000
Transmission and Distribution								
11	Mains	1,062,401,000	549,872,000	169,192,000	338,383,000			4,954,000
12	Meters	35,888,000				35,888,000		-
13	Hydrants	9,200,000					9,200,000	-
	Filtered Water Storage							
14	Land	182,000	93,000	29,000	57,000			3,000
15	Buildings and Equipment	17,097,000	8,736,000	2,688,000	5,376,000			297,000
16	Total Transmission and Distribution	1,124,768,000	558,701,000	171,909,000	343,816,000	35,888,000	9,200,000	5,254,000
17	Subtotal	1,540,374,000	835,017,000	278,807,000	369,222,000	35,888,000	9,200,000	12,240,000
Administrative and General (b)								
18	Land	205,000	111,000	37,000	49,000	5,000	1,000	2,000
19	Buildings and Equipment	63,550,000	34,449,000	11,502,000	15,232,000	1,481,000	380,000	506,000
20	Total Administrative and General	63,755,000	34,560,000	11,539,000	15,281,000	1,486,000	381,000	508,000
21	Total Water Plant Investment	1,604,129,000	869,577,000	290,346,000	384,503,000	37,374,000	9,581,000	12,748,000

(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 2022

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Total		Extra Capacity			Public Fire	
		Test Year		Maximum Day	Maximum Hour	Protection - Direct		
		Depreciation Expense	Base	In Excess of Base	In Excess of Maximum Day	Customer Meters	Standard Pressure	Wholesale Direct
		\$	\$	\$	\$	\$	\$	\$
Raw Water Supply and Pumping								
1	Source of Supply	105,000	105,000	-				
2	Power and Pumping	435,000	305,000	125,000				5,000
3	Total Supply and Pumping	540,000	410,000	125,000	-	-	-	5,000
Purification and Treatment								
4	Power and Pumping (a)	1,597,000	816,000	251,000	503,000			27,000
5	Treatment	6,986,000	4,873,000	1,991,000				122,000
6	Total Purification and Treatment	8,583,000	5,689,000	2,242,000	503,000	-	-	149,000
Transmission and Distribution								
7	Mains	20,031,000	10,368,000	3,190,000	6,380,000			93,000
8	Meters	2,512,000				2,512,000		-
9	Hydrants	230,000					230,000	-
10	Filtered Water Storage	595,000	304,000	94,000	187,000			10,000
11	Total Transmission and Distribution	23,368,000	10,672,000	3,284,000	6,567,000	2,512,000	230,000	103,000
12	Subtotal	32,491,000	16,771,000	5,651,000	7,070,000	2,512,000	230,000	257,000
13	Administrative and General	1,956,000	1,059,000	354,000	469,000	46,000	12,000	16,000
14	Total Water Plant Depreciation Expense	34,447,000	17,830,000	6,005,000	7,539,000	2,558,000	242,000	273,000

(a) Includes booster pumping

TABLE W-10
WATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE
TEST YEAR 2022

Line No.	Description	(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)
		Test Year Operation & Maintenance Expense	Base	Extra Capacity		Maximum Hour In Excess of Maximum Day	Customer Costs	Billing	Public Fire Protection Direct Standard Pressure	Wholesale Direct
				Maximum Day In Excess of Base	Maximum Hour In Excess of Maximum Day		Meters			
		\$	\$	\$	\$		\$	\$	\$	\$
Raw Water Pumping										
1	Purchased Power	2,628,000	2,475,000	130,000						23,000
2	Purchased Gas	-	-	-						-
3	Other	2,836,000	1,987,000	811,000						38,000
4	Total Raw Water Pumping	5,464,000	4,462,000	941,000	-	-	-	-	-	61,000
Purification and Treatment										
Power and Pumping (a)										
5	Purchased Power	3,729,000	3,326,000	185,000	185,000					33,000
6	Purchased Gas	467,000	241,000	74,000	148,000					4,000
7	Other	10,789,000	5,535,000	1,703,000	3,407,000					144,000
Treatment										
8	Purchased Power	-	-	-	-					-
9	Purchased Gas	29,000	21,000	8,000	-					-
10	Chemicals	18,483,000	18,319,000							164,000
	Other									
11	Other	45,272,000	31,713,000	12,953,000						606,000
12	Water Treatment Plant Sludge	14,078,000	13,922,000							156,000
13	Subtotal Other (b)	59,350,000	45,635,000	12,953,000	-	-	-	-	-	762,000
14	Total Purification and Treatment	92,847,000	73,077,000	14,923,000	3,740,000	-	-	-	-	1,107,000
Transmission and Distribution										
15	Mains	68,700,000	35,514,000	10,927,000	21,855,000					404,000
16	Meters	1,945,000					1,945,000			-
17	Hydrants	534,000							534,000	-
18	Filtered Water Storage	997,000	507,000	156,000	312,000					22,000
19	Total Transmission and Distribution	72,176,000	36,021,000	11,083,000	22,167,000	1,945,000	-	-	534,000	426,000
20	Customer Accounting and Collection	24,144,000						24,144,000		-
21	Subtotal	194,631,000	113,560,000	26,947,000	25,907,000	1,945,000	24,144,000		534,000	1,594,000
22	Administrative and General	30,651,000	14,861,000	5,243,000	5,050,000	384,000	4,768,000		105,000	240,000
23	Subtotal Water Operating Expense	225,282,000	128,421,000	32,190,000	30,957,000	2,329,000	28,912,000		639,000	1,834,000
24	Residual Fund Deposit	(97,000)	(56,000)	(14,000)	(13,000)	(1,000)	(12,000)		-	(1,000)
25	Deposit (from) to RSF	3,026,000	1,725,000	432,000	416,000	31,000	388,000		9,000	25,000
26	Total Water Operating Expense	228,211,000	130,090,000	32,608,000	31,360,000	2,359,000	29,288,000		648,000	1,858,000
27	Other Operating Revenue	14,811,000	8,491,000	2,129,000	2,048,000	154,000	1,913,000		43,000	33,000
28	Non-Operating Income	684,000	389,000	98,000	94,000	7,000	88,000		2,000	6,000
29	Total Operating Expense Less Other	212,716,000	121,210,000	30,381,000	29,218,000	2,198,000	27,287,000		603,000	1,819,000

(a) Includes booster pumping.

(b) Includes Wastewater System cost of treating water treatment plant sludge of \$14,078,000.

TABLE W-11
WATER: ESTIMATED RETAIL UNITS OF SERVICE
TEST YEAR 2022

Line No.	Customer Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Total	Average	Maximum Day Extra Capacity		Maximum Hour Extra Capacity		Customer Costs		
		Test Year	Daily	Capacity	Total	Extra	Capacity	Total	Extra	Equiv.
		Water Use	Water Use	Factor	Capacity	Capacity (a)	Factor	Capacity	Capacity (b)	Meters
		Mcf	Mcf/day (1) / 365	%	Mcf/day (2) x (3) / 100	Mcf/day (4) - (2)	%	Mcf/day (2) x (6) / 100	Mcf/day (7) - (4)	
1	Residential	3,245,700	8,890	200	17,780	8,890	360	32,000	14,220	457,923
2	Senior Citizens	136,500	370	200	740	370	360	1,330	590	22,758
3	Commercial	1,483,500	4,060	180	7,310	3,250	265	10,760	3,450	124,848
4	Industrial	93,400	260	160	420	160	200	520	100	3,513
5	Public Utilities	8,500	20	160	30	10	200	40	10	808
6	Total General Service	4,967,600	13,600		26,280	12,680		44,650	18,370	609,850
7	Housing Authority	152,900	420	190	800	380	313	1,310	510	9,173
8	Charities & Schools	114,000	310	180	560	250	270	840	280	14,559
9	Hospital/University	112,500	310	180	560	250	233	720	160	6,135
10	Hand Billed	428,000	1,170	180	2,110	940	270	3,160	1,050	6,265
11	Scheduled (Flat Rate)	0	0	200	0	0	360	0	0	3
	Fire Protection (c)									
12	Public		0		950	950		2,480	1,530	
13	Private	15,600	40		200	160		450	250	7,610
14	Total Retail Customers	5,790,600	15,850		31,460	15,610		53,610	22,150	653,595

(a) Capacity in excess of average daily use.

(b) Capacity in excess of maximum day.

(c) System wide fire protection demands reflect two simultaneous fires, one requiring 10,000 gallons per minute (gpm) fire flow demand for 10 hours and the second requiring 5,000 gpm for 8 hours. These demands are allocated between standard pressure public fire service and private fire service based upon equivalent 6-inch connections for each of the two fire service classes.

Mcf - thousand cubic feet

TABLE W-12
WATER: EQUIVALENT METER
AND BILL RATIOS

Line No.	Meter Size (Inches)	(1) (2) Equivalent Factors	
		Meters	
		Capacity Basis	Bills
1	5/8	1.0	1.0
2	3/4	1.5	1.0
3	1	2.5	1.1
4	1-1/4	3.8	1.2
5	1-1/2	5.0	1.2
6	2	8.0	1.5
7	3	15.0	2.0
8	4	25.0	4.0
9	6	50.0	7.0
10	8	80.0	10.0
11	10	115.0	15.0
12	12	215.0	20.0

TABLE W-13A
WATER: SUMMARY OF COST OF SERVICE
ALLOCATED TO AQUA PA
AND PROPOSED RATES
Test Year 2022

Line No.	Description	(1)	(2)
		Allocated Investment	Cost of Service
1	Operating Expense (Table W-10, Line 29, Column 8)		\$ 1,819,000
2	Depreciation Expense (Table W-9, Line 14, Column 7)		273,000
3	Return on Investment		
4	Allocated Investment (Table W-8, Line 21, Column 7)	\$ 12,748,000	
5	Return @ 7.50%		956,000
6	Total Allocated Cost of Service		3,048,000
CONTRACTUAL RATES			
7	Commodity Charge (\$/Mg)		0.452
8	Lump Sum Payment (\$/year)		2,828,000

Mg - Thousand gallons

TABLE W-13B
WATER: SUMMARY OF COST OF SERVICE
ALLOCATED TO AQUA PA
AND PROPOSED RATES
Test Year 2023

Line No.	Description	(1)	(2)
		Allocated Investment	Cost of Service
1	Operating Expense		\$ 1,897,000
2	Depreciation Expense		273,000
3	Return on Investment		
4	Allocated Investment	\$ 12,748,000	
5	Return @ 7.50%		956,000
6	Total Allocated Cost of Service		3,126,000
FY 2023 CONTRACTUAL RATES			
7	Commodity Charge (\$/Mg)		0.469
8	Lump Sum Payment (\$/year)		2,898,000

Mg - Thousand gallons

TABLE W-14
WATER: TEST YEAR RETAIL UNIT COSTS OF SERVICE
TEST YEAR 2022

Line No.	Description	(1)	(2)	(3)		(4)	(5)	(6)	(7)
		Total Test Year Retail Costs	Base	Extra Capacity		Maximum Hour In Excess of Maximum Day	Customer Costs		Direct Public Fire Protection
				Maximum Day In Excess of Base	Maximum Hour In Excess of Maximum Day		Meters	Billing	
		\$							
	Total Retail Customer Units of Service								
1	Number		5,790,600	15,610	22,150	653,595	6,729,249		
2	Units		Mcf	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills		Total
	Operating Expense								
3	Total Expense - \$	210,897,000	121,210,000	30,381,000	29,218,000	2,198,000	27,287,000		603,000
4	Unit Expense - \$/Unit		20.9322	1,946.2524	1,319.0971	3.3629	4.0550		
	Depreciation Expense								
5	Total Expense - \$	34,174,000	17,830,000	6,005,000	7,539,000	2,558,000			242,000
6	Unit Expense - \$/Unit		3.0791	384.6893	340.3612	3.9137			
	Plant Investment								
7	Total Investment - \$	1,591,381,000	869,577,000	290,346,000	384,503,000	37,374,000			9,581,000
8	Unit Investment - \$/Unit		150.1704	18,600.0000	17,359.0519	57.1822			
	Unit Return on Investment								
9	Total Return - \$	36,915,000	20,172,000	6,735,000	8,919,000	867,000			222,000
10	Inside City - \$/Unit (a)		3.4835	431.4642	402.6779	1.3265			
	Total Unit Costs of Service								
11	Inside City - \$/Unit		27.4948	2,762.4059	2,062.1362	8.6031	4.0550		

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$36,915,000 / \$1,591,381,000 = 2.3197%
Mcf - thousand cubic feet

TABLE W-15
WATER: TEST YEAR COST OF SERVICE BY FUNCTIONAL COST COMPONENTS
TEST YEAR 2022

Line No.	Customer Type	(1)	(2)	(3)		(4)	(5)	(6)	(7)	
		Total Allocated Cost Of Service	Base	Extra Capacity		Maximum Hour In Excess of Maximum Day	Customer Costs	Meters	Billing	Direct Public Fire Protection
				Maximum Day						
Retail										
	General Service									
1	Senior Citizens	\$ 7,295,000	\$ 3,753,000	\$ 1,022,000	\$ 1,217,000	\$ 196,000	\$ 1,107,000	\$ -		
2	Residential	167,727,000	89,238,000	24,558,000	29,324,000	3,940,000	20,667,000	-		
3	Commercial	60,157,000	40,789,000	8,978,000	7,114,000	1,074,000	2,202,000	-		
4	Industrial	3,307,000	2,568,000	442,000	206,000	30,000	61,000	-		
5	Public Utilities	301,000	234,000	28,000	21,000	7,000	11,000	-		
6	Subtotal General Service	238,787,000	136,582,000	35,028,000	37,882,000	5,247,000	24,048,000	-		
7	Housing Authority	6,678,000	4,204,000	1,050,000	1,052,000	79,000	293,000	-		
8	Charities & Schools	4,684,000	3,134,000	691,000	577,000	125,000	157,000	-		
9	Hospitals & University	4,213,000	3,093,000	691,000	330,000	53,000	46,000	-		
10	Hand Billed	16,584,000	11,768,000	2,597,000	2,165,000	54,000	-	-		
11	Scheduled (Flat Rate)	-	-	-	-	-	-	-		
Fire Protection										
12	Private	4,194,000	429,000	442,000	516,000	65,000	2,742,000	-		
13	Public									
	Standard Pressure	6,846,000	-	2,624,000	3,155,000	-	-	1,067,000		
14	Subtotal Public Fire Protection	6,846,000	-	2,624,000	3,155,000	-	-	1,067,000		
15	Total Retail Service	\$ 281,986,000	\$ 159,210,000	\$ 43,123,000	\$ 45,677,000	\$ 5,623,000	\$ 27,286,000	\$ 1,067,000		

TABLE W-16
WATER: TEST YEAR ADJUSTED COST OF SERVICE
TEST YEAR 2022

Line No.	Customer Type	(1)	(2)	(3)	(4)	(5)	(6)
		Allocated Cost of Service	Discount	Cost of Service w Discount	Recovery of Discount	Adjusted Cost of Service	Percent Change
		\$	\$	\$	\$	\$	%
1	Residential	167,727,000	-	167,727,000	2,648,000	170,375,000	1.58%
2	Senior Citizens	7,295,000	1,824,000	5,471,000	86,000	5,557,000	-23.82%
3	Commercial	60,157,000	-	60,157,000	950,000	61,107,000	1.58%
4	Industrial	3,307,000	-	3,307,000	52,000	3,359,000	1.57%
5	Public Utilities	301,000	-	301,000	5,000	306,000	1.66%
6	Housing Authority	6,678,000	334,000	6,344,000	100,000	6,444,000	-3.50%
Charities and Schools							
7	Charities & Schools	4,684,000	1,171,000	3,513,000	55,000	3,568,000	-23.83%
8	Hospital/University	4,213,000	1,053,000	3,160,000	50,000	3,210,000	-23.81%
9	Subtotal Charities and Schools	8,897,000	2,224,000	6,673,000	105,000	6,778,000	-23.82%
10	Hand Billed	16,584,000	-	16,584,000	262,000	16,846,000	1.58%
11	Scheduled (Flat Rate)	-	-	-	-	-	0.00%
Fire Protection							
12	Private	4,194,000	-	4,194,000	66,000	4,260,000	1.57%
	Public						
13	Standard Pressure	6,846,000	-	6,846,000	108,000	6,954,000	1.58%
14	Subtotal Public Fire Protection	6,846,000	-	6,846,000	108,000	6,954,000	1.58%
15	Subtotal Retail Service	281,986,000	4,382,000	277,604,000	4,382,000	281,986,000	0.00%
16	Wholesale	3,353,000	-	3,353,000	-	3,353,000	0.00%
17	Total System	285,339,000	4,382,000	280,957,000	4,382,000	285,339,000	0.00%

TABLE W-17
WATER: COMPARISON OF TEST YEAR COSTS OF SERVICE
AND ADJUSTED COST OF SERVICE
WITH REVENUES UNDER EXISTING RATES
TEST YEAR 2022

Line No.	Customer Type	(1) Revenue Under Existing Rates	(2) Allocated Cost of Service	(3) Adjusted Cost of Service	(4) Indicated Increase (Decrease) Required
		\$	\$	\$	%
Retail					
	General Service				
1	Senior Citizens	5,207,314	7,295,000	5,557,000	6.70%
2	Residential	157,333,791	167,727,000	170,375,000	8.30%
3	Commercial	55,098,551	60,157,000	61,107,000	10.90%
4	Industrial	3,254,813	3,307,000	3,359,000	3.20%
5	Public Utilities	324,570	301,000	306,000	-5.70%
6	Subtotal General Service	221,219,040	238,787,000	240,704,000	8.80%
7	Housing Authority	5,633,013	6,678,000	6,444,000	14.40%
8	Charities & Schools	3,302,927	4,684,000	3,568,000	8.00%
9	Hospitals & University	2,805,172	4,213,000	3,210,000	14.40%
10	Hand Billed	12,872,064	16,584,000	16,846,000	30.90%
11	Scheduled (Flat Rate)	646	-	-	-100.00%
Fire Protection					
12	Private	4,381,712	4,194,000	4,260,000	-2.80%
	Public				
13	Standard Pressure	9,235,000	6,846,000	6,954,000	-24.70%
14	Subtotal Public Fire Protection	9,235,000	6,846,000	6,954,000	
15	Total Retail Service	259,449,573	281,986,000	281,986,000	8.70%
Wholesale					
16	Total Wholesale (Aqua Pennsylvania)	3,567,995	3,048,000	3,048,000	-14.60%
17	Total System	263,017,568	285,034,000	285,034,000	8.40%

TABLE W-18 **WATER: PROPOSED RATES FOR** **GENERAL SERVICE**

		(1)	(2)
SERVICE CHARGE			
Line No.	Meter Size	FY 2022 Monthly	FY 2023 Monthly
	Inches	\$	\$
1	5/8	5.28	5.36
2	3/4	5.67	5.78
3	1	6.91	7.06
4	1-1/2	9.34	9.60
5	2	13.06	13.47
6	3	20.85	21.58
7	4	37.73	38.97
8	6	70.98	73.43
9	8	108.20	112.06
10	10	158.34	163.92
11	12	259.97	270.12
QUANTITY CHARGE			
Line No.	Monthly Water Usage	FY 2022 Charge per Mcf	FY 2023 Charge per Mcf
		\$	\$
12	First 2 Mcf	49.33	52.94
13	Next 98 Mcf	45.41	48.64
14	Next 1,900 Mcf	35.15	37.61
15	Over 2,000 Mcf	34.20	36.59

Mcf - Thousand cubic feet

TABLE W-19
WATER: PROPOSED RATES FOR
PRIVATE FIRE PROTECTION

Line No.	Size of Meter or Connection	(1)	(2)
		FY 2022 Monthly Charge	FY 2023 Monthly Charge
	Inches	\$	\$
1	4" or less	24.11	24.76
2	6	43.75	45.00
3	8	64.62	66.59
4	10	95.69	98.54
5	12	142.85	147.90

PUBLIC FIRE PROTECTION

Line No.	Description	(1)	(2)
		FY 2022 Annual Charge	FY 2023 Annual Charge
		\$	\$
6	Standard Pressure	6,954,000	7,661,000

**TABLE W-19A
PROPOSED RATES FOR
PRIVATE FIRE PROTECTION
RESIDENTIAL PRIVATE FIRE PROTECTION**

Line No.	Size of Meter or Connection	(1)	(2)
		FY 2022	FY 2023
		Monthly Charge	Monthly Charge
	Inches	\$	\$
Water Service Charge Including Fire Protection			
1	3/4	7.52	7.79
2	1	8.76	9.07
3	1-1/2	11.19	11.61
4	2	14.91	15.48
Sewer Service Charge			
5	3/4	7.92	8.11
6	1	7.92	8.11
7	1-1/2	7.92	8.11
8	2	7.92	8.11

TABLE WW-1: PROJECTED RECEIPTS UNDER EXISTING RATES
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Sanitary Sewer Receipts	245,058	253,995	256,956	259,796	258,165	256,537
2	Stormwater Receipts	161,671	169,438	172,311	174,974	173,929	172,897
3	Total Wastewater Service Receipts	406,729	423,433	429,267	434,770	432,095	429,434
4	Other Operating Revenues (a)	25,676	14,381	14,338	14,296	14,254	14,213
Interest Income							
5	Interest Income on Debt Service Reserve Fund (b)	-	-	-	-	-	-
6	Operating Fund	673	783	804	818	823	840
7	Rate Stabilization Fund	795	685	687	703	719	722
8	Total Interest Income	1,467	1,468	1,491	1,521	1,541	1,561
9	Total Receipts	433,872	439,282	445,096	450,587	447,890	445,208

(a) Includes Debt Service Reserve Fund Release in FY 2021.

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

TABLE WW-1A: PROJECTED RECEIPTS UNDER EXISTING SANITARY SEWER RATES
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Residential	121,925	128,080	129,452	130,558	128,928	127,299
2	Senior Citizens	4,119	4,317	4,413	4,505	4,505	4,505
3	Commercial	45,863	47,655	48,613	49,633	49,633	49,633
4	Industrial	2,389	2,471	2,520	2,573	2,573	2,573
5	Public Utilities	300	311	317	324	324	324
6	Sewer Only	1,771	1,858	1,900	1,940	1,940	1,940
7	Groundwater	2,830	2,961	3,025	3,088	3,088	3,088
8	Subtotal General Customers	179,197	187,653	190,241	192,622	190,992	189,363
9	Housing Authority	4,574	4,804	4,914	5,017	5,017	5,017
10	Charities and Schools	2,959	3,032	3,087	3,152	3,152	3,152
11	Hospitals and University	2,874	2,725	2,730	2,788	2,788	2,788
12	Hand Billed	10,575	10,903	11,105	11,338	11,338	11,338
13	Scheduled	1	1	1	1	1	1
14	Fire Service	281	281	281	281	281	281
15	Contract Service	38,943	38,943	38,943	38,943	38,943	38,943
16	Surcharge	5,654	5,654	5,654	5,654	5,654	5,654
17	Total Sanitary Sewer Service Receipts	245,058	253,995	256,956	259,796	258,165	256,537

TABLE WW-1B: PROJECTED RECEIPTS UNDER EXISTING STORMWATER RATES
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Residential						
2	Non Discount	73,561	76,940	78,600	80,255	80,255	80,255
3	Discount: Senior, Education & Charities	2,870	2,998	3,063	3,127	3,127	3,127
4	Discount PHA	651	680	695	710	710	710
5	Non Residential						
6	Non Discount	73,193	76,826	77,757	78,511	77,552	76,604
7	Discount: Senior, Education & Charities	7,328	7,688	7,823	7,946	7,901	7,856
8	Discount PHA	1,138	1,237	1,269	1,298	1,298	1,298
9	Condominium						
10	Non Discount	2,858	2,994	3,028	3,053	3,014	2,976
11	Discount: Senior, Education & Charities	71	74	74	74	72	71
12	Discount PHA	1	1	1	1	1	1
13	Total Receipts	161,671	169,438	172,311	174,974	173,929	172,897

TABLE WW-1C: OTHER REVENUE PROJECTED RECEIPTS
(in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Other Income							
1	Penalties	4,087	6,136	6,093	6,051	6,010	5,968
2	Miscellaneous City Revenues	-	-	-	-	-	-
3	Other	4,982	4,982	4,982	4,982	4,982	4,982
4	State & Federal Grants	-	-	-	-	-	-
5	Permits Issued by Licenses & Inspections	2,900	2,900	2,900	2,900	2,900	2,900
6	Miscellaneous (Procurement)	195	195	195	195	195	195
7	City & UESF Grants	168	168	168	168	168	168
8	Affordability Program Discount Cost (a)	-	-	-	-	-	-
9	Release from Debt Service Reserve (b)	13,345	-	-	-	-	-
10	Total Wastewater Other Income	25,676	14,381	14,338	14,296	14,254	14,213
Interest Income							
11	Debt Reserve Fund (c)	-	-	-	-	-	-
12	Operating Fund	673	783	804	818	823	840
13	Rate Stabilization Fund	795	685	687	703	719	722
14	Total Wastewater Operations	27,144	15,848	15,829	15,817	15,796	15,774

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

TABLE WW-2: PROJECTED OPERATION AND MAINTENANCE EXPENSE
(in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Wastewater Operations							
1	Personal Services	92,475	95,976	99,451	103,027	106,706	110,491
2	Pension and Benefits	87,443	90,591	94,074	97,436	100,859	104,504
3	Subtotal	179,918	186,568	193,525	200,463	207,565	214,995
Purchase of Services							
4	Power	7,030	7,030	7,065	7,136	7,207	7,279
5	Gas	3,692	3,895	3,954	4,013	4,053	4,094
6	SMIP/GARP	15,000	25,000	25,000	25,000	25,000	25,000
7	Other	103,162	99,829	101,452	103,101	104,778	106,481
8	Subtotal	128,885	135,754	137,471	139,250	141,038	142,854
Materials and Supplies							
9	Chemicals	3,419	3,504	3,592	3,682	3,774	3,868
10	Other	14,892	15,284	15,686	16,099	16,522	16,956
11	Subtotal	18,311	18,788	19,278	19,780	20,296	20,824
12	Equipment	1,723	2,588	2,661	2,735	2,812	2,890
13	Indemnities and Transfers	8,243	8,243	8,243	8,243	8,243	8,243
14	Subtotal Expenses	337,080	351,941	361,178	370,471	379,953	389,806
15	Liquidated Encumbrances	(19,763)	(19,278)	(19,603)	(19,940)	(20,279)	(20,625)
16	Total Expenses	317,317	332,663	341,575	350,532	359,674	369,182

TABLE WW-3: PROJECTED CAPITAL IMPROVEMENT PROGRAM
(in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Wastewater Collection and Treatment							
1	Engineering and Administration (a)	7,560	7,341	6,410	5,479	4,548	3,617
2	Water Pollution Control Plant	200,000	188,000	160,000	110,000	110,000	60,000
3	Storm Flood Relief	15,000	-	15,000	15,000	15,000	15,000
4	Reconstruction of Sewers	72,460	45,260	68,360	68,360	68,360	68,360
5	Green Infrastructure	72,000	20,000	72,000	72,000	72,000	134,000
6	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
7	Total Improvements	373,020	266,601	327,770	276,839	275,908	286,977
8	Inflation Adjustment (b)	-	-	9,833	16,860	25,584	36,018
9	Inflated Total	373,020	266,601	337,604	293,699	301,493	322,996
10	Rollforward Adjustments	(264,488)	268,000	-	-	-	-
11	Total Inflated Adjusted CIP Budget	108,532	534,601	337,604	293,699	301,493	322,996
12	Contingency Adjustment	(13,719)	(78,189)	(48,723)	(42,228)	(43,495)	(46,826)
13	Annual Encumbrances	94,813	456,412	288,880	251,471	257,998	276,170
14	Project Expenses (c)	133,083	252,715	232,925	222,609	307,310	248,005
15	Annual Net Encumbrances	(38,270)	203,698	55,955	28,862	(49,312)	28,165

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0 percent per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

TABLE WW-4: PROJECTED FLOW OF FUNDS - CONSTRUCTION FUND & DEBT RESERVE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Disposition of Revenue Bond Proceeds							
1	Proceeds From Sale of Bonds	-	195,000	274,000	235,000	238,000	255,000
	Transfers:						
2	Debt Reserve Fund (a)	-	13,150	14,053	15,956	16,329	17,327
3	Cost of Bond Issuance (b)	-	1,268	1,781	1,528	1,547	1,658
4	Refund Commercial Paper	-	-	120,000	120,000	120,000	120,000
5	Construction Fund (c)	-	180,583	138,166	97,517	100,124	116,015
6	Total Issue	-	195,000	274,000	235,000	238,000	255,000
Disposition of Commercial Paper Proceeds							
7	Proceeds From Commercial Paper	-	120,000	120,000	120,000	120,000	120,000
	Transfers:						
8	Debt Reserve Fund (a)	-	1,200	1,200	-	-	-
9	Cost of Issuance	-	150	-	-	150	-
10	Construction Fund (c)	-	118,650	118,800	120,000	119,850	120,000
11	Total Issue	-	120,000	120,000	120,000	120,000	120,000
Construction Fund							
12	Beginning Balance	392,777	289,291	364,418	421,532	450,406	400,357
13	Transfer From Revenue Bond Proceeds	-	180,583	138,166	97,517	100,124	116,015
14	Transfer From Commercial Paper Proceeds	-	118,650	118,800	120,000	119,850	120,000
15	Penn Vest Loan	-	-	-	-	-	-
16	Capital Account Deposit	16,405	17,356	18,363	19,428	20,555	21,747
17	Transfer from Residual Fund	9,800	8,000	10,800	10,200	12,500	14,800
18	Interest Income on Construction Fund	3,393	3,252	3,910	4,338	4,233	4,126
19	Total Available	422,375	617,133	654,457	673,015	707,667	677,045
20	Net Cash Financing Required	133,083	252,715	232,925	222,609	307,310	248,005
21	Ending Balance	289,291	364,418	421,532	450,406	400,357	429,040
Capital Program Net Encumbrances							
22	Beginning Balance	196,693	158,423	362,120	418,076	446,938	397,626
23	Annual Encumbrances	94,813	456,412	288,880	251,471	257,998	276,170
24	Project Expenses	(133,083)	(252,715)	(232,925)	(222,609)	(307,310)	(248,005)
25	Ending Balance	158,423	362,120	418,076	446,938	397,626	425,791
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	158,423	362,120	418,076	446,938	397,626	425,791
Debt Reserve Fund							
28	Beginning Balance	130,240	116,896	131,245	146,498	162,453	178,783
29	Transfer From Bond Proceeds	-	14,350	15,253	15,956	16,329	17,327
30	Debt Service Reserve Release	(13,345)	-	-	-	-	-
31	Ending Balance	116,896	131,245	146,498	162,453	178,783	196,110
32	Interest Income on Debt Reserve Fund	1,236	1,241	1,389	1,545	1,706	1,874

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

(b) Cost of bonds issuance assumed at 0.59 percent of issue amount.

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

TABLE WW-5: SUMMARY OF EXISTING AND PROPOSED DEBT SERVICE
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
Revenue Bonds							
1	Existing (a)	119,286	110,984	111,093	97,820	97,700	98,492
	Proposed						
2	Fiscal Year 2021	-	-	-	-	-	-
3	Fiscal Year 2022 (b)		8,125	12,879	12,879	12,879	12,879
4	Fiscal Year 2023 (c)			11,988	18,603	18,603	18,603
5	Fiscal Year 2024 (c)				10,281	15,956	15,956
6	Fiscal Year 2025 (c)					10,413	16,159
7	Fiscal Year 2026 (c)						11,156
8	Total Proposed	-	8,125	24,866	41,764	57,850	74,753
9	Total Revenue Bonds	119,286	119,109	135,960	139,584	155,550	173,245
Pennvest Loans							
10	Parity Pennvest	6,278	6,278	6,278	6,278	6,278	6,278
Commercial Paper							
11	Commercial Paper	-	1,200	2,400	2,400	2,400	2,400
12	Total Debt Service	125,563	126,586	144,637	148,261	164,228	181,922

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and
(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate;

TABLE WW-6: PROJECTED REVENUE AND REVENUE REQUIREMENTS**Base Rates
(in thousands of dollars)**

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
OPERATING REVENUE							
1	Wastewater Service - Existing Rates (a)	406,729	423,433	429,267	434,770	432,095	429,434
	Additional Service Revenue Required						
		Percent	Months				
	Year	Increase	Effective				
2	FY 2021	0.00%	10	-	-	-	-
3	FY 2022	8.98%	10	31,084	38,547	39,039	38,554
4	FY 2023	4.48%	10	17,143	21,245	21,120	20,997
5	FY 2024	1.23%	10		4,937	6,049	6,057
6	FY 2025	6.65%	10			27,067	32,918
7	FY 2026	6.21%	10				26,801
8	Total Additional Service Revenue Required	-	31,084	55,689	65,220	93,032	125,327
9	Total Wastewater Service Revenue	406,729	454,518	484,956	499,990	525,126	554,761
	Other Income (b)						
10	Other Operating Revenue	25,676	14,381	14,338	14,296	14,254	14,213
11	Debt Reserve Fund Interest Income	-	-	-	-	-	-
12	Operating Fund Interest Income	673	783	804	818	823	840
13	Rate Stabilization Interest Income	795	685	687	703	719	722
14	Total Revenues	433,872	470,366	500,785	515,807	540,922	570,535
OPERATING EXPENSES							
15	Wastewater Operations	(317,317)	(332,663)	(341,575)	(350,532)	(359,674)	(369,182)
16	Water Treatment Plant Sludge (c)	12,308	14,078	14,913	15,341	16,289	17,214
17	Total Operating Expenses	(305,009)	(318,586)	(326,661)	(335,190)	(343,385)	(351,968)
18	Transfer From/(To) Rate Stabilization Fund	21,815	125	(500)	(2,700)	(400)	(200)
19	NET REVENUES AFTER OPERATIONS	150,678	151,905	173,624	177,917	197,137	218,367
DEBT SERVICE							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(119,286)	(110,984)	(111,093)	(97,820)	(97,700)	(98,492)
21	Pennvest Parity Bonds	(6,278)	(6,278)	(6,278)	(6,278)	(6,278)	(6,278)
22	Projected Future Bonds	-	(8,125)	(24,866)	(41,764)	(57,850)	(74,753)
23	Commercial Paper	-	(1,200)	(2,400)	(2,400)	(2,400)	(2,400)
24	Total Senior Debt Service	(125,563)	(126,586)	(144,637)	(148,261)	(164,228)	(181,922)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L20/L25)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(125,563)	(126,586)	(144,637)	(148,261)	(164,228)	(181,922)
29	CAPITAL ACCOUNT DEPOSIT	(16,405)	(17,356)	(18,363)	(19,428)	(20,555)	(21,747)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.06 x	1.06 x	1.07 x	1.06 x	1.07 x	1.07 x
31	End of Year Revenue Fund Balance	8,710	7,963	10,624	10,228	12,355	14,698

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

TABLE WW-6A: PROJECTED REVENUE AND REVENUE REQUIREMENTS
Base Rates
Annualized for Test Year 2022 Rates
(in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2022						
OPERATING REVENUE								
1	Wastewater Service - Existing Rates (a)	423,433						
	Additional Service Revenue Required							
	<table> <tr> <th>Year</th><th>Percent Increase</th><th>Months Effective</th></tr> <tr> <td>FY 2022</td><td>8.98%</td><td>12</td></tr> </table>	Year	Percent Increase	Months Effective	FY 2022	8.98%	12	38,025
Year	Percent Increase	Months Effective						
FY 2022	8.98%	12						
3	Total Additional Service Revenue Required	38,025						
4	Total Wastewater Service Revenue	461,458						
	Other Income (b)							
5	Other Operating Revenue	14,381						
6	Debt Reserve Fund Interest Income	-						
7	Operating Fund Interest Income	783						
8	Rate Stabilization Interest Income	685						
9	Total Revenues	477,306						
OPERATING EXPENSES								
10	Wastewater Operations	(332,663)						
11	Water Treatment Plant Sludge (c)	14,078						
12	Total Operating Expenses	(318,586)						
13	Transfer From/(To) Rate Stabilization Fund	(6,816)						
14	NET REVENUES AFTER OPERATIONS	151,905						
DEBT SERVICE								
	Senior Debt Service							
	Revenue Bonds							
15	Outstanding Bonds	(110,984)						
16	Pennvest Parity Bonds	(6,278)						
17	Projected Future Bonds	(8,125)						
18	Commercial Paper	(1,200)						
19	Total Senior Debt Service	(126,586)						
20	TOTAL SENIOR DEBT SERVICE COVERAGE (L20/L25)	1.20 x						
21	Subordinate Debt Service	-						
22	Transfer to Escrow	-						
23	Total Debt Service on Bonds	(126,586)						
24	CAPITAL ACCOUNT DEPOSIT	(17,356)						
25	TOTAL COVERAGE (L14/(L19+L21+L24))	1.06 x						
26	End of Year Revenue Fund Balance	7,963						

(a) Revenue from rates effective September 1, 2020.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

TABLE WW-7: ESTIMATED TEST YEAR COST OF SERVICE
(in thousands of dollars)
Test Year 2022

Line No.		(1)	(2)	(3)
		Operating Expense	Capital Cost	Total
		\$	\$	\$
REVENUE REQUIREMENTS				
1	Operations & Maintenance Expense	206,669		206,669
2	Direct Interdepartmental Charges	125,994		125,994
3	Water Treatment Plant Sludge	(10,492)	(3,586)	(14,078)
	Existing Bond Debt Service			
4	Revenue Bonds		117,261	117,261
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service		9,325	9,325
7	Capital Account Deposit		17,356	17,356
8	Residual Fund Deposit	5,546	2,417	7,963
9	Deposit (From)/To Rate Stabilization Fund	4,747	2,069	6,816
10	Total	332,465	144,842	477,306
DEDUCTIONS OF FUNDS FROM OTHER SOURCES				
11	Other Operating Revenue	(14,381)	-	(14,381)
12	Interest Income	(1,032)	(436)	(1,468)
13	COST OF SERVICE TO BE DERIVED FROM RATES	317,052	144,406	461,458

TABLE WW - 8
WASTEWATER: TEST YEAR UNITS OF SERVICE BY CUSTOMER TYPE
Test Year 2022

Line No.	Customer Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		FY 2022 Test Year Volume	Capacity Flow Rate		Strength		Customer Costs		
			Collection System	Pumping and Treatment	Suspended Solids	BOD	Equiv. Meters	Equiv. Bills	Bills
		Mcf	Mcf/day	Mcf/day	1,000 lbs	1,000 lbs			
1	Residential	3,072,104	33,667	12,625	57,510	56,551	441,986	5,052,875	5,033,820
2	Commercial	1,371,321	15,028	5,636	25,671	25,243	94,421	490,991	427,692
3	Industrial	73,355	804	301	1,373	1,350	3,991	15,038	12,132
4	Public Utilities	8,117	89	33	152	149	1,220	3,235	2,040
5	Senior Citizens	129,551	1,420	532	2,425	2,385	22,738	272,722	272,712
6	Sewer Only	59,850	656	246	1,120	1,102	461	1,264	720
7	Groundwater	229,000	5,019	1,568	1,000	143	0	0	0
8	Surcharge	0	0	0	1,863	12,420	0	0	0
9	Water Treatment Plant Sludge	292,800	3,209	1,203	27,200	0	0	0	0
10	Housing Authority	145,231	1,592	597	2,719	2,673	9,160	72,252	68,556
11	Charities & Schools	107,481	1,178	442	2,012	1,979	14,403	38,184	22,884
12	Hospital/University	106,881	1,171	439	2,001	1,967	5,876	10,788	3,396
13	Hand Bill	347,050	3,803	1,426	6,497	6,388	4,634	8,267	2,496
14	Fire Meters	8,550	94	35	160	157	358	1,649	1,428
15	Scheduled (Flat Rate)	10	0	0	0	0	3	36	36
16	Subtotal Retail Service	5,951,300	67,730	25,083	131,703	112,507	599,251	5,967,301	5,847,912
17	Infiltration/Inflow	11,466,600	251,324	78,539	50,073	7,153	-	-	-
18	Total Retail Service	17,417,900	319,054	103,622	181,776	119,660	599,251	5,967,301	5,847,912
	Contract Service								
19	Sanitary	4,274,000	32,577	32,577	44,100	39,060			
20	Infiltration/Inflow	105,100	420	420	459	66			
21	Total Contract Service	4,379,100	32,997	32,997	44,559	39,126			
22	Total System	21,797,000	352,051	136,619	226,335	158,786	599,251	5,967,301	5,847,912

Mcf - Thousand cubic feet

lbs - pounds

TABLE WW - 9
WASTEWATER: TEST YEAR PLANT INVESTMENT
SUMMARY OF ALLOCATIONS TO
FUNCTIONAL COST COMPONENTS
Test Year 2022

Line No.	Cost Component	(1)	(2)	(3)
		Total Direct Investment	Investment Allocated to Contract Service	Investment Allocated to Retail Service
		\$	\$	\$
Collection System:				
1	Sewers-Capacity	1,619,632,000	17,991,000	1,601,641,000
2	Pumping Stations Capacity	28,528,000	252,000	28,276,000
3	LTCP Investment	133,492,000	19,448,000	114,044,000
4	Total Collection System	1,781,652,000	37,691,000	1,743,961,000
Water Pollution Control Plants				
Northeast Plant				
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Cheltenham, Lower Moreland, & Lower Southampton			
5	Volume	64,362,000	17,924,000	46,438,000
6	Capacity	58,448,000	13,551,000	44,897,000
7	Suspended Solids	83,097,000	15,602,000	67,495,000
8	BOD	94,218,000	23,477,000	70,741,000
9	Total Northeast Plant	300,125,000	70,554,000	229,571,000
Southwest Plant				
	Retail, DELCORA, Lower Merion, Springfield (excluding Wyndmoor), & Upper Darby			
10	Volume	67,429,000	28,790,000	38,639,000
11	Capacity	43,871,000	8,093,000	35,778,000
12	Suspended Solids	64,162,000	18,178,000	45,984,000
13	BOD	51,663,000	25,455,000	26,208,000
14	Total Southwest Plant	227,125,000	80,516,000	146,609,000
Southeast Plant				
	Retail & Springfield (Wyndmoor)			
15	Volume	43,735,000	398,000	43,337,000
16	Capacity	46,943,000	262,000	46,681,000
17	Suspended Solids	30,977,000	96,000	30,881,000
18	BOD	25,274,000	69,000	25,205,000
19	Total Southeast Plant	146,929,000	825,000	146,104,000
20	Total Allocated Treatment Plants	674,179,000	151,895,000	522,284,000
21	Total Allocated System Investment	2,455,831,000	189,586,000	2,266,245,000

(a) Plant Investment as of 6/30/2020. Includes Administration & General Costs

TABLE WW - 9A
WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE
NORTHEAST WATER POLLUTION CONTROL PLANT
Test Year 2022

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)
		Total Investment (a)	Retail, Abington, Bensalem, Bucks Cty W&SA Lower Southampton	Retail, Abington, Bensalem, Bucks Cty W&SA Lower Moreland, and Lower Southampton	Suspended Solids	BOD	
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES							
1	Primary Sedimentation Basins	5,639	-	5,639	-	-	-
2	Pumping Station	1,365	-	-	1,365	-	-
3	Aeration Facilities	18,632	-	-	-	-	18,632
4	Primary Sludge Pumps	1,250	-	-	-	1,250	-
5	Scum Ejectors	196	-	-	-	196	-
6	Effluent Conduit	-	-	-	-	-	-
7	Final Sedimentation Basins	9,806	-	9,806	-	-	-
8	Recirculation Pumps	1,765	-	1,765	-	-	-
9	Digesters	19,196	-	-	-	14,397	4,799
10	Sludge Dewatering	4,941	-	-	-	3,706	1,235
11	Frankford Grit Chamber	-	-	-	-	-	-
12	Chlorination Facilities	25,693	-	-	25,693	-	-
13	Aeration Tank No. 1	3,133	-	-	-	-	3,133
14	Sludge Thickener Building	4,407	-	-	-	2,204	2,203
15	Sludge Transfer Station	284	-	-	-	213	71
16	Loading Terminal/Barges	6,678	-	-	-	5,009	1,669
17	Subtotal All Above	102,985	-	17,210	27,058	26,975	31,742
Administrative and General Facilities							
18	Administrative and General Plant	76,274	-	-	-	-	-
19	Land	941	-	-	-	-	-
20	Subtotal	77,215	1,921	17,918	11,284	21,678	24,414
21	Total Non-Water Pollution Abatement Program Facilities	180,200	1,921	35,128	38,342	48,653	56,156
WATER POLLUTION ABATEMENT PROGRAM FACILITIES							
22	New Preliminary Treatment Building	40,851	10,213	-	30,638	-	-
23	Primary Sedimentation Tanks Modifications	52,561	-	52,561	-	-	-
24	Blower Building	16,483	-	-	-	-	16,483
25	Aeration Tank No. 1	38,430	-	-	-	-	38,430
26	Chlorination Facilities	-	-	-	-	-	-
27	New Sludge Thickener Building	41,077	-	-	-	20,539	20,538
28	Effluent Conduits	2,282	-	-	2,282	-	-
29	New Final Sedimentation Tanks	25,467	-	25,467	-	-	-
30	Sludge Digestion System Modifications	34,295	-	-	-	25,721	8,574
31	Composting Facilities	-	-	-	-	-	-
32	Sludge Dewatering	26,177	-	-	-	19,633	6,544
33	Sludge Transfer Station	24,355	-	-	-	18,266	6,089
34	Loading Terminal/Barges	5,451	-	-	-	4,088	1,363
35	Subtotal	307,429	10,213	78,028	32,920	88,247	98,021
36	Admin. and General Facilities	47,345	1,178	10,987	6,919	13,292	14,969
37	Adjustment for Joint Use Facilities	3,377	-	-	-	2,533	844
38	Total Water Pollution Abatement Program Facilities	358,151	11,391	89,015	39,839	104,072	113,834
39	TOTAL NORTHEAST WPC PLANT BOOK COST	538,351	13,312	124,143	78,181	152,725	169,990
40	Less Federal Grants	238,226	7,824	59,781	25,221	69,628	75,772
41	ADJUSTED TOTAL NORTHEAST WPC PLANT INVESTMENT	300,125	5,488	64,362	52,960	83,097	94,218

(a) Plant Investment as of 6/30/2020.

TABLE WW - 9B
WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE
SOUTHWEST WATER POLLUTION CONTROL PLANT
Test Year 2022

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)
		Total Investment (a)	Retail Capacity	Volume	Retail, DELCORA, Lower Merion, Springfield (excluding Wyndmoor), and Upper Darby Capacity	Suspended Solids	BOD
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES							
1	Raw Wastewater Pumping Station	12,763	12,763	-	-	-	-
2	Sludge Digestion Facilities	11,813	-	-	-	8,619	3,194
3	Scum Incineration	1,939	-	-	-	1,939	-
4	Settling Tanks	30,449	-	30,449	-	-	-
5	Sludge Handling	7,832	-	-	-	5,874	1,958
6	Chlorination Facilities	1,212	-	-	1,212	-	-
7	Aeration Tanks	698	-	-	-	-	698
8	Oxygen Supply	3,622	-	-	-	-	3,622
9	Effluent Pump Station	1,632	-	-	1,632	-	-
10	Sludge Thickener Building	1,608	-	-	-	804	804
11	Composting Facilities	1,162	-	-	-	872	290
12	Sludge Gas Facilities	9,527	-	-	-	7,145	2,382
13	Subtotal	84,257	12,763	30,449	2,844	25,253	12,948
Administrative and General Facilities							
14	Administrative and General Plant	80,584	-	-	-	-	-
15	Land	684	-	-	-	-	-
16	Subtotal	81,268	5,611	20,828	9,695	24,208	20,926
17	Adjustment for Joint Use Facilities	(5,152)	-	-	-	(4,081)	(1,071)
18	Total Non-Water Pollution Abatement Program Facilities	160,373	18,374	51,277	12,539	45,380	32,803
WATER POLLUTION ABATEMENT PROGRAM FACILITIES							
19	Influent Pumping Station	6,302	6,302	-	-	-	-
20	Preliminary Treatment Building	24,189	-	-	24,189	-	-
21	Primary Sedimentation Tanks	11,099	-	11,099	-	-	-
22	Aeration Tanks	16,348	-	-	-	-	16,348
23	Oxygen Supply System	14,059	-	-	-	-	14,059
24	Compressor Building	3,721	-	-	-	-	3,721
25	Final Tanks	29,223	-	29,223	-	-	-
26	Scum Concentration Building	1,369	-	-	-	1,369	-
27	Sludge Thickener Building	12,515	-	-	-	6,258	6,257
28	Sludge Digestion Facilities	31,027	-	-	-	22,639	8,388
29	Effluent Pumping Station	5,909	-	-	5,909	-	-
30	New Centrifuges	10,034	-	-	-	7,321	2,713
31	Composting Facilities	-	-	-	-	-	-
32	Sludge Dewatering	18,857	-	-	-	14,142	4,715
33	Sludge Gas Facilities	7,228	-	-	-	5,274	1,954
34	Subtotal	191,880	6,302	40,322	30,098	57,003	58,155
35	Admin. and Gen'l. Facilities	33,895	2,340	8,687	4,044	10,097	8,727
36	Adjust. for Joint Use Facilities	(8,704)	-	-	(531)	(6,106)	(2,067)
37	Total Water Pollution Abatement Program Facilities	217,071	8,642	49,009	33,611	60,994	64,815
38	TOTAL SOUTHWEST WPC PLANT BOOK COST	377,444	27,016	100,286	46,150	106,374	97,618
39	Less Federal Grants	150,319	5,136	32,857	24,159	42,212	45,955
40	ADJUSTED TOTAL SOUTHWEST WPC PLANT INVESTMENT	227,125	21,880	67,429	21,991	64,162	51,663

(a) Plant Investment as of 6/30/2020.

TABLE WW - 9C
WASTEWATER: ALLOCATION OF TEST YEAR PLANT INVESTMENT FOR THE
SOUTHEAST WATER POLLUTION CONTROL PLANT
Test Year 2022

Line No.	Description	(1)	(2)	(3)	(4)	(5)
		Total Investment (a)	Retail and Springfield (Wyndmoor)		Suspended Solids	BOD
		\$1,000	Volume	Capacity	\$1,000	\$1,000
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Main Pumping Station	2,145	-	2,145	-	-
2	Grit Chambers	13,123	-	13,123	-	-
3	Outfall Line	568	-	568	-	-
4	Sludge Digestion Facilities	5,703	-	-	4,518	1,185
5	Settling Tanks & Floc. Channel	15,787	15,787	-	-	-
6	Sludge Force Main	5,001	-	-	3,751	1,250
7	Subtotal	42,327	15,787	15,836	8,269	2,435
	Administrative and General Facilities					
8	Administrative and General Plant	27,420	-	-	-	-
9	Land	156	-	-	-	-
10	Subtotal	27,576	7,962	8,772	5,093	5,749
11	Adjustment for Joint Use Facilities	5,152	-	-	4,081	1,071
12	Total Non-Water Pollution Abatement Program Facilities	75,055	23,749	24,608	17,443	9,255
WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
13	Influent Pump. Stat. and Screen & Grit Chamber	24,890	-	24,890	-	-
14	Primary Sedimentation Tanks	21,095	21,095	-	-	-
15	Compressor Building	9,898	-	-	-	9,898
16	Air Supply Facilities	23,119	-	-	-	23,119
17	Final Sedimentation	26,008	26,008	-	-	-
18	Effluent Pumping Station	12,870	-	12,870	-	-
19	Effluent Conduit	11,571	-	11,571	-	-
20	Scum Concentration Facilities	2,811	-	-	2,811	-
21	Sludge Force Main	1,940	-	-	1,455	485
22	Preliminary Treatment Bldg.	4,116	-	4,116	-	-
23	Sludge Thickeners	4,648	-	-	2,324	2,324
24	Sludge Digesters	14,979	-	-	11,866	3,113
25	Sludge Disposal Facilities	4,845	-	-	3,838	1,007
26	Composting Facilities	-	-	-	-	-
27	Sludge Dewatering	9,197	-	-	6,898	2,299
28	Sludge Gas Facilities	3,490	-	-	2,765	725
29	Subtotal	175,477	47,103	53,447	31,957	42,970
30	Admin. and Gen'l. Facilities	43,187	12,470	13,738	7,976	9,003
31	Adjustment for Joint Use Facilities	5,327	-	531	3,573	1,223
32	Total Water Pollution Abatement Program Facilities	223,991	59,573	67,716	43,506	53,196
33	TOTAL SOUTHEAST WPC PLANT BOOK COST	299,046	83,322	92,324	60,949	62,451
34	Less Federal Grants	152,117	39,587	45,381	29,972	37,177
35	ADJUSTED TOTAL SOUTHEAST WPC PLANT INVESTMENT	146,929	43,735	46,943	30,977	25,274

(a) Plant Investment as of 6/30/2020.

TABLE WW - 10
WASTEWATER: OPERATION AND MAINTENANCE EXPENSE
SUMMARY OF ALLOCATIONS TO FUNCTIONAL COST COMPONENTS
Test Year 2022

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	89,278	1,542	87,736	3,203	84,533
	Inlet Cleaning					
2	Retail - Storm Capacity	19,888	-	19,888	726	19,162
Neill Drive Pumping Station						
	Retail and Lower Merion					
3	Total Volume	6	1	5	-	5
4	Total Capacity	166	51	115	4	111
Central Schuylkill Pumping Station						
	Retail and Springfield (excl. Wyndmoor)					
5	Total Volume	41	1	40	1	39
6	Total Capacity	527	10	517	19	498
All Other Pumping Stations						
	Retail					
7	Total Volume	2,819	-	2,819	103	2,716
8	Total Capacity	17,994	-	17,994	657	17,337
9	Total Collection Systems	161,140	2,286	158,854	5,799	153,055
WATER POLLUTION CONTROL PLANTS						
Northeast Plant:						
	Retail and Cheltenham					
10	Volume	-	-	-	-	-
11	Capacity	-	-	-	-	-
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
12	Volume	461	115	346	13	333
13	Capacity	2,482	602	1,880	69	1,811
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
14	Volume	11,485	2,696	8,789	321	8,468
15	Capacity	4,164	950	3,214	117	3,097
16	Suspended Solids	21,802	4,016	17,786	650	17,136
17	BOD	17,113	4,281	12,832	469	12,363
Southwest Plant:						
	Retail					
18	Volume	58	-	58	2	56
19	Capacity	533	-	533	19	514
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
20	Volume	12,687	3,265	9,422	344	9,078
21	Capacity	4,828	1,774	3,054	112	2,942
22	Suspended Solids	17,238	5,097	12,141	443	11,698
23	BOD	11,384	4,168	7,216	263	6,953
Southeast Plant:						
	Retail and Springfield (Wyndmoor)					
24	Volume	8,809	45	8,764	320	8,444
25	Capacity	5,427	36	5,391	197	5,194
26	Suspended Solids	11,217	72	11,145	407	10,738
27	BOD	3,809	23	3,786	138	3,648
28	Total Water Pollution Control Plants	133,497	27,140	106,357	3,884	102,473
CUSTOMER COSTS						
	All Customers					
29	Equivalent Bills	33,528	228	33,300	1,216	32,084
	Equivalent Meters					
30	Industrial Waste Unit	4,028	68	3,960	145	3,815
31	Other	4,653	-	4,653	170	4,483
32	Stormwater - Direct	-	-	-	-	-
33	Excess Strength Wastewater - Direct	1,983	-	1,983	72	1,911
34	Total Customer Costs	44,192	296	43,896	1,603	42,293
35	Total Operation and Maintenance Expense	338,829	29,722	309,107	11,286	297,821

TABLE WW - 10A
WASTEWATER: ALLOCATION OF TEST YEAR OPERATION AND MAINTENANCE EXPENSE FOR THE
COLLECTION SYSTEM
Test Year 2022

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Total	All Customers Capacity	Volume	Retail Capacity	Storm Capacity	Retail & Lower Merion Volume	Capacity	Retail & Springfield (excluding Wyndmoor) Volume	Capacity
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
1	Sewer Maintenance	31,495	31,495	-	-	-	-	-	-	-
2	Inlet Cleaning	13,165	-	-	-	13,165	-	-	-	-
	Pump Stations									
	Neill Drive									
3	Power	7	-	-	-	-	6	1	-	-
4	Gas	-	-	-	-	-	-	-	-	-
5	Other	113	-	-	-	-	-	113	-	-
	Central Schuylkill									
6	Power	48	-	-	-	-	-	-	41	7
7	Gas	-	-	-	-	-	-	-	-	-
8	Other	335	-	-	-	-	-	-	-	335
	All Other Pumping Stations									
9	Power	3,327	-	2,828	499	-	-	-	-	-
10	Gas	-	-	-	-	-	-	-	-	-
11	Other	12,457	-	-	12,457	-	-	-	-	-
12	GSI Maintenance	10,089	10,089	-	-	-	-	-	-	-
13	Total Collection System	71,036	41,584	2,828	12,956	13,165	6	114	41	342

TABLE WW - 10B
WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE
NORTHEAST WPC PLANT
Test Year 2022

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Total	Retail, Abington,			Retail, Cheltenham, Abington,		
		Operation &	Bensalem, Bucks County			Bensalem, Bucks County W&SA,		
		Maintenance	W&SA, Lower Moreland, and			Lower Moreland, and Lower Southampton		
Line			Lower Southampton				Suspended	
No.	Description	Expense	Volume	Capacity	Volume	Capacity	Solids	BOD
		\$	\$	\$	\$	\$	\$	\$
Personal Services:								
1	Raw Wastewater Pumping	812,635	-	812,635	-	-	-	-
2	Preliminary Treatment	1,580,123	-	-	1,121,887	458,236	-	-
3	Primary Sedimentation	637,693	-	-	637,693	-	-	-
4	Aeration	2,635,420	-	-	-	-	-	2,635,420
5	Secondary Sedimentation	643,336	-	-	643,336	-	-	-
6	Recirculating Pumping	474,037	-	-	474,037	-	-	-
7	Chlorination	445,820	-	-	271,950	173,870	-	-
8	Primary Sludge Pumping	129,796	-	-	-	-	129,796	-
9	Secondary Sludge Thickening	316,025	-	-	-	-	158,013	158,012
10	Sludge Digestion	2,483,051	-	-	-	-	1,862,288	620,763
11	Sludge Holding Tanks	180,586	-	-	-	-	135,440	45,146
12	Sludge Dewatering	457,107	-	-	-	-	342,830	114,277
13	Grit and Screening Incineration	1,015,794	-	-	680,582	335,212	-	-
14	Scum and Grease Incineration	242,662	-	-	-	-	242,662	-
15	Laboratory	840,851	-	-	-	-	420,426	420,425
16	Subtotal Personal Services	12,894,936	-	812,635	3,829,485	967,318	3,291,455	3,994,043
Purchase of Services, Materials, Supplies, and Equipment:								
17	Raw Wastewater Pumping	595,909	-	595,909	-	-	-	-
18	Preliminary Treatment	941,683	-	-	-	941,683	-	-
19	Primary Sedimentation	441,414	-	-	441,414	-	-	-
20	Aeration	662,121	-	-	-	-	-	662,121
21	Secondary Sedimentation	507,626	-	-	507,626	-	-	-
22	Recirculating Pumping	191,279	-	-	191,279	-	-	-
23	Chlorination	1,601,049	-	-	1,601,049	-	-	-
24	Primary Sludge Pumping	80,926	-	-	-	-	80,926	-
25	Secondary Sludge Thickening	95,640	-	-	-	-	47,820	47,820
26	Sludge Digestion	1,243,316	-	-	-	-	932,487	310,829
27	Sludge Holding Tanks	176,566	-	-	-	-	132,425	44,141
28	Sludge Dewatering	139,781	-	-	-	-	104,836	34,945
29	Grit and Screening Incineration	397,273	-	-	-	397,273	-	-
30	Scum and Grease Incineration	110,354	-	-	-	-	110,354	-
31	Laboratory	853,400	-	-	-	-	426,700	426,700
32	Subtotal Purchase of Services, Materials, Supplies & Equipment	8,038,337	-	595,909	2,741,368	1,338,956	1,835,548	1,526,556
33	Subtotal All Above	20,933,273	-	1,408,544	6,570,853	2,306,274	5,127,003	5,520,599
Administrative and General:								
34	Personal Services	3,318,257	-	209,116	985,442	248,920	846,991	1,027,788
35	Other	1,111,735	-	82,417	379,142	185,183	253,864	211,129
36	Subtotal Administration & General	4,429,992	-	291,533	1,364,584	434,103	1,100,855	1,238,917
Power Requirements:								
37	Raw Wastewater Pumping	556,456	472,988	83,468	-	-	-	-
38	Preliminary Treatment	4,599	-	-	3,909	690	-	-
39	Primary Sedimentation	36,790	-	-	31,272	5,518	-	-
40	Aeration	3,049,010	-	-	-	-	-	3,049,010
41	Secondary Sedimentation	36,790	-	-	31,272	5,518	-	-
42	Recirculating Pumping	128,767	-	-	109,452	19,315	-	-
43	Chlorination	9,198	-	-	7,818	1,380	-	-
44	Primary Sludge Pumping	4,599	-	-	-	-	4,599	-
45	Secondary Sludge Thickening	344,911	-	-	-	-	172,456	172,455
46	Sludge Digestion	78,180	-	-	-	-	58,635	19,545
47	Sludge Dewatering	82,779	-	-	-	-	62,084	20,695
48	Grit and Screening Incineration	73,581	-	-	62,544	11,037	-	-
49	Scum and Grease Incineration	4,599	-	-	-	-	4,599	-
50	Subtotal Power Requirements	4,410,259	472,988	83,468	246,267	43,458	302,373	3,261,705
Gas Requirements:								
51	Raw Wastewater Pumping	60,038	-	60,038	-	-	-	-
52	Preliminary Treatment	94,875	-	-	-	94,875	-	-
53	Primary Sedimentation	44,473	-	-	44,473	-	-	-
54	Aeration	66,709	-	-	-	-	-	66,709
55	Secondary Sedimentation	51,144	-	-	51,144	-	-	-
56	Recirculating Pumping	19,272	-	-	19,272	-	-	-
57	Chlorination	8,153	-	-	8,153	-	-	-
58	Primary Sludge Pumping	8,153	-	-	-	-	8,153	-
59	Secondary Sludge Thickening	9,636	-	-	-	-	4,818	4,818
60	Sludge Digestion	125,265	-	-	-	-	93,949	31,316
61	Sludge Dewatering	14,083	-	-	-	-	10,562	3,521
62	Grit and Screening Incineration	40,026	-	-	-	40,026	-	-
63	Scum and Grease Incineration	11,118	-	-	-	-	11,118	-
64	Subtotal Gas Requirements	656,715	-	60,038	123,042	134,901	184,933	153,801
65	Sludge Disposal	12,011,674	-	-	-	-	9,008,755	3,002,919
66	Total Northeast WPC Plant Expense	42,441,912	472,988	1,843,583	8,304,746	2,918,736	15,723,919	13,177,941

TABLE WW - 10C
WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE
SOUTHWEST WPC PLANT
Test Year 2022

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Total Operation & Maintenance	Retail, DELCORA, Lower Merion, Springfield (w/o Wyndmoor) and Upper Darby					
Line			Retail					
No.	Description	Expense	Volume	Capacity	Volume	Capacity	Suspended Solids	BOD
		\$	\$	\$	\$	\$	\$	\$
Personal Services								
1	Raw Wastewater Pumping	161,728	-	161,728	-	-	-	-
2	Preliminary Treatment	2,134,807	-	-	1,558,409	576,398	-	-
3	Flocculation	388,147	-	-	388,147	-	-	-
4	Primary Sedimentation	562,813	-	-	562,813	-	-	-
5	Aeration	1,145,033	-	-	-	-	-	1,145,033
6	Secondary Sedimentation	970,367	-	-	970,367	-	-	-
7	Recirculating Pumping	362,270	-	-	362,270	-	-	-
8	Chlorination	549,875	-	-	324,426	225,449	-	-
9	Effluent Pumping	452,838	-	-	-	452,838	-	-
10	Primary Sludge Pumping	414,023	-	-	-	-	414,023	-
11	Secondary Sludge Thickening	342,863	-	-	-	-	168,003	174,860
12	Sludge Digestion	1,309,996	-	-	-	-	982,497	327,499
13	Sludge Holding Tanks	223,184	-	-	-	-	167,388	55,796
14	Sludge Dewatering	1,018,885	-	-	-	-	764,164	254,721
15	Sludge Lagoon	9,703	-	-	-	-	7,277	2,426
16	Grit and Screening Incineration	897,589	-	-	610,361	287,228	-	-
17	Scum and Grease Incineration	228,036	-	-	-	-	228,036	-
18	Laboratory	828,046	-	-	-	-	414,023	414,023
19	Subtotal Personal Services	12,000,203	-	161,728	4,776,793	1,541,913	3,145,411	2,374,358
Purchase of Services, Materials, Supplies, and Equipment:								
20	Raw Wastewater Pumping	75,776	-	75,776	-	-	-	-
21	Preliminary Treatment	867,451	-	-	-	867,451	-	-
22	Flocculation	449,602	-	-	449,602	-	-	-
23	Primary Sedimentation	253,307	-	-	253,307	-	-	-
24	Aeration	493,624	-	-	-	-	-	493,624
25	Secondary Sedimentation	531,873	-	-	531,873	-	-	-
26	Recirculating Pumping	221,554	-	-	221,554	-	-	-
27	Chlorination	773,591	-	-	773,591	-	-	-
28	Effluent Pumping	25,259	-	-	-	25,259	-	-
29	Primary Sludge Pumping	285,061	-	-	-	-	285,061	-
30	Secondary Sludge Thickening	50,517	-	-	-	-	24,753	25,764
31	Sludge Digestion	498,496	-	-	-	-	373,872	124,624
32	Sludge Holding Tanks	175,908	-	-	-	-	131,931	43,977
33	Sludge Dewatering	1,053,823	-	-	-	-	790,367	263,456
34	Sludge Lagoon	9,742	-	-	-	-	7,307	2,435
35	Grit and Screening Incineration	222,997	-	-	-	222,997	-	-
36	Scum and Grease Incineration	71,446	-	-	-	-	71,446	-
37	Laboratory	569,400	-	-	-	-	284,700	284,700
38	Subtotal Purchase of Services, Materials, Supplies & Equipment	6,629,427	-	75,776	2,229,927	1,115,707	1,969,437	1,238,580
39	Subtotal All Above	18,629,630	-	237,504	7,006,720	2,657,620	5,114,848	3,612,938
Administrative & General								
40	Personal Services	2,893,200	-	38,992	1,151,665	371,749	758,346	572,448
41	Other	837,500	-	9,573	281,708	140,948	248,800	156,471
42	Subtotal Administration & General	3,730,700	-	48,565	1,433,373	512,697	1,007,146	728,919
Power Requirements								
43	Raw Wastewater Pumping	69,828	59,354	10,474	-	-	-	-
44	Preliminary Treatment	4,655	-	-	3,957	698	-	-
45	Flocculation	223,782	-	-	190,215	33,567	-	-
46	Primary Sedimentation	17,623	-	-	14,980	2,643	-	-
47	Aeration	2,180,293	-	-	-	-	-	2,180,293
48	Secondary Sedimentation	44,889	-	-	38,156	6,733	-	-
49	Recirculating Pumping	119,040	-	-	101,184	17,856	-	-
50	Chlorination	9,643	-	-	8,197	1,446	-	-
51	Effluent Pumping	29,261	-	-	24,872	4,389	-	-
52	Primary Sludge Pumping	2,660	-	-	-	-	2,660	-
53	Secondary Sludge Thickening	291,282	-	-	-	-	142,728	148,554
54	Sludge Digestion	68,082	-	-	-	-	51,062	17,020
55	Sludge Dewatering	49,877	-	-	-	-	37,408	12,469
56	Grit and Screening Incineration	30,924	-	-	26,285	4,639	-	-
57	Scum and Grease Incineration	4,738	-	-	-	-	4,738	-
58	Subtotal Power Requirements	3,146,577	59,354	10,474	407,846	71,971	238,596	2,358,336
Gas Requirements								
59	Raw Wastewater Pumping	23,468	-	23,468	-	-	-	-
60	Preliminary Treatment	268,653	-	-	-	268,653	-	-
61	Flocculation	139,243	-	-	139,243	-	-	-
62	Primary Sedimentation	78,450	-	-	78,450	-	-	-
63	Aeration	152,877	-	-	-	-	-	152,877
64	Secondary Sedimentation	164,723	-	-	164,723	-	-	-
65	Recirculating Pumping	68,616	-	-	68,616	-	-	-
66	Chlorination	23,468	-	-	23,468	-	-	-
67	Effluent Pumping	7,823	-	-	-	7,823	-	-
68	Primary Sludge Pumping	88,284	-	-	-	-	88,284	-
69	Secondary Sludge Thickening	15,645	-	-	-	-	7,666	7,979
70	Sludge Digestion	154,386	-	-	-	-	115,790	38,596
71	Sludge Dewatering	326,373	-	-	-	-	244,780	81,593
72	Grit and Screening Incineration	69,063	-	-	-	69,063	-	-
73	Scum and Grease Incineration	22,127	-	-	-	-	22,127	-
74	Subtotal Gas Requirements	1,837,040	-	23,468	474,500	345,539	609,942	383,591
75	Sludge Disposal	7,451,126	-	-	-	-	5,588,345	1,862,781
76	Total Southwest WPC Plant Expense	34,795,073	59,354	320,011	9,322,439	3,587,827	12,558,877	8,946,565

TABLE WW - 10D WASTEWATER: ALLOCATION OF OPERATION AND MAINTENANCE EXPENSE FOR THE SOUTHEAST WPC PLANT Test Year 2022						
Line No.	Description	(1) Total Operation & Maintenance Expense	(2)	(3)	(4)	(5)
			Retail and Springfield (Wyndmoor)			
		\$	Volume	Capacity	Suspended Solids	BOD
Personal Services						
1	Raw Wastewater Pumping	970,615	-	970,615	-	-
2	Preliminary Treatment	1,378,555	992,560	385,995	-	-
3	Flocculation	422,007	422,007	-	-	-
4	Primary Sedimentation	492,341	492,341	-	-	-
5	Aeration	492,341	-	-	-	492,341
6	Secondary Sedimentation	611,910	611,910	-	-	-
7	Recirculating Pumping	295,405	295,405	-	-	-
8	Chlorination	471,241	296,882	174,359	-	-
9	Effluent Pumping	372,773	-	372,773	-	-
10	Primary Sludge Pumping	393,873	-	-	393,873	-
11	Waste Sludge Pumping	288,371	-	-	245,115	43,256
12	Sludge Digestion	436,665	-	-	371,165	65,500
13	Sludge Holding Tanks	278,365	-	-	236,610	41,755
14	Sludge Dewatering	339,629	-	-	288,685	50,944
15	Sludge Lagoon	3,235	-	-	2,750	485
16	Grit and Screening Incineration	299,197	203,454	95,743	-	-
17	Scum and Grease Incineration	76,012	-	-	76,012	-
18	Scum Pumping	393,873	-	-	393,873	-
19	Primary Sludge Transfer Pumping	203,970	-	-	203,970	-
20	Waste Activated Sludge Xfer Pumping	189,903	-	-	161,418	28,485
21	Laboratory	675,211	-	-	337,606	337,605
22	Subtotal Personal Services	9,085,492	3,314,559	1,999,485	2,711,077	1,060,371
Purchase of Services, Materials, Supplies, and Equipment:						
23	Raw Wastewater Pumping	212,615	-	212,615	-	-
24	Preliminary Treatment	620,698	-	620,698	-	-
25	Flocculation	260,624	260,624	-	-	-
26	Primary Sedimentation	168,034	168,034	-	-	-
27	Aeration	260,624	-	-	-	260,624
28	Secondary Sedimentation	212,615	212,615	-	-	-
29	Recirculating Pumping	126,883	126,883	-	-	-
30	Chlorination	695,198	695,198	-	-	-
31	Effluent Pumping	109,737	-	109,737	-	-
32	Primary Sludge Pumping	198,898	-	-	198,898	-
33	Waste Sludge Pumping	126,883	-	-	107,851	19,032
34	Sludge Digestion	166,165	-	-	141,240	24,925
35	Sludge Holding Tanks	158,085	-	-	134,372	23,713
36	Sludge Dewatering	351,274	-	-	298,583	52,691
37	Sludge Lagoon	3,248	-	-	2,761	487
38	Grit and Screening Incineration	74,332	-	74,332	-	-
39	Scum and Grease Incineration	23,815	-	-	23,815	-
40	Scum Pumping	198,898	-	-	198,898	-
41	Primary Sludge Transfer Pumping	72,015	-	-	72,015	-
42	Waste Activated Sludge Xfer Pumping	68,585	-	-	58,297	10,288
43	Laboratory	277,771	-	-	138,886	138,885
44	Subtotal Purchase of Services, Materials, Supplies & Equipment	4,386,997	1,463,354	1,017,382	1,375,616	530,645
45	Subtotal All Above	13,472,489	4,777,913	3,016,867	4,086,693	1,591,016
Administrative & General						
46	Personal Services	2,560,840	934,242	563,576	764,145	298,877
47	Other	449,194	149,836	104,172	140,852	54,334
48	Gas	15,713	1,626	2,928	9,043	2,116
49	Subtotal Administration & General	3,025,747	1,085,704	670,676	914,040	355,327
Power Requirements						
50	Raw Wastewater Pumping	225,767	191,902	33,865	-	-
51	Flocculation	347,562	295,428	52,134	-	-
52	Primary Sedimentation	13,863	11,784	2,079	-	-
53	Aeration	301,023	-	-	-	301,023
54	Secondary Sedimentation	9,902	8,417	1,485	-	-
55	Recirculating Pumping	23,765	20,200	3,565	-	-
56	Chlorination	2,971	2,525	446	-	-
57	Effluent Pumping	26,736	22,726	4,010	-	-
58	Primary Sludge Pumping	990	-	-	990	-
59	Waste Sludge Pumping	2,971	-	-	2,525	446
60	Sludge Digestion	22,694	-	-	19,290	3,404
61	Sludge Dewatering	16,626	-	-	14,132	2,494
62	Grit and Screening Incineration	10,308	8,762	1,546	-	-
63	Scum and Grease Incineration	1,580	-	-	1,580	-
64	Scum Pumping	2,971	-	-	2,971	-
65	Primary Sludge Transfer Pumping	20,794	-	-	20,794	-
66	Waste Activated Sludge Xfer Pumping	10,892	-	-	9,258	1,634
67	Subtotal Power Requirements	1,041,415	561,744	99,130	71,540	309,001
Gas Requirements						
68	Raw Wastewater Pumping	9,191	-	9,191	-	-
69	Flocculation	11,266	11,266	-	-	-
70	Primary Sedimentation	7,264	7,264	-	-	-
71	Aeration	11,266	-	-	-	11,266
72	Secondary Sedimentation	9,191	9,191	-	-	-
73	Recirculating Pumping	5,485	5,485	-	-	-
74	Chlorination	2,224	2,224	-	-	-
75	Effluent Pumping	4,744	-	4,744	-	-
76	Primary Sludge Pumping	8,598	-	-	8,598	-
77	Waste Sludge Pumping	5,485	-	-	4,662	823
78	Sludge Digestion	51,462	-	-	43,743	7,719
79	Sludge Dewatering	108,791	-	-	92,472	16,319
80	Grit and Screening Incineration	23,021	-	23,021	-	-
81	Scum and Grease Incineration	7,376	-	-	7,376	-
82	Scum Pumping	8,598	-	-	8,598	-
83	Primary Sludge Transfer Pumping	3,113	-	-	3,113	-
84	Waste Activated Sludge Xfer Pumping	2,965	-	-	2,520	445
85	Subtotal Gas Requirements	342,345	35,430	63,788	197,031	46,096
86	Sludge Disposal	3,319,065	-	-	2,821,205	497,860
87	Total Southeast WPC Plant Expense	21,201,061	6,460,791	3,850,461	8,090,509	2,799,300

TABLE WW - 10E
WASTEWATER: TEST YEAR OPERATION AND MAINTENANCE EXPENSE
SUMMARY OF ALLOCATIONS
Test Year 2022

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Direct	Administrative & General Expenses		Total	O&M Expense Deductions		Net
Line	Cost Component	Operation & Maintenance Expense	Direct Assignment	Allocated	Operation & Maintenance Expense	Less Interest Income	Less Grants	Operation & Maintenance Expense
No.		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
COLLECTION SYSTEM								
	Sewer Maintenance							
1	All Customers - Capacity	31,495	26,469	31,583	89,547	269	-	89,278
	Inlet Cleaning							
2	Retail - Storm Capacity	13,165	1,063	5,720	19,948	60	-	19,888
	Neill Drive Pumping Station							
	Retail and Lower Merion							
3	Total Volume	6	-	-	6	-	-	6
4	Total Capacity	114	-	53	167	1	-	166
	Central Schuylkill Pumping Station							
	Retail and Springfield (excl. Wyndmoor)							
5	Total Volume	41	-	-	41	-	-	41
6	Total Capacity	342	-	187	529	2	-	527
	All Other Pumping Stations							
	Retail							
7	Total Volume	2,828	-	-	2,828	9	-	2,819
8	Total Capacity	12,956	-	5,092	18,048	54	-	17,994
	Green Stormwater Infrastructure Maintenance							
9	All Customers - Capacity	10,089	11,188	9,236	30,513	92	-	30,421
10	Total Collection Systems	71,036	38,720	51,871	161,627	487	-	161,140
WATER POLLUTION CONTROL PLANTS								
	Northeast Plant:							
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland & Lower Southampton							
11	Volume	473	-	-	473	1	11	461
12	Capacity	1,844	-	704	2,548	8	58	2,482
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton							
13	Volume	8,305	-	3,481	11,786	35	266	11,485
14	Capacity	2,919	-	1,355	4,274	13	97	4,164
15	Suspended Solids	15,724	89	6,561	22,374	67	505	21,802
16	BOD	13,178	-	4,385	17,563	53	397	17,113
	Southwest Plant:							
	Retail							
17	Volume	59	-	-	59	-	1	58
18	Capacity	320	-	227	547	2	12	533
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby							
19	Volume	9,322	-	3,698	13,020	39	294	12,687
20	Capacity	3,588	-	1,367	4,955	15	112	4,828
21	Suspended Solids	12,559	91	5,041	17,691	53	400	17,238
22	BOD	8,947	-	2,736	11,683	35	264	11,384
	Southeast Plant:							
	Retail and Springfield (Wyndmoor)							
23	Volume	6,461	-	2,579	9,040	27	204	8,809
24	Capacity	3,850	-	1,720	5,570	17	126	5,427
25	Suspended Solids	8,091	89	3,332	11,512	35	260	11,217
26	BOD	2,799	-	1,110	3,909	12	88	3,809
27	Total Water Pollution Control Plants	98,439	269	38,296	137,004	412	3,095	133,497
CUSTOMER COSTS								
	All Customers							
28	Equivalent Bills	24,903	-	8,726	33,629	101	-	33,528
	Equivalent Meters							
29	Industrial Waste Unit	2,992	-	1,048	4,040	12	-	4,028
30	Other	3,456	-	1,211	4,667	14	-	4,653
31	Excess Strength Wastewater - Direct	1,473	-	516	1,989	6	-	1,983
32	Stormwater Incentive Programs	-	-	-	-	-	-	-
33	Total Customer Costs	32,824	-	11,501	44,325	133	-	44,192
34	Total Operation & Maintenance Expense	202,299	38,989	101,668	342,956	1,032	3,095	338,829

TABLE WW - 11
WASTEWATER: RETAIL UNIT COSTS OF SERVICE - (Part I)
Test Year 2022

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
			Collection System			Water Pollution Control Plants				
Line No.	Description	Total	Pumping Station		Sanitary Sewers	Storm Costs	Suspended			
			Volume	Capacity	Capacity		Volume	Capacity	Solids	BOD
	Total Units of Service									
1	Units	\$	Mcf	Mcf/day	Mcf/day		Mcf	Mcf/day	1,000 lbs.	1,000 lbs.
2	Quantity		17,417,900	103,622	319,054		17,417,900	103,622	181,776	119,660
	Operation and Maintenance Expense									
3	Total Expense - \$	255,527,601	2,760,000	17,945,500	45,274,800	87,074,200	26,379,000	13,558,000	39,572,101	22,964,000
4	Unit Expense - \$/unit		0.1585	173.1823	141.9033		1.5145	130.8409	217.6971	191.9104
	Capital Costs									
5	Total Plant Investment - \$	2,266,245,000		28,276,000	617,646,600	1,098,038,400	128,414,000	127,356,000	144,360,000	122,154,000
6	Unit Plant Investment - \$/unit			272.8764	1,935.8685		7.3725	1,229.0440	794.1642	1,020.8424
7	Depreciable Plant Investment - \$	2,263,082,667		28,276,000	616,992,800	1,096,876,200	128,102,000	127,049,000	143,973,000	121,813,667
8	Unit Depreciable Plant Investment - \$/unit			272.8764	1,933.8194		7.3546	1,226.0813	792.0352	1,017.9982
9	Depreciation Expense - \$	48,007,700		706,900	12,339,900	21,937,500	3,202,600	3,176,200	3,599,300	3,045,300
10	Unit Depreciation Expense - \$/unit			6.8219	38.6764		0.1839	30.6520	19.8009	25.4500
	Unit Return on Investment									
11	Total Return - \$ (a)	87,817,000		1,095,700	23,933,800	42,549,000	4,976,000	4,935,000	5,594,000	4,733,500
12	Inside City - \$/Unit (a)			10.5740	75.0149		0.2857	47.6255	30.7739	39.5577
	Total Unit Capital Costs									
13	(Line 10 + Line 12) - \$/unit			17.3959	113.6913		0.4696	78.2775	50.5748	65.0077
	Total Unit Costs of Service									
14	Inside City (Line 4 + Line 13) - \$/unit		0.1585	190.5782	255.5946		1.9841	209.1184	268.2719	256.9181

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$87,817,000 / \$2,266,245,000 = 3.8750 %.

Mcf - Thousand cubic feet

lbs - pounds

TABLE WW - 12
WASTEWATER: RETAIL UNIT COSTS OF SERVICE - (Part 2)
Test Year 2022

		(1)	(2)	(3)	(4)	(5)	(6)
		Customer Costs					
					Industrial Waste Unit		
					Direct Excess		
Line		Billing			Retail	Strength	Direct
No.	Description	Meter Costs	Sanitary	Stormwater	Customers	Wastewater	Stormwater
	Total Units of Service						
1	Units	Eq. Meters	Eq. Bills		Eq. Meters		
2	Quantity	599,251	5,967,301		599,251		
	Operation and Maintenance Expense						
3	Total Expense - \$	4,483,000	19,556,000	12,528,427	3,815,000	1,911,000	-
4	Unit Expense - \$/unit	7.4810	3.2772		6.3663		
	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	7.4810	3.2772		6.3663	-	

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$87,817,000 / \$2,266,245,000 = 3.8750 %.

Mcf - Thousand cubic feet

lbs - pounds

TABLE WW - 13
WASTEWATER: RETAIL COSTS OF SERVICE (a)
 (in thousands of dollars)
 Test Year FY 2022

Line No.	Customer Type	(1) Allocated Cost of Service	(2) (3) (4) Collection System			(5) (6) (7) (8) Treatment				(9) (10) Customer		(11) (12) Industrial Waste	
			Pumping Volume	Pumping Capacity	Sewer Capacity	Volume	Capacity	TSS	BOD	Meter	Billing & Collection	Surcharge	Meter
1	Residential	\$ 72,870	\$ 487	\$ 2,406	\$ 8,605	\$ 6,095	\$ 2,640	\$ 15,428	\$ 14,529	\$ 3,307	\$ 16,559	\$ -	\$ 2,814
2	Commercial	25,321	217	1,074	3,841	2,721	1,179	6,887	6,485	706	1,609	-	601
3	Industrial	1,303	12	57	205	146	63	368	347	30	49	-	25
4	Public Utilities	160	1	6	23	16	7	41	38	9	11	-	8
5	Senior Citizens	3,325	21	101	363	257	111	651	613	170	894	-	145
6	Wastewater Only	988	9	47	168	119	51	300	283	3	4	-	3
7	Groundwater	2,705	36	299	1,283	454	328	268	37	-	-	-	-
8	Surcharge	5,588	-	-	-	-	-	500	3,191	-	-	1,898	-
9	Housing Authority	2,736	23	114	407	288	125	729	687	69	237	-	58
10	Charities & Schools	2,081	17	84	301	213	92	540	508	108	125	-	92
11	Hospital/University	1,863	17	84	299	212	92	537	505	44	35	-	37
12	Hand Bill	5,761	55	272	972	689	298	1,743	1,641	35	27	-	30
13	Water Treatment Plant Sludge	9,225	46	229	820	581	252	7,297	-	-	-	-	-
14	Private Fire Connections	150	1	7	24	17	7	43	40	3	5	-	2
15	Scheduled (Flat Rate) Infiltration/Inflow	0	0	-	-	0	-	-	-	0	0	-	0
16	Conveyance	64,237	-	-	64,237	-	-	-	-	-	-	-	-
17	Pumping & Treatment	71,229	1,817	14,968	-	22,750	16,424	13,433	1,838	-	-	-	-
18	Total	\$ 269,544	\$ 2,760	\$ 19,749	\$ 81,549	\$ 34,558	\$ 21,669	\$ 48,765	\$ 30,743	\$ 4,483	\$ 19,556	\$ 1,898	\$ 3,815

TABLE WW - 14
WASTEWATER: ADJUSTED COSTS OF SERVICE (AFTER ALLOCATION OF I/I AND DISCOUNTS)
(in thousands of dollars)
Test Year FY 2022

Line No.	Customer Type	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Allocated Cost of Service	Re-allocation of I/I (a)		Adjusted Cost of Service	Discounts	Adjusted Cost of Service with	Recovery of Discounts (b)	Adjusted Cost of Service
			Sanitary Sewer	Stormwater					
1	Residential	\$ 72,870	\$ 65,123	\$ -	\$ 137,993	\$ -	\$ 137,993	\$ 2,313	\$ 140,307
2	Commercial	25,321	25,761		51,082		51,082	856	51,938
3	Industrial	1,303	1,344		2,647		2,647	44	2,691
4	Public Utilities	160	174		334		334	6	339
5	Senior Citizens	3,325	2,878		6,203	(1,551)	4,652	78	4,730
6	Wastewater Only	988	1,007		1,995		1,995	33	2,028
7	Groundwater	2,705	-		2,705		2,705	45	2,751
8	Surcharge	5,588	-		5,588		5,588	94	5,682
9	Housing Authority	2,736	2,701		5,438	(272)	5,166	87	5,252
10	Charities & Schools	2,081	2,244		4,325	(1,081)	3,244	54	3,298
11	Hospital/University	1,863	1,960		3,823	(956)	2,867	48	2,915
12	Hand Bill	5,761	5,900		11,661		11,661	195	11,857
13	Water Treatment Plant Sludge	9,225	4,852		14,078		14,078		14,078
14	Private Fire Connections	150	153		303		303	5	308
15	Scheduled Infiltration/Inflow	0	0		0		0	0	0
16	Conveyance	64,237	(64,237)		-	-	-	-	-
17	Pumping & Treatment	71,229	(49,861)	(21,369)	-	-	-	-	-
18	Total	269,544	-	(21,369)	248,175	(3,860)	244,316	3,860	248,175
Allocation of I/I									
19	Sanitary Sewer	269,544		(21,369)	248,175				
20	Stormwater	-	-	21,369	21,369	-	-	-	-
21	Total	\$ 269,544	\$ -	\$ -	\$ 269,544	\$ -	\$ -	\$ -	\$ -

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 2022

Line No.	Cost Component	(1) Units	(2) Unadjusted Unit Cost \$/Unit	(3) COS Deficit Recovery Factor	(4) Billing Units Conversion Factor	(5) Total Adjustment Factor	(6) Adjusted Unit Cost \$/Unit
Collection System							
	Pumping Station						
1	Volume	Mcf	0.1585	1.0168	0.95	0.9660	0.1531
2	Capacity	Mcf/day	190.5782	1.0168	0.95	0.9660	184.0985
3	Sanitary Sewers - Capacity	Mcf/day	255.5946	1.0168	0.95	0.9660	246.9044
	WPC Plants						
4	Volume	Mcf	1.9841	1.0168	0.95	0.9660	1.9166
5	Capacity	Mcf/day	209.1184	1.0168	0.95	0.9660	202.0084
6	Suspended Solids	1,000 lbs	268.2719	1.0168	1.00	1.0168	272.7789
7	BOD	1,000 lbs	256.9181	1.0168	1.00	1.0168	261.2343
Customer Costs							
8	Meter Costs	Eq. Meters	7.4810	1.0168	1.00	1.0168	7.6067
	Billing Costs						
9	Sanitary	Eq. Bills	3.2772	1.0168	1.00	1.0168	3.3323
10	Industrial Waste Unit - Retail	Eq. Meters	6.3663	1.0168	1.00	1.0168	6.4733
11	Infiltration/Inflow - Customer Related	Eq. Meters	32.1588	1.0168	1.00	1.0168	32.6991
12	Infiltration/Inflow - Volume Related	Volume	16.5714	1.0168	0.95	0.9660	16.0080
	Mcf - Thousand cubic feet						
	lbs - pounds						

TABLE WW - 16
WASTEWATER: DEVELOPMENT OF COST OF SERVICE
MONTHLY SERVICE CHARGE FOR CUSTOMERS WITH 5/8-INCH METER
Test Year 2022

Line No.	Cost Component	(1) Units	(2) Unit Cost \$/Unit	(3) Number of Units
Customer Costs				
1	Meter Costs	Eq. Meter	0.6339	1.0
2	Billing Costs	Eq. Bills	3.3323	1.0
3	Industrial Waste Unit	Eq. Meter	0.5394	1.0
4	Infiltration/Inflow Costs - Sanitary	Eq. Meter	2.7249	1.0
5	Total Service Charge (a)			
6	Total Service Charge - Rounded (a)			

(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 2022

Line No.	Cost Component	(1) Units	(2) Adjusted Unit Cost \$/Unit	(3) Number of Units
Collection System				
	Pumping Stations			
1	Volume	Mcf	0.1531	1.0000
2	Capacity (a)	Mcf/day/mo.	15.3415	0.0493
3	Sanitary Sewers: Capacity (b)	Mcf/day/mo.	20.5754	0.1316
Water Pollution Control Plants				
4	Volume	Mcf	1.9166	1.0000
5	Capacity (a)	Mcf/day/mo.	16.8340	0.0493
6	Suspended Solids (c)	1,000 lbs	272.7789	0.0187
7	BOD (d)	1,000 lbs	261.2343	0.0184
8	Total Cost per Mcf			
9	Infiltration/Inflow Cost	Mcf	16.0080	1.0000
10	Total Cost + Infiltration/Inflow per Mcf (e)			
11	Total Cost per Mcf - Rounded (e)			

(a) $(1.0 \text{ Mcf} * 1 \text{ month}/30.4 \text{ days}) * 1.5$

(b) $(1.0 \text{ Mcf} * 1 \text{ month}/30.4 \text{ days}) * 4.0$

(c) 1.0 Mcf @ 300 mg/l

(d) 1.0 Mcf @ 295 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			
Line No.	Meter Size	(1) FY 2022 Monthly Charge	(2) FY 2023 Monthly Charge
	Inches	\$	\$
1	5/8	7.92	8.11
2	3/4	10.05	10.33
3	1	14.68	15.17
4	1 1/2	25.72	26.70
5	2	39.62	41.19
6	3	71.33	74.28
7	4	121.30	126.23
8	6	238.97	248.82
9	8	377.97	393.75
10	10	545.62	568.29
11	12	990.71	1,033.23

QUANTITY CHARGE			
Line No.		FY 2022 Charge per Mcf	FY 2023 Charge per Mcf
		\$	\$
12	All billable water usage	35.35	37.02
13	Groundwater Charge	12.94	13.51

SURCHARGE RATES			
Line No.		FY 2022 Charge per lb	FY 2023 Charge per lb
		\$	\$
14	BOD (excess of 250 mg/l)	0.413	0.424
15	SS (excess of 350 mg/l)	0.430	0.438

SEPTIC HAULER RATE			
Line No.		FY 2022 Charge per Mgal	FY 2023 Charge per Mgal
		\$	\$
16	Sanitary Wastewater Delivered to WPCP (a)	61.16	62.54

(a) Based on BOD and SS Loading of 9,000 mg/l.

Mcf-Thousand cubic feet

mg/l-milligrams per liter

Mgal - Thousand gallons

WPCP - Water Pollution Control Plant

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-2

Dated: January 15, 2021

Schedule REF #		Schedule Name
BV-2 Black & Veatch Schedules		
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 LOADINGS
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

Schedule REF #		Schedule Name
BV-2 Black & Veatch Schedules		
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
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29	TABLE WH-29	WASTEWATER WHOLESale: SUMMARY OF ALLOCATED COST OF SERVICE FOR CONTRACT CUSTOMERS TEST YEAR 2022
30	TABLE WH-29A	WASTEWATER WHOLESale: SUMMARY OF ALLOCATED COST OF SERVICE FOR CONTRACT CUSTOMERS TEST YEAR 2023
31	TABLE WH-30	WASTEWATER WHOLESale: SUMMARY OF TEST YEAR CHARGES FOR WHOLESale CONTRACT CUSTOMERS TEST YEAR 2022
32	TABLE WH-30A	WASTEWATER WHOLESale: SUMMARY OF TEST YEAR CHARGES FOR WHOLESale CONTRACT CUSTOMERS TEST YEAR 2023

TABLE WH - 1
WASTEWATER WHOLESALE: ALLOCATION OF TEST YEAR
PLANT INVESTMENT AND DEPRECIATION
Test Year 2022

Line No.	Cost Component	(1) Total Direct Investment (a)	(2) Annual Depreciation Expense (b)
		\$	\$
COLLECTION SYSTEM			
1	Sewers - Capacity	1,619,632,000	32,253,000
2	Pumping Stations - Capacity	28,528,000	708,000
3	LTCP Investment	133,492,000	2,670,000
4	Total Collection System	1,781,652,000	35,631,000
WATER POLLUTION CONTROL PLANTS			
Northeast Plant:			
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Lower Moreland, and Lower Southampton		
5	Capacity	5,488,000	
	Retail, Abington, Bensalem, Bucks Cty. W&SA, Cheltenham, Lower Moreland, & Lower Southampton		
6	Volume	64,362,000	
7	Capacity	52,960,000	
8	Suspended Solids	83,097,000	
9	BOD	94,218,000	
10	Total Northeast Plant	300,125,000	6,684,000
Southwest Plant:			
	Retail		
11	Capacity	21,880,000	
	Retail, DELCORA, Lower Merion, Springfield excl. Wyndmoor), & Upper Darby		
12	Volume	67,429,000	
13	Capacity	21,991,000	
14	Suspended Solids	64,162,000	
15	BOD	51,663,000	
16	Total Southwest Plant	227,125,000	3,919,000
Southeast Plant:			
	Retail and Springfield (Wyndmoor)		
17	Volume	43,735,000	
18	Capacity	46,943,000	
19	Suspended Solids	30,977,000	
20	BOD	25,274,000	
21	Total Southeast Plant	146,929,000	3,669,000
22	Total Water Pollution Control Plants	674,179,000	14,272,000
23	Total Investment	2,455,831,000	49,903,000

(a) Plant Investment as of 6/30/2020. 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 2022

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Direct	Administrative & General Expenses		Total	O&M Expense Deductions		Net
Line		Operation &			Operation &			Operation &
No.	Cost Component	Maintenance	Direct	Allocated	Maintenance	Less Interest	Less	Maintenance
		Expense	Assignment		Expense	Income	Grants	Expense
		\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
COLLECTION SYSTEM								
Sewer Maintenance								
1	All Customers - Capacity	31,495	26,469	31,583	89,547	269	-	89,278
Inlet Cleaning								
2	Retail - Storm Capacity	13,165	1,063	5,720	19,948	60	-	19,888
Neill Drive Pumping Station								
	Retail and Lower Merion							
3	Total Volume	6	-	-	6	-	-	6
4	Total Capacity	114	-	53	167	1	-	166
Central Schuylkill Pumping Station								
	Retail and Springfield (excl. Wyndmoor)							
5	Total Volume	41	-	-	41	-	-	41
6	Total Capacity	342	-	187	529	2	-	527
All Other Pumping Stations								
	Retail							
7	Total Volume	2,828	-	-	2,828	9	-	2,819
8	Total Capacity	12,956	-	5,092	18,048	54	-	17,994
Green Stormwater Infrastructure Maintenance								
9	All Customers - Capacity	10,089	11,188	9,236	30,513	92	-	30,421
10	Total Collection Systems	71,036	38,720	51,871	161,627	487	-	161,140
WATER POLLUTION CONTROL PLANTS								
Northeast Plant:								
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland & Lower Southampton							
11	Volume	473	-	-	473	1	11	461
12	Capacity	1,844	-	704	2,548	8	58	2,482
Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham,								
	Lower Moreland, and Lower Southampton							
13	Volume	8,305	-	3,481	11,786	35	266	11,485
14	Capacity	2,919	-	1,355	4,274	13	97	4,164
15	Suspended Solids	15,724	89	6,561	22,374	67	505	21,802
16	BOD	13,178	-	4,385	17,563	53	397	17,113
Southwest Plant:								
	Retail							
17	Volume	59	-	-	59	-	1	58
18	Capacity	320	-	227	547	2	12	533
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby							
19	Volume	9,322	-	3,698	13,020	39	294	12,687
20	Capacity	3,588	-	1,367	4,955	15	112	4,828
21	Suspended Solids	12,559	91	5,041	17,691	53	400	17,238
22	BOD	8,947	-	2,736	11,683	35	264	11,384
Southeast Plant:								
	Retail and Springfield (Wyndmoor)							
23	Volume	6,461	-	2,579	9,040	27	204	8,809
24	Capacity	3,850	-	1,720	5,570	17	126	5,427
25	Suspended Solids	8,091	89	3,332	11,512	35	260	11,217
26	BOD	2,799	-	1,110	3,909	12	88	3,809
27	Total Water Pollution Control Plants	98,439	269	38,296	137,004	412	3,095	133,497
CUSTOMER COSTS								
All Customers								
28	Equivalent Bills	24,903	-	8,726	33,629	101	-	33,528
	Equivalent Meters							
29	Industrial Waste Unit	2,992	-	1,048	4,040	12	-	4,028
30	Other	3,456	-	1,211	4,667	14	-	4,653
31	Excess Strength Wastewater - Direct	1,473	-	516	1,989	6	-	1,983
32	Stormwater Incentive Programs	-	-	-	-	-	-	-
33	Total Customer Costs	32,824	-	11,501	44,325	133	-	44,192
34	Total Operation & Maintenance Expense	202,299	38,989	101,668	342,956	1,032	3,095	338,829

TABLE WH - 3
WASTEWATER WHOLESALE: OUTSIDE CITY CONTRACT SERVICE UNITS OF SERVICE
Test Year 2022

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
	Northeast WPC Plant								Southwest WPC Plant							
Line No.	Units	Abington	Bensalem	Bucks County	Cheltenham	Lower Moreland	Lower Southampton	Total Northeast	DELCORA	Lower Merion	Springfield (Excluding Wyndmoor)	Upper Darby	Total Southwest	Springfield Wyndmoor	Total	
FY 2022 Test Year																
Volume																
1	Sanitary Wastewater	(Mcf)	94,000	170,000	1,000,000	450,000	65,000	310,000	2,089,000	1,200,000	350,000	115,000	500,000	2,165,000	20,000	4,274,000
2	Infiltration	(Mcf)	4,500	5,600	35,100	15,000	2,800	7,500	70,500	-	14,900	2,200	16,600	33,700	900	105,100
3	Total	(Mcf)	98,500	175,600	1,035,100	465,000	67,800	317,500	2,159,500	1,200,000	364,900	117,200	516,600	2,198,700	20,900	4,379,100
Suspended Solids																
4	Sanitary Wastewater	(1,000 lbs)	920	1,600	10,900	3,400	660	2,500	19,980	13,000	3,600	2,500	4,800	23,900	220	44,100
5	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308	-	65	10	73	148	4	460
6	Total	(1,000 lbs)	940	1,624	11,053	3,466	672	2,533	20,288	13,000	3,665	2,510	4,873	24,048	224	44,560
BOD																
7	Sanitary Wastewater	(1,000 lbs)	1,400	1,650	10,500	3,000	500	1,840	18,890	10,500	3,100	2,300	4,100	20,000	170	39,060
8	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44	-	9	1	10	20	1	65
9	Total	(1,000 lbs)	1,403	1,653	10,522	3,009	502	1,845	18,934	10,500	3,109	2,301	4,110	20,020	171	39,125
Contract Maximum Units																
Capacity																
10	Sanitary Wastewater	(Mcf/day)	824	1,014	6,416	2,743	508	1,364	12,869	13,392	2,728	397	3,024	19,541	167	32,577
11	Infiltration	(Mcf/day)	20	20	140	60	10	30	280	-	60	10	70	140	-	420
12	Total	(Mcf/day)	844	1,034	6,556	2,803	518	1,394	13,149	13,392	2,788	407	3,094	19,681	167	32,997
Volume																
13	Sanitary Wastewater	(Mcf)	217,292	299,271	1,171,123	654,370	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	15,000	2,800	7,500	70,500	-	14,900	2,200	16,600	33,700	900	105,100
15	Total	(Mcf)	221,792	304,871	1,206,223	669,370	95,514	355,909	2,853,679	2,439,840	722,453	158,350	846,145	4,166,788	49,697	7,070,164
Suspended Solids																
16	Sanitary Wastewater	(1,000 lbs)	2,481	3,734	13,400	5,635	966	6,000	32,216	19,487	7,250	3,300	7,349	37,386	200	69,802
17	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308	-	65	10	73	148	4	460
18	Total	(1,000 lbs)	2,501	3,758	13,553	5,701	978	6,033	32,524	19,487	7,315	3,310	7,422	37,534	204	70,262
BOD																
19	Sanitary Wastewater	(1,000 lbs)	2,102	5,340	13,400	4,900	729	5,500	31,971	21,771	6,871	3,100	6,831	38,573	155	70,699
20	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44	-	9	1	10	20	1	65
21	Total	(1,000 lbs)	2,105	5,343	13,422	4,909	731	5,505	32,015	21,771	6,880	3,101	6,841	38,593	156	70,764

Mcf - thousand cubic feet

Mcf/day - thousand cubic feet per day

lbs - pounds

TABLE WH - 4
WASTEWATER: PROJECTED
WASTEWATER STRENGTH LOADINGS
Test Year 2022

Customer	(1)	(2)
	Average Wastewater Strength Concentration	
	Suspended Solids	BOD
	1,000 lbs	1,000 lbs
Abington	920	1,400
Bensalem	1,600	1,650
Bucks County	10,900	10,500
Cheltenham	3,400	3,000
DELCORA	13,000	10,500
Lower Merion	3,600	3,100
Lower Moreland	660	500
Lower Southampton	2,500	1,840
Springfield (excluding Wyndmoor)	2,500	2,300
Springfield (Wyndmoor)	220	170
Upper Darby	4,800	4,100

lbs - pounds

TABLE WH - 5
WASTEWATER WHOLESALE: WATER POLLUTION CONTROL PLANT
INVESTMENT PER UNIT OF CAPACITY
Test Year 2022

Line No.	Cost Component	(1) Direct Investment (a) \$	(2) Units of Capacity	(3) Unit Investment (a) \$
Northeast Water Pollution Control Plant				
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton			
1	- Capacity	5,488,000	370 mgd = 49,470 Mcf/day	110.9359 /Mcf/day
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton			
2	Volume	64,362,000	76,650 mg = 10,247,000 Mcf	6.2811 /Mcf
3	Capacity	52,960,000	420 mgd = 56,150 Mcf/day	943.1879 /Mcf/day
4	Suspended Solids	83,097,000	173,240,000 lbs	479.6640 /1,000 lbs
5	BOD	94,218,000	128,491,000 lbs	733.2654 /1,000 lbs
Southwest Water Pollution Control Plant				
6	Retail - Capacity	21,880,000	50 mgd = 6,684 Mcf/day	3,273.4889 /Mcf/day
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby			
7	Volume	67,429,000	73,000 mg = 9,759,000 Mcf	6.9094 /Mcf
8	Capacity	21,991,000	400 mgd = 53,476 Mcf/day	411.2312 /Mcf/day
9	Suspended Solids	64,162,000	132,477,000 lbs	484.3270 /1,000 lbs
10	BOD	51,663,000	78,324,000 lbs	659.6072 /1,000 lbs
Southeast Water Pollution Control Plant				
	Retail and Springfield (Wyndmoor)			
11	Volume	43,735,000	40,880 mg = 5,465,000 Mcf	8.0027 /Mcf
12	Capacity	46,943,000	224 mgd = 29,947 Mcf/day	1,567.5360 /Mcf/day
13	Suspended Solids	30,977,000	66,065,000 lbs	468.8867 /1,000 lbs
14	BOD	25,274,000	56,940,000 lbs	443.8707 /1,000 lbs

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 2022**

		(1)	(2)	(3)	(4)	(5)	(6)
Line			Investment	Number of	Infiltration/Inflow	Allocated	Allocated
No.	Cost Component	Units	Per Unit (a)	Units	Capacity Allocation Factor	Investment (a)	Investment Rounded (a)
			\$			\$	\$
Treatment							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	844	-	93,630	94,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	6.2811	221,792	-	1,393,098	1,393,000
3	Capacity	Mcf/day	943.1879	844	-	796,051	796,000
4	SS	1,000 lbs	479.6640	2,501	-	1,199,640	1,200,000
5	BOD	1,000 lbs	733.2654	2,105	-	1,543,524	1,544,000
6	Total Treatment					5,025,943	5,027,000
Conveyance							
7	Shady Lane & City Line	cfs	58,421	1.3680	1.0225	81,718	82,000
8	Pennypack & City Line	cfs	49,045	7.6940	1.0225	385,843	386,000
9	Cottman and Orville	cfs	45,328	0.4800	1.0225	22,247	22,000
10	Total Conveyance					489,808	490,000
Long Term Control Plan (LTCP)							
Line		System		Allocation		Allocated	Allocated
No.	Cost Component	Investment				Investment (a)	Investment Rounded (a)
		\$				\$	\$
11	LTCP Infrastructure Investment	133,492,000		0.58244%		777,505	778,000
12	Total Allocated System Investment					\$ 6,293,256	\$ 6,295,000

(a) Plant Investment as of 6/30/2020. 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 2022**

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			\$			\$	\$
Treatment							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	1,034	-	114,708	115,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	6.2811	304,871	-	1,914,925	1,915,000
3	Capacity	Mcf/day	943.1879	1,034	-	975,256	975,000
4	SS	1,000 lbs	479.6640	3,758	-	1,802,577	1,803,000
5	BOD	1,000 lbs	733.2654	5,343	-	3,917,837	3,918,000
6	Total Treatment					8,725,303	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
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System Investment	Allocation			Allocated Investment (a)	Allocated Investment Rounded (a)
		\$				\$	\$
25	LTCP Infrastructure Investment	133,492,000	0.0000%			-	-
26	Total Allocated System Investment					\$ 9,838,113	\$ 9,836,000

(a) Plant Investment as of 6/30/2020. 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 2022**

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			\$			\$	\$
Treatment							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	6,556	-	727,296	727,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	6.2811	1,206,223	-	7,576,407	7,576,000
3	Capacity	Mcf/day	943.1879	6,556	-	6,183,540	6,184,000
4	SS	1,000 lbs	479.6640	13,553	-	6,500,886	6,501,000
5	BOD	1,000 lbs	733.2654	13,422	-	9,841,888	9,842,000
6	Total Treatment					30,830,017	30,830,000
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
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System Investment	Allocation			Allocated Investment (a)	Allocated Investment Rounded (a)
		\$				\$	\$
9	LTCP Infrastructure Investment	133,492,000	0.00000%			-	-
10	Total Allocated System Investment					32,395,914	32,396,000

(a) Plant Investment as of 6/30/2020. 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 2022**

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		Units	Investment Per Unit (a)	Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			\$			\$	\$
Treatment							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	NA	-	-	-
2	Volume	Mcf	6.2811	669,370	-	4,204,380	4,204,000
3	Capacity	Mcf/day	943.1879	2,803	-	2,643,756	2,644,000
4	SS	1,000 lbs	479.6640	5,701	-	2,734,564	2,735,000
5	BOD	1,000 lbs	733.2654	4,909	-	3,599,600	3,600,000
6	Total Treatment					13,182,300	13,183,000
Conveyance							
7	Cheltenham and Tacony Creek	cfs	15,378	29.00	1.02250	455,996	456,000
8	Bouvier Street	cfs	23,315	2.75	1.02250	65,559	66,000
9	Total Conveyance					521,555	522,000
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System Investment	Allocation			Allocated Investment (a)	Allocated Investment Rounded (a)
		\$				\$	\$
10	LTCP Infrastructure Investment	133,492,000	2.42801%			3,241,192	3,241,000
11	Total Allocated System Investment					16,945,047	16,946,000

(a) Plant Investment as of 6/30/2020. Includes Administration and General costs.

cfs - cubic feet per second

Mcf - Thousand cubic feet

lbs - pounds

**TABLE WH - 10
WATER SYSTEM IN
ALLOCATED TO
DELCORA
Fiscal Year 2022**

58,768,000

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

TABLE WH - 11
WASTEWATER SYSTEM INVESTMENT
ALLOCATED TO
LOWER MERION TOWNSHIP
Test Year 2022

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		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	6.9094	722,453	-	4,991,717	4,992,000
2	Capacity	Mcf/day	411.2312	2,788	-	1,146,513	1,147,000
3	SS	1,000 lbs	484.3270	7,315	-	3,542,852	3,543,000
4	BOD	1,000 lbs	659.6072	6,880	-	4,538,098	4,538,000
5	Total Treatment					14,219,180	14,220,000
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

Long Term Control Plan (LTCP):

Line No.	Cost Component	System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		\$		\$	\$
17	LTCP Infrastructure Investment	133,492,000	0.00000%	-	-
18	Total Allocated System Investment			16,028,227	16,028,000

(a) Plant Investment as of 6/30/2020. 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 2022

		(1)	(2)	(3)	(4)	(5)	(6)
Line No.	Cost Component			Number of Contract Units	Infiltration/Inflow Capacity Allocation Factor	Allocated Investment (a)	Allocated Investment Rounded (a)
			\$			\$	\$
Treatment							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	518	-	57,465	57,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	6.2811	95,514	-	599,933	600,000
3	Capacity	Mcf/day	943.1879	518	-	488,571	489,000
4	SS	1,000 lbs	479.6640	978	-	469,111	469,000
5	BOD	1,000 lbs	733.2654	731	-	536,017	536,000
6	Total Treatment					2,151,097	2,151,000
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
Long Term Control Plan (LTCP):							
Line No.	Cost Component	System Investment		Allocation		Allocated Investment (a)	Allocated Investment Rounded (a)
			\$			\$	\$
16	LTCP Infrastructure Investment	133,492,000		0.35883%		479,008	479,000
17	Total Allocated System Investment					3,335,491	3,335,000

(a) Plant Investment as of 6/30/2020. 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 2022

		(1)	(2)	(3)	(4)	(5)	(6)
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							
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	110.9359	1,394	-	154,645	155,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	6.2811	355,909	-	2,235,500	2,236,000
3	Capacity	Mcf/day	943.1879	1,394	-	1,314,804	1,315,000
4	SS	1,000 lbs	479.6640	6,033	-	2,893,813	2,894,000
5	BOD	1,000 lbs	733.2654	5,505	-	4,036,626	4,037,000
6	Total Treatment					10,635,388	10,637,000
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
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System Investment		Allocation		Allocated Investment (a)	Allocated Investment Rounded (a)
		\$				\$	\$
10	LTCP Infrastructure Investment	133,492,000		0.96317%		1,285,759	1,286,000
11	Total Allocated System Investment					22,141,629	22,143,000

(a) Plant Investment as of 6/30/2020. 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 2022

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		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	6.9094	158,350	-	1,094,103	1,094,000
2	Capacity	Mcf/day	411.2312	407	-	167,371	167,000
3	SS	1,000 lbs	484.3270	3,310	-	1,603,122	1,603,000
4	BOD	1,000 lbs	659.6072	3,101	-	2,045,442	2,045,000
5	Total Treatment					4,910,038	4,909,000
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
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System		Allocation		Allocated Investment	
		Investment				Investment (a)	Rounded (a)
		\$				\$	\$
15	LTCP Infrastructure Investment	133,492,000		0.79320%		1,058,859	1,059,000
16	Total Allocated System Investment					6,735,495	6,736,000

(a) Plant Investment as of 6/30/2020. 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 2022

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		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	8.0027	49,697	-	397,710	398,000
2	Capacity	Mcf/day	1,567.5360	167	-	261,779	262,000
3	SS	1,000 lbs	468.8867	204	-	95,653	96,000
4	BOD	1,000 lbs	443.8707	156	-	69,244	69,000
5	Total Treatment					824,386	825,000
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					1,155,633	1,156,000

(a) Plant Investment as of 6/30/2020. 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 2022

Line No.	Cost Component	(1)	(2)	(3)	(4)	(5)	(6)
		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	6.9094	846,145	-	5,846,354	5,846,000
2	Capacity	Mcf/day	411.2312	3,094	-	1,272,349	1,272,000
3	SS	1,000 lbs	484.3270	7,422	-	3,594,433	3,594,000
4	BOD	1,000 lbs	659.6072	6,841	-	4,512,373	4,512,000
5	Total Treatment					15,225,509	15,224,000
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
Long Term Control Plan (LTCP)							
Line No.	Cost Component	System Investment	Allocation			Allocated Investment (a)	Allocated Investment Rounded (a)
		\$				\$	\$
8	LTCP Infrastructure Investment	133,492,000	0.00%			-	-
9	Total Allocated System Investment					15,948,094	15,947,000

(a) Plant Investment as of 6/30/2020. 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 2022

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	6,000	61,250 Mcf	0.0980
2	Total Capacity	165,500	370 Mcf/day	447.2973
Central Schuylkill Pumping Station				
	Retail and Springfield (excl. Wyndmoor)			
3	Total Volume	41,000	3,425,000 Mcf	0.0120
4	Total Capacity	527,000	22,110 Mcf/day	23.8354
WATER POLLUTION CONTROL PLANTS				
Northeast Plant				
	Retail and Cheltenham			
5	Volume	-	NA Mcf	-
6	Capacity	-	NA Mcf/day	-
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton			
7	Volume	461,000	6,807,000 Mcf	0.0677
8	Capacity	2,482,000	42,660 Mcf/day	58.1810
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton			
9	Volume	11,485,000	9,198,000 Mcf	1.2486
10	Capacity	4,164,000	57,651 Mcf/day	72.2277
11	Suspended Solids	21,802,000	110,146 1,000 lbs	197.9373
12	BOD	17,113,000	75,683 1,000 lbs	226.1142
Southwest Plant:				
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby			
13	Volume	12,687,000	8,544,000 Mcf	1.4849
14	Capacity	4,828,000	53,552 Mcf/day	90.1554
15	Suspended Solids	17,238,101	81,327 1,000 lbs	211.9604
16	BOD	11,384,000	54,680 1,000 lbs	208.1931
Southeast Plant:				
	Retail and Springfield (Wyndmoor)			
17	Volume	8,809,000	4,055,000 Mcf	2.1724
18	Capacity	5,427,000	25,416 Mcf/day	213.5269
19	Suspended Solids	11,217,000	34,862 1,000 lbs	321.7543
20	BOD	3,809,000	28,423 1,000 lbs	134.0112

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 2022**

		(1)	(2)	(3)	(4)	(5)
Collection System:						
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 490,000	x 3.90%	\$ 19,110	\$ -	\$ 19,110
Treatment:						
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$		\$	\$	\$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.0677	\$/Mcf 98,500 Mcf	6,668	-	6,668
3	Capacity	58.1810	\$/Mcf/day 844 Mcf/day	49,105	-	49,105
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.2486	\$/Mcf 98,500 Mcf	122,987	-	122,987
5	Capacity	72.2277	\$/Mcf/day 844 Mcf/day	60,960	-	60,960
6	Suspended Solids	197.9373	\$/1,000 lbs 940 1,000 lbs	186,061	-	186,061
7	BOD	226.1142	\$/1,000 lbs 1,403 1,000 lbs	317,238	-	317,238
8	Customer Costs			13,800	-	13,800
9	Total Treatment			775,929	-	775,929
Long Term Control Plan (LTCP)						
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
10	Amortization of SMIP/GARP Expenses (b)	\$ 5,683,453	0.58244%	\$ 33,102	\$ -	\$ 33,102
11	LTCP O&M Costs	4,672,220	0.58244%	27,213	-	27,213
12	Total Annual Operating Expense			836,244	-	836,244
13	Total - Rounded			836,000		836,000

(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 2022**

	(1)	(2)	(3)	(4)	(5)
Collection System:					
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 1,110,000 x 3.90%		\$ 43,290	\$ 43,290
Treatment:					
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Total Adjusted Operating Expense
		\$		\$	\$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
2	Volume	0.0677 \$/Mcf	175,600 Mcf	11,888	11,888
3	Capacity	58.1810 \$/Mcf/day	1,034 Mcf/day	60,159	60,159
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
4	Volume	1.2486 \$/Mcf	175,600 Mcf	219,254	219,254
5	Capacity	72.2277 \$/Mcf/day	1,034 Mcf/day	74,683	74,683
6	Suspended Solids	197.9373 \$/1,000 lbs	1,624 1,000 lbs	321,450	321,450
7	BOD	226.1142 \$/1,000 lbs	1,653 1,000 lbs	373,767	373,767
8	Customer Costs			49,400	49,400
9	Total Treatment			1,153,891	1,153,891
Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Total Adjusted Operating Expense
		\$		\$	\$
10	Amortization of SMIP/GARP Expenses (b)	5,683,453	0.00000%	-	-
11	LTCP O&M Costs	4,672,220	0.00000%	-	-
12	Total			1,153,891	1,153,891
13	Total - Rounded			1,154,000	1,154,000

(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 2022**

	(1)	(2)	(3)	(4)	(5)
Collection System:					
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 1,566,000 x 3.90%		\$ 61,074	\$ 61,074
Treatment:					
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Total Adjusted Operating Expense
		\$		\$	\$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
2	Volume	0.0677 \$/Mcf	1,035,100 Mcf	70,076	70,076
3	Capacity	58.1810 \$/Mcf/day	6,556 Mcf/day	381,435	381,435
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
4	Volume	1.2486 \$/Mcf	1,035,100 Mcf	1,292,426	1,292,426
5	Capacity	72.2277 \$/Mcf/day	6,556 Mcf/day	473,525	473,525
6	Suspended Solids	197.9373 \$/1,000 lbs	11,053 1,000 lbs	2,187,801	2,187,801
7	BOD	226.1142 \$/1,000 lbs	10,522 1,000 lbs	2,379,174	2,379,174
8	Customer Costs			16,200	16,200
9	Total Treatment			6,861,711	6,861,711
Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Total Adjusted Operating Expense
		\$		\$	\$
10	Amortization of SMIP/GARP Expenses (b)	5,683,453	0.00000%	-	-
11	LTCP O&M Costs	4,672,220	0.00000%	-	-
12	Total			6,861,711	6,861,711
13	Total - Rounded			6,862,000	6,862,000

(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 2022**

Collection System:						
Line No.	Cost Component	(1) Allocated Investment	(2)	(3) Allocated Operating Expense	(4) Adjustment for Contract	(5) Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 522,000	x 3.90%	\$ 20,358	\$ -	\$ 20,358
Treatment:						
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton	\$		\$	\$	\$
2	Volume	0.0677 \$/Mcf	NA Mcf	-	-	-
3	Capacity	58.1810 \$/Mcf/day	NA Mcf/day	-	-	-
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.2486 \$/Mcf	465,000 Mcf	580,599	-	580,599
5	Capacity	72.2277 \$/Mcf/day	2,803 Mcf/day	202,454	-	202,454
6	Suspended Solids	197.9373 \$/1,000 lbs	3,466 1,000 lbs	686,051	-	686,051
7	BOD	226.1142 \$/1,000 lbs	3,009 1,000 lbs	680,378	-	680,378
8	Customer Costs			33,700	-	33,700
9	Total Treatment			2,203,540	-	2,203,540
Long Term Control Plan (LTCP):						
Line No.	Cost Component	System Annual Cost	Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
	LTCP O&M Costs	\$		\$	\$	\$
10	Amortization of SMIP/GARP Expenses (b)	5,683,453	2.42801%	137,995		137,995
11	LTCP O&M	4,672,220	2.42801%	113,442		113,442
12	Total			2,454,977	-	2,454,977
13	Total - Rounded			2,455,000		2,455,000

(a) Based on investment in sewers serving Cheltenham.

(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 - 22
OPERATING EXPENSE
ALLOCATED TO
DELCORA
Fiscal Year 2022

		(1)	(2)	(3)	(4)	(5)
Treatment:						
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$		\$	\$	\$
	SW Treatment Plant: Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
1	Volume	1.4849 \$/Mcf	1,200,000 Mcf	1,781,880	-	1,781,880
2	Capacity	90.1554 \$/Mcf/day	13,392 Mcf/day	1,207,361	-	1,207,361
3	Suspended Solids	211.9604 \$/1,000 lbs	13,000 1,000 lbs	2,755,485	-	2,755,485
4	BOD	208.1931 \$/1,000 lbs	10,500 1,000 lbs	2,186,028	-	2,186,028
5	Customer Costs			43,000	-	43,000
6	Total Treatment			7,973,754	-	7,973,754
Long Term Control Plan (LTCP):						
Line No.	Cost Component	System Annual Cost	Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$		\$	\$	\$
	LTCP O&M Costs					
7	Amortization of SMIP/GARP Expenses (a)	5,683,453	9.44287%	536,681		536,681
8	LTCP O&M	4,672,220	9.44287%	441,192	-	441,192
9	Total Annual Operating Expense			8,951,627		8,951,627
10	Total - Rounded			8,952,000		8,952,000

(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 2022**

		(1)	(2)	(3)	(4)	(5)	
Collection System:							
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense	
1	Sewer Maintenance (a)	\$ 1,808,000	x 3.90%	\$ 70,512	\$ -	\$ 70,512	
Treatment:							
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$			\$	\$	\$
	Neill Drive Pump Station						
	Retail and Lower Merion						
2	Volume	0.0980	\$/Mcf	14,300 Mcf	1,401	-	1,401
3	Capacity	447.2973	\$/Mcf/day	115 Mcf/day	51,439	-	51,439
	SW Treatment Plants:						
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby						
4	Volume	1.4849	\$/Mcf	364,900 Mcf	541,840	-	541,840
5	Capacity	90.1554	\$/Mcf/day	2,788 Mcf/day	251,353	-	251,353
6	Suspended Solids	211.9604	\$/1,000 lbs	3,665 1,000 lbs	776,835	-	776,835
7	BOD	208.1931	\$/1,000 lbs	3,109 1,000 lbs	647,272	-	647,272
8	Customer Costs				53,900	-	53,900
9	Total Treatment				2,394,552	-	2,394,552
Long Term Control Plan (LTCP):							
Line No.	Cost Component	System Annual Cost		Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$			\$	\$	\$
	LTCP O&M Costs						
10	Amortization of SMIP/GARP Expenses (a)	5,683,453		0.00000%	-	-	-
11	LTCP O&M	4,672,220		0.00000%	-	-	-
12	Total Annual Operating Expense				2,394,552	-	2,394,552
13	Total - Rounded				2,395,000		2,395,000
(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 2022**

	(1)	(2)	(3)	(4)	(5)
Collection System:					
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 705,000 x 3.90%		\$ 27,495	\$ 27,495
Treatment:					
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Total Adjusted Operating Expense
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
2	Volume	0.0677 \$/Mcf	67,800 Mcf	4,590	4,590
3	Capacity	58.1810 \$/Mcf/day	518 Mcf/day	30,138	30,138
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
4	Volume	1.2486 \$/Mcf	67,800 Mcf	84,655	84,655
5	Capacity	72.2277 \$/Mcf/day	518 Mcf/day	37,414	37,414
6	Suspended Solids	197.9373 \$/1,000 lbs	672 1,000 lbs	133,014	133,014
7	BOD	226.1142 \$/1,000 lbs	502 1,000 lbs	113,509	113,509
8	Customer Costs			20,700	20,700
9	Total Treatment			451,515	451,515
Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Total Adjusted Operating Expense
10	Amortization of SMIP/GARP Expenses (b)	\$ 5,683,453	0.35883%	\$ 20,394	\$ 20,394
11	LTCP O&M Costs	4,672,220	0.35883%	16,765	16,765
12	Total Annual Operating Expense			488,674	488,674
13	Total - Rounded			489,000	489,000

(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 2022**

		(1)	(2)	(3)	(4)	(5)	
Collection System:							
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense	
1	Sewer Maintenance (a)	\$ 10,220,000	x 3.90%	\$ 398,580	\$ -	\$ 398,580	
Treatment:							
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$			\$	\$	\$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton						
2	Volume	0.0677	\$/Mcf	317,500 Mcf	21,495	-	21,495
3	Capacity	58.1810	\$/Mcf/day	1,394 Mcf/day	81,104	-	81,104
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton						
4	Volume	1.2486	\$/Mcf	317,500 Mcf	396,431	-	396,431
5	Capacity	72.2277	\$/Mcf/day	1,394 Mcf/day	100,685	-	100,685
6	Suspended Solids	197.9373	\$/1,000 lbs	2,533 1,000 lbs	501,375	-	501,375
7	BOD	226.1142	\$/1,000 lbs	1,845 1,000 lbs	417,181	-	417,181
8	Customer Costs				16,200	-	16,200
9	Total Treatment				1,933,051	-	1,933,051
Long Term Control Plan (LTCP):							
Line No.	LTCP O&M Costs	System Annual Cost		Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$			\$	\$	\$
10	Amortization of SMIP/GARP Expenses (b)	5,683,453		0.96317%	54,741		54,741
11	LTCP O&M Costs	4,672,220		0.96317%	45,002		45,002
12	Total Annual Operating Expense				2,032,794		2,032,794
13	Total - Rounded				2,033,000		2,033,000

(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 2022

	(1)	(2)	(3)	(4)	(5)
Collection System:					
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 768,000 x 3.90%		\$ 29,952	\$ 29,952
Treatment:					
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Total Adjusted Operating Expense
	Central Schuylkill Pump Station				
	Retail and Springfield (excluding Wyndmoor)				
2	Volume	0.0120 \$/Mcf	117,200 Mcf	1,406	1,406
3	Capacity	23.8354 \$/Mcf/day	407 Mcf/day	9,701	9,701
	SW Treatment Plants:				
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby				
4	Volume	1.4849 \$/Mcf	117,200 Mcf	174,030	174,030
5	Capacity	90.1554 \$/Mcf/day	407 Mcf/day	36,693	36,693
6	Suspended Solids	211.9604 \$/1,000 lbs	2,510 1,000 lbs	532,021	532,021
7	BOD	208.1931 \$/1,000 lbs	2,301 1,000 lbs	479,052	479,052
8	Customer Costs			27,200	27,200
9	Total Treatment			1,290,055	1,290,055
Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Total Adjusted Operating Expense
10	Amortization of SMIP/GARP Expenses (b)	\$ 5,683,453	0.79320%	45,081	45,081
11	LTCP O&M Costs	4,672,220	0.79320%	37,060	37,060
12	Total Annual Operating Expense			1,372,196	1,372,196
13	Total - Rounded			1,372,000	1,372,000

(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 2022

		(1)	(2)	(3)	(4)	(5)
Collection System:						
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 331,000	x 3.90%	\$ 12,909	\$ -	\$ 12,909
Treatment:						
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
		\$		\$	\$	\$
	SE Treatment Plants:					
	Retail, Springfield (Wyndmoor)					
2	Volume	2.1724 \$/Mcf	20,900 Mcf	45,403	-	45,403
3	Capacity	213.5269 \$/Mcf/day	167 Mcf/day	35,659	-	35,659
4	Suspended Solids	321.7543 \$/1,000 lbs	224 1,000 lbs	72,073	-	72,073
5	BOD	134.0112 \$/1,000 lbs	171 1,000 lbs	22,916	-	22,916
6	Customer Costs			7,700	-	7,700
7	Total			196,660	-	196,660
8	Total - Rounded			197,000		197,000

(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 2022

	(1)	(2)	(3)	(4)	(5)	
Collection System:						
Line No.	Cost Component	Allocated Investment		Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
1	Sewer Maintenance (a)	\$ 723,000	x 3.90%	\$ 28,197	\$ -	\$ 28,197
Treatment:						
Line No.	Cost Component	Operating Expense Per Unit	Test Yr. No. of Units	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
	SW Treatment Plants: Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby	\$		\$	\$	\$
2	Volume	1.4849 \$/Mcf	516,600 Mcf	767,099	-	767,099
3	Capacity	90.1554 \$/Mcf/day	3,094 Mcf/day	278,941	-	278,941
4	Suspended Solids	211.9604 \$/1,000 lbs	4,873 1,000 lbs	1,032,883	-	1,032,883
5	BOD	208.1931 \$/1,000 lbs	4,110 1,000 lbs	855,674	-	855,674
6	Customer Costs			13,800	-	13,800
7	Total Treatment			2,976,594	-	2,976,594
Long Term Control Plan (LTCP):						
Line No.	LTCP O&M Costs	System Annual Cost	Allocation	Allocated Operating Expense	Adjustment for Contract	Total Adjusted Operating Expense
8	Amortization of SMIP/GARP Expenses (b)	\$ 5,683,453	0.000000%	-	-	-
9	LTCP O&M Costs	4,672,220	0.000000%	-	-	-
10	Total Annual Operating Expense			2,976,594	-	2,976,594
11	Total - Rounded			2,977,000		2,977,000

(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 2022

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	6,295,000	6,279,000	836,000	150,635	472,125	1,458,760
2	Bensalem	9,836,000	9,809,000	1,154,000	(a)	(a)	1,154,000
3	Bucks County (b)	32,396,000	32,299,000	6,862,000	204,625	614,025	7,680,650
4	Cheltenham	16,946,000	16,905,000	2,455,000	403,810	1,270,950	4,129,760
5	DELCORA (c)	58,768,000	58,629,000	8,952,000	392,865	1,366,425	10,711,290
6	Lower Merion	16,028,000	15,985,000	2,395,000	(a)	(a)	2,395,000
7	Lower Moreland	3,335,000	3,328,000	489,000	77,280	250,125	816,405
8	Lower Southampton (d)	22,143,000	22,110,000	2,033,000	440,195	1,476,200	3,949,395
9	Springfield (less Wyndmoor)	6,736,000	6,722,000	1,372,000	159,225	505,200	2,036,425
10	Springfield (Wyndmoor)	1,156,000	1,155,000	197,000	27,220	86,700	310,920
11	Upper Darby	15,947,000	15,901,000	2,977,000	(a)	(a)	2,977,000
12	Total	\$ 189,586,000	\$ 189,122,000	\$ 29,722,000	\$ 1,855,855	\$ 6,041,750	\$ 37,619,605

(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 over 18 years starting in FY 2007.

TABLE WH - 29A
WASTEWATER WHOLESALE: SUMMARY OF ALLOCATED COST OF SERVICE
FOR CONTRACT CUSTOMERS
Test Year 2023

Line No.	Customer	(1)	(2)	(3)	(4)	(5)	(6)
		Allocated Investment (a)	Allocated Depreciable Investment (a)	O&M Expense	Depreciation Expense	Return on Investment	Allocated Cost of Service
		\$	\$	\$	\$	\$	\$
1	Abington	6,295,000	6,279,000	856,000	150,635	472,125	1,478,760
2	Bensalem	9,836,000	9,809,000	1,183,000	(a)	(a)	1,183,000
3	Bucks County (b)	32,396,000	32,299,000	7,034,000	204,625	614,025	7,852,650
4	Cheltenham	16,946,000	16,905,000	2,510,000	403,810	1,270,950	4,184,760
5	DELCORA (c)	58,768,000	58,629,000	9,131,000	392,865	1,366,425	10,890,290
6	Lower Merion	16,028,000	15,985,000	2,451,000	(a)	(a)	2,451,000
7	Lower Moreland	3,335,000	3,328,000	500,000	77,280	250,125	827,405
8	Lower Southampton (d)	22,143,000	22,110,000	2,091,000	467,708	1,568,462	4,127,170
9	Springfield (less Wyndmoor)	6,736,000	6,722,000	1,402,000	159,225	505,200	2,066,425
10	Springfield (Wyndmoor)	1,156,000	1,155,000	201,000	27,220	86,700	314,920
11	Upper Darby	15,947,000	15,901,000	3,045,000	(a)	(a)	3,045,000
12	Total	\$ 189,586,000	\$ 189,122,000	\$ 30,404,000	\$ 1,883,368	\$ 6,134,012	\$ 38,421,380

(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 over 18 years starting in FY 2007.

TABLE WH - 30
WASTEWATER WHOLESALE: SUMMARY OF TEST YEAR CHARGES
FOR WHOLESALE CONTRACT CUSTOMERS
Test Year 2022

Line No.	Customer	(1)	(2)	(3)	(4)	(5)
		Annual Lump Sum	Volume	Capacity (a)	Unit Costs Suspended Solids	BOD
		\$	\$/Mcf	\$/cfs	\$/1,000 lbs	\$/1,000 lbs
1	Abington	716,000	1.36	11,512	200.99	226.64
2	Bensalem	92,000	1.36	11,512	200.99	226.64
3	Bucks County (b)	896,000	1.36	11,512	200.99	226.64
4	Cheltenham	1,981,000	1.29	6,376	200.99	226.64
5	Lower Moreland	413,000	1.36	11,512	200.99	226.64
6	Lower Southampton	2,430,000	1.36	11,512	200.99	226.64
7	DELCORA	2,780,000	1.48	7,789	211.96	208.19
8	Lower Merion (c)(d)	124,000	1.54	7,967	214.84	208.63
9	Springfield (less Wyndmoor)	803,000	1.55	10,078	214.84	208.63
10	Upper Darby	42,000	1.54	7,967	214.84	208.63
11	Springfield (Wyndmoor)	135,000	2.27	18,449	327.60	134.80
12	Total	10,412,000				

(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 \$0.1022 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 \$457.14 per Mcf/day (\$39,496 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 - 30A
WASTEWATER WHOLESALE: SUMMARY OF TEST YEAR CHARGES
FOR WHOLESALE CONTRACT CUSTOMERS
Test Year 2023

Line No.	Customer	(1)	(2)	(3)	(4)	(5)
		Annual Lump Sum	Volume	Capacity (a)	Unit Costs Suspended Solids	BOD
		\$	\$/Mcf	\$/cfs	\$/1,000 lbs	\$/1,000 lbs
1	Abington	717,000	1.39	11,774	205.83	232.90
2	Bensalem	95,000	1.39	11,774	205.83	232.90
3	Bucks County (b)	899,000	1.39	11,774	205.83	232.90
4	Cheltenham	1,982,000	1.32	6,541	205.83	232.90
5	Lower Moreland	414,000	1.39	11,774	205.83	232.90
6	Lower Southampton	2,571,000	1.39	11,774	205.83	232.90
7	DELCORA	2,780,000	1.52	7,945	216.73	213.29
8	Lower Merion (c)(d)	128,000	1.57	8,126	219.67	213.74
9	Springfield (less Wyndmoor)	804,000	1.58	10,330	219.67	213.74
10	Upper Darby	44,000	1.57	8,126	219.67	213.74
11	Springfield (Wyndmoor)	136,000	2.32	18,883	335.11	138.55
12	Total	10,570,000				

(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 \$0.1022 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 \$474.81 per Mcf/day (\$41,024 per cfs) is applicable to costs related to Neill Drive Pump Station.

Mcf - Thousand cubic feet

cfs - cubic feet per second

lbs - pounds

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-3

Dated: January 15, 2021

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Schedule REF #		Schedule Name
BV-3 Black & Veatch Schedules		
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/IA MANAGEMENT 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

Schedule REF #		Schedule Name
BV-3 Black & Veatch Schedules		
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
20	TABLE SW-19B	STORMWATER: PROPOSED RATES FOR NON-RESIDENTIAL SERVICES

**TABLE SW-1: NON-RESIDENTIAL
MEAN GROSS AREA & IMPERVIOUS AREA (SF)**

Line No.	Description	FY 2022 MEAN GA	FY 2022 MEAN IA
1	All Residential Parcels	2,110	1,200
Non-Residential Sub-Classes			
Non-Discount			
2	Water & Sewer	29,248	16,276
3	SW Only	8,389	2,529
Discount: Senior, Education & Charities			
4	Water & Sewer	92,585	50,403
5	SW Only	28,547	15,134
Discount: PHA			
6	Water & Sewer	55,534	30,008
7	SW Only	2,003	697
Condominiums Sub-Classes			
Non-Discount			
8	Water & Sewer	16,323	11,787
9	SW Only	23,969	4,343
Discount: Senior, Education & Charities			
10	Water & Sewer	40,187	19,046
11	SW Only	-	-
Discount: PHA			
12	Water & Sewer	9,358	6,158
13	SW Only	-	-

FY 2022 Mean GA and Mean IA is based on fully transitioned stormwater parcel data. This dataset is based on 2015 aerial and infrared imagery obtained by the City of Philadelphia.

TABLE SW-2: DETERMINATION OF BILLABLE PARCELS

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Residential							
1	Initial Parcel Count	462,670	462,670	462,670	462,670	462,670	462,670
2	Less Residential Zero Rate ¹	0	0	0	1	1	1
3	Subtotal Residential	462,670	462,670	462,670	462,669	462,669	462,669
Non-Residential							
4	Initial Parcel Count	73,274	73,274	73,274	73,274	73,274	73,274
5	Less Non-Residential Zero Rate ²	17	34	51	67	84	101
6	Subtotal Non Residential	73,257	73,240	73,223	73,207	73,190	73,173
Condominium							
7	Initial Parcel Count	2,181	2,181	2,181	2,181	2,181	2,181
8	Less Stormwater Appeals Adjustments	-	-	-	-	-	-
9	Subtotal Condominium	2,181	2,181	2,181	2,181	2,181	2,181
10	TOTAL: System Billable Parcels	538,108	538,091	538,074	538,057	538,040	538,023

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens under Non-Residential Category

TABLE SW-3: DETERMINATION OF BILLABLE GROSS AREA (sf)

Line		Fiscal Year Ending June 30,					
No.	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Residential							
1	Initial GA	974,645,692	976,233,700	976,233,700	976,233,700	976,233,700	976,233,700
2	Less Residential Zero Rate ¹	960	1,920	2,880	3,840	4,800	5,759
3	Subtotal Residential Billable GA (sf)	974,644,732	976,231,780	976,230,820	976,229,860	976,228,900	976,227,941
Non-Residential							
4	Initial GA	1,434,043,363	1,434,043,363	1,434,043,363	1,434,043,363	1,434,043,363	1,434,043,363
5	Less Credits Adjustments	333,652,223	349,030,078	362,959,123	377,643,039	392,220,280	406,695,437
6	Less Stormwater Appeals	736,680	1,214,645	1,433,895	1,433,895	1,433,895	1,433,895
7	Less Non-Residential Zero Rate ²	192,493	384,986	577,479	769,972	962,465	1,154,959
8	Subtotal Non Residential Billable GA (sf)	1,099,461,967	1,083,413,654	1,069,072,866	1,054,196,457	1,039,426,723	1,024,759,073
Condominium							
9	Initial GA	36,978,430	36,978,625	36,978,625	36,978,625	36,978,625	36,978,625
10	Less Credits Adjustments	7,929,037	8,294,482	8,625,497	8,974,451	9,320,870	9,664,863
11	Subtotal Condominium Billable GA (sf)	29,049,393	28,684,143	28,353,128	28,004,174	27,657,755	27,313,762
12	TOTAL: System Billable GA (sf)	2,103,156,092	2,088,329,577	2,073,656,814	2,058,430,491	2,043,313,378	2,028,300,775

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens in the Non-Residential Category.

TABLE SW-4: DETERMINATION OF BILLABLE IMPERVIOUS AREA (sf)

Line		Fiscal Year Ending June 30,					
No.	Description	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Residential							
1	Initial IA	553,519,482	555,204,000	555,204,000	555,204,000	555,204,000	555,204,000
2	Less Residential Zero Rate ¹	229	458	688	917	1,146	1,375
3	Subtotal Residential Billable IA (sf)	553,519,253	555,203,542	555,203,312	555,203,083	555,202,854	555,202,625
Non-Residential							
4	Initial IA	705,472,945	718,061,929	718,061,929	718,061,929	718,061,929	718,061,929
5	Less Credits Adjustments	103,766,823	110,902,348	116,617,462	123,072,650	129,423,273	135,673,776
6	Less Stormwater Appeals	649,320	1,070,605	1,263,855	1,263,855	1,263,855	1,263,855
7	Less Non-Residential Zero Rate ²	7,484	14,968	22,451	29,935	37,419	44,903
8	Subtotal Non Residential Billable IA (sf)	601,049,319	606,074,009	600,158,161	593,695,489	587,337,382	581,079,396
Condominium							
9	Initial IA	25,191,458	25,634,891	25,634,891	25,634,891	25,634,891	25,634,891
10	Less Credits Adjustments	4,589,907	4,905,532	5,158,328	5,443,860	5,724,767	6,001,244
11	Subtotal Condominium Billable IA (sf)	20,601,551	20,729,359	20,476,563	20,191,031	19,910,124	19,633,647
12	TOTAL: System Billable IA (sf)	1,175,170,122	1,182,006,909	1,175,838,036	1,169,089,603	1,162,450,360	1,155,915,667

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens in the Non-Residential Category.

TABLE SW-5: CREDITS PROJECTIONS

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
Parcels (#)							
1	IAR Practices	674	733	791	850	908	966
2	GA/IA Management Practices ¹	1,167	1,209	1,251	1,293	1,335	1,377
3	SMIP/GARP	155	195	219	239	259	279
4	Subtotal	1,996	2,137	2,261	2,382	2,502	2,622
Impervious Area (sf)							
5	IAR Practices	6,158,347	6,785,533	7,412,719	8,039,905	8,667,091	9,294,277
6	GA/IA Management Practices ¹	84,271,824	87,551,053	90,830,282	94,109,511	97,388,740	100,667,969
7	SMIP/GARP	17,926,557	21,471,296	23,532,788	26,367,092	29,092,206	31,712,776
8	Subtotal	108,356,728	115,807,882	121,775,789	128,516,508	135,148,037	141,675,022
Gross Area (sf)							
9	IAR Practices	-	-	-	-	-	-
10	GA/IA Management Practices ¹	316,265,439	328,464,004	340,662,569	352,861,134	365,059,699	377,258,264
11	SMIP/GARP	25,315,813	28,860,552	30,922,044	33,756,348	36,481,462	39,102,032
12	Subtotal	341,581,252	357,324,556	371,584,613	386,617,482	401,541,161	416,360,296

Notes

1: GA/IA Management Practices Credits include Surface and Non-Surface Discharge credits for IA managed and open space. Refer to Table SW-11 for additional information.

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

Line No.	Description	2021	2022	2023	2024	2025	2026
1	Annual Grant Budget (a)	\$ 15,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000	\$ 25,000,000
2	PIDC Annual Administration Fee (b)	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
3	Service Fee % (c)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
4	PIDC Estimated Service Fee Cost (Line 1 - Line 2) X Line 3	\$ 298,000	\$ 498,000	\$ 498,000	\$ 498,000	\$ 498,000	\$ 498,000
5	TOTAL PIDC SMIP/GARP FEE (Line 2 + Line 4)	\$ 398,000	\$ 598,000	\$ 598,000	\$ 598,000	\$ 598,000	\$ 598,000
6	Available Award Amount (Line 1 - Line 5)	\$ 14,602,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000

Notes:

(a) Amount available in each fiscal year for new "Greened Acres" after accounting for amendments to previously awarded projects.

(b) Annual Administration Fee for SMIP/GARP Program is \$100K. Paid to PIDC each fiscal year.

(c) Service Fee is calculated as 2% of annual grant budget less the annual administration fee paid to PIDC.

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

Line No.	Description	2021	2022	2023	2024	2025	2026
INPUT PARAMETERS							
1	Available Award Amount (a)	\$ 14,602,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000
2	\$/Greened Acre	\$ 192,400	\$ 200,096	\$ 208,100	\$ 216,424	\$ 225,081	\$ 234,084
3	% of Award Amount	100%	100%	100%	100%	100%	100%
4	Acre conversion to square feet	43,560	43,560	43,560	43,560	43,560	43,560
5	Runoff Depth Managed per Greened Acre (inches)	1.5	1.5	1.5	1.5	1.5	1.5
Stormwater GA/IA Managed Area Projections - Anticipated Awards							
Anticipated SMIP/ GARP Projects (b)							
6	Anticipated Award Amount (Line 1 x Line 4)	\$ 14,602,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000	\$ 24,402,000
7	Greened Acres (Line 6 / Line 2)	75.9	122.0	117.3	112.8	108.4	104.2
8	Gross Area to be Managed (sf)	2,204,136	3,542,880	3,406,392	3,275,712	3,147,936	3,025,968
9	Impervious Area to be Managed (sf)	2,204,136	3,542,880	3,406,392	3,275,712	3,147,936	3,025,968
Annual Totals							
10	GA to be Managed (sf)	2,204,136	3,542,880	3,406,392	3,275,712	3,147,936	3,025,968
11	IA to be Managed (sf)	2,204,136	3,542,880	3,406,392	3,275,712	3,147,936	3,025,968
12	Total Greened Acres	75.9	122.0	117.3	112.8	108.4	104.2

Notes:

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

(b) Anticipated SMIP/GARP projects with a cost (\$185,000 in FY 2020 and escalated at 4% thereafter) per greened acre and with a 24 months average project completion time.

TABLE SW-8: SMIP/GARP PROGRAM AS-BUILT & VERIFIED PROJECT PROJECTIONS
As-Built & Verified Projections

Line No.	Description	2021	2022	2023	2024	2025	2026
Awarded Projects Pre-FY2021 (a)		14	20	4			
1	Greened Acres	105.9	152.6	12.8			
2	Gross Area Managed (sf)	3,076,591	4,430,923	372,728			
3	Impervious Area Managed (sf)	3,076,591	4,430,923	372,728			
Estimated Awarded Projects Post FY2021							
Anticipated New Projects (b)							
4	Greened Acres	-	-	75.9	122.0	117.3	112.8
5	Gross Area Managed (sf)	-	-	2,204,136	3,542,880	3,406,392	3,275,712
6	Impervious Area Managed (sf)	-	-	2,204,136	3,542,880	3,406,392	3,275,712
Annual Totals							
7	Greened Acres (Line 1 + Line 4 + Line 7)	105.9	152.6	88.7	122.0	117.3	112.8
8	Gross Area Managed (sf)	3,076,591	4,430,923	2,576,864	3,542,880	3,406,392	3,275,712
9	Impervious Area Managed (sf)	3,076,591	4,430,923	2,576,864	3,542,880	3,406,392	3,275,712
10	Cummulative Greened Acres	105.9	258.5	347.3	469.3	586.6	699.4

Notes:

(a) Completed Greened Acres based upon actuals from PWD's SMIP/GARP Grant Tracking.

FY2020 - FY 2023 estimated based upon projects awarded prior to FY21 but not yet completed/verified.

(b) From Table SW-7: SMIP/GARP Program - Project Projections. Projects are expected to be completed and verified within 24 months.

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

Line No.	Description	2021	2022	2023	2024	2025	2026
INPUT PARAMETERS							
1	% of GA and IA Credits (a)	80%	80%	80%	80%	80%	80%
Annual Total Credits							
2	GA Managed Credit (sf) (Line 1 X Table SW-8: Line 8)	2,461,273	3,544,739	2,061,492	2,834,304	2,725,114	2,620,570
3	IA Managed Credit (sf) (Line 1 X Table SW-8: Line 9)	2,461,273	3,544,739	2,061,492	2,834,304	2,725,114	2,620,570
Cumulative Total Credits							
4	GA Managed Credit (sf)	2,461,273	6,006,012	8,067,504	10,901,808	13,626,922	16,247,492
5	IA Managed Credit (sf)	2,461,273	6,006,012	8,067,504	10,901,808	13,626,922	16,247,492

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

Line		Fiscal Year Ending June 30,					
No.	Customer Type	2021	2022	2023	2024	2025	2026
Section A: Number of Billable Parcels (Projected)							
1	Residential	462,670	462,670	462,670	462,669	462,669	462,669
2	Non-Residential	73,257	73,240	73,223	73,207	73,190	73,173
3	Condominium	2,181	2,181	2,181	2,181	2,181	2,181
4	Total: Number of Billable Parcels	538,108	538,091	538,074	538,057	538,040	538,023
Section B: Billable Gross Area (Projected - sf)							
5	Residential	974,644,732	976,231,780	976,230,820	976,229,860	976,228,900	976,227,941
6	Non-Residential	1,099,461,967	1,083,413,654	1,069,072,866	1,054,196,457	1,039,426,723	1,024,759,073
7	Condominium	29,049,393	28,684,143	28,353,128	28,004,174	27,657,755	27,313,762
8	Total: Billable Gross Area	2,103,156,092	2,088,329,577	2,073,656,814	2,058,430,491	2,043,313,378	2,028,300,775
Section C: Billable Impervious Area (Projected - sf)							
9	Residential	553,519,253	555,203,542	555,203,312	555,203,083	555,202,854	555,202,625
10	Non-Residential	601,049,319	606,074,009	600,158,161	593,695,489	587,337,382	581,079,396
11	Condominium	20,601,551	20,729,359	20,476,563	20,191,031	19,910,124	19,633,647
12	Total: Billable Impervious Area	1,175,170,122	1,182,006,909	1,175,838,036	1,169,089,603	1,162,450,360	1,155,915,667

TABLE SW-11: GA/IA MANAGEMENT CREDIT PROJECTION FACTORS

Line No.	Description	Annual Increase in Parcels	Annual Average GA Credit	Annual Average IA Credit
Credit Type- IAR			(sf)	(sf)
1	Impervious Area Reduction	58		10,739
Credit Type-Non Surface Discharge			(sf)	(sf)
2	Area Managed	29	22,392	20,998
3	Open Space		84,619	
4	NPDES		0	
Credit Type			(sf)	(sf)
5	Area Managed	13	200,964	200,757
6	Open Space		495,567	
7	NPDES		6,213	1,540

Annual Increase in parcels is applied to the annual average IA and GA credit to project credits for the Study Period.

Annual Increase in parcels and the annual average IA and GA credit are based on 5-year average (FY 2015-FY 2019) historical data provided by PWD.

TABLE SW-12: PROJECTED NUMBER OF BILLABLE ACCOUNTS

Line No.	CUSTOMER TYPE	Fiscal Year Ending June 30,					
		FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
1	Residential	464,564	464,564	464,564	464,563	464,563	464,563
2	Non-Residential	80,448	80,431	80,414	80,398	80,381	80,364
3	Condominium	5,071	5,071	5,071	5,071	5,071	5,071
4	Total	550,083	550,066	550,049	550,032	550,015	549,998

TABLE SW-13: SUMMARY OF STORMWATER COSTS
(in thousands of dollars)
TEST YEAR FY 2022

Line No.	Cost Component	(1) Allocated Cost of	
		Service	
1	Billing & Collection Costs	\$	12,211
2	Impervious Area and Gross Area Costs <i>(Excluding CAP Costs)</i>		172,119
3	Total	\$	184,329

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

Line No.	DESCRIPTION	(1)		(2)		(3)	
		FY 2022		FY 2022		FY 2022	
		GA	IA	GA	IA	Total	
		20%	80%				
1	Annual Cost of Service (\$ 1000) from GA & IA (Excluding CAP)	\$	34,424	\$	137,695	\$	172,119
2	Stormwater Units of Service (500 Square Feet)		4,176,659		2,364,014		
3	System Annual Unit Cost (\$/500 Square Feet)		8.242		58.246		
4	System Monthly Unit Cost (\$/500 Square Feet)		0.687		4.854		

**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	(1)	(2)		(3)
		FY 2022			
		GA	IA	Total	
	RESIDENTIAL				
1	Residential Cost of Service (a)	\$ 16,091	\$ 64,676	\$ 80,767	
	NON-RESIDENTIAL				
2	Initial Non-Residential Cost of Service (b)	18,333	73,019	91,352	
3	Adjustment for CAP (c)	344	1,378	1,722	
4	Adjusted Non-Residential Cost of Service	18,677	74,397	93,074	
5	Total GA & IA Cost of Service	\$ 34,768	\$ 139,073	\$ 173,841	

(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	(1)	(2) FY 2022		(3)
		GA	IA	Total	
1	Residential Monthly GA & IA Charge (a)	\$ 2.90	\$ 11.65	\$ 14.55	
2	Non-Residential Monthly GA & IA Unit Cost (Adjusted for CAP)	0.700	4.946		
3	Impact of CAP on Non-Residential GA & IA Rate	0.013	0.092		

(a) Calculated based on Residential Mean GA (2,110 sf) and Mean IA (1,200 sf).

TABLE SW-17: STORMWATER BILLING and COLLECTION UNIT COSTS

Line No.	Description	Units	(1) FY 2022
1	Stormwater Billing & Collection Annual Revenue Requirements	\$	12,210,942
2	Monthly Billable Accounts: Residential	# Accounts	464,564
3	Non-Residential Cost Weighting Factor (a)		1.3
4	Weighted Monthly Billable Accounts: Non-Residential	# Accounts	111,153
5	Total Weighted Monthly Billable Accounts (Line 2+ Line 4)	# Accounts	575,717
6	Annual Billable Accounts: Residential (Line 2 x 12)	# Accounts	5,574,764
7	Weighted Annual Billable Accounts: Non-Residential (Line 4 x 12)	# Accounts	1,333,836
8	Total Weighted Annual Billable Accounts (Line 6 + Line 7)	# Accounts	6,908,600
9	Residential Billing & Collection Unit Cost per Billing Cycle	\$/Unit	1.77
10	Non-Residential Billing & Collection Unit Cost per Billing Cycle (Line 9 x Line 3)	\$/Unit	2.30

(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 FY 2022

		(1)	(2)	(3)	(4)	(5)
Line No.	Customer Class	Allocated Cost of Service (a)	Discounts	Adjusted Cost of Service with	Recovery of Discounts (b)	Adjusted Cost of Service
Residential						
1	Non-Discount	\$ 85,424,286	\$ -	\$ 85,424,286	\$ 1,786,262	\$ 87,210,548
2	Discount - Non-PHA	4,426,289	(1,106,572)	3,319,716	69,417	3,389,133
3	Discount - PHA	798,858	(39,943)	758,915	15,869	774,784
Non-Residential						
4	Non-Discount	79,847,872		79,847,872	1,669,657	81,517,529
5	Discount - Non-PHA	10,211,392	(2,552,848)	7,658,544	160,144	7,818,688
6	Discount - PHA	1,362,738	(68,137)	1,294,601	27,071	1,321,672
Condominiums						
7	Non-Discount	2,949,752		2,949,752	61,681	3,011,433
8	Discount - Non-PHA	96,335	(24,084)	72,251	1,511	73,762
9	Discount - PHA	916	(46)	870	18	888
10	Total	\$ 185,118,438	\$ (3,791,629)	\$ 181,326,808	\$ 3,791,629	\$ 185,118,438

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 FY 2022**

		(1)	(2)	(3)	(4)	(5)
Line No.	Service Type	Discount Recovery		Lag Factor		Proposed Rate
		Cost of Service Rate	Factor	Cost of Service Rate	Adjustment	
Billing & Collection Charge						
1	Residential	\$	1.77	1.021	\$	1.98
2	Non-Residential		2.30	1.021		2.57
3	Condominiums		2.30	1.021		2.57
IA/GA Charge						
4	Residential		14.55	1.021		16.27
	Non-Residential					
5	IA Charge		4.946	1.021		5.529
6	GA Charge		0.700	1.021		0.783
	Condominiums					
7	IA Charge		4.946	1.021		5.529
8	GA Charge	\$	0.700	1.021	\$	0.783

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

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

Line No.	Description	(1) FY 2022 Monthly Charge	(2) FY 2023 Monthly Charge
STORMWATER MANAGEMENT SERVICE CHARGE			
1	Charge Per Parcel	\$ 16.27	\$ 17.32
BILLING AND COLLECTION CHARGE			
2	Charge Per Bill	\$ 1.98	\$ 2.00

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

Line No.	Description	(1) FY 2022 Monthly Charge	(2) FY 2023 Monthly Charge
STORMWATER MANAGEMENT SERVICE CHARGE			
1	Min Charge	\$ 16.27	\$ 17.32
2	GA (per 500 sf)	0.783	0.833
3	IA (per 500 sf)	5.529	5.876
BILLING AND COLLECTION CHARGE			
4	Charge Per Bill	\$ 2.57	\$ 2.60

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-4

Dated: January 15, 2021

Schedule REF #		Schedule Name
BV-4 Black & Veatch Schedules		
1	TABLE M-1	Summary of Miscellaneous Charges (Regular Hours)
4	TABLE M-2	Summary of Miscellaneous Charges (Overtime Hours)

Philadelphia Water Department

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

Section 6- Miscellaneous Water Charges						
1	Meter Test Charges	6.1				
	3",4",6",8",10",12"	6.1 (e)	\$660.00	\$639.27	\$640.00	\$640.00
	Field Tests 3" and above	6.1 (e)	\$660.00	\$639.27	\$640.00	\$640.00
2	Charges for Furnishing and Installation of Water Meters	6.2				
a	Setting both Meter and Meter Interface Unit (MIU)	6.2 (a)				
	5/8"	6.2 (a)	\$250.00	\$252.79	\$255.00	\$255.00
	3/4 RFSS	6.2 (a)	\$430.00	\$430.97	\$435.00	\$435.00
	1"	6.2 (a)	\$425.00	\$425.99	\$430.00	\$430.00
	2" RFSS	6.2 (a)	\$965.00	\$967.94	\$970.00	\$970.00
	3" Compound	6.2 (a)	\$2,380.00	\$2,366.41	\$2,370.00	\$2,370.00
	3" Turbine	6.2 (a)	\$1,495.00	\$1,480.13	\$1,485.00	\$1,485.00
	3" Fire Series	6.2 (a)	\$3,380.00	\$3,367.59	\$3,370.00	\$3,370.00
	4" Compound	6.2 (a)	\$2,795.00	\$2,780.48	\$2,785.00	\$2,785.00
	4" Turbine	6.2 (a)	\$2,535.00	\$2,521.41	\$2,525.00	\$2,525.00
	4" Fire Series	6.2 (a)	\$3,670.00	\$3,655.65	\$3,660.00	\$3,660.00
	4" Fire Assembly	6.2 (a)	\$6,025.00	\$6,011.41	\$6,015.00	\$6,015.00
	6" Compound	6.2 (a)	\$4,825.00	\$4,811.41	\$4,815.00	\$4,815.00
	6" Turbine	6.2 (a)	\$4,075.00	\$4,061.41	\$4,065.00	\$4,065.00
	6" Fire Series	6.2 (a)	\$5,320.00	\$5,306.44	\$5,310.00	\$5,310.00
	6" Fire Assembly	6.2 (a)	\$7,925.00	\$7,911.41	\$7,915.00	\$7,915.00
	8" Turbine	6.2 (a)	\$5,455.00	\$5,442.47	\$5,445.00	\$5,445.00
	8" Fire Series	6.2 (a)	\$6,090.00	\$6,078.84	\$6,080.00	\$6,080.00
	8" Fire Assembly	6.2 (a)	\$11,145.00	\$11,132.11	\$11,135.00	\$11,135.00
	10" Turbine	6.2 (a)	\$7,795.00	\$7,783.58	\$7,785.00	\$7,785.00
	10" Fire Series	6.2 (a)	\$8,525.00	\$8,511.41	\$8,515.00	\$8,515.00
	10" Fire Assembly	6.2 (a)	\$15,310.00	\$15,295.83	\$15,300.00	\$15,300.00
	12" Turbine	6.2 (a)	\$7,910.00	\$7,897.07	\$7,900.00	\$7,900.00
	12" Fire Series	6.2 (a)	\$8,715.00	\$8,700.98	\$8,705.00	\$8,705.00
	12" Fire Assembly	6.2 (a)	\$16,180.00	\$16,166.49	\$16,170.00	\$16,170.00
b	Furnishing and Setting Meter Interface Unit (MIU)	6.2 (b)				
	1"	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	1" RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	1 1/2	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	1 1/2 RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	2"	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	2" RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00
	3" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	3" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	4" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	4" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	6" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00

Philadelphia Water Department

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

			1	2	3	4
#	Miscellaneous Charge Description	PWD Rates and Charges Reference	PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)
	6" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	8"	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
	10"	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00
3	Tampering of Meter	6.3				
	3" and larger	6.3 (a)	\$580.00	\$511.41	\$570.00	\$570.00
4	Shut-Off and Restoration of Water Service	6.4				
a	Site Visit for Non-payment	6.4 (a)	\$100.00	\$104.97	\$105.00	\$105.00
c	Restoration of Water Service	6.4 (c)				
	Operating service valve 2" and smaller service lines	6.4 (c) (1) (i)	\$60.00	\$104.97	\$105.00	\$105.00
	Operating service valve larger than 2" service lines	6.4 (c) (1) (ii)	\$200.00	\$451.30	\$280.00	\$395.00
	Obstructed curb stop, missing access box, requires excavation	6.4 (c) (2)	\$590.00	\$902.60	\$830.00	\$905.00
	Curb stop inoperable, requires installation of new curb stop	6.4 (c) (3)	\$885.00	\$949.94	\$950.00	\$950.00
	Obstructed curb stop, missing access box, requires excavation and footway paving	6.4 (c) (4)	\$820.00	\$902.60	\$905.00	\$905.00
	Curb stop inoperable, requires installation of new curb stop and footway paving	6.4 (c) (5)	\$865.00	\$949.94	\$950.00	\$950.00
	Excavation and shutoff of ferrule at the water main	6.4 (c) (6)	\$1,985.00	\$2,161.26	\$2,165.00	\$2,165.00
	TAP Customers -Shut-off and Restoration of Water Service	Proposed 6.4 (e)				
	Shut off service for non-payment; and, payment is tendered at the time of the shut-off	6.4 (e) (1)	NA	NA	\$12.00	\$12.00
	Restore water service after termination for non-payment or violation of service requirements	6.4 (e) (2)	NA	NA	\$12.00	\$12.00
6	Charges for Water Main Shutdown Service	6.6	\$210.00	\$227.04	\$225.00	\$225.00
7	Water Connection Charges	6.7				
b	Ferrule Connections	6.7 (b)				
	3/4"	6.7 (b) (2)	\$240.00	\$232.33	\$235.00	\$235.00
	1"	6.7 (b) (2)	\$270.00	\$253.35	\$255.00	\$255.00
	1.5"	6.7 (b) (2)	\$365.00	\$284.69	\$285.00	\$285.00
	2"	6.7 (b) (2)	\$430.00	\$337.44	\$340.00	\$340.00
c	Valve Connections	6.7 (c)				
	3" & 4"	6.7 (c) (1)	\$15,705.00	\$15,665.11	\$15,670.00	\$15,670.00
	6" & 8"	6.7 (c) (1)	\$15,945.00	\$16,008.11	\$16,010.00	\$16,010.00
	10" & 12"	6.7 (c) (1)	\$18,605.00	\$18,966.85	\$18,970.00	\$18,970.00
d	Attachment to a Transmission Main	6.7 (d)				
	3" & 4" Sleeve	6.7 (d) (2)				
	16" Main	6.7 (d) (2)	\$23,475.00	\$23,960.09	\$23,965.00	\$23,965.00
	20" Main	6.7 (d) (2)	\$24,860.00	\$25,460.09	\$25,465.00	\$25,465.00
	24" Main	6.7 (d) (2)	\$26,475.00	\$27,060.09	\$27,065.00	\$27,065.00
	30" Main	6.7 (d) (2)	\$36,845.00	\$36,738.09	\$36,740.00	\$36,740.00
	36" Main	6.7 (d) (2)	\$42,010.00	\$41,900.09	\$41,905.00	\$41,905.00
	6" & 8" Sleeve	6.7 (d) (2)				
	16" Main	6.7 (d) (2)	\$23,595.00	\$24,160.09	\$24,165.00	\$24,165.00
	20" Main	6.7 (d) (2)	\$24,630.00	\$25,360.09	\$25,365.00	\$25,365.00

Philadelphia Water Department

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

#	Miscellaneous Charge Description	PWD Rates and Charges Reference	1	2	3	4
			PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)
	24" Main	6.7 (d) (2)	\$26,475.00	\$27,060.09	\$27,065.00	\$27,065.00
	30" Main	6.7 (d) (2)	\$37,450.00	\$38,222.09	\$38,225.00	\$38,225.00
	36" Main	6.7 (d) (2)	\$43,830.00	\$45,320.09	\$45,325.00	\$45,325.00
	10" & 12" Sleeve	6.7 (d) (2)				
	16" Main	6.7 (d) (2)	\$22,445.00	\$24,160.09	\$24,165.00	\$24,165.00
	20" Main	6.7 (d) (2)	\$23,295.00	\$25,660.09	\$25,665.00	\$25,665.00
	24" Main	6.7 (d) (2)	\$24,485.00	\$27,160.09	\$27,165.00	\$27,165.00
	30" Main	6.7 (d) (2)	\$38,805.00	\$38,697.09	\$38,700.00	\$38,700.00
	36" Main	6.7 (d) (2)	\$47,450.00	\$47,342.09	\$47,345.00	\$47,345.00
9	Hydrant Permits	6.9				
	One Week	6.9 (b) (1)	\$525.00	\$858.43	\$735.00	\$860.00
	Six Month	6.9 (b) (2)	\$3,370.00	\$4,490.99	\$4,495.00	\$4,495.00
10	Flow Tests	6.10	\$690.00	\$929.60	\$930.00	\$930.00
Section 7- Miscellaneous Sewer Charges						
5	Manhole Pump-out Permit	7.5	\$1,960.00	\$4,408.95	\$2,745.00	\$3,845.00
6	Trucked or Hauled Wastewater Permit	7.6	\$1,960.00	\$2,351.90	\$2,355.00	\$2,355.00
Section 8- Miscellaneous Stormwater Charges						
1	Stormwater Plan Review Fees	8.1				
	Conceptual Stormwater Plan Approval	8.1 (a) (1)	\$1,160.00	\$1,111.10	\$1,115.00	\$1,115.00
	Post Construction Stormwater Plan Submission	8.1 (a) (2)	\$285.00	\$62.54	\$65.00	\$65.00
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)	8.1 (a) (2)	\$150.00	\$115.55	\$120.00	\$120.00
2	Stormwater Management Fee in Lieu	8.2				
	Exemption to Water Quality Requirement	8.2 (c) (1)	\$15.00	\$30.82	\$25.00	\$31.00
Other- Not in the Miscellaneous Charges Section (Section 3- Rates and Charges)						
1	Sewer Credit Application Fee	3.5 (c)	\$295.00	\$1,651.00	\$415.00	\$585.00
3	Stormwater Credit Application Fee Renewal	4.5 (f) (4)	\$100.00	\$1,462.29	\$140.00	\$200.00

Column Notes

- 1 From the PWD Regulations Chapter 3-Rates and Charges Effective September 1, 2020 (FY 2021 Charges)
- 2 Calculated charges for work performed during Water Department's regular business hours (9:00 a.m. to 4:45 p.m.) (i.e. not including overtime)
- 3,4 Proposed FY 2022 - FY 2023 Miscellaneous charges.

Row Notes

- Section 6.4 (e) As provided by PWD.
- Section 8.2 (c) (1) As provided by PWD.

Philadelphia Water Department

TABLE M-2- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING NON BUSINESS HOURS)

TABLE 11-2 SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING NON-BUSINESS HOURS)						
		PWD Rates and Charges Reference	1 PWD Existing Charges (Non Business Hours)	2 Calculated Charges (Non Business Hours)	3 PWD Miscellaneous Charges (Proposed-FY 2022)	4 PWD Miscellaneous Charges (Proposed-FY 2023)
#	Miscellaneous Charge Description					
Section 6- Miscellaneous Water Charges						
7	Water Connection Charges					
	Ferrule Connections	6.7 (b)				
	3/4"	6.7 (b) (3)	\$250.00	\$252.96	\$255.00	\$255.00
	1"	6.7 (b) (3)	\$280.00	\$273.98	\$275.00	\$275.00
	1.5"	6.7 (b) (3)	\$375.00	\$305.32	\$310.00	\$310.00
	2"	6.7 (b) (3)	\$440.00	\$358.07	\$360.00	\$360.00
	Valve Connections	6.7 (c)				
	3" & 4"	6.7 (c) (2)	\$16,450.00	\$17,375.34	\$17,380.00	\$17,380.00
	6" & 8"	6.7 (c) (2)	\$16,690.00	\$17,718.34	\$17,720.00	\$17,720.00
	10" & 12"	6.7 (c) (2)	\$19,440.00	\$20,890.85	\$20,895.00	\$20,895.00
	Attachment to a Transmission Main	6.7 (d)				
	3" & 4" Sleeve	6.7 (d) (3)				
	16" Main	6.7 (d) (3)	\$24,410.00	\$26,097.87	\$26,100.00	\$26,100.00
	20" Main	6.7 (d) (3)	\$25,790.00	\$27,597.87	\$27,600.00	\$27,600.00
	24" Main	6.7 (d) (3)	\$27,405.00	\$29,197.87	\$29,200.00	\$29,200.00
	30" Main	6.7 (d) (3)	\$37,775.00	\$38,875.87	\$38,880.00	\$38,880.00
	36" Main	6.7 (d) (3)	\$42,940.00	\$44,037.87	\$44,040.00	\$44,040.00
	6" & 8" Sleeve					
	16" Main	6.7 (d) (3)	\$24,525.00	\$26,297.87	\$26,300.00	\$26,300.00
	20" Main	6.7 (d) (3)	\$25,560.00	\$27,497.87	\$27,500.00	\$27,500.00
	24" Main	6.7 (d) (3)	\$27,405.00	\$29,197.87	\$29,200.00	\$29,200.00
	30" Main	6.7 (d) (3)	\$38,380.00	\$40,359.87	\$40,360.00	\$40,360.00
	36" Main	6.7 (d) (3)	\$44,760.00	\$47,457.87	\$47,460.00	\$47,460.00
	10" & 12" Sleeve					
	16" Main	6.7 (d) (3)	\$23,375.00	\$26,297.87	\$26,300.00	\$26,300.00
	20" Main	6.7 (d) (3)	\$24,225.00	\$27,797.87	\$27,800.00	\$27,800.00
	24" Main	6.7 (d) (3)	\$25,415.00	\$29,297.87	\$29,300.00	\$29,300.00
	30" Main	6.7 (d) (3)	\$39,735.00	\$40,834.87	\$40,835.00	\$40,835.00
	36" Main	6.7 (d) (3)	\$48,380.00	\$49,479.87	\$49,480.00	\$49,480.00

Column Notes

- 1 From the PWD Regulations Chapter 3 Rates and Charges Effective September 1, 2020
- 2 Calculated charges for work performed outside of Water Department's business hours (business hours are from 9:00 a.m. to 4:45 p.m.)
Includes overtime costs.
- 3,4 Proposed FY 2022 - FY 2023 Miscellaneous charges for work performed during non-business hours.

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-5

Dated: January 15, 2021

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Water & Wastewater Cost of Service Report

PHILADELPHIA WATER DEPARTMENT
JANUARY 2021

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List of Acronyms

ADD	Average daily demand
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
Black & Veatch	Black & Veatch Management Consulting, LLC
BOD	Biological oxygen demand
CAFR	Comprehensive Annual Financial Report
CAP	Customer Assistance Program
cfs	Cubic feet per second
CIP	Capital Improvement Program
City	The City of Philadelphia
City Charter	Philadelphia Home Rule Charter
COA	Consent Order Agreement
Combined System	The City of Philadelphia's Water and Wastewater Systems
COS	Cost of Service
COVID 19	Coronavirus 19
CP	Commercial Paper
CPI	Consumer Price Index
DELCORA	Delaware County Regional Water Authority
ENR	Engineering News Record
FPL	Federal Poverty Level
FY	Fiscal Year ending June 30
GA	Gross Area
gpm	Gallons per minute
Green Cities, Clean Waters	Consent Order Agreement
I/I	Infiltration/Inflow
IA	Impervious Area
IAR	Impervious Area Reduction
L&I	License and Inspection
LTCP	Long-Term Control Plan
M1 Manual	AWWA's Principles of Water Rates, Fees, and Charges" Manual of Water Supply Practices M1.
Mcf	Thousand cubic feet
mg/l	Milligrams per liter
MGD	Million gallons per day
MoP 27	WEF's Financing and Charges for Wastewater Systems Manual of Practice 27
MOU	Memorandum of Understanding
MS-4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PADEP	Pennsylvania Department of Environmental Protection
PennVest	Pennsylvania Infrastructure Investment Authority

PHA	Philadelphia Housing Authority
PPI	Producer Price Index
PWD	The City of Philadelphia Water Department
Rate Board	The Philadelphia Water, Sewer, and Storm Water Rate Board
Rate Ordinance	Water Rate Board Ordinance
R&R	Renewal and Replacement
RSF	The Rate Stabilization Fund
SMIP/GARP	Stormwater Management Incentive Program/Greened Acre Retrofit Program
sq	Square feet
SS	Suspended solids
SWMS	Stormwater Management Service Charge
TAP	Tiered Assistance Program
TAP-R	TAP Rate Rider Surcharge Rate included with the water and sewer quantity charges
TY	Test Year
UESF	Utility Emergency Services Fund
US	United States
Water Department	The City of Philadelphia Water Department
WEF	Water Environment Federation
WRB	Water Revenue Bureau

Index of Report and Rate Filing Tables

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NA = Not Applicable

Executive Summary

Black & Veatch Management Consulting, LLC ("Black & Veatch") has prepared this Water and Wastewater Cost of Service Report (the "Report") on behalf of the City of Philadelphia (the "City") Water Department (the "Water Department") in connection with its application to increase rates and charges for water, sanitary sewer and stormwater service for fiscal years 2022 and 2023 (the "Rate Period"). The analyses presented herein include projected revenue and revenue requirements for fiscal year 2021 through fiscal year 2026 (the "Study Period") and the proposed rate schedules for water, sanitary sewer and stormwater services for the Rate Period, as determined from the cost of service analysis.

Specifically, Black & Veatch's scope of work addresses the following elements:

- Assesses the Water and Wastewater Systems' (together, the "System" or "Combined System") ability to meet current and future anticipated financial obligations, and
- Develops a financial plan and proposes water, sanitary, and stormwater rates for fiscal year 2022 and fiscal year 2023 sufficient to fund the Combined System's fund operations and capital financing needs.

The forecast consists of implementing annual revenue increases and leveraging available funds from the Water Department's Rate Stabilization Fund during the Study Period. Based on the assumptions detailed herein, the financing plan requires annual Combined System Service Revenue increases from Base Rates¹ ranging from 8.70% to 5.10% during the Study Period.

As noted above, this Report includes a cost of service analysis, conducted using causative cost approaches endorsed by industry-recognized manuals of practices, which produce cost of service allocations recognizing the projected customer service requirements. The proposed rates designed by Black & Veatch follow the allocated cost of service results and local policy considerations. For the analyses defined and presented herein, fiscal year 2022 and fiscal year 2023 serve as the fully projected test years for allocating costs to customer types and for designing the Base Rate schedules.

Revenues Under Existing Rates

In fiscal year 2020, the Water System provided treated water services to approximately 490,400 customer accounts (excluding private fire and fire hydrants). The total number of Water System customer accounts are projected to remain stable during the Study Period. However, the projected water consumption is projected to decrease from approximately 6.0 billion cubic feet in fiscal year 2021 to 5.6 billion cubic feet in fiscal year 2026, which reflects an average annual decrease of 0.7%.

In fiscal year 2020, the Wastewater System provided sanitary sewer services to approximately 487,300 customer accounts. Like the Water System, the total number of Wastewater System customer accounts are projected to remain stable during the Study Period. However, the projected billed water volume for

¹ Excludes Tiered Assistance Program Rate Rider Surcharges.

sanitary sewer service is projected to decrease over this period from approximately 10.2 billion cubic feet in fiscal 2021 to 10.0 billion cubic feet in fiscal year 2026, which reflects an average annual decrease of 0.4%.

The Wastewater System also includes Stormwater services. In fiscal year 2020, the Wastewater System provided stormwater services to approximately 550,100 accounts. A slight decrease is projected in the number of stormwater accounts during the Study Period to reflect an increase in the number of community gardens². The number of stormwater accounts is projected to decrease from approximately 550,100 accounts in fiscal year 2021 to approximately 550,000 accounts in fiscal year 2026. Projections of billable impervious and gross areas for the Study Period reflect the following adjustments:

- **Updated Billing Data Implementation.** Based upon the updated Stormwater Billing Data, the overall impervious area has increased 87.5 million square feet compared to the prior data set. Most of this increase in impervious area is attributable to residential parcels, which reflect a total increase of 72.6 million square feet. Overall, the non-residential (including condominiums) impervious area increased 15 million square feet. Overall gross area increased by 4.1 million square feet.
- **Credits.** Projections of billable impervious and gross areas reflect an average annual reduction of 14.9 million square feet of gross area per year and 6.6 million square feet of impervious area per year for additional credits.

Revenues under existing rates are projected based on fiscal year 2021 rates (for which base rates remain unchanged from fiscal year 2020), projections of relative billing statistics (customer accounts by service, billed water and sewer volumes, and billable impervious and gross areas), and projected collection factors. Table ES-1 summarizes the projection of revenue under existing rates. During the Study Period, revenues under existing rates are projected to range from \$659.8 Million in fiscal year 2021 to \$694.6 Million in fiscal year 2026, with the increase primarily attributable to an assumed recovery in overall collections over the study period.

Table ES-1 Projected Receipts Under Existing Rates

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
1	Water Sales Receipts	\$ 253,071	\$ 263,593	\$ 266,743	\$ 269,713	\$ 267,430	\$ 265,151
	Wastewater Sales Receipts						
2	Sanitary Sewer	245,058	253,995	256,956	259,796	258,165	256,537
3	Stormwater	161,671	169,438	172,311	174,974	173,929	172,897
4	Subtotal Wastewater Receipts	406,729	423,433	429,267	434,770	432,095	429,434
5	Total Water & Wastewater Receipts	\$ 659,800	\$ 687,026	\$ 696,010	\$ 704,483	\$ 699,525	\$ 694,584

² Community Gardens, as defined by, §19-1603 of the Philadelphia code, are parcels which receive a 100% discount on all stormwater management service charges once approved.

In addition to revenues under existing rates, the Water Department receives other operating and non-operating income. During the Study Period, other operating and non-operating revenues average \$29.0 Million annually. In fiscal year 2021, a projected release from the debt service reserve will provide an additional \$19.8 Million.

Revenue Requirements

Costs of service recovered from water and wastewater service charges include operation and maintenance expenses, debt service payments, and transfers for cash funded capital and reserves.

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the Water and Wastewater Systems during each year. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities and liquidated encumbrances. Projected operation and maintenance expenses for the Water System will increase from \$220.8 Million in fiscal year 2021 to \$250.2 Million in fiscal year 2026. The projected operating expenses for the Wastewater System show an increase from \$305.0 Million in fiscal year 2021 to \$352.0 Million in fiscal year 2026. On a Combined System basis, the operation and maintenance expenses increase from \$525.8 Million in fiscal year 2021 to \$602.2 Million in fiscal year 2026.

Annual debt service, including principal and interest payments, for the Combined System is approximately \$186.4 Million for fiscal year 2021. The Water Department anticipates issuing water and wastewater revenue bonds during each year of the Study Period (beginning in fiscal year 2022), in the following amounts: \$240 Million, \$500 Million, \$585 Million, \$420 Million, and \$600 Million, respectively. In addition, per the recently authorized Commercial Paper Program³ the Water Department is planning to issue \$200 million in commercial paper annually on a rolling basis beginning in fiscal year 2022. The Water Department intends to repay each commercial paper draw via bond sales issued in the year immediately after the draw. Because of the projected capital needs, annual debt service payments on existing, projected revenue bonds and commercial paper increase from \$186.4 Million in fiscal year 2021 to \$315.9 Million in fiscal year 2026.

During the Study Period, in accordance with the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended (the "General Bond Ordinance"), the Water Department is projected to make transfers from the Revenue Fund to the Capital Account and Residual Fund. The Capital Account Deposit is projected to increase from \$27.8 Million in fiscal year 2021 to \$36.9 Million in fiscal year 2026. The projected end of year transfers from the Revenue Fund to the Residual Fund, attributable to Base Rates are projected to increase from \$9.4 Million in fiscal year 2021 to \$26.4 Million in fiscal year 2026 – prior to transfers to the Construction Fund and City General Fund. The end of year

³ The Philadelphia City Council enacted the Twenty-Fifth Supplemental Ordinance to the General Ordinance on November 19, 2020. The supplemental ordinance establishes a revolving Commercial Paper Program intended to provide interim, short-term financing to meet immediate capital spending needs between long-term debt issuances.

balance in the Residual Fund throughout the Study Period remains constant at \$15 Million. To help manage overall revenue adjustments, customer impacts, and meet overall revenue requirements, the Water Department will use about \$42 Million from the Rate Stabilization Fund in fiscal years 2021 and 2022, drawing the balance in this fund down to approximately \$109 Million.

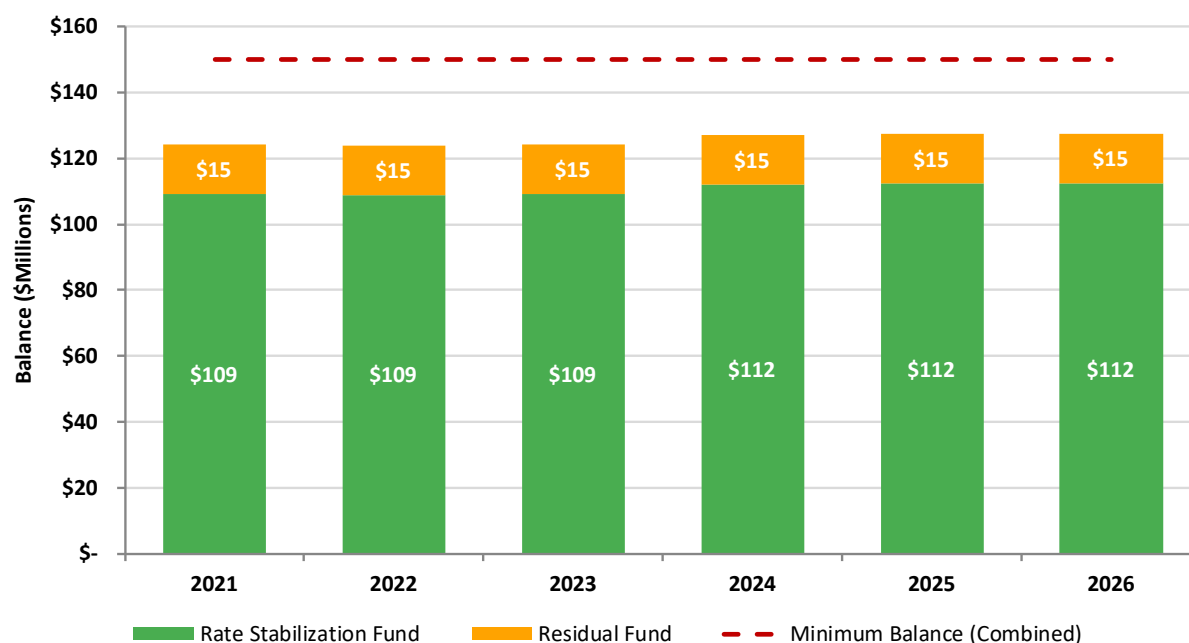
Table ES-2 summarizes the Combined System Revenue Requirements during the Study Period based on the projected cash flows.

Table ES-2 Combined System Revenue Requirements

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Revenue Requirements							
1	Operations & Maintenance Expense	\$ 525,844	\$ 543,868	\$ 558,009	\$ 572,357	\$ 586,998	\$ 602,222
	Existing Debt Service						
2	Revenue Bonds	175,726	163,516	164,558	151,302	151,438	152,439
3	PennVest Parity Bonds	10,651	10,885	11,067	14,864	14,864	15,182
	Proposed Debt Service						
4	Revenue Bonds	-	10,000	37,726	75,393	107,893	144,284
5	Commercial Paper	-	2,000	4,000	4,000	4,000	4,000
6	Capital Account Deposit	27,833	29,447	31,155	32,962	34,874	36,896
7	Residual Fund Deposit	9,448	7,835	12,410	16,203	20,839	26,370
8	Deposit (From)/To RSF	(41,464)	(331)	446	2,611	340	170
9	Total	708,038	767,220	819,371	869,691	921,245	981,564
Deductions of Funds from Other Sources							
10	Other Operating Revenue	(38,160)	(21,719)	(21,638)	(21,561)	(21,484)	(21,408)
11	Interest Income	(2,369)	(2,369)	(2,408)	(2,464)	(2,502)	(2,545)
12	NET REVENUE REQUIREMENTS	\$ 667,509	\$ 743,132	\$ 795,325	\$ 845,666	\$ 897,258	\$ 957,611
RSF = Rate Stabilization Fund							

RSF = Rate Stabilization Fund

Figure ES-1 depicts the overall fund balance performance against the combined Rate Stabilization Fund and Residual Fund target balance of \$150 Million, in accord with the decision of the Philadelphia Water, Sewer and Storm Water Rate Board ("Rate Board"), dated July 12, 2018 (the "2018 Rate Determination"). As noted above, the Water Department is using Rate Stabilization Funds where possible to help mitigate the impact of revenue adjustments on customers. Replenishing the Rate Stabilization Fund begins after the Rate Period, but the combined balance of the two funds remains over 15% below the \$150 Million target throughout the Study Period.

Figure ES-1 Combined Rate Stabilization and Residual Fund Balance Performance

Proposed Combined System Adjustments

Table ES-3 summarizes the overall annual revenue increases required from Base Rates during the Study Period. The rates proposed for the Water System are based on an increase of 8.25% and 6.10% in fiscal year 2022 and fiscal year 2023, respectively. The rates proposed for the Wastewater System are based on an increase of 8.98% in fiscal year 2022 and 4.48% in fiscal year 2023. The aggregate increase for the Combined System is 8.70% in fiscal year 2022 and 5.10% in fiscal year 2023. As discussed below, the proposed increases are needed to meet future revenue requirements, maintain/improve System infrastructure, meet targeted debt service coverage ratios, maintain fund balances and other relevant financial metrics and ordinance obligations.

Table ES-3 Required Base Rate Service Revenue Adjustments

ADDITIONAL BASE RATE REVENUE REQUIRED			
FISCAL YEAR	WATER	WASTEWATER	COMBINED
2022	8.25%	8.98%	8.70%
2023	6.10%	4.48%	5.10%
2024	11.30%	1.23%	5.10%
2025	8.25%	6.65%	7.30%
2026	9.60%	6.21%	7.60%

Table ES-4 summarizes the additional service revenue required for the Combined System during the Study Period in the context of overall system revenues including both Base Rates and TAP-R rates⁴. This table summarizes the overall level of total service revenue adjustments required to meet operating and capital financing needs of the Combined System as well as all other legal and financial requirements discussed herein.

Table ES-4 Required Total Service Revenue Adjustments

ADDITIONAL SERVICE REVENUE REQUIRED	
FISCAL YEAR	COMBINED
2022	8.61%
2023	5.05%
2024	5.05%
2025	7.24%
2026	7.54%

These revenue adjustments, coupled with planned withdrawals from the Rate Stabilization Fund, will allow the Water Department to meet the overall revenue and revenue requirements of the Combined System as well as sustain financial metrics and ordinance obligations and requirements as further described in this Report.

Cost of Service Allocations

Allocating the Combined System’s cost of service to customer types in accordance with their respective water, sanitary sewer and stormwater service demands provide a basis for evaluating the equity of existing rates and designing proposed rates. The underlying cost of service allocation methodology, as utilized during the fiscal year 2018 Rate Determination has not changed. The various allocation factors were updated to reflect more current system operating conditions when applicable and where updated data was available.

⁴ Overall Additional Service Revenue Required reflects TAP-R revenues based upon existing rates, which are subject to a separate annual reconciliation proceeding.

Table ES-5, Table ES-6, and Table ES-7 present the total costs of service allocated to applicable customer types for water, sanitary sewer and stormwater service for Fiscal Year 2022 (Test Year 1). Section 4 (Water) and Section 7 (Wastewater) provide summaries of the respective cost of service allocations for each system.

Table ES-5 Test Year 1 Distribution of Water Cost of Service to Customer Types

LINE NO.	CUSTOMER TYPE	REVENUE		INDICATED INCREASE (DECREASE) REQUIRED
		UNDER EXISTING RATES	ADJUSTED COST OF SERVICE	
		\$	\$	%
Retail Service (\$000s)				
1	Senior Citizens	\$ 5,207,314	\$ 5,557,000	6.70%
2	Residential	157,333,791	170,375,000	8.30%
3	Commercial	55,098,551	61,107,000	10.90%
4	Industrial	3,254,813	3,359,000	3.20%
5	Public Utilities	324,570	306,000	-5.70%
6	Subtotal General Service	221,219,040	240,704,000	8.80%
7	PHA	5,633,013	6,444,000	14.40%
8	Charities & Schools	3,302,927	3,568,000	8.00%
9	Hospitals & Universities	2,805,172	3,210,000	14.40%
10	Hand Billed	12,872,064	16,846,000	30.90%
11	Scheduled (Flat Rate)	646	-	-100.00%
Fire Protection				
12	Private	4,381,712	4,260,000	-2.80%
	Public			
13	Standard Pressure	9,235,000	6,954,000	-24.70%
14	Subtotal	13,616,712	11,214,000	-17.60%
15	Total Retail Service	259,449,573	281,986,000	8.70%
16	Total Wholesale	3,567,995	3,048,000	-14.60%
17	Total System	\$ 263,017,568	\$ 285,034,000	8.40%

Table ES-6 Test Year 1 Distribution of Sanitary Sewer Cost of Service to Customer Types

LINE NO.	CUSTOMER TYPE	REVENUE UNDER EXISTING RATES	ADJUSTED COST OF SERVICE	INDICATED INCREASE (DECREASE) REQUIRED
Retail Service (\$000s)				
1	Residential	125,152	140,307	12.1%
2	Commercial	51,703	51,938	0.5%
3	Industrial	2,303	2,691	16.9%
4	Public Utilities	346	339	-2.1%
5	Senior Citizens	4,251	4,730	11.3%
6	Wastewater Only	2,181	2,028	-7.0%
7	Groundwater	2,968	2,751	-7.3%
8	Surcharge	4,862	5,682	16.9%
9	Housing Authority	5,111	5,252	2.8%
10	Charities & Schools	4,152	3,298	-20.6%
11	Hospital/University	6,879	2,915	-57.6%
12	Hand Billed	13,591	11,857	-12.8%
13	Private Fire	250	308	23.3%
14	Scheduled	1	0	-22.4%
15	Total Retail Service	223,751	234,098	4.6%
16	Total Wholesale	38,982	41,847	7.4%
17	Total System	262,733	275,945	5.0%

Table ES-7 Test Year 1 Distribution of Stormwater Cost of Service to Customer Types

LINE NO.	CUSTOMER TYPE	REVENUE UNDER EXISTING RATES	ADJUSTED COST OF SERVICE	INDICATED INCREASE (DECREASE) REQUIRED
Stormwater (\$000)				
Residential				
1	Non-Discount	\$ 79,913	\$ 87,211	9.1%
2	Discount - Non-PHA	3,261	3,389	3.9%
3	Discount - PHA	732	775	5.8%
Non-Residential				
4	Non-Discount	77,844	81,518	4.7%
5	Discount - Non-PHA	9,036	7,819	-13.5%
6	Discount - PHA	1,309	1,322	0.9%
Condominiums				
7	Non-Discount	3,007	3,011	0.1%
8	Discount - Non-PHA	75	74	-1.3%
9	Discount - PHA	1	1	-2.1%
10	Total	\$ 175,178	\$ 185,118	5.7%

Proposed Water, Sanitary Sewer, and Stormwater Rates

The cost of service analysis provides the basis for the design of the water and wastewater rate schedules to recover the allocated cost of service from each respective system and service (including stormwater). The proposed rates are consistent with the existing rate structure as described in the Water Department's existing Rates and Charges (effective October 1, 2020⁵) and no rate structure changes are proposed at this time.

The proposed rates and charges for water, sanitary sewer and stormwater service are applicable to General Service retail customers and recognize: 1) adjustments to account for the recovery of discounts provided to certain retail customers⁶; and 2) the application of a "lag factor" to account proration of billings between the existing and proposed rates⁷. The proposed rates do not include a "rate compression"⁸ factor addressing the impact of reduced billings and receipts in the initial fiscal year.

Table ES-8 summarizes the existing and proposed rates for the requested Test Years of fiscal year 2022 and fiscal year 2023.

The proposed rates will result in increased bills for most customers. The Typical Bill impacts for Residential, Senior Citizen and Small Business Customers are shown in Table ES-9.

Typical residential and senior citizen customers will see bill impacts higher than the proposed service revenue increases due to: (i) the influence of customer cost of service allocations; (ii) the impacts of projected declines in billed water and sewer volumes associated with declining consumption; and (iii) the impact from updated stormwater billing data, which indicates residential customer account for a greater portion of the overall billable stormwater units, than in prior studies.

Based on the analyses conducted, the adoption of the increased water, sewer and stormwater rates for fiscal year 2022 and fiscal year 2023 is recommended, as discussed below.

This Report does not address the Tiered Assistance Program Reconciliation (TAP-R) rates as they are subject to a separate reconciliation proceeding.

⁵ Current Base Rates became effective September 1, 2019. TAP-R rates became effective October 1, 2020.

⁶ Discounts are provided to qualifying customers including senior citizens, charities and schools, and the Philadelphia Housing Authority.

⁷ The "lag factor" recognizes 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.

⁸ The proposed revenue increases are effective for 10 out of 12 months. By not implementing increases for a full fiscal year, during the first fiscal year of a revenue increase, billings and revenues are reduced and reflect about 98.16% of total combined revenues.

Table ES-8 Existing and Proposed Retail Rates




Water				Wastewater			
Description	Existing	Proposed		Description	Existing	Proposed	
	FY 2021	FY 2022	FY 2023		FY 2021	FY 2022	FY 2023
Monthly Water Service Charge (\$/bill)				Monthly Sanitary Sewer Service Charge (\$/bill)			
<u>Meter Size (Inches)</u>				<u>Meter Size (Inches)</u>			
5/8	\$5.21	\$5.28	\$5.36	5/8	\$7.01	\$7.92	\$8.11
3/4	\$5.55	\$5.67	\$5.78	3/4	\$8.93	\$10.05	\$10.33
1	\$6.70	\$6.91	\$7.06	1	\$13.07	\$14.68	\$15.17
1-1/2	\$8.88	\$9.34	\$9.60	1-1/2	\$22.97	\$25.72	\$26.70
2	\$12.32	\$13.06	\$13.47	2	\$35.42	\$39.62	\$41.19
3	\$19.44	\$20.85	\$21.58	3	\$63.82	\$71.33	\$74.28
4	\$35.39	\$37.73	\$38.97	4	\$108.49	\$121.30	\$126.23
6	\$66.29	\$70.98	\$73.43	6	\$213.81	\$238.97	\$248.82
8	\$100.66	\$108.20	\$112.06	8	\$338.27	\$377.97	\$393.75
10	\$147.50	\$158.34	\$163.92	10	\$488.25	\$545.62	\$568.29
12	\$239.52	\$259.97	\$270.12	12	\$887.22	\$990.71	\$1,033.23
Base Rate - Water Quantity Charges (\$/Mcf)				Base Rate - Sanitary Sewer Quantity Charges (\$/Mcf)			
<u>Monthly Water Usage</u>				<u>Monthly Usage</u>			
First 2 Mcf	\$44.80	\$49.33	\$52.94	All Billable Water Usage	\$31.25	\$35.35	\$37.02
Next 98 Mcf	\$38.56	\$45.41	\$48.64	Groundwater Charge	\$13.86	\$12.94	\$13.51
Next 1,900 Mcf	\$29.88	\$35.15	\$37.61				
Over 2,000 Mcf	\$29.06	\$34.20	\$36.59				
				Sanitary - Surcharge Rates (\$/lb)			
				BOD (\$/lb in excess of 250 mg/l)	\$0.397	\$0.413	\$0.424
				SS (\$/lb in excess of 350 mg/l)	\$0.388	\$0.430	\$0.438
				Residential Stormwater Charges			
				<u>Monthly Stormwater Management Service Charge</u>			
				Charge Per Parcel	\$14.03	\$16.27	\$17.32
				<u>Monthly Billing & Collection Charge</u>			
				Charge Per Bill	\$1.77	\$1.98	\$2.00
				Non-Residential Stormwater Charges			
				<u>Monthly Stormwater Management Service Charge</u>			
				Gross Area (\$/500 sf)	\$0.717	\$0.783	\$0.833
				Impervious Area (\$/500 sf)	\$5.410	\$5.529	\$5.876
				<u>Monthly Billing & Collection Charge</u>			
				Charge Per Bill	\$2.30	\$2.57	\$2.60

Notes:




All proposed are effective September 1st of the respective Fiscal Year.
Non-Residential Stormwater Charges includes Condominiums.

Table ES-9 Typical Bill Impacts




RESIDENTIAL CUSTOMER⁹

 CURRENT TYPICAL BILL	 PROPOSED FY2022 TYPICAL BILL	 PROPOSED FY2023 TYPICAL BILL
Water \$22.69	Water \$24.95	Water \$26.76
Wastewater \$16.02	Wastewater \$18.07	Wastewater \$18.90
Stormwater \$15.80	Stormwater \$18.25	Stormwater \$19.32
Service \$12.22	Service \$13.20	Service \$13.47
\$66.73	\$74.47 <i>11.6% increase</i>	\$78.45 <i>5.3% increase</i>

SENIOR CITIZEN WITH DISCOUNTED BILL¹⁰

 CURRENT TYPICAL BILL	 PROPOSED FY2022 TYPICAL BILL	 PROPOSED FY2023 TYPICAL BILL
Water \$13.61	Water \$14.97	Water \$16.05
Wastewater \$9.61	Wastewater \$10.84	Wastewater \$11.34
Stormwater \$15.80	Stormwater \$18.25	Stormwater \$19.32
Service \$12.22	Service \$13.20	Service \$13.47
Senior Discount (-\$12.81)	Senior Discount (-\$14.32)	Senior Discount (-\$15.05)
\$38.43	\$42.94 <i>11.7% increase</i>	\$45.13 <i>5.1% increase</i>

SMALL BUSINESS CUSTOMER¹¹

 CURRENT TYPICAL BILL	 PROPOSED FY2022 TYPICAL BILL	 PROPOSED FY2023 TYPICAL BILL
Water \$27.22	Water \$29.94	Water \$32.11
Wastewater \$19.22	Wastewater \$21.68	Wastewater \$22.68
Stormwater \$53.47	Stormwater \$55.42	Stormwater \$58.77
Service \$12.22	Service \$13.20	Service \$13.47
\$112.13	\$120.24 <i>7.2% increase</i>	\$127.03 <i>5.7% increase</i>

⁹ "Typical" residential account with 5/8" meter using 5 hundred cubic feet of water monthly.

¹⁰ "Typical" senior citizen discounted bill account with 5/8" meter using 3 hundred cubic feet of water monthly. Bill amounts reflect a 25% discount on all fees and charges.

¹¹ "Typical" small business account with 5/8" meter using 6 hundred cubic feet of water monthly and a parcel with a gross area of 5,500 square feet and impervious area of 4,000 square feet.

The Combined System Operating Results

Table ES- 10 provides a summary of the overall Combined System Projected Revenue and Revenue Requirements during the Study Period. The proposed rates, coupled with planned use of available RSF balance, presented in this Report allows all the Combined System to meet projected revenue requirements, fulfills the bond coverage and other ordinance requirements, and maintains target fund balance for the Residual Fund. For this analysis, an effective increase date of September 1st for each fiscal year is assumed.

Table ES- 11 summarize Combined System performance with respect to the General Bond Ordinance Covenants.

Table ES-12 summarizes performance with respect to the Rate Board Ordinance Requirements. The proposed rates presented in this Report are necessary to meet the Combined System's (i) projected revenue requirements, (ii) targeted debt service coverage, as well as, (iii) other ordinance requirements, and (iv) transition to targeted fund balances for the RSF and Residual Fund.

For the proposed Study Period, the Water Department is proposing revenue adjustments that will allow meeting minimum senior debt coverage requirements to help address customer affordability impacts.

Table ES- 10 Projected Revenue and Revenue Requirements: Base Rates & TAP-R Rates
[Schedule BV-1: Table C-1]

LINE				FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION			2021	2022	2023	2024	2025	2026
Combined System (\$000s)									
Operating Revenues									
1	Water Service - Existing Rates			\$ 256,215	\$ 266,656	\$ 269,813	\$ 272,813	\$ 270,500	\$ 268,191
2	Wastewater Service - Existing Rates			411,294	427,613	433,417	438,954	436,238	433,537
3	Total Service Revenue - Existing Rates			667,509	694,269	703,229	711,766	706,738	701,727
	Additional Service Revenue Required								
		Percent	Months						
	Year	Increase	Effective						
4	FY 2021	0.00%	10	-	-	-	-	-	-
5	FY 2022	8.61%	10		48,864	60,553	61,290	60,859	60,429
6	FY 2023	5.05%	10			31,543	39,054	38,780	38,506
7	FY 2024	5.05%	10				33,556	40,757	40,469
8	FY 2025	7.24%	10					50,125	60,881
9	FY 2026	7.54%	10						55,599
10	Total Additional Service Revenue Required			-	48,864	92,096	133,900	190,520	255,884
11	Total Water & Wastewater Service Revenue			667,509	743,132	795,325	845,666	897,258	957,611
	Other Income (a)								
12	Other Operating Revenue			38,160	21,719	21,638	21,561	21,484	21,408
13	Debt Reserve Fund Interest Income			-	-	-	-	-	-
14	Operating Fund Interest Income			1,071	1,280	1,316	1,354	1,376	1,413
15	Rate Stabilization Interest Income			1,298	1,089	1,092	1,110	1,127	1,132
16	Total Revenues			708,038	767,220	819,371	869,691	921,245	981,564
Operating Expenses									
17	Total Operating Expenses			(525,844)	(543,868)	(558,009)	(572,357)	(586,998)	(602,222)
Net Revenues									
18	Transfer From/(To) Rate Stabilization Fund			41,464	331	(446)	(2,611)	(340)	(170)
19	NET REVENUES AFTER OPERATIONS			223,658	223,683	260,916	294,723	333,907	379,172
Debt Service									
Senior Debt Service									
Revenue Bonds									
20	Outstanding Bonds			(175,726)	(163,516)	(164,558)	(151,302)	(151,438)	(152,439)
21	Pennvest Parity Bonds			(10,651)	(10,885)	(11,067)	(14,864)	(14,864)	(15,182)
22	Projected Future Bonds			-	(10,000)	(37,726)	(75,393)	(107,893)	(144,284)
23	Commercial Paper			-	(2,000)	(4,000)	(4,000)	(4,000)	(4,000)
24	Total Senior Debt Service			(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)			1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
Subordinate Debt Service									
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	Total Debt Service on Bonds			(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
29	CAPITAL ACCOUNT DEPOSIT			\$ (27,833)	\$ (29,447)	\$ (31,155)	\$ (32,962)	\$ (34,874)	\$ (36,896)
30	TOTAL COVERAGE (L19/(L24+L26+L29))			1.04 x	1.03 x	1.04 x	1.05 x	1.06 x	1.07 x

Table ES-10 Projected Revenue and Revenue Requirements: Base Rates & TAP-R Rates (continued)

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Residual Fund							
31	Beginning of Year Balance	\$ 16,261	\$ 15,064	\$ 15,049	\$ 15,009	\$ 15,062	\$ 15,051
32	Interest Income	156	150	150	150	150	150
	Plus:						
33	End of Year Revenue Fund Balance	9,448	7,835	12,410	16,203	20,839	26,370
34	Deposit for Transfer to City General Fund (b)	1,855	1,847	2,076	2,413	2,756	3,104
	Less:						
35	Transfer to Construction Fund	(10,800)	(8,000)	(12,600)	(16,300)	(21,000)	(26,500)
36	Transfer to City General Fund	(1,855)	(1,847)	(2,076)	(2,413)	(2,756)	(3,104)
37	Transfer to Debt Service Reserve Fund	-	-	-	-	-	-
38	End of Year Balance	15,064	15,049	15,009	15,062	15,051	15,071
Rate Stabilization Fund							
39	Beginning of Year Balance	150,652	109,188	108,857	109,303	111,914	112,254
40	Deposit From/(To) Revenue Fund	(41,464)	(331)	446	2,611	340	170
41	End of Year Balance	\$ 109,188	\$ 108,857	\$ 109,303	\$ 111,914	\$ 112,254	\$ 112,424

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

(b) Transfer of interest earnings from the Bond Reserve Account to the Residual Fund as shown in Line 32 to satisfy the requirements for the transfer to the City General Fund shown on Line 34.

(c) FY 2021 beginning balance is estimated based on preliminary FY 2020 results.

Table ES- 11 General Bond Ordinance Covenants – Performance Metrics [Schedule BV-1: Table C-2]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
General Bond Ordinance Covenants							
1	Senior Debt Coverage (c)	1.20	1.20	1.20	1.20	1.20	1.20
2	Total Debt Coverage (d)	1.04	1.03	1.04	1.05	1.06	1.07
	90% Test - Senior Debt Coverage from						
3	Current Revenues (e)	0.97	1.19	1.20	1.20	1.20	1.20

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

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

(c) 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 General Bond Ordinance requires a minimum Senior Debt Service Coverage of 0.90 from Current Revenues.

Table ES-12 Rate Board Ordinance Requirements – Performance Metrics
[Schedule BV-1: Table C-2]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Rate Ordinance Requirements (\$000s)							
1	Projected Total Revenues	708,038	767,220	819,371	869,691	921,245	981,564
2	Projected Total Appropriations (g)	828,019	845,520	899,527	951,118	1,004,096	1,065,867
	Rate Ordinance Requirement						
3	Compliance (h)	Yes	Yes	Yes	Yes	Yes	Yes

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

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

Coronavirus 19 Pandemic

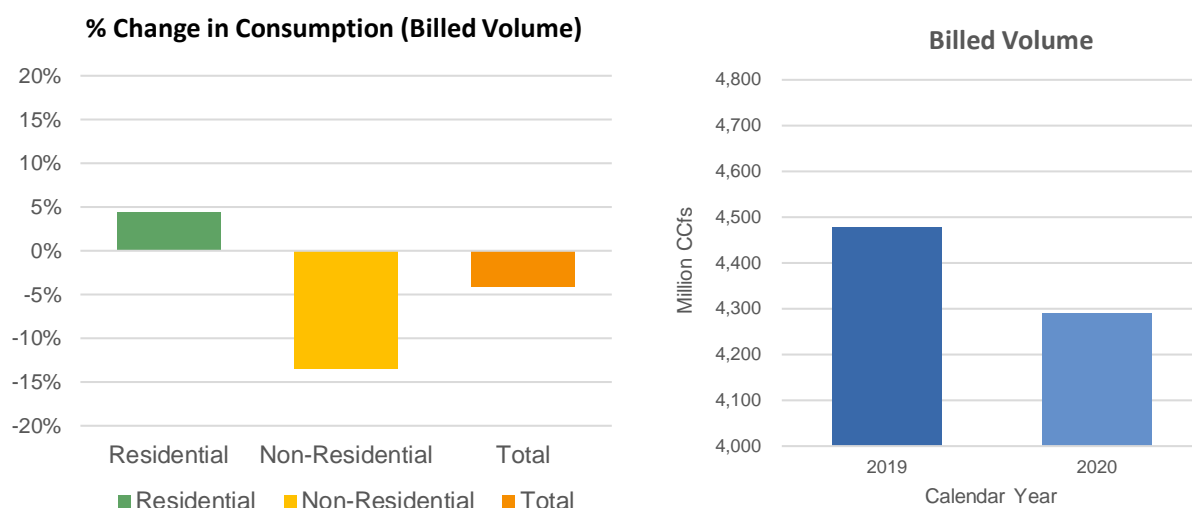
The Coronavirus 19 (“COVID”) pandemic has created a global public health crisis. In the US, the lockdowns and social distancing efforts that started in mid-March 2020 helped stem the initial spread of the disease, but also precipitated an economic downturn. The resulting economic crisis is unprecedented in scale in that the pandemic is causing shocks on three fronts: demand-side, supply-side, and financial.

Impact on the Water Department

The Water Department provides essential water and wastewater services to its customers on an around-the-clock basis. However, the pandemic has impacted the Water Department’s operations and financial condition. Quarantines, business closures, work-from-home restrictions, and health and safety requirements have stretched the Water Department’s ability to maintain customer levels of service. The pandemic has put further pressure on the Water Department’s revenues particularly in the areas of consumption, revenue collections, and shut-offs.

Decreased Consumption

Figure ES-2 illustrates how consumption levels have decreased during COVID. Specifically, the Water Department reports a 4% overall reduction between late March through December 2020 compared to the same period in the prior fiscal year. The increase in residential consumption due to work-from-home orders and the shut-off moratorium is 4.4%. Still, the 13.5% decline in non-residential usage is so large that it negates any potential revenue gains achieved by the residential demand increase.

Figure ES-2 Change in Demand During COVID

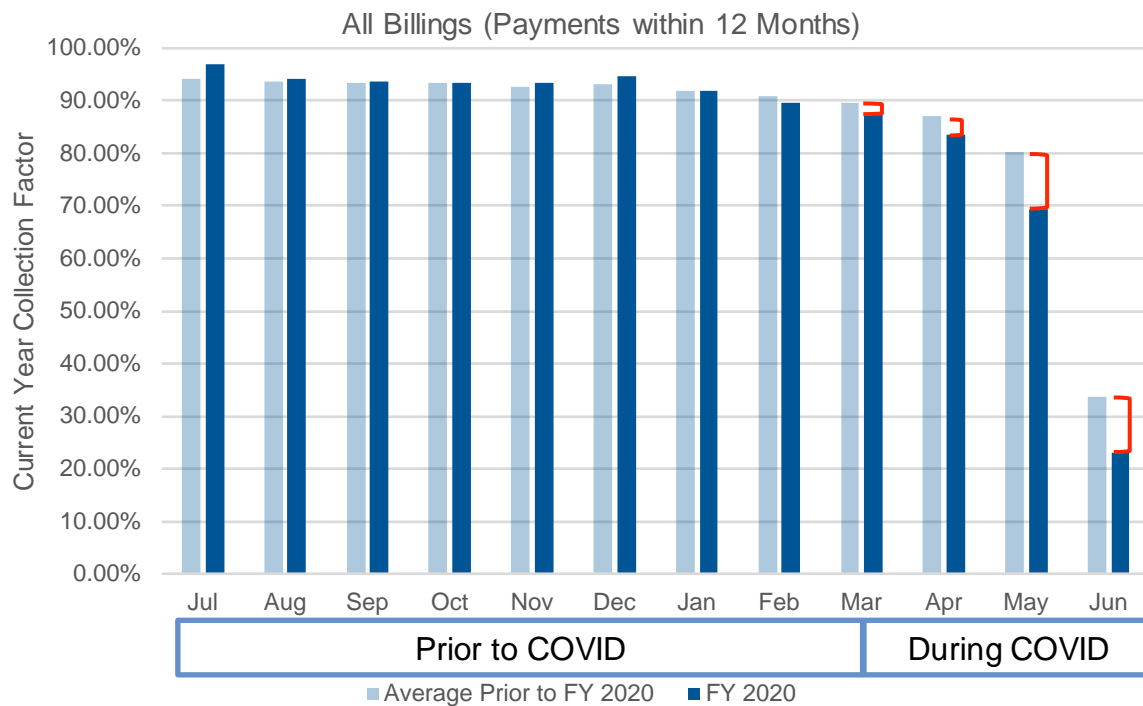
Decreased Collections

Changes in collection patterns typically take a few months to manifest after an economic event.

Figure ES-3 bears out this observation and shows that current year billings during the first three months of COVID are as much as 10% less than the same period historical average during fiscal years 2012 to 2019. The data clearly shows a greater rate of decline as the pandemic lengthens and suggests that the Water Department may not have seen the lowest month of collections yet since the data only reflect numbers through June. Data trends suggest that fiscal year 2021 collections may be lower by 5 to 10% overall.

Shut-off Moratorium

Per the Governor's order and in accordance with the City's directive, the Water Department suspended water service terminations beginning in March 2020. The Water Department waived shut-off and reconnect fees on March 20th, 2020 and started restoring service to most delinquent accounts. As of the end of December 2020, over 72,000 accounts were eligible for shut-off. The duration of the shut-off moratorium is unknown; however, both the Water Department and the Water Revenue Bureau expect that the number of shut-off eligible accounts will continue to rise, and impact collections without the lack of an enforcement mechanism.

Figure ES-3 Impact of Pandemic on Collections

The Water Department's COVID Response

After the Commonwealth of Pennsylvania enacted a “stay at home” order in late March, the Water Department implemented several management initiatives and cost-saving strategies focused on maintaining service to its customers and addressing the pandemic’s economic challenges. The following is a list of some of the steps that the Water Department has undertaken in response to the pandemic’s impacts.

- **Modifications to Fiscal Year 2021 Budget.** The Water Department reduced the original fiscal year 2021 budget by about \$25 million.
- **Increased Cost Monitoring.** Water Department staff perform monthly budget reviews to monitor cost trends for compliance with General Bond Ordinance requirements.
- **Suspension of Discretionary Expenses.** The Water Department has suspended or significantly decreased all travel and other reimbursable expenses.
- **Delayed Capital Improvement Program.** The Water Department is focusing only on critical capital projects in fiscal year 2021. As a result, the Water Department is postponing many capital projects until further notice.
- **Withdrawal of Fiscal Year 2021 and 2022 Rate Case.** The Water Department withdrew the rate case on June 10, 2020.

- **Use of Reserves.** The Water Department made a \$33 Million withdrawal from the Rate Stabilization Fund in fiscal year 2020 and will withdraw another \$42 Million from the Rate Stabilization Fund in fiscal year 2021 to meet ongoing obligations.

Findings and Conclusions

The data assessed in this Report clearly show that the Water Department is being materially impacted by the COVID pandemic and the resulting economic crisis. The management initiatives, cost-saving measures, deferred rate request, and use of reserves undertaken by the Water Department have helped stretch limited revenues to meet current obligations. However, the confluence of significant decreases in demand and collections rates, as well as pressing needs for capital program funding and diminishing reserves, is creating a situation whereby revenue adjustments are a necessity to continue critical operations and meet General Bond Ordinance requirements.

Based on the analyses performed for this Report, the following findings are presented for the Rate Board's consideration:

1. Revenues under existing rates will be insufficient to fund the Combined System needs over the Rate Period and action is needed to offset anticipated reductions in revenues resulting from:
 - a. A projected continued decline in system-wide billed water and sewer volumes;
 - b. A decrease in system-wide collection rates; and
 - c. Losses of stormwater billing units related to credits and appeals.
2. In addition, the total projected expenses will exceed revenues under existing rates during the Rate Period and will require additional service revenues as recommended in this Report;
3. The implementation of a commercial paper program is due to changes in how the City is funding capital projects. Combined with the need to re-start deferred investment in an aging system, the Water Department needs additional revenues to adhere to the City's capital funding policy, as well as meet ongoing capital obligations and debt covenant requirements.
4. To help manage customer bill impacts, and meet the financial obligations and metrics of the Combined System the Water Department proposes the following for the Rate Period:
 - a. Setting rates to meet the minimum senior debt service coverage requirement of 1.20x, instead of the target 1.30 set forth under the 2018 Rate Determination;
 - b. Not funding the Rate Stabilization Fund to the \$135 million target under the 2018 Rate Determination; and
 - c. Deferring the 20% cash funding target for capital projects.
5. The Rate Stabilization Fund is projected to be below the target level during the rate period. Once utilized, these funds may no longer be available to help manage future revenue adjustments

unless replenished. A small deposit is planned for fiscal year 2023 and minimal deposits are anticipated during the Study Period.

6. Need for rate action is further illustrated by the Water Department's performance against the "90% Test¹²" in FY 2021, as presented in Table ES- 11, which will be marginally meet with 97% of senior debt service being paid from current revenues. Without increased revenues the Water Department will fail to meet the requirements of the General Bond Ordinance including the 90% Test.
7. Moving forward, lack of sufficient rate revenues may require the Water Department to reduce the existing level of service below current levels and further delay implementation of the capital improvement program. In both instances, this may lead to a lower overall level of service for customers as well as impact overall system performance and compliance efforts.
8. Based on the above, among other factors, explained herein, it is recommended that the proposed water, sanitary sewer and stormwater rates for fiscal year 2022 and fiscal year 2023 be adopted to become effective September 1st of each fiscal year.

¹²The General Bond Ordinance requires that, during any given fiscal year, the Water Department's revenues (for both water and wastewater service combined), must be sufficient to yield Net Revenues at least equal to 90% of the Debt Service Requirements (exclusive of debt service on subordinate bond and any transfers from the Rate Stabilization Fund) in such fiscal year; referred to as the "90% Test."

1.0 Introduction

The City of Philadelphia (City) owns, operates, maintains, repairs, and improves the water system (“Water System”) and wastewater system (“Wastewater System”) serving the City and 10 wholesale wastewater contract customers and one wholesale water contract customer, as a self-supporting enterprise fund utility. Collectively, the Water System and the Wastewater System are known as the “Water and Wastewater Systems,” “the System,” or the “Combined System.”

On April 17, 1951, the Philadelphia Home Rule Charter (the “Charter”) established the Philadelphia Water Department (“PWD” or the “Water Department”) as one of the City’s ten operating departments. The Water Department is responsible for the planning, construction, operation, and maintenance of the Water and Wastewater Systems; for complying with regulatory requirements; for rate setting and stakeholder engagement; budgeting and detailed cost accounting; and preparation of financial statements for the System. The City’s combined Comprehensive Annual Financial Report (“CAFR”) includes the data from the Water Department’s annual financial statements.

Section 5-800 of the Charter conveys the authority to the Water Department to operate the Water and Wastewater System. In addition, Section 5-801 authorizes the regulation of rates and charges for utility services. In November 2012, Philadelphia voters approved an amendment to the Charter to allow Philadelphia City Council (“City Council”) to establish, by ordinance, an independent ratemaking board responsible for fixing and regulating rates and charges for water, sanitary sewer and stormwater services. Consistent with the foregoing, City Council enacted, effective January 20, 2014, Ordinance 130251-A (the “Rate Ordinance”) which created the Rate Board and prescribed certain ratemaking standards.

The Water Revenue Bureau (“WRB”), which is a division within the City’s Revenue Department, is responsible for billing, collection, and customer accounting for the Water and Wastewater Systems. Functions such as customer care and delinquent enforcement are joint responsibilities of the Water Department and the WRB. The City’s Revenue Commissioner oversees the activities of the WRB. The City’s Finance Director has the ultimate oversight of the WRB.

The Water Commissioner, who is appointed by the City’s Managing Director with approval of the Mayor, leads the Water Department. In June 2019, the City appointed Mr. Randy Hayman as Water Commissioner. Mr. Hayman is an environmental attorney and prior to his appointment as Commissioner, he served as a partner at Beveridge & Diamond, and as an attorney for the District of Columbia Water and Sewer Authority and the Metropolitan St. Louis Sewer District.

Under Ordinance No. 130251-A, known as the Rate Ordinance, an amendment to the Philadelphia Code established an independent rate-making body, the Philadelphia Water, Sewer, and Storm Water Rate Board (the “Rate Board”). The Rate Board is responsible for setting and regulating rates and charges for supplying water, sewer, and stormwater services.

1.1 Purpose

At the direction of the Water Department, Black & Veatch Management Consulting, LLC (“Black & Veatch”) conducted a comprehensive rates, fees, and charges cost of service study. The purpose of this Report is (1) to project and examine the future operating and capital financing requirements of the utilities and the ability of existing rates to recover the requirements, and (2) to develop rates and charges to recover these revenue requirements.

In conducting these analyses and in forming an opinion of the projection of future financial operations summarized in this Report, Black & Veatch made certain assumptions on the conditions, events, and circumstances that may occur in the future. The methodology utilized in performing the analyses follows generally accepted practices for such projections. Such assumptions and methodologies are reasonable and appropriate for the purpose for which they are used. While we believe the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that occur. Such factors may include the utilities’ ability to execute the capital improvement program as scheduled and within budget, regional climate and weather conditions affecting the demand for water, discharge of wastewater flow and adverse legislative, regulatory, or legal decisions (including environmental laws and regulations) affecting the utilities’ ability to manage the system and meet water quality requirements.

1.2 Scope of Work

This Report presents the results of a comprehensive study of projected revenue requirements, cost of service, and proposed rates and charges for water, sanitary sewer, and stormwater service. Revenue and revenue requirements cover the Study Period beginning July 1, 2020 and ending June 30, 2026 (the “Study Period”). The analyses recognize growth patterns and water consumption patterns throughout the Water Department’s service territory. The Water Department authorized the comprehensive study to assess the Water and Wastewater Systems’ ability to meet current and future anticipated financial obligations and to develop a financing plan and proposed rates sufficient to fund operations and support capital financing needs.

The cost of service analysis conducted herein utilizes a cost causative approach endorsed by the American Water Works Association (“AWWA”) Principles of Water Rates, Fees, and Charges Manual of Water Supply Practices M1 (“M1 Manual”) and Water Environment Federation (“WEF”) Financing and Charges for Wastewater Systems, Manual of Practice (“MoP”) No. 27; as well as WEF’s User Fee Funded Stormwater Programs manual. These allocation methodologies produce cost of service allocations recognizing the projected customer service requirements for the City. Proposed rates are designed in accordance with allocated cost of service and local policy considerations.

As part of the Water Department’s 2021 Rate Filing (“Rate Filing”), the Water Department, Black & Veatch, and others produced several documents included as schedules and exhibits supporting the Rate Filing. This Report reflects a compilation of these documents, and cross-references to the appropriate testimony, schedules, and exhibits are noted to facilitate the review of the Rate Filing and this Report.

1.3 Coronavirus 19 Pandemic

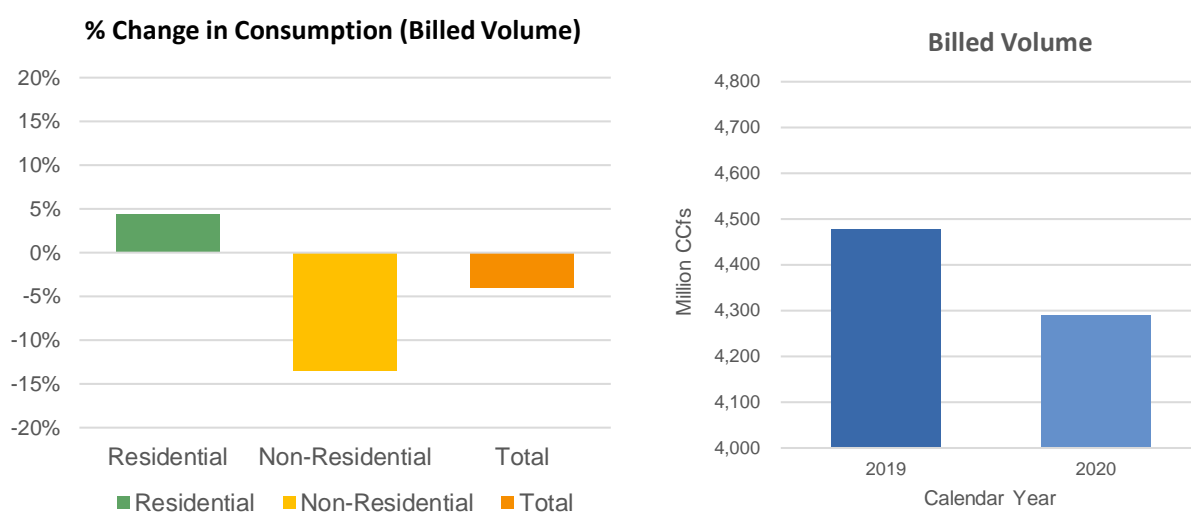
Throughout this Report, the projections presented reflect the fact that the COVID pandemic has significantly impacted the nation’s economy and the Water Department. Quarantines, business closures, work-from-home restrictions, and health and safety requirements have stretched the Water Department’s ability to maintain existing customer levels of service. The pandemic has put further pressure on the Water Department’s revenues particularly in the areas of consumption, revenue collections, and shut-offs.

The following sections provide additional context on how COVID is impacting the Water Department. The assumptions presented herein reflect both the observed trends and the Water Department’s response to the pandemic.

1.3.1 Decreased Consumption

Figure 1-1 illustrates how consumption levels have decreased during COVID. Specifically, the Water Department reports a 4% overall reduction between late March through December 2020 compared to the same period in the prior fiscal year. The increase in residential consumption due to work-from-home orders and the shut-off moratorium is 4.4%. Still, the 13.5% decline in non-residential usage is so large that it negates any potential revenue gains achieved by the residential demand increase.

Figure 1-1 Change in Demand During COVID



1.3.2 Decreased Collections

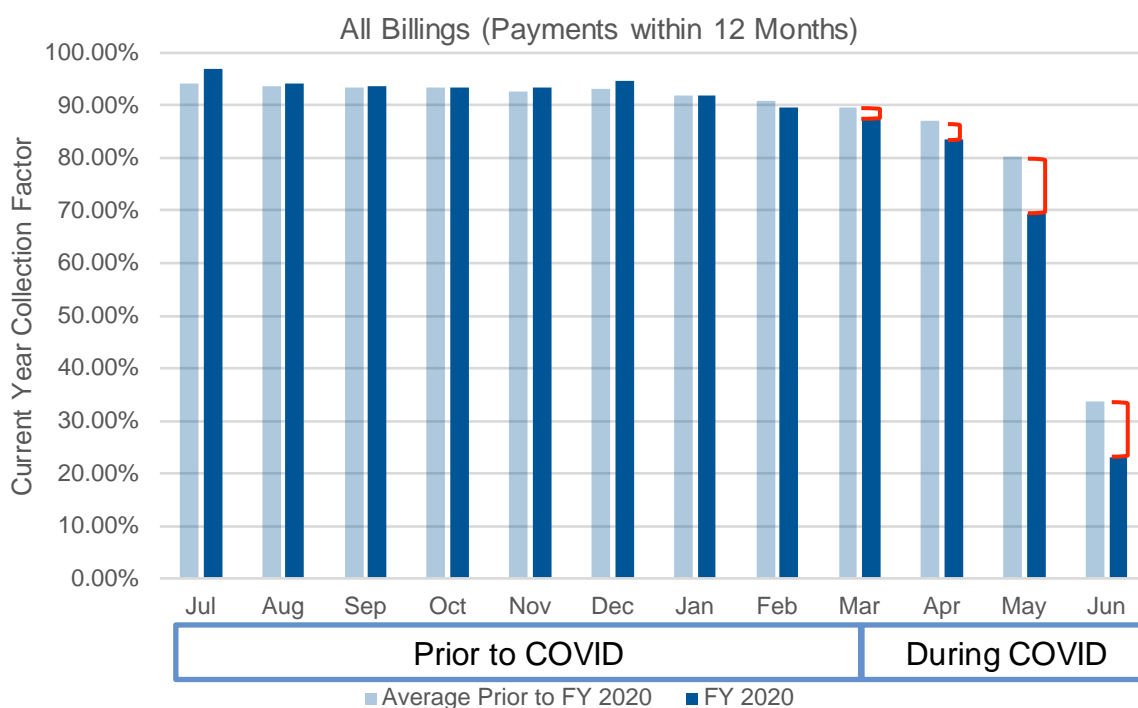
Changes in collection patterns typically take a few months to manifest after an economic event.

Figure 1-2 bears out this observation and shows that current year billings during the first three months of COVID are as much as 10% less than the same period historical average during fiscal years 2012 to 2019. The data clearly shows a greater rate of decline as the pandemic lengthens and suggests that the Water Department may not have seen the lowest month of collections yet since the data only reflect numbers through June. Data trends suggest that fiscal year 2021 collections may be lower by 5 to 10% overall.

1.3.3 Shut-off Moratorium

Per the Governor's order and in accordance with the City's directive, the Water Department suspended water service terminations beginning in March 2020. The Water Department waived shut-off and reconnect fees on March 20th, 2020 and started restoring service to most delinquent accounts. As of the end of December 2020, over 72,000 accounts were eligible for shut-off. The duration of the shut-off moratorium is unknown; however, both the Water Department and the WRB expect that the number of shut-off eligible accounts will continue to rise, and impact collections without the lack of an enforcement mechanism.

Figure 1-2 **Impact of Pandemic on Collections**



1.3.4 Water Department Actions

After the Commonwealth of Pennsylvania enacted a “stay at home” order in late March, the Water Department implemented several management initiatives and cost-saving strategies focused on maintaining service to its customers and addressing the pandemic’s economic challenges. The following is a list of some of the steps that the Water Department has undertaken in response to the pandemic’s impacts.

- **Modifications to Fiscal Year 2021 Budget.** The Water Department reduced the original fiscal year 2021 budget by about \$25 million.
- **Increased Cost Monitoring.** Water Department staff perform monthly budget reviews to monitor cost trends for compliance with General Bond Ordinance requirements.
- **Suspension of Discretionary Expenses.** The Water Department has suspended or significantly decreased all travel and other reimbursable expenses.
- **Delayed Capital Improvement Program.** The Water Department is focusing only on critical capital projects in fiscal year 2021. As a result, the Water Department is postponing many capital projects until further notice.
 - Projects currently in construction are being allowed to continue
 - Bid projects that have not entered the construction phase are frozen unless the project is deemed critical for maintaining the operation of the system
 - No project bidding unless the project is deemed critical for the system’s operation or is of an emergency nature.
 - Engineering consulting contracts for the design and planning of capital projects will continue so that projects will be ready to bid once conditions return to normal.
- **Withdrawal of Fiscal Year 2021 and 2022 Rate Case.** Before the pandemic’s onset, the Water Department filed for a rate adjustment for fiscal years 2021 and 2022. However, when it became clear that there was no clear end of sight for the pandemic, the Water Department withdrew the rate case on June 10, 2020.
- **Use of Reserves.** To meet its ongoing revenue needs and financial metrics, the Water Department made a \$33 Million withdrawal from the Rate Stabilization Fund (“RSF”) in fiscal year 2020. The rate case’s withdrawal, coupled with decreases in consumption and collections, means that the Water Department will need to withdraw another \$42 Million from the Rate Stabilization Fund in fiscal year 2021 to meet ongoing obligations.

1.4 General Assumptions

The following discussion summarizes the general assumptions used to analyze projected revenues and revenue requirements for the Study Period.

1.4.1 Revenue

- Projected fiscal year (“FY”) 2021 to FY 2026 service revenues under existing rates reflect the current FY 2021 rates (effective October 1, 2020). Base Rates remain unchanged from FY 2020.
- Total system accounts are anticipated to remain stable during the Study Period.
- Projected water usage reflects the current number of accounts and the projected usage per account.
- Black & Veatch has adjusted the usage per account projections to reflect the pandemic demand patterns for various customer types¹³. Those usage per account assumptions are as follows:
 - For all customer types, the 2-year average usage per account for FY 2018 and FY 2019 serves as the initial basis for the projection.
 - To reflect the impact of the COVID pandemic, Black & Veatch included the following adjustments:
 - FY 2021 usages per account are adjusted by applying escalation factors¹⁴ to reflect current customer demands based on recent monthly reporting data.
 - The usage per account reflects the Commonwealth of Pennsylvania’s extended shut-off moratorium.
 - Except for the Residential customers with a 5/8-inch meter, constant consumption levels are assumed over the Study Period. Further decreases in usage for the remaining customer types are not anticipated over the Study Period as they experienced significant usage declines due to the pandemic.
 - Prior to the pandemic, the 5/8-inch meter General Service customers, including the Residential customer type, have historically exhibited a 2.0% annual decrease over time. While Residential usage has increased in recent months, a resumption of the historical decline in consumption for 5/8-inch residential service customers is anticipated. This decrease is assumed to resume beginning in FY 2023 and continue for the remainder of the Study Period as people return to work.

Table 1-1 provides the baseline usage per account and summarizes the associated escalation factors for the Study Period.

Table 1-2 summarizes these assumptions and reflect Black & Veatch’s review of the historical 2-Year Average change¹⁵

¹³ The COVID-19 pandemic and associated economic downturn have influenced customer demand in the months since Pennsylvania’s initial shut-down in March 2020.

¹⁴ These escalation factors are based upon comparing the usage from July 2019 to February 2020 (before the pandemic) and April to October 2020.

¹⁵ Since the Commercial and Industrial customer types’ usage was significantly reduced due to the pandemic, a continuation of the historical trend of decreasing usage is not anticipated over the Study Period.

Table 1-1 Demand Escalation Factors by Customer Type [Schedule BV-6: WP-1, Table 1]

CUSTOMER TYPE	USAGE PER ACCOUNT [1] (MCF)	FY 2021	FY 2022	FY 2023 TO FY 2026
Senior Discount				
Senior Discount 5/8"	5.45	10.0%	0.0%	0.0%
Senior Discount >5/8"	6.54	10.0%	0.0%	0.0%
Residential				
Residential 5/8"	6.48	5.5%	0.0%	(2.0%)
Residential >5/8"	43.49	0.0%	0.0%	0.0%
Commercial				
Commercial 5/8"	10.71	(7.4%)	0.0%	0.0%
Commercial > 5/8"	149.35	(7.4%)	0.0%	0.0%
Industrial				
Industrial 5/8"	12.71	(25.4%)	0.0%	0.0%
Industrial > 5/8"	216.73	(25.4%)	0.0%	0.0%
Public Utilities				
Public Utilities 5/8"	9.77	(9.8%)	0.0%	0.0%
Public Utilities >5/8"	86.84	(9.8%)	0.0%	0.0%
PHA	26.76	0.0%	0.0%	0.0%
Charities & Schools	72.66	(19.3%)	0.0%	0.0%
Hospitals and Universities	713.72	(46.0%)	0.0%	0.0%
Hand Billed	1,864.84	(1.5%)	0.0%	0.0%
Scheduled	3.73	(3.8%)	0.0%	0.0%
Fire Service	2.51	11.2%	0.0%	0.0%

Notes:

1. Baseline Usage per Account uses the 2-year average usage per account for FY 2018 and FY 2019. See Appendix A of Schedule BV-6: WP-1.

Table 1-2 Historical Usage per Account for General Service Customers (5/8" Meters)
[Schedule BV-6: WP-1, Table 2]

Description	Historical (Fiscal Year)				
	2015	2016	2017	2018	2019
Annual Billed Volume Per Account (Mcf/Account)	7.32	7.02	6.93	6.75	6.64
Annual Change	0.69%	(4.10%)	(1.28%)	(2.60%)	(1.63%)
2 Year Average Change		(1.73%)	(2.70%)	(1.94%)	(2.11%)

- FY 2021 revenue projections for stormwater reflect the following
 - The current initial billing data of Impervious Area ("IA") and Gross Area ("GA"), as of June 2020;
 - FY 2022 projections and beyond reflect full implementation of the updated IA and GA stormwater billing data; and
 - Reductions in billable IA and GA square footage resulting from stormwater credits and appeals.
- Projected revenues under existing rates reflect the anticipated cumulative receipts for the water, sanitary sewer, and stormwater services (including retail and wholesale receipts) each fiscal year. The receipts for each fiscal year are estimated based on the projected system billings and the associated projected collection factors.
 - Projected collection factors for retail Non-Stormwater Only and Stormwater Only Customers are based historical collections data for FY 2012 through FY 2020¹⁶. The collection factors represent the multi-year payment pattern for the following periods:
 - **Billing Year** – All payments associated with a given fiscal year's billing and received within the 12 months following the beginning of the fiscal year.
 - **Billing Year Plus 1** – All payments associated with a given fiscal year's billing and received within 13-24 months following the beginning of the fiscal year.
 - **Billing Year Plus 2 and Beyond** – All payments associated with a given fiscal year's billing and received after 24 months following the beginning of the fiscal year.
 - Collection factors used in the financial plan analysis reflect the average collection factors for these periods based upon the historical fiscal years and represent the multi-year payment pattern¹⁷. The collection factors used in the analysis are presented in Table 1-3.

¹⁶ As provided by Raftelis. See Schedule BV-6: WP-1, Appendix C. Refer to Raftelis Report 4 for additional background data regarding historic billing and collections.

¹⁷ The application of collection factors to projected billings results in estimated receipts used to develop projections of anticipated fiscal year revenues. Collection factors do not represent all billings or receipts and they are limited by available data from FY 2012 to FY 2020.

Table 1-3 Projected Collection Factors [Schedule BV-6: WP-1, Table 3]

	BILLING YEAR	BILLING YEAR PLUS 1	BILLING YEAR PLUS 2 AND BEYOND
Non-Stormwater Only	86.60%	8.76%	1.94%
Stormwater Only	63.99%	7.98%	6.65%

- The economic recession resulting from the pandemic is impacting overall collections. As such, the following adjustments to the projected collection factors are proposed based upon the Water Department's recent experience¹⁸:
 - FY 2021 Billing Year Collection Factors – Reduce by 8%.
 - FY 2022 Billing Year Collection Factors – Reduce by 4%.
 - FY 2023 Billing Year Collection Factors – Reduce by 2%.
- Operating Fund and Rate Stabilization Fund interest earnings are estimated based on projected fund balances and 1.0% annual interest earnings rate.
- Miscellaneous and contra revenues are projected based on historical and budgeted levels as summarized in Table 1-4.

Table 1-4 Projected Miscellaneous and Contra Revenues [Schedule BV-6: WP-1, Table 4]

DESCRIPTION	FISCAL YEARS	PROJECTION
Penalties [1]	2021 – 2026	\$6.7 Million / Year to \$9.8 Million / Year
Other Miscellaneous Revenue [2]	2021 – 2026	\$12.0 Million / Year
Debt Service Reserve Release	2021	\$19.8 Million
State and Federal Grants [3]	2021 – 2026	\$1.0 Million / Year
License and Inspection Permits [2]	2021 – 2026	\$5.8 Million / Year
UESF Grants [3]	2021 – 2026	\$0.3 Million / Year
Stormwater Customer Assistance Program (CAP) [4]	2021 – 2026	(\$1.7) Million / Year

Notes:

1. Reflects 1.0% of billings under existing rates for FY 2021 to account for anticipated waiving of penalties due to COVID. FY 2022 reflects 1.5% of billings based on the two-year historical average from FY 2018 to FY 2019, assuming a return to pre-COVID levels.
2. FY 2020 reflects the 2-year average for FY 2019 and FY 2020.
3. Reflects FY 2021 Budget amount.
4. Stormwater CAP revenue loss is anticipated to remain constant due to the updated stormwater billing data.

¹⁸ Current monthly collection data imply that collection rates are lower by 10% compared to the average historical data. The proposed adjustment factors assume some recovery from the current monthly trends and anticipate an improvement of collections over the next several years.

1.4.2 Operating Expenses

- For FY 2021, projected operating expenses are based on the Water Department's approved FY 2021 budget and the application of the actual-to-budget factors to estimate anticipated expenses.
- For FY 2022 through FY 2026, projected operating expenses are based on escalation of the FY 2021 projected operating expenses and include additional adjustments for planned increases or decreases in operating expenses.
- Operating Expenses for FY 2022 through 2026 are projected by applying the annual escalation factors to the projected FY 2021 operating expenses by category as presented in Table 1-5.

Table 1-5 Annual Escalation Factors [Schedule BV-6: WP-1, Table 6]

CLASS	DESCRIPTION	ANNUAL ESCALATION FACTOR				
		FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
100	Labor Costs	2.00%	2.00%	2.00%	2.00%	2.00%
191	Pension	1.78%	3.28%	2.82%	2.80%	2.67%
190	Pension Obligations	0.00%	0.00%	0.00%	0.00%	0.00%
1xx	Benefits	4.89%	4.05%	3.92%	3.81%	4.17%
220	Power	0.00%	0.50%	1.00%	1.00%	1.00%
221	Gas	5.50%	1.50%	1.50%	1.00%	1.00%
200	Services	0.00%	1.60%	1.60%	1.60%	1.60%
200	Public Property - Leases	1.80%	1.80%	1.80%	1.80%	1.80%
307	Chemical Costs	2.50%	2.50%	2.50%	2.50%	2.50%
300	Materials and Supplies	2.63%	2.63%	2.63%	2.63%	2.63%
400	Equipment	2.80%	2.80%	2.80%	2.80%	2.80%
500	Indemnities	0.00%	0.00%	0.00%	0.00%	0.00%
800	Transfers	0.00%	0.00%	0.00%	0.00%	0.00%

- The escalation factors for Labor costs are based on the prior average annual salary increases under the current labor agreement.
- The pension and benefit cost escalation factors are based on the cost increases reflected in the City's current projections.
- The escalation factors for Power and Gas are based on the City's Energy Office estimates and provided in Schedule BV-6: WP-1, Appendix I.
- The escalation factors for Chemicals reflect the 2-year annual increase per the Water Department's recent experience.
- The escalation factors for Public Property – Leases use the 3-year average annual increase per the Water Department's recent experience.

- The escalation factor for Equipment is based upon the 2-year and 3-year average increase per the Producer Price Index (“PPI”) for Construction Equipment and Machinery.
- The escalation factor for Materials and Supplies is based upon the 2-year and 3-year average increase per PPI for Materials for Construction.
- No escalation factor is applied for Indemnities and Transfers for FY 2022 through FY 2026.

1.4.3 Other Adjustments and Expenditures

Projected Operating Expenses also include adjustments as presented in Table 1-6.

Table 1-6 Additional Adjustments for Projected Operating Expenses
[Schedule BV-6: WP-1, Table 7]

DEPARTMENT	CLASS	FISCAL YEARS	ADJUSTMENT AMOUNT	PURPOSE
Operations	100	2022 to 2026	\$0.6 Million to \$2.2 Million	Additional Water Department staff costs related to the Consent Order & Agreement (also known as Green City, Clean Waters).
Planning & Environmental Services	100	2022 to 2026	\$0.05 Million	Additional staff costs due to the Pennsylvania Department of Environmental Protection (“PADEP”) regulatory requirements for sample collection and field testing.
City Finance	100	2022 to 2026	\$0.7 million to \$2.4 Million	Additional pension and benefits costs associated with additional staff noted above. Costs are estimated based upon the City’s estimated fringe costs as a percentage of salaries (as provided).
Finance	200	2022 to 2026	\$10.0 Million	Restoration of SMIP/GARP Budget to prior levels.
Planning & Environmental Services	100	2022 to 2026	\$0.7 Million to \$3.8 Million	Transition of staff salaries from Capital Funded Positions to O&M Funded.
Construction & Engineering	100	2022 to 2026	\$1.0 Million to \$5.6 Million	Transition of staff salaries from Capital Funded Positions to O&M Funded.
Operations	200	2022 to 2026	(\$6.8 Million) to (\$7.0 Million)	Reduction of maintenance.
Operations Admin	400	2022 to 2026	\$1.6 Million to \$1.8 Million	Restoration of the budget for Water Department vehicles.

- Liquidated encumbrances for FY 2021 thru FY 2026 are estimated as 17.4% of projected Services (Class 200) and Materials and Supplies (Class 300) expenses excluding Stormwater Management Incentive Program/Greened Acre Retrofit Program (“SMIP/GARP”). The projection is based on the average of the actual ratio of liquidated encumbrances to expenses for Services (Class 200) and

Materials and Supplies (Class 300) experienced in FY 2018 to FY 2020. SMIP/GARP is excluded from this ratio as the budget has been fully expended.

1.4.4 Debt Service

- Existing debt service reflects the actual debt service schedules for the following issuances:
 - All Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2020.
 - Water and Wastewater Revenue and Revenue Refunding Bonds Series 2020A and Water and Wastewater Revenue Refunding Bonds Series 2020B (issued in FY 2021); and
 - The forward refunding of Water and Wastewater Revenue Bonds Series 2011A (issued in FY 2021).
- Projected debt service reflects anticipated bond issues for each fiscal year of the Study Period and assumed interest rates of 5.0% in FY 2022 and 5.25% thereafter; all issuances are assumed to have a 30-year tenure.
- Projected debt service for the anticipated bond issues in FY 2022 to 2026 reflect:
 - Bond issuance in July of each year;
 - Level debt service payments with interest-only payments, in October and April, during the first year of the bond amortization;
 - First maturity of each series on October 1st; and
 - Bond issuance cost of 0.65% based upon the Water and Wastewater Revenue Bonds Series 2020A and 2020B issues.
- Projected debt service also includes using a revolving Commercial Paper (“CP”) Program¹⁹ as authorized by City Council on November 19, 2020.
 - Beginning in FY 2022, the CP Program is intended to fund approximately \$200 Million of capital improvements per year at a 2.0% annual interest rate.
 - In each subsequent fiscal year following the CP's use, the Water Department expects to issue revenue bonds for permanent financing.

1.4.5 Bond Covenants, Transfers, and Fund Balances

- The General Bond Ordinance rate covenant requires the following:
 - Minimum senior debt service coverage of 1.20;
 - Interest due on the CP program is considered on par with senior debt and included in the determination of senior debt service coverage in accordance with the General Bond Ordinance.
 - Per the 2018 Rate Determination, the Water Department targets a debt service coverage of 1.30.
 - However, minimum senior debt service coverage is proposed for the Study Period.

¹⁹ The Commercial Paper Program provides the Water Department the ability to temporarily fund obligations on a revolving basis, in an aggregate principal amount no greater than \$400 million at any time.

- Net Revenues, excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year, must equal to at least 90% of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) payable in such fiscal year (this is referred to herein as the “90% Test”); and
- Minimum total debt coverage of 1.00.
- Projected FY 2021 to FY 2026 Capital Account Deposits are based on the following assumptions:
 - Inflated net plant investment of 5.8% per year based on the average annual increase in net plant investment during FY 2019 and FY 2020.
 - Annual Capital Account Deposit is based on 1.0% of the prior year projected net plant investment (original cost less depreciation).
- In accordance with the 2018 Rate Determination, the Water Department has a Rate Stabilization Fund balance target of approximately \$135 Million.
 - Due to the pandemic, the Water Department did not request a Base Rate revenue increase for FY 2021. As a result, the Water Department is leveraging available Rate Stabilization Fund balance to meet overall revenue requirements, including debt service coverage needs.
 - The projected withdrawal from the Rate Stabilization in FY 2021, will result in a FY 2022 beginning year balance almost 20% below the target level of \$135 million.
 - For the Rate Period, the Water Department proposes to forego meeting this metric and plans to rebuild necessary reserves over time.
- Residual Transfer to Construction Fund transfers are made as available.
- The end-of-year Residual Fund balance is maintained at \$15.0 Million for the Study Period.
- The FY 2021 beginning fund balances are based on the preliminary FY 2020 financial results.

1.4.6 Capital Improvement Program

- The projected capital program is based on the Water Department’s adopted FY 2021 Capital Improvement Program (“CIP”) Budget and proposed FY 2022 through FY 2026 CIP budget.
- The Water Department’s CIP budget is an appropriation-based budget and reflects the following:
 - The budget for each respective fiscal year represents the total cost of the capital improvements expected to be let in that fiscal year;
 - The total CIP Budget does not represent expected project duration or anticipated cashflows;
 - The CIP Budget includes contingencies; and
 - The CIP Budget does not include inflation.
- Due to a change in the City’s funding policy for capital projects, the Water Department will only contract fully funded CIP projects and must provide sufficient CIP funding so that estimated outstanding encumbrances (or project commitments) will not exceed available funding in any given fiscal year. Overall CIP funding sources, including revenue from current year rates, bond proceeds, CP

proceeds, other loans, and accumulated interest, are compared against overall project encumbrances less estimated capital spending.

- To evaluate CIP program funding, Black & Veatch estimated the expected encumbrances for each fiscal year of the Study Period, based upon the Water Department's CIP Budget and adjusted to reflect the following:
 - The shift in positions from the Capital Fund to Operating;
 - The rollforward of remaining FY 2020 budget appropriations associated with vehicle purchases;
 - The rollforward of remaining FY 2021 budget appropriation due to bidding and project-related delays, as provided by the Water Department;
 - Annual inflation of 3.0% based on industry construction cost indices for FY 2023 to FY 2026 capital program costs (relevant capital cost industry indices are provided in Schedule BV Schedule 6: WP-1, Appendix H); and
 - Removal of contingencies by applying an adjustment factor of 85% to planned improvements, excluding Engineering and Administration and Vehicles.
- To assess the drawdown of available CIP Funding, estimates of annual capital expenses reflect the timing of annual encumbrances as noted above and further account for the following:
 - Anticipated program level project durations:
 - Water Conveyance – 2 years;
 - Sewer Collection – 3 years;
 - Facilities Improvements – 5 years; and
 - Adjusted cash flow reflecting a two-month shift in spending from FY 2020 to FY 2021 as the result of a temporary shutdown of the capital program in FY 2020 due to the pandemic.

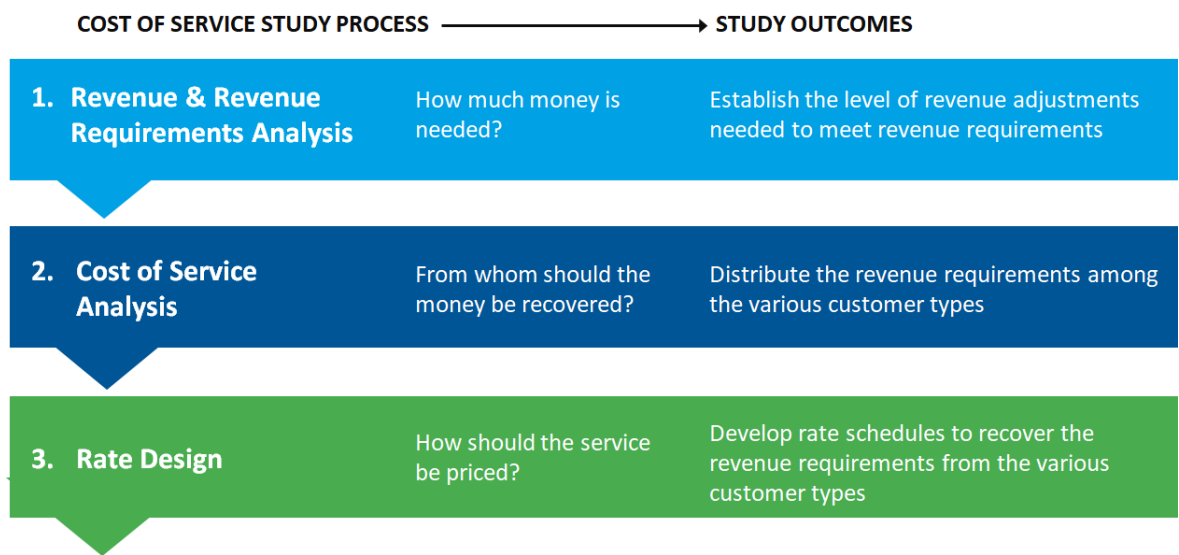
2.0 Combined System Summary

The Water Department is a self-supporting enterprise fund dedicated to providing high-quality water and wastewater services (which includes stormwater services) to the City’s residents and businesses. Water operations provide potable water for its residential, commercial, and industrial water demands. Wastewater operations provide sanitary sewer treatment and collection services to its residential, commercial, and industrial customers. The Water Department performs many of the City’s stormwater activities, including maintenance of the City’s 750 miles of separate storm sewers, 1,850 miles of combined sewers, and 71,500 stormwater inlets. Service to customers located outside the City is on a wholesale basis through contracts with various entities. The respective contracts for service to each wholesale customer set forth the present bases for charges.

2.1 Cost of Service Study

To provide these services and fulfill all its regulatory obligations, the Water Department fully funds its operations through its rates and charges imposed on its retail and wholesale customer base. Thus, the Water Department not only performs a multi-year financial plan that supports revenue sufficiency, but it also conducts retail and wholesale cost of service studies and goes through a rate case process which concludes with the determination by the Rate Board. A Cost of Service study serves as the foundation for establishing rates and charges. Figure 2-1 illustrates the three parts of such a study. This section presents the results for the Combined System. Specifically, it summarizes the proposed financial plan for the Combined System during the Study Period and presents the FY 2022 and FY 2023 proposed schedule of rates for water, sanitary sewer, and stormwater services.

Figure 2-1 Elements of a Cost of Service Study



To assist the reader with understanding potential impacts customer impacts associated with the proposed rates, typical monthly bills for select customer types are included using a range of volumes at the recommended FY 2022 and FY 2023 rates. Details regarding the cost of service study for the Water System and Wastewater System are presented in subsequent sections of this Report. PWD Exhibit 6 includes the full model workpapers for FY 2022 in support of the Rate Filing.

2.2 Revenue

Using the assumptions discussed in Section 1.4 and the details derived for the Water System and the Wastewater System presented later in this Report, Table 2-1 presents the Projected Revenues (receipts) for the Combined System. These revenues reflect the application of the billing collection factors presented in Table 1-3 to gross billings, which are the result of applying the existing rate schedules to projections of customer accounts, consumption, billed volume, and impervious and gross areas. Specifics regarding the projection of gross billings is described later in this Report.

Table 2-1 Projected Receipts Under Existing Rates [Schedule BV-1: Table C-3]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
1	Water Sales Receipts	\$ 253,071	\$ 263,593	\$ 266,743	\$ 269,713	\$ 267,430	\$ 265,151
	Wastewater Sales Receipts						
2	Sanitary Sewer	245,058	253,995	256,956	259,796	258,165	256,537
3	Stormwater	161,671	169,438	172,311	174,974	173,929	172,897
4	Subtotal Wastewater Receipts	406,729	423,433	429,267	434,770	432,095	429,434
5	Total Water & Wastewater Receipts	659,800	687,026	696,010	704,483	699,525	694,584
Other Income							
6	Penalties	6,722	10,089	10,008	9,931	9,854	9,778
7	Miscellaneous City Revenue	1,650	1,650	1,650	1,650	1,650	1,650
8	Other	9,963	9,963	9,963	9,963	9,963	9,963
9	State & Federal Grants	1,000	1,000	1,000	1,000	1,000	1,000
10	Permits Issued by L&I	5,800	5,800	5,800	5,800	5,800	5,800
11	Miscellaneous (Procurement)	390	390	390	390	390	390
12	City & UESF Grants	300	300	300	300	300	300
13	Affordability Program Discount Cost (a)	-	-	-	-	-	-
14	Release from Debt Service Reserve (b)	19,808	-	-	-	-	-
15	Other Operating Revenues	45,633	29,192	29,111	29,034	28,957	28,881
Interest Income							
16	Interest Income on Debt Service Reserve Fund (c)	-	-	-	-	-	-
17	Operating Fund	1,071	1,280	1,316	1,354	1,376	1,413
18	Rate Stabilization Fund	1,298	1,089	1,092	1,110	1,127	1,132
19	Total Nonoperating Income	2,369	2,369	2,408	2,464	2,502	2,545
20	Total Receipts	\$ 707,802	\$ 718,587	\$ 727,529	\$ 735,981	\$ 730,984	\$ 726,010

(a) Affordability Program Discounts represent anticipated lost revenue due to the Tiered Assistance Program (TAP).

Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

In addition to rates and charges, the Water Department also has wholesale service contracts for water and wastewater service, provides private fire protection to certain customers who maintain private fire systems, and assesses surcharges for customers with high strength wastewater.

2.2.1 Other Operating Income

The Water Department has several sources of other revenues including miscellaneous fees, City and Utility Emergency Services Fund (“UESF”) grants, License and Inspection (“L&I”) permits, penalties, and releases from the Debt Service Reserve Fund. These revenues are shown on Lines 6 through 15 of Table 2-1.

2.2.2 Non-Operating Income

The Water Department’s non-operating income consists primarily of interest earnings on the amounts within certain funds and accounts. In accordance with the authorizing revenue bond ordinance, the analysis credits interest earnings in the Debt Reserve Fund, Revenue Fund, and the Rate Stabilization Fund as revenue to the Revenue Fund. Interest Earnings in the Debt Reserve Fund are first credited to the extent that they are needed to fulfill the Debt Service Reserve Requirement. Once the Debt Service Reserve Requirement is met, any remaining monies, up to a maximum of \$4,994,000 is permitted to be transferred to the City’s General Fund.

Actual annual fund valuations and interest earnings are based on a mark-to-market valuation which the City performs at the end of the fiscal year. The differential between mark-to-market and the Debt Reserve Fund requirement results in:

- Either a transfer from the Operating Fund of the Water Department to the Debt Reserve Fund, if there is a deficiency in the Debt Reserve Fund, or
- A transfer from the Debt Reserve Fund to the Operating Fund of the Water Department, if there is an excess in the Debt Reserve Fund.

Projected transfers from the Debt Reserve Fund to the Operating Fund are included as Other Operating Revenue.

2.2.3 Tiered Assistance Program Rate Rider Surcharge

Revenue figures for the Study Period exclude current Tiered Assistance Program (“TAP”) Rate Rider Surcharge Rates (“TAP-R”), of \$0.57 per thousand cubic feet (Mcf) for water and \$0.78/Mcf for sanitary sewer. The Water Department established TAP in 2017 to assist low-income households at or below 150% of the Federal Poverty Level (“FPL”) and those experiencing special hardship. As part of the 2018 Rate Determination, the Rate Board approved the implementation of a TAP Rate Rider. This rider provides a mechanism to (i) timely reconcile actual TAP costs with estimated TAP-R revenues and (ii) update projected TAP costs for the next rate period. The TAP-R currently recovers the cost of providing discounts to TAP customers from Non-TAP customers and is subject to an annual reconciliation.

The Water Department is proposing to handle the reconciliation of TAP discounts and TAP-R billings as part of a separate proceeding. Consequently, the revenues developed in this Cost of Service study are referred to as the “Base Rate Revenues” because they do not include the impact of providing discounts to TAP customers and associated TAP-R surcharge revenues.

2.3 Revenue Requirements

Projections for the Water Department's revenue requirements for the Combined System make use of the assumptions discussed in Section 1.4.

2.3.1 Operation and Maintenance Expenses

The operation and maintenance ("O&M") expenses incurred by the Water Department are necessary for the effective operation of the Combined System. Not performing timely O&M activities may result in System inefficiencies, affects the level of service provided to customers, and puts the Water Department at risk of not meeting regulatory requirements. Table 2-2 summarizes the general O&M expense categories used by the Water Department for budgeting and reporting purposes.

Table 2-2 O&M Expense Categories

CLASS	CATEGORY	DESCRIPTION
100	Personal Services	Expenses related to salaries, fringe benefits, pension costs, overtime, and other employee-related costs
200	Purchase of Services	Expenses related to contracts or services from outside entities, including electricity and natural gas service
300	Materials and Supplies	Miscellaneous materials and supplies, including water treatment chemicals
400	Equipment	Costs of heavy equipment, trucks, vehicles, boats, trailers, and other related items.
500	Contributions, Indemnities, and Taxes	Includes payments made by the Law Department on behalf of the Water Department for liabilities, claims and property damages. This category also includes taxes and other contributions.
800	Payments to Other Funds	O&M payment to the General Fund associated with the direct interdepartmental services provided to the Water Department by other City Departments

Estimated future O&M expenses include the additional adjustments to items identified on Table 1-6.

Table 2-3 shows the operating expenses for the Combined System incorporating the adjustments to the budgeted O&M, application of the actual-to-budget spend factors, inclusion of additional operating expenses, and adjustments for escalation as discussed in Sections 1.4.2 and 1.4.3.

Table 2-3 Projected Operation and Maintenance Expense [Schedule BV-1: Table C-6]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
1	Personal Services	\$ 157,513	\$ 163,064	\$ 168,411	\$ 173,987	\$ 179,719	\$ 185,610
2	Pension and Benefits	148,940	153,915	159,305	164,544	169,871	175,552
3	Subtotal	306,453	316,979	327,715	338,531	349,589	361,162
	Purchase of Services						
4	Power	14,800	14,800	14,874	15,023	15,173	15,325
5	Gas	4,362	4,602	4,671	4,741	4,788	4,836
6	SMIP/GARP	15,000	25,000	25,000	25,000	25,000	25,000
7	Other	151,471	144,781	147,147	149,552	151,995	154,478
8	Subtotal	185,632	189,183	191,692	194,315	196,956	199,639
	Materials and Supplies						
9	Chemicals	25,317	25,950	26,599	27,264	27,946	28,644
10	Other	25,175	25,837	26,516	27,214	27,929	28,664
11	Subtotal	50,492	51,787	53,115	54,478	55,875	57,308
12	Equipment	2,969	4,686	4,817	4,952	5,091	5,233
13	Indemnities and Transfers	13,044	13,044	13,044	13,044	13,044	13,044
14	Subtotal Expenses	558,590	575,678	590,383	605,319	620,555	636,386
15	Liquidated Encumbrances	(32,746)	(31,810)	(32,374)	(32,962)	(33,557)	(34,163)
16	Total Expenses	\$ 525,844	\$ 543,868	\$ 558,009	\$ 572,357	\$ 586,998	\$ 602,222

2.3.2 Bond Covenants, Transfers, and Fund Balances

The Water Department primarily uses debt financing to pay for necessary capital improvement projects. The Water Department's flow of funds is dictated by the requirements of the General Bond Ordinance. The Water System and the Wastewater System are treated as one combined utility for the purpose of revenue bond financing, pursuant to the General Bond Ordinance.

The General Bond Ordinance establishes the funds and accounts shown in Table 2-4, which are collectively known as the "Water and Wastewater Funds" or the "Water Fund."²⁰

Table 2-4 Water and Wastewater Funds

FUNDS AND ACCOUNTS	
Revenue Fund	Rate Stabilization Fund
Sinking Fund	Construction Fund
<ul style="list-style-type: none"> Debt Service Account Debt Reserve Account Charges Account 	<ul style="list-style-type: none"> Existing Project Account Bond Proceeds Account Capital Account
Subordinated Bond Fund	Residual Fund
	<ul style="list-style-type: none"> Special Water Infrastructure Account

²⁰ The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City. The Water Fund is an accounting convention established for the purposes of accounting for the assets, liabilities, revenues, expenses of and to measure Rate Covenant compliance for, the Water and Wastewater Systems.

Revenues collected by the Water Department cascade through the Revenue Fund in the priority order shown in Figure 2-2.

Figure 2-2 General Flow of Funds

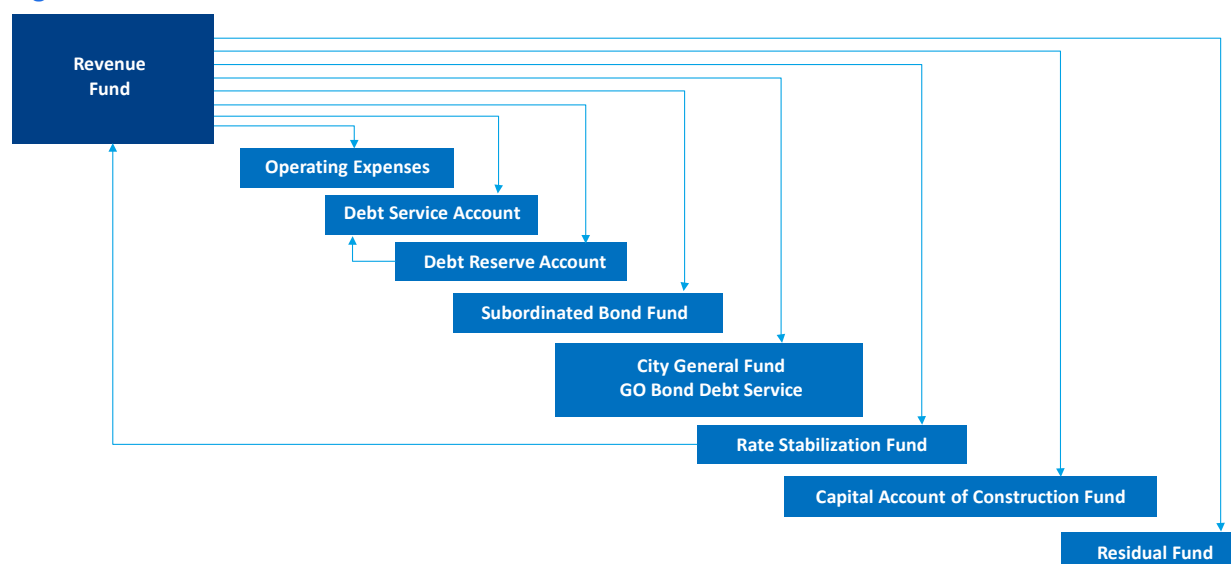


Table 2-5 summarizes the performance targets of the General Bond Ordinance and the 2018 Rate Determination described in Section 1.4.

Table 2-5 Combined System Performance Targets

DESCRIPTION	PERFORMANCE TARGET
GENERAL BOND ORDINANCE PERFORMANCE TARGETS	
Debt Coverage	Minimum Senior Debt Coverage: 1.20 Senior Debt Coverage from Current Revenues: 0.90x Minimum Total Debt Coverage: 1.00x
Capital Account Deposit	1.0% of prior year net plant investment
2018 RATE DETERMINATION PERFORMANCE TARGETS	
Debt Coverage	Senior Debt Service Coverage 1.30x
Cash Funded Capital	20% of Annual Capital Expenditures
Rate Stabilization Fund Balance	Target of \$135 Million
Residual Fund Balance	Annual target of \$15 Million

2.3.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Combined System required to meet regulatory requirements and maintain existing levels of service. The CIP includes water treatment and wastewater treatment facility improvements, distribution system rehabilitation, large meter replacement including the implementation of Advanced Metering Infrastructure ("AMI"), storm flood relief, reconstruction of sewer and green stormwater infrastructure.

As discussed in Section 1.4.6, the Water Department's CIP is an appropriations-based projection that is not inflation-adjusted and contains contingencies. An appropriation-based budget means that the Water Department budgets the full amount of a proposed project in the year in which it is expected to be contracted. This type of budgeting does not reflect the actual cash expenditures as the project is executed nor does it reflect the City's capital funding policy, as previously noted. As such, the overall annual CIP encumbrances must be estimated along with project expenses and evaluated against available monies in the Construction Fund, which is discussed in Section 2.4.

The overall resulting CIP Encumbrances adjusted for inflation, budget rollforward, and removal of contingencies as well as the resulting project expenses, which account for program level project durations, are reflected in Table 2-6.

Table 2-6 Projected Capital Program Budget and Annual Expenditures [Schedule BV-1: Table C-7]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
1	Engineering and Administration (a)	\$ 14,000	\$ 13,595	\$ 11,871	\$ 10,147	\$ 8,423	\$ 6,699
2	Plant Improvements	328,000	250,550	309,300	306,600	190,300	301,300
3	Distribution System Rehabilitation	93,060	30,760	106,760	177,860	118,160	108,760
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Storm Flood Relief	15,000	-	15,000	15,000	15,000	15,000
6	Reconstruction of Sewers	72,460	45,260	68,360	68,360	68,360	68,360
7	Green Infrastructure	72,000	20,000	72,000	72,000	72,000	134,000
8	Vehicles	12,000	12,000	12,000	12,000	12,000	12,000
9	Total Improvements	611,520	377,165	600,291	666,967	489,243	651,119
10	Inflation Adjustment (b)	-	-	18,009	40,618	45,366	81,721
11	Inflated Total	611,520	377,165	618,300	707,585	534,609	732,840
12	Rollforward Adjustments	(344,975)	352,000	-	-	-	-
13	Total Inflated Adjusted CIP Budget	266,545	729,165	618,300	707,585	534,609	732,840
14	Contingency Adjustment	(35,028)	(105,536)	(89,057)	(102,613)	(76,844)	(106,769)
15	Annual Encumbrances	231,517	623,630	529,243	604,972	457,765	626,071
16	Project Expenses (c)	324,964	345,303	426,730	535,538	545,260	562,222
17	Annual Net Encumbrances	\$ (93,448)	\$ 278,327	\$ 102,513	\$ 69,434	\$ (87,494)	\$ 63,849

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0 percent per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

2.3.4 Debt Service

Table 2-7 summarizes the existing and proposed debt service payments during the Study Period and reflects the assumptions outlined in Section 1.4.4. For the analyses conducted herein, Black & Veatch worked with the Water Department, and the City's financial advisors to estimate anticipated bond issue sizes, interest rates for a 30-year term, and issuance costs.

In late 2020, the Water Department applied for, and received, a Pennsylvania Infrastructure Investment Authority ("PennVest") loan. PennVest provides low-interest loans and grants for new construction or improvements to publicly or privately-owned drinking water, stormwater, or sewerage treatment facilities. The PennVest loan is parity debt.

Debt Service also includes interest on the Water Department's CP program, which is considered part of senior debt in accordance with the General Bond Ordinance.

As of the date of this Report, the Water Department has no subordinate debt.

Table 2-7 Summary of Existing and Proposed Debt Service [Schedule BV-1: Table C-9]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Revenue Bonds							
1	Existing (a)	\$ 175,726	\$ 163,516	\$ 164,558	\$ 151,302	\$ 151,438	\$ 152,439
	Proposed						
2	Fiscal Year 2022 (b)		10,000	15,851	15,851	15,851	15,851
3	Fiscal Year 2023 (c)			21,875	33,948	33,948	33,948
4	Fiscal Year 2024 (c)				25,594	39,719	39,719
5	Fiscal Year 2025 (c)					18,375	28,516
6	Fiscal Year 2026 (c)						26,250
7	Total Proposed	-	10,000	37,726	75,393	107,893	144,284
8	Total Revenue Bonds	175,726	173,516	202,284	226,694	259,331	296,723
PennVest Loans							
9	PennVest Loans - Parity PennVest (d)	10,651	10,885	11,067	14,864	14,864	15,182
Commercial Paper							
10	Commercial Paper	-	2,000	4,000	4,000	4,000	4,000
11	Total Debt Service	\$ 186,377	\$ 186,401	\$ 217,351	\$ 245,558	\$ 278,195	\$ 315,905

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and

(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Includes projected Pennvest Loan for the Torresdale Pump Station Rehabilitation.

2.4 Sources and Uses of Funds

Table 2-8 summarizes the sources and uses of funds for financing of the Combined System CIP. Line 1 of the table shows the projected total revenue bond principal amounts projected to be issued FY 2022 through FY 2026, to finance the proposed capital improvements of the Water and Wastewater Systems.

As shown in Lines 2 through 5, in addition to funding capital construction costs, the bond issuance proceeds are also used to fund required deposits into the Debt Reserve Fund and pay the costs of bond issuance.

Table 2-8 Projected Flow of Funds – Construction Fund & Debt Reserve Account
 [Schedule BV-1: Table C-8]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	\$ -	\$ 240,000	\$ 500,000	\$ 585,000	\$ 420,000	\$ 600,000
	Transfers:						
2	Debt Reserve Fund (a)	-	16,184	25,644	39,719	28,816	40,771
3	Cost of Bond Issuance (b)	-	1,560	3,250	3,803	2,730	3,900
4	Refund Commercial Paper	-	-	200,000	200,000	200,000	200,000
5	Construction Fund (c)	-	222,256	271,106	341,478	188,454	355,329
6	Total Issue	-	240,000	500,000	585,000	420,000	600,000
Disposition of Commercial Paper Proceeds							
7	Proceeds From Commercial Paper	-	200,000	200,000	200,000	200,000	200,000
	Transfers:						
8	Debt Reserve Fund (a)	-	2,000	2,000	-	-	-
9	Cost of Issuance	-	250	-	-	250	-
10	Construction Fund (c)	-	197,750	198,000	200,000	199,750	200,000
11	Total Issue	-	200,000	200,000	200,000	200,000	200,000
Construction Fund							
12	Beginning Balance	643,908	377,543	518,045	620,231	690,001	601,362
13	Transfer From Revenue Bond Proceeds	-	222,256	271,106	341,478	188,454	355,329
14	Transfer From Commercial Paper Proceeds	-	197,750	198,000	200,000	199,750	200,000
15	Penn Vest Loan	14,884	23,897	10,391	8,048	6,119	2,811
16	Capital Account Deposit	27,833	29,447	31,155	32,962	34,874	36,896
17	Transfer from Residual Fund	10,800	8,000	12,600	16,300	21,000	26,500
18	Interest Income on Construction Fund	5,082	4,456	5,663	6,519	6,425	6,310
19	Total Available	702,507	863,348	1,046,961	1,225,538	1,146,622	1,229,209
20	Net Cash Financing Required	324,964	345,303	426,730	535,538	545,260	562,222
21	Ending Balance	377,543	518,045	620,231	690,001	601,362	666,987
Capital Program Net Encumbrances							
22	Beginning Balance	327,821	234,373	512,700	615,213	684,647	597,153
23	Annual Encumbrances	231,517	623,630	529,243	604,972	457,765	626,071
24	Project Expenses	(324,964)	(345,303)	(426,730)	(535,538)	(545,260)	(562,222)
25	Ending Balance	234,373	512,700	615,213	684,647	597,153	661,002
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	234,373	512,700	615,213	684,647	597,153	661,002
Debt Reserve Fund							
28	Beginning Balance	195,433	175,625	193,809	221,453	261,172	289,988
29	Transfer From Bond Proceeds	-	18,184	27,644	39,719	28,816	40,771
30	Debt Service Reserve Release	(19,808)	-	-	-	-	-
31	Ending Balance	175,625	193,809	221,453	261,172	289,988	330,759
32	Interest Income on Debt Reserve Fund	\$ 1,855	\$ 1,847	\$ 2,076	\$ 2,413	\$ 2,756	\$ 3,104

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

(b) Cost of bonds issuance assumed at 0.65 percent of issue amount.

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

Line 7 presents the CP Program proceeds, while lines 8 through 10 show the amounts deposited to the Debt Reserve Fund and Construction Fund as well as the Cost of Issuance. The annual Debt Reserve Fund balance must equal the maximum future annual debt service estimated for the outstanding and proposed bonds as well as interest on the CP program.

Per the updated City funding policy for capital projects, the Water Department will need to maintain sufficient funds (including revenue sources from current year rates, bond proceeds, CP proceeds, other loans, and accumulated interest) in the Construction Fund such that outstanding project encumbrances do not exceed available funding. This is best illustrated by comparing the ending balance for the Construction Fund as presented on Line 21 against the Target Balance shown on Line 27, which accounts for new CIP Encumbrances and Project Expenses for each fiscal year. Black & Veatch projects that the Water Department will adhere to the City funding policy for the Study Period, assuming the CP program is successfully launched and requested revenue adjustments are granted by the Rate Board.

The projected bond issuances are as discussed above and consistent with the general assumptions outlined in Section 1.4.

The General Bond Ordinance requires two transfers that impact net revenue requirements: Interest Earnings Payment and the Capital Account Deposit. The Interest Earnings Payment is discussed later in this Report. The Capital Account Deposit is shown on Line 16 and the Residual Fund Transfer is found on Line 17.

Interest income on annual average balances in the Construction Fund and the Debt Reserve Fund are shown in Lines 18 and 32. 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 assumed interest rate of 1.0% is used to determine the interest income for FY 2021 through FY 2026.

2.5 Summary of Revenue and Revenue Requirements

In this section, three tables are presented to provide the statement of financial operations for the Combined System. The first, Table 2-9, is the Water Department's financial plan reflecting only Base Rates. That is, TAP discounts and TAP-R revenues are not included. Table 2-10 presents the cashflows for the TAP discounts and TAP-R revenues. Finally, Table 2-11, combines Table 2-9 and Table 2-10 to show a cashflow for the Combined System accounting for all revenues and revenue requirements. Compliance with the requirements of the General Bond Ordinance and metrics set by the Rate Board is based on Table 2-11. For all three tables, the proposed revenue increases do not reflect any rate compression.

As indicated on Lines 4 through 9 of Table 2-9 and Table 2-11, annual increases in revenue are required beginning in FY 2022. Revenue increases presented on Lines 4 to 9 of Table 2-9 reflect the overall needed increase to the Base Rates. The resulting percentage increases on Table 2-11 are lower because the additional revenue is relative to the total service revenue including TAP-R revenues.

Table 2-9 **Projected Revenue and Revenue Requirements: Base Rates Only**
[Schedule BV-1: Table C-1A]

LINE				FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION			2021	2022	2023	2024	2025	2026
Combined System (\$000s)									
Operating Revenues									
1	Water Service - Existing Rates			\$ 253,071	\$ 263,593	\$ 266,743	\$ 269,713	\$ 267,430	\$ 265,151
2	Wastewater Service - Existing Rates			406,729	423,433	429,267	434,770	432,095	429,434
3	Total Service Revenue - Existing Rates			659,800	687,026	696,010	704,483	699,525	694,584
	Additional Service Revenue Required								
		Percent	Months						
	Year	Increase	Effective						
4	FY 2021	0.00%	10	-	-	-	-	-	-
5	FY 2022	8.70%	10		48,864	60,553	61,290	60,859	60,429
6	FY 2023	5.10%	10			31,543	39,054	38,780	38,506
7	FY 2024	5.10%	10				33,556	40,757	40,469
8	FY 2025	7.30%	10					50,125	60,881
9	FY 2026	7.60%	10						55,599
10	Total Additional Service Revenue Required			-	48,864	92,096	133,900	190,520	255,884
11	Total Water & Wastewater Service Revenue			659,800	735,890	788,107	838,383	890,045	950,468
	Other Income (a)								
12	Other Operating Revenue			45,633	29,192	29,111	29,034	28,957	28,881
13	Debt Reserve Fund Interest Income			-	-	-	-	-	-
14	Operating Fund Interest Income			1,071	1,280	1,316	1,354	1,376	1,413
15	Rate Stabilization Interest Income			1,298	1,089	1,092	1,110	1,127	1,132
16	Total Revenues			707,802	767,451	819,625	869,881	921,505	981,894
Operating Expenses									
17	Total Operating Expenses			(525,844)	(543,868)	(558,009)	(572,357)	(586,998)	(602,222)
Net Revenues									
18	Transfer From/(To) Rate Stabilization Fund			41,700	100	(700)	(2,800)	(600)	(500)
19	NET REVENUES AFTER OPERATIONS			223,658	223,683	260,916	294,723	333,907	379,172
Debt Service									
	Senior Debt Service								
	Revenue Bonds								
20	Outstanding Bonds			(175,726)	(163,516)	(164,558)	(151,302)	(151,438)	(152,439)
21	Pennvest Parity Bonds			(10,651)	(10,885)	(11,067)	(14,864)	(14,864)	(15,182)
22	Projected Future Bonds			-	(10,000)	(37,726)	(75,393)	(107,893)	(144,284)
23	Commercial Paper			-	(2,000)	(4,000)	(4,000)	(4,000)	(4,000)
24	Total Senior Debt Service			(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)			1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	Total Debt Service on Bonds			(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
29	CAPITAL ACCOUNT DEPOSIT			(27,833)	(29,447)	(31,155)	(32,962)	(34,874)	(36,896)
30	TOTAL COVERAGE (L19/(L24+L26+L29))			1.04 x	1.03 x	1.04 x	1.05 x	1.06 x	1.07 x
31	End of Year Revenue Fund Balance			\$ 9,448	\$ 7,835	\$ 12,410	\$ 16,203	\$ 20,839	\$ 26,370

(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 2021.

Table 2-10 Projected Revenue and Revenue Requirements: TAP-R Rates Only
[Schedule BV-1: Table C-1B]

LINE				FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION			2021	2022	2023	2024	2025	2026
Combined System (\$000s)									
Operating Revenues									
1	Water Service - Existing Rates			\$ 3,144	\$ 3,063	\$ 3,069	\$ 3,099	\$ 3,070	\$ 3,040
2	Wastewater Service - Existing Rates			4,565	4,179	4,150	4,184	4,143	4,103
3	Total Service Revenue - Existing Rates			7,709	7,242	7,219	7,284	7,213	7,143
	Additional Service Revenue Required								
		Percent	Months						
	Year	Increase	Effective						
4	FY 2021	0.00%	10	-	-	-	-	-	-
5	FY 2022	0.00%	10		-	-	-	-	-
6	FY 2023	0.00%	10			-	-	-	-
7	FY 2024	0.00%	10				-	-	-
8	FY 2025	0.00%	10					-	-
9	FY 2026	0.00%	10						-
10	Total Additional Service Revenue Required			-	-	-	-	-	-
11	Total Water & Wastewater Service Revenue			7,709	7,242	7,219	7,284	7,213	7,143
	Other Income								
12	Other Operating Revenue (a)			(7,473)	(7,473)	(7,473)	(7,473)	(7,473)	(7,473)
13	Debt Reserve Fund Interest Income			-	-	-	-	-	-
14	Operating Fund Interest Income			-	-	-	-	-	-
15	Rate Stabilization Interest Income			-	-	-	-	-	-
16	Total Revenues			236	(231)	(254)	(189)	(260)	(330)
Operating Expenses									
17	Total Operating Expenses			-	-	-	-	-	-
Net Revenues									
18	Transfer From/(To) Rate Stabilization Fund (b)			(236)	231	254	189	260	330
19	NET REVENUES AFTER OPERATIONS			-	-	-	-	-	-
Debt Service									
	Senior Debt Service								
	Revenue Bonds								
20	Outstanding Bonds			-	-	-	-	-	-
21	Pennvest Parity Bonds			-	-	-	-	-	-
22	Projected Future Bonds			-	-	-	-	-	-
23	Commercial Paper			-	-	-	-	-	-
24	Total Senior Debt Service			-	-	-	-	-	-
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)			NA	NA	NA	NA	NA	NA
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	Total Debt Service on Bonds			-	-	-	-	-	-
29	CAPITAL ACCOUNT DEPOSIT			-	-	-	-	-	-
30	TOTAL COVERAGE (L19/(L24+L26+L29))			NA	NA	NA	NA	NA	NA
31	End of Year Revenue Fund Balance			\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

(a) Reflects net recoverable costs for TAP-R based on the 2020 Annual Adjustment Proceeding.

(b) Rate Stabilization Fund transfers necessary to meet over or under recovery of TAP costs until recovery is reconciled via TAP-R reconciliation.

Table 2-11 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates
[Schedule BV-1: Table C-1]

LINE NO.	DESCRIPTION	FISCAL YEAR ENDING JUNE 30,					
		2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Operating Revenues							
1	Water Service - Existing Rates	256,215	266,656	269,813	272,813	270,500	268,191
2	Wastewater Service - Existing Rates	411,294	427,613	433,417	438,954	436,238	433,537
3	Total Service Revenue - Existing Rates	667,509	694,269	703,229	711,766	706,738	701,727
	Additional Service Revenue Required						
		Year	Percent Increase	Months Effective			
4	FY 2021	0.00%	10	-	-	-	-
5	FY 2022	8.61%	10	48,864	60,553	60,859	60,429
6	FY 2023	5.05%	10	31,543	39,054	38,780	38,506
7	FY 2024	5.05%	10		33,556	40,757	40,469
8	FY 2025	7.24%	10			50,125	60,881
9	FY 2026	7.54%	10				55,599
10	Total Additional Service Revenue Required	-	48,864	92,096	133,900	190,520	255,884
11	Total Water & Wastewater Service Revenue	667,509	743,132	795,325	845,666	897,258	957,611
	Other Income (a)						
12	Other Operating Revenue	38,160	21,719	21,638	21,561	21,484	21,408
13	Debt Reserve Fund Interest Income	-	-	-	-	-	-
14	Operating Fund Interest Income	1,071	1,280	1,316	1,354	1,376	1,413
15	Rate Stabilization Interest Income	1,298	1,089	1,092	1,110	1,127	1,132
16	Total Revenues	708,038	767,220	819,371	869,691	921,245	981,564
Operating Expenses							
17	Total Operating Expenses	(525,844)	(543,868)	(558,009)	(572,357)	(586,998)	(602,222)
Net Revenues							
18	Transfer From/(To) Rate Stabilization Fund	41,464	331	(446)	(2,611)	(340)	(170)
19	NET REVENUES AFTER OPERATIONS	223,658	223,683	260,916	294,723	333,907	379,172
Debt Service							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(175,726)	(163,516)	(164,558)	(151,302)	(151,438)	(152,439)
21	Pennvest Parity Bonds	(10,651)	(10,885)	(11,067)	(14,864)	(14,864)	(15,182)
22	Projected Future Bonds	-	(10,000)	(37,726)	(75,393)	(107,893)	(144,284)
23	Commercial Paper	-	(2,000)	(4,000)	(4,000)	(4,000)	(4,000)
24	Total Senior Debt Service	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(186,377)	(186,401)	(217,351)	(245,558)	(278,195)	(315,905)
29	CAPITAL ACCOUNT DEPOSIT	(27,833)	(29,447)	(31,155)	(32,962)	(34,874)	(36,896)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.04 x	1.03 x	1.04 x	1.05 x	1.06 x	1.07 x

Table 2-11 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates (continued)

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Combined System (\$000s)							
Residual Fund							
31	Beginning of Year Balance	16,261	15,064	15,049	15,009	15,062	15,051
32	Interest Income	156	150	150	150	150	150
	Plus:						
33	End of Year Revenue Fund Balance	9,448	7,835	12,410	16,203	20,839	26,370
34	Deposit for Transfer to City General Fund (b)	1,855	1,847	2,076	2,413	2,756	3,104
	Less:						
35	Transfer to Construction Fund	(10,800)	(8,000)	(12,600)	(16,300)	(21,000)	(26,500)
36	Transfer to City General Fund	(1,855)	(1,847)	(2,076)	(2,413)	(2,756)	(3,104)
37	Transfer to Debt Service Reserve Fund	-	-	-	-	-	-
38	End of Year Balance	15,064	15,049	15,009	15,062	15,051	15,071
Rate Stabilization Fund							
39	Beginning of Year Balance	150,652	109,188	108,857	109,303	111,914	112,254
40	Deposit From/(To) Revenue Fund	(41,464)	(331)	446	2,611	340	170
41	End of Year Balance	109,188	108,857	109,303	111,914	112,254	112,424

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund and reflects projected contra revenue credits for Affordability Program Discounts (TAP Costs). Includes Debt Service Reserve Fund Release in FY 2020.

(b) Transfer of interest earnings from the Bond Reserve Account to the Residual Fund as shown in Line 32 to satisfy the requirements for the transfer to the City General Fund shown on Line 34.

(c) FY 2020 beginning balance is estimated based on preliminary FY 2019 results.

For this analysis, an effective increase date of September 1 for each fiscal year is assumed. As indicated in Lines 25 and 30 on Table 2-11, the debt service coverage requirements discussed previously would be met with these overall levels of increase in revenues. Annual cash requirements for the Combined System would also be met with the proposed levels of increase, as shown on Line 31 of Table 2-9 and Line 33 of Table 2-11.

2.6 Compliance with General Bond Ordinance and Rate Ordinance Requirements

As stated in the assumptions utilized for these analyses, the Water Department must establish rates and charges to meet the financial management requirements of the General Bond Ordinance with respect to, among other things, (1) maintaining the Rate Stabilization Fund at minimum levels; (2) financing a portion of major annual capital improvement requirements directly from annual system revenues; (3) fulfilling rate covenant requirements; and (4) making required deposits into the Residual Fund of any monies remaining after payment of all current cash obligations to further support the Water Department's goal towards 20% capital funding from system revenues.

The 2018 Rate Determination approved the following financial policy goals: a target Rate Stabilization Fund balance of approximately \$135 Million, a 1.30 senior debt service coverage ratio, 20% cash financing of capital improvements, and maintaining a target Residual Fund balance of \$15 Million.

Due to the impact of the pandemic, the Water Department has decided to temporarily defer meeting the Rate Stabilization Fund, senior debt service coverage, and cash-funded capital targets. The proposed rates and charges are derived to meet minimum senior debt service coverage requirements and adhere to the 90% Test.

In addition to the General Bond Ordinance, under Section 13-101(4)(a) of the Philadelphia Code, the Water Rate Board Ordinance (“Rate Ordinance”) sets forth the floor for the amounts that rates and charges must generate to support the Combined 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 and Wastewater Systems;
2. Debt service on all obligations of the City in respect of the Water and Wastewater Systems;
3. With respect to the water, sewer and stormwater 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 the City Council in connection with the authorization or issuance of water, sewer and stormwater revenue bonds; and
4. Proportionate charges for all services performed for the Water Department by all officers, departments, boards or commissions of the City.

Moreover, Section 13-101(4)(b) of the Philadelphia 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 2022 and FY 2023 do not exceed the Water Fund’s projected appropriations for the above years.

Lines 4 through 6 on Table 2-12 show the calculation for compliance with the General Bond Ordinance Rate Covenant. Line 11 in Table 2-12 reflects the compliance with the Rate Ordinance requirement over the Study Period.

While the Water Department has decided to defer the approved financial policy goals on an interim basis, a return to these metrics in future years will be necessary to improve the Water Department’s financial position, restore reserves and help manage through future emergencies and strains on the system. At this point in time, it is critical that the RSF not be significantly further drawn down. A withdrawal of \$33 million was required in FY 2020. As shown on line 2 of Table 2-12, the projected RSF withdrawal is an additional \$41.5 million in FY 2021, resulting in a FY 2022 beginning year balance of \$109 million, well below the target level of \$135 million.

Without proposed increased revenues, and if all other factors remain unchanged, the RSF will be depleted by the end of FY 2023. Further, the 90% Test will be marginally met in FY 2022 but will not be met in FY 2023. Finally, the senior debt service coverage requirements will not be met in FY 2023.

Table 2-12 Projected Rate Stabilization Fund and Covenants Metrics Performance: Base Rates and TAP-R Rates [Schedule BV-1: Table C-2]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Rate Stabilization Fund (\$000s)							
1	Beginning Balance: Rate Stabilization Fund (a)	\$ 150,652	\$ 109,188	\$ 108,857	\$ 109,303	\$ 111,914	\$ 112,254
2	Transfers From (To) Revenue Fund (b)	(41,464)	(331)	446	2,611	340	170
3	Year-End Rate Stabilization Fund Balance (Line 1 + Line 2)	109,188	108,857	109,303	111,914	112,254	112,424
General Bond Ordinance Covenants							
4	Senior Debt Coverage (c)	1.20	1.20	1.20	1.20	1.20	1.20
5	Total Debt Coverage (d)	1.04	1.03	1.04	1.05	1.06	1.07
6	90% Test - Senior Debt Coverage from Current Revenues (e)	0.97	1.19	1.20	1.20	1.20	1.20
O&M Actual-to-Budget Ratio							
7	Projected O&M Budget (\$000s) (f)	604,361	621,837	637,910	653,595	669,589	686,195
8	O&M Actual to Budget Ratio	87.0%	87.5%	87.5%	87.6%	87.7%	87.8%
Rate Ordinance Requirements (\$000s)							
9	Projected Total Revenues	708,038	767,220	819,371	869,691	921,245	981,564
10	Projected Total Appropriations (g)	828,019	845,520	899,527	951,118	1,004,096	1,065,867
11	Rate Ordinance Requirement	Yes	Yes	Yes	Yes	Yes	Yes
Cash Funding (\$000s)							
12	Cash Funded Capital (i)	38,633	37,447	43,755	49,262	55,874	63,396
13	Capital Improvement Program Annual Expenses	324,964	345,303	426,730	535,538	545,260	562,222
14	Cash Funded Capital Ratio (j)	11.9%	10.8%	10.3%	9.2%	10.2%	11.3%

(a) FY 2021 beginning balance is estimated based on FY 2020 preliminary financial results.

(b) See Line 18 in Table 2-11.

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

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

(e) 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 General Bond Ordinance requires a minimum Senior Debt Service Coverage of 0.90 from Current Revenues.

(f) FY 2021 budget reflects the PWD adopted budget; FY 2022 through FY 2026 budget reflects annual cost escalation factors.

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

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

(i) Cash Funded Capital = Capital Account Deposit + Residual Transfer to Construction Fund

(j) Cash Funded Capital Ratio = Cash Funded Capital divided by Capital Improvement Program annual expenses.

The Water Department will need to closely monitor all aspects of financial performance, including the receipt of revenues, operation and maintenance expenses, capital program expenses and associated financing in order to meet the requirements of the General Bond Ordinance.

2.7 Proposed Rates

The proposed charges for water and wastewater service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including qualifying senior

citizens, charities and schools, and the Philadelphia Housing Authority “(PHA)”, receive services at a discounted rate. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools and 5% for PHA) will continue to be applicable for the entire Study Period.

In designing the proposed rates, water, sanitary sewer, and stormwater costs of service are adjusted to reflect the fact that the above customer types are served at a discount and do not pay the full cost of service. Accordingly, the proposed retail water, sewer, and stormwater rates are adjusted to recover this cost of service revenue reduction due to discounts.

In addition, in the case of the non-residential stormwater group, we adjust their stormwater rates to address the discounts as well as to recover the reduction in revenue due to the existing stormwater customer assistance program (“CAP”). Additional information regarding the anticipated revenue reductions due to the stormwater CAP are discussed later in this Report.

As previously noted, revenue loss due to providing TAP discounts and TAP-R revenues were excluded from the analysis of Base Rates. Consequently, Table 2-13 only summarizes the proposed Base Rates for the Rate Period (FY 2022 and FY 2023). Current effective rates for FY 2021 are presented for informational purposes.

Table 2-13 Proposed FY 2022 and FY 2023 Rates

Water				Wastewater			
Description	Existing	Proposed		Description	Existing	Proposed	
	FY 2021	FY 2022	FY 2023		FY 2021	FY 2022	FY 2023
Monthly Water Service Charge (\$/bill)				Monthly Sanitary Sewer Service Charge (\$/bill)			
<u>Meter Size (Inches)</u>				<u>Meter Size (Inches)</u>			
5/8	\$5.21	\$5.28	\$5.36	5/8	\$7.01	\$7.92	\$8.11
3/4	\$5.55	\$5.67	\$5.78	3/4	\$8.93	\$10.05	\$10.33
1	\$6.70	\$6.91	\$7.06	1	\$13.07	\$14.68	\$15.17
1-1/2	\$8.88	\$9.34	\$9.60	1-1/2	\$22.97	\$25.72	\$26.70
2	\$12.32	\$13.06	\$13.47	2	\$35.42	\$39.62	\$41.19
3	\$19.44	\$20.85	\$21.58	3	\$63.82	\$71.33	\$74.28
4	\$35.39	\$37.73	\$38.97	4	\$108.49	\$121.30	\$126.23
6	\$66.29	\$70.98	\$73.43	6	\$213.81	\$238.97	\$248.82
8	\$100.66	\$108.20	\$112.06	8	\$338.27	\$377.97	\$393.75
10	\$147.50	\$158.34	\$163.92	10	\$488.25	\$545.62	\$568.29
12	\$239.52	\$259.97	\$270.12	12	\$887.22	\$990.71	\$1,033.23
Base Rate - Water Quantity Charges (\$/Mcf)				Base Rate - Sanitary Sewer Quantity Charges (\$/Mcf)			
<u>Monthly Water Usage</u>				<u>Monthly Usage</u>			
First 2 Mcf	\$44.80	\$49.33	\$52.94	All Billable Water Usage	\$31.25	\$35.35	\$37.02
Next 98 Mcf	\$38.56	\$45.41	\$48.64	Groundwater Charge	\$13.86	\$12.94	\$13.51
Next 1,900 Mcf	\$29.88	\$35.15	\$37.61				
Over 2,000 Mcf	\$29.06	\$34.20	\$36.59				
				Sanitary - Surcharge Rates (\$/lb)			
				BOD (\$/lb in excess of 250 mg/l)	\$0.397	\$0.413	\$0.424
				SS (\$/lb in excess of 350 mg/l)	\$0.388	\$0.430	\$0.438
				Residential Stormwater Charges			
				<u>Monthly Stormwater Management Service Charge</u>			
				Charge Per Parcel	\$14.03	\$16.27	\$17.32
				<u>Monthly Billing & Collection Charge</u>			
				Charge Per Bill	\$1.77	\$1.98	\$2.00
				Non-Residential Stormwater Charges			
				<u>Monthly Stormwater Management Service Charge</u>			
				Gross Area (\$/500 sf)	\$0.717	\$0.783	\$0.833
				Impervious Area (\$/500 sf)	\$5.410	\$5.529	\$5.876
				<u>Monthly Billing & Collection Charge</u>			
				Charge Per Bill	\$2.30	\$2.57	\$2.60

Notes:

All proposed are effective September 1st of the respective Fiscal Year.
 Non-Residential Stormwater Charges includes Condominiums.

2.7.1 Residential and Senior Citizen Typical Bills

Table 2-14 presents a series of typical or representative combined residential water, sanitary sewer, and stormwater monthly bills under existing and proposed rates for FY 2022 and FY 2023 for the 5/8-inch meter size. A typical PWD residential customer has a 5/8-inch meter and uses about 0.5 Mcf, or approximately 500 cubic feet, monthly. Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2022, this customer's monthly bill would increase from \$66.73 to \$74.47, an increase of \$7.74 or about 11.6%. In FY 2023, the bill increases to \$78.45, an increase of \$3.98 over FY 2022 rates, or about 5.3%.

Table 2-14 Comparison of Typical Bill for Residential Customers Under Existing and Proposed Rates [Schedule BV-1: Table C-4]

Meter Size	Monthly Use	FY 2021	FY 2022		FY 2023	
		Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2022
Inches	Mcf	\$	\$	%	\$	%
5/8	0.0	28.02	31.45	12.2	32.79	4.3
5/8	0.2	43.50	48.66	11.9	51.05	4.9
5/8	0.3	51.24	57.26	11.7	60.18	5.1
5/8	0.4	58.98	65.86	11.7	69.31	5.2
5/8	0.5	66.73	74.47	11.6	78.45	5.3
5/8	0.6	74.46	83.07	11.6	87.58	5.4
5/8	0.7	82.20	91.67	11.5	96.71	5.5
5/8	0.8	89.94	100.27	11.5	105.84	5.6
5/8	1.7	159.60	177.70	11.3	188.02	5.8
5/8	2.7	232.63	260.99	12.2	276.32	5.9
5/8	3.3	275.33	310.25	12.7	328.52	5.9

Notes:

The above figures reflect the current TAP-R rates, of \$0.57 MCF for water and \$0.78/MCF for sewer. The TAP-R rates are subject to annual reconciliation.

A typical PWD senior residential customer has a 5/8-inch meter and uses about 0.3 Mcf or approximately 300 cubic feet, monthly. Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2022, this customer's monthly bill would increase from \$51.24 to \$57.26, an increase of \$6.02 or about 11.7%. In FY 2023, the bill increases to \$60.18, an increase of \$2.92 over FY 2022 rates, or about 5.1%. As previously noted, qualifying senior citizens may receive a 25% discount on their entire bill. The total monthly bills presented in Table 2-14 do not reflect this discount. Accounting for the discount for qualifying senior citizens, the typical senior residential customer's monthly bill (based upon the previously stated billing parameters) would increase from \$38.43 to \$42.94, an increase of \$4.51 or about 11.7%. In FY 2023, the bill increases to \$45.13, an increase of \$2.19 over FY 2022 rates, or about 5.1%.

2.7.2 Non-Residential Typical Bills

Table 2-15 presents a series of typical or representative combined non-residential water, sanitary sewer, and stormwater monthly bills under existing and proposed rates for FY 2022 and FY 2023 for multiple meter sizes and various parcel characteristics (i.e., GA and IA). A PWD small commercial business customer has a 5/8-inch meter and uses about 0.6 Mcf or approximately 600 cubic feet, monthly. A parcel with gross area of 5,500 square feet and impervious area of 4,000 square feet was assumed for development of the typical bill comparison.

Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2022, this customer's monthly bill would increase from \$112.13 to \$120.24, an increase of \$8.11 or about 7.2%. In FY 2023, the bill increases to \$127.03, an increase of \$6.79 over FY 2022 rates, or about 5.7%.

Table 2-15 Comparison of Typical Bill for Non-Residential Customers Under Existing and Proposed Rates [Schedule BV-1: Table C-5]

Meter Size	Monthly Use	Impervious Area	Gross Area	FY 2021	FY 2022		FY 2023	
				Existing Rates	Proposed Rates	% Proposed of Existing	Proposed Rates	% Proposed of FY 2021
Inches	Mcf	sf	sf	\$	\$	%	\$	%
5/8	0.0	1,794	2,110	39.75	41.80	5.2	43.74	4.6
5/8	0.2	1,794	2,110	55.23	59.01	6.9	62.00	5.1
5/8	0.3	1,794	2,110	62.97	67.61	7.4	71.13	5.2
5/8	0.4	1,794	2,110	70.71	76.21	7.8	80.26	5.3
5/8	0.5	1,794	2,110	78.46	84.82	8.1	89.40	5.4
5/8	0.6	4,000	5,500	112.13	120.24	7.2	127.03	5.7
5/8	0.7	4,000	5,500	119.87	128.84	7.5	136.16	5.7
5/8	0.8	26,000	38,000	412.25	431.61	4.7	457.98	6.1
5/8	1.7	26,000	38,000	481.91	509.04	5.6	540.16	6.1
5/8	2.7	4,000	5,500	270.30	298.16	10.3	315.77	5.9
5/8	3.3	4,000	5,500	313.00	347.42	11.0	367.97	5.9
5/8	11.0	7,000	11,000	901.27	1,021.45	13.3	1,082.37	6.0
1	1.7	7,700	7,900	251.68	271.40	7.8	287.40	5.9
1	5.0	22,500	24,000	668.22	728.94	9.1	772.88	6.0
1	8.0	7,700	7,900	701.86	789.87	12.5	836.85	5.9
1	17.0	22,500	24,000	1,522.14	1,714.26	12.6	1,817.00	6.0
2	7.6	1,063	1,250	621.72	706.07	13.6	747.27	5.8
2	16.0	22,500	24,000	1,478.95	1,663.24	12.5	1,762.42	6.0
2	33.0	66,500	80,000	3,245.05	3,633.36	12.0	3,851.98	6.0
2	100.0	7,700	7,900	7,276.55	8,375.08	15.1	8,874.20	6.0
4	30.0	7,700	7,900	2,391.49	2,733.73	14.3	2,894.04	5.9
4	170.0	10,500	12,000	11,779.08	13,544.84	15.0	14,339.39	5.9
4	330.0	26,000	38,000	21,980.87	25,252.96	14.9	26,721.66	5.8
4	500.0	140,000	160,000	34,010.90	38,919.12	14.4	41,181.24	5.8
6	150.0	10,500	12,000	10,665.70	12,258.76	14.9	12,976.84	5.9
6	500.0	41,750	45,500	32,922.57	37,807.05	14.8	39,995.84	5.8
6	1,000.0	26,000	38,000	63,978.69	73,543.38	14.9	77,785.31	5.8
6	1,500.0	140,000	160,000	96,627.12	110,920.04	14.8	117,318.29	5.8
8	750.0	10,500	12,000	48,312.53	55,544.98	15.0	58,748.40	5.8
8	1,500.0	66,500	80,000	95,875.96	110,158.22	14.9	116,504.80	5.8
8	2,000.0	26,000	38,000	126,617.52	145,569.60	15.0	153,948.87	5.8
8	3,000.0	140,000	160,000	189,685.95	217,921.26	14.9	230,451.85	5.8
10	600.0	22,500	24,000	39,284.40	45,136.76	14.9	47,738.81	5.8
10	1,700.0	41,750	45,500	108,254.22	124,421.06	14.9	131,581.80	5.8
10	3,300.0	26,000	38,000	206,972.34	237,957.39	15.0	251,623.27	5.7
10	6,000.0	140,000	160,000	374,862.77	430,839.05	14.9	455,558.25	5.7

(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.

(b) Figures reflect the current TAP-R rates, of \$0.57 MCF for water and \$0.78/MCF for sewer. The TAP-R rates are subject to annual reconciliation.

3.0 Water System Revenue and Revenue Requirements

The major elements of the water system include three river supply intakes, three treatment plants, storage facilities and a conveyance network. Based on the 2020 U.S. Census Bureau estimate, the Water System served 1,584,540 individuals.

This section of the report focuses on the Revenue and Revenue Requirements component of the Cost of Service study for the Water System. These requirements establish how much money the Water System needs to meet its fiscal year operating and capital obligations. In the following discussion, we review O&M expenses, debt service payments, funding for specific deposits and reserves, and the cost of capital improvement projects that the Water Department does not fund via debt or contributions from third parties.

3.1 Water Revenue

The City’s Water System derives revenue primarily from charges for water service. During the Study Period, future levels of revenue are projected based on an analysis of historical and future system growth in terms of the number of accounts and water consumption.

3.1.1 Customers and Growth

Table 3-1 summarizes the Water Department’s customer account classifications. Customer types are based on a combination of service type, customer type, and installation type designations in Basis2.

Table 3-1 Water System Customer Types

CUSTOMER TYPES		
General Service	Other	Fire Service
- Residential	- PHA	- Public (Hydrants)
- Senior Citizens	- Charities & Schools	- Private
- Commercial	- Hospitals & Universities	Wholesale
- Industrial	- Hand Billed	
- Public Utilities	- Scheduled (Flat Rate)	

From 2010 to 2018, the US Census Bureau reports that metropolitan areas with populations of 1 million or more residents have generally seen declining populations. According to The Philadelphia Citizen, Philadelphia’s population increased by 472 residents in 2019. Since 2010, the City’s population has gained almost 55,800 people. As a point of comparison, the Dallas-Fort Worth metropolitan area added over 1.2 million people over the same timeframe. The Philadelphia metropolitan area consists of 5.96 million people.

Based on a review of historical growth patterns, the total number of customer accounts for the Water System is projected to remain stable during the Study Period, as shown on Table 3-2.

Table 3-2 Number of Customer Accounts

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System							
1	Residential	421,728	421,728	421,728	421,728	421,728	421,728
2	Senior Citizens	22,746	22,746	22,746	22,746	22,746	22,746
3	Commercial	36,539	36,539	36,539	36,539	36,539	36,539
4	Industrial	1,054	1,054	1,054	1,054	1,054	1,054
5	Public Utilities	173	173	173	173	173	173
6	Subtotal General Service	482,240	482,240	482,240	482,240	482,240	482,240
7	PHA	5,715	5,715	5,715	5,715	5,715	5,715
8	Charities and Schools	1,945	1,945	1,945	1,945	1,945	1,945
9	Hospitals and Universities	292	292	292	292	292	292
10	Hand Billed	233	233	233	233	233	233
11	Scheduled (Flat Rate)	3	3	3	3	3	3
12	Private Fire Protection	5,606	5,606	5,606	5,606	5,606	5,606
13	Subtotal Retail Customers	496,034	496,034	496,034	496,034	496,034	496,034
14	Aqua Pennsylvania	1	1	1	1	1	1
15	Total Water System	496,035	496,035	496,035	496,035	496,035	496,035

3.1.2 Billed Volume

As previously noted, the pandemic and associated economic downturn have influenced customer demand in the months since Pennsylvania's initial shut-down in March 2020. Consequently, the usage per account projections are adjusted to reflect the pandemic demand patterns for various customer types. Those usage per account assumptions are as follows:

For all customer types, the 2-year average usage per account for FY 2018 and FY 2019 serves as the initial basis for the projection, as presented in Table 1-1. To reflect the pandemic's impact, billed volume projections included the following adjustments:

- The FY 2021 usages per account are adjusted to reflect current customer demands based on recent monthly reporting data. These escalation factors are based upon comparing the usage from July 2019 to February 2020 (before the pandemic) and April to October 2020²¹.
- The usage per account reflects the Commonwealth of Pennsylvania's extended shut-off moratorium.
- Except for the Residential customers with a 5/8-inch meter, Black & Veatch assumes constant consumption levels over the Study Period. We do not anticipate a further decrease in usage for the remaining customer types over the Study Period because they experienced significant usage declines due to the pandemic.
- Prior to the pandemic, the 5/8-inch meter General Service customers, including the Residential customer type, have historically exhibited a 2.0% annual decrease over time. While Residential usage has increased in recent months, Black & Veatch assumes a resumption of the historical decline in

²¹ March 2020 was excluded from both periods, since the Governor declared a disaster emergency in the Commonwealth of Pennsylvania on March 6th followed by an order closing all non-life-sustaining businesses in the Commonwealth on March 19th.

consumption for 5/8-inch residential service customers as people return to work. Beginning in FY 2023, Black & Veatch assumes that this decrease will resume for the remainder of the Study Period.

Section 1 discussed the assumptions underlying the billed volumes projections. Table 1-1 provides the baseline usage per account and summarizes the associated escalation factors for the Study Period.

Table 1-2 presents the historical usage per account for General Service customers (5/8-inch meters).

Table 3-3 presents the projected billed volume in Mcf for the Study Period. The projected water usage reflects the current number of accounts and the average usage per account based on historical demands, as presented in Schedule BV-6: WP-1, Appendix A.

Table 3-3 Projected Billed Volume

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (Mcf)							
1	Residential	3,245,659	3,245,659	3,187,996	3,134,452	3,080,908	3,027,364
2	Senior Citizens	136,486	136,486	136,486	136,486	136,486	136,486
3	Commercial	1,483,481	1,483,481	1,483,481	1,483,481	1,483,481	1,483,481
4	Industrial	93,398	93,398	93,398	93,398	93,398	93,398
5	Public Utilities	8,546	8,546	8,546	8,546	8,546	8,546
6	Subtotal General Service	4,967,568	4,967,568	4,909,906	4,856,362	4,802,818	4,749,274
7	PHA	152,933	152,933	152,933	152,933	152,933	152,933
8	Charities and Schools	114,035	114,035	114,035	114,035	114,035	114,035
9	Hospitals and Universities	112,540	112,540	112,540	112,540	112,540	112,540
10	Hand Billed	427,991	427,991	427,991	427,991	427,991	427,991
11	Scheduled (Flat Rate)	11	11	11	11	11	11
12	Private Fire Protection	15,641	15,641	15,641	15,641	15,641	15,641
13	Public Fire Protection	0	0	0	0	0	0
14	Subtotal Retail Customers	5,790,719	5,790,719	5,733,056	5,679,512	5,625,968	5,572,424
15	Aqua Pennsylvania	65,000	65,000	65,000	65,000	65,000	65,000
16	Total Water System	5,855,719	5,855,719	5,798,056	5,744,512	5,690,968	5,637,424

3.1.3 Bill Tabulation

In addition to analyzing the historical usage per account trends, the bill-frequency distribution (more commonly known as a bill tabulation) was also examined. Specifically, the bill tabulation presents the number of customer bills issued at different meter sizes and water usage levels for each customer type served by the utility. The bill tabulation of customer bills provides information on customer type meter distributions and usage patterns. For the analysis conducted herein, the bill tabulation results provide data on the number of accounts by meter size and how much volume passes through each block of the Water Department's quantity charge structure.

3.1.4 Water Revenue

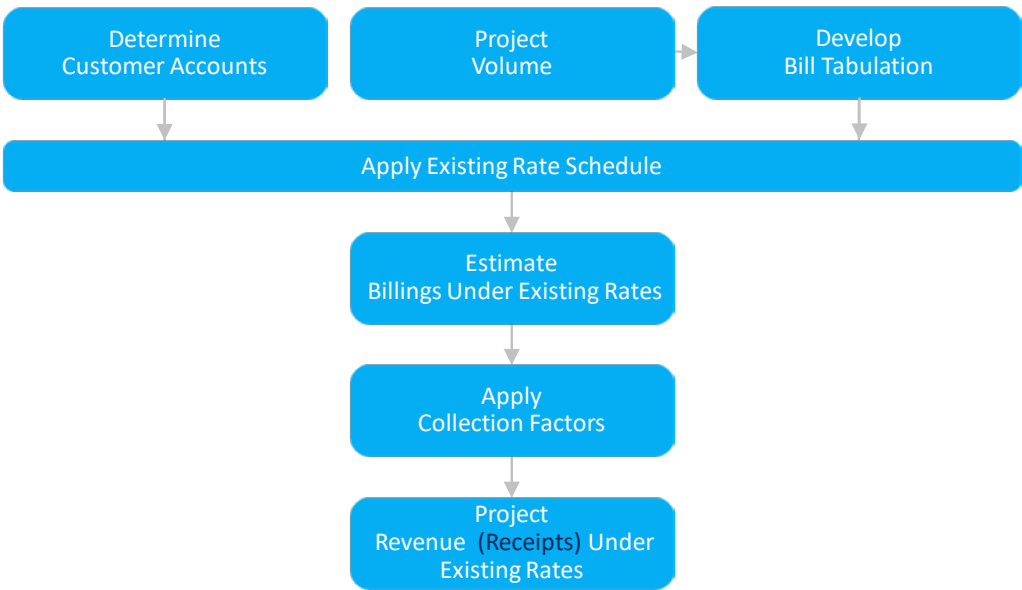
The total operating revenues for the Water Department include the following:

- Retail (i.e., all customers excluding wholesale) Water Service and Quantity charges;
- Private Fire Protection – A monthly charge based on meter size to recover a portion of the Water System costs related to serving certain customers with private fire systems; and
- Wholesale customer water charges.

3.1.4.1 Retail Operating Revenues

Retail operating revenues were developed following the process described below and illustrated in Figure 3-1.

Figure 3-1 Projecting Revenues Under Existing Rates



3.1.4.2 Projection of Gross Billings

To project the FY 2022 water gross billings, the FY 2021 (effective October 1, 2020) schedules of water rates were applied to the projected FY 2022 annual water sales and number of customer accounts. To project FY 2023 to FY 2026 water gross billings, the FY 2021 schedule of water rates shown on Table 3-4 were applied to the projections of annual water sales and number of customer accounts.

Table 3-4 Existing FY 2021 Water Rates

DESCRIPTION	WATER	PRIVATE FIRE
Monthly Water Service Charge (\$/bill)		
<u>Meter Size (Inches)</u>		
5/8	\$5.21	\$27.63
3/4	\$5.55	\$27.63
1	\$6.70	\$27.63
1-1/2	\$8.88	\$27.63
2	\$12.32	\$27.63
3	\$19.44	\$27.63
4	\$35.39	\$27.63
6	\$66.29	\$50.74
8	\$100.66	\$75.77
10	\$147.50	\$111.74
12	\$239.52	\$172.64
Base Rate - Water Quantity Charges (\$/Mcf)		
<u>Monthly Water Usage</u>		
First 2 Mcf	\$44.80	
Next 98 Mcf	\$38.56	
Next 1,900 Mcf	\$29.88	
Over 2,000 Mcf	\$29.06	

Where applicable, discounts were applied for eligible customer types. Table 3-5 summarizes the current discounts available.

Table 3-5 Current Customer Discounts

	SENIOR CITIZENS	PHA	CHARITIES/HOSPITALS/EDUCATION
Discount Rate	25%	5%	25%

Applying the appropriate rates and discounts to the number of accounts and billed volumes by customer type, billings for water services under existing rates were calculated, as shown in Table 3-6.

As shown on Line 14, the Water System billings generated reflect a compounded annual decline of approximately 0.69%, which is primarily due the reduction in demand amongst the non-residential accounts. The business shutdowns resulting from the pandemic has resulted in a 7.7% increase in residential (including senior citizens) consumption due to stay-at-home orders, which is seen as a 6.4% increase in billings. However, this increase is more than offset by a 10.6% billable volume reduction from the non-residential accounts, or an 7.9% billings decline.

Table 3-6 Billings Under Existing Rates

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
Water Non-Discount							
1	Residential	\$ 168,839	\$ 168,839	\$ 166,316	\$ 163,974	\$ 161,631	\$ 159,288
2	Commercial	58,967	58,967	58,967	58,967	58,967	58,967
3	Industrial	3,484	3,484	3,484	3,484	3,484	3,484
4	Public Utilities	347	347	347	347	347	347
5	Private Fire Protection	4,701	4,701	4,701	4,701	4,701	4,701
6	Public Fire Protection	9,235	9,235	9,235	9,235	9,235	9,235
7	Wholesale	3,824	3,824	3,824	3,824	3,824	3,824
8	Other (Hand-Billed and Scheduled)	13,762	13,762	13,762	13,762	13,762	13,762
9	Subtotal Water Non-Discount Billings	263,159	263,159	260,636	258,294	255,951	253,608
Water Discount							
10	Residential (Senior Citizens)	5,586	5,586	5,586	5,586	5,586	5,586
11	PHA	6,047	6,047	6,047	6,047	6,047	6,047
12	Charity/Schools/Hospital/University	6,471	6,471	6,471	6,471	6,471	6,471
13	Subtotal Water Discount Billings	18,103	18,103	18,103	18,103	18,103	18,103
14	Total Water Service Billings	\$ 281,262	\$ 281,262	\$ 278,739	\$ 276,397	\$ 274,054	\$ 271,711

3.1.4.3 Application of Collection Factors

The second step in the process of calculating revenues involves applying receipt factors (i.e., collection factors) to the corresponding gross billings to determine the operating retail cash receipts. The historical collection factors are based on nine fiscal years (FY 2012 through FY 2020) of billing and associated collections.

The collection factors represent the multi-year payment pattern, as described below. Table 1-3 in Section 1.4.1 presents the historical collection factors²² used in the Study. Schedule BV-6: WP-1, Appendix C provides the data used to determine the projected collection factors used in this analysis. The collection factors represent the multi-year payment pattern as described in Section 1.4.1.

As noted in Section 1.4.1, the following adjustments to the projected collection factors are proposed based upon the Water Department's recent experience:

- **FY 2021 Billing Year Collection Factors** – Reduce by 8%.
- **FY 2022 Billing Year Collection Factors** – Reduce by 4%.
- **FY 2023 Billing Year Collection Factors** – Reduce by 2%.

Figure 3-2 presents an illustration of how the billing year collection factors were applied to determine the projected revenues (receipts).

²² As previously discussed in Section 1.4.1, collection factors used in the financial plan analysis reflect the average collection factors for FY 2012 through FY 2020. Collection factors do not represent all historical billings and receipts, as they are limited by available data and derived from historical collection data.

Figure 3-2 Sample Calculation for Application of Collection Factors to Billings for Derivation of Receipts



1. To determine the FY 2023 projected receipts for Residential customers, we use the following information:
 - a. Identify the Billing Years and Collection Factors (Table 1-3) for each Collection Period relative to the FY 2023 receipts and accounting for the billing year collection factor adjustments as applicable:
 - i. **Billing Year** is FY 2023 with a collection factor of $86.60\% - 2.0\% = 84.60\%$
 - ii. **Billing Year Plus 1** is FY 2022 with a collection factor of 8.76%
 - iii. **Billing Year Plus 2 and Beyond** is FY 2021 with a collection factor of 1.94%
 - b. Identify Projected Billings (in \$000s) for each Collection Period from Table 3-6 (Line 1)
 - i. **Billing Year:** FY 2023 = \$166,316
 - ii. **Billing Year Plus 1:** FY 2022 = \$168,839
 - iii. **Billing Year Plus 2 and Beyond:** FY 2021 = \$168,839
2. Calculate the projected FY 2023 receipts (in \$000s) for each Collection Period:
 - a. **Billing Year receipts** = $\$166,316 \times 84.6\% = \$140,704$
 - b. **Billing Year Plus 1 receipts** = $\$168,839 \times 8.76\% = \$14,790$
 - c. **Billing Year Plus 2 and Beyond receipts** = $\$168,839 \times 1.94\% = \$3,275$
3. Sum the projected FY 2023 receipts by Collection Period to arrive at the total FY 2023 receipts:
 $\$140,704 + \$14,790 + \$3,275 = \$158,769$ (Matches Line 1 of Table 3-7 for FY 2023)

3.1.4.4 Wholesale Operating Revenues

Currently, Aqua Pennsylvania ("Aqua PA") is the Water Department's only wholesale water customer. The Water Department's service to Aqua PA commenced in Fiscal Year 2002. Water charges for this service include a commodity charge designed to recover power and chemical costs and a fixed charge designed to recover allocated capital costs and all other allocated operation and maintenance expenses, excluding power and chemical costs.

3.1.4.5 Projected Operating Revenues

Table 3-7 summarizes the projected revenues (receipts) for the Study Period.

Table 3-7 Projected Water Receipts Under Existing Rates [Schedule BV-1: Table W-1]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
1	Residential	\$ 149,735	\$ 157,334	\$ 158,769	\$ 159,846	\$ 157,563	\$ 155,283
2	Senior Citizens	4,967	5,207	5,323	5,435	5,435	5,435
3	Commercial	53,098	55,099	56,196	57,375	57,375	57,375
4	Industrial	3,176	3,255	3,320	3,390	3,390	3,390
5	Public Utilities	314	325	331	338	338	338
6	Subtotal General Customers	211,290	221,219	223,939	226,383	224,100	221,821
7	Housing Authority	5,366	5,633	5,762	5,883	5,883	5,883
8	Charities and Schools	3,234	3,303	3,360	3,431	3,431	3,431
9	Hospitals and Universities	2,978	2,805	2,806	2,865	2,865	2,865
10	Hand Billed	12,442	12,872	13,114	13,389	13,389	13,389
11	Scheduled (Flat Rate)	1	1	1	1	1	1
Fire Protection							
12	Private	4,701	4,701	4,701	4,701	4,701	4,701
13	Public	9,235	9,235	9,235	9,235	9,235	9,235
14	Subtotal Retail Customers	249,247	259,769	262,919	265,889	263,606	261,327
15	Aqua Pennsylvania	3,824	3,824	3,824	3,824	3,824	3,824
16	Total Water System Sales	253,071	263,593	266,743	269,713	267,430	265,151
17	Other Operating Revenues (a)	19,957	14,811	14,773	14,738	14,703	14,668
Interest Income							
18	Interest Income on Debt Reserve Fund (b)	-	-	-	-	-	-
19	Operating Fund	399	498	512	536	553	574
20	Rate Stabilization Fund	503	404	405	407	408	411
21	Total Interest Income	902	902	917	943	961	984
22	Total Water System Receipts	\$ 273,930	\$ 279,306	\$ 282,433	\$ 285,394	\$ 283,094	\$ 280,802

(a) Includes Debt Service Reserve Fund Release in FY 2021.

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

3.1.5 Tiered Assistance Program Rate Rider Surcharge

As, previously noted, revenue figures for the Study Period exclude the current TAP-R rate of \$0.57/Mcf for water. The TAP-R currently recovers the cost of providing discounts to TAP customers from Non-TAP customers and is subject to an annual reconciliation.

3.1.6 Other Operating Revenues

The Water Department has several sources of other revenues including miscellaneous fees, City and UESF grants, L&I permits, penalties, and releases from the Debt Service Reserve Fund. As noted above, no revenue losses associated with TAP discounts are included under Other Operating Revenues for the development of the Base Rates. Table 3-8 summarizes the other operating revenues for the Water System.

Table 3-8 Other Projected Receipts [Schedule BV-1: Table W-1A]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
1	Penalties	\$ 2,635	\$ 3,953	\$ 3,915	\$ 3,880	\$ 3,844	\$ 3,809
2	Miscellaneous City Revenue	1,650	1,650	1,650	1,650	1,650	1,650
3	Other	4,982	4,982	4,982	4,982	4,982	4,982
4	State & Federal Grants	1,000	1,000	1,000	1,000	1,000	1,000
5	Permits Issued by L&I	2,900	2,900	2,900	2,900	2,900	2,900
6	Miscellaneous (Procurement)	195	195	195	195	195	195
7	City & UESF Grants	132	132	132	132	132	132
8	Affordability Program Discount Cost (a)	0	0	0	0	0	0
9	Release from Debt Service Reserve (b)	6,463	0	0	0	0	0
10	Total Water Other Income	19,957	14,811	14,773	14,738	14,703	14,668
Interest Income							
11	Debt Reserve Fund (c)	0	0	0	0	0	0
12	Operating Fund	399	498	512	536	553	574
13	Rate Stabilization Fund	503	404	405	407	408	411
14	Total Water System	\$ 20,859	\$ 15,713	\$ 15,690	\$ 15,681	\$ 15,664	\$ 15,652

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

3.2 Water Revenue Requirements

3.2.1 Operation and Maintenance Expenses

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the Water System during each year. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities and liquidated encumbrances. Capital and reserve fund transfers required by the General Bond Ordinance are also revenue requirements, but are handled separately from O&M.

Table 3-9 summarizes the results of applying the assumptions described in Section 1.4, as well as after making budget adjustments, applying actual-to-budget factors, escalation factors, and incorporating known future O&M expenses described in Section 1.4.3.

Table 3-9 **Projected O&M Expense [Schedule BV-1: Table W-2]**

LINE		FISCAL YEAR ENDING JUNE 30,						
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026	
Water System (\$000s)								
1	Personal Services	\$ 65,037	\$ 67,088	\$ 68,959	\$ 70,960	\$ 73,012	\$ 75,119	
2	Pension and Benefits	61,498	63,324	65,231	67,109	69,012	71,048	
3	Subtotal	126,535	130,411	134,190	138,068	142,024	146,167	
Purchase of Services								
4	Power	7,770	7,770	7,809	7,887	7,966	8,045	
5	Gas	670	706	717	728	735	742	
6	Other	48,308	44,953	45,695	46,450	47,217	47,997	
7	Subtotal	56,748	53,429	54,221	55,065	55,918	56,785	
Materials and Supplies								
8	Chemicals	21,899	22,446	23,007	23,582	24,172	24,776	
9	Other	10,282	10,553	10,830	11,115	11,407	11,707	
10	Subtotal	32,181	32,999	33,837	34,697	35,579	36,484	
11	Equipment	1,246	2,098	2,156	2,217	2,279	2,343	
12	Indemnities and Transfers	4,800	4,800	4,800	4,800	4,800	4,800	
13	Subtotal Expenses	221,510	223,737	229,206	234,848	240,601	246,579	
14	Liquidated Encumbrances	(12,983)	(12,532)	(12,771)	(13,022)	(13,278)	(13,539)	
15	Total Expenses	\$ 208,527	\$ 211,205	\$ 216,434	\$ 221,826	\$ 227,323	\$ 233,040	

3.2.2 Debt Service

As discussed earlier in this Report, the General Bond Ordinance views the Water and Wastewater Systems as one combined system for the purposes of the Rate Covenant. As a result, bond issuances are allocated between water and wastewater based on system needs.

The existing and proposed debt service were previously discussed in Sections 1.4.4 and 2.3.4 of this Report. Table 3-10 summarizes the Water System's share of the total existing and proposed debt financing for the Water System CIP.

Table 3-10 Summary of Existing and Proposed Water System Debt Service
[Schedule BV-1: Table W-5]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
Revenue Bonds							
1	Existing (a)	\$ 56,440	\$ 52,533	\$ 53,465	\$ 53,482	\$ 53,738	\$ 53,947
	Proposed						
2	Fiscal Year 2022 (b)		1,875	2,972	2,972	2,972	2,972
3	Fiscal Year 2023 (c)			9,888	15,344	15,344	15,344
4	Fiscal Year 2024 (c)				15,313	23,764	23,764
5	Fiscal Year 2025 (c)					7,963	12,357
6	Fiscal Year 2026 (c)						15,094
7	Total Proposed	-	1,875	12,860	33,629	50,043	69,531
8	Total Revenue Bonds	56,440	54,408	66,324	87,111	103,781	123,478
PennVest Loans							
9	PennVest Loans - Parity PennVest (d)	4,374	4,607	4,790	8,586	8,586	8,905
Commercial Paper							
10	Commercial Paper	-	800	1,600	1,600	1,600	1,600
11	Total Senior Debt Service	\$ 60,814	\$ 59,815	\$ 72,714	\$ 97,297	\$ 113,967	\$ 133,983

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and

(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Includes projected Pennvest Loan for the Torresdale Pump Station Rehabilitation.

3.2.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Water System required to meet regulatory requirements and maintain existing levels of service. The CIP includes engineering and administrative support, improvements to the water treatment plants, distribution system rehabilitation, large meter replacement including implementation of AMI and equipment vehicle purchases.

As discussed in Sections 1.4.6 and 2.3.3, Black & Veatch made adjustments to the Water Department's appropriations-based CIP budget to develop the projected annual encumbrances and anticipated project expenses. Following the steps outlined in Section 1.4.6 produces the CIP shown in Table 3-11.

Table 3-11 Projected Water System CIP [Schedule BV-1: Table W-3]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
1	Engineering and Administration (a)	\$ 6,440	\$ 6,254	\$ 5,461	\$ 4,668	\$ 3,875	\$ 3,082
2	Water Treatment Plant Improvements	128,000	62,550	149,300	196,600	80,300	241,300
3	Distribution System Rehabilitation	93,060	30,760	106,760	177,860	118,160	108,760
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
6	Total CIP Budget	238,500	110,564	272,521	390,128	213,335	364,142
7	Inflation Adjustment (b)	-	-	8,176	23,759	19,782	45,703
8	Total Inflated CIP Budget	238,500	110,564	280,696	413,886	233,117	409,845
9	Rollforward Adjustments	(80,488)	84,000	-	-	-	-
10	Total Inflated Adjusted CIP Budget	158,012	194,564	280,696	413,886	233,117	409,845
11	Contingency Adjustment	(21,309)	(27,347)	(40,334)	(60,385)	(33,349)	(59,943)
12	Annual Encumbrances	136,703	167,217	240,363	353,501	199,768	349,901
13	Project Expenses (c)	191,881	92,588	193,805	312,929	237,950	314,217
14	Annual Net Encumbrances	\$ (55,178)	\$ 74,629	\$ 46,558	\$ 40,572	\$ (38,182)	\$ 35,684

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0% per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

3.2.4 Capital Flow of Funds

The Water Department meets its projected capital needs by using several sources for funding, including internally generated funds (cash) and debt. As defined by the General Bond Ordinance, the Construction Fund is where the Water Department draws funds to pay for the CIP. The Water Department may deposit bond proceeds, commercial paper proceeds, and cash transfers from the Revenue Fund and the Residual Fund into the Construction Fund to pay for capital projects.

Table 3-12 presents the proposed sources and uses for the Water System CIP. As shown on Line 12, the Construction Fund has an estimated beginning balance of \$251.1 Million on July 1, 2021. Over the course of the Study Period, the Water Department anticipates issuing debt (both revenue bonds and CP) and the proceeds for these transactions are shown on Line 1 and 7. The level of debt financing increases during the Study Period as the Water Department's CIP starts to ramp up. The Water System's share of bond proceeds totals \$1.55 billion during the Study Period.

Line 15 shows that the PennVest loan proceeds for associated with the Torresdale Pump Station Rehabilitation project. Line 20 shows the estimated level of total annual capital expenditures the Water Department will fund. Lines 16 and 17 show the estimated level of annual pay-go (i.e., cash-funded) the Water Department will fund. Line 23 shows the estimated annual encumbrances, while line 24 shows the anticipated annual project expenses the Water Department will fund. Per the City's updated CIP funding policy, total outstanding project encumbrances may not exceed available funds; therefore, the Target Balance on Line 27, which represents the Water Departments estimated outstanding encumbrances (or project commitments), should not exceed the ending Construction Fund balance shown on Line 21.

Table 3-12 **Projected Flow of Funds – Water: Construction Fund & Debt Reserve Account**
[Schedule BV-1: Table W-4]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Water System (\$000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	\$ -	\$ 45,000	\$ 226,000	\$ 350,000	\$ 182,000	\$ 345,000
	Transfers:						
2	Debt Reserve Fund (a)	-	3,035	11,591	23,764	12,487	23,443
3	Cost of Bond Issuance (b)	-	293	1,469	2,275	1,183	2,243
4	Refund Commercial Paper	-	-	80,000	80,000	80,000	80,000
5	Construction Fund (c)	-	41,673	132,940	243,961	88,330	239,314
6	Total Issue	-	45,000	226,000	350,000	182,000	345,000
Disposition of Commercial Paper Proceeds							
7	Proceeds From Commercial Paper	-	80,000	80,000	80,000	80,000	80,000
	Transfers:						
8	Debt Reserve Fund	-	800	800	-	-	-
9	Cost of Issuance	-	100	-	-	100	-
10	Construction Fund (c)	-	79,100	79,200	80,000	79,900	80,000
11	Total Issue	-	80,000	80,000	80,000	80,000	80,000
Construction Fund							
12	Beginning Balance	251,132	88,251	153,628	198,699	239,594	201,005
13	Transfer From Revenue Bond Proceeds	-	41,673	132,940	243,961	88,330	239,314
14	Transfer From Commercial Paper Proceeds	-	79,100	79,200	80,000	79,900	80,000
15	Penn Vest Loan Proceeds	14,884	23,897	10,391	8,048	6,119	2,811
16	Capital Account Deposit	11,428	12,091	12,792	13,534	14,319	15,150
17	Transfer from Residual Fund	1,000	-	1,800	6,100	8,500	11,700
18	Interest Income on Construction Fund	1,688	1,203	1,753	2,181	2,192	2,184
19	Total Available	280,132	246,215	392,504	552,523	438,954	552,164
20	Net Cash Financing Required	191,881	92,588	193,805	312,929	237,950	314,217
21	Ending Balance	88,251	153,628	198,699	239,594	201,005	237,947
Capital Program Net Encumbrances							
22	Beginning Balance	131,128	75,950	150,580	197,137	237,710	199,527
23	Annual Encumbrances	136,703	167,217	240,363	353,501	199,768	349,901
24	Project Expenses	(191,881)	(92,588)	(193,805)	(312,929)	(237,950)	(314,217)
25	Ending Balance	75,950	150,580	197,137	237,710	199,527	235,212
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	75,950	150,580	197,137	237,710	199,527	235,212
Debt Reserve Fund							
28	Beginning Balance	65,193	58,730	62,564	74,955	98,719	111,206
29	Transfer From Bond Proceeds	-	3,835	12,391	23,764	12,487	23,443
30	Debt Service Reserve Release	(6,463)	-	-	-	-	-
31	Ending Balance	\$ 58,730	\$ 62,564	\$ 74,955	\$ 98,719	\$ 111,206	\$ 134,649
32	Interest Income on Debt Reserve Fund	620	606	688	868	1,050	1,229

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

(b) Cost of bonds issuance assumed at 0.59% of issue amount.

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

3.3 Water System Summary of Revenues and Revenue Requirements

The Water System's financial performance during the Study Period is presented in Table 3-13. As seen in Table 3-13, the Water System will need a series of revenue increases, of 8.25% in FY 2022, 6.10% in FY 2023, followed by 11.30%, 8.25%, and 9.60% over the remaining three years of the Study Period. These revenue adjustments are necessary to meet O&M, debt service, Capital Account deposit requirements, and provide additional coverage per the Rate Covenant.

Table 3-13 presents the Water System operating results for Base Rates. The proposed revenue increases in the table do not reflect any rate compression as discussed in Section 2.5.

As previously mentioned, the Water Department is addressing the reconciliation of TAP discounts and TAP-R revenues in a separate proceeding.

3.4 Projected Water System Operating Results

Line 1 on Table 3-13 is the consolidated total for water retail and wholesale receipts from Table 3-7. These represent receipts under existing rates. Lines 2 through 7 present the additional revenues from proposed revenue increases. Line 10 presents other operating receipts as detailed on Table 3-8. Interest income from the Debt Reserve, Operating Fund, and Rate Stabilization Funds is shown on Lines 11 through 13. Line 14 summarizes the projected Total Revenues for the Water System.

Operating expenses are summarized on Lines 15 and 16. Line 16 represents the Water System's share of costs to process water treatment sludge at the wastewater treatment plants. Refer to Section 4.6.1 of this Report for further explanation of these costs.

During the Study Period, it is assumed that the Water Department will make a series of deposits to and transfers from the Rate Stabilization Fund as shown on Line 18. Line 19 presents the Net Revenues after Operations. Existing and proposed senior debt service obligations, including those related to the CP program, are shown on Lines 20 through 23. Debt service coverage on senior debt is calculated on Line 25 and indicates that coverage meets the minimum 1.20x requirement. The Capital Account deposit is on Line 29. Line 30 then shows results of the total debt service coverage requirement and indicates that total coverage requirements meet the 1.00 minimum coverage required by the General Bond Ordinance.

As established in the General Bond Ordinance and Rate Covenant, debt service coverage requirements are for the Combined System. The calculations shown in Table 3-13 are presented to demonstrate that the Water System's proposed financial plan provides sufficient resources for the Water System to be financially stable on its own.

Table 3-13 **Projected Water System Revenue and Revenue Requirements: Base Rates**
[Schedule BV-1: Table W-6]

LINE			FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION		2021	2022	2023	2024	2025	2026
Water System (\$000s)								
Operating Revenues								
1	Water Service - Existing Rates (a)		\$ 253,071	\$ 263,593	\$ 266,743	\$ 269,713	\$ 267,430	\$ 265,151
	Additional Service Revenue Required							
		Percent						
	Year	Increase						
		Months						
		Effective						
2	FY 2021	0.00%		10	-	-	-	-
3	FY 2022	8.25%		10	17,779	22,006	22,251	22,063
4	FY 2023	6.10%		10	14,400	17,810	17,659	17,509
5	FY 2024	11.30%		10		28,619	34,708	34,412
6	FY 2025	8.25%		10			23,058	27,963
7	FY 2026	9.60%		10				28,798
8	Total Additional Service Revenue Required		-	17,779	36,407	68,680	97,489	130,557
9	Total Water Service Revenue		253,071	281,372	303,150	338,393	364,919	395,707
	Other Income (b)							
10	Other Operating Revenue		19,957	14,811	14,773	14,738	14,703	14,668
11	Debt Reserve Fund Interest Income		-	-	-	-	-	-
12	Operating Fund Interest Income		399	498	512	536	553	574
13	Rate Stabilization Interest Income		503	404	405	407	408	411
14	Total Revenues		273,930	297,085	318,840	354,074	380,583	411,359
Operating Expenses								
15	Water Operations		(208,527)	(211,205)	(216,434)	(221,826)	(227,323)	(233,040)
16	Water Treatment Plant Sludge (c)		(12,308)	(14,078)	(14,913)	(15,341)	(16,289)	(17,214)
17	Total Operating Expenses		(220,836)	(225,282)	(231,348)	(237,167)	(243,613)	(250,254)
18	Transfer From/(To) Rate Stabilization Fund		19,885	(25)	(200)	(100)	(200)	(300)
19	NET REVENUES AFTER OPERATIONS		72,979	71,778	87,293	116,807	136,770	160,805
Debt Service								
	Senior Debt Service							
	Revenue Bonds							
20	Outstanding Bonds		(56,440)	(52,533)	(53,465)	(53,482)	(53,738)	(53,947)
21	Pennvest Parity Bonds		(4,374)	(4,607)	(4,790)	(8,586)	(8,586)	(8,905)
22	Projected Future Bonds		-	(1,875)	(12,860)	(33,629)	(50,043)	(69,531)
23	Commercial Paper		-	(800)	(1,600)	(1,600)	(1,600)	(1,600)
24	Total Senior Debt Service		(60,814)	(59,815)	(72,714)	(97,297)	(113,967)	(133,983)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)		1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service		-	-	-	-	-	-
27	Transfer to Escrow		-	-	-	-	-	-
28	Total Debt Service on Bonds		(60,814)	(59,815)	(72,714)	(97,297)	(113,967)	(133,983)
29	CAPITAL ACCOUNT DEPOSIT		(11,428)	(12,091)	(12,792)	(13,534)	(14,319)	(15,150)
30	TOTAL COVERAGE (L19/(L24+L26+L29))		1.01 x	1.00 x	1.02 x	1.05 x	1.07 x	1.08 x
31	End of Year Balance		\$ 737	\$ (128)	\$ 1,787	\$ 5,976	\$ 8,484	\$ 11,672

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

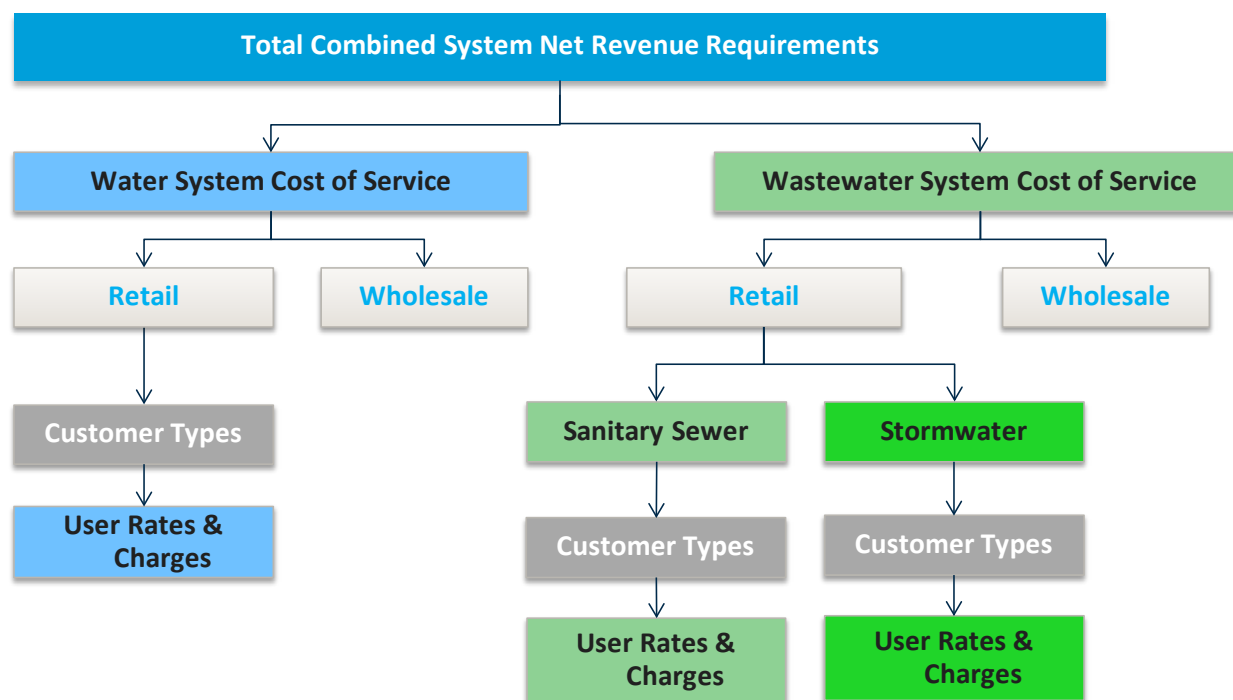
4.0 Water System Cost of Service Allocations

The cost of service analysis is the middle step of three depicted in Figure 2-1 that form the basis for how a utility sets its rates and charges. At the cost of service stage, we identify how different customer types are using the Water System. As such, each customer type potentially places a different level of demands on the system – requirements that the Water Department must meet. The types of demand are cost drivers and the cost of service step is where we develop the nexus between how the system is designed and operated and how customers are using the system (cost-benefit nexus).

4.1 General

The cost of service process involves a multi-level allocation, where the net revenue requirements for the Combined System are first allocated between water and wastewater, then between customer category (Retail versus Wholesale), and then finally among customer types to determine each type's cost responsibility. This process is illustrated in Figure 4-1.

Figure 4-1 Multi-Layer Allocation of Costs



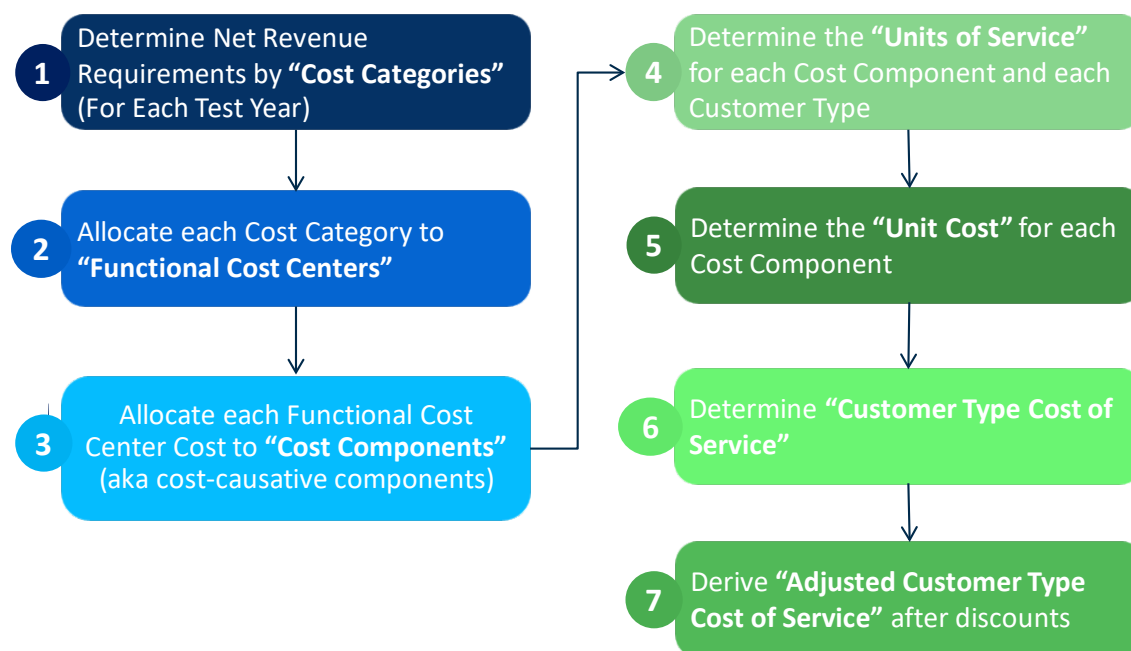
Cost of service is the process by which total net revenue requirements (O&M and capital costs) are allocated to the customer types of the system in proportion to the services received by the customer types. The process typically follows the following steps:

- Identification of net revenue requirements by cost category;
- Allocation of functional cost to appropriate cost centers;
- Allocate functional cost center costs to cost components or drivers;

- Determination of units of service by customer and by cost component;
- Development of unit cost for each cost component;
- Determine the cost of service by each customer type; and
- Apply any appropriate discounts and / or adjustments and derive the Adjusted Cost of Service by customer type.

Figure 4-2 shows the typical analytical steps performed as part of a Cost of Service study.

Figure 4-2 Seven Analytical Steps for Determining the Cost of Service



4.2 Identification of Net Revenue Requirements by Cost Category

The cash-needs revenue requirements for a utility consist mainly of O&M, debt service, and capital expenditures. These revenue requirements should be identified by cost category or center (function) as best as possible. A function represents the type of operational activity that the costs are used for such as source of supply, pumping, treatment, etc. for water systems. The operational costs can be attributable directly or indirectly to a function. Costs such as engineering, administration, finance, etc. are indirectly allocated based on other costs. The debt service and capital expenditure costs can be attributable to functions based on existing fixed asset records. Figure 4-3 illustrates the Water System cost centers examined in this Report.

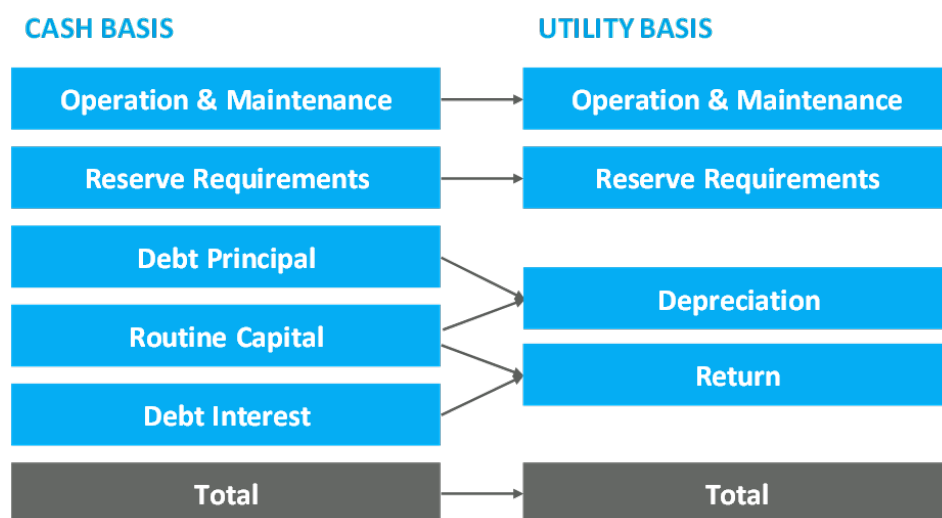
Figure 4-3 Functional Cost Centers

FUNCTIONAL COST CENTERS

- Water Supply
- Raw Water Pumping
- Treatment
- Treated Water Pumping
- Treated Water Storage
- Transmission & Distribution
- Water Meters
- Hydrants
- Customer Accounting & Collection
- Administration & General

O&M, debt service and capital are cost categories used under the cash-needs approach to cost of service. Because the Water Department also provides water services to a wholesale customer, these cost categories are translated into categories used under the utility-basis approach. Under the utility-basis, the relevant cost categories are O&M, depreciation, and return on rate base. Return on rate base recognizes the recovery of return on the Water Department's capital investment. Because the Water Department provides water service to wholesale customers (non-system owners), the Water Department is entitled to a higher rate of return from these customers. Figure 4-4 illustrates how the cash-needs basis cost categories relate to utility-basis cost categories.

Figure 4-4 Relationship Between Cash-Needs Basis and Utility-Basis



The process of allocating the net revenue requirements to the system's users allows recognition of issues such as:

- Differences between service levels
- Differences in user characteristics
- Regulations and covenants that affect user rates and charges
- Nexus between charges and service demands

In the analysis described herein, the cost of the service provided serves as the allocation basis for the Test Year ("TY") revenue requirements to the various customer classifications. Since the Water Department's Rate Proposal is for two fully projected fiscal years, we are using the naming convention of "Test Year 1" to refer to FY 2022 and "Test Year 2" to refer to FY 2023. Allocations of revenue requirements to customer types account for the quantity of water used relative to peak capacity requirements placed on the system, the number and size of services to customers, proprietary interest in the system investment, and other relevant factors.

4.3 Cost of Service to be Allocated

4.3.1 Overall Water System

The projected annual revenue requirements for FY 2022 serve as the Test Year 1 requirements for the analyses conducted herein. The proposed rate increases will go into effect on September 1st of each respective fiscal year. However, rates are designed based upon a 12-month period. Because the proposed revenue increase will not go into effect until September 1st of each fiscal year, the proposed rates are designed based on annualizing the 10-month period for which rates are effective. Table 4-1 shows the projected Test Year 1 cash flow of base rates for the Water System based on the annualizing the proposed revenue increase.

Table 4-1 Test Year 1 Annualized Revenue and Revenue Requirements [Schedule BV-1: Table W-6A]

LINE NO.	DESCRIPTION	2022
Water System (\$000s)		
Operating Revenues		
1	Water Service - Existing Rates (a)	\$ 263,593
	Additional Service Revenue Required	
	<div> <div>Year</div> <div>Percent Increase</div> <div>Months Effective</div> </div>	
2	FY 2022 8.25% 12	21,746
3	Total Additional Service Revenue Required	21,746
4	Total Water Service Revenue	285,340
Other Income (b)		
5	Other Operating Revenue	14,811
6	Debt Reserve Fund Interest Income	-
7	Operating Fund Interest Income	498
8	Rate Stabilization Interest Income	404
9	Total Revenues	301,052
Operating Expenses		
10	Water Operations	(211,205)
11	Water Treatment Plant Sludge (c)	(14,078)
12	Total Operating Expenses	(225,282)
13	Transfer From/(To) Rate Stabilization Fund	(3,992)
14	NET REVENUES AFTER OPERATIONS	71,778
Debt Service		
Senior Debt Service		
Revenue Bonds		
15	Outstanding Bonds	(52,533)
16	Pennvest Parity Bonds	(4,607)
17	Projected Future Bonds	(1,875)
18	Commercial Paper	(800)
19	Total Senior Debt Service	(59,815)
20	TOTAL SENIOR DEBT SERVICE COVERAGE (L14/L19)	1.20 x
21	Subordinate Debt Service	-
22	Transfer to Escrow	-
23	Total Debt Service on Bonds	(59,815)
24	CAPITAL ACCOUNT DEPOSIT	(12,091)
25	TOTAL COVERAGE (L14/(L19+L21+L24))	1.00 x
26	End of Year Balance	\$ (128)

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

Table 4-2 presents the cost of service to be recovered from rates for Test Year 1. The net cost of service recovered from water service charges is the total revenue requirements less revenues received from other sources. The TY net cost of service of \$285.3 Million (Column 3, Line 13), represents the total revenue requirements of \$301.0 Million (Column 3, Line 10) minus other revenues and transfers received of \$15.7 Million (Column 3, Lines 11 and 12). The cost of service to be recovered from rates consists of \$212.7 Million of net operating expenses (Column 1, Line 13) and \$72.6 Million of net capital-related costs (Column 2, Line 13).

Table 4-2 Water Estimated Test Year 1 Cost of Service [Schedule BV-1: Table W-7]

LINE NO.	DESCRIPTION	(1) OPERATING EXPENSE	(2) CAPITAL COSTS	(3) TOTAL
Water System (\$000s)				
Revenue Requirements				
1	Operations & Maintenance Expense	\$ 122,302		\$ 122,302
2	Direct Interdepartmental Charges	88,902		88,902
3	Water Treatment Plant Sludge	14,078		14,078
	Existing Bond Debt Service			
4	Revenue Bonds		57,140	57,140
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service		2,675	2,675
7	Capital Account Deposit		12,091	12,091
8	Residual Fund Deposit	(97)	(31)	(128)
9	Deposit (From)/To Rate Stabilization Fund	3,026	966	3,992
10	Total	228,211	72,841	301,052
Deductions of Funds from Other Sources				
11	Other Operating Revenue	(14,811)	-	(14,811)
12	Interest Income	(684)	(218)	(902)
13	COST OF SERVICE TO BE DERIVED FROM RATES	\$ 212,716	\$ 72,623	\$ 285,340

4.3.2 Wholesale Water

The cost of service allocable to Aqua PA and the rates developed to recover the allocated costs, reflect consideration of the contract demands for service as set forth in the contract between Aqua PA and the City, as well as the projected annual water consumption, and the maximum day and hour demands for Aqua PA. The Water Department allocates O&M expenses to Aqua PA in the same manner as for its retail customers. The annual capital costs allocable to Aqua PA recognize annual depreciation expense and return on investment, with the allocable investment based upon the contract maximum day demands versus the design capacity of the various facilities used in the provision of service to Aqua PA. The Water Department uses original cost to allocate plant investment for determining the applicable rate base. This approach is consistent with the methodology applied in previous rate filings and is consistent with the derivation of Aqua PA's existing rates. The rate of return for service to the City's wholesale water and wastewater customers used in this Cost of Service Study is 7.5%, which is consistent with the rate of return used in the development of Aqua PA's existing rates. The specific maximum day contract demands

for Aqua PA used in the cost of service analysis amount to 9.5 million gallons per day (MGD) for the period of July 1, 2019 through June 30, 2022.

As established under the contract, the rates applicable to Aqua PA include a commodity or usage charge, a fixed charge, and a management fee. The commodity charge includes only the costs associated with power and chemicals and applies to Aqua PA's metered consumption. As agreed, to by both the City and Aqua PA, the cost of service analysis limits water loss percentage applied to Aqua PA to 20%. The fixed charge includes the allocated return on investment and depreciation expense, as described above, and the balance of O&M expenses allocated to Aqua PA, excluding power and chemical costs. The O&M expenses allocable to Aqua PA reflect the relationship of the projected annual consumption, the maximum day demands, and the maximum hour demands from Aqua PA relative to the projected annual usage or production and total maximum day and hour demands of the facilities used by Aqua PA. The management fee amounts to 10% and is applied to the sum of the usage charge and fixed charge.

4.4 Functional Cost Components

The costs derived in revenue requirements are incurred as a result of cost drivers placed on the system by its customers. Many utilities are designed and sized to meet the cost drivers; therefore, the operational and capital costs (depreciation and return on rate base) are linked to these cost drivers. The principal cost drivers for water are volume of water consumed, peak water demands, number of customers, and the number of fire services.

The various cost elements of water service are assigned to functional cost components as the first step in the subsequent distribution of the cost of service to the customer types. For the analyses conducted herein, the Base-Extra Capacity Method²³ as outlined in the AWWA M1 Manual is used. This cost of service allocation methodology uses base, extra-capacity, customer and fire protection functional cost centers as listed in Figure 4-5.

- **Base costs** are those which vary directly with the quantity of water used, as well as those costs associated with serving customers under average load conditions without the elements necessary to meet peak demands. Base costs include purchased treatment chemicals, and other operating and capital costs of the water system associated with serving customers to the extent required for a constant, or average annual rate of use.

Figure 4-5 Functional Cost Components

COST COMPONENTS

- **Wholesale (Aqua PA)**
 - Base
 - Maximum Day
 - Maximum Hour
 - Meters
 - Billing & Collection
 - Fire Protection

²³ Per the AWWA M1 Manual, the Base-Extra Capacity Method is one of the "two most widely used methods" of allocating annual cost of service to cost components. Black & Veatch employees this methodology as appropriate in other cost of service studies and it has been used for allocating the Water Department's retail cost to the various cost components for years.

- **Extra capacity costs** represent those operating costs incurred due to demands in excess of average, and capital-related costs for additional plant and system capacity beyond that required for the average rate of use. Total extra capacity costs are subdivided into costs associated with maximum day and maximum hour demands.
- **Customer costs** are defined as costs that tend to vary in proportion to the number of customers connected to the system. These include meter reading, billing, collection and accounting costs, and maintenance and capital charges associated with meters and services.
- **Fire Protection costs** assigned to fire protection include operating expenses and capital costs associated with public and private fire protection.

The separation of costs of service into these principal categories provides the means of further allocating such costs to the various customer types based on the respective base, extra capacity, customer, and fire service requirements of each customer type.

4.5 Allocation to Cost Components

Under Step 4 of the process, we determine units of service for each cost component and each customer type.

The Water System is comprised of various facilities, each designed and operated to fulfill a given function. To provide adequate service to its customers, the Water System must be capable of providing not only the total amount of water used but also supplying water at the maximum rates of demand.

4.5.1 Base, Maximum Day, and Maximum Hour

Since all customers do not exert their maximum demand for water at the same time, capacities of the various water system components are designed to meet the peak coincidental demands that all types of customers place on the system. For every water service facility on the system, there is an underlying average demand, or uniform rate of usage exerted by the customers for which the base cost component is applicable. For those facilities designed solely to meet average day demand, costs are allocated 100% to the base cost component. Extra capacity requirements associated with coincidental demands in excess of average use are further related to maximum daily (“max day”) and maximum hourly (“max hour”) demands.

For volume-related cost allocations, the first step in determining the allocation percentages is to assign system peaking factors. The base element is equal to the average daily demand (“ADD”) and assigned a value of 1.0. For the Water System, max day and max hour ratios by Water System Facilities were reviewed.

As an example of how to interpret peaking factors and their relationship with base-extra capacity, we will use for illustrative purposes, the Water System’s raw water pumping max day demand factor of

1.40 times the ADD for max day allocations. The costs associated with facilities required to meet maximum day demand are allocable to base and maximum day extra capacity as follows:

$$\text{Base} = (1.0/1.4) \times 100 = 71\%$$

$$\text{Max Day} = (1.4 - 1.0)/1.4 \times 100 = 29\%$$

These calculations indicate that the average or base use requires 71% of the capacity of facilities designed and generated to meet average day demand and the remaining 21% meets maximum day extra capacity requirements.

The Water System's treated water delivered max hour demand factor of 1.90 times the ADD and max day demand factor of 1.30 times the ADD for max hour allocations. The costs associated with facilities required to meet maximum hour demand are allocable to base, maximum day extra capacity and maximum hour extra capacity as follows:

$$\text{Base} = (1.0/1.9) \times 100 = 52\%$$

$$\text{Max Day} = (1.3 - 1.0)/1.9 \times 100 = 16\%$$

$$\text{Max Hour} = (1.9 - 1.3)/1.9 \times 100 = 32\%$$

4.5.2 Units of Service

The estimated Test Year 1 value of Water System facilities is allocated to appropriate cost functions as the basis for further distribution to the various customer types.

Base costs vary with the volume of water used and distributed to customer types on that basis. Extra Capacity costs are those associated with meeting peak rates of water use and distributed to customer types based on the respective customer type capacity requirements in excess of average rates of use. The number of bills for each customer type serves as the basis for distributing customer billing requirements. Customer meter and fire protection requirements are allocated based on the number of equivalent meters. The estimated number of equivalent meters for each customer type is based on the total number of various sizes of meters serving respective types and the capacity ratio of the meters for the various sizes to the cost of 5/8-inch meters. Table 4-3 summarizes the equivalent meter ratios and billing ratios used in this Report.

Table 4-3 **Equivalent Meter and Bill Ratios [Schedule BV-1: Table W-12]**

LINE NO.	METER SIZE (INCHES)	(1) EQUIVALENT FACTORS	(2)
		METERS CAPACITY BASIS	BILLS
1	5/8	1.0	1.0
2	3/4	1.5	1.0
3	1	2.5	1.1
4	1-1/4	3.8	1.2
5	1-1/2	5.0	1.2
6	2	8.0	1.5
7	3	15.0	2.0
8	4	25.0	4.0
9	6	50.0	7.0
10	8	80.0	10.0
11	10	115.0	15.0
12	12	215.0	20.0

With respect to Fire Protection, Fire Protection Extra Capacity requirements are based on peak fire flow requirements reflected in previous cost of service studies and rate proceedings. The system wide fire protection demands reflect two simultaneous fires, one requiring 10,000 gallons per minute (“gpm”) fire flow demand for 10 hours and the second requiring 5,000 gpm for 8 hours. 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.

Table 4-4 summarizes the estimated Test Year 1 units of service for the Water System’s retail customers. Estimates of test year annual water requirements, shown in Column 1, are based on the projections of total water sales developed in this Report. Column 2 presents the average daily use of all water sales. Columns 3 through 8 show the estimated maximum day and maximum hour capacity factors for each customer type, the resulting demands, and extra capacity requirements, respectively. We derived the customer type extra capacity factors based on previous cost of service studies and rate proceedings.

Based on our experience, we believe that the capacity factors determined in this analysis are reasonable. Generally, the peak water usage characteristics vary among the different customer types as follows:

- Residential customers place a higher peak demand on the water system than the non-residential customers. For example, the Residential customers typically would have high water usage in the morning due to shower and other morning chores and similarly may reflect a high usage in the evening when residents are usually back home from work/school, etc.
- The Senior Citizen and PHA types are projected to have usage patterns closely related to the Residential customers.
- Within the non-residential group, typically Commercial customer types and others including Charities and Schools are likely to have higher demand during business hours and very low demand during non-business hours.

- Industrial customer type usually has low peaking factors, as industrial enterprises often have very stable pattern of water usage. Industrial use is generally spread more uniformly throughout the day and hence their maximum rates of use vary less from their average day use.

To verify the reasonableness of the capacity factors, the system peak demand diversity factors were verified based on the capacity factors are within the AWWA industry acceptable range of 1.1 to 1.4.

In the following sections, we discuss the results of conducting Steps 5 through 7 of the cost of service process. The purpose of each of these remaining steps is outlined in Figure 4-6.

Figure 4-6 Cost of Service Steps 5 through 7

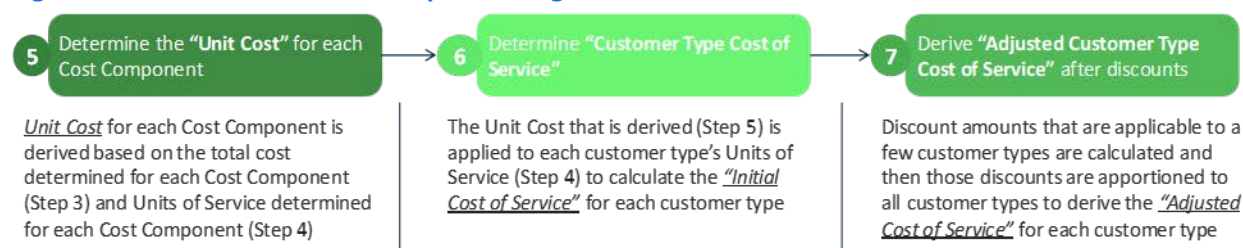


Table 4-4 Test Year 1 Retail Units of Service [Schedule BV-1: Table W-11]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
		TOTAL	AVERAGE	MAXIMUM DAY EXTRA CAPACITY		MAXIMUM HOUR EXTR CAPACITY		CUSTOMER COSTS		METERS	BILLS
		TEST YEAR	DAILY	CAPACITY	TOTAL	EXTRA	CAPACITY	TOTAL	EXTRA		
		WATER USE	WATER USE (BASE)	FACTOR	CAPACITY	CAPACITY (a)	FACTOR	CAPACITY	CAPACITY (b)		
		Mcf	Mcf/day	%	Mcf/day	Mcf/day	%	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills
			(1) / 365		(2) x (3) / 100	(4) - (2)		(2) x (6) / 100	(7) - (4)		
1	Residential	3,245,700	8,890	200	17,780	8,890	360	32,000	14,220	457,923	5,096,682
2	Senior Citizens	136,500	370	200	740	370	360	1,330	590	22,758	272,962
3	Commercial	1,483,500	4,060	180	7,310	3,250	265	10,760	3,450	124,848	543,125
4	Industrial	93,400	260	160	420	160	200	520	100	3,513	15,166
5	Public Utilities	8,500	20	160	30	10	200	40	10	808	2,755
6	Total General Service	4,967,600	13,600		26,280	12,680		44,650	18,370	609,850	5,930,690
7	Housing Authority	152,900	420	190	800	380	313	1,310	510	9,173	72,285
8	Charities & Schools	114,000	310	180	560	250	270	840	280	14,559	38,791
9	Hospital/University	112,500	310	180	560	250	233	720	160	6,135	11,256
10	Hand Billed	428,000	1,170	180	2,110	940	270	3,160	1,050	6,265	10
11	Scheduled (Flat Rate)	0	0	200	0	0	360	0	0	3	36
	Fire Protection (c)										
12	Public		0		950	950		2,480	1,530		
13	Private	15,600	40		200	160		450	250	7,610	676,181
14	Total Retail Customers	5,790,600	15,850		31,460	15,610		53,610	22,150	653,595	6,729,249

(a) Capacity in excess of average daily use.

(b) Capacity in excess of maximum day.

(c) System wide fire protection demands reflect two simultaneous fires, one requiring 10,000 gallons per minute (gpm) fire flow demand for 10 hours and the second requiring 5,000 gpm for 8 hours. These allocated between standard pressure public fire service and private fire service based upon equivalent 6-inch connections for each of the two fire service classes.

Mcf - thousand cubic feet

4.6 Allocation of O&M Expense

4.6.1 Retail

Table 4-5 shows the allocation of Test Year 1 O&M expenses for the Water System to the identified functional cost components by cost center. The four key components of the Water System's portion of the Operating expenses are: (i) the O&M expense, (ii) the deposit to the Rate Stabilization Fund, (iii) the year-end Revenue Fund balance which is deposited into the Residual Fund and (iv) the cost of treating and disposing water treatment plant sludge that is discharged into the City's Wastewater System. The water treatment plant sludge expense of \$14.1 Million is shown in Line 3 of Table 4-2. A corresponding credit for this amount is shown in the wastewater cost of service in Table 7-2.

The projected net O&M expense for Test Year 1 is \$212.7 Million. Operation and Maintenance expense is allocated to water cost components generally in the same proportion as the plant investment and depreciation expense allocations.

The Test Year 1 O&M costs are allocated to the cost components using a two-step process.

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

The O&M expenses that are directly allocable to Aqua PA are deducted from the total expenses shown in Column 1 of Table 4-5. 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 71% to Base and 29% to Maximum Day cost components. The power costs associated with raw water pumping is allocated 95% to Base and 5% 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 71% to Base and 29% to Maximum Day Extra Capacity.
 - 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 52% to Base, 16% to Maximum Day Extra Capacity, and 32% to Maximum Hour Extra Capacity cost components.

Table 4-5 Allocation of Test Year 1 O&M Expense [Schedule BV-1: Table W-10]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)
		TEST YEAR O&M EXPENSE	BASE	EXTRA CAPACITY		CUSTOMER COSTS METERS	BILLING	PUBLIC FIRE		
				MAX DAY IN EXCESS OF BASE	MAX HOUR IN EXCESS OF MAX DAY			PROTECTION - DIRECT		
								STANDARD PRESSSURE	WHOLESALE DIRECT	
WATER SYSTEM (\$)										
	Raw Water Pumping									
1	Purchased Power	\$ 2,628,000	\$ 2,475,000	\$ 130,000						\$ 23,000
2	Purchased Gas	-	-	-						-
3	Other	2,836,000	1,987,000	811,000						38,000
4	Total Raw Water Pumping	5,464,000	4,462,000	941,000	-	-	-	-	-	61,000
	Purification and Treatment									
	Power and Pumping (a)									
5	Purchased Power	3,729,000	3,326,000	185,000	185,000					33,000
6	Purchased Gas	467,000	241,000	74,000	148,000					4,000
7	Other	10,789,000	5,535,000	1,703,000	3,407,000					144,000
	Treatment									
8	Purchased Power	-	-	-	-					-
9	Purchased Gas	29,000	21,000	8,000	-					-
10	Chemicals	18,483,000	18,319,000							164,000
	Other									
11	Other	45,272,000	31,713,000	12,953,000						606,000
12	Water Treatment Plant Sludge	14,078,000	13,922,000							156,000
13	Subtotal Other (b)	59,350,000	45,635,000	12,953,000	-	-	-	-	-	762,000
14	Total Purification and Treatment	92,847,000	73,077,000	14,923,000	3,740,000	-	-	-	-	1,107,000
	Transmission and Distribution									
15	Mains	68,700,000	35,514,000	10,927,000	21,855,000					404,000
16	Meters	1,945,000				1,945,000				-
17	Hydrants	534,000						534,000		-
18	Filtered Water Storage	997,000	507,000	156,000	312,000					22,000
	High Pressure Fire System	-								-
19	Total Transmission and Distribution	\$ 72,176,000	\$ 36,021,000	\$ 11,083,000	\$ 22,167,000	\$ 1,945,000	\$ -	\$ 534,000	\$	426,000

Table 4-5 Allocation of Test Year 1 O&M Expense (continued)

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		TEST YEAR O&M EXPENSE	BASE	EXTRA CAPACITY		CUSTOMER COSTS METERS	BILLING	PUBLIC FIRE	
				MAX DAY IN EXCESS OF BASE	MAX HOUR IN EXCESS OF MAX DAY			PROTECTION - DIRECT	
								STANDARD PRESSURE	WHOLESALE DIRECT
WATER SYSTEM (\$)									
20	Customer Accounting and Collection Warranty Program	\$ 24,144,000	-				\$ 24,144,000		\$ -
21	Subtotal	194,631,000	113,560,000	26,947,000	25,907,000	1,945,000	24,144,000	534,000	1,594,000
22	Administrative and General	30,651,000	14,861,000	5,243,000	5,050,000	384,000	4,768,000	105,000	240,000
23	Subtotal Water Operating Expense	225,282,000	128,421,000	32,190,000	30,957,000	2,329,000	28,912,000	639,000	1,834,000
24	Residual Fund Deposit	(97,000)	(56,000)	(14,000)	(13,000)	(1,000)	(12,000)	-	(1,000)
25	Deposit (from) to RSF	3,026,000	1,725,000	432,000	416,000	31,000	388,000	9,000	25,000
26	Total Water Operating Expense	228,211,000	130,090,000	32,608,000	31,360,000	2,359,000	29,288,000	648,000	1,858,000
27	Other Operating Revenue	14,811,000	8,491,000	2,129,000	2,048,000	154,000	1,913,000	43,000	33,000
28	Non-Operating Income	684,000	389,000	98,000	94,000	7,000	88,000	2,000	6,000
29	Total Operating Expense Less Other	\$212,716,000	\$121,210,000	\$ 30,381,000	\$ 29,218,000	\$ 2,198,000	\$ 27,287,000	\$ 603,000	\$ 1,819,000

(a) Includes booster pumping.

(b) Includes Wastewater System cost of treating water treatment plant sludge of \$14,078,000.

- Treatment plant power costs are allocated 90% to Base, 5% to Maximum Day Extra Capacity and 5% to Maximum Hour Extra Capacity in recognition of the effect of the demand structure of electric rates.
- **Water Treatment Sludge Costs:** As shown in Line 12 in Table 4-5, the water treatment sludge O&M cost for FY 2022 is determined to be \$14.1 Million. This cost represents the cost of treating the water treatment plant sludge. The water treatment sludge, which is discharged into the Wastewater System, is ultimately treated in the wastewater treatment facility and thereby becomes a wastewater treatment cost. This wastewater treatment cost is appropriately charged back to the Water System.
- **Transmission and Distribution:** Transmission and distribution test year operating expenses associated with mains and reservoirs are allocated to Base, Maximum Day Extra Capacity, and Maximum Hour Extra Capacity 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, chemicals, and water treatment sludge.
- **Residual Fund and Rate Stabilization Fund Transfers:** The deposit into the Residual Fund (Line 24) and the deposit from the Rate Stabilization Fund (Line 25), each of which is allocable to O&M expense, are allocated to the various cost components in proportion to the allocation of the Subtotal Water Operating Expense (Line 23).
- **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 operating revenue (Line 27) is allocated to the various O&M cost components, in proportion to the allocation of the Subtotal Water Operating Expense (Line 23).
 - The non-operating interest income (Line 28) is allocated to the various O&M cost components, in proportion to the allocation of the Subtotal Water Operating Expense (Line 22).
 - The total net operation and maintenance expense of \$212.7 Million to be recovered from water rates is shown on Line 29.

4.6.2 Wholesale

Currently, Aqua Pennsylvania is the only wholesale water customer. O&M expenses are allocated to Aqua Pennsylvania taking into considerations their projected annual usage and maximum day demands for service 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 8 of Table 4-5, a total of \$1.82 Million of Test Year 1 O&M expense has been allocated to Aqua PA.

4.7 Allocation of Net Plant Investment

Table 4-6 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 1 investment of \$1.60 Billion is the total original cost investment in facilities as of June 30, 2020.

4.7.1 Retail

The Test Year 1 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 customers.
- Then the retail portion of the total plant investment costs (which is the total plant investment less the proportionate share allocated to wholesale customers), are allocated to the other five cost components (Base, Extra Capacity (Max Day and Max Hour), Customer, and Public Fire Protection).

After deducting the investment directly allocable to Aqua PA, the balance of the plant investment is allocated to retail customers as follows:

- **Source of Supply (Raw Water):** The investment in the source of supply facilities shown in Lines 1 and 2 includes the Fairmont Dam and associated structures and equipment. These facilities are designed to meet average annual water supply requirements and are allocated 100% to the Base cost component.
- **Raw Water Pumping:** Lines 3 and 4 reflect investment in the Baxter, Queen Lane, and Belmont raw water intakes, buildings, structures, and raw water pumping equipment. 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 71% to Base cost component and 29% to Maximum Day Extra Capacity cost component.

Table 4-6 Allocation of Test Year 1 Net Plant Investment to Functional Cost Components [Schedule BV-1: Table W-8]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)		(4)	(5)	(6)	(7)
		ESTIMATED PLANT INVESTMENT	BASE	EXTRA CAPACITY		PUBLIC FIRE PROTECTION CUSTOMER METERS	DIRECT STANDARD PRESSURE	WHOLESALE DIRECT	
				MAX DAY IN EXCESS OF BASE	MAX HOUR IN EXCESS OF MAX DAY				
WATER SYSTEM (\$)									
Raw Water Supply and Pumping									
Source of Supply									
1	Land	\$ 200,000	\$ 200,000						
2	Buildings and Equipment	4,218,000	4,218,000						
Power and Pumping									
3	Land	31,000	22,000	9,000					-
4	Buildings and Equipment	21,202,000	14,880,000	6,078,000					244,000
5	Total Raw Water Supply and Pumping	25,651,000	19,320,000	6,087,000	-	-	-	-	244,000
Purification and Treatment									
Power and Pumping (a)									
6	Land	71,000	36,000	11,000	23,000				1,000
7	Buildings and Equipment	80,682,000	41,247,000	12,691,000	25,383,000				1,361,000
Treatment									
8	Land	1,325,000	924,000	378,000					23,000
9	Buildings and Equipment	307,877,000	214,789,000	87,731,000					5,357,000
10	Total Purification and Treatment	389,955,000	256,996,000	100,811,000	25,406,000	-	-	-	6,742,000
Transmission and Distribution									
11	Mains	1,062,401,000	549,872,000	169,192,000	338,383,000				4,954,000
12	Meters	35,888,000				35,888,000			-
13	Hydrants	9,200,000					9,200,000		-
Filtered Water Storage									
14	Land	182,000	93,000	29,000	57,000				3,000
15	Buildings and Equipment	17,097,000	8,736,000	2,688,000	5,376,000				297,000
16	Total Transmission and Distribution	1,124,768,000	558,701,000	171,909,000	343,816,000	35,888,000	9,200,000		5,254,000
17	Subtotal	1,540,374,000	835,017,000	278,807,000	369,222,000	35,888,000	9,200,000		12,240,000
Administrative and General (b)									
18	Land	205,000	111,000	37,000	49,000	5,000	1,000		2,000
19	Buildings and Equipment	63,550,000	34,449,000	11,502,000	15,232,000	1,481,000	380,000		506,000
20	Total Administrative and General	63,755,000	34,560,000	11,539,000	15,281,000	1,486,000	381,000		508,000
21	Total Water Plant Investment	\$ 1,604,129,000	\$869,577,000	\$ 290,346,000	\$384,503,000	\$37,374,000	\$ 9,581,000		\$ 12,748,000

(a) Includes booster pumping

(b) Administrative and General allocated based on allocation of system investment.

- **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. 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 52% to Base, 16% to Maximum Day Extra Capacity, and 32% to Maximum Hour Extra Capacity cost components.
- **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. Hence, 71% of these costs are allocated to the Base cost component and 29% to the Maximum Day Extra Capacity cost component. The investment for Treatment is shown in Lines 8 and 9.
- **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 Extra Capacity, and Maximum Hour Extra Capacity cost components, with factors identical to that of the Treated Water Pumping allocation, discussed above.
- **Customer Meters and Public Fire Protection:** Investments in customer meters are entirely allocable to the Customer Meters cost component. Public fire protection service is comprised of the standard pressure fire system. Investment in public fire protection facilities is allocated 100% to the Public Fire Protection component.
- **General Plant and Equipment:** Other general plant and equipment investments are allocated to all the cost components based on the proportion of the total non-general plant and equipment component cost to the total plant investment cost.

4.7.2 Wholesale

Aqua PA 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 PA based on the proportionate share of their contract capacity in the various facilities relative to the total design capacity of the various facilities. Aqua PA'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.

As shown in Column 7 of Table 4-6, a total of \$12.75 Million of test year net plant investment has been allocated to Aqua PA. The associated return on investment at 7.50% is \$956,100.

4.8 Allocation of Depreciation Expense

Table 4-7 shows the estimated annual depreciation expense of the Water System and it is estimated to be \$34.4 Million for the Test Year 1. As shown on Line 14, the total depreciation expense allocated to Aqua PA is \$273,000.

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 various items of depreciation expense are allocated to cost components on the same basis as the proportion of plant investment costs allocated to each of those cost components.

Table 4-7 Allocation of Test Year 1 Depreciation Expense [Schedule BV-1: Table W-9]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)		(4)	(5)	(6)	(7)
		ESTIMATED PLANT INVESTMENT	BASE	EXTRA CAPACITY		CUSTOMER METERS	PUBLIC FIRE PROTECTION - STANDARD PRESSURE	DIRECT WHOLESALE DIRECT	
				MAX DAY IN EXCESS OF BASE	MAX HOUR IN EXCESS OF MAX DAY				
WATER SYSTEM (\$)									
Raw Water Supply and Pumping									
1	Source of Supply	\$ 105,000	\$ 105,000	\$ -					
2	Power and Pumping	435,000	305,000	125,000					5,000
3	Total Supply and Pumping	540,000	410,000	125,000	-	-	-	-	5,000
Purification and Treatment									
4	Power and Pumping (a)	1,597,000	816,000	251,000	503,000				27,000
5	Treatment	6,986,000	4,873,000	1,991,000					122,000
6	Total Purification and Treatment	8,583,000	5,689,000	2,242,000	503,000	-	-	-	149,000
Transmission and Distribution									
7	Mains	20,031,000	10,368,000	3,190,000	6,380,000				93,000
8	Meters	2,512,000				2,512,000			-
9	Hydrants	230,000					230,000		-
10	Filtered Water Storage	595,000	304,000	94,000	187,000				10,000
11	Total Transmission and Distribution	23,368,000	10,672,000	3,284,000	6,567,000	2,512,000	230,000		103,000
12	Subtotal	32,491,000	16,771,000	5,651,000	7,070,000	2,512,000	230,000		257,000
13	Administrative and General	1,956,000	1,059,000	354,000	469,000	46,000	12,000		16,000
14	Total Water Plant Depreciation Expense	\$ 34,447,000	\$ 17,830,000	\$ 6,005,000	\$ 7,539,000	\$ 2,558,000	\$ 242,000	\$ -	\$ 273,000

(a) Includes booster pumping

4.9 Wholesale Cost of Service Allocations

Table 4-8 summarizes the cost of service allocations for Aqua PA based on the discussions presented above.

Table 4-8 Summary of Test Year 1 Cost of Service Allocated to Aqua PA
[Schedule BV-1: Table W-13A]

LINE NO.	DESCRIPTION	(1) ALLOCATED INVESTMENT	(2) COST OF SERVICE
1	Operating Expense		\$ 1,819,000
2	Depreciation Expense		273,000
3	Return on Investment		
4	Allocated Investment	12,748,000	
5	Return @ 7.50%		956,000
6	Total Allocated Cost of Service		\$ 3,048,000

4.10 Distribution of Costs to Customer Types

The cost of service is distributed to customer types by applying the unit costs to the individual customer types' units of service. Applying the unit costs of service to the number of units for which the customer type is responsible produces the customer type responsibility. The costs attributable to each customer type are based on the functional cost components described in earlier in this Report. Each customer type places a burden on the system in different ways and thus the allocation of the units is representative of this burden.

Table 4-9 presents the derivation of the unit costs of service for the Retail customers. Table 4-10 summarizes the distribution of the costs to the different customer types utilizing these unit costs. The total cost of service for each customer type is the sum of each type's units of service multiplied by the unit costs for the functional cost component.

As discussed earlier, the Water Department provides discounts to select customers. The cost of these discounts is not directly charged to customers. Instead, these costs are reallocated to the other retail customers in proportion to their allocated cost of service, as shown in Columns 2 to 4 of Table 4-11. The test year adjusted cost of service, reflecting the reallocation of these costs, is shown in Column 5. The indicated increase or decrease in the cost of service required to meet the adjusted cost of service is shown in Column 6.

Table 4-12 compares the total adjusted cost of service for each customer type to their respective revenues under existing rates. The indicated increase or decrease in the revenue required to meet the adjusted cost of service is shown in Column 3.

Table 4-9 Test Year 1 Retail Unit Costs of Service [Schedule BV-1: Table W-14]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		TOTAL ALLOCATED COST OF SERVICE	BASE	EXTRA CAPACITY		CUSTOMER COSTS	BILLING	Direct Public Fire Protection
				MAX DAY	MAX HOUR IN EXCESS OF MAX DAY			
Water System (\$)								
Total Retail Customer Units of Service								
1	Number		5,790,600	15,610	22,150	653,595	6,729,249	
2	Units		Mcf	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills	Total
Operating Expense								
3	Total Expense - \$	210,897,000	121,210,000	30,381,000	29,218,000	2,198,000	27,287,000	603,000
4	Unit Expense - \$/Unit		20.9322	1,946.2524	1,319.0971	3.3629	4.0550	
Depreciation Expense								
5	Total Expense - \$	34,174,000	17,830,000	6,005,000	7,539,000	2,558,000		242,000
6	Unit Expense - \$/Unit		3.0791	384.6893	340.3612	3.9137		
Plant Investment								
7	Total Investment - \$	1,591,381,000	869,577,000	290,346,000	384,503,000	37,374,000		9,581,000
8	Unit Investment - \$/Unit		150.1704	18,600.0000	17,359.0519	57.1822		
Unit Return on Investment								
9	Total Return - \$	36,915,000	20,172,000	6,735,000	8,919,000	867,000		222,000
10	Inside City - \$/Unit (a)		3.4835	431.4642	402.6779	1.3265		
Total Unit Costs of Service								
11	Inside City - \$/Unit		27.4948	2,762.4059	2,062.1362	8.6031	4.0550	

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$36,915,000 / \$1,591,381,000 = 2.3197%

Mcf - thousand cubic feet

Table 4-10 Test Year 1 Distribution of Costs of Service by Functional Cost Component to Customer Types [Schedule BV-1: Table W-15]

LINE NO.	CUSTOMER TYPE	(1)	(2)	EXTRA CAPACITY		(5)	(6)	(7)
		TOTAL			MAX HOUR	CUSTOMER COSTS		DIRECT PUBLIC
		ALLOCATED COST OF SERVICE	BASE	MAX DAY	IN EXCESS OF MAX DAY	METERS	BILLING	FIRE PROTECTION
Water System (\$)								
Retail								
General Service								
1	Senior Citizens	\$ 7,295,000	\$ 3,753,000	\$ 1,022,000	\$ 1,217,000	\$ 196,000	\$ 1,107,000	0
2	Residential	167,727,000	89,238,000	24,558,000	29,324,000	3,940,000	20,667,000	0
3	Commercial	60,157,000	40,789,000	8,978,000	7,114,000	1,074,000	2,202,000	0
4	Industrial	3,307,000	2,568,000	442,000	206,000	30,000	61,000	0
5	Public Utilities	301,000	234,000	28,000	21,000	7,000	11,000	0
6	Subtotal General Service	238,787,000	136,582,000	35,028,000	37,882,000	5,247,000	24,048,000	0
7	PHA	6,678,000	4,204,000	1,050,000	1,052,000	79,000	293,000	0
8	Charities & Schools	4,684,000	3,134,000	691,000	577,000	125,000	157,000	0
9	Hospitals & University	4,213,000	3,093,000	691,000	330,000	53,000	46,000	0
10	Hand Billed	16,584,000	11,768,000	2,597,000	2,165,000	54,000	-	0
11	Scheduled (Flat Rate)	-	-	-	-	-	-	0
Fire Protection								
12	Private	4,194,000	429,000	442,000	516,000	65,000	2,742,000	0
	Public							
13	Standard Pressure	6,846,000	-	2,624,000	3,155,000	-	-	1,067,000
14	Subtotal Public Fire Protection	6,846,000	-	2,624,000	3,155,000	-	-	1,067,000
15	Total Retail Service	\$ 281,986,000	\$ 159,210,000	\$ 43,123,000	\$ 45,677,000	\$ 5,623,000	\$ 27,286,000	\$ 1,067,000

Table 4-11 Test Year 1 Adjusted Cost of Service [Schedule BV-1: Table W-16]

LINE NO.	CUSTOMER TYPE	(1) ALLOCATED COST OF SERVICE	(2) DISCOUNT	(3) COST OF SERVICE WITH DISCOUNT	(4) RECOVERY OF DISCOUNT	(5) ADJUSTED COST OF SERVICE
Water System						
1	Residential	\$ 167,727,000	\$ -	\$ 167,727,000	\$ 2,648,000	\$ 170,375,000
2	Senior Citizens	7,295,000	1,824,000	5,471,000	86,000	5,557,000
3	Commercial	60,157,000	-	60,157,000	950,000	61,107,000
4	Industrial	3,307,000	-	3,307,000	52,000	3,359,000
5	Public Utilities	301,000	-	301,000	5,000	306,000
6	PHA	6,678,000	334,000	6,344,000	100,000	6,444,000
Charities, Schools, & Universities						
7	Charities & Schools	4,684,000	1,171,000	3,513,000	55,000	3,568,000
8	Hospital/University	4,213,000	1,053,000	3,160,000	50,000	3,210,000
9	Subtotal	8,897,000	2,224,000	6,673,000	105,000	6,778,000
10	Hand Billed	16,584,000	-	16,584,000	262,000	16,846,000
11	Scheduled (Flat Rate)	-	-	-	-	-
Fire Protection						
12	Private	4,194,000	-	4,194,000	66,000	4,260,000
13	Public					
13	Standard Pressure	6,846,000	-	6,846,000	108,000	6,954,000
14	Subtotal Public Fire Protection	6,846,000	-	6,846,000	108,000	6,954,000
15	Subtotal Retail Service	281,986,000	4,382,000	277,604,000	4,382,000	281,986,000
16	Wholesale	3,353,000	-	3,353,000	-	3,353,000
17	Total System	\$ 285,339,000	\$ 4,382,000	\$ 280,957,000	\$ 4,382,000	\$ 285,339,000

Table 4-12 Comparison of Test Year 1 Cost of Service and Adjusted Cost of Service with Revenues Under Existing Rates [Schedule BV-1: Table W-17]

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
		\$	\$	%
Retail Service (\$000s)				
General Service				
1	Senior Citizens	\$ 5,207,314	\$ 5,557,000	6.70%
2	Residential	157,333,791	170,375,000	8.30%
3	Commercial	55,098,551	61,107,000	10.90%
4	Industrial	3,254,813	3,359,000	3.20%
5	Public Utilities	324,570	306,000	-5.70%
6	Subtotal General Service	221,219,040	240,704,000	8.80%
7	PHA	5,633,013	6,444,000	14.40%
8	Charities & Schools	3,302,927	3,568,000	8.00%
9	Hospitals & Universities	2,805,172	3,210,000	14.40%
10	Hand Billed	12,872,064	16,846,000	30.90%
11	Scheduled (Flat Rate)	646	-	-100.00%
Fire Protection				
12	Private	4,381,712	4,260,000	-2.80%
	Public			
13	Standard Pressure	9,235,000	6,954,000	-24.70%
14	Subtotal Fire Protection	13,616,712	11,214,000	-17.60%
15	Total Retail Service	259,449,573	281,986,000	8.70%
16	Total Wholesale	3,567,995	3,048,000	-14.60%
17	Total System	\$ 263,017,568	\$ 285,034,000	8.40%

5.0 Water System Rate Design

The revenue requirement and cost of service analyses described in the preceding sections of this Report provide a basis for the review and update of a schedule of water rates that recover allocated cost of service. These studies are the results of engineering estimates, consideration of historical data and, to some extent, judgment and experience. Judgment must enter the final choice of rates, and factors such as public reaction to the extent of changes and adjustments, previous rate levels, contractual agreements, and past local practice are recognized in making rate adjustments.

Rates should be reasonably simple in application and subject to as few misinterpretations as possible. Considerations regarding the proposed rate adjustments reflect discussions with the Water Department staff and include the above considerations and the desire of the Water Department to maintain the existing structure for the Rate Period. This Report proposes water user rates in accordance with these considerations.

The cost of service analysis described in the preceding section of this Report provides the basis for the design of water rate schedules to cover the allocated cost for service for the Water System.

5.1 General Service

The proposed charges for water service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including senior citizens, charities and schools, and the PHA, receive services at a discounted rate. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools and 5% for PHA) will continue to be applicable for the entire Study Period.

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

Additionally, the cost of service water rates that are designed for each Test Year require 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 quantity 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 the test year, recognizing the normally expected historical payment patterns. A lag factor of 1.088 is applied to the FY 2022 water cost of service rates.

Table 5-1 presents the proposed water rates for General Service customers applicable for Test Year 1 and Test Year 2. The proposed rates reflect a continuation of the existing rate structure, including a service charge which varies by meter size and a declining block quantity charge. The proposed rates designed for

each fiscal year, are designed to recover the water revenue increase indicated in Table 3-13, taking into consideration the collection factor patterns as applied to billings from current and prior fiscal years.

Table 5-1 Proposed FY 2022 and FY 2023 General Service Water Rates
[Schedule BV-1: Table W-18]

Description	Proposed	
	FY 2022	FY 2023
Monthly Water Service Charge (\$/bill)		
<u>Meter Size (Inches)</u>		
5/8	\$5.28	\$5.36
3/4	\$5.67	\$5.78
1	\$6.91	\$7.06
1-1/2	\$9.34	\$9.60
2	\$13.06	\$13.47
3	\$20.85	\$21.58
4	\$37.73	\$38.97
6	\$70.98	\$73.43
8	\$108.20	\$112.06
10	\$158.34	\$163.92
12	\$259.97	\$270.12
Base Rate - Water Quantity Charges (\$/Mcf)		
<u>Monthly Water Usage</u>		
First 2 Mcf	\$49.33	\$52.94
Next 98 Mcf	\$45.41	\$48.64
Next 1,900 Mcf	\$35.15	\$37.61
Over 2,000 Mcf	\$34.20	\$36.59

5.2 Fire Protection

Table 5-2 presents the proposed rates for private fire connections for Test Year 1 and Test Year 2.

Table 5-2 Proposed Rates for Fire Protection [Schedule BV-1: Table W-19 and W-19A]

Size of Meter			Size of Meter		
Or Connection	Monthly Charge (\$/bill)		Or Connection	Monthly Charge (\$/bill)	
	FY 2022	FY 2023		FY 2022	FY 2023
Private Fire Protection			Residential Private Fire Protection Water Service Charge w/ Fire Protection		
4" or less	\$24.11	\$24.76	3/4	\$7.52	\$7.79
6	\$43.75	\$45.00	1	\$8.76	\$9.07
8	\$64.62	\$66.59	1-1/2	\$11.19	\$11.61
10	\$95.69	\$98.54	2	\$14.91	\$15.48
12	\$142.85	\$147.90	Monthly Sewer Service Charge		
			3/4	\$7.92	\$8.11
			1	\$7.92	\$8.11
			1-1/2	\$7.92	\$8.11
			2	\$7.92	\$8.11

6.0 Wastewater System Revenue and Revenue Requirements

The Wastewater System currently serves the City of Philadelphia, and parts of Bucks, Montgomery, and Delaware Counties, a service area that is over 364 square miles, with 230 square miles in suburban communities and 134 square miles in the City.

The wastewater collection system consists of approximately 3,718 miles of total collector system piping, 19 pumping stations (16 Water Department owned and 3 owned by others but operated by the Water Department), 94,530 manholes, 26 storm relief structures, and 71,431 stormwater inlets. There are approximately 761 miles, 755 miles, and 1,851 miles of sanitary, stormwater, and combined sanitary/stormwater mains, respectively. Approximately 55% of the collection system consists of combined sanitary/stormwater mains. Sewers range in size from 8-inch diameter to 21 feet by 24 feet arch-shaped conduits primarily constructed of brick, vitrified clay, or reinforced concrete.

This section focuses on the Revenue and Revenue Requirements part of the Cost of Service study for the Wastewater System. In the following discussion, we review O&M expenses, debt service payments, funding for specific deposits and reserves, and the cost of capital improvement projects that the Water Department does not fund via debt or contributions from third parties.

6.1 Wastewater Revenue

The Wastewater System derives revenue primarily from charges for sanitary sewer and stormwater services. During the Study Period, future levels of sanitary sewer revenues were projected based on an analysis of historical and future system growth in terms of the number of accounts and water consumption for sewer customers. For stormwater, trends for billable parcels and estimates of billable GA and IA were examined.

6.1.1 Stormwater Services Background

The Water Department has been responsible for providing stormwater services to the City of Philadelphia since its creation. Historically, stormwater costs were recovered from customers through the Water Department's rates and charges.

The Water Department fully transitioned the Stormwater Management Service Charge ("SWMS Charge") to a parcel area-based SWMS Charge, as of July 1, 2013. Prior to the transition to the parcel area-based SWMS Charge, stormwater costs were recovered from customers via a meter-based stormwater charge with the customers sanitary service fees. Under this approach, equivalent meter sizes were used as a proxy for the demand a customer places on stormwater services. While customers were charged on the same basis, water meter size (or water use) does not directly correlate to the generation of stormwater or the demand placed on the Water Department's system and/or services. In addition, the use of equivalent meter as the basis for the stormwater charged did not capture properties without water meters, such as parking lots, which generate stormwater runoff and may place a demand on the system and/or services.

Based upon prior rate proceedings as well as discussions with City stakeholders, the Water Department undertook a process in the 1990s to develop and implement a more acceptable and technically appropriate methodology for stormwater cost recovery. The underlying change in cost recovery recognizes that stormwater costs of service are not related to sanitary service requirements, which are generally related to customers' water use, and that a more appropriate basis would be a measure of (or surrogate for) the generation of stormwater runoff. As a result of this process, the Water Department chose a methodology that considered (1) the overall area of customer properties (i.e., gross area), and (2) stormwater runoff potential, including the impervious area of the property was identified as a more appropriate basis for recovery of stormwater costs. These two elements are recognized in the two primary components which make up the SWMS Charge, namely the GA and IA charges. The parcel area-based fee is far more equitable, compared to an equivalent meter basis, as it better recognizes the generation of stormwater runoff from both pervious and impervious surfaces, associated demands placed on systems or services, and includes customers without a water meter, who previously did not contribute to cost recovery.

While this change in cost recovery approach was initially identified in the 1990s, billing data development and billing system updates to enable the use of a parcel area-based fee took several years. The Water Department began to transition customers to the current SWMS rate structure in July 2010.

In the past, it was not unusual for stormwater costs to be recovered from customers via charges based upon water or sewer system attributes (such as water meter size). However, with improved data availability and technology, recovering stormwater costs via area-based fees has become far more widely used and publicly accepted nationwide. Further, WEF's User Fee Funded Stormwater Programs manual provides guidance on the development and implementation of such stormwater fees, and recognizes the methodology employed by the Water Department as one of the five named "Property Characteristics-Based Stormwater User Fee Methods,"²⁴ which provide an equitable and defensible basis for establishing a stormwater rate structure and estimating units of service by customer class.

6.1.2 Customers and Growth

Table 6-1 summarizes the Water Department's wastewater customer account classifications.

For the most part, the sanitary sewer customer types are like those for water customers, except for sewer-only accounts, groundwater accounts, and hand-billed accounts. Hand-billed accounts are "H"-coded customers in the Basis2 billing system that receive surcharge and/or sewer credits. The adjustments to these accounts are made manually.

²⁴ See Section 5.4 of WEF's "User-Fee-Funded Stormwater Programs" Manual.

Table 6-1 Wastewater System Customer Types

CUSTOMER TYPES			
Sanitary Sewer			Stormwater
General Service	Other	Fire Service	Residential
- Residential	- PHA	Wholesale	Condominiums
- Senior Citizens	- Charities & Schools		Non-Residential
- Commercial	- Hospitals & Universities		Note: Stormwater also recognizes discounts as applicable to elderly, PHA and charities and schools.
- Industrial	- Hand Bill		
- Public Utilities	- Scheduled (Flat Rate)		
- Sewer Only	- Surcharge		
- Groundwater			

Based on a review of historical growth patterns, it is projected that the total number of sanitary sewer accounts will remain stable during the Study Period. Table 6-2 and Table 6-3 present the projection for number of accounts and billable parcels during the Study Period.

Table 6-2 Number of Customer Accounts

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Sanitary Sewer							
1	Residential	419,485	419,485	419,485	419,485	419,485	419,485
2	Senior Citizens	22,726	22,726	22,726	22,726	22,726	22,726
3	Commercial	35,641	35,641	35,641	35,641	35,641	35,641
4	Industrial	1,011	1,011	1,011	1,011	1,011	1,011
5	Public Utilities	170	170	170	170	170	170
6	Subtotal General Service	479,033	479,033	479,033	479,033	479,033	479,033
7	PHA	5,713	5,713	5,713	5,713	5,713	5,713
8	Charities and Schools	1,907	1,907	1,907	1,907	1,907	1,907
9	Hospitals and University	283	283	283	283	283	283
10	Hand Billed	208	208	208	208	208	208
11	Scheduled	3	3	3	3	3	3
12	Fire Service	119	119	119	119	119	119
13	Sewer Only	60	60	60	60	60	60
14	Groundwater	4	4	4	4	4	4
15	Subtotal Retail Customers	487,330	487,330	487,330	487,330	487,330	487,330
16	Wholesale	10	10	10	10	10	10
17	Total Sanitary Sewer	487,340	487,340	487,340	487,340	487,340	487,340
Stormwater							
18	Residential	464,564	464,564	464,564	464,563	464,563	464,563
19	Non-Residential	80,448	80,431	80,414	80,398	80,381	80,364
20	Condominium	5,071	5,071	5,071	5,071	5,071	5,071
21	Subtotal Stormwater	550,083	550,066	550,049	550,032	550,015	549,998

Table 6-3 Number of Billable Parcels [Schedule BV-3: Table SW-2]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Stormwater							
Residential							
1	Initial Parcel Count	462,670	462,670	462,670	462,670	462,670	462,670
2	Less Residential Zero Rate (1)	0	0	0	1	1	1
3	Subtotal Residential	462,670	462,670	462,670	462,669	462,669	462,669
Non-Residential							
4	Initial Parcel Count	73,274	73,274	73,274	73,274	73,274	73,274
5	Less Non-Residential Zero Rate (2)	17	34	51	67	84	101
6	Subtotal Non Residential	73,257	73,240	73,223	73,207	73,190	73,173
Condominium							
7	Initial Parcel Count	2,181	2,181	2,181	2,181	2,181	2,181
8	Less Appeals Adjustments	0	0	0	0	0	0
9	Subtotal Condominium	2,181	2,181	2,181	2,181	2,181	2,181
10	Total Billable Parcels	538,108	538,091	538,074	538,057	538,040	538,023

(1) Comprises Community Gardens under Residential Category

(2) Comprises Community Gardens under Non-Residential Category

6.1.3 Sanitary Sewer Retail Billed Volume

Table 6-4 presents the projected billed volume for retail sanitary sewer customers.

Table 6-4 Retail Billed Volumes

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (Mcf)							
1	Residential	3,233,747	3,233,747	3,176,085	3,122,541	3,068,997	3,015,453
2	Senior Citizens	136,369	136,369	136,369	136,369	136,369	136,369
3	Commercial	1,443,496	1,443,496	1,443,496	1,443,496	1,443,496	1,443,496
4	Industrial	77,216	77,216	77,216	77,216	77,216	77,216
5	Public Utilities	8,544	8,544	8,544	8,544	8,544	8,544
6	Subtotal General Service	4,899,372	4,899,372	4,841,709	4,788,165	4,734,621	4,681,077
7	PHA	152,874	152,874	152,874	152,874	152,874	152,874
8	Charities and Schools	113,138	113,138	113,138	113,138	113,138	113,138
9	Hospitals and University	112,506	112,506	112,506	112,506	112,506	112,506
10	Hand Billed	365,315	365,315	365,315	365,315	365,315	365,315
11	Scheduled	11	11	11	11	11	11
12	Fire Service	9,000	9,000	9,000	9,000	9,000	9,000
13	Sewer Only	63,000	63,000	63,000	63,000	63,000	63,000
14	Groundwater	229,000	229,000	229,000	229,000	229,000	229,000
15	Subtotal Retail Customers	5,944,216	5,944,216	5,886,554	5,833,010	5,779,466	5,725,922
16	Wholesale	4,274,000	4,274,000	4,274,000	4,274,000	4,274,000	4,274,000
17	Total Sanitary Sewer System	10,218,216	10,218,216	10,160,554	10,107,010	10,053,466	9,999,922

6.1.4 Wholesale Volume, Capacity, and Strength Loadings

Table 6-5 summarizes projections of billed volume, capacity, and biological oxygen demand ("BOD") and suspended solids ("SS") loadings for the wholesale customers.

Table 6-5 Projections for Wholesale Customer Volumes, Capacities, and Strength Loadings

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System							
Abington							
1	Volume (Mcf)		94,000	94,000	94,000	94,000	94,000
2	Capacity (Mcf/day)		6,167	6,167	6,167	6,167	6,167
3	SS (1,000 lbs)		920	920	920	920	920
4	BOD (1,000 lbs)		1,400	1,400	1,400	1,400	1,400
Bucks County (Bensalem)							
5	Volume (Mcf)		170,000	170,000	170,000	170,000	170,000
6	Capacity (Mcf/day)		7,588	7,588	7,588	7,588	7,588
7	SS (1,000 lbs)		1,600	1,600	1,600	1,600	1,600
8	BOD (1,000 lbs)		1,650	1,650	1,650	1,650	1,650
Bucks County							
9	Volume (Mcf)		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
10	Capacity (Mcf/day)		47,996	47,996	47,996	47,996	47,996
11	SS (1,000 lbs)		10,900	10,900	10,900	10,900	10,900
12	BOD (1,000 lbs)		10,500	10,500	10,500	10,500	10,500
Cheltenham							
13	Volume (Mcf)		450,000	450,000	450,000	450,000	450,000
14	Capacity (Mcf/day)		20,521	20,521	20,521	20,521	20,521
15	SS (1,000 lbs)		3,400	3,400	3,400	3,400	3,400
16	BOD (1,000 lbs)		3,000	3,000	3,000	3,000	3,000
Lower Moreland							
17	Volume (Mcf)		65,000	65,000	65,000	65,000	65,000
18	Capacity (Mcf/day)		3,800	3,800	3,800	3,800	3,800
19	SS (1,000 lbs)		660	660	660	660	660
20	BOD (1,000 lbs)		500	500	500	500	500
Lower Southampton							
21	Volume (Mcf)		310,000	310,000	310,000	310,000	310,000
22	Capacity (Mcf/day)		10,205	10,205	10,205	10,205	10,205
23	SS (1,000 lbs)		2,500	2,500	2,500	2,500	2,500
24	BOD (1,000 lbs)		1,840	1,840	1,840	1,840	1,840
DELCORA							
25	Volume (Mcf)		1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
26	Capacity (Mcf/day)		100,179	100,179	100,179	100,179	100,179
27	SS (1,000 lbs)		13,000	13,000	13,000	13,000	13,000
28	BOD (1,000 lbs)		10,500	10,500	10,500	10,500	10,500
Lower Merion							
29	Volume (Mcf)		350,000	350,000	350,000	350,000	350,000
30	Capacity (Mcf/day)		20,404	20,404	20,404	20,404	20,404
31	SS (1,000 lbs)		3,600	3,600	3,600	3,600	3,600
32	BOD (1,000 lbs)		3,100	3,100	3,100	3,100	3,100

Table 6-5 Projections for Wholesale Customer Volumes, Capacities, and Strength Loadings (continued)

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System							
Springfield (less Wyndmoor)							
33	Volume (Mcf)	115,000	115,000	115,000	115,000	115,000	115,000
34	Capacity (Mcf/day)	2,973	2,973	2,973	2,973	2,973	2,973
35	SS (1,000 lbs)	2,500	2,500	2,500	2,500	2,500	2,500
36	BOD (1,000 lbs)	2,300	2,300	2,300	2,300	2,300	2,300
Upper Darby							
37	Volume (Mcf)	500,000	500,000	500,000	500,000	500,000	500,000
38	Capacity (Mcf/day)	22,621	22,621	22,621	22,621	22,621	22,621
39	SS (1,000 lbs)	4,800	4,800	4,800	4,800	4,800	4,800
40	BOD (1,000 lbs)	4,100	4,100	4,100	4,100	4,100	4,100
Springfield (Wyndmoor)							
41	Volume (Mcf)	20,000	20,000	20,000	20,000	20,000	20,000
42	Capacity (Mcf/day)	1,247	1,247	1,247	1,247	1,247	1,247
43	SS (1,000 lbs)	220	220	220	220	220	220
44	BOD (1,000 lbs)	170	170	170	170	170	170

6.1.5 Stormwater Impervious and Gross Areas

A stormwater units of service analysis was performed to develop estimates of the billable GA and IA units of service for the Study Period and is provided as Schedule BV-6: WP-2. The billable units of service are utilized in projecting the stormwater revenues under existing rates, as well as in developing the proposed GA and IA rates discussed later in this Report.

The Water Department obtained updated stormwater billing data based upon 2015 aerial and infrared imagery. The updated data set provides new impervious area and gross area data for billing purposes for properties City-wide. Based upon the updated Stormwater Billing Data, the overall impervious area has increased 87.5 million square feet compared to the prior data set. Most of this increase in IA is attributable to residential parcels, which reflect a total increase in IA of 72.5 million square feet. Overall non-residential impervious area increased 15 million square feet. Based on the updated Billing Data, the overall gross area increased 4.1 million square feet compared to the prior data set. The Residential GA has increased 2.1 million square feet, while Non-residential GA increased 2.0 million square feet. The Water Department has been in the process of transitioning to the updated data set²⁵.

Based upon the updated data set, there is no impact to the mean residential GA square footage, which remains unchanged from the prior rate proceeding at 2,110 square feet. The mean residential IA has increased to 1,200 square feet as compared to the mean residential IA of 1,050 square feet from the prior rate proceeding.

²⁵ The Water Department has not fully transitioned new billing data for roughly 7,010 Non-residential parcels. 2,625 of these parcels were identified as being potentially highly impacted and are proposed to be transitioned pending the adoption of rates based upon the updated data set. Residential customers are billed a uniform charge per parcel and would not be impacted until rates are adopted based upon the updated stormwater billing data.

Table 6-6 summarizes the mean GA and IA square footage for each customer class. These values were used to project the initial GA and IA for each customer class based upon the associated number of parcels for each customer class beginning in FY 2022. Further discussion is provided in Schedule BV-6: WP-2.

Table 6-6 FY 2022 Mean GA and Mean IA [Schedule BV-3: Table SW-1]

LINE NO.	DESCRIPTION	FY 2022 MEAN GA (*)	FY 2022 MEAN IA (*)
Stormwater (square feet)			
	All Residential Parcels	2,110	1,200
Non-Residential Sub-Classes			
Non-Discount			
1	Water & Sewer	29,248	16,276
2	SW Only	8,389	2,529
Discount: Senior, Education & Charities			
3	Water & Sewer	92,585	50,403
4	SW Only	28,547	15,134
Discount: PHA			
5	Water & Sewer	55,534	30,008
6	SW Only	2,003	697
Condominiums Sub-Classes			
Non-Discount			
7	Water & Sewer	16,323	11,787
8	SW Only	23,969	4,343
Discount: Senior, Education & Charities			
9	Water & Sewer	40,187	19,046
10	SW Only	-	-
Discount: PHA			
11	Water & Sewer	9,358	6,158
12	SW Only	0	0

(*)FY 2022 Mean GA and Mean IA is based on fully transitioned stormwater parcel data.

This dataset is based on 2015 aerial and infrared imagery obtained by the City.

With this cost of service study, projected billable units of service reflect:

- Updated stormwater billing data as follows:
 - For FY 2021 – Initial IA and GA square footage as reflected in the Water Department’s stormwater billing data as of June 2020.
 - For FY 2022 and beyond – full transition of initial IA and GA square footage based upon the updated data set.
 - Reduction in billable IA and GA square footage as a result of credits, based upon:
 - Projected increase in Impervious Area Reduction (“IAR”) credits based upon the average 5-year growth and average IAR loss per parcel;
 - Projected increase in IA, GA, and National Pollutant Discharge Elimination System (“NPDES”) Credits based upon the average 5-year growth in the number of parcels receiving credit and the associated average credit per parcel; and
 - Credits resulting from SMIP/GARP grants:

- Based upon the overall annual program budget of \$15 million in FY 2021 and \$25 million thereafter; and
 - Average grant award per greened acre, anticipated cost escalation and average project completion time.
- Reduction in billable IA and GA square footage due to appeals and other adjustments:
- Adjustment appeals, include reductions in GA and IA billable square footage resulting from customers who seek clarification for and take exception to GA and IA billing data;
 - Other adjustments include reductions in GA and IA billable square footage resulting from a property's designation as a "Community Garden," which provides customers with a 100% discount on their stormwater bill and as referred to as a "Zero Rate Adjustment" in the tables below. This discount also applies to billing and collection charges associated with the subject parcel(s).
- Additional information regarding the derivation of the billable GA and IA units of service, including the basis for above mentioned projections, are provided in Schedule BV-6: WP-2.

Table 6-7 summarizes the development of the billable GA for the Study Period, while Table 6-8 summarizes the development of the billable IA for the Study Period.

Table 6-7 Determination of Billable Gross Area [Schedule BV-3: Table SW-3]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Stormwater (thousand square feet)							
Residential							
1	Initial GA	974,646	976,234	976,234	976,234	976,234	976,234
2	Less Residential Zero Rate (1)	1	2	3	4	5	6
3	Subtotal Residential	974,645	976,232	976,231	976,230	976,229	976,228
Non-Residential							
4	Initial GA	1,434,043	1,434,043	1,434,043	1,434,043	1,434,043	1,434,043
5	Less Credits Adjustments	333,652	349,030	362,959	377,643	392,220	406,695
6	Less Stormwater Appeals	737	1,215	1,434	1,434	1,434	1,434
7	Less Non-Residential Zero Rate (2)	192	385	577	770	962	1,155
8	Subtotal Non Residential	1,099,462	1,083,414	1,069,073	1,054,196	1,039,427	1,024,759
Condominium							
9	Initial GA	36,978	36,979	36,979	36,979	36,979	36,979
10	Less Credits Adjustments	7,929	8,294	8,625	8,974	9,321	9,665
11	Subtotal Condominium	29,049	28,684	28,353	28,004	27,658	27,314
12	Total Billable GA	2,103,156	2,088,330	2,073,657	2,058,430	2,043,313	2,028,301

(1) Comprises Community Gardens under Residential Category

(2) Comprises Community Gardens in the Non-Residential Category.

Table 6-8 Determination of Billable Impervious Area [Schedule BV-3: Table SW-4]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Stormwater (thousand square feet)							
Residential							
1	Initial IA	553,519	555,204	555,204	555,204	555,204	555,204
2	Less Residential Zero Rate (1)	0	0	1	1	1	1
3	Subtotal Residential	553,519	555,204	555,203	555,203	555,203	555,203
Non-Residential							
4	Initial IA	705,473	718,062	718,062	718,062	718,062	718,062
5	Less Credits Adjustments	103,767	110,902	116,617	123,073	129,423	135,674
6	Less Stormwater Appeals	649	1,071	1,264	1,264	1,264	1,264
7	Less Non-Residential Zero Rate (2)	7	15	22	30	37	45
8	Subtotal Non Residential	601,049	606,074	600,158	593,695	587,337	581,079
Condominium							
9	Initial IA	25,191	25,635	25,635	25,635	25,635	25,635
10	Less Credits Adjustments	4,590	4,906	5,158	5,444	5,725	6,001
11	Subtotal Condominium	20,602	20,729	20,477	20,191	19,910	19,634
12	Total Billable IA	1,175,170	1,182,007	1,175,838	1,169,090	1,162,450	1,155,916

(1) Comprises Community Gardens under Residential Category

(2) Comprises Community Gardens in the Non-Residential Category.

Revenue Under Existing Rates projections utilize the number of billable residential parcels, since residential properties are billed a uniform charge per parcel. The impact of the updated billing data is more evident in the allocation of stormwater cost of service (see Section 7.10). The distribution of projected credits, appeals, and community garden adjustments are based on current distributions within the stormwater billing data.

6.1.6 Bill Tabulation

Similar to our process for calculating water revenues, we used the bill tabulation results generated in Section 3.1.3 for the sewer revenue calculations as well. However, it is only necessary to utilize the distribution of accounts by meter size. The billed volume distribution is not required for sanitary sewer billings since the sanitary sewer quantity charge is a uniform volume charge for all billed volume.

6.1.7 Wastewater Revenue

The total operating revenues for the Water Department include the following:

- Retail (i.e., all customers excluding wholesale) Sanitary Sewer Service and Quantity charges and Stormwater charges
- Additional charges for high-strength customers (surcharges)
- Wholesale wastewater charges

6.1.7.1 Retail Operating Revenues

In developing projections for retail operating revenues, the process described in the following paragraphs and illustrated in Figure 3-1 was followed.

6.1.7.2 Projection of Gross Billings

To project the FY 2021 sewer gross billings, the FY 2021 (effective October 1, 2020) schedules of sanitary sewer rates were applied to the projected FY 2021 annual billed water volume and number of customer accounts. For stormwater, the method is like the sanitary sewer billing projections, the FY 2021 (effective October 1, 2020) schedules of stormwater are applied to the projected FY 2021 billable residential parcels and accounts, and non-residential billable GA and IA, as well as accounts.

To project the FY 2022 to FY 2026 sewer gross billings, the FY 2021 schedule of sewer rates shown Table 6-9 were applied to the projections of annual billed water volume, bill tabulation, and number of customer accounts. For stormwater, we apply the FY 2021 GA and IA rates to the projected billable residential parcels and accounts, and non-residential billable GA and IA, and the projected number of billable accounts.

Table 6-9 Existing Sanitary Sewer and Stormwater Rates

Sanitary Sewer		Stormwater	
Monthly Sanitary Sewer Service Charge (\$/bill)		Residential Stormwater Charges	
<u>Meter Size (Inches)</u>		<u>Monthly Stormwater Management Service Charge</u>	
5/8	\$7.01	Charge Per Parcel	\$14.03
3/4	\$8.93		
1	\$13.07	<u>Monthly Billing & Collection Charge</u>	
1-1/2	\$22.97	Charge Per Bill	\$1.77
2	\$35.42		
3	\$63.82	Non-Residential Stormwater Charges	
4	\$108.49	<u>Monthly Stormwater Management Service Charge</u>	
6	\$213.81	Gross Area (\$/500 sf)	\$0.717
8	\$338.27	Impervious Area (\$/500 sf)	\$5.410
10	\$488.25		
12	\$887.22	<u>Monthly Billing & Collection Charge</u>	
		Charge Per Bill	\$2.30
Base Rate - Sanitary Sewer Quantity Charges (\$/Mcf)		Notes:	
<u>Monthly Usage</u>		Non-Residential Stormwater Charges includes Condominiums.	
All Billable Water Usage	\$31.25	Non-Residential Stormwater Customers are	
Groundwater Charge	\$13.86	subject to a minimum Stormwater Management Service Charge	
		equal to the residential charge per parcel.	
Sanitary - Surcharge Rates (\$/lb)			
BOD (\$/lb in excess of 250 mg/l)	\$0.397		
SS (\$/lb in excess of 350 mg/l)	\$0.388		

Where applicable, for all customer types that are eligible for discounts, the appropriate discounts previously shown on Table 3-5 were applied. Moreover, like to our analysis for the Water System, TAP discounts and TAP-R surcharge billings are excluded from this analysis. Thus, the proposed revenue adjustments and rates developed will reflect the Base Rates for sanitary sewer and stormwater.

6.1.7.4 Projection of Projected Billings

Table 6-10 presents the projected billings under existing rates for the Wastewater System.

Table 6-10 Billings Under Existing Rates

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
Sewer Non-Discount							
1	Residential	\$ 137,436	\$ 137,436	\$ 135,634	\$ 133,961	\$ 132,288	\$ 130,615
2	Commercial	51,011	51,011	51,011	51,011	51,011	51,011
3	Industrial	2,644	2,644	2,644	2,644	2,644	2,644
4	Public Utilities	333	333	333	333	333	333
5	Fire Protection	281	281	281	281	281	281
6	Wholesale	38,943	38,943	38,943	38,943	38,943	38,943
7	Surcharge	5,654	5,654	5,654	5,654	5,654	5,654
8	Other (Hand-Billed and Groundwater)	14,827	14,827	14,827	14,827	14,827	14,827
9	Sewer Only	1,994	1,994	1,994	1,994	1,994	1,994
10	Subtotal Sewer Non-Discount Billings	253,124	253,124	251,322	249,648	247,975	246,302
Sewer Discount							
11	Residential (Senior Citizens)	4,630	4,630	4,630	4,630	4,630	4,630
12	PHA	5,157	5,157	5,157	5,157	5,157	5,157
13	Charity/Schools/Hospital/University	6,104	6,104	6,104	6,104	6,104	6,104
14	Subtotal Sewer Discount Billings	15,891	15,891	15,891	15,891	15,891	15,891
15	Subtotal Sewer Service Billings	269,015	269,015	267,213	265,540	263,866	262,193
Stormwater							
Stormwater General Service							
16	Residential	82,708	82,708	82,708	82,708	82,708	82,708
17	Non Residential	89,961	90,212	89,217	88,144	87,086	86,042
18	Subtotal Stormwater Non-Discount	172,669	172,920	171,925	170,852	169,794	168,750
Stormwater Discount							
19	Residential (Senior Citizens)	3,214	3,214	3,214	3,214	3,214	3,214
20	PHA	2,070	2,125	2,125	2,125	2,124	2,124
21	Charity/Schools/Hospital/University	8,335	8,394	8,349	8,301	8,253	8,205
22	Subtotal Stormwater Discount	13,619	13,733	13,688	13,639	13,591	13,544
23	Subtotal Stormwater Service Billings	186,289	186,653	185,614	184,491	183,385	182,294
24	Subtotal Wastewater Billings	\$ 455,304	\$ 455,668	\$ 452,827	\$ 450,031	\$ 447,251	\$ 444,487

6.1.7.5 Application of Collection Factors

As shown in Figure 3-1, the second step in the process of calculating revenues involves applying receipt factors (i.e., collection factors) to the corresponding gross billings to determine the operating retail cash receipts. Table 1-3 in Section 1.4.1 presents the collection factors used in determining the revenues for sanitary sewer and stormwater in the Study.

Table 6-11 and Table 6-12 summarizes the projected revenues (receipts) during the Study Period for the Retail and Wholesale customers of the Wastewater System.

Table 6-11 Projected Receipts Under Existing Sanitary Sewer Rates [Schedule BV-1: Table WW-1A]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Sanitary Sewer (\$000s)							
1	Residential	\$ 121,925	\$ 128,080	\$ 129,452	\$ 130,558	\$ 128,928	\$ 127,299
2	Senior Citizens	4,119	4,317	4,413	4,505	4,505	4,505
3	Commercial	45,863	47,655	48,613	49,633	49,633	49,633
4	Industrial	2,389	2,471	2,520	2,573	2,573	2,573
5	Public Utilities	300	311	317	324	324	324
6	Sewer Only	1,771	1,858	1,900	1,940	1,940	1,940
7	Groundwater	2,830	2,961	3,025	3,088	3,088	3,088
8	Subtotal General Customers	179,197	187,653	190,241	192,622	190,992	189,363
9	Housing Authority	4,574	4,804	4,914	5,017	5,017	5,017
10	Charities and Schools	2,959	3,032	3,087	3,152	3,152	3,152
11	Hospitals and University	2,874	2,725	2,730	2,788	2,788	2,788
12	Hand Billed	10,575	10,903	11,105	11,338	11,338	11,338
13	Scheduled	1	1	1	1	1	1
14	Fire Service	281	281	281	281	281	281
15	Wholesale	38,943	38,943	38,943	38,943	38,943	38,943
16	Surcharge	5,654	5,654	5,654	5,654	5,654	5,654
17	Subtotal Sanitary Sewer Receipts	\$ 245,058	\$ 253,995	\$ 256,956	\$ 259,796	\$ 258,165	\$ 256,537

Table 6-12 Projected Receipts Under Existing Stormwater Rates [Schedule BV-1: Table WW-1B]

LINE		FISCAL YEAR ENDING JUNE 30,						
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026	
Stormwater (\$000s)								
Residential								
1	Non Discount	\$ 73,561	\$ 76,940	\$ 78,600	\$ 80,255	\$ 80,255	\$ 80,255	
2	Discount: Senior, Education & Charities	2,870	2,998	3,063	3,127	3,127	3,127	
3	Discount PHA	651	680	695	710	710	710	
Non Residential								
4	Non Discount	73,193	76,826	77,757	78,511	77,552	76,604	
5	Discount: Senior, Education & Charities	7,328	7,688	7,823	7,946	7,901	7,856	
6	Discount PHA	1,138	1,237	1,269	1,298	1,298	1,298	
Condominium								
7	Non Discount	2,858	2,994	3,028	3,053	3,014	2,976	
8	Discount: Elderly, Education & Charities	71	74	74	74	72	71	
9	Discount PHA	1	1	1	1	1	1	
10	Total Stormwater Receipts	\$ 161,671	\$ 169,438	\$ 172,311	\$ 174,974	\$ 173,929	\$ 172,897	

6.1.7.6 Wholesale Operating Revenues

The Water Department provides wholesale wastewater service to ten (10) suburban customers on a contractual basis. Three wholesale customers (Bensalem, Lower Merion, and Upper Darby) make capital contributions to the Water Department for their allocated share of investment in treatment and collection system facilities used in providing wastewater service to the customer. Contract rates for wastewater service apply on a monthly basis and generally consist of charges for O&M expense, applicable capital costs associated with the collection and treatment facilities used in providing the service, customer related costs, and a management fee. Cheltenham, Lower Southampton, Springfield,

Abington, and Lower Moreland Townships, and the Delaware County Regional Water Authority (“DELCORA”) contract rates consist of charges for O&M expense and capital costs associated with the Long-Term Control Plan (“LTCP”) and Consent Order Agreement (“COA”) in accordance with their contract terms. The Water Department actively manages the wholesale service agreements to recover the costs associated with the wholesale service.

Table 6-13 presents the projected revenues under existing rates from the wholesale customers based on their respective contract terms.

Table 6-13 Projected Receipts for Wholesale Contract Customers

LINE		FISCAL YEAR ENDING JUNE 30,						
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026	
Wastewater System (\$000s)								
1	Abington	\$ 1,594	\$ 1,594	\$ 1,594	\$ 1,594	\$ 1,594	\$ 1,594	
2	Bucks County (Bensalem)	1,430	1,430	1,430	1,430	1,430	1,430	
3	Bucks County	8,895	8,895	8,895	8,895	8,895	8,895	
4	Cheltenham	4,410	4,410	4,410	4,410	4,410	4,410	
5	Lower Moreland	887	887	887	887	887	887	
6	Lower Southampton	4,201	4,201	4,201	4,201	4,201	4,201	
7	DELCORA	9,610	9,610	9,610	9,610	9,610	9,610	
8	Lower Merion	2,416	2,416	2,416	2,416	2,416	2,416	
9	Springfield (less Wyndmoor)	2,087	2,087	2,087	2,087	2,087	2,087	
10	Upper Darby	3,080	3,080	3,080	3,080	3,080	3,080	
11	Springfield (Wyndmoor)	333	333	333	333	333	333	
12	Total Wastewater Wholesale	\$ 38,943	\$ 38,943	\$ 38,943	\$ 38,943	\$ 38,943	\$ 38,943	

6.1.7.7 Projected Wastewater System Operating Revenues

Table 6-14 summarizes the projected receipts for the Wastewater System during the Study Period.

Table 6-14 Projected Receipts under Existing Rates [Schedule BV-1: Table WW-1]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
1	Sanitary Sewer Receipts	\$ 245,058	\$ 253,995	\$ 256,956	\$ 259,796	\$ 258,165	\$ 256,537
2	Stormwater Receipts	161,671	169,438	172,311	174,974	173,929	172,897
3	Total Wastewater Service Receipts	\$ 406,729	\$ 423,433	\$ 429,267	\$ 434,770	\$ 432,095	\$ 429,434

6.1.8 Tiered Assistance Program Rate Rider Surcharge

The FY 2022 and FY 2023 projected revenues do not include the current TAP-R rate of \$0.78/Mcf for sanitary sewer. Similar to our methodology for the Water System, the revenues developed in for the Wastewater Cost of Service analysis are referred to as the “Base Rates” (corresponding with Table 2-9) because they do not include the impact of providing discounts to TAP customers nor do they reflect the impact of TAP-R revenues.

6.1.9 Other Revenues and Adjustments

The Water Department has several sources of other revenues including miscellaneous fees, UESF grants, L&I permits, penalties, and releases from the Debt Service Reserve Fund. As noted above, no revenue losses associated with TAP discounts are included under Other Operating Revenues for the development of the Base Rates. Table 6-15 summarizes the other operating revenues for the Wastewater System.

Table 6-15 Other Revenue Projected Receipts [Schedule BV-1: Table WW-1C]

LINE		FISCAL YEAR ENDING JUNE 30,						
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026	
Wastewater System (\$000s)								
1	Penalties	\$ 4,087	\$ 6,136	\$ 6,093	\$ 6,051	\$ 6,010	\$ 5,968	
2	Miscellaneous City Revenues	-	-	-	-	-	-	
3	Other	4,982	4,982	4,982	4,982	4,982	4,982	
4	State & Federal Grants	-	-	-	-	-	-	
5	Permits Issued by License & Inspections	2,900	2,900	2,900	2,900	2,900	2,900	
6	Miscellaneous (Procurement)	195	195	195	195	195	195	
7	City & UESF Grants	168	168	168	168	168	168	
8	Affordability Program Discount Cost (a)	-	-	-	-	-	-	
9	Release from Debt Service Reserve (b)	13,345	-	-	-	-	-	
10	Total Wastewater Other Income	25,676	14,381	14,338	14,296	14,254	14,213	
Interest Income								
11	Debt Reserve Fund (c)	-	-	-	-	-	-	
12	Operating Fund	673	783	804	818	823	840	
13	Rate Stabilization Fund	795	685	687	703	719	722	
14	Total Wastewater System	\$ 27,144	\$ 15,848	\$ 15,829	\$ 15,817	\$ 15,796	\$ 15,774	

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(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.

6.2 Wastewater Revenue Requirements

6.2.1 Operation and Maintenance Expenses

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the Wastewater System during each year. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities and liquidated encumbrances.

Table 6-16 summarizes the projected O&M expenses reflecting the assumptions and adjustments described in Sections 1.4.2 and 1.4.3.

Table 6-16 **Projected O&M Expenses [Schedule BV-1: Table WW-2]**

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
1	Personal Services	\$ 92,475	\$ 95,976	\$ 99,451	\$ 103,027	\$ 106,706	\$ 110,491
2	Pension and Benefits	87,443	90,591	94,074	97,436	100,859	104,504
3	Subtotal	179,918	186,568	193,525	200,463	207,565	214,995
Purchase of Services							
4	Power	7,030	7,030	7,065	7,136	7,207	7,279
5	Gas	3,692	3,895	3,954	4,013	4,053	4,094
6	SMIP/GARP	15,000	25,000	25,000	25,000	25,000	25,000
7	Other	103,162	99,829	101,452	103,101	104,778	106,481
8	Subtotal	128,885	135,754	137,471	139,250	141,038	142,854
Materials and Supplies							
9	Chemicals	3,419	3,504	3,592	3,682	3,774	3,868
10	Other	14,892	15,284	15,686	16,099	16,522	16,956
11	Subtotal	18,311	18,788	19,278	19,780	20,296	20,824
12	Equipment	1,723	2,588	2,661	2,735	2,812	2,890
13	Indemnities and Transfers	8,243	8,243	8,243	8,243	8,243	8,243
14	Subtotal Expenses	337,080	351,941	361,178	370,471	379,953	389,806
15	Liquidated Encumbrances	(19,763)	(19,278)	(19,603)	(19,940)	(20,279)	(20,625)
16	Total Expenses	\$ 317,317	\$ 332,663	\$ 341,575	\$ 350,532	\$ 359,674	\$ 369,182

6.2.2 Debt Service

As discussed earlier in this Report, the General Bond Ordinance views the Water and Wastewater Systems as one combined system for the purposes of the Rate Covenant. Accordingly, bond issuances are allocated between water and wastewater based on System needs.

The existing and proposed debt service were previously discussed in Sections 1.4.4 and 2.3.4 of this Report.

Table 6-17 summarizes the Wastewater System's share of the total existing and proposed debt financing for the Wastewater System CIP.

Table 6-17 Summary of Existing and Proposed Debt Service [Schedule BV-1: Table WW-5]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
Revenue Bonds							
1	Existing (a)	\$ 119,286	\$ 110,984	\$ 111,093	\$ 97,820	\$ 97,700	\$ 98,492
	Proposed						
2	Fiscal Year 2022 (b)		8,125	12,879	12,879	12,879	12,879
3	Fiscal Year 2023 (c)			11,988	18,603	18,603	18,603
4	Fiscal Year 2024 (c)				10,281	15,956	15,956
5	Fiscal Year 2025 (c)					10,413	16,159
6	Fiscal Year 2026 (c)						11,156
7	Total Proposed	-	8,125	24,866	41,764	57,850	74,753
8	Total Revenue Bonds	119,286	119,109	135,960	139,584	155,550	173,245
PennVest Loans							
9	Parity PennVest	6,278	6,278	6,278	6,278	6,278	6,278
Commercial Water							
10	Commercial Paper	-	1,200	2,400	2,400	2,400	2,400
11	Total Debt Service	\$ 125,563	\$ 126,586	\$ 144,637	\$ 148,261	\$ 164,228	\$ 181,922

(a) Projected debt service amounts include (i) debt service for the Series 2020A and 2020B Bonds which issued in FY 2021; and

(ii) debt service and savings from the Forward Refunding for the Series 2011A Bonds.

(b) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.25% interest rate; and assume issuance during the first quarter of the fiscal year.

6.2.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Wastewater System required to meet regulatory requirements and maintain existing levels of service. The Wastewater System CIP includes major capital projects required for implementing the LTCP and complying with the COA. The Water Department currently estimates that executing the 25-year LTCP program will cost about \$4.5 Billion, of which \$3.5 Billion is related to anticipated capital expenditures. The Wastewater System CIP reflects a ramp-up of COA-related projects associated with increasing compliance criteria over the life of the LTCP.

As discussed in Sections 1.4.6 and 2.3.3, several adjustments were made to the Water Department's appropriations-based CIP budget to develop the projected anticipated annual encumbrances and project expenses. Following the steps outlined in Section 1.4.6 produces the CIP shown in Table 6-18.

Table 6-18 Projected Wastewater System CIP [Schedule BV-1: Table WW-3]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
1	Engineering and Administration (a)	\$ 7,560	\$ 7,341	\$ 6,410	\$ 5,479	\$ 4,548	\$ 3,617
2	Water Pollution Control Plant	200,000	188,000	160,000	110,000	110,000	60,000
3	Storm Flood Relief	15,000	-	15,000	15,000	15,000	15,000
4	Reconstruction of Sewers	72,460	45,260	68,360	68,360	68,360	68,360
5	Green Infrastructure	72,000	20,000	72,000	72,000	72,000	134,000
6	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
7	Total Improvements	373,020	266,601	327,770	276,839	275,908	286,977
8	Inflation Adjustment (b)	-	-	9,833	16,860	25,584	36,018
9	Inflated Total	373,020	266,601	337,604	293,699	301,493	322,996
10	Rollforward Adjustments	(264,488)	268,000	-	-	-	-
11	Total Inflated Adjusted CIP Budget	108,532	534,601	337,604	293,699	301,493	322,996
12	Contingency Adjustment	(13,719)	(78,189)	(48,723)	(42,228)	(43,495)	(46,826)
13	Annual Encumbrances	94,813	456,412	288,880	251,471	257,998	276,170
14	Project Expenses (c)	133,083	252,715	232,925	222,609	307,310	248,005
15	Annual Net Encumbrances	\$ (38,270)	\$ 203,698	\$ 55,955	\$ 28,862	\$ (49,312)	\$ 28,165

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 3.0 percent per year after fiscal year 2022.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

6.2.4 Capital Flow of Funds

The Water Department meets its projected capital needs by using several sources for funding, including internally generated funds (cash) and debt. As defined by the General Bond Ordinance, the Construction Fund is where the Water Department draws funds to pay for the CIP. The Water Department may deposit bond proceeds, CP proceeds and cash transfers from the Revenue Fund and the Residual Fund into the Construction Fund to pay for capital projects.

Table 6-19 presents the proposed sources and uses for the Wastewater System CIP. As shown on Line 12, the Construction Fund has an estimated beginning balance of \$392.8 Million on July 1, 2020. Over the course of the Study Period, the Water Department anticipates issuing debt (both revenue bonds and CP) and the proceeds for these transactions are shown on Lines 1 and 7. The level of debt financing increases during the Study Period as the Water Department's CIP starts to ramp up. The Wastewater System's net bond and CP proceeds total \$1.23 Billion during the Study Period. Lines 16 and 17 show the estimated level of annual pay-go (i.e., cash-funded) the Water Department will fund. Line 23 shows the estimated annual encumbrances, while line 24 shows the anticipated annual project expenses the Water Department will fund. Per the City's updated CIP funding policy, total outstanding project encumbrances may need exceed available funds; therefore, the Target Balance on Line 27, which represents the Water Department's estimated outstanding encumbrances (or project commitments), should not exceed the ending Construction Fund balance shown on Line 21.

Table 6-19 Projected Flow of Funds – Wastewater: Construction Fund & Debt Reserve Account
[Schedule BV-1: Table WW-4]

LINE		FISCAL YEAR ENDING JUNE 30,					
NO.	DESCRIPTION	2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	\$ -	\$ 195,000	\$ 274,000	\$ 235,000	\$ 238,000	\$ 255,000
	Transfers:	-	-	-	-	-	-
2	Debt Reserve Fund (a)	-	13,150	14,053	15,956	16,329	17,327
3	Cost of Bond Issuance (b)	-	1,268	1,781	1,528	1,547	1,658
4	Refund Commercial Paper	-	-	120,000	120,000	120,000	120,000
5	Construction Fund (c)	-	180,583	138,166	97,517	100,124	116,015
6	Total Issue	-	195,000	274,000	235,000	238,000	255,000
Disposition of Commercial Paper Proceeds							
7	Proceeds From Commercial Paper	-	120,000	120,000	120,000	120,000	120,000
	Transfers:						
8	Debt Reserve Fund	-	1,200	1,200	-	-	-
9	Cost of Issuance	-	150	-	-	150	-
10	Construction Fund (c)	-	118,650	118,800	120,000	119,850	120,000
11	Total Issue	-	120,000	120,000	120,000	120,000	120,000
Construction Fund							
12	Beginning Balance	392,777	289,291	364,418	421,532	450,406	400,357
13	Transfer From Revenue Bond Proceeds	-	180,583	138,166	97,517	100,124	116,015
14	Transfer From Commercial Paper Proceeds	-	118,650	118,800	120,000	119,850	120,000
15	Penn Vest Loan	-	-	-	-	-	-
16	Capital Account Deposit	16,405	17,356	18,363	19,428	20,555	21,747
17	Transfer from Residual Fund	9,800	8,000	10,800	10,200	12,500	14,800
18	Interest Income on Construction Fund	3,393	3,252	3,910	4,338	4,233	4,126
19	Total Available	422,375	617,133	654,457	673,015	707,667	677,045
20	Net Cash Financing Required	133,083	252,715	232,925	222,609	307,310	248,005
21	Ending Balance	289,291	364,418	421,532	450,406	400,357	429,040
Capital Program Net Encumbrances							
22	Beginning Balance	196,693	158,423	362,120	418,076	446,938	397,626
23	Annual Encumbrances	94,813	456,412	288,880	251,471	257,998	276,170
24	Project Expenses	(133,083)	(252,715)	(232,925)	(222,609)	(307,310)	(248,005)
25	Ending Balance	158,423	362,120	418,076	446,938	397,626	425,791
26	Allowance Commitments Prior to Bond Issue	-	-	-	-	-	-
27	Target Balance	158,423	362,120	418,076	446,938	397,626	425,791
Debt Reserve Fund							
28	Beginning Balance	130,240	116,896	131,245	146,498	162,453	178,783
29	Transfer From Bond Proceeds	-	14,350	15,253	15,956	16,329	17,327
30	Debt Service Reserve Release	(13,345)	-	-	-	-	-
31	Ending Balance	\$ 116,896	\$ 131,245	\$ 146,498	\$ 162,453	\$ 178,783	\$ 196,110
32	Interest Income on Debt Reserve Fund	\$ 1,236	\$ 1,241	\$ 1,389	\$ 1,545	\$ 1,706	\$ 1,874

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

(b) Cost of bonds issuance assumed at 0.59 percent of issue amount.

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

6.3 Wastewater System Summary of Revenue and Revenue Requirements

The Wastewater System's estimated financial performance during the Study Period is presented in Table 6-20. As shown in the table below, the Wastewater System will need a series of revenue increases, starting at 8.98% in FY 2022, followed by increases of 4.48%, 1.23%, 6.65%, and then 6.21% for each

subsequent year. These revenue adjustments are necessary to meet O&M, debt service, Capital Account deposit requirements, and provide additional coverage per the Rate Covenant.

Table 6-20 presents the Wastewater System operating results for Base Rates. The proposed revenue increases in the table do not reflect any rate compression as discussed in Section 2.5.

As previously mentioned, the Water Department is addressing the reconciliation of TAP discounts and TAP-R revenues in a separate proceeding.

6.4 Projected Wastewater System Operating Results

Line 1 of Table 6-20 is the consolidated total for wastewater retail and wholesale receipts from Table 6-11, Table 6-12, Table 6-13. These represent receipts under existing rates. Lines 2 through 7 present the additional revenues from proposed revenue increases. Line 10 presents other operating receipts as detailed on Lines 1 to 10 of Table 6-15. Interest income from the Debt Reserve, Operating Fund, and Rate Stabilization Funds is shown on Lines 11 through 13. Line 14 summarizes the projected Total Revenues for the Wastewater System.

Operating expenses are summarized on Lines 15 and 16. Line 16 represents the Wastewater System's share of costs to process water treatment sludge at the wastewater treatment plants. As noted in Section 3.4, a portion of the cost to process this sludge is allocated back to the Water System as well. During the Study Period, it is estimated that the Water Department will make a series of deposits to and transfers from the RSF as shown on Line 18. Line 19 presents the Net Revenues after Operations. Existing and proposed senior debt service obligations are shown on Lines 20 through 24. Debt service coverage on senior debt is calculated on Line 25 and indicates that coverage meets the minimum 1.20x requirement. The Capital Account deposit is on Line 29. Line 30 then shows results of the total debt service coverage requirement and indicates that total coverage requirements meet the 1.00 minimum coverage required by the General Bond Ordinance.

As established in the General Bond Ordinance and Rate Covenant, debt service coverage requirements are for the Combined System. The calculations shown in Table 6-20 are presented to demonstrate that the Wastewater System's proposed financial plan provides sufficient resources for the Wastewater System to be financially stable on its own.

Table 6-20 Projected Revenue and Revenue Requirements: Base Rates
 [Schedule BV-1: Table WW-6]

LINE NO.	DESCRIPTION	FISCAL YEAR ENDING JUNE 30,					
		2021	2022	2023	2024	2025	2026
Wastewater System (\$000s)							
Operating Revenues							
1	Wastewater Service - Existing Rates (a)	406,729	423,433	429,267	434,770	432,095	429,434
	Additional Service Revenue Required						
		Percent	Months				
	Year	Increase	Effective				
2	FY 2021	0.00%	10	-	-	-	-
3	FY 2022	8.98%	10	31,084	38,547	39,039	38,554
4	FY 2023	4.48%	10	17,143	21,245	21,120	20,997
5	FY 2024	1.23%	10		4,937	6,049	6,057
6	FY 2025	6.65%	10			27,067	32,918
7	FY 2026	6.21%	10				26,801
8	Total Additional Service Revenue Required	-	31,084	55,689	65,220	93,032	125,327
9	Total Wastewater Service Revenue	406,729	454,518	484,956	499,990	525,126	554,761
	Other Income (b)						
10	Other Operating Revenue	25,676	14,381	14,338	14,296	14,254	14,213
11	Debt Reserve Fund Interest Income	-	-	-	-	-	-
12	Operating Fund Interest Income	673	783	804	818	823	840
13	Rate Stabilization Interest Income	795	685	687	703	719	722
14	Total Revenues	433,872	470,366	500,785	515,807	540,922	570,535
Operating Expenses							
15	Wastewater Operations	(317,317)	(332,663)	(341,575)	(350,532)	(359,674)	(369,182)
16	Wastewater Treatment Plant Sludge (c)	12,308	14,078	14,913	15,341	16,289	17,214
17	Total Operating Expenses	(305,009)	(318,586)	(326,661)	(335,190)	(343,385)	(351,968)
18	Transfer From/(To) Rate Stabilization Fund	21,815	125	(500)	(2,700)	(400)	(200)
19	NET REVENUES AFTER OPERATIONS	150,678	151,905	173,624	177,917	197,137	218,367
Debt Service							
	Senior Debt Service						
	Revenue Bonds						
20	Outstanding Bonds	(119,286)	(110,984)	(111,093)	(97,820)	(97,700)	(98,492)
21	Pennvest Parity Bonds	(6,278)	(6,278)	(6,278)	(6,278)	(6,278)	(6,278)
22	Projected Future Bonds	-	(8,125)	(24,866)	(41,764)	(57,850)	(74,753)
23	Commercial Paper	-	(1,200)	(2,400)	(2,400)	(2,400)	(2,400)
24	Total Senior Debt Service	(125,563)	(126,586)	(144,637)	(148,261)	(164,228)	(181,922)
25	TOTAL SENIOR DEBT SERVICE COVERAGE (L19/L24)	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x	1.20 x
26	Subordinate Debt Service	-	-	-	-	-	-
27	Transfer to Escrow	-	-	-	-	-	-
28	Total Debt Service on Bonds	(125,563)	(126,586)	(144,637)	(148,261)	(164,228)	(181,922)
29	CAPITAL ACCOUNT DEPOSIT	(16,405)	(17,356)	(18,363)	(19,428)	(20,555)	(21,747)
30	TOTAL COVERAGE (L19/(L24+L26+L29))	1.06 x	1.06 x	1.07 x	1.06 x	1.07 x	1.07 x
31	End of Year Balance	\$ 8,710	\$ 7,963	\$ 10,624	\$ 10,228	\$ 12,355	\$ 14,698

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

7.0 Wastewater System Cost of Service Allocations

The cost of service analysis is the middle step of three depicted in Figure 2-1 that forms the basis for how a utility sets its rates and charges. At the cost of service stage, we identify how different customer types are using the sanitary sewer and stormwater systems. As such, each customer type potentially places a different level of demands on the system – requirements that the Water Department must meet. The types of demand are cost drivers and the cost of service step is where we develop the nexus between how the systems are designed and operated and how customers are using the systems.

7.1 General

As indicated previously for the Water System, in allocating the test year cost of service, we apportion revenue requirements between wholesale customers and retail customer types on a utility basis, per the industry accepted guidelines provided in the WEF MoP 27. The tasks illustrated in Figure 7-1 to conduct the wastewater cost of service analysis presented herein.

Figure 7-1 Wastewater Cost of Service Steps

Wastewater Cost of Service Analytical Tasks	1. Categorize	2. Functionalize	3. Allocate	4. Distribute
	Determine net revenue requirements by <i>cost categories</i>	Assign revenue requirements to <i>functional cost centers</i>	Allocate functional costs to <i>cost components</i>	Distribute costs to <i>customer types</i>
Subcomponent Costs	<ul style="list-style-type: none"> O&M Costs Capital Costs 	<ul style="list-style-type: none"> Collection & Pumping Water Pollution Control Plants Customer Costs Administrative & General 	<ul style="list-style-type: none"> Volume Capacity Strength (Suspended Solids & BOD) Direct Stormwater 	<ul style="list-style-type: none"> Residential Senior Citizens Commercial Industrial Public Utilities Housing Authority Charities / Schools Retail Infiltration/Inflow Contract Services

7.2 Costs of Service to be Allocated

7.2.1 Overall Wastewater System

The projected annual revenue requirements for FY 2022 serve as the Test Year 1 requirements for the analyses conducted herein. The proposed rate increases will go into effect on September 1st of each respective fiscal year. However, rates are designed based upon a 12-month period. Because the proposed revenue increase will not go into effect until September 1st of each fiscal year, the proposed rates are designed based on annualizing the 10-month period for which rates are effective. Table 7-1 shows the projected Test Year 1 cash flow of base rates for the Wastewater System based on the annualizing the proposed revenue increase.

Table 7-1 Test Year 1 Annualized Revenue and Revenue Requirements
[Schedule BV-1: Table WW-6A]

LINE NO.	DESCRIPTION	2022
Wastewater System (\$000s)		
Operating Revenues		
1	Wastewater Service - Existing Rates (a)	\$ 423,433
	Additional Service Revenue Required	
	Percent Increase	Months Effective
2	FY 2022	8.98% 12
3	Total Additional Service Revenue Required	38,025
4	Total Wastewater Service Revenue	461,458
	Other Income (b)	
5	Other Operating Revenue	14,381
6	Debt Reserve Fund Interest Income	-
7	Operating Fund Interest Income	783
8	Rate Stabilization Interest Income	685
9	Total Revenues	477,306
Operating Expenses		
10	Wastewater Operations	(332,663)
11	Wastewater Treatment Plant Sludge (c)	14,078
12	Total Operating Expenses	(318,586)
13	Transfer From/(To) Rate Stabilization Fund	(6,816)
14	NET REVENUES AFTER OPERATIONS	151,905
Debt Service		
	Senior Debt Service	
	Revenue Bonds	
15	Outstanding Bonds	(110,984)
16	Pennvest Parity Bonds	(6,278)
17	Projected Future Bonds	(8,125)
18	Commercial Paper	(1,200)
19	Total Senior Debt Service	(126,586)
20	TOTAL SENIOR DEBT SERVICE COVERAGE (L14/L19)	1.20 x
21	Subordinate Debt Service	-
22	Transfer to Escrow	-
23	Total Debt Service on Bonds	(126,586)
24	CAPITAL ACCOUNT DEPOSIT	(17,356)
25	TOTAL COVERAGE (L14/(L19+L21+L24))	1.06 x
26	End of Year Balance	\$ 7,963

(a) Revenue from rates effective September 1, 2020.

(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 2021.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

The net cost of service recovered from wastewater service charges is the total revenue requirements less revenues received from other sources. Table 7-2 presents the cost of service to be recovered from sanitary sewer and stormwater rates for Test Year 1. The TY net cost of service of \$461.5 Million (Column 3, Line 13), represents the total revenue requirements of \$477.3 Million (Column 3, Line 10) minus other revenues and transfers received of \$15.8 Million (Column 3, Lines 11 and 12). The cost of service to be recovered from rates consists of \$317.1 Million of net operating expenses (Column 1, Line 13) and \$144.4 Million of net capital-related costs (Column 2, Line 13).

Table 7-2 **Estimated Wastewater System Test Year 1 Cost of Service**
[Schedule BV-1: Table WW-7]

LINE NO.	DESCRIPTION	(1) OPERATING EXPENSE	(2) CAPITAL COSTS	(3) TOTAL
Wastewater System (\$000s)				
Revenue Requirements				
1	Operations & Maintenance Expense	\$ 206,669		\$ 206,669
2	Direct Interdepartmental Charges	125,994		125,994
3	Water Treatment Plant Sludge	(10,492)	(3,586)	(14,078)
	Existing Bond Debt Service			
4	Revenue Bonds		117,261	117,261
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service		9,325	9,325
7	Capital Account Deposit		17,356	17,356
8	Residual Fund Deposit	5,546	2,417	7,963
9	Deposit (From)/To Rate Stabilization Fund	4,747	2,069	6,816
10	Total	332,465	144,842	477,306
Deductions of Funds from Other Sources				
11	Other Operating Revenue	(14,381)	-	(14,381)
12	Interest Income	(1,032)	(436)	(1,468)
13	COST OF SERVICE TO BE DERIVED FROM RATES	\$ 317,052	\$ 144,406	\$ 461,458

7.2.2 Wholesale Wastewater

The cost of service allocable to the 10 wholesale wastewater customers and the rates developed to recover these allocated costs, reflect consideration of the contract demands for service as set forth in each customer's contract with the City. Contract rates for wastewater service apply on a monthly basis and generally consist of charges for O&M expense, applicable capital costs associated with the collection and treatment facilities used in providing the service, customer related costs, and a management fee ranging from 10 to 12% applied to the sum of the unit and fixed charges.

For Test Year 1, the O&M expense of \$317.1 Million from Table 7-2 is allocated between wholesale and retail customers based on service demand characteristics. With respect to capital costs, to allocate the \$144.4 Million (Column 2, Line 13 of Table 7-2) of Capital Costs using the utility-basis approach, typically we delineate the annual Capital Costs into two components, namely, the Depreciation Expense and the Return on Investment. Under the utility-basis approach, the restatement of Capital Costs into these two components 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.

To restate the Capital Costs in terms of depreciation and return, we determine the depreciation expense for the Wastewater System and subtract this amount from the Total Capital Costs. The resulting figure corresponds to the return on investment for the Wastewater System, which is recovered from both the inside City retail and outside City wholesale customers. As noted earlier, the rate of return for service to

the City's wholesale wastewater customers used in the Cost of Service Study is 7.5%, which is consistent with the rate of return used in the development of the wastewater wholesale existing rates.

7.3 Functional Cost Components

The costs derived in revenue requirements are incurred as a result of cost drivers placed on the system by its customers. Many systems are designed and sized to meet the cost drivers; therefore, the operational and capital costs (depreciation and return on rate base) are linked to these cost drivers.

The various cost elements of wastewater service are assigned to functional cost components as the first step in the subsequent distribution of the cost of service to the customer types. For a wastewater system, the functional cost centers include collection system, pumping, treatment, pollutant loadings (strength), customer costs, and general administration. For the analyses conducted herein, the Design Basis cost of service methodology proposed in WEF MoP 27 was followed.

7.3.1 Wastewater System Facilities

A wastewater system includes different facilities each designed and operated to fulfill a given function. The sewage collection system in the City of Philadelphia consists of both separate sanitary and storm sewers as well as combined sanitary and storm sewers designed to convey sanitary and stormwater flows. In addition, these conveyance systems 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 consist of different facilities as well. The sizing of certain facilities, such as the sedimentation basins, is based on the average annual volume of wastewater received at the plant. The sizing of other facilities, such as the aeration basins, use the measurable pollutant, BOD, since these facilities are required to reduce this pollutant prior to discharge into the river. The sizing of other facilities is on the basis of SS loading, another readily measurable pollutant, contained in the influent wastewater. Finally, certain other facilities, such as sludge disposal facilities, are designed to manage both BOD and SS.

7.3.2 Wastewater System Design Basis

The Design Basis method uses volume, capacity, strengths, and customer. Volume represents costs incurred for the quantity of sewerage volume treated. Capacity represents costs incurred with meeting peak flows. Strengths represents costs incurred with treating and handling specific constituents in the sewer flow such as BOD, SS, nitrogen, and ammonia. Customer represents the costs associated with meter reading, billing, collecting, and accounting costs related to the provision of wastewater service.

7.3.3 Units of Service

Table 7-3 summarizes the Test Year 1 units of service for the sanitary sewer customers. Table 7-4 presents the Test Year 1 units of service for the wholesale customers and Table 7-5 summarizes the estimated average wastewater loadings applied for the wholesale customer contracts.

Table 7-3 Test Year 1 Sanitary Sewer Units of Service [Schedule BV-1: Table WW-8]

		(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
			CAPACITY FLOW RATE							
			(Mcf/day)		STRENGTH (1,000 lbs)		CUSTOMER COSTS			
LINE		TY 2022	COLLECTION	PUMPING &	SUSPENDED		EQUIV.	EQUIV.		
NO.	CUSTOMER TYPE	VOLUME (Mcf)	SYSTEM	TREATMENT	SOLIDS	BOD	METERS	BILLS	BILLS	
Sanitary Sewer										
1	Residential	3,072,104	33,667	12,625	57,510	56,551	441,986	5,052,875	5,033,820	
2	Commercial	1,371,321	15,028	5,636	25,671	25,243	94,421	490,991	427,692	
3	Industrial	73,355	804	301	1,373	1,350	3,991	15,038	12,132	
4	Public Utilities	8,117	89	33	152	149	1,220	3,235	2,040	
5	Senior Citizens	129,551	1,420	532	2,425	2,385	22,738	272,722	272,712	
6	Sewer Only	59,850	656	246	1,120	1,102	461	1,264	720	
7	Groundwater	229,000	5,019	1,568	1,000	143	0	0	0	
8	Surcharge	0	0	0	1,863	12,420	0	0	0	
9	Water Treatment Plant Sludge	292,800	3,209	1,203	27,200	0	0	0	0	
10	Housing Authority	145,231	1,592	597	2,719	2,673	9,160	72,252	68,556	
11	Charities & Schools	107,481	1,178	442	2,012	1,979	14,403	38,184	22,884	
12	Hospital/University	106,881	1,171	439	2,001	1,967	5,876	10,788	3,396	
13	Hand Billed	347,050	3,803	1,426	6,497	6,388	4,634	8,267	2,496	
14	Fire Meters	8,550	94	35	160	157	358	1,649	1,428	
15	Scheduled (Flat Rate)	10	0	0	0	0	3	36	36	
16	Subtotal Retail Service	5,951,300	67,730	25,083	131,703	112,507	599,251	5,967,301	5,847,912	
17	Infiltration/Inflow	11,466,600	251,324	78,539	50,073	7,153	0	0	0	
18	Total Retail Service	17,417,900	319,054	103,622	181,776	119,660	599,251	5,967,301	5,847,912	
Contract Service										
19	Sanitary	4,274,000	32,577	32,577	44,100	39,060				
20	Infiltration/Inflow	105,100	420	420	459	66				
21	Total Contract Service	4,379,100	32,997	32,997	44,559	39,126				
22	Total System	21,797,000	352,051	136,619	226,335	158,786	599,251	5,967,301	5,847,912	

Table 7-4 Test Year 1 Wholesale Customer Units of Service [Schedule BV-2: Table WH-3]

		NORTHEAST WPC PLANT							
LINE NO.		UNITS	ABINGTON	BENSALEM	BUCKS COUNTY	CHELTENHAM	LOWER MORELAND	LOWER SOUTHAMPTON	TOTAL NORTHEAST
Wholesale Customers									
Volume									
1	Sanitary Wastewater	(Mcf)	94,000	170,000	1,000,000	450,000	65,000	310,000	2,089,000
2	Infiltration	(Mcf)	4,500	5,600	35,100	15,000	2,800	7,500	70,500
3	Total	(Mcf)	98,500	175,600	1,035,100	465,000	67,800	317,500	2,159,500
Suspended Solids									
4	Sanitary Wastewater	(1,000 lbs)	920	1,600	10,900	3,400	660	2,500	19,980
5	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308
6	Total	(1,000 lbs)	940	1,624	11,053	3,466	672	2,533	20,288
BOD									
7	Sanitary Wastewater	(1,000 lbs)	1,400	1,650	10,500	3,000	500	1,840	18,890
8	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44
9	Total	(1,000 lbs)	1,403	1,653	10,522	3,009	502	1,845	18,934
Contract Maximum Units									
Capacity									
10	Sanitary Wastewater	(Mcf/day)	824	1,014	6,416	2,743	508	1,364	12,869
11	Infiltration	(Mcf/day)	20	20	140	60	10	30	280
12	Total	(Mcf/day)	844	1,034	6,556	2,803	518	1,394	13,149
Volume									
13	Sanitary Wastewater	(Mcf)	217,292	299,271	1,171,123	654,370	92,714	348,409	2,783,179
14	Infiltration	(Mcf)	4,500	5,600	35,100	15,000	2,800	7,500	70,500
15	Total	(Mcf)	221,792	304,871	1,206,223	669,370	95,514	355,909	2,853,679
Suspended Solids									
16	Sanitary Wastewater	(1,000 lbs)	2,481	3,734	13,400	5,635	966	6,000	32,216
17	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308
18	Total	(1,000 lbs)	2,501	3,758	13,553	5,701	978	6,033	32,524
BOD									
19	Sanitary Wastewater	(1,000 lbs)	2,102	5,340	13,400	4,900	729	5,500	31,971
20	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44
21	Total	(1,000 lbs)	2,105	5,343	13,422	4,909	731	5,505	32,015

Table 7-4 Test Year 1 Wholesale Customer Units of Service (continued)

LINE NO.		UNITS	SOUTHWEST WPC PLANT				WPC PLANT		
			DELCORA	LOWER MERION	SPRINGFIELD (EXCLUDING WYNDMOOR)	UPPER DARBY	TOTAL SOUTHWEST	SPRINGFIELD (WYNDMOOR)	TOTAL
Wholesale Customers									
Volume									
1	Sanitary Wastewater	(Mcf)	1,200,000	350,000	115,000	500,000	2,165,000	20,000	4,274,000
2	Infiltration	(Mcf)	0	14,900	2,200	16,600	33,700	900	105,100
3	Total	(Mcf)	1,200,000	364,900	117,200	516,600	2,198,700	20,900	4,379,100
Suspended Solids									
4	Sanitary Wastewater	(1,000 lbs)	13,000	3,600	2,500	4,800	23,900	220	44,100
5	Infiltration	(1,000 lbs)	0	65	10	73	148	4	460
6	Total	(1,000 lbs)	13,000	3,665	2,510	4,873	24,048	224	44,560
BOD									
7	Sanitary Wastewater	(1,000 lbs)	10,500	3,100	2,300	4,100	20,000	170	39,060
8	Infiltration	(1,000 lbs)	0	9	1	10	20	1	65
9	Total	(1,000 lbs)	10,500	3,109	2,301	4,110	20,020	171	39,125
Contract Maximum Units									
Capacity									
10	Sanitary Wastewater	(Mcf/day)	13,392	2,728	397	3,024	19,541	167	32,577
11	Infiltration	(Mcf/day)	0	60	10	70	140	0	420
12	Total	(Mcf/day)	13,392	2,788	407	3,094	19,681	167	32,997
Volume									
13	Sanitary Wastewater	(Mcf)	2,439,840	707,553	156,150	829,545	4,133,088	48,797	6,965,064
14	Infiltration	(Mcf)	0	14,900	2,200	16,600	33,700	900	105,100
15	Total	(Mcf)	2,439,840	722,453	158,350	846,145	4,166,788	49,697	7,070,164
Suspended Solids									
16	Sanitary Wastewater	(1,000 lbs)	19,487	7,250	3,300	7,349	37,386	200	69,802
17	Infiltration	(1,000 lbs)	0	65	10	73	148	4	460
18	Total	(1,000 lbs)	19,487	7,315	3,310	7,422	37,534	204	70,262
BOD									
19	Sanitary Wastewater	(1,000 lbs)	21,771	6,871	3,100	6,831	38,573	155	70,699
20	Infiltration	(1,000 lbs)	0	9	1	10	20	1	65
21	Total	(1,000 lbs)	21,771	6,880	3,101	6,841	38,593	156	70,764

Table 7-5 **Estimated Average Wastewater Loadings for Wholesale Customers**
[Schedule BV-2: Table WH-4]

CUSTOMER	(1)	(2)
	WASTEWATER POLLUTANT	
	LOADING (1,000 lbs)	
	SUSPENDED	
	SOLIDS	BOD
Abington	920	1,400
Bensalem	1,600	1,650
Bucks County	10,900	10,500
Cheltenham	3,400	3,000
DELCORA	13,000	10,500
Lower Merion	3,600	3,100
Lower Moreland	660	500
Lower Southampton	2,500	1,840
Springfield (excluding Wyndmoor)	2,500	2,300
Springfield (Wyndmoor)	220	170
Upper Darby	4,800	4,100

7.3.3.1 Retail Service

The units of service for the retail customer types of the Wastewater System are determined as follows:

- **Volume:** For the retail customer types, we estimate the sanitary wastewater quantities by applying a 95% return factor to the projected test year water sales from each customer type. The return factor reflects an allowance for water consumption which is not discharged into the Wastewater System. In addition, we also apportion the test year infiltration/inflow (“I/I”) in the Wastewater System to the retail customer types 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 wholesale customers.
- **Collection System – Capacity:** The sanitary wastewater peak (capacity) flow rate, exclusive of I/I, for each retail customer type is estimated to be approximately four times (4 times) the average daily flow rate, computed from the annual volumes shown in Column 1 of Table 7-3. These estimated capacity requirements reflect the system-wide ratio of maximum to average sanitary wastewater flow rates. The capacity flow rate of I/I in the collection system is estimated to be eight times (8 times) the average daily flow rate. Retail customers’ I/I is largely due to leakage into sewers and direct extraneous inflows.
- **Treatment – Capacity:** The peak sanitary wastewater capacity flow rate, exclusive of I/I is estimated to be 1.5 times the average daily flow rate. The capacity flow rate of I/I at the water pollution control plants is estimated to be 2.5 times the average daily flow rate.
- **Strengths (BOD and Suspended Solids):** The estimated strength units for each customer type are shown in Columns 4 and 5 of Table 7-3. 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 166 milligrams per liter (“mg/l”), and a weighted average BOD concentration of approximately 117 mg/l. These weighted averages are based on estimated influent concentrations at the three treatment plants. Infiltration/ inflow is assumed to have a suspended solids and BOD concentration of 70 mg/l and 10 mg/l, respectively. The estimates of strength units for customers with excess strength wastewater are based upon an analysis of surcharge bills.

- 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 7-3 in Line 9.
- The retail loadings for suspended solids and BOD are determined as the difference between the total influent wastewater loadings at the plant less the sum of I&I and water plant sludge loadings for those two components respectively. The resulting retail suspended solids and BOD concentrations are 300 mg/l and 295 mg/l, respectively.
- **Customer:** Units of service applicable for the allocation of customer costs are summarized in Columns 6 to 8 of Table 7-3. 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 capacity factors determined for various size meters relative to the capacity associated with a 5/8-inch meter.

7.3.3.2 Wholesale Customers

Table 7-4 and Table 7-5 present a summary of the test year units of service for volume, capacity, strength, and customer units of service for each of the wholesale customers. The strength units from wholesale customers are estimated for each customer based on historical measured wastewater strength loadings, as measured at the point of their discharge to the City’s sewers.

7.4 Allocation to Cost Components

We allocate the Test Year 1 cost to the functional cost components using a two-step process.

1. First, a portion of the Wastewater System costs (O&M, depreciation, and net plant investment) are allocated to wholesale wastewater customers.
2. Then the retail portion of the remaining costs are allocated to the various wastewater cost components, including direct charges to stormwater.

7.5 Allocation of O&M Expense

7.5.1 Retail

Table 7-6 shows the allocation of Test Year 1 O&M expenses for the Wastewater System to the identified functional cost components by cost center. O&M expense is allocated to wastewater cost components generally in the same proportion as the plant investment and depreciation expense allocations.

Table 7-6 Test Year 1 Allocation of O&M to Functional Cost Components
[Schedule BV-1: Table WW-10]

LINE NO.	COST COMPONENT	(1) NET O&M	(2) LESS O&M ALLOCATED TO CONTRACT SERVICE	(3) O&M ALLOCATED TO RETAIL SERVICE	(4) LESS RETAIL O&M DEDUCTIONS: OTHER OPERATING REVENUE	(5) NET O&M TO BE ALLOCATED TO RETAIL SERVICE
Wastewater System (\$000s)						
COLLECTION SYSTEM						
	Sewer Maintenance					
1	All Customers - Capacity	\$ 89,278	\$ 1,542	\$ 87,736	\$ 3,203	\$ 84,533
	Inlet Cleaning					
2	Retail - Storm Capacity	19,888	-	19,888	726	19,162
	Neill Drive Pumping Station					
	Retail and Lower Merion					
3	Total Volume	6	1	5	-	5
4	Total Capacity	166	51	115	4	111
	Central Schuylkill Pumping Station					
	Retail and Springfield (excl. Wyndmoor)					
5	Total Volume	41	1	40	1	39
6	Total Capacity	527	10	517	19	498
	All Other Pumping Stations					
	Retail					
7	Total Volume	2,819	-	2,819	103	2,716
8	Total Capacity	17,994	-	17,994	657	17,337
	Direct to Bucks County	-	-	-	-	-
9	Total Collection Systems	161,140	2,286	158,854	5,799	153,055
WATER POLLUTION CONTROL PLANTS						
	Northeast Plant:					
	Retail and Cheltenham					
10	Volume	-	-	-	-	-
11	Capacity	-	-	-	-	-
	Retail, Abington, Bensalem, Bucks County, Lower Moreland, and Lower Southampton					
12	Volume	461	115	346	13	333
13	Capacity	2,482	602	1,880	69	1,811
	Retail, Abington, Bensalem, Bucks County, Cheltenham, Lower Moreland, and Lower Southampton					
14	Volume	11,485	2,696	8,789	321	8,468
15	Capacity	4,164	950	3,214	117	3,097
16	Suspended Solids	21,802	4,016	17,786	650	17,136
17	BOD	17,113	4,281	12,832	469	12,363

Table 7-6 Test Year 1 Allocation of O&M to Functional Cost Components (continued)

LINE NO.	COST COMPONENT	(1) NET O&M	(2) LESS O&M ALLOCATED TO CONTRACT SERVICE	(3) O&M ALLOCATED TO RETAIL SERVICE	(4) LESS RETAIL O&M DEDUCTIONS: OTHER OPERATING REVENUE	(5) NET O&M TO BE ALLOCATED TO RETAIL SERVICE
Wastewater System (\$000s)						
Southwest Plant:						
	Retail					
18	Volume	58	-	58	2	56
19	Capacity	533	-	533	19	514
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
20	Volume	12,687	3,265	9,422	344	9,078
21	Capacity	4,828	1,774	3,054	112	2,942
22	Suspended Solids	17,238	5,097	12,141	443	11,698
23	BOD	11,384	4,168	7,216	263	6,953
Southeast Plant:						
	Retail and Springfield (Wyndmoor)					
24	Volume	8,809	45	8,764	320	8,444
25	Capacity	5,427	36	5,391	197	5,194
26	Suspended Solids	11,217	72	11,145	407	10,738
27	BOD	3,809	23	3,786	138	3,648
28	Total Water Pollution Control Plants	133,497	27,140	106,357	3,884	102,473
CUSTOMER COSTS						
	All Customers					
29	Equivalent Bills	33,528	228	33,300	1,216	32,084
	Equivalent Meters					
30	Industrial Waste Unit	4,028	68	3,960	145	3,815
31	Other	4,653	-	4,653	170	4,483
32	Stormwater - Direct	-	-	-	-	-
33	Excess Strength Wastewater - Direct	1,983	-	1,983	72	1,911
34	Total Customer Costs	44,192	296	43,896	1,603	42,293
35	Total O&M	\$ 338,829	\$ 29,722	\$ 309,107	\$ 11,286	\$ 297,821

NOTE: The total net O&M from Table 7-2 of \$317.1 Million (Column 1, Line 13) = Total net Retail O&M of \$297.8 Million (Table 7-6, Column 5, Line 35) + Total net Wholesale O&M of \$29.7 Million (Table 7-6, Column 2, Line 35) - Water Treatment Plant sludge costs of \$10.4 Million (Table 7-2, Column 1, Line 3)

The net O&M expenses are allocated to the retail customer types as follows:

- **Collection System:** The various functional cost centers of the wastewater collection system are designed based on different wastewater parameters. Therefore, those functional O&M expenses are allocated to respective wastewater parameter (cost component). The allocation of the operation and maintenance expense for each collection system component is presented in Table 7-7 and is summarized in Lines 1 to 9 on Table 7-6.

- **Wastewater Collection System - Sewers:** The operation and maintenance costs of the wastewater collection system sewers are shown in Line 1 of Table 7-7. These facilities are designed to carry maximum rates of wastewater flows and are allocated 100% to the capacity cost component.

We further delineate the test year collection system O&M between sanitary sewer related costs and stormwater costs. Based on an analysis of system-wide ratio of peak wet weather flows to peak dry weather flows, 60% of the sewer maintenance cost is allocated to stormwater and 40% to sanitary sewer. The rationale for using the peak flow ratio as the basis for apportioning sewer maintenance costs is that those costs would normally be incurred in proportional to the quantity of flow.

- **Wastewater Collection System – Inlet Cleaning:** The inlet cleaning related operation and maintenance expenses are shown on Line 2 of Table 7-7. These expenses are allocated 100% 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, 6, and 9 of Table 7-7, 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 5, 8, and 11 of Table 7-7 is allocated 100% to the capacity cost component.
- **Wastewater Treatment:** The various functional facilities of the water pollution control plants are designed to process different wastewater parameters. Therefore, those functional O&M expenses are allocated to respective wastewater parameter (cost component). The allocation of the operation and maintenance expense for each of the water pollution control plants is presented in Table 7-8, Table 7-9, and Table 7-10 and is summarized in Lines 10 to 28 on Table 7-6.
 - **Volume:** Wastewater treatment related power costs are allocated 85% to the volume cost component. Water pollution control plant facilities such as primary and secondary sedimentation basins, recirculation pumping and chlorination, are designed largely based on total average flow projected for the plant. Therefore, most of the operation and maintenance expense excluding power costs, associated with these functions, is allocated largely to the volume cost component.
 - **Capacity:** Wastewater treatment related power costs are allocated 15% to the capacity cost component. Most of the operation and maintenance expenses, excluding power, which is associated with facilities such as raw wastewater pumps, preliminary treatment, and effluent pumping vary according to peak wastewater flow rates. Therefore, the O&M costs of those functions are largely allocated to the capacity functional cost component.

Table 7-7 Test Year 1 Allocation of O&M for the Collection System [Schedule BV-1: Table WW-10A]

		(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
LINE NO.	DESCRIPTION	TOTAL		ALL CUSTOMERS CAPACITY		RETAIL				RETAIL AND LOWER MERION				RETAIL AND SPRINGFIELD (EXCLUDING WYNDMOOR)					
						VOLUME		CAPACITY		STORM CAPACITY		VOLUME		CAPACITY		Volume		Capacity	
Wastewater System (\$000s)																			
1	Sewer Maintenance	\$	31,495	\$	31,495	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-
2	Inlet Cleaning		13,165		-		-		-		13,165		-		-		-		-
Pump Stations																			
Neill Drive																			
3	Power		7		-		-		-		-		6		1		-		-
4	Gas		-		-		-		-		-		-		-		-		-
5	Other		113		-		-		-		-		-		113		-		-
Central Schuylkill																			
6	Power		48		-		-		-		-		-		-		41		7
7	Gas		-		-		-		-		-		-		-		-		-
8	Other		335		-		-		-		-		-		-		-		335
All Other Pumping Stations																			
9	Power		3,327		-		2,828		499		-		-		-		-		-
10	Gas		-		-		-		-		-		-		-		-		-
11	Other		12,457		-		-		12,457		-		-		-		-		-
12	GSI Maintenance		10,089		10,089		-		-		-		-		-		-		-
13	Total Collection System	\$	71,036	\$	41,584	\$	2,828	\$	12,956	\$	13,165	\$	6	\$	114	\$	41	\$	342

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant [Schedule BV-1: Table WW-10B]

LINE NO.	DESCRIPTION	(1)	(2)		(3)	(4)		(5)	(6)	(7)
		TOTAL	RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, & LOWER SOUTHAMPTON			RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON			SUSPENDED	
		O&M	VOLUME	CAPACITY		VOLUME	CAPACITY		SOLIDS	BOD
Wastewater System (\$000s)										
Personal Services:										
1	Raw Wastewater Pumping	\$ 812,635	\$ -	\$ 812,635	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2	Preliminary Treatment	1,580,123	-	-	1,121,887	458,236	-	-	-	-
3	Primary Sedimentation	637,693	-	-	637,693	-	-	-	-	-
4	Aeration	2,635,420	-	-	-	-	-	-	-	2,635,420
5	Secondary Sedimentation	643,336	-	-	643,336	-	-	-	-	-
6	Recirculating Pumping	474,037	-	-	474,037	-	-	-	-	-
7	Chlorination	445,820	-	-	271,950	173,870	-	-	-	-
8	Primary Sludge Pumping	129,796	-	-	-	-	-	129,796	-	-
9	Secondary Sludge Thickening	316,025	-	-	-	-	-	158,013	158,012	-
10	Sludge Digestion	2,483,051	-	-	-	-	-	1,862,288	620,763	-
11	Sludge Holding Tanks	180,586	-	-	-	-	-	135,440	45,146	-
12	Sludge Dewatering	457,107	-	-	-	-	-	342,830	114,277	-
13	Grit and Screening Incineration	1,015,794	-	-	680,582	335,212	-	-	-	-
14	Scum and Grease Incineration	242,662	-	-	-	-	-	242,662	-	-
15	Laboratory	840,851	-	-	-	-	-	420,426	420,425	-
16	Subtotal Personal Services	12,894,936	-	812,635	3,829,485	967,318	3,291,455	3,994,043		
Purchase of Services, Materials, Supplies, and Equipment:										
17	Raw Wastewater Pumping	595,909	-	595,909	-	-	-	-	-	-
18	Preliminary Treatment	941,683	-	-	-	941,683	-	-	-	-
19	Primary Sedimentation	441,414	-	-	441,414	-	-	-	-	-
20	Aeration	662,121	-	-	-	-	-	-	-	662,121
21	Secondary Sedimentation	507,626	-	-	507,626	-	-	-	-	-
22	Recirculating Pumping	191,279	-	-	191,279	-	-	-	-	-
23	Chlorination	1,601,049	-	-	1,601,049	-	-	-	-	-

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
			RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, &		RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON			
LINE		TOTAL	LOWER SOUTHAMPTON		SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
24	Primary Sludge Pumping	80,926	-	-	-	-	80,926	-
25	Secondary Sludge Thickening	95,640	-	-	-	-	47,820	47,820
26	Sludge Digestion	1,243,316	-	-	-	-	932,487	310,829
27	Sludge Holding Tanks	176,566	-	-	-	-	132,425	44,141
28	Sludge Dewatering	139,781	-	-	-	-	104,836	34,945
29	Grit and Screening Incineration	397,273	-	-	-	397,273	-	-
30	Scum and Grease Incineration	110,354	-	-	-	-	110,354	-
31	Laboratory	853,400	-	-	-	-	426,700	426,700
32	Subtotal Purchase of Services, Materials, Supplies & Equipment	8,038,337	-	595,909	2,741,368	1,338,956	1,835,548	1,526,556
33	Subtotal All Above	20,933,273	-	1,408,544	6,570,853	2,306,274	5,127,003	5,520,599
Administrative and General:								
34	Personal Services	3,318,257	-	209,116	985,442	248,920	846,991	1,027,788
35	Other	1,111,735	-	82,417	379,142	185,183	253,864	211,129
36	Subtotal Administration & General	4,429,992	-	291,533	1,364,584	434,103	1,100,855	1,238,917
Power Requirements:								
37	Raw Wastewater Pumping	556,456	472,988	83,468	-	-	-	-
38	Preliminary Treatment	4,599	-	-	3,909	690	-	-
39	Primary Sedimentation	36,790	-	-	31,272	5,518	-	-
40	Aeration	3,049,010	-	-	-	-	-	3,049,010
41	Secondary Sedimentation	36,790	-	-	31,272	5,518	-	-
42	Recirculating Pumping	128,767	-	-	109,452	19,315	-	-
43	Chlorination	9,198	-	-	7,818	1,380	-	-
44	Primary Sludge Pumping	4,599	-	-	-	-	4,599	-
45	Secondary Sludge Thickening	344,911	-	-	-	-	172,456	172,455

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
			RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, & LOWER SOUTHAMPTON		RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON			
LINE NO.	DESCRIPTION	TOTAL O&M					SUSPENDED	
			VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
46	Sludge Digestion	78,180	-	-	-	-	58,635	19,545
47	Sludge Dewatering	82,779	-	-	-	-	62,084	20,695
48	Grit and Screening Incineration	73,581	-	-	62,544	11,037	-	-
49	Scum and Grease Incineration	4,599	-	-	-	-	4,599	-
50	Subtotal Power Requirements	4,410,259	472,988	83,468	246,267	43,458	302,373	3,261,705
Gas Requirements:								
51	Raw Wastewater Pumping	60,038	-	60,038	-	-	-	-
52	Preliminary Treatment	94,875	-	-	-	94,875	-	-
53	Primary Sedimentation	44,473	-	-	44,473	-	-	-
54	Aeration	66,709	-	-	-	-	-	66,709
55	Secondary Sedimentation	51,144	-	-	51,144	-	-	-
56	Recirculating Pumping	19,272	-	-	19,272	-	-	-
57	Chlorination	8,153	-	-	8,153	-	-	-
58	Primary Sludge Pumping	8,153	-	-	-	-	8,153	-
59	Secondary Sludge Thickening	9,636	-	-	-	-	4,818	4,818
60	Sludge Digestion	125,265	-	-	-	-	93,949	31,316
61	Sludge Dewatering	14,083	-	-	-	-	10,562	3,521
62	Grit and Screening Incineration	40,026	-	-	-	40,026	-	-
63	Scum and Grease Incineration	11,118	-	-	-	-	11,118	-
64	Subtotal Gas Requirements	656,715	-	60,038	123,042	134,901	184,933	153,801
65	Sludge Disposal	12,011,674	-	-	-	-	9,008,755	3,002,919
66	Total Northeast WPC Plant Expense	\$ 42,441,912	\$ 472,988	\$ 1,843,583	\$ 8,304,746	\$ 2,918,736	\$ 15,723,919	\$ 13,177,941

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant [Schedule BV-1: Table WW-10C]

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY						
LINE		TOTAL	RETAIL		SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
Personal Services								
1	Raw Wastewater Pumping	161,728	0	161,728	0	0	0	0
2	Preliminary Treatment	2,134,807	0	0	1,558,409	576,398	0	0
3	Flocculation	388,147	0	0	388,147	0	0	0
4	Primary Sedimentation	562,813	0	0	562,813	0	0	0
5	Aeration	1,145,033	0	0	0	0	0	1,145,033
6	Secondary Sedimentation	970,367	0	0	970,367	0	0	0
7	Recirculating Pumping	362,270	0	0	362,270	0	0	0
8	Chlorination	549,875	0	0	324,426	225,449	0	0
9	Effluent Pumping	452,838	0	0	0	452,838	0	0
10	Primary Sludge Pumping	414,023	0	0	0	0	414,023	0
11	Secondary Sludge Thickening	342,863	0	0	0	0	168,003	174,860
12	Sludge Digestion	1,309,996	0	0	0	0	982,497	327,499
13	Sludge Holding Tanks	223,184	0	0	0	0	167,388	55,796
14	Sludge Dewatering	1,018,885	0	0	0	0	764,164	254,721
15	Sludge Lagoon	9,703	0	0	0	0	7,277	2,426
16	Grit and Screening Incineration	897,589	0	0	610,361	287,228	0	0
17	Scum and Grease Incineration	228,036	0	0	0	0	228,036	0
18	Laboratory	828,046	0	0	0	0	414,023	414,023
19	Subtotal Personal Services	12,000,203	0	161,728	4,776,793	1,541,913	3,145,411	2,374,358

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY						
LINE		TOTAL	RETAIL		SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
Purchase of Services, Materials, Supplies, and Equipment:								
20	Raw Wastewater Pumping	75,776	0	75,776	0	0	0	0
21	Preliminary Treatment	867,451	0	0	0	867,451	0	0
22	Flocculation	449,602	0	0	449,602	0	0	0
23	Primary Sedimentation	253,307	0	0	253,307	0	0	0
24	Aeration	493,624	0	0	0	0	0	493,624
25	Secondary Sedimentation	531,873	0	0	531,873	0	0	0
26	Recirculating Pumping	221,554	0	0	221,554	0	0	0
27	Chlorination	773,591	0	0	773,591	0	0	0
28	Effluent Pumping	25,259	0	0	0	25,259	0	0
29	Primary Sludge Pumping	285,061	0	0	0	0	285,061	0
30	Secondary Sludge Thickening	50,517	0	0	0	0	24,753	25,764
31	Sludge Digestion	498,496	0	0	0	0	373,872	124,624
32	Sludge Holding Tanks	175,908	0	0	0	0	131,931	43,977
33	Sludge Dewatering	1,053,823	0	0	0	0	790,367	263,456
34	Sludge Lagoon	9,742	0	0	0	0	7,307	2,435
35	Grit and Screening Incineration	222,997	0	0	0	222,997	0	0
36	Scum and Grease Incineration	71,446	0	0	0	0	71,446	0
37	Laboratory	569,400	0	0	0	0	284,700	284,700
38	Subtotal Purchase of Services, Materials, Supplies & Equipment	6,629,427	0	75,776	2,229,927	1,115,707	1,969,437	1,238,580
39	Subtotal All Above	18,629,630	0	237,504	7,006,720	2,657,620	5,114,848	3,612,938

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY						
LINE		TOTAL	RETAIL		SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
Administrative & General								
40	Personal Services	2,893,200	0	38,992	1,151,665	371,749	758,346	572,448
41	Other	837,500	0	9,573	281,708	140,948	248,800	156,471
42	Subtotal Administration & General	3,730,700	0	48,565	1,433,373	512,697	1,007,146	728,919
Power Requirements								
43	Raw Wastewater Pumping	69,828	59,354	10,474	0	0	0	0
44	Preliminary Treatment	4,655	0	0	3,957	698	0	0
45	Flocculation	223,782	0	0	190,215	33,567	0	0
46	Primary Sedimentation	17,623	0	0	14,980	2,643	0	0
47	Aeration	2,180,293	0	0	0	0	0	2,180,293
48	Secondary Sedimentation	44,889	0	0	38,156	6,733	0	0
49	Recirculating Pumping	119,040	0	0	101,184	17,856	0	0
50	Chlorination	9,643	0	0	8,197	1,446	0	0
51	Effluent Pumping	29,261	0	0	24,872	4,389	0	0
52	Primary Sludge Pumping	2,660	0	0	0	0	2,660	0
53	Secondary Sludge Thickening	291,282	0	0	0	0	142,728	148,554
54	Sludge Digestion	68,082	0	0	0	0	51,062	17,020
55	Sludge Dewatering	49,877	0	0	0	0	37,408	12,469
56	Grit and Screening Incineration	30,924	0	0	26,285	4,639	0	0
57	Scum and Grease Incineration	4,738	0	0	0	0	4,738	0
58	Subtotal Power Requirements	3,146,577	59,354	10,474	407,846	71,971	238,596	2,358,336

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY						
LINE		TOTAL	RETAIL		SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)								
Gas Requirements								
59	Raw Wastewater Pumping	23,468	0	23,468	0	0	0	0
60	Preliminary Treatment	268,653	0	0	0	268,653	0	0
61	Flocculation	139,243	0	0	139,243	0	0	0
62	Primary Sedimentation	78,450	0	0	78,450	0	0	0
63	Aeration	152,877	0	0	0	0	0	152,877
64	Secondary Sedimentation	164,723	0	0	164,723	0	0	0
65	Recirculating Pumping	68,616	0	0	68,616	0	0	0
66	Chlorination	23,468	0	0	23,468	0	0	0
67	Effluent Pumping	7,823	0	0	0	7,823	0	0
68	Primary Sludge Pumping	88,284	0	0	0	0	88,284	0
69	Secondary Sludge Thickening	15,645	0	0	0	0	7,666	7,979
70	Sludge Digestion	154,386	0	0	0	0	115,790	38,596
71	Sludge Dewatering	326,373	0	0	0	0	244,780	81,593
72	Grit and Screening Incineration	69,063	0	0	0	69,063	0	0
73	Scum and Grease Incineration	22,127	0	0	0	0	22,127	0
74	Subtotal Gas Requirements	1,837,040	0	23,468	474,500	345,539	609,942	383,591
75	Sludge Disposal	7,451,126	0	0	0	0	5,588,345	1,862,781
76	Total Southwest WPC Plant Expense	\$ 34,795,073	\$ 59,354	\$ 320,011	\$ 9,322,439	\$ 3,587,827	\$ 12,558,877	\$ 8,946,565

Table 7-10 Test Year 1 Allocation of O&M for the Southwest WPC Plant [Schedule BV-1: Table WW-10D]

		(1)	(2)	(3)	(4)	(5)
		RETAIL AND SPRINGFIELD (WYNDMOOR)				
LINE		TOTAL	SUSPENDED			
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)						
Personal Services						
1	Raw Wastewater Pumping	\$ 970,615	\$ -	\$ 970,615	\$ -	\$ -
2	Preliminary Treatment	1,378,555	992,560	385,995	-	-
3	Flocculation	422,007	422,007	-	-	-
4	Primary Sedimentation	492,341	492,341	-	-	-
5	Aeration	492,341	-	-	-	492,341
6	Secondary Sedimentation	611,910	611,910	-	-	-
7	Recirculating Pumping	295,405	295,405	-	-	-
8	Chlorination	471,241	296,882	174,359	-	-
9	Effluent Pumping	372,773	-	372,773	-	-
10	Primary Sludge Pumping	393,873	-	-	393,873	-
11	Waste Sludge Pumping	288,371	-	-	245,115	43,256
12	Sludge Digestion	436,665	-	-	371,165	65,500
13	Sludge Holding Tanks	278,365	-	-	236,610	41,755
14	Sludge Dewatering	339,629	-	-	288,685	50,944
15	Sludge Lagoon	3,235	-	-	2,750	485
16	Grit and Screening Incineration	299,197	203,454	95,743	-	-
17	Scum and Grease Incineration	76,012	-	-	76,012	-
18	Scum Pumping	393,873	-	-	393,873	-
19	Primary Sludge Transfer Pumping	203,970	-	-	203,970	-
20	Waste Activated Sludge Xfer Pumping	189,903	-	-	161,418	28,485
21	Laboratory	675,211	-	-	337,606	337,605
22	Subtotal Personal Services	9,085,492	3,314,559	1,999,485	2,711,077	1,060,371

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)
			RETAIL AND SPRINGFIELD (WYNDMOOR)			
LINE		TOTAL			SUSPENDED	
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)						
Purchase of Services, Materials, Supplies, and Equipment:						
23	Raw Wastewater Pumping	212,615	-	212,615	-	-
24	Preliminary Treatment	620,698	-	620,698	-	-
25	Flocculation	260,624	260,624	-	-	-
26	Primary Sedimentation	168,034	168,034	-	-	-
27	Aeration	260,624	-	-	-	260,624
28	Secondary Sedimentation	212,615	212,615	-	-	-
29	Recirculating Pumping	126,883	126,883	-	-	-
30	Chlorination	695,198	695,198	-	-	-
31	Effluent Pumping	109,737	-	109,737	-	-
32	Primary Sludge Pumping	198,898	-	-	198,898	-
33	Waste Sludge Pumping	126,883	-	-	107,851	19,032
34	Sludge Digestion	166,165	-	-	141,240	24,925
35	Sludge Holding Tanks	158,085	-	-	134,372	23,713
36	Sludge Dewatering	351,274	-	-	298,583	52,691
37	Sludge Lagoon	3,248	-	-	2,761	487
38	Grit and Screening Incineration	74,332	-	74,332	-	-
39	Scum and Grease Incineration	23,815	-	-	23,815	-
40	Scum Pumping	198,898	-	-	198,898	-
41	Primary Sludge Transfer Pumping	72,015	-	-	72,015	-
42	Waste Activated Sludge Xfer Pumping	68,585	-	-	58,297	10,288
43	Laboratory	277,771	-	-	138,886	138,885
44	Subtotal Purchase of Services, Materials, Supplies & Equipment	4,386,997	1,463,354	1,017,382	1,375,616	530,645
45	Subtotal All Above	13,472,489	4,777,913	3,016,867	4,086,693	1,591,016

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)
			RETAIL AND SPRINGFIELD (WYNDMOOR)			
LINE NO.	DESCRIPTION	TOTAL O&M	VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD
Wastewater System (\$000s)						
Administrative & General						
46	Personal Services	2,560,840	934,242	563,576	764,145	298,877
47	Other	449,194	149,836	104,172	140,852	54,334
48	Gas	15,713	1,626	2,928	9,043	2,116
49	Subtotal Administration & General	3,025,747	1,085,704	670,676	914,040	355,327
Power Requirements						
50	Raw Wastewater Pumping	225,767	191,902	33,865	-	-
51	Flocculation	347,562	295,428	52,134	-	-
52	Primary Sedimentation	13,863	11,784	2,079	-	-
53	Aeration	301,023	-	-	-	301,023
54	Secondary Sedimentation	9,902	8,417	1,485	-	-
55	Recirculating Pumping	23,765	20,200	3,565	-	-
56	Chlorination	2,971	2,525	446	-	-
57	Effluent Pumping	26,736	22,726	4,010	-	-
58	Primary Sludge Pumping	990	-	-	990	-
59	Waste Sludge Pumping	2,971	-	-	2,525	446
60	Sludge Digestion	22,694	-	-	19,290	3,404
61	Sludge Dewatering	16,626	-	-	14,132	2,494
62	Grit and Screening Incineration	10,308	8,762	1,546	-	-
63	Scum and Grease Incineration	1,580	-	-	1,580	-
64	Scum Pumping	2,971	-	-	2,971	-
65	Primary Sludge Transfer Pumping	20,794	-	-	20,794	-
66	Waste Activated Sludge Xfer Pumping	10,892	-	-	9,258	1,634
67	Subtotal Power Requirements	1,041,415	561,744	99,130	71,540	309,001

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

		(1)	(2)	(3)	(4)	(5)
			RETAIL AND SPRINGFIELD (WYNDMOOR)			
LINE		TOTAL			SUSPENDED	
NO.	DESCRIPTION	O&M	VOLUME	CAPACITY	SOLIDS	BOD
Wastewater System (\$000s)						
Gas Requirements						
68	Raw Wastewater Pumping	9,191	-	9,191	-	-
69	Flocculation	11,266	11,266	-	-	-
70	Primary Sedimentation	7,264	7,264	-	-	-
71	Aeration	11,266	-	-	-	11,266
72	Secondary Sedimentation	9,191	9,191	-	-	-
73	Recirculating Pumping	5,485	5,485	-	-	-
74	Chlorination	2,224	2,224	-	-	-
75	Effluent Pumping	4,744	-	4,744	-	-
76	Primary Sludge Pumping	8,598	-	-	8,598	-
77	Waste Sludge Pumping	5,485	-	-	4,662	823
78	Sludge Digestion	51,462	-	-	43,743	7,719
79	Sludge Dewatering	108,791	-	-	92,472	16,319
80	Grit and Screening Incineration	23,021	-	23,021	-	-
81	Scum and Grease Incineration	7,376	-	-	7,376	-
82	Scum Pumping	8,598	-	-	8,598	-
83	Primary Sludge Transfer Pumping	3,113	-	-	3,113	-
84	Waste Activated Sludge Xfer Pumping	2,965	-	-	2,520	445
85	Subtotal Gas Requirements	342,345	35,430	63,788	197,031	46,096
86	Sludge Disposal	3,319,065	-	-	2,821,205	497,860
87	Total Southeast WPC Plant Expense	\$ 21,201,061	\$ 6,460,791	\$ 3,850,461	\$ 8,090,509	\$ 2,799,300

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 O&M expense is assigned to the BOD functional cost component.
 - The operation and maintenance expense of sludge conditioning and disposal facilities pertains to both the suspended solids and BOD parameters and is allocated to those two cost components. 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 O&M 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% to the suspended solids functional cost component and 25% to the BOD functional cost component. The O&M expense of the sludge force main at the Southeast plant is allocated 85% to suspended solids and 15% to BOD functional cost components, based on design flows.
 - Some of the treatment and sludge related facilities in the Wastewater System service multiple treatment facilities. The digesters and the sludge processing and distribution facilities provide treatment and disposal of sludge from both the Southwest treatment plant and the Southeast treatment plant and provide disposal of sludge from the Northeast treatment plant. To properly recognize cost responsibility for these joint use facilities, a portion of the operations and maintenance expense associated with these facilities is allocated to the Southeast and Northeast plants.
- **Customer:** The allocation of customer related O&M costs is summarized on Lines 29 to 34 of Table 7-6. 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. 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 8 of Table 7-2) and the deposit from the Rate Stabilization Fund (Line 9 of Table 7-2), each of which is allocable O&M expense, are allocated to the various cost components in proportion to the direct O&M expense.
- **Net Operating Expense:** The net operating expense to be recovered from all customers through charges for wastewater 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 7-6. 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 12 of Table 7-2) is allocated in proportion to the distribution of the O&M expenses allocable to retail service (Column 3 of Table 7-6).

7.5.2 Wholesale

The process of allocating O&M expenses to the Wholesale customers follows the analytical steps outlined below. The tables for these steps are provided in Schedule BV-2.

The following four categories of O&M costs are allocated to wholesale contract service customers, as applicable:

- Pumping and Treatment;
- Collection System;
- LTCP; and
- Customer.

The following analytical steps are used to allocate the applicable O&M costs to each wholesale contract service customer:

1. Determine O&M Unit cost by cost component for each “Pumping Station” and each “Water Pollution Control (Treatment) Plant” (Schedule BV-2: Table WH-17).
2. Allocate Pumping & Treatment O&M Cost to each wholesale contract service customer based on contract customer’s units of service and applicable O&M unit cost (Schedule BV-2: Table WH-18 through Table WH-28). Only costs associated with facilities used directly by a customer are allocated to that customer.
3. Allocate Collection System O&M Cost to each wholesale contract service customer based on the allocation of applicable capital investments in sewer collection system which serves that specific contract service customer and the ratio of the total O&M expense associated with collection system

maintenance to the total plant investment of the collection system (Schedule BV-2: Table WH-18 through Table WH-28).

- a. Sewer Maintenance O&M costs are not applicable to DELCORA contract service customer since they pump their wastewater directly to the Southwest WPCP and do not utilize the Water Department's collection system.
4. Allocate LTCP O&M Cost to applicable wholesale contract service customers in accordance with their contractual agreements (Schedule BV-2: Table WH-18 through Table WH-28). Test year Green infrastructure maintenance expense is estimated based on 3.5% of the total estimated test year LTCP investment. Wholesale customers are allocated a portion of the sewer maintenance expense on the basis of 3.5% of their respective allocated share of LTCP investment. In lieu of recovering the annual SMIP and GARP O&M costs in the year the expenses are incurred, the Water Department allocates SMIP/GARP costs based on amortized costs determined recognizing expected project completion.
5. Allocate customer costs to the wholesale customers based on estimates of costs of billing for wastewater service, including allowances for flow and strength monitoring, bill preparation, and calibration of the flow meters.

7.6 Allocation of Net Plant Investment

Table 7-11 summarizes the Test Year 1 (FY 2022) investment in the Wastewater System used in the allocation of test year capital related costs of service. The total test year investment of \$2.46 Billion is the total original cost investment in facilities as of June 30, 2020. Contributed plant investments from Federal grants on the three wastewater treatment plants are deducted in arriving at the plant investment for cost allocation and rate design purposes.

Table 7-11 Summary of Test Year 1 Plant Investment Allocations to Functional Cost Components [Schedule BV-1: Table WW-9]

LINE NO.	COST COMPONENT	(1) TOTAL DIRECT INVESTMENT	(2) INVESTMENT ALLOCATED TO CONTRACT SERVICE	(3) INVESTMENT ALLOCATED TO RETAIL SERVICE
Wastewater System (\$)				
COLLECTION SYSTEM				
1	Sewers-Capacity	\$ 1,619,632,000	\$ 17,991,000	\$ 1,601,641,000
2	Pumping Stations Capacity	28,528,000	252,000	28,276,000
3	LTCP Investment	133,492,000	19,448,000	114,044,000
4	Total Collection System	1,781,652,000	37,691,000	1,743,961,000
WATER POLLUTION CONTROL PLANTS				
Northeast Plant				
Retail, Abington, Bensalem, Bucks County				
Cheltenham, Lower Moreland, & Lower Southampton				
5	Volume	64,362,000	17,924,000	46,438,000
6	Capacity	58,448,000	13,551,000	44,897,000
7	Suspended Solids	83,097,000	15,602,000	67,495,000
8	BOD	94,218,000	23,477,000	70,741,000
9	Total Northeast Plant	300,125,000	70,554,000	229,571,000
Southwest Plant				
Retail, DELCORA, Lower Merion, Springfield (excluding Wyndmoor), & Upper Darby				
10	Volume	67,429,000	28,790,000	38,639,000
11	Capacity	43,871,000	8,093,000	35,778,000
12	Suspended Solids	64,162,000	18,178,000	45,984,000
13	BOD	51,663,000	25,455,000	26,208,000
14	Total Southwest Plant	227,125,000	80,516,000	146,609,000
Southeast Plant				
Retail & Springfield (Wyndmoor)				
15	Volume	43,735,000	398,000	43,337,000
16	Capacity	46,943,000	262,000	46,681,000
17	Suspended Solids	30,977,000	96,000	30,881,000
18	BOD	25,274,000	69,000	25,205,000
19	Total Southeast Plant	146,929,000	825,000	146,104,000
20	Total Allocated Treatment Plants	674,179,000	151,895,000	522,284,000
21	Total Allocated System Investment	\$ 2,455,831,000	\$ 189,586,000	\$ 2,266,245,000

(a) Plant Investment as of 6/30/2020. Includes Administration & General Costs

7.6.1 Retail

Similar to our treatment of O&M expenses, the net plant investment allocable to Retail customers is the difference between the net plant investment on Line 21, Column 1 on Table 7-11 and the amount allocated to Wholesale customers on Line 21, Column 2. After deducting the investment directly allocable to Wholesale customers, the balance of the plant investment is allocated to Retail customers as follows:

- **Collection System:** The various functional cost centers of the wastewater collection system are designed based on different wastewater parameters. Therefore, the net plant investment allocable to Retail customers is allocated to the respective wastewater parameter (cost component). The

allocation of net plant investment allocable to retail customers for each collection system component is summarized in Lines 1 to 4 of Table 7-11.

- **Wastewater Collection System - Sewers:** The collection system is designed to carry maximum rates of wastewater flow and as such, 100% of the collection system costs are allocated to the capacity cost component.

As the combined sewer system also conveys stormwater, the test year retail customer plant investment associated with the collection system is apportioned between sanitary sewer-related costs and stormwater-related costs. Consistent with the allocation factor presented in prior rate proceedings, 64% of the collection system retail plant investment costs were allocated to stormwater. This factor was determined based on an “inch-foot” analysis (the inch (diameter) of pipes times the number of feet of the sewer system), and then further adjusted to reflect the trenching cost savings typically associated with the construction of separate sanitary and storm sewers. As explained in prior rate proceedings, during construction, the sanitary sewer is buried deeper and a storm sewer is placed in the same trench above the sanitary sewer. Our analysis indicates that it is reasonable to allocate 36% of the capacity of the system for conveyance of sanitary flows and 64% for stormwater drainage.

- **Wastewater Collection System - Pumping:** These facilities are designed to meet the maximum rates of wastewater flows and are allocated 100% to the capacity cost component.
- **Wastewater Collection System - Long-Term Control Plan:** The LTCP investments reduce the maximum rates of wastewater flows and are allocated 100% to the capacity cost component.
- **Wastewater Treatment:** The various functional facilities of the water pollution control plants are designed to manage different wastewater parameters including average and peak flows, BOD, and suspended solids. Hence, the treatment plant investments in each functional facility are allocated across the key wastewater parameters, as shown in Table 7-12, Table 7-13, and Table 7-14 for each of the three water pollution control plants and summarized in Lines 5 to 20 of Table 7-11.
- **Volume:** The water pollution control plant facilities such as flocculation, sedimentation basins, and recirculation pumping, are designed primarily to handle the total average flow projected for the plant. Therefore, investments in such facilities are 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 peak wastewater flow rates, and therefore is allocated to the capacity functional cost component.

Wholesale customers whose flow is tributary to the plant do not use the raw wastewater pumping facilities at the Southwest plant. Consequently, the investment in raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Table 7-12 Test Year 1 Allocation of Plant Investment for the Northeast WPC Plant
[Schedule BV-1: Table WW-9A]

LINE NO.	DESCRIPTION	(1)	(2)	(3)	(4)	(5)	(6)	
		TOTAL INVESTMENT (a)	RETAIL, ABINGTON	VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD	
			BENSALEM,					RETAIL, ABINGTON, BENSALEM,
			BUCKS COUNTY, & LOWER SOUTHAMPTON					BUCKS COUNTY, CHELTENHAM, LOWER MORELAND & LOWER SOUTHAMPTON
Wastewater System (\$000s)								
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES								
1	Primary Sedimentation Basins	\$ 5,639	\$ -	\$ 5,639	\$ -	\$ -	\$ -	
2	Pumping Station	1,365	-	-	1,365	-	-	
3	Aeration Facilities	18,632	-	-	-	-	18,632	
4	Primary Sludge Pumps	1,250	-	-	-	1,250	-	
5	Scum Ejectors	196	-	-	-	196	-	
6	Effluent Conduit	-	-	-	-	-	-	
7	Final Sedimentation Basins	9,806	-	9,806	-	-	-	
8	Recirculation Pumps	1,765	-	1,765	-	-	-	
9	Digesters	19,196	-	-	-	14,397	4,799	
10	Sludge Dewatering	4,941	-	-	-	3,706	1,235	
11	Frankford Grit Chamber	-	-	-	-	-	-	
12	Chlorination Facilities	25,693	-	-	25,693	-	-	
13	Aeration Tank No. 1	3,133	-	-	-	-	3,133	
14	Sludge Thickener Building	4,407	-	-	-	2,204	2,203	
15	Sludge Transfer Station	284	-	-	-	213	71	
16	Loading Terminal/Barges	6,678	-	-	-	5,009	1,669	
17	Subtotal All Above	102,985	-	17,210	27,058	26,975	31,742	
Administrative and General Facilities								
18	Administrative and General Plant	76,274	-	-	-	-	-	
19	Land	941	-	-	-	-	-	
20	Subtotal	77,215	1,921	17,918	11,284	21,678	24,414	
21	Total	180,200	1,921	35,128	38,342	48,653	56,156	
WATER POLLUTION ABATEMENT PROGRAM FACILITIES								
22	New Preliminary Treatment Building	40,851	10,213	-	30,638	-	-	
23	Primary Sedimentation Tanks	52,561	-	52,561	-	-	-	
24	Blower Building	16,483	-	-	-	-	16,483	
25	Aeration Tank No. 1	38,430	-	-	-	-	38,430	
26	Chlorination Facilities	-	-	-	-	-	-	
27	New Sludge Thickener Building	41,077	-	-	-	20,539	20,538	
28	Effluent Conduits	2,282	-	-	2,282	-	-	
29	New Final Sedimentation Tanks	25,467	-	25,467	-	-	-	
30	Sludge Digestion System	34,295	-	-	-	25,721	8,574	
31	Composting Facilities	-	-	-	-	-	-	
32	Sludge Dewatering	26,177	-	-	-	19,633	6,544	
33	Sludge Transfer Station	24,355	-	-	-	18,266	6,089	
34	Loading Terminal/Barges	5,451	-	-	-	4,088	1,363	
35	Subtotal	307,429	10,213	78,028	32,920	88,247	98,021	
36	Admin. and General Facilities	47,345	1,178	10,987	6,919	13,292	14,969	
37	Adjustment for Joint Use Facilities	3,377	-	-	-	2,533	844	
38	Total	358,151	11,391	89,015	39,839	104,072	113,834	
39	Total Northeast WPC Plant Book Cost	538,351	13,312	124,143	78,181	152,725	169,990	
40	Less Federal Grants	238,226	7,824	59,781	25,221	69,628	75,772	
41	Adjusted Total Northeast WPC Plant	\$ 300,125	\$ 5,488	\$ 64,362	\$ 52,960	\$ 83,097	\$ 94,218	

(a) Plant Investment as of 6/30/2020.

Table 7-13 Test Year 1 Allocation of Plant Investment for the Southwest WPC Plant
[Schedule BV-1: Table WW-9B]

		(1)	(2)	(3)	(4)		(5)	(6)
		RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR), & UPPER DARBY						
LINE NO.	DESCRIPTION	TOTAL INVESTMENT (a)	RETAIL CAPACITY	VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD	
Wastewater System (\$000s)								
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES								
1	Raw Wastewater Pumping Station	\$ 12,763	\$ 12,763	\$ -	\$ -	\$ -	\$ -	
2	Sludge Digestion Facilities	11,813	-	-	-	8,619	3,194	
3	Scum Incineration	1,939	-	-	-	1,939	-	
4	Settling Tanks	30,449	-	30,449	-	-	-	
5	Sludge Handling	7,832	-	-	-	5,874	1,958	
6	Chlorination Facilities	1,212	-	-	1,212	-	-	
7	Aeration Tanks	698	-	-	-	-	698	
8	Oxygen Supply	3,622	-	-	-	-	3,622	
9	Effluent Pump Station	1,632	-	-	1,632	-	-	
10	Sludge Thickener Building	1,608	-	-	-	804	804	
11	Composting Facilities	1,162	-	-	-	872	290	
12	Sludge Gas Facilities	9,527	-	-	-	7,145	2,382	
13	Subtotal	84,257	12,763	30,449	2,844	25,253	12,948	
	Administrative and General Facilities							
14	Administrative and General Plant	80,584	-	-	-	-	-	
15	Land	684	-	-	-	-	-	
16	Subtotal	81,268	5,611	20,828	9,695	24,208	20,926	
17	Adjustment for Joint Use Facilities	(5,152)	-	-	-	(4,081)	(1,071)	
18	Total	160,373	18,374	51,277	12,539	45,380	32,803	
WATER POLLUTION ABATEMENT PROGRAM FACILITIES								
19	Influent Pumping Station	6,302	6,302	-	-	-	-	
20	Preliminary Treatment Building	24,189	-	-	24,189	-	-	
21	Primary Sedimentation Tanks	11,099	-	11,099	-	-	-	
22	Aeration Tanks	16,348	-	-	-	-	16,348	
23	Oxygen Supply System	14,059	-	-	-	-	14,059	
24	Compressor Building	3,721	-	-	-	-	3,721	
25	Final Tanks	29,223	-	29,223	-	-	-	
26	Scum Concentration Building	1,369	-	-	-	1,369	-	
27	Sludge Thickener Building	12,515	-	-	-	6,258	6,257	
28	Sludge Digestion Facilities	31,027	-	-	-	22,639	8,388	
29	Effluent Pumping Station	5,909	-	-	5,909	-	-	
30	New Centrifuges	10,034	-	-	-	7,321	2,713	
31	Composting Facilities	-	-	-	-	-	-	
32	Sludge Dewatering	18,857	-	-	-	14,142	4,715	
33	Sludge Gas Facilities	7,228	-	-	-	5,274	1,954	
34	Subtotal	191,880	6,302	40,322	30,098	57,003	58,155	
35	Admin. and Gen'l. Facilities	33,895	2,340	8,687	4,044	10,097	8,727	
36	Adjust. for Joint Use Facilities	(8,704)	-	-	(531)	(6,106)	(2,067)	
37	Total	217,071	8,642	49,009	33,611	60,994	64,815	
38	Total Southwest WPC Plant	377,444	27,016	100,286	46,150	106,374	97,618	
39	Less Federal Grants	150,319	5,136	32,857	24,159	42,212	45,955	
40	Adjusted Total Southwest WPC Plant	\$ 227,125	\$ 21,880	\$ 67,429	\$ 21,991	\$ 64,162	\$ 51,663	

(a) Plant Investment as of 6/30/2020.

Table 7-14 Test Year 1 Allocation of Plant Investment for Southeast WPC Plant
 [Schedule BV-1: Table WW-9C]

LINE NO.	DESCRIPTION	(1)	(2)	(3)	(4)	(5)
		RETAIL AND SPRINGFIELD (WYNDMOOR)				
		TOTAL INVESTMENT (a)	VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD
Wastewater System (\$000s)						
NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Main Pumping Station	\$ 2,145	\$ -	\$ 2,145	\$ -	\$ -
2	Grit Chambers	13,123	-	13,123	-	-
3	Outfall Line	568	-	568	-	-
4	Sludge Digestion Facilities	5,703	-	-	4,518	1,185
5	Settling Tanks & Floc. Channel	15,787	15,787	-	-	-
6	Sludge Force Main	5,001	-	-	3,751	1,250
7	Subtotal	42,327	15,787	15,836	8,269	2,435
	Administrative and General Facilities					
8	Administrative and General Plant	27,420	-	-	-	-
9	Land	156	-	-	-	-
10	Subtotal	27,576	7,962	8,772	5,093	5,749
11	Adjustment for Joint Use Facilities	5,152	-	-	4,081	1,071
12	Total	75,055	23,749	24,608	17,443	9,255
WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
13	Influent Pump. Stat. and Screen & Grit Chamber	24,890	-	24,890	-	-
14	Primary Sedimentation Tanks	21,095	21,095	-	-	-
15	Compressor Building	9,898	-	-	-	9,898
16	Air Supply Facilities	23,119	-	-	-	23,119
17	Final Sedimentation	26,008	26,008	-	-	-
18	Effluent Pumping Station	12,870	-	12,870	-	-
19	Effluent Conduit	11,571	-	11,571	-	-
20	Scum Concentration Facilities	2,811	-	-	2,811	-
21	Sludge Force Main	1,940	-	-	1,455	485
22	Preliminary Treatment Bldg.	4,116	-	4,116	-	-
23	Sludge Thickeners	4,648	-	-	2,324	2,324
24	Sludge Digesters	14,979	-	-	11,866	3,113
25	Sludge Disposal Facilities	4,845	-	-	3,838	1,007
26	Composting Facilities	-	-	-	-	-
27	Sludge Dewatering	9,197	-	-	6,898	2,299
28	Sludge Gas Facilities	3,490	-	-	2,765	725
29	Subtotal	175,477	47,103	53,447	31,957	42,970
30	Admin. and Gen'l. Facilities	43,187	12,470	13,738	7,976	9,003
31	Adjustment for Joint Use Facilities	5,327	-	531	3,573	1,223
32	Total	223,991	59,573	67,716	43,506	53,196
33	Total Southeast WPC Plant	299,046	83,322	92,324	60,949	62,451
34	Less Federal Grants	152,117	39,587	45,381	29,972	37,177
35	Adjusted Total Southeast WPC Plant	\$ 146,929	\$ 43,735	\$ 46,943	\$ 30,977	\$ 25,274

(a) Plant Investment as of 6/30/2020.

- **Strength (BOD and Suspended Solids):** The aeration basins and oxygen, or air blower facilities are designed to handle BOD, and investments in these facilities are allocated 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% to the suspended solids and 50% to the BOD functional cost components based upon the design loadings and degree of treatment provided.

- Likewise, the investment in other facilities such as digesters and sludge dewatering and composting facilities, that handle both primary and waste activated sludge, is allocated to the suspended solids functional cost component and to the BOD functional cost component. We determined the allocation of cost between SS and BOD based on the relative quantities of sludge generated from BOD and SS components, and the relative difficulty of treating waste activated sludge as compared with primary sludge. The resulting allocation percentages are 75% to the suspended solids functional cost component and 25% to the BOD functional cost component. The investment in the sludge force main at the Southeast plant is allocated 75% to suspended solids and 25% to BOD functional cost components, based on design flows.
- Some of the treatment and sludge related facilities in the Wastewater System service multiple treatment facilities. The digesters and the sludge processing and distribution facilities provide treatment and disposal of sludge from both the Southwest treatment plant and the Southeast treatment plant and 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 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.

7.6.2 Wholesale

For the Wholesale 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 MGD, and maximum annual suspended solids and BOD loadings expressed in pounds (“lbs”). The Cost of Service analysis recognizes the City’s obligation to provide service to its wholesale customers through the allocation of plant investment and operating expenses. Since installed capacity is the primary concern of the contracts, the basis for wholesale customer allocations uses 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.

As presented earlier, Table 7-4 and Table 7-5 summarize the units of service applicable to wholesale customers used in the cost of service analysis. In Table 7-4, the section titled “Contract Maximum Units,” is based upon the contractual rate of flow for each customer, including an allowance for I/I that can occur downstream from the wholesale customer’s discharge point into the City’s Wastewater System. To determine the contract maximum units for suspended solids and BOD, contractual strength loadings for those customers which have such provisions in their contracts were used. For those customers which do not have specific loadings in their contracts, the estimated measured strength for each customer as

applied to their contract maximum daily flow rate, expressed in MGD was used. The contract maximum units serve as the basis for allocation of capital investment related costs to the wholesale customers.

Each wholesale customer is allocated a share of the Wastewater System investment in the wastewater collection system (mains, pumping, and LTCP) 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. In the interest of avoiding duplication, the reader is referred to Schedule BV-2: Tables WH-6 through WH-16 for details regarding the allocation of plant investment for each wholesale customer.

7.7 Allocation of Depreciation Expense

The allocation of depreciation expenses for Retail and Wholesale customers follows the steps used for the allocation of plant investment described above. The annual depreciation expense to be distributed to Wastewater System cost components is based on the application of appropriate depreciation expense rates to the various categories of Wastewater System facilities. The various items of depreciation expense are allocated to cost components on the same basis as the proportion of plant investment costs allocated to each of those cost components.

7.8 Wholesale Cost of Service Allocations

Table 7-15 summarizes the Test Year 1 cost of service allocated to the wholesale customers. Specifically, the table presents the total allocated plant investment, depreciable investment, depreciation expense, return on rate base, and operation and maintenance expense for the wholesale customers. The total cost of service allocable to wholesale customers, for Test Year 1 is estimated at \$37.6 Million. This amount includes a return on investment requirement of \$6.0 Million, which reflects a 7.50% rate of return on allocated investment.

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

Table 7-15 Summary of Test Year 1 Allocated Cost of Service for Wholesale Customers
[Schedule BV-2: Table WH-29]

LINE NO.	CUSTOMER	(1) INVESTMENT (a)		(2)	(3)	(4)	(5)	(6) ALLOCATED
		ALLOCATED	DEPRECIABLE	O&M	DEPR'N	RETURN	COST OF SERVICE	
Wholesale Customers (\$000s)								
1	Abington	\$ 6,295	\$ 6,279	\$ 836	\$ 151	\$ 472	\$ 1,459	
2	Bucks County (Bensalem)	9,836	9,809	1,154	(a)	(a)	1,154	
3	Bucks County (b)	32,396	32,299	6,862	205	614	7,681	
4	Cheltenham	16,946	16,905	2,455	404	1,271	4,130	
5	DELCORA (c)	58,768	58,629	8,952	393	1,366	10,711	
6	Lower Merion	16,028	15,985	2,395	(a)	(a)	2,395	
7	Lower Moreland	3,335	3,328	489	77	250	816	
8	Lower Southampton (d)	22,143	22,110	2,033	440	1,476	3,949	
9	Springfield (less Wyndmoor)	6,736	6,722	1,372	159	505	2,036	
10	Springfield (Wyndmoor)	1,156	1,155	197	27	87	311	
11	Upper Darby	15,947	15,901	2,977	(a)	(a)	2,977	
12	Total	\$ 189,586	\$ 189,122	\$ 29,722	\$ 1,856	\$ 6,042	\$ 37,620	

(a) It is assumed that Bucks County (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 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 over 18 years starting in FY 2007.

The Water Department does not anticipate any contractual changes; as such Bucks County (Bensalem), Lower Merion and Upper Darby will continue to provide upfront annual capital contributions associated with applicable plant improvements. Therefore, there is no cost of service allocation of depreciation or return on rate base for these three wholesale customers.

Bucks County, DELCORA, and Lower Southampton were initially capital contribution-based customers. However, their current contracts reflect the utility basis for the recovery of allocated capital investment.

The allocation of return and depreciation, presented in Table 7-15, reflects the terms of the current contracts for these customers. The depreciation expense presented in Column 4 reflects 2% of the depreciable investment in the collection system and 2.5% of the depreciable investment in treatment and pumping facilities. The corresponding table for Test Year 2 (FY 2023) is provided as Schedule BV-2: Table WH-29A.

7.9 Distribution of Costs to Customer Types

As a basis for estimating the cost of providing wastewater service to each customer type, we distribute each functional component cost among the customer types in proportion to their respective service requirements for each of those cost components.

We perform the following key steps to allocate the Sanitary Sewer Retail Capital and O&M Costs to the various customer types:

■ Retail: Determination of Sanitary Sewer Unit Costs of Cost Components

- The retail test year unit cost, for each of the cost components, is summarized on Table 7-16 and derived as follows:
 - Divide the operational and capital costs allocated to each cost component by the respective retail units of service.
 - Derive the total Retail unit cost for each cost component as follows:
 - Total Retail Unit Cost = Operation Expense unit cost + Depreciation Expense unit cost + Inside City Return on Plant Investment unit cost.

■ Retail: Distribution of Sanitary Sewer Costs to Customer Types

- The Wastewater test year cost of service is distributed to each customer type as follows:
 - Applying the total unit cost of each cost component to the corresponding units of service of each customer type as presented on Table 7-17; and
 - Reapportioning the Pumping & Treatment related I&I Costs between Sanitary Sewer and Stormwater as shown on Table 7-18.

7.9.1 Infiltration/Inflow Adjustments

The cost of service allocable to I/I 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 I/I cost can neither be precisely measured, nor can it be directly associated with the parameters of sanitary wastewater service.

In general, I/I 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 I/I 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 I/I cost.

Columns 3 and 4 of Table 7-18 reflect the redistribution of the cost of I/I to the other customer types based upon equivalent meters and volume. In accordance with the prior rate proceeding decisions, the cost of service and rate design for the current study reflects a 30% recovery of pumping and treatment related I/I costs through the service charge and 70% through the volume charge.

Table 7-16 Test Year 1 Retail Unit Costs of Service [Schedule BV-1: Table WW-11 and Table WW-12]

		(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
			COLLECTION SYSTEM				WATER POLLUTION CONTROL PLANTS				
LINE NO.	DESCRIPTION	TOTAL	PUMPING STATION		SANITARY SEWERS		STORMWATER	VOLUME	CAPACITY	SUSPENDED	
			VOLUME	CAPACITY	CAPACITY					SOLIDS	BOD
Retail Sanitary Sewer											
Total Units of Service											
1	Units	\$000s	Mcf	Mcf/day	Mcf/day			Mcf	Mcf/day	1,000 lbs.	1,000 lbs.
2	Quantity		17,417,900	103,622	319,054			17,417,900	103,622	181,776	119,660
Operation and Maintenance Expense											
3	Total Expense - \$000s	\$ 255,528	\$ 2,760	\$ 17,946	\$ 45,275	\$ 87,074	\$ 26,379	\$ 13,558	\$ 39,572	\$ 22,964	
4	Unit Expense - \$/unit		0.1585	173.1823	141.9033		1.5145	130.8409	217.6971	191.9104	
Capital Costs											
5	Total Plant Investment - \$000s	2,266,245		28,276	617,647	1,098,038	128,414	127,356	144,360	122,154	
6	Unit Plant Investment - \$/unit			272.8764	1,935.8685		7.3725	1,229.0440	794.1642	1,020.8424	
7	Depreciable Plant Investment - \$000s	2,263,083		28,276	616,993	1,096,876	128,102	127,049	143,973	121,814	
8	Unit Depreciable Plant Investment - \$/unit			272.8764	1,933.8194		7.3546	1,226.0813	792.0352	1,017.9982	
9	Depreciation Expense - \$000s	48,008		707	12,340	21,938	3,203	3,176	3,599	3,045	
10	Unit Depreciation Expense - \$/unit			6.8219	38.6764		0.1839	30.6520	19.8009	25.4500	
Unit Return on Investment											
11	Total Return - \$000s (a)	87,817		1,096	23,934	42,549	4,976	4,935	5,594	4,734	
12	Inside City - \$/Unit (a)			10.5740	75.0149		0.2857	47.6255	30.7739	39.5577	
Total Unit Capital Costs											
13	(Line 10 + Line 12) - \$/unit			17.3959	113.6913		0.4696	78.2775	50.5748	65.0077	
Total Unit Costs of Service											
14	Inside City (Line 4 + Line 13) - \$/unit		\$ 0.1585	\$ 190.5782	\$ 255.5946		\$ 1.9841	\$ 209.1184	\$ 268.2719	\$ 256.9181	

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$87,817,000 / \$2,266,245,000 = 3.8750 %.

Table 7-16 Retail Unit Costs of Service (continued)

LINE NO.	DESCRIPTION	(10)	(11)	(12)	(13)	(14)	(15)	
		CUSTOMER COSTS					DIRECT STORMWATER	
		METER COSTS	BILLING		RETAIL CUSTOMERS	INDUSTRIAL WASTE UNIT		
			SANITARY	STORMWATER		DIRECT EXTRA STRENGTH WASTEWATER		
Retail Sanitary Sewer								
Total Units of Service								
1	Units	Eq. Meters		Eq. Bills		Eq. Meters		
2	Quantity	599,251		5,967,301		599,251		
Operation and Maintenance Expense								
3	Total Expense - \$000s	\$ 4,483	\$ 19,556	\$ 12,528	\$ 3,815	\$ 1,911	\$ -	
4	Unit Expense - \$/unit	7.4810	3.2772		6.3663			
Capital Costs								
5	Total Plant Investment - \$000s							
6	Unit Plant Investment - \$/unit							
7	Depreciable Plant Investment - \$							
8	Unit Depreciable Plant Investment - \$/unit							
9	Depreciation Expense - \$000s							
10	Unit Depreciation Expense - \$/unit							
Unit Return on Investment								
11	Total Return - \$000s							
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	\$ 7.4810	\$ 3.2772		\$ 6.3663	\$ -		

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = \$87,817 / \$2,266,245 = 3.8750 %.

Table 7-17 Wastewater Retail Costs of Service [Schedule BV-1: Table WW-13]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		ALLOCATED COST OF SERVICE	COLLECTION SYSTEM			TREATMENT				CUSTOMER		INDUSTRIAL WASTE	
			PUMPING VOLUME	PUMING CAPACITY	SEWER CAPACITY	VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD	METER	BILLING & COLLECTION	SURCHARGE	METER
Retail Service (\$000s)													
1	Residential	\$ 72,870	\$ 487	\$ 2,406	\$ 8,605	\$ 6,095	\$ 2,640	\$ 15,428	\$ 14,529	\$ 3,307	\$ 16,559	\$ -	\$ 2,814
2	Commercial	25,321	217	1,074	3,841	2,721	1,179	6,887	6,485	706	1,609	0	601
3	Industrial	1,303	12	57	205	146	63	368	347	30	49	0	25
4	Public Utilities	160	1	6	23	16	7	41	38	9	11	0	8
5	Senior Citizens	3,325	21	101	363	257	111	651	613	170	894	0	145
6	Wastewater Only	988	9	47	168	119	51	300	283	3	4	0	3
7	Groundwater	2,705	36	299	1,283	454	328	268	37	0	0	0	0
8	Surcharge	5,588	0	0	0	0	0	500	3,191	0	0	1,898	0
9	Housing Authority	2,736	23	114	407	288	125	729	687	69	237	0	58
10	Charities & Schools	2,081	17	84	301	213	92	540	508	108	125	0	92
11	Hospital/University	1,863	17	84	299	212	92	537	505	44	35	0	37
12	Hand Billed	5,761	55	272	972	689	298	1,743	1,641	35	27	0	30
13	Water Treatment Plant Sludge	9,225	46	229	820	581	252	7,297	0	0	0	0	0
14	Private Fire	150	1	7	24	17	7	43	40	3	5	0	2
15	Scheduled (Flat Rate)	0	0	0	0	0	0	0	0	0	0	0	0
16	Conveyance	64,237	0	0	64,237	0	0	0	0	0	0	0	0
17	Pumping & Treatment	71,229	1,817	14,968	0	22,750	16,424	13,433	1,838	0	0	0	0
18	Total	\$ 269,544	\$ 2,760	\$ 19,749	\$ 81,549	\$ 34,558	\$ 21,669	\$ 48,765	\$ 30,743	\$ 4,483	\$ 19,556	\$ 1,898	\$ 3,815

Annual Cost of Service by component for each customer type based on the customer type units of service (Table 7-3) and the total unit cost for each component (Table 7-16).

Table 7-18 Wastewater Adjusted Costs of Service [Schedule BV-1: Table WW-14]

LINE NO.	CUSTOMER TYPE	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)			
		ALLOCATED COST OF SERVICE	RE-ALLOCATION OF I/I (a)			ADJUSTED COST OF SERVICE	DISCOUNTS	ADJUSTED COST OF SERVICE W/ DISCOUNTS	RECOVERY OF DISCOUNTS (b)	ADJUSTED COST OF SERVICE			
			SANITARY SEWER	STORMWATER									
Retail Service (\$000s)													
1	Residential	\$	72,870	\$	65,123	\$	-	\$	137,993	\$	2,313	\$	140,307
2	Commercial		25,321		25,761				51,082		856		51,938
3	Industrial		1,303		1,344				2,647		44		2,691
4	Public Utilities		160		174				334		6		339
5	Senior Citizens		3,325		2,878			(1,551)	4,652		78		4,730
6	Wastewater Only		988		1,007				1,995		33		2,028
7	Groundwater		2,705		-				2,705		45		2,751
8	Surcharge		5,588		-				5,588		94		5,682
9	Housing Authority		2,736		2,701			(272)	5,166		87		5,252
10	Charities & Schools		2,081		2,244			(1,081)	3,244		54		3,298
11	Hospital/University		1,863		1,960			(956)	2,867		48		2,915
12	Hand Billed		5,761		5,900				11,661		195		11,857
13	Water Treatment Plant Sludge		9,225		4,852				14,078				14,078
14	Private Fire		150		153				303		5		308
15	Scheduled		0		0				0		0		0
16	Conveyance		64,237		(64,237)								
17	Pumping & Treatment		71,229		(49,861)		(21,369)		-	-	-	-	-
18	Total		269,544		-		(21,369)		248,175	(3,860)	244,316	3,860	248,175
Allocation of I/I													
19	Sanitary Sewer		269,544				(21,369)		248,175				
20	Stormwater		-		-		21,369		21,369	-	-	-	-
21	Total	\$	269,544	\$	-	\$	-	\$	269,544	\$	-	\$	-

(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.

7.9.2 Fee Discounts

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

- Senior Citizens, and Charities and Schools customer types are billed at 75% of the general customer rate levels.
- The PHA is billed at 95% 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 cost of service for retail customers.

Column 8 of Table 7-18 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.

7.10 Stormwater Cost of Service Allocations

Stormwater management and related costs are an integral component of the Water Department's Wastewater System costs. We have already discussed in detail the Wastewater System cost of service allocations between sanitary sewer and stormwater, and the associated rationale for each allocation.

7.10.1 Test Year Revenue Requirements

The following is a summary of the key allocation factors used in determining the stormwater revenue requirements.

- **Conveyance O&M Cost Allocation:** As discussed earlier in Section 7.5.1, 60% of the sewer collection system maintenance cost is allocated to stormwater and 40% to sanitary sewer.
- **Conveyance Capital Cost Allocation:** As discussed in Section 7.6.1, 64% of the sewer collection system capital cost is allocated to stormwater and 36% to sanitary sewer based on a cost weighted pipe capacity analysis.
- **Pumping & Treatment O&M and Capital Cost:** A portion of the retail pumping and treatment component cost is allocated to Infiltration and Inflow. Affirmed in prior rate proceedings, the Infiltration and Inflow cost is allocated 70% to sanitary sewage and 30% to stormwater services based on the ratio of average dry weather flow to average wet weather flow.
- **Customer Costs:** The allocation approach used in allocating customer costs to stormwater is consistent with the method used in the previous general rate proceeding. The customer costs are first allocated one-third to water service and two-thirds to the wastewater service (as wastewater includes sanitary sewer and stormwater). The wastewater customer costs less the metering costs are further allocated 59% to sanitary sewer and 41% to stormwater services based on the relative revenue requirement levels between the two services.

Table 7-19 presents the total FY 2022 stormwater revenue requirements. Based on the detailed technical cost allocations, the estimated FY 2022 stormwater revenue requirements are \$184.3 Million excluding stormwater Customer Assistance Program (CAP) costs.

Table 7-19 Summary of Test Year 1 Stormwater Costs [Schedule BV-3: Table SW-13]

LINE NO.	COST COMPONENT	(1) ALLOCATED COST OF SERVICE
Stormwater (\$000s)		
1	Billing & Collection Costs	\$ 12,211
2	Impervious Area and Gross Area Costs <i>(Excluding CAP Costs)</i>	172,119
3	Total	\$ 184,329

7.10.2 Allocation to Customer Types

To delineate the stormwater management costs from the balance of annual wastewater costs, a multi-step cost allocation approach was used to allocate the Test Year 1 stormwater costs to various customer types. The framework we used is outlined below:

- Allocate SWMS costs (i.e. impervious area and gross area costs) presented in Table 7-20, to their respective charge components.
 - As established in the 2009 Rate Determination, the SWMS charge costs are allocated 20% to GA and 80% to IA.
 - The resulting System Wide Unit Costs for GA and IA are summarized on Table 7-20;
 - System-Wide Unit Costs for GA and IA reflect overall reductions in billable GA and IA, resulting from credits and other adjustments; therefore, the recovery of these reductions is shared by all stormwater customers as reflected in the System-Wide Units Costs for GA and IA. Refer to Schedule BV-6: WP-3 Cost Recovery Approach of various customer assistance programs (including stormwater credits).
- Distribute GA and IA costs to Residential and Non-Residential Customer Types.
 - Residential GA and IA costs of service are calculated by applying the system-wide unit costs presented in Table 7-20 to the estimated residential billable GA and IA units of service (Table 6-7 and Table 6-8).
 - The initial Non-residential GA and IA costs of service are calculated as the total GA and IA cost of service less residential. The resulting Non-Residential costs are then adjusted to account for the Stormwater CAP costs.
 - Table 7-21 shows the results of this step.

- Determine the GA and IA cost of service rates prior to discount and lag factor adjustments.
 - Residential Monthly GA and IA Unit rates are then calculated to reflect:
 - Residential customers are billed a uniform fee per parcel based upon the mean residential IA and GA.
 - As previously noted, based upon the updated Stormwater Billing Data the mean residential GA square footage is 2,110 square feet and the mean residential IA is 1,200 square feet.
 - The System-Wide GA and IA unit costs are applied to the mean residential GA and IA respectively and then summed to calculate the resulting stormwater management service charge per parcel.
 - Non-residential customers GA and IA unit costs are calculated to account for the recovery of stormwater CAP costs (presented in Table 7-21) by dividing the Adjusted Non-Residential Cost of Service by the respective GA and IA billable units of service.
 - Table 7-22 shows the results of the above steps.
- Allocate Billing & Collection costs to Residential and Non-Residential Customers.
 - Billing & Collection costs are allocated to Residential and Non-Residential customers based on the weighted number of billable accounts.
 - As with prior rate determinations, a cost weighting factor of 1.3 higher weighting factor is assigned to non-residential accounts 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 and the corresponding billing and collection unit costs.
 - The resulting monthly billing & collection unit cost by customer type are presented in Table 7-23.
- Determine “Adjusted Stormwater Cost of Service” by Customer Type after re-apportioning revenue reduction due to discounts to customer types. Table 7-24 illustrates the recovery of discounts.

The adjusted Stormwater cost of service determined for each retail customer type provides the basis for the design of the Stormwater Rates and Charges for the test year. Schedule BV-6: WP-2 provides additional information regarding the development of the stormwater units of service for the analysis conducted herein.

Table 7-20 Test Year 1 Estimate of GA and IA Unit Costs Adjusted for CAP
[Schedule BV-3: Table SW-14]

LINE NO.	DESCRIPTION	(1) GA	(2) IA	(3) TOTAL
		20%	80%	
1	Annual Cost of Service (\$ 1000) from GA & IA (Excluding CAP)	\$ 34,424	\$ 137,695	\$ 172,119
2	Stormwater Units of Service (500 Square Feet)	4,176,659	2,364,014	
3	System Annual Unit Cost (\$/500 Square Feet)	8.24	58.25	
4	System Monthly Unit Cost (\$/500 Square Feet)	\$ 0.687	\$ 4.854	

Table 7-21 Test Year 2022 Estimate of Customer Type GA and IA Cost of Service Adjusted for CAP [Schedule BV-3: Table SW-15]

LINE NO.	DESCRIPTION	(1) GA	(2) IA	(3) TOTAL
Stormwater (\$000s)				
RESIDENTIAL				
1	Residential Cost of Service (a)	\$ 16,091	\$ 64,676	\$ 80,767
NON-RESIDENTIAL				
2	Initial Non-Residential Cost of Service (b)	18,333	73,019	91,352
3	Adjustment for CAP (c)	344	1,378	1,722
4	Adjusted Non-Residential Cost of Service	18,677	74,397	93,074
5	Total GA & IA Cost of Service	\$ 34,768	\$ 139,073	\$ 173,841

(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 7-22 Test Year 1 Estimate of Customer Type GA and IA Cost of Service Rates Prior to Discount and Lag Factor Adjustments [Schedule BV-3: Table SW-16]

LINE NO.	DESCRIPTION	(1) GA	(2) IA	(3) Total
GA and IA Cost of Service Rates				
1	Residential Monthly GA & IA Charge (a)	\$ 2.90	\$ 11.65	\$ 14.55
2	Non-Residential Monthly GA & IA Unit Cost (Adjusted for CAP)	0.700	4.946	
3	Impact of CAP on Non-Residential GA & IA Rate	\$ 0.013	\$ 0.092	

(a) Calculated based on Residential Mean GA (2,110 sf) and Mean IA (1,200 sf).

Table 7-23 Test Year 1 Stormwater Billing and Collection Unit Costs [Schedule BV-3: Table SW-17]

LINE NO.	DESCRIPTION	UNITS	TEST YEAR
1	Stormwater Billing & Collection Annual Revenue Requirements	\$	12,210,942
2	Monthly Billable Accounts: Residential	# Accounts	464,564
3	Non-Residential Cost Weighting Factor (a)		1.3
4	Weighted Monthly Billable Accounts: Non-Residential	# Accounts	111,153
5	Total Weighted Monthly Billable Accounts (Line 2 + Line 4)	# Accounts	575,717
6	Annual Billable Accounts: Residential (Line 2 x 12)	# Accounts	5,574,764
7	Weighted Annual Billable Accounts: Non-Residential (Line 4 x 12)	# Accounts	1,333,836
8	Total Weighted Annual Billable Accounts (Line 6 + Line 7)	# Accounts	6,908,600
9	Residential Billing & Collection Unit Cost per Billing Cycle	\$/Unit	1.77
10	Non-Residential Billing & Collection Unit Cost per Billing Cycle (Line 9 x Line 3)	\$/Unit	2.30

(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 7-24 Test Year 1 Stormwater Adjusted Costs of Service After Discounts
[Schedule BV-3: Table SW-18]

LINE NO.	CUSTOMER TYPE	(1)	(2)	(3)	(4)	(5)
		ALLOCATED COST OF SERVICE (a)	DISCOUNTS	ADJUSTED COST		
				OF SERVICE WITH DISCOUNTS	RECOVERY OF DISCOUNTS ALL (b)	ADJUSTED COST OF SERVICE
Stormwater (\$)						
Residential						
1	Non-Discount	\$ 85,424,286	\$ -	\$ 85,424,286	\$ 1,786,262	\$ 87,210,548
2	Discount - Non-PHA	4,426,289	(1,106,572)	3,319,716	69,417	3,389,133
3	Discount - PHA	798,858	(39,943)	758,915	15,869	774,784
Non-Residential						
4	Non-Discount	79,847,872		79,847,872	1,669,657	81,517,529
5	Discount - Non-PHA	10,211,392	(2,552,848)	7,658,544	160,144	7,818,688
6	Discount - PHA	1,362,738	(68,137)	1,294,601	27,071	1,321,672
Condominiums						
7	Non-Discount	2,949,752		2,949,752	61,681	3,011,433
8	Discount - Non-PHA	96,335	(24,084)	72,251	1,511	73,762
9	Discount - PHA	916	(46)	870	18	888
10	Total	\$ 185,118,438	\$ (3,791,629)	\$ 181,326,808	\$ 3,791,629	\$ 185,118,438

(a) Non-Residential Customer cost of service includes the cost of CAP.

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

Table 7-25 and Table 7-26 compare the total adjusted cost of service for each customer type to their respective revenues under existing rates for sanitary sewer and stormwater, respectively. The indicated increase or decrease in the revenue required to meet the adjusted cost of service is shown in Column 3 of each table.

Table 7-25 Test Year 1 Distribution of Sanitary Sewer Cost of Service to Customer Types

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
Retail Service (\$000s)				
1	Residential	125,152	140,307	12.1%
2	Commercial	51,703	51,938	0.5%
3	Industrial	2,303	2,691	16.9%
4	Public Utilities	346	339	-2.1%
5	Senior Citizens	4,251	4,730	11.3%
6	Wastewater Only	2,181	2,028	-7.0%
7	Groundwater	2,968	2,751	-7.3%
8	Surcharge	4,862	5,682	16.9%
9	Housing Authority	5,111	5,252	2.8%
10	Charities & Schools	4,152	3,298	-20.6%
11	Hospital/University	6,879	2,915	-57.6%
12	Hand Billed	13,591	11,857	-12.8%
13	Private Fire	250	308	23.3%
14	Scheduled	1	0	-22.4%
15	Total Retail Service	223,751	234,098	4.6%
16	Total Wholesale	38,982	41,847	7.4%
17	Total System	262,733	275,945	5.0%

Table 7-26 Test Year 1 Distribution of Stormwater Cost of Service to Customer Types

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
Stormwater (\$000s)				
Residential				
1	Non-Discount	\$ 79,913	\$ 87,211	9.1%
2	Discount - Non-PHA	3,261	3,389	3.9%
3	Discount - PHA	732	775	5.8%
Non-Residential				
4	Non-Discount	77,844	81,518	4.7%
5	Discount - Non-PHA	9,036	7,819	-13.5%
6	Discount - PHA	1,309	1,322	0.9%
Condominiums				
7	Non-Discount	3,007	3,011	0.1%
8	Discount - Non-PHA	75	74	-1.3%
9	Discount - PHA	1	1	-2.1%
10	Total	\$ 175,178	\$ 185,118	5.7%

8.0 Wastewater System Rate Design

The revenue requirement and cost of service analyses described in the preceding sections of this Report provide a basis for the review and update of a schedule of sanitary sewer and stormwater rates that recover allocated cost of service. These studies are the results of engineering estimates, consideration of historical data and, to some extent, judgment and experience. Judgment must enter the final choice of rates, and factors such as public reaction to the extent of changes and adjustments, previous rate levels, contractual agreements, and past local practice are recognized in making rate adjustments.

Rates should be reasonably simple in application and subject to as few misinterpretations as possible. Considerations regarding the proposed rate adjustments reflect discussions with the Water Department staff and include the above considerations and the desire of the Water Department to maintain the existing structure for the Rate Period. This Report proposes sanitary sewer and stormwater user rates in accordance with these considerations.

The cost of service analysis described in the preceding section of this Report provides the basis for the design of sanitary sewer and stormwater rate schedules to cover the allocated cost for service for the Wastewater System.

The proposed charges for sanitary sewer service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including senior citizens, charities and schools, and the PHA, receive services at a discounted rate. Similarly, the proposed charges for stormwater derived in this Report are applicable to Retail Residential, Non-residential and Condominium stormwater customers and recognize these same discounts. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools and 5% for PHA) will continue to be applicable for the entire Study Period.

In designing the proposed rates, we adjust the wastewater costs of service determined for each customer type to reflect the fact that these customer types will not pay full cost of service. Accordingly, we increase the proposed retail sanitary sewer and stormwater rates to recover this cost of service revenue reduction due to discounts.

Similar to the situation for water rates, the cost of service wastewater rates that are designed for Test Year-1 requires the application of a lag factor. The lag factor is calculated to recover only the anticipated receipts of the prorated revenue increase projected for FY 2022, recognizing the normally expected historical payment patterns. A lag factor of 1.095 is applied to the FY 2022 sanitary sewer and stormwater cost of service rates.

8.1 Proposed Sanitary Sewer Rates

The proposed sanitary sewer rates are designed based on the unit costs of service developed for the cost of service analysis. Since the sanitary sewer quantity charges are based on the water consumption volume, the unit costs of service are adjusted to eliminate the return factor reflected in the cost of

service analysis. Table 8-1 presents the Unit Costs of Service adjusted for the basis of rate design. Column 1 of Table 8-1 presents the Unit Costs of Service developed for the wastewater cost of service analysis (Line 14 of Table 7-16). Columns 3 to 5 present the adjustment factors to account for discounts and billed water consumption. Column 6 presents the adjusted unit costs of service for rate design.

Table 8-1 Inside City Retail Service Unit Costs of Service for Rate Design
[Schedule BV-1: Table WW-15]

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
	Inside City Retail Service		\$/Unit				\$/Unit
	Collection System						
	Pumping Station						
1	Volume	Mcf	0.1585	1.0168	0.95	0.9660	0.1531
2	Capacity	Mcf/day	190.5782	1.0168	0.95	0.9660	184.0985
3	Sanitary Sewers - Capacity	Mcf/day	255.5946	1.0168	0.95	0.9660	246.9044
	WPC Plants						
4	Volume	Mcf	1.9841	1.0168	0.95	0.9660	1.9166
5	Capacity	Mcf/day	209.1184	1.0168	0.95	0.9660	202.0084
6	Suspended Solids	1,000 lbs	268.2719	1.0168	1.00	1.0168	272.7789
7	BOD	1,000 lbs	256.9181	1.0168	1.00	1.0168	261.2343
	Customer Costs						
8	Meter Costs	Eq. Meters	7.4810	1.0168	1.00	1.0168	7.6067
	Billing Costs						
9	Sanitary	Eq. Bills	3.2772	1.0168	1.00	1.0168	3.3323
10	Industrial Waste Unit - Retail	Eq. Meters	6.3663	1.0168	1.00	1.0168	6.4733
11	I/I - Customer Related	Eq. Meters	32.1588	1.0168	1.00	1.0168	32.6991
12	I/I - Volume Related	Volume	16.5714	1.0168	0.95	0.9660	16.0080

Table 8-2 and Table 8-3 illustrate the development of the cost of service monthly service charge for customers with a 5/8-inch meter and the quantity charge for normal strength sanitary wastewater. Table 8-4 presents the proposed sanitary sewer rates for General Service customers applicable for Test Year 1 and Test Year 2. The proposed rates reflect a continuation of the existing rate structure, including a service charge which varies by meter size and a uniform quantity charge.

Table 8-2 Development of Cost of Service Monthly Service Charge for 5/8-inch Meter Customers
[Schedule BV-1: Table WW-16]

LINE NO.	COST COMPONENT	(1) UNITS	(2) ADJUSTED UNIT COST (\$/unit)	(3) NUMBER OF UNITS	(4) TOTAL COST (\$)
Sanitary Sewer					
Customer Costs					
1	Meter Costs	Eq. Meter	0.6339	1.0	\$ 0.6339
2	Billing Costs	Eq. Bills	3.3323	1.0	3.3323
3	Industrial Waste Unit	Eq. Meter	0.5394	1.0	0.5394
4	I/I Costs - Sanitary	Eq. Meter	2.7249	1.0	2.7249
5	Total Service Charge (a)				7.2305
6	Total Service Charge - Rounded (a)				\$ 7.23

(a) Prior to lag factor.

Table 8-3 Development of Cost of Service Quantity Charge for Normal Strength Sanitary Wastewater [Schedule BV-1: Table WW-17]

LINE NO.	COST COMPONENT	(1) UNITS	(2) ADJUSTED UNIT COST (\$/unit)	(3) NUMBER OF UNITS	(4) TOTAL COST (\$)
Sanitary Sewer					
Collection System					
Pumping Stations					
1	Volume	Mcf	0.1531	1.0000	\$ 0.1531
2	Capacity (a)	Mcf/day/mo.	15.3415	0.0493	0.7563
3	Sanitary Sewers: Capacity (b)	Mcf/day/mo.	20.5754	0.1316	2.7077
Water Pollution Control Plants					
4	Volume	Mcf	1.9166	1.0000	1.9166
5	Capacity (a)	Mcf/day/mo.	16.8340	0.0493	0.8299
6	Suspended Solids (c)	1,000 lbs	272.7789	0.0187	5.1010
7	BOD (d)	1,000 lbs	261.2343	0.0184	4.8067
8	Total Cost per Mcf				16.2713
9	Infiltration/Inflow Cost	Mcf	16.0080	1.0000	16.0080
10	Total Cost + Infiltration/Inflow per Mcf (e)				32.2793
11	Total Cost per Mcf - Rounded (e)				\$ 32.28

(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 @ 300 mg/l

(d) 1.0 Mcf @ 295 mg/l

(e) Prior to lag factor.

Table 8-4 Proposed FY 2022 and FY 2023 General Service Sanitary Sewer Rates
[Schedule BV-1: Table WW-18]

	(1) FY 2022 Monthly Charge	(2) FY 2023 Monthly Charge
METER SIZE (inches)		
METER BASED SERVICE CHARGE (\$/month)		
5/8	7.92	8.11
3/4	10.05	10.33
1	14.68	15.17
1 1/2	25.72	26.70
2	39.62	41.19
3	71.33	74.28
4	121.30	126.23
6	238.97	248.82
8	377.97	393.75
10	545.62	568.29
12	990.71	1,033.23
	FY 2022 Charge	FY 2023 Charge
QUANTITY CHARGE (\$/Mcf)		
All billable water usage	35.35	37.02
Groundwater Charge	12.94	13.51
	FY 2022 Charge	FY 2023 Charge
SURCHARGE RATES (\$/lb)		
BOD (excess of 250 mg/l)	0.413	0.424
SS (excess of 350 mg/l)	0.430	0.438
	FY 2022 Charge	FY 2023 Charge
SEPTIC HAULER RATES (\$/1,000 gallons)		
Sanitary Wastewater Delivered to WPCP (a)	61.16	62.54

(a) Based on BOD and SS Loading of 9,000 mg/l.

8.2 Proposed Stormwater Rates

Table 8-5 illustrates the development of the Test Year 1 proposed rates for stormwater service. The proposed rates include recovery of provided discounts and application of the lag factor based upon the adjusted cost of service presented in Table 7-24.

Table 8-6 and Table 8-7 summarize the FY 2022 and FY 2023 proposed stormwater rates for residential and non-residential customers respectively.

Table 8-5 Development of Test Year 1 Stormwater Cost of Service Rates
[Schedule BV-3: Table SW-19]

LINE NO.	SERVICE TYPE	(1) COST OF SERVICE RATE	(2) DISCOUNT RECOVERY FACTOR	(3) COST OF SERVICE RATE	(4) LAG FACTOR ADJUSTMENT	(5) PROPOSED RATE
Stormwater (\$)						
Billing & Collection Charge						
1	Residential	\$ 1.77	1.021	\$ 1.81	1.095	\$ 1.98
2	Non-Residential	2.30	1.021	2.35	1.095	2.57
3	Condominiums	2.30	1.021	2.35	1.095	2.57
IA/GA Charge						
4	Residential	14.55	1.021	14.85	1.095	16.27
	Non-Residential					
5	IA Charge	4.946	1.021	5.049	1.095	5.529
6	GA Charge	0.700	1.021	0.715	1.095	0.783
	Condominiums					
7	IA Charge	4.946	1.021	5.049	1.095	5.529
8	GA Charge	\$ 0.700	1.021	\$ 0.715	1.095	\$ 0.783

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

Table 8-6 Proposed FY 2022 and FY 2023 Residential Stormwater Rates
[Schedule BV-3: Table SW-19A]

LINE NO.	DESCRIPTION	(1) FY 2022 MONTHLY CHARGE Charge	(2) FY 2023 MONTHLY CHARGE Charge
Residential Stormwater Service			
Stormwater Mangement Service Charge (\$/month/parcel)			
1	Charge Per Parcel	\$ 16.27	\$ 17.32
Billing and Collection Charge (\$/bill)			
2	Charge Per Bill	\$ 1.98	\$ 2.00

Table 8-7 **Proposed FY 2022 and FY 2023 Non-Residential Stormwater Rates**
[Schedule BV-3: Table SW-19B]

LINE NO.	DESCRIPTION	(1)		(2)	
		FY 2022 MONTHLY CHARGE		FY 2023 MONTHLY CHARGE	
Non-Residential Stormwater Service					
Stormwater Mangement Service Charge					
1	Min Charge	\$	16.27	\$	17.32
2	GA (per 500 sf)	\$	0.78	\$	0.83
3	IA (per 500 sf)	\$	5.53	\$	5.88
Billing and Collection Charge (\$/bill)					
4	Charge Per Bill	\$	2.57	\$	2.60

9.0 Findings and Conclusions

The data assessed in this Report clearly show that the Water Department is being materially impacted by the COVID pandemic and the resulting economic crisis. The management initiatives, cost-saving measures, deferred rate request, and use of reserves undertaken by the Water Department have helped stretch limited revenues to meet current obligations. However, the confluence of significant decreases in demand and collections rates, as well as pressing needs for capital program funding and diminishing reserves, is creating a situation whereby revenue adjustments are a necessity to continue critical operations and meet General Bond Ordinance requirements.

Based on the analyses performed for this Report, the following findings are presented for the Rate Board's consideration:

1. Revenues under existing rates will be insufficient to fund the Combined System needs over the Rate Period and action is needed to offset anticipated reductions in revenues resulting from:
 - a. A projected continued decline in system-wide billed water and sewer volumes;
 - b. A decrease in system-wide collection rates; and
 - c. Losses of stormwater billing units related to credits and appeals.
2. In addition, the total projected expenses will exceed revenues under existing rates during the Rate Period and will require additional service revenues as recommended in this Report.
3. The implementation of a commercial paper program is due to changes in how the City is funding capital projects. Combined with the need to re-start deferred investment in an aging system, the Water Department needs additional revenues to adhere to the City's capital funding policy, as well as meet ongoing capital obligations and debt covenant requirements.
4. To help manage customer bill impacts, and meet the financial obligations and metrics of the Combined System the Water Department proposes the following for the Rate Period:
 - a. Setting rates to meet the minimum senior debt service coverage requirement of 1.20x, instead of the target 1.30 set forth under the 2018 Rate Determination;
 - b. Not funding the Rate Stabilization Fund to the \$135 million target under the 2018 Rate Determination; and
 - c. Deferring the 20% cash funding target for capital projects.
5. The Rate Stabilization Fund is projected to be below the target level during the rate period. Once utilized, these funds may no longer be available to help manage future revenue adjustments unless replenished. A small deposit is planned for fiscal year 2023 and minimal deposits are anticipated during the Study Period.

6. Need for rate action is further illustrated by the Water Department's performance against the "90% Test" in FY 2021, which will be marginally meet with 97% of senior debt service being paid from current revenues. Without increased revenues the Department will fail to meet the requirements of the General Bond Ordinance, including the 90% Test.
7. Moving forward, lack of sufficient rate revenues may require the Water Department to reduce the existing level of service below current levels and further delay implementation of the capital improvement program. In both instances, this may lead to a lower overall level of service for customers as well as impact overall system performance and compliance efforts.
8. Based on the above, among other factors, explained herein, it is recommended that the proposed water, sanitary sewer and stormwater rates for FY 2022 and FY 2023 be adopted to become effective September 1st of each fiscal year.

Glossary

90% Test	General Bond Ordinance requirements that specifies Net Revenues, excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year, must equal to at least 90% of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) payable in such fiscal year.
Base Rates	Rate revenues that exclude revenue losses associated with providing TAP discounts and the TAP-R surcharge revenues.
Base-Extra Capacity Method	A cost allocation method that considers base costs (O&M expenses and capital costs that vary with the quantity of water at average load operations), extra capacity costs (additional costs above base costs for maximum day and maximum hour demands), customer costs (customer service, meter maintenance and reading, billing, collection, accounting), and fire protection costs (hydrants, water towers, oversized mains, pumps) to determine rates for various customer types.
Billing Year Collections	All payments associated with a given fiscal year's billing and received within the 12 months following the beginning of the fiscal year.
Billing Year Plus 1 Collections	All payments associated with a given fiscal year's billing and received within 13-24 months following the beginning of the fiscal year. For this Study, the billing database reflects available data from FY 2012 to FY 2019.
Billing Year Plus 2 and Beyond Collections	All payments associated with a given fiscal year's billing and received after 24 months following the beginning of the fiscal year. For this Study, the billing database reflects available data from FY 2012 to FY 2019.
Collection Factors	Represent the multi-year payment pattern for Billing Year, Billing Year Plus 1, and Billing Year Plus 2 and Beyond. For this Study, the billing database reflects available data from FY 2012 to FY 2019.
Combined System	The City of Philadelphia's Water and Wastewater Systems
Community Gardens	Parcels, as defined by, Section 19-1603, which receive a 100 percent discount on all stormwater management service charges once approved.
General Bond Ordinance	The Restated General Water and Wastewater Revenue Bond Ordinance of 1989, approved by the Mayor on June 24, 1993, as supplemented and amended.
Hand Bill	Hand-billed accounts are "H"-coded customers in the Basis2 billing system that receive surcharge and/or sewer credits. The adjustments to these accounts are made manually.
Lag Factor	Factor that recognizes 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.
M1 Manual	AWWA's Principles of Water Rates, Fees, and Charges" Manual of Water Supply Practices M1. The M1 Manual is the utility industry's guidance manual for water rate-making.
MoP 27	WEF's Financing and Charges for Wastewater Systems Manual of Practice No. 27. This is the wastewater industry's manual for sewer rate-making.
Rate Compression Factor	Factor that recognizes impact of not receiving a full year's worth of revenues due to an effective rate implementation date that is not on the first day of the fiscal year.
Rate Ordinance	Refers to Section 13-101(4)(a) of the Philadelphia Code
TAP-R	TAP Rate Rider Surcharge Rate included with the water and sewer quantity charges.
The System	The City of Philadelphia's Water and Wastewater Systems
Utility-Basis	Restatement of annual revenue requirements in terms of O&M, depreciation, and return on rate base.
Water Fund	An accounting convention established pursuant to the Charter for accounting for the assets, liabilities, revenues, expenses, and Rate Covenant compliance for the City's water and wastewater systems. The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City.

**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-6

Dated: January 15, 2021

Schedule REF #		Schedule Name
BV-6 Black & Veatch Schedules		
1	WP-1	FINANCIAL PLAN – REVENUE AND REVENUE REQUIREMENT ASSUMPTIONS
2	WP-2	STORMWATER UNITS OF SERVICE
3	WP-3	COST RECOVERY OF DISCOUNTS, CREDITS, GRANTS, AND TAP
4	WP-4	SENIOR CITIZEN DISCOUNT THRESHOLD ADJUSTMENT
5	WP-5	MISCELLANEOUS FEES METHODOLOGY

FINANCIAL PLAN: REVENUE & REVENUE REQUIREMENTS ASSUMPTIONS

SCHEDULE BV-6: WP-1

This document summarizes the assumptions used by Black & Veatch Management Consulting, LLC. (Black & Veatch) in developing the revenue and revenue requirement projections for the City of Philadelphia (City) Water Department's (PWD or the Water Department) Financial Plan for the Fiscal Year (FY) 2021 - FY 2026 projection period (the Study Period) in conjunction with the FY 2022 - FY 2023 Rate Proceeding before the Philadelphia Water, Sewer and Storm Water Rate Board (the Rate Board). The assumptions presented in this document apply only to the development of revenue and revenue requirements related to PWD's base rates (Base Rates). The Base Rates exclude the Tiered Assistance Program (TAP) revenue loss and TAP Rate Rider Surcharge Rate (TAP-R) revenues.

1. Revenue Projections

- a. Projected FY 2021 to FY 2026 service revenues under existing rates reflect the current FY 2021 rates (effective October 1, 2020). Base Rates remain unchanged from FY 2020.
- b. Total system accounts remain stable over the projection period.
- c. Projected water usage reflects the current number of accounts and the projected usage per account.
- d. The COVID-19 Pandemic (pandemic) and associated economic downturn have influenced customer demand in the months since Pennsylvania's initial shut-down in March 2020. Consequently, Black & Veatch has adjusted the usage per account projections to reflect the pandemic demand patterns for various customer types. Those usage per account assumptions are as follows:
 - i. For all customer types, the 2-year average usage per account for FY 2018 and FY 2019 serves as the initial basis for the projection, as presented in Appendix A.
 - ii. To reflect the pandemic's impact, Black & Veatch included the following adjustments:
 - The FY 2021 usages per account are adjusted to reflect current customer demands based on recent monthly reporting data. These escalation factors are based upon comparing the usage from July 2019 to February 2020 (before the pandemic) and April to October 2020¹.
 - The usage per account reflects the Commonwealth of Pennsylvania's extended shut-off moratorium.
 - Except for the Residential customers with a 5/8-inch meter, Black & Veatch assumes constant consumption levels over the Study Period. We do not anticipate a further decrease in usage for the remaining customer types over the Study Period because they experienced significant usage declines due to the pandemic.
 - Prior to the pandemic, the 5/8-inch meter General Service customers, including the Residential customer type, have historically exhibited a 2.0% annual decrease over time. While Residential usage has increased in recent months, Black & Veatch assumes a resumption of the historical decline in consumption for 5/8-inch

¹ March 2020 was excluded from both periods, since the Governor declared a disaster emergency in the Commonwealth of Pennsylvania on March 6th followed by an order closing all non-life-sustaining businesses in the Commonwealth on March 19th.

residential service customers as people return to work. Beginning in FY 2023, Black & Veatch assumes that this decrease will resume for the remainder of the Study Period.

Table 1 provides the baseline usage per account and summarizes the associated escalation factors for the Study Period. Table 2 summarizes these assumptions and reflect Black & Veatch's review of the historical 2-Year Average change².

Table 1 – Demand Escalation Factors by Customer Type

CUSTOMER TYPE	USAGE PER ACCOUNT ¹ (MCF)	FY 2021	FY 2022	FY 2023 TO FY 2026
Senior Discount				
Senior Discount 5/8"	5.45	10.0%	0.0%	0.0%
Senior Discount >5/8"	6.54	10.0%	0.0%	0.0%
Residential				
Residential 5/8"	6.48	5.5%	0.0%	(2.0%)
Residential >5/8"	43.49	0.0%	0.0%	0.0%
Commercial				
Commercial 5/8"	10.71	(7.4%)	0.0%	0.0%
Commercial > 5/8"	149.35	(7.4%)	0.0%	0.0%
Industrial				
Industrial 5/8"	12.71	(25.4%)	0.0%	0.0%
Industrial > 5/8"	216.73	(25.4%)	0.0%	0.0%
Public Utilities				
Public Utilities 5/8"	9.77	(9.8%)	0.0%	0.0%
Public Utilities >5/8"	86.84	(9.8%)	0.0%	0.0%
PHA	26.76	0.0%	0.0%	0.0%
Charities & Schools	72.66	(19.3%)	0.0%	0.0%
Hospitals and Universities	713.72	(46.0%)	0.0%	0.0%
Hand Billed	1,864.84	(1.5%)	0.0%	0.0%
Scheduled	3.73	(3.8%)	0.0%	0.0%
Fire Service	2.51	11.2%	0.0%	0.0%

Notes:

¹ Baseline Usage per Account uses the 2-year average usage per account for FY 2018 and FY 2019, as presented in Appendix A.

² Since the Commercial and Industrial customer types' usage was significantly reduced due to the pandemic, we do not anticipate the continuation of the historical trend of decreasing usage during the study period.

Table 2 – Historical Usage Per Account for General Service Customers (5/8" Meters)

Description	Historical (Fiscal Year)				
	2015	2016	2017	2018	2019
Annual Billed Volume Per Account (Mcf/Account)	7.32	7.02	6.93	6.75	6.64
Annual Change	0.69%	(4.10%)	(1.28%)	(2.60%)	(1.63%)
2 Year Average Change		(1.73%)	(2.70%)	(1.94%)	(2.11%)

- e. Impervious Area (IA) and Gross Area (GA) billable square footage:
- FY 2021 reflects current initial billing data (before applying credits and appeals) as of June 30th, 2020.
 - FY 2022 and beyond reflect full implementation of the updated IA and GA initial stormwater billing data.
 - Billing units for FY 2021 to FY 2026 include stormwater credits, reflected as a reduction in billable IA and GA square footage. The credits reflect an average incremental reduction of:
 - 14.9 million square feet of gross area per year; and
 - 6.6 million square feet of impervious area per year.

This reduction in square footage is primarily due to:

- Projected increase in IA, GA, and National Pollutant Discharge Elimination System (NPDES) Credits based upon the average 5-year growth in the number of parcels receiving credit and the associated average credit per parcel.
- IA and GA Credits resulting from Stormwater Management Incentive Program/Greened Acre Retrofit Program (SMIP/GARP) grants:
 - Based upon the overall annual program budget of \$15 million in FY 2021 and \$25 million after that; and
 - The average grant award per greened acre, anticipated cost escalation, and average project completion time.

Appendix B presents the historical stormwater credit program information.

- Reductions are also anticipated due to appeals and other adjustments, amounting to an average reduction of 0.4 million square feet in gross area per year and a 0.2 million square feet reduction in impervious area per year.
- f. Projected revenues under existing rates reflect the anticipated cumulative receipts for water, sanitary sewer, and stormwater services (including retail and wholesale receipts) each fiscal year. Each fiscal year's receipts are estimated based on the projected system billings and the associated projected collection factors.

Raftelis provided the projected collection factors for retail *Non-Stormwater Only* and *Stormwater Only* Customers, as detailed in Raftelis Report 4 and included in Appendix C. The collection factors represent the multi-year payment pattern for the following periods:

- **Billing Year** – All payments associated with a given fiscal year’s billing and received within the 12 months following the beginning of the fiscal year.
- **Billing Year Plus 1** - All payments associated with a given fiscal year’s billing and received within 13-24 months following the beginning of the fiscal year.
- **Billing Year Plus 2 and Beyond** - All payments associated with a given fiscal year’s billing and received after 24 months following the beginning of the fiscal year.

The financial plan analysis of collection factors reflects the average collection factors for fiscal years provided in Raftelis Report 4. Table 3 presents the initial collection factors utilized in the financial plan analysis for FY 2021 to FY 2026.

Table 3 – Initial Collection Factors Prior to Adjustment

	Billing Year	Billing Year Plus 1	Billing Year Plus 2 and Beyond
Non-Stormwater Only	86.60%	8.76%	1.94%
Stormwater Only	63.99%	7.98%	6.65%

The economy is in a recession due to the current pandemic. The recession is impacting overall collections, and as such, Black & Veatch proposes the following adjustments to the projected collection factors based upon the Water Department’s recent experience:

- **FY 2021 Billing Year Collection Factors** – Reduce by 8%.
- **FY 2022 Billing Year Collection Factors** – Reduce by 4%.
- **FY 2023 Billing Year Collection Factors** – Reduce by 2%.

Current monthly collection data imply that collection rates are lower by 10% compared to the average historical data. The above factors assume some recovery level from the current monthly trend and anticipate an improvement of collections over the next several years.

- g. Operating Fund and Rate Stabilization Fund interest earnings are estimated based on projected fund balances and a 1.0% annual interest earnings rate.
- h. Miscellaneous and contra revenues are projected based on historical and budgeted levels, as presented in Table 4.

Table 4 – Projected Miscellaneous and Contra Revenues

Description	Fiscal Years	Projection
Penalties ¹	2021 – 2026	\$6.7 Million / Year to \$9.8 Million / Year
Other Miscellaneous Revenue ²	2021 – 2026	\$12.0 Million / Year
Debt Service Reserve Release	2021	\$19.8 Million
State and Federal Grants ³	2021 – 2026	\$1.0 Million / year
License and Inspection Permits ²	2021 – 2026	\$5.8 Million / year
UESF Grants ³	2021 – 2026	\$0.3 Million / year
Stormwater CAP ⁴	2021 – 2026	(\$1.7) Million / Year

Notes:

1. Reflects 1.0% of billings under existing rates for FY 2021 to account for anticipated waiving of penalties due to COVID. FY 2022 reflects 1.5% of billings based on the two-year historical average from FY 2018 to FY 2019, assuming a return to pre-COVID levels.
2. FY 2020 reflects the 2-year average for FY 2019 and FY 2020.
3. Reflects FY 2021 Budget amount.
4. Stormwater CAP revenue loss is anticipated to remain constant due to the updated stormwater billing data.

2. Operating Expenses

- a. Projected annual operating expenses reflect the following:
 - i. For FY 2021, projected operating expenses are:
 1. Based upon the Water Fund's approved FY 2021 budget (as of December 2020); and
 2. Reflect the application of actual to budget factors to estimate anticipated expenses [discussed further in Section 2(c)].
 - b. For FY 2022 through FY 2026, projected operating expenses are:
 - i. Based upon escalation of the FY 2021 projected operating expenses and reflect the escalation factors [discussed further in Section 2(d)]; and
 - ii. Include additional adjustments for planned increases or decreases in operating expenses.
- c. Actual-to-Budget Factors
 Actual-to-Budget factors by cost classification for each Water Department Division and City Department (whose budget costs are funded by the Water Fund) reflect the two-year historical average of the actual-to-budget ratio from FY 2019 and FY 2020 (see Appendix D), with the following exceptions noted in Table 5:

Table 5 – Actual-to-Budget Factor Exceptions

Department	Class(es)	Description	Actual to Budget Factor
Operations	400	Equipment	100% ¹
Planning & Environmental Services	100	Salaries & Wages	100% ²
Planning & Environmental Services	200	Services	100% ¹
Public Affairs	100	Salaries & Wages	100% ²
Public Affairs	200	Services	100% ¹
Rate Board	100, 200 and 300	Personnel, Services and Materials and Supplies	100% ³
Finance	800	Transfers	72.2% ⁴
Fleet Management	300	Materials and Supplies	77.0% ⁵
City Finance	100	Pension, Pension Obligations, and Benefits	100% ⁶

Notes:

1. FY 2021 Budget reduced below FY 2020 actual spending, 100% actual to budget factor applied for FY 2021.
2. 2-year average actual to budget factor greater than 100%, 100% actual to budget factor applied for FY 2021.
3. Adjusted spending factor to 100% based on anticipated spending.
4. Reflects the historical average actual to budget factors from FY 2016, FY 2018, and FY 2019. Excludes FY 2020 and FY 2017 due to non-typical expenses related to General Fund reimbursement.
5. Adjusted actual to budget factor to reflect reduced FY 2021 budget.
6. Reflects actual to budget factor adjustment to reflect estimated FY 2020 expense provided by City Finance.

d. Escalation Factors

Projected operating Expenses for FY 2022 through 2026 reflect applying the annual escalation factors to the projected FY 2021 operating expenses by category as presented in Table 6.

Table 6 – Annual Escalation Factors

Class	Description	Fiscal Year – Annual Escalation Factor				
		FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
100	Labor Costs	2.00%	2.00%	2.00%	2.00%	2.00%
191	Pension	1.78%	3.28%	2.82%	2.80%	2.67%
190	Pension Obligations	0.00%	0.00%	0.00%	0.00%	0.00%
1xx	Benefits	4.89%	4.05%	3.92%	3.81%	4.17%

Class	Description	Fiscal Year – Annual Escalation Factor				
		FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
220	Power	0.00%	0.50%	1.00%	1.00%	1.00%
221	Gas	5.50%	1.50%	1.50%	1.00%	1.00%
200	Services	0.00%	1.60%	1.60%	1.60%	1.60%
200	Public Property – Leases	1.80%	1.80%	1.80%	1.80%	1.80%
307	Chemical Costs	2.50%	2.50%	2.50%	2.50%	2.50%
300	Materials and Supplies	2.63%	2.63%	2.63%	2.63%	2.63%
400	Equipment	2.80%	2.80%	2.80%	2.80%	2.80%
500	Indemnities	0.00%	0.00%	0.00%	0.00%	0.00%
800	Transfers	0.00%	0.00%	0.00%	0.00%	0.00%

- The escalation factors for Labor costs include the prior average annual salary increases under the current labor agreement.
- The pension and benefits cost escalation factors incorporate the City's current projections' cost increases.
- The escalation factors for Power and Gas integrate the City's Energy Office estimates (see Appendix I).
- The escalation factors for Services for FY 2022 through FY 2026 use the 2-year average Consumer Price Index (CPI) for the Philadelphia Area.
- The escalation factors for Chemicals reflect the 2-year average annual increase per PWD's recent experience.
- The escalation factors for Public Property – Leases use the 3-year average annual increase per PWD's recent experience.
- The escalation factor for Equipment incorporates the average of the 2-year and 3-year average increase per PPI for Construction Equipment and Machinery.
- The Materials and Supplies' escalation factor incorporates the average of the 2-year and 3-year average increase per PPI for Materials for Construction.
- No escalation factor is applied for Indemnities and Transfers for FY 2022 through FY 2026.

Appendix E presents the Water Department's long-term historical O&M costs. Appendix F provides the relevant O&M cost industry indices discussed above.

e. Adjustments

Projected Operating Expenses also include adjustments as presented in Table 7. These adjustments reflect the application of the actual-to-budget and escalation factors associated with each expense based on the department and class of costs.

Table 7 – Additional Adjustments for Projected Operating Expenses

Department	Class	Fiscal Year(s)	Adjustment Amount	Purpose
Operations	100	2022 to 2026	\$0.6 Million to \$2.2 Million	Additional Water Department staff costs related to the Consent Order & Agreement (also known as Green City, Clean Waters).
Planning & Environmental Services	100	2022 to 2026	\$0.05 Million	Additional staff costs due to the Pennsylvania Department of Environmental Protection (PADEP) regulatory requirements for sample collection and field testing.
City Finance	100	2022 to 2026	\$0.7 million to \$2.4 Million	Additional pension and benefits costs associated with additional staff noted above. Costs are estimated based upon the City's estimated fringe costs as a percentage of salaries (as provided).
Finance	200	2022 to 2026	\$10.0 Million	Restoration of SMIP/GARP Budget to prior levels.
Planning & Environmental Services	100	2022 to 2026	\$0.7 Million to \$3.8 Million	Transition of staff salaries from Capital Funded Positions to O&M Funded.
Construction & Engineering	100	2022 to 2026	\$1.0 Million to \$5.6 Million	Transition of staff salaries from Capital Funded Positions to O&M Funded.
Operations	200	2022 to 2026	(\$6.8 Million) to (\$7.0 Million)	Reduction of maintenance.
Operations Admin	400	2022 to 2026	\$1.6 Million to \$1.8 Million	Restoration of the budget for Water Department vehicles.

f. Liquidated Encumbrances

Black & Veatch projects liquidated encumbrances for FY 2021 thru FY 2026 to be 17.4% of projected Services (class 200) and Materials and Supplies (class 300) expenses excluding SMIP/GARP. The projection uses the average of the actual ratio of liquidated encumbrances to expenses for Services (class 200) and Materials and Supplies (class 300) experienced in FY 2018 to FY 2020. The SMIP/GARP budget is fully expended, and thus, excluded from this ratio.

3. Debt Service

- a. Existing debt service reflects the actual debt service schedules for the following issuances:
 - i. All Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2020;
 - ii. Water and Wastewater Revenue and Revenue Refunding Bonds Series 2020A and Water and Wastewater Revenue Refunding Bonds Series 2020B (issued in FY 2021); and
 - iii. The forward refunding of Water and Wastewater Revenue Bonds Series 2011A (issued in FY 2021).
- b. Projected debt service reflects the following anticipated bond issues and assumed interest rates:
 - i. FY 2022 - \$240 Million at 5.00%
 - ii. FY 2023 - \$500 Million at 5.25%
 - iii. FY 2024 - \$585 Million at 5.25%
 - iv. FY 2025 - \$420 Million at 5.25%
 - v. FY 2026 - \$600 Million at 5.25%
- c. Projected debt service for the anticipated bond issues in FY 2022 to 2026 reflect:
 - i. Bond issuance in July of each year;
 - ii. Level debt service payments with interest-only payments, in October and April, during the first year of the bond amortization;
 - iii. First maturity of each series on October 1st; and
 - iv. Bond issuance cost of 0.65% based upon the Water and Wastewater Revenue Bonds Series 2020A and 2020B issues.
- d. Projected debt service also includes using a revolving Commercial Paper (CP) Program³ as authorized by City Council on November 19, 2020.
 - i. Beginning in FY 2022, the Water Department intends to use the CP Program to fund approximately \$200 Million of capital improvements per year at a 2.0% annual interest rate.
 - ii. In each subsequent fiscal year following the CP's use, the Water Department expects to issue revenue bonds for permanent financing.
- e. Appendix G presents the existing and proposed debt service payments over the Study Period.

4. Bond Covenants, Transfers, and Fund Balances

- a. Senior Debt Coverage:
 - i. The General Bond Ordinance rate covenant requires minimum senior debt service coverage of 1.20.
 - a. In accordance with the 2018 Rate Determination, the Water Department targets a debt service coverage of 1.30.
 - b. However, the Water Department is proposing to maintain minimum senior debt service coverage for the Study Period.
 - c. Per the General Bond Ordinance, interest due on the CP program is considered on par with senior debt and included in the determination of senior debt service coverage.

³ The Commercial Paper Program provides the Water Department the ability to temporarily fund obligations on a revolving basis, in an aggregate principal amount no greater than \$400 million at any time.

- ii. The General Bond Ordinance rate covenant requires the City 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% of the Debt Service Requirements (excluding debt service due on any Subordinated Bonds) in such fiscal year.
 - iii. The General Bond Ordinance rate covenant requires minimum total debt coverage of 1.00.
- b. Capital Account Deposit.
 - i. Projected FY 2021 to FY 2026 Capital Account Deposit is based on the following assumptions:
 - a. Inflated net plant investment of 5.8% per year based on the average annual increase in net plant investment during FY 2019 and FY 2020.
 - b. An annual Capital Account Deposit of 1.0% of the prior year projected net plant investment (original cost less depreciation).
- c. Residual Transfer to Construction.
 - i. The Water Department will make projected transfers as available.
 - ii. The Water Department will maintain the end-of-year Residual Fund balance at \$15.0 million for the Study Period.
- d. Rate Stabilization Fund Transfers.
 - i. In accordance with the 2018 Rate Determination, the Water Department has a Rate Stabilization Fund balance target of approximately \$135 million.
 - ii. Due to the pandemic, the Water Department did not request a Base Rate revenue increase for FY 2021. As a result, the Water Department is leveraging available Rate Stabilization Fund balance to meet overall revenue requirements, including debt service coverage needs. The projected withdrawal from the Rate Stabilization in FY 2021, will result in a FY 2022 beginning year balance below the target level of \$135 million. For the Rate Period, the Water Department proposes to forego meeting this metric and plans to rebuild necessary reserves over time.
- e. Beginning Fund Balances.
 - i. The FY 2021 beginning fund balances reflect the preliminary FY 2020 financial results.

5. Capital Program

Table 8 shows the total Capital Improvement Program (CIP) for the Study Period.

The projected capital program is based on the Water Department's adopted FY 2021 capital program budget and proposed FY 2022 to FY 2027 capital program (note - FY 2027 is outside of the study period for this analysis).

- The Water Department's CIP Budget is an appropriation-based budget and reflects the following:
 - The budget for each respective fiscal year represents the total cost of the capital improvements the Water Department expects to contract in that fiscal year;
 - The Water Department's total CIP Budget does not represent expected project duration or anticipated cash flows;
 - The Water Department's CIP budget includes contingencies; and

- The Water Department's CIP Budget is not adjusted for inflation.

In response to a change in how the City funds capital programs, the Water Department will only contract fully funded CIP projects. In other words, the Water Department plans to provide sufficient CIP funding so that estimated outstanding encumbrances (or project commitments) will not exceed available funding in any given fiscal year. Overall CIP funding sources, including revenue from current year rates, bond proceeds, CP proceeds, other loans, and accumulated interest, are compared against overall encumbrances less estimated capital spending.

To evaluate CIP program funding, Black & Veatch estimated the expected encumbrances for each fiscal year of the study period, based upon the Water Department's CIP Budget and adjusted to reflect the following:

- The rollforward of remaining FY 2020 budget appropriations associated with vehicle purchases;
- The rollforward of remaining FY 2021 budget appropriation due to bidding and project-related delays, as provided by the Water Department;
- The shift in positions from the Capital budget to the O&M budget (as previously noted in Section 2 of this document);
- Annual inflation of 3.0% based on industry construction cost indices for FY 2023 to FY 2026 capital program costs (See Appendix H); and
- Removal of contingencies by applying an adjustment factor of 85% to planned improvements, excluding Engineering and Administration and Vehicles.

To assess the overall drawdown of available CIP Funding, Black & Veatch estimated the Water Department's CIP Funds' drawdown based upon a projection of overall spending over the study period. Black & Veatch's spending estimates reflect the following:

- Anticipated program level project durations as follows:
 - Water Conveyance – 2 years;
 - Sewer Collection – 3 years;
 - Facilities Improvements – 5 years; and
- Adjusted the projected cash flow to reflect a shift of two months of spending from FY 2020 to FY 2021 to reflect a temporary 2-month shut down of the capital program in FY 2020 due to the pandemic.

The overall resulting CIP funding and subsequent drawdown, reflecting the above-noted adjustments, are summarized in Table 8.

Table 8 – Projected Capital Program Budget and Annual Expenditures (\$000s)

Line No.	Description	Fiscal Year Ending June 30,					
		2021	2022	2023	2024	2025	2026
1	Engineering and Administration (a)	14,000	13,595	11,871	10,147	8,423	6,699
2	Plant Improvements	328,000	250,550	309,300	306,600	190,300	301,300
3	Distribution System Rehabilitation	93,060	30,760	106,760	177,860	118,160	108,760
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Storm Flood Relief	15,000	-	15,000	15,000	15,000	15,000
6	Reconstruction of Sewers	72,460	45,260	68,360	68,360	68,360	68,360
7	Green Infrastructure	72,000	20,000	72,000	72,000	72,000	134,000
8	Vehicles	12,000	12,000	12,000	12,000	12,000	12,000
9	Total Improvements	611,520	377,165	600,291	666,967	489,243	651,119
10	Inflation Adjustment (b)	-	-	18,009	40,618	45,366	81,721
11	Inflated Total	611,520	377,165	618,300	707,585	534,609	732,840
12	Rollforward Adjustments	(344,975)	352,000	-	-	-	-
13	Total Inflated Adjusted CIP Budget	266,545	729,165	618,300	707,585	534,609	732,840
14	Contingency Adjustment	(35,028)	(105,536)	(89,057)	(102,613)	(76,844)	(106,769)
15	Annual Encumbrances	231,517	623,630	529,243	604,972	457,765	626,071
16	Project Expenses (c)	324,964	345,303	426,730	535,538	545,260	562,222
17	Annual Net Encumbrances	(93,448)	278,327	102,513	69,434	(87,494)	63,849

(a) Engineering and Administration Costs reflect the shift of staff salaries from the capital budget to the operating budget.

(b) Allowance for inflation of 3.0% per year after fiscal year 2022.

(c) Reflects the annual drawdown of capital budget appropriations based on project duration and annual encumbrances/commitments.

Appendix A

Billed Volume per Account

Customer Type	USE	Historical Averages		Historical Usage Per Account		
	FY 2021	2 Year	3 Year	FY 2018	FY 2019	FY 2020
Senior Citizens (Special Customer Group II)						
5/8" Meter	5.45	5.62	5.54	5.37	5.54	5.71
> 5/8" Meter	6.54	6.82	7.00	7.37	5.71	7.93
General Service (Residential)						
5/8" Meter	6.48	6.42	6.46	6.54	6.42	6.42
> 5/8" Meter	43.49	38.71	41.37	46.68	40.30	37.12
General Service (Commercial)						
5/8" Meter	10.71	10.29	10.48	10.87	10.55	10.03
> 5/8" Meter	149.35	148.42	149.64	152.07	146.62	150.22
General Service (Industrial)						
5/8" Meter	12.71	13.43	13.09	12.40	13.01	13.85
> 5/8" Meter	216.73	219.09	200.77	164.12	269.34	168.84
General Service (Public Utilities)						
5/8" Meter	9.77	7.61	8.79	11.15	8.39	6.83
> 5/8" Meter	86.84	86.54	87.61	89.75	83.92	89.16
General Service (Excluding Senior Citizens)						
5/8" Meter	NA	6.68	6.72	6.82	6.69	6.66
> 5/8" Meter	NA	95.21	97.93	103.38	97.92	92.50
General Service (Including Senior Citizens)						
5/8" Meter	NA	6.62	6.67	6.75	6.64	6.61
> 5/8" Meter	NA	95.17	97.89	103.34	97.88	92.46
PHA (Special Customer Group IV)						
Charities & Schools (Special Customer Group I)	72.66	71.65	71.90	72.42	72.89	70.40
Hospital/University (Special Customer Group III)	713.72	743.28	736.14	721.88	705.56	781.00
Hand Bill	1,864.84	1,917.88	1,928.98	1,951.17	1,778.52	2,057.24
Scheduled	3.73	8.08	6.49	3.30	4.17	12.00
Fire Service	2.51	1.62	2.24	3.48	1.53	1.71

Note: The volumes presented above represent the average annual billed volume per account for all accounts within the respective customer type. These figures differ from the typical customer consumption used to estimate the typical customer bills for residential, senior citizens, and small commercial customers.

Appendix B

Stormwater Credit Historical Data

CREDITS FOR NON SURFACE DISCHARGE ELIGIBLE PROPERTIES																	
Fiscal Year Ending		Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	IA NPDES Credit (Avg per parcel)	GA NPDES Credit (Avg per parcel)
Line #	June 30,					Impervious Credit											
1	2013	604	223,367,443	61,793,808	84,520,414	17,965,807	67,429,822	11,563,893	10,305,605	-	-	-	111,639	19,146	17,062	-	-
2	2014	653	257,321,475	76,969,015	94,009,369	20,633,398	55,499,304	12,668,858	11,410,570	-	-	49	84,991	19,401	17,474	-	-
3	2015	670	264,384,894	83,734,431	100,305,627	25,029,525	54,712,505	13,777,050	12,373,766	-	-	17	81,660	20,563	18,468	-	-
4	2016	695	308,606,388	110,633,550	119,638,164	33,170,833	60,658,419	16,434,037	15,025,143	-	-	25	87,278	23,646	21,619	-	-
5	2017	767	348,805,332	118,146,821	138,022,843	33,920,101	72,445,173	15,539,131	14,141,507	-	-	72	94,453	20,260	18,437	-	-
6	2018	823	314,434,590	113,476,770	144,822,988	39,742,752	72,337,150	19,141,871	17,744,247	-	-	56	87,894	23,259	21,560	-	-
7	2019	782	310,134,440	115,126,357	149,679,885	41,344,307	62,542,914	16,212,413	15,425,254	-	-	(41)	79,978	20,732	19,725	-	-
8	2020	813	322,039,967	120,201,957	160,913,257	45,539,961	59,748,724	19,565,431	19,223,758	-	-	31	73,492	24,066	23,645	-	-
9	5-Yr Average	776	320,804,143	115,517,091	142,615,427	38,743,591	65,546,476	17,378,577	16,311,982	-	-	29	84,619	22,392	20,998	-	-
CREDITS FOR SURFACE DISCHARGE ELIGIBLE PROPERTIES																	
Fiscal Year Ending		Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	IA NPDES Credit (Avg Per parcel)	GA NPDES Credit (Avg per parcel)
Line #	June 30,					Impervious Credit											
10	2013	152	220,024,320	79,752,423	129,107,867	47,612,306	80,471,840	43,703,240	43,717,412	1,500,062	2,575,193	-	529,420	287,521	287,615	9,869	16,942
11	2014	212	272,919,261	91,624,837	170,699,769	53,693,207	114,259,551	49,493,761	49,668,409	1,580,879	2,681,653	60	538,960	233,461	234,285	7,457	12,649
12	2015	246	283,413,656	98,224,301	176,930,329	60,226,500	122,127,335	55,736,478	47,311,404	1,524,473	2,590,089	34	496,453	226,571	192,323	6,197	10,529
13	2016	273	253,507,206	84,881,856	192,946,835	61,024,331	127,568,199	58,166,690	58,101,140	250,387	428,721	27	467,283	213,065	212,825	917	1,570
14	2017	312	289,520,162	88,550,428	223,008,811	63,952,942	151,024,452	61,284,210	61,338,258	242,176	423,291	39	484,053	196,424	196,597	776	1,357
15	2018	318	331,071,935	98,430,878	227,585,196	66,195,369	149,779,130	62,881,606	62,901,801	726,596	3,097,451	6	471,004	197,741	197,804	2,285	9,740
16	2019	308	340,151,826	95,665,431	241,876,061	65,118,503	165,977,231	62,023,047	62,089,933	621,466	2,942,661	(10)	538,887	201,374	201,591	2,018	9,554
17	2020	312	330,347,932	93,855,746	236,698,310	64,145,133	161,182,489	60,896,113	61,152,874	531,051	2,759,029	4	516,611	195,180	196,003	1,702	8,843
18	5-Yr Average	305	308,919,812	92,276,868	224,423,043	64,087,256	151,106,300	61,050,333	61,116,801	474,335	1,930,231	13	495,567	200,757	200,964	1,540	6,213
CREDITS FOR PROPERTIES RECEIVING SMIP/GARP GRANTS																	
Fiscal Year Ending		Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total	Open Space GA GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)		
Line #	June 30,					Impervious Credit											
19	2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	2014	1	55,200	31,107	23,176	8,721	14,455	8,721	8,721	-	-	1	14,455	8,721	8,721	-	-
21	2015	10	6,634,034	4,522,112	2,564,644	3,813,527	1,070,554	3,778,379	1,494,090	-	-	9	107,055	377,838	149,409	-	-
22	2016	26	12,539,266	7,907,711	5,346,848	5,709,958	2,128,113	5,600,316	3,326,415	-	-	16	81,851	215,397	127,939	-	-
23	2017	50	23,040,962	13,228,000	11,342,572	9,138,988	4,724,492	8,848,391	6,516,302	-	-	24	94,490	176,968	130,326	-	-
24	2018	59	24,855,602	14,444,874	12,497,771	10,178,890	4,925,563	9,904,203	7,572,208	-	-	9	83,484	167,868	128,343	-	-
25	2019	106	35,717,801	21,226,658	19,007,315	15,138,098	6,531,348	14,759,336	12,476,267	-	-	47	61,616	139,239	117,701	-	-
26	2020	121	41,782,758	21,669,430	22,855,597	15,906,007	9,727,821	15,465,284	13,126,719	-	-	15	80,395	127,812	108,485	-	-
27	5-Yr Average	72	27,587,278	15,695,335	14,210,021	11,214,388	5,607,467	10,915,506	8,603,582	-	-	20	84,815	200,854	127,034	-	-

Note: The above tables summarize the historical IA, GA, and NPDES credits granted to parcels meeting eligibility requirements for Non-Surface and Surface Discharge as described under PWD Rates and Charges Section 4.5(c); Non-Surface are properties not eligible under surface discharge requirements. Credits resulting from properties that have received the award of SMIP/GARP grants are listed separately. Historical growth in the number of parcels receiving credit and average credit per parcel are not utilized in developing for SMIP/GARP projections. SMIP/GARP Projections are based upon program budget, average grant award amount per greened acre, and estimated completion timeline.

Appendix C

Historical Retail Non-Stormwater Only and Stormwater Only Collection Factor Calculations Prior to Adjustments for Economic Impact of COVID

Non-Stormwater Only Customers	Collection Factors		
	Billing Year (Payments within 12 months)	Billing Year Plus 1 (Payments w/in 13-24 months)	Billing Year Plus 2 and Beyond (Payment after 24 months)
<i>FY 2012</i>	84.69%	9.67%	2.72%
<i>FY 2013</i>	84.83%	9.81%	2.68%
<i>FY 2014</i>	86.19%	8.63%	2.40%
<i>FY 2015</i>	87.15%	8.26%	2.07%
<i>FY 2016</i>	87.69%	8.31%	1.65%
<i>FY 2017</i>	88.17%	8.17%	1.26%
<i>FY 2018</i>	87.94%	8.38%	0.77%
<i>FY 2019</i>	87.97%	8.89%	
<i>FY 2020</i>	84.76%		
Average	86.60%	8.76%	1.94%

Stormwater Only Customers	Collection Factors		
	Billing Year (Payments within 12 months)	Billing Year Plus 1 (Payments w/in 13-24 months)	Billing Year Plus 2 and Beyond (Payment after 24 months)
<i>FY 2012</i>	59.22%	9.22%	9.26%
<i>FY 2013</i>	60.84%	7.49%	8.79%
<i>FY 2014</i>	59.07%	5.99%	9.04%
<i>FY 2015</i>	59.50%	8.17%	7.35%
<i>FY 2016</i>	64.65%	8.15%	6.01%
<i>FY 2017</i>	66.74%	7.96%	4.12%
<i>FY 2018</i>	67.26%	8.26%	1.97%
<i>FY 2019</i>	69.43%	8.63%	
<i>FY 2020</i>	69.19%		
Average	63.99%	7.98%	6.65%

Source: Raftelis Report 4

Appendix D

Actual-to-Budget Factors

Philadelphia Water Department | FY 2022 – FY 2023 Rate Proceeding

	Factor Used	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense			
		2 Year	3 Year	5 Year	2020	2019	2018	2020	2019	2018	2020	2019	2018	
Human Resources and Administration														
Salaries & Wages	100	97.65%	97.65%	94.50%	95.15%	99.99%	95.25%	88.39%	\$ 9,673,937	\$ 9,009,476	\$ 8,707,658	\$ 9,675,002	\$ 9,459,000	\$ 9,851,135
Services	200	63.14%	63.14%	66.70%	67.07%	81.61%	53.05%	73.81%	\$ 2,516,056	\$ 2,997,589	\$ 3,228,503	\$ 3,083,000	\$ 5,650,000	\$ 4,374,100
Materials and Supplies	300	77.06%	77.06%	76.15%	68.39%	73.55%	79.73%	74.57%	\$ 631,090	\$ 899,390	\$ 859,256	\$ 858,000	\$ 1,128,000	\$ 1,152,218
Equipment	400	32.05%	32.05%	53.32%	61.00%	51.18%	29.24%	85.49%	\$ 55,271	\$ 214,297	\$ 475,462	\$ 108,000	\$ 733,000	\$ 556,190
Indemnities	500	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$ -	\$ -	\$ -	\$ 100,000	\$ 100,000	\$ 100,000
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Human Resources and Administration			84.15%	83.68%	82.95%	93.14%	76.86%	82.77%	\$ 12,876,354	\$ 13,120,752	\$ 13,270,879	\$ 13,824,002	\$ 17,070,000	\$ 16,033,643
Finance														
Salaries & Wages	100	90.19%	90.19%	92.25%	91.32%	116.72%	64.96%	98.72%	\$ 5,456,616	\$ 3,193,307	\$ 3,012,527	\$ 4,675,000	\$ 4,916,034	\$ 3,051,659
Services	200	93.04%	93.04%	92.05%	82.41%	92.91%	93.18%	90.27%	\$ 7,312,002	\$ 7,328,266	\$ 7,882,538	\$ 7,870,000	\$ 7,865,000	\$ 8,731,808
SMIP/GARP	2xx	100.00%	100.00%	100.00%	101.79%	100.00%	100.00%	100.00%	\$ 25,000,000	\$ 25,000,000	\$ 26,900,000	\$ 25,000,000	\$ 25,000,000	\$ 26,900,000
Materials and Supplies	300	37.79%	37.79%	44.63%	44.42%	5.09%	72.01%	54.06%	\$ 3,459	\$ 46,807	\$ 52,064	\$ 68,000	\$ 65,000	\$ 96,305
Equipment	400	49.04%	49.04%	59.03%	39.17%	34.28%	63.80%	108.98%	\$ 14,398	\$ 26,798	\$ 18,309	\$ 42,000	\$ 42,000	\$ 16,800
Indemnities	500	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		\$ -	\$ -	\$ -	\$ 10,000	\$ 10,000	\$ -
Transfers	800	72.21%	56.71%	59.99%	76.12%	40.21%	73.21%	66.54%	\$ 4,423,296	\$ 8,052,752	\$ 7,319,325	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000
Subtotal Finance			88.00%	88.93%	90.94%	86.74%	89.26%	90.74%	\$ 42,209,771	\$ 43,647,930	\$ 45,184,763	\$ 48,665,000	\$ 48,898,034	\$ 49,796,572
Construction and Engineering														
Salaries & Wages	100	97.99%	97.99%	94.45%	91.89%	113.40%	77.94%	81.84%	\$ 4,214,474	\$ 2,225,368	\$ 1,513,130	\$ 3,716,360	\$ 2,855,352	\$ 1,848,821
Services	200	84.53%	84.53%	87.50%	72.59%	85.07%	84.05%	96.68%	\$ 1,021,702	\$ 1,141,400	\$ 799,991	\$ 1,201,000	\$ 1,358,000	\$ 827,500
Materials and Supplies	300	48.71%	48.71%	44.13%	36.27%	53.04%	45.14%	38.04%	\$ 61,791	\$ 63,643	\$ 73,576	\$ 116,500	\$ 141,000	\$ 193,420
Equipment	400	44.44%	44.44%	40.53%	37.00%	82.24%	6.65%	10.57%	\$ 193,259	\$ 15,632	\$ 6,486	\$ 235,000	\$ 235,000	\$ 61,350
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Construction and Engineering			90.66%	88.59%	81.82%	104.22%	75.09%	81.65%	\$ 5,491,226	\$ 3,446,043	\$ 2,393,183	\$ 5,268,860	\$ 4,589,352	\$ 2,931,091

Note: Spend factors using 2-year average highlighted yellow and exceptions are highlighted in blue.

	Factor Used	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense			
		2 Year	3 Year	5 Year	2020	2019	2018	2020	2019	2018	2020	2019	2018	
Human Resources and Administration														
Salaries & Wages	100	97.65%	97.65%	94.50%	95.15%	99.99%	95.25%	88.39%	\$ 9,673,937	\$ 9,009,476	\$ 8,707,658	\$ 9,675,002	\$ 9,459,000	\$ 9,851,135
Services	200	63.14%	63.14%	66.70%	67.07%	81.61%	53.05%	73.81%	\$ 2,516,056	\$ 2,997,589	\$ 3,228,503	\$ 3,083,000	\$ 5,650,000	\$ 4,374,100
Materials and Supplies	300	77.06%	77.06%	76.15%	68.39%	73.55%	79.73%	74.57%	\$ 631,090	\$ 899,390	\$ 859,256	\$ 858,000	\$ 1,128,000	\$ 1,152,218
Equipment	400	32.05%	32.05%	53.32%	61.00%	51.18%	29.24%	85.49%	\$ 55,271	\$ 214,297	\$ 475,462	\$ 108,000	\$ 733,000	\$ 556,190
Indemnities	500	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	\$ -	\$ -	\$ -	\$ 100,000	\$ 100,000	\$ 100,000
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Human Resources and Administration			84.15%	83.68%	82.95%	93.14%	76.86%	82.77%	\$ 12,876,354	\$ 13,120,752	\$ 13,270,879	\$ 13,824,002	\$ 17,070,000	\$ 16,033,643
Finance														
Salaries & Wages	100	90.19%	90.19%	92.25%	91.32%	116.72%	64.96%	98.72%	\$ 5,456,616	\$ 3,193,307	\$ 3,012,527	\$ 4,675,000	\$ 4,916,034	\$ 3,051,659
Services	200	93.04%	93.04%	92.05%	82.41%	92.91%	93.18%	90.27%	\$ 7,312,002	\$ 7,328,266	\$ 7,882,538	\$ 7,870,000	\$ 7,865,000	\$ 8,731,808
SMIP/GARP	2xx	100.00%	100.00%	100.00%	101.79%	100.00%	100.00%	100.00%	\$ 25,000,000	\$ 25,000,000	\$ 26,900,000	\$ 25,000,000	\$ 25,000,000	\$ 26,900,000
Materials and Supplies	300	37.79%	37.79%	44.63%	44.42%	5.09%	72.01%	54.06%	\$ 3,459	\$ 46,807	\$ 52,064	\$ 68,000	\$ 65,000	\$ 96,305
Equipment	400	49.04%	49.04%	59.03%	39.17%	34.28%	63.80%	108.98%	\$ 14,398	\$ 26,798	\$ 18,309	\$ 42,000	\$ 42,000	\$ 16,800
Indemnities	500	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		\$ -	\$ -	\$ -	\$ 10,000	\$ 10,000	\$ -
Transfers	800	72.21%	56.71%	59.99%	76.12%	40.21%	73.21%	66.54%	\$ 4,423,296	\$ 8,052,752	\$ 7,319,325	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000
Subtotal Finance			88.00%	88.93%	90.94%	86.74%	89.26%	90.74%	\$ 42,209,771	\$ 43,647,930	\$ 45,184,763	\$ 48,665,000	\$ 48,898,034	\$ 49,796,572
Construction and Engineering														
Salaries & Wages	100	97.99%	97.99%	94.45%	91.89%	113.40%	77.94%	81.84%	\$ 4,214,474	\$ 2,225,368	\$ 1,513,130	\$ 3,716,360	\$ 2,855,352	\$ 1,848,821
Services	200	84.53%	84.53%	87.50%	72.59%	85.07%	84.05%	96.68%	\$ 1,021,702	\$ 1,141,400	\$ 799,991	\$ 1,201,000	\$ 1,358,000	\$ 827,500
Materials and Supplies	300	48.71%	48.71%	44.13%	36.27%	53.04%	45.14%	38.04%	\$ 61,791	\$ 63,643	\$ 73,576	\$ 116,500	\$ 141,000	\$ 193,420
Equipment	400	44.44%	44.44%	40.53%	37.00%	82.24%	6.65%	10.57%	\$ 193,259	\$ 15,632	\$ 6,486	\$ 235,000	\$ 235,000	\$ 61,350
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Construction and Engineering			90.66%	88.59%	81.82%	104.22%	75.09%	81.65%	\$ 5,491,226	\$ 3,446,043	\$ 2,393,183	\$ 5,268,860	\$ 4,589,352	\$ 2,931,091

Note: Spend factors using 2-year average highlighted yellow and exceptions are highlighted in blue.

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			Factor Used	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
				2 Year	3 Year	5 Year	2020	2019	2018	2020	2019	2018	2020	2019	2018
Division of Technology															
Salaries & Wages	100	80.05%	80.05%	81.84%	84.58%	78.96%	81.24%	85.95%	\$ 6,869,622	\$ 6,502,251	\$ 6,236,674	\$ 8,700,632	\$ 8,003,747	\$ 7,256,281	
Services	200	74.18%	74.18%	73.64%	73.55%	75.56%	72.86%	72.50%	\$ 15,123,111	\$ 15,249,284	\$ 13,806,992	\$ 20,015,542	\$ 20,930,724	\$ 19,043,874	
Materials and Supplies	300	67.82%	67.82%	70.28%	67.11%	71.96%	64.90%	75.00%	\$ 1,535,616	\$ 1,967,863	\$ 2,025,326	\$ 2,133,850	\$ 3,032,350	\$ 2,700,550	
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Subtotal Division of Technology			75.22%	75.49%	75.89%	76.27%	74.20%	76.10%	\$ 23,528,349	\$ 23,719,398	\$ 22,068,992	\$ 30,850,024	\$ 31,966,821	\$ 29,000,705	
Mayor's Office of Transportation & Utilities and Office of Sustainability															
Salaries & Wages	100	100.00%	100.00%	100.00%	99.95%	100.00%	100.00%	100.00%	\$ 202,433	\$ 202,424	\$ 202,424	\$ 202,424	\$ 202,424	\$ 202,424	
Services	200	100.00%	100.00%	100.00%	99.33%	100.00%	100.00%	100.00%	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000	
Materials and Supplies	300	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Subtotal Mayor's Office of Transportation & Utilities			100.00%	100.00%	99.87%	100.00%	100.00%	100.00%	\$ 232,433	\$ 232,424	\$ 232,424	\$ 232,424	\$ 232,424	\$ 232,424	
Philadelphia Water, Sewer and Storm Water Rate Board															
Salaries & Wages	100	100.00%	95.02%	49.84%	32.49%	97.61%	92.24%	18.67%	\$ 41,760	\$ 36,897	\$ 22,404	\$ 42,782	\$ 40,000	\$ 120,000	
Services	200	100.00%	54.50%	54.47%	42.03%	73.14%	26.52%	54.44%	\$ 548,683	\$ 132,615	\$ 462,749	\$ 750,200	\$ 500,000	\$ 850,000	
Materials and Supplies	300	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%		\$ -	\$ -	\$ -	\$ 25,000	\$ 25,000	\$ -	
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Subtotal Philadelphia Water, Sewer and Stormwater Rate Board						72.18%	30.00%	50.02%	\$ 590,443	\$ 169,512	\$ 485,153	\$ 817,982	\$ 565,000	\$ 970,000	

Note: Spend factors using 2-year average highlighted yellow and exceptions are highlighted in blue.

			Factor Used	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
				2 Year	3 Year	5 Year	2020	2019	2018	2020	2019	2018	2020	2019	2018
Public Property															
Salaries & Wages	100	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Leases	200	100.00%	100.00%	100.00%	100.00%		100.00%	100.00%	100.00%	\$ 4,270,347	\$ 4,265,847	\$ 4,256,817	\$ 4,270,347	\$ 4,265,847	\$ 4,256,817
Materials and Supplies	300	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	400	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transfers	800	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Public Property				100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	\$ 4,270,347	\$ 4,265,847	\$ 4,256,817	\$ 4,270,347	\$ 4,265,847	\$ 4,256,817
Fleet Management															
Salaries & Wages	100	94.86%	94.86%	94.72%	93.02%		95.37%	94.35%	94.44%	\$ 2,940,437	\$ 2,909,020	\$ 2,891,880	\$ 3,083,114	\$ 3,083,114	\$ 3,062,196
Services	200	92.38%	92.38%	84.80%	89.65%		85.29%	99.48%	69.63%	\$ 1,269,896	\$ 1,481,230	\$ 1,036,762	\$ 1,489,000	\$ 1,489,000	\$ 1,489,000
Materials and Supplies	300	77.00%	72.86%	75.75%	79.55%		73.63%	72.08%	81.54%	\$ 3,147,317	\$ 3,081,353	\$ 3,485,331	\$ 4,274,640	\$ 4,274,640	\$ 4,274,640
Equipment	400	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transfers	800	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Fleet Management				83.81%	83.88%	85.92%				\$ 7,357,650	\$ 7,471,603	\$ 7,413,973	\$ 8,846,754	\$ 8,846,754	\$ 8,825,836
City Finance															
Salaries & Wages	100	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits	1xx	100.00%	88.03%	92.66%	92.97%		87.73%	88.35%	103.42%	\$ 57,760,775	\$ 54,912,153	\$ 56,886,859	\$ 65,839,194	\$ 62,155,000	\$ 55,005,283
Pension	191	100.00%	103.12%	106.49%	105.40%		106.41%	99.70%	114.67%	\$ 71,612,808	\$ 64,686,954	\$ 62,666,813	\$ 67,300,000	\$ 64,881,002	\$ 54,652,000
Pension Obligations	190	100.00%	104.94%	107.87%	107.46%		109.69%	100.14%	114.55%	\$ 15,686,125	\$ 14,170,375	\$ 14,290,585	\$ 14,300,000	\$ 14,150,000	\$ 12,475,000
Services	200	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Materials and Supplies	300	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	400	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	52.13%	45.16%	55.12%	68.20%		52.13%	39.01%	73.87%	\$ 3,909,860	\$ 3,316,246	\$ 6,279,219	\$ 7,500,000	\$ 8,500,000	\$ 8,500,000
Transfers	800	0.00%								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal City Finance				93.90%	97.91%	98.20%	96.15%	91.58%	107.27%	\$ 148,969,568	\$ 137,085,728	\$ 140,123,476	\$ 154,939,194	\$ 149,686,002	\$ 130,632,283

Note: Spend factors using 2-year average highlighted yellow and exceptions are highlighted in blue.

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		Factor Used	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
			2 Year	3 Year	5 Year	2020	2019	2018	2020	2019	2018	2020	2019	2018
Revenue														
Salaries & Wages	100	93.70%	93.70%	95.61%	92.66%	92.91%	94.53%	99.76%	\$ 10,102,618	\$ 9,791,864	\$ 9,735,827	\$ 10,873,116	\$ 10,358,907	\$ 9,759,200
Services	200	96.03%	96.03%	95.94%	97.02%	96.02%	96.05%	95.76%	\$ 4,959,294	\$ 4,858,989	\$ 4,834,053	\$ 5,165,000	\$ 5,059,000	\$ 5,048,100
Materials and Supplies	300	59.25%	59.25%	60.47%	63.15%	37.01%	81.48%	62.91%	\$ 529,102	\$ 1,164,755	\$ 898,556	\$ 1,429,500	\$ 1,429,500	\$ 1,428,400
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	0.00%	0.00%	0.00%	2.79%	0.00%	0.00%	0.00%	\$ -	\$ -	\$ -	\$ 5,000	\$ 5,000	\$ 5,000
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Revenue			91.50%	92.70%	91.70%	89.23%	93.85%	95.24%	\$ 15,591,014	\$ 15,815,608	\$ 15,468,436	\$ 17,472,616	\$ 16,852,407	\$ 16,240,700
Procurement														
Salaries & Wages	100	81.89%	81.89%	85.83%	90.94%	68.65%	96.87%	94.57%	\$ 72,282	\$ 90,176	\$ 84,412	\$ 105,285	\$ 93,093	\$ 89,261
Services	200	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Materials and Supplies	300	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Procurement			81.89%	85.83%	90.94%	68.65%	96.87%	94.57%	\$ 72,282	\$ 90,176	\$ 84,412	\$ 105,285	\$ 93,093	\$ 89,261
Law														
Salaries & Wages	100	100.00%	100.00%	98.38%	94.59%	100.00%	100.00%	95.04%	\$ 2,569,445	\$ 2,569,445	\$ 2,381,984	\$ 2,569,445	\$ 2,569,445	\$ 2,506,206
Services	200	99.99%	99.99%	89.37%	63.73%	100.00%	99.97%	68.12%	\$ 691,589	\$ 691,440	\$ 471,162	\$ 691,614	\$ 691,614	\$ 691,614
Materials and Supplies	300	97.30%	97.30%	84.83%	76.40%	96.01%	98.59%	59.88%	\$ 41,295	\$ 42,404	\$ 25,753	\$ 43,010	\$ 43,010	\$ 43,010
Equipment	400	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Indemnities	500	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Transfers	800	0.00%							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal Law			99.96%	96.30%	87.82%	99.95%	99.98%	88.83%	\$ 3,302,329	\$ 3,303,289	\$ 2,878,899	\$ 3,304,069	\$ 3,304,069	\$ 3,240,830
Total Water Fund			90.97%	91.77%	91.92%	91.49%	90.43%	93.49%	\$ 542,027,687	\$ 521,548,393	\$ 505,908,230	\$ 592,441,170	\$ 576,725,039	\$ 541,141,465

Note: Spend factors using 2-year average highlighted yellow and exceptions are highlighted in blue.

Appendix E

Water Fund Historical O&M Costs

Description		Historical					
		2015	2016	2017	2018	2019	2020
PWD Operating and Maintenance Expenses Summary							
100	Salaries & Wages	\$ 118,718,437	\$ 118,414,751	\$ 125,010,184	\$ 132,309,261	\$ 137,155,996	\$ 149,776,460
1xx	Benefits	\$ 48,293,131	\$ 47,276,002	\$ 52,651,923	\$ 56,886,859	\$ 54,912,153	\$ 57,760,775
191	Pension	\$ 40,861,335	\$ 46,646,526	\$ 55,552,438	\$ 62,666,813	\$ 64,686,954	\$ 71,612,808
190	Pension Obligations	\$ 11,415,451	\$ 12,468,686	\$ 13,362,362	\$ 14,290,585	\$ 14,170,375	\$ 15,686,125
200	Services	\$ 107,412,392	\$ 106,570,050	\$ 127,171,308	\$ 125,564,692	\$ 138,073,835	\$ 136,371,779
220	Power	\$ 20,427,534	\$ 20,071,556	\$ 18,252,847	\$ 15,002,114	\$ 13,854,363	\$ 15,046,774
221	Gas	\$ 4,190,988	\$ 4,013,404	\$ 3,176,528	\$ 3,855,757	\$ 4,652,000	\$ 3,991,800
2xx	Services - Property Leases	\$ 3,959,919	\$ 4,042,633	\$ 4,042,633	\$ 4,256,817	\$ 4,265,847	\$ 4,270,347
2xx	SMIP/GARP	\$ 11,598,134	\$ 15,000,000	\$ 15,000,000	\$ 26,900,000	\$ 25,000,000	\$ 25,000,000
300	Materials and Supplies	\$ 23,180,707	\$ 22,505,723	\$ 25,773,136	\$ 25,210,739	\$ 25,953,178	\$ 25,095,689
307	Chemicals	\$ 22,324,969	\$ 21,075,520	\$ 18,728,508	\$ 21,771,176	\$ 22,115,310	\$ 22,886,203
400	Equipment	\$ 1,849,016	\$ 1,992,145	\$ 2,120,160	\$ 3,094,873	\$ 4,839,384	\$ 5,695,771
500	Indemnities	\$ 3,842,040	\$ 5,440,820	\$ 7,352,313	\$ 6,779,219	\$ 3,816,246	\$ 4,409,860
800	Transfers	\$ 6,244,621	\$ 8,100,186	\$ 12,097,064	\$ 7,319,325	\$ 8,052,752	\$ 4,423,296
Total PWD Operating and Maintenance Expenses Summary		\$ 424,318,674	\$ 433,618,002	\$ 480,291,404	\$ 505,908,230	\$ 521,548,393	\$ 542,027,687
PWD Operating and Maintenance Expenses Summary - Annual Increase		2015 - 2016		2016 - 2017	2017 - 2018	2018 - 2019	2019 - 2020
100	Salaries & Wages			5.57%	5.84%	3.66%	9.20%
1xx	Benefits			11.37%	8.04%	-3.47%	5.19%
191	Pension			19.09%	12.81%	3.22%	10.71%
190	Pension Obligations			7.17%	6.95%	-0.84%	10.70%
200	Services			19.33%	-1.26%	9.96%	-1.23%
220	Power			-9.06%	-17.81%	-7.65%	8.61%
221	Gas			-20.85%	21.38%	20.65%	-14.19%
2xx	Services - Property Leases			0.00%	5.30%	0.21%	0.11%
307	Chemicals			-11.14%	16.25%	1.58%	3.49%
400	Equipment			6.43%	45.97%	56.37%	17.70%
500	Indemnities			35.13%	-7.79%	-43.71%	15.55%
800	Transfers			49.34%	-39.50%	10.02%	-45.07%
Total PWD Operating and Maintenance Expenses Summary - Annual Increase				10.76%	5.33%	3.09%	3.93%
PWD Operating and Maintenance Expenses Summary - 2 Year Average Increase				2016 - 2018		2017 - 2019	2018 - 2020
100	Salaries & Wages			5.70%		4.75%	6.40%
1xx	Benefits			9.69%		2.12%	0.77%
191	Pension			15.91%		7.91%	6.90%
190	Pension Obligations			7.06%		2.98%	4.77%
200	Services			8.55%		4.20%	4.21%
220	Power			-13.55%		-12.88%	0.15%
221	Gas			-1.98%		21.02%	1.75%
2xx	Services - Property Leases			2.61%		2.72%	0.16%
2xx	SMIP/GARP			33.92%		29.10%	-3.60%
300	Materials and Supplies			5.84%		0.35%	-0.23%
307	Chemicals			1.64%		8.67%	2.53%
400	Equipment			24.64%		51.08%	35.66%
500	Indemnities			11.62%		-27.95%	-19.35%
800	Transfers			-4.94%		-18.41%	-22.26%
Total PWD Operating and Maintenance Expenses Summary - 2 Year Average Increase				8.01%		4.21%	3.51%
PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase							
100	Salaries & Wages					5.02%	6.21%
1xx	Benefits					5.12%	3.14%
191	Pension					11.51%	8.83%
190	Pension Obligations					4.36%	5.49%
200	Services					9.02%	2.36%
220	Power					-11.62%	-6.24%
221	Gas					5.05%	7.91%
2xx	Services - Property Leases					1.81%	1.84%
2xx	SMIP/GARP					18.56%	18.56%
300	Materials and Supplies					4.87%	-0.88%
307	Chemicals					1.62%	6.91%
400	Equipment					34.43%	39.01%
500	Indemnities					-11.15%	-15.67%
800	Transfers					-0.20%	-28.49%
Total PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase						6.35%	4.11%

Appendix F

O&M Cost Industry Indices Data

Fiscal Year	Price Indices					
	Consumer Price Index		Producer Price Index		Producer Price Index	
	All Urban Consumers Philadelphia Area		Materials for Construction		Construction Machinery & Equipment	
	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change
2017	247.2	-	231.7	-	219.9	-
2018	250.0	1.13%	240.5	3.80%	220.0	0.05%
2019	254.1	1.64%	250.4	4.12%	229.5	4.32%
2020	258.0	1.53%	252.2	0.72%	235.0	2.40%
3-Year Avg.	-	1.44%	-	2.87%	-	2.24%
2-Year Avg.	-	1.59%	-	2.40%	-	3.35%

Notes: All consumer and producer price indexes are from the Bureau of Labor Statistics. References are provided below.
 Indexes are presented as the fiscal year average based upon the associated Water Department's fiscal year.
 Indexes are not seasonally adjusted.

Index	Series Id (s)	Area	Items	Base Period
CPI - All Urban Consumers - Philadelphia Area	CUURA102SA0;CUUSA102SA0	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	All Items	1982-84=100

Index	Series Id	Group	Items	Base Date
PPI - Materials for Construction	WPUID612	Intermediate demand by commodity type	Materials and components for construction	198200
PPI - Construction Machinery & Equipment	WPU112	Machinery and equipment	Construction machinery and equipment	198200

Appendix G

Existing & Proposed Debt Service

Line		Fiscal Year Ending June 30,					
No.	Description	2021	2022	2023	2024	2025	2026
	Revenue Bonds						
1	Existing (a)	175,726	163,516	164,558	151,302	151,438	152,439
	Proposed						
2	Fiscal Year 2022 (b)		10,000	15,851	15,851	15,851	15,851
3	Fiscal Year 2023 (c)			21,875	33,948	33,948	33,948
4	Fiscal Year 2024 (c)				25,594	39,719	39,719
5	Fiscal Year 2025 (c)					18,375	28,516
6	Fiscal Year 2026 (c)						26,250
7	Total Proposed	-	10,000	37,726	75,393	107,893	144,284
8	Total Revenue Bonds	175,726	173,516	202,284	226,694	259,331	296,723
	Pennvest Loans						
9	Pennvest Loans - Parity Pennvest (d)	10,651	10,885	11,067	14,864	14,864	15,182
	Commercial Paper						
10	Commercial Paper	-	2,000	4,000	4,000	4,000	4,000
11	Total Senior Debt Service	186,377	186,401	217,351	245,558	278,195	315,905

(a) Includes the debt service for the Series 2020A and 2020B Bonds issued in FY 2021. Reflects debt service and savings from the Forward Refunding of the Series 2011A Bonds.

(b) Assumes interest-only payments for the first year of the bond amortization based on 5.00% interest. Also assumes bond issuance during the first quarter of the fiscal year.

(c) Assumes interest-only payments for the first year of the bond amortization based on 5.25% interest. Also assumes bond issuance during the first quarter of the fiscal year.

(d) Includes projected Pennvest Loan for the Torresdale Pump Station Rehabilitation.

Appendix H

Capital Cost Industry Indices

Fiscal Year	H.W. Index Cost of Construction Pump Plant - Equipment		H.W. Index Cost of Construction Treatment Plant - Equipment		H.W. Index Cost of Construction Transmission Plant - Steel Mains		H.W. Index Cost of Construction Distribution Plant - Mains		H.W. Index Cost of Construction Distribution Plant - Meters		McGraw-Hill (ENR) Construction Cost Index	
	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change
2012	780	10.17%	669	4.21%	711	10.40%	669	5.69%	646	1.73%	9,189.3	2.67%
2013	800	2.56%	689	2.99%	724	1.83%	698	4.33%	677	4.80%	9,424.2	2.56%
2014	856	7.00%	713	3.48%	694	-4.14%	720	3.15%	688	1.62%	9,672.1	2.63%
2015	928	8.41%	736	3.23%	712	2.59%	736	2.22%	702	2.03%	9,933.1	2.70%
2016	990	6.68%	755	2.58%	697	-2.11%	747	1.49%	709	1.00%	10,166.6	2.35%
2017	1,052	6.26%	774	2.52%	723	3.73%	774	3.61%	722	1.83%	10,534.5	3.62%
2018	1,146	8.94%	797	2.97%	733	1.38%	790	2.07%	750	3.88%	10,898.1	3.45%
2019	1,261	10.03%	832	4.39%	792	8.05%	819	3.67%	765	2.00%	11,194.7	2.72%
2020	1,374	8.96%	871	4.69%	824	4.04%	847	3.42%	790	3.27%	11,371.2	1.58%
2 Yr Avg												
2015	-	7.70%	-	3.35%	-	-0.83%	-	2.69%	-	1.83%	-	2.66%
2016	-	7.54%	-	2.90%	-	0.22%	-	1.86%	-	1.51%	-	2.52%
2017	-	6.47%	-	2.55%	-	0.77%	-	2.55%	-	1.41%	-	2.98%
2018	-	7.59%	-	2.74%	-	2.55%	-	2.84%	-	2.85%	-	3.54%
2019	-	9.48%	-	3.68%	-	4.66%	-	2.87%	-	2.93%	-	3.09%
2020	-	9.50%	-	4.54%	-	6.03%	-	3.54%	-	2.63%	-	2.15%
3 Yr Avg												
2015	-	5.96%	-	3.23%	-	0.05%	-	3.23%	-	2.81%	-	2.63%
2016	-	7.36%	-	3.10%	-	-1.26%	-	2.29%	-	1.55%	-	2.56%
2017	-	7.11%	-	2.77%	-	1.37%	-	2.44%	-	1.62%	-	2.89%
2018	-	7.29%	-	2.69%	-	0.97%	-	2.39%	-	2.23%	-	3.14%
2019	-	8.40%	-	3.29%	-	4.35%	-	3.11%	-	2.57%	-	3.26%
2020	-	9.31%	-	4.01%	-	4.46%	-	3.05%	-	3.05%	-	2.58%

Appendix I

Memo from the City Energy Office
Re: Escalation Factors for the Philadelphia Water Department

THE CITY OF PHILADELPHIA
OFFICE OF
SUSTAINABILITY

MEMO

TO: Melissa LaBuda, Philadelphia Water Department
CC: Jaclyn Rogers, Emily Hill, Paul Kohl, Madeline Schuh
FROM: Amanda Warwood
DATE: November 12, 2020
SUBJECT: Utility Escalation Factors for the Philadelphia Water Department

Background

At the request of the Philadelphia Water Department (PWD), this memo means to serve as a reference document for utility escalation prices for FY22-FY26 for PWD's use. The Energy Office, housed in the Office of Sustainability, purchases Electricity, Natural Gas and Vehicle Fuel on behalf of City government (including PWD) and has information relative to how the hedge purchases impact future costs.

Electricity

The City has purchases of electricity in place through Fiscal Year FY2022 and is planning to incorporate electricity into its portfolio from its executed solar electricity power purchase agreement (PPA) by June 2022. This PPA will serve as a 20-year hedge in electricity markets for future price increases. The City will not need to make an electricity hedge purchase for some time. After accounting for the electricity purchases already made, the solar PPA and future markets, the Energy Office anticipates no increase in rates into FY22 followed by a relatively flat escalation rate for electricity prices from FY22 to FY26 as outlined below.

Year Transition	Escalation Rate
FY21 to FY22	0.0%
FY22 to FY23	0.5%
FY23 to FY24	1.0%
FY24 to FY25	1.0%
FY25 to FY26	1.0%

The other significant portion of electricity costs come from distribution services provided by PECO. PECO does not presently have a rate case open and therefore no escalation costs are assumed from the distribution portion of the bill.

Natural Gas

The City has purchases of natural gas for Fiscal Years FY21 and FY22. Projections for future escalation curves beyond hedges are primarily based on the forward NYMEX natural gas market and Winter Basis Strips from Transco Z6 (NNY) North. Winter Basis strip prices are used as a proxy for all months as they tend to have the most volatile cost changes. PWD's use is not driven by weather patterns as much as the General Fund use and thus is more sheltered from the basis market (and price volatility). We do not anticipate significant increases to commodity prices for PWD over the next five years.

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SUSTAINABILITY

Beyond natural gas commodity, the other significant portion of natural gas costs come from distribution services provided by PGW. PGW filed a rate case in February 2020, and the Pennsylvania Public Utility Commission (PUC) is expected to issue a final order in November or December 2020. While the PUC has not issued a final order yet, a petition for settlement was filed and it is expected that the City's PGW rates will increase incrementally beginning January 2021. Based on the settlement petition, the City's overall natural gas costs will increase by approximately 7% by mid- FY23. This increase is based on the proposed increase schedule, and the City's portfolio of PGW accounts. This increase is expected to be followed by a relatively flat escalation through FY26. The Energy Office will share with PWD any changes from the PUC's final order when received. Please see the table below for the estimated year-over-year natural gas cost increases.

Year Transition	Escalation Rate
FY21 to FY22	5.5%
FY22 to FY23	1.5%
FY23 to FY24	1.5%
FY24 to FY25	1.0%
FY25 to FY26	1.0%

Next Steps

The Energy Office will provide regular updates to PWD on the purchases and impacts to electricity and natural gas rates, as well as escalation projections. Please feel free to reach out if there are any questions.

Amanda Warwood
Energy Manager
amanda.warwood@phila.gov
267-216-5887

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STORMWATER UNITS OF SERVICE

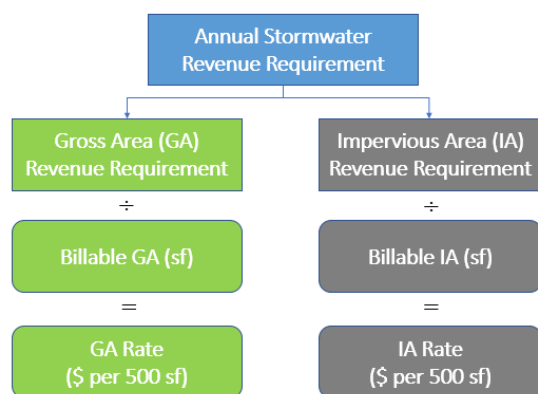
SCHEDULE BV-6: WP-2

This memorandum outlines the methodology used in developing the projections of the Billable Gross Area (GA) and Impervious Area (IA), collectively referred to as the “Stormwater Units of Service”, for the Water and Wastewater Cost of Service (COS) Study (Study) for the study period of FY 2021 through FY 2026 (Study Period).

Introduction

The Philadelphia Water Department (PWD or the Water Department) stormwater charge is comprised of a Billing and Collection charge and the Stormwater Management Services (SWMS) charge. The Billing and Collection charge is a fixed charge per account, whereas the SWMS charge is parcel area based. The SWMS Charge consists of two components: a Gross Area (GA) Charge and an Impervious Area (IA) Charge. These two charges are calculated based on the GA and IA square footage of a property and the associated GA and IA Rates. As illustrated in Figure 1, the system-wide GA and IA rates are determined based on the estimated GA and IA revenue requirements for a given fiscal year and the billable GA and IA square footage. *The Billable GA and IA Square Footage (sf) is also referred to as “Stormwater Units of Service”.*

Figure 1: Determination of GA and IA Rates



As part of the Study performed, the GA and IA units of service over the Study Period were estimated to support the development of the GA and IA rates for stormwater services provided under the Water Department’s wastewater utility. This memorandum explains the methods used in developing the projected billable GA and IA units of service and discusses the results of the units of service analysis.

Definitions

The following key terms are used throughout this memorandum.

1. **Gross Area (GA)** - Includes all of the property area within the legally described boundaries except streets, medians and sidewalks in the public right-of-way.
2. **Impervious Area (IA)** - Includes surfaces which are compacted or covered with material that restricts infiltration of water, including semi-pervious surfaces such as compacted clay, most conventionally hardscaped surfaces such as streets, driveways, roofs, sidewalks, parking lots, attached and detached structures, and other similar surfaces.

3. **Stormwater Management Incentives Program (SMIP)** – The Water Department’s stormwater grant program offered to non-residential property owners for stormwater retrofit projects.
4. **Green Acres Retrofit Program (GARP)** – The Water Department’s stormwater grant program offered to contractors, companies or project aggregators to build large-scale stormwater retrofit projects across multiple properties.
5. **Units of Service** – The system wide billable GA and IA square footage.
6. **Impervious Area Managed** - Impervious area that directs runoff to surface water bodies or to approved Stormwater Management Practices (SMPs). For the purposes of PWD’s credit program, IA managed is calculated in square footage.
7. **Impervious Area Reduction (IAR)** - Impervious area that is directed to a pervious area on a property or, based on the type of land cover, has characteristics similar to a pervious area.
8. **Adjustment Appeals** – PWD’s appeal program which enables customers to seek adjustments for billing inaccuracies including inaccurate parcel classification, incorrect parcel identification, residential sideyard, or for errors in the calculation of a parcel’s gross and/or impervious area.

Purpose

The primary purpose of the stormwater units of services analysis is to develop reasonable estimates of the billable GA and IA units of service for the Study Period of FY 2021 through FY 2026. The billable units of service are utilized in projecting the stormwater revenues under existing rates, as well as in developing the proposed GA and IA rates.

Updated Stormwater Billing Data

The Water Department recently obtained updated Stormwater Billing Data developed using [based upon 2015] aerial and infrared imagery. The updated data set provides new impervious area and gross area data for billing purposes for properties City-wide. The City-wide total impervious area is 1,299 million square feet (sf) and the total gross area is 2,447 million sf. Table 1 below presents the impervious area under the prior dataset¹ and the updated data set.

Table 1 Impervious Area Change by Customer Class

Line No.	Description	Prior Dataset (Square Feet)	Updated Dataset (Square Feet)	Variance (Square Feet)
1	Initial Impervious Area-Residential	482,687,000	555,204,000	72,517,000
2	Initial Impervious Area-Non- Residential	706,470,000	718,062,000	11,592,000
3	Initial Impervious Area-Condominium	22,198,000	25,635,000	3,437,000
4	Initial Impervious Area-Total	1,211,355,000	1,298,901,000	87,546,000

¹ Prior dataset is data from the Stormwater Database as of June 30, 2018.

Table 2 below presents the gross area under the prior dataset and updated dataset.

Table 2 Gross Area change by Customer Class

Line No.	Description	Prior Dataset (Square Feet)	Updated Dataset (Square Feet)	Variance (Square Feet)
1	Initial Gross Area-Residential	974,110,000	976,234,000	2,124,000
2	Initial Gross Area-Non- Residential	1,436,695,000	1,434,043,000	-2,652,000
3	Initial Gross Area-Condominium	32,284,000	36,979,000	4,695,000
4	Initial Gross Area-Total	2,443,089,000	2,447,256,000	4,167,000

- Overall, the updated billing data indicates an increase of 87.5 million sf of impervious area and an increase of 4.2 million sf of gross area when compared to the prior billing data set.
- The residential IA has increased 72.5 million sf and the residential GA has increased 2.1 million sf.
 - Residential customers are currently billed a uniform charge (per parcel) based upon the mean IA and GA square footage;
 - Based on the prior rate study (used in the 2018 general rate case), the mean residential IA per parcel was 1,050 sf and the mean GA per parcel was 2,110 sf².
 - With updated data set, the mean residential IA per parcel has increased to 1,200 sf.
 - Residential customers have not yet been impacted because the average IA and GA are used to establish the residential IA and GA rates, and would not see a change until updated stormwater rates are determined by the Rate Board.
 - Based upon the above, Black & Veatch has utilized the updated average residential IA and GA for projecting billable units of service for Study Period and determining residential rates for FY 2022 and FY 2023.
- The combined non-residential and condominium IA has increased by 15 million sf and the GA has increased by 2.0 million sf from the prior billing data set.
 - The Water Department has been in the process of updating all stormwater billing information for all customers.
 - Of the approximately, 75,500 Non-Residential parcels, roughly 7,010 Non-Residential Parcels would be impacted and of those parcels approximately 2,625 would be highly impacted³.
 - These properties have not been fully transitioned to their new billing data.
 - The Water Department would transition these properties to their new data, following this rate case (2021) and after such time that the Water Department can notify customer of the updated billing data and associated impacts to their respective bills.

² As reflected in the Rate Determination of the Water, Sewer and Storm Water Rate Board (Rate Board) dated July 12, 2018.

³ Accounts seeing a change of more than \$6 and 8-percent from their current stormwater charge are defined as highly impacted.

- Based upon the above, Black & Veatch has utilized the billing data currently in place to estimate units of service for FY 2021 and utilized the fully transitioned billing data set for the Study Period and determining non-residential rates for FY 2022 and FY 2023.

The fully transitioned stormwater data set is referred to as the FY 2022 data set, herein.

Adjustment Factors

In addition to the updated stormwater billing data, the GA and IA units of service projections are impacted by the following three “Adjustment Factors”:

- a. ***Adjustments for Stormwater Credits⁴***: Stormwater credits which are offered in the form of a reduction in GA and/or IA square footage;
- b. ***Adjustments for Stormwater Appeals***: Reduction in GA and IA square footage due to customer appeals; and
- c. ***Other Adjustments***: Reduction in GA and IA due to exempt Community Gardens⁵, Residential Side Yards and City Owned Vacant Properties.

The billable GA and IA units of service are projected taking into consideration any potential reduction or gain in billable square footage due to the above three Adjustment Factors.

Units of Service Analysis

This section provides an overview of the methodology used in the determination of the billable GA and IA units of service for the three customer classes: *Residential, Non-Residential, and Condominium*.

Classification of Parcels

PWD’s Rates and Charges (Effective September 1, 2020), Section 4 defines three classes for the purposes of SWMS Charge:

- **Residential Property** - Real estate used exclusively for residential purposes with at least one and no more than four dwelling units.
- **Non-residential Property** - Real estate which cannot be classified as either residential or condominium.
- **Condominium Property** – Real estate, portions of which are designated for separate ownership, and the remainder of which is designated for common ownership by the owners of those portions.

In determining the billable unit of service, identical methodology is used for both the Non-Residential and Condominium customer classes. For presentation purposes, the discussion on the Non-Residential class also encompasses the Condominium class.

⁴ As per PWD Rates and Charges Section 4.5 SWMS Credits.

⁵ As per 2016 Special Filing Rate Board Decision, PWD Rates and Charges Section 5.2 (f) and Philadelphia Code Section 19-1603.

System-Wide Billable GA and IA Units of Service Framework

The following key steps are used in the determination of the billable GA and IA square footage, which are as follows:

- **Step 1** – Project Initial GA and IA square footage for each customer class;
- **Step 2** – Project GA and IA adjustments for each of the three adjustment factors; and
- **Step 3** –Derive the billable GA and IA square footage for each customer class by applying the adjustments to the initial GA and IA square footage.

Step 1 – Project Initial GA and IA

The initial GA and IA refer to the baseline GA and IA square footage prior to the application of any Adjustment Factors. The Initial GA and IA for the Residential and Non-residential classes⁶ are projected by applying the Mean GA and IA to the projected number of parcels in each of those classes.

Residential Initial GA and IA

- **Mean GA & IA:** Based on the Fiscal Year 2022 Residential GA and IA and the number of parcels, the Residential Mean GA is 2,110 sf and the Mean IA is 1,200 sf.
- **Projected Number of Parcels:** The annual number of parcels projected for the Study Period is set to equal the FY 2022 number of parcels.
- **Initial GA & IA:** The Initial GA and IA for each year of the Study Period is derived by applying the Mean GA of 2,110 sf and Mean IA of 1,200 sf to the annual number of parcels determined for each year of the Study Period.

Non-Residential Initial GA and IA

- **Mean GA & IA:** Due to the significant diversity in the types of parcels within the non-residential and Condominium customer classes, sub-groups were delineated as illustrated in Figure 3. The Mean GA and Mean IA for FY 2022 is derived for each of the sub-groups based on the FY 2022 Mean GA and Mean IA. **Table SW-1** in Schedule BV-3 illustrates the FY 2022 Mean GA and Mean IA determined for each of the Non-residential and Condominium sub-groups.
- **Projected Number of Parcels:** The annual number of parcels projected for the Study Period is set to equal the FY 2022 number of parcels.
- **Initial GA & IA:** The Initial GA and IA for each year of the Study Period is derived by applying the FY 2022 Mean GA and Mean IA square footage of the sub-groups to the annual number of parcels determined for each year of the Study Period for each of those sub-groups.

Table SW-2 in Schedule BV-3 presents the projection of the Initial Parcel Count, Initial GA, and Initial IA estimated for the Residential, Non-Residential, and Condominium customer classes.

⁶ As noted earlier, the Water Department is currently integrating the 2015 impervious area data into the stormwater billing database. The FY 2021 initial GA and IA reflect the IA and GA data currently in use. This data set integrates all new IA and GA data with the exception of parcels most impacted by the update data set change. The full integration of the updated dataset is anticipated to occur in FY 2022. Therefore, the baseline GA and IA for projection purposes is assumed to be the full implemented in FY 2022. This is referred to as the “FY 2022” data set, herein.

Step 2 Project GA and IA Adjustments

The estimation of the potential reduction or gain in the billable GA and IA units involved an analysis of each of the three Adjustment Factors referenced in Section 3, namely:

- A. Adjustments for Stormwater Credits
- B. Adjustments for Appeals
- C. Other Adjustments

The approach used to estimate the impact on GA and IA units of service due to each of these three Adjustment Factors is discussed in the following sections.

A. Adjustments for Stormwater Credits

Stormwater fee credits, which are offered to Non-residential and Condominium properties for implementing and maintaining onsite stormwater management practices, cause a reduction in stormwater billing and ultimately stormwater revenues. To assure revenue adequacy, potential reduction in the billable GA and IA units of service due to credits need to be accounted for in designing the GA and IA rates.

Three primary types of stormwater management activities and/or programs are integral to private onsite stormwater management, each of which could result in the issuance of additional stormwater GA and IA credits during the Study Period. The three types of stormwater management activities/programs are:

1. Impervious Area Reduction (IAR) Practices
2. GA/IA Management Practices
3. SMIP/GARP Grants

The potential reduction in GA and IA credits, defined in terms of square footage, was estimated for each of these three types of activities/programs. The projections were developed based upon a review of the five-year historical data (FY 2016 through FY 2020) as provided by the Water Department, discussions with Department Stormwater Billing and Incentives Staff, and use the following approach(es):

IAR Practices – IAR practices refer to stormwater management practices that are typically deployed onsite by property owners to effectively reduce the impervious area square footage. IAR practices include tree canopy cover, impervious area disconnection, and down spout disconnections. The potential IA reduction during the Study Period due to these practices is estimated as follows:

Annual Estimated Additional IAR Credits (sf) = Number of additional IAR parcels projected for the fiscal year x Historical average IAR (sf) per parcel

- Historical average IAR (sf) per parcel Average IAR (sf) per parcel – The average IAR per parcel, determined using that 5-year trend, was estimated at 10,739 sf.
- Projection of Additional IAR Parcels – The number of IAR parcels from FY 2020 was used as the baseline for projection purposes. A five-year average annual growth rate of 58 parcels per year was estimated based on the growth rate from FY 2016 to FY 2020 and used to project the number of additional IAR parcels anticipated annually over the Study Period.

Average Impervious Area Reduction
per Parcel = 10,739 sf

Average five-year annual growth in
parcels with IAR practices = 58

Parcels with IAR Practices (FY 2020
Baseline) = 616

The annual growth in parcels is multiplied by the average credit per parcel (sf) to estimate the IA credit over the Study Period.

Table A-1 in the Appendix presents the historical IAR credits along with the annual growth rate and average IAR credit per parcel.

Table SW-5 in Schedule BV-3 presents the estimated additional number of parcels projected to receive IAR credits, and the associated reduction in Impervious Area estimated for the Study Period.

GA/IA Management Practices – The GA/IA Management Practices refer to stormwater management practices that are typically deployed to comply with the Water Department’s stormwater management regulations. The potential GA and IA reduction during the Study Period due to these GA/IA Management practices were estimated as follows:

Annual Estimated Additional GA/IA Managed Credits (sf) = Number of additional GA/IA Managed parcels projected for the fiscal year x Historical Average GA/IA Managed (sf) per parcel

- Average GA/IA Managed (sf) per parcel – The FY 2020 data was used as the baseline for the projection of GA & IA credits.
 - Parcel level data on the GA and IA credits issued in FY 2016 to FY 2020 was obtained from the Department, to determine the average square footage for GA and IA credits issued.
 - A review of the FY 2016 to FY 2020 GA/IA managed credits data revealed differences in the average GA and IA credits issued per parcel, between the “Surface Discharge” and “Non-Surface Discharge” properties, and by the type of credits issued.
 - Therefore, the average GA and IA credits were determined for the two discharge types, and by the type of credits granted historically.
 - Table 3 presents the results of the five year (FY 2016 to FY 2020) average GA and average IA credits by type (IA Managed, GA Managed, National Pollutant Discharge Elimination System [NPDES] and Open Space Credits) for the two types of stormwater discharges.

Table 3 Projection Factors for GA/IA Managed Credits

NON-SURFACE DISCHARGE ELIGIBLE PROPERTIES			SURFACE DISCHARGE ELIGIBLE PROPERTIES		
Line No.	Description	Average Per Parcel-Year End (5-Yr)	Line No.	Description	Average Per Parcel-Year End (5-Yr)
1	Parcel Growth	29	1	Parcel Growth	13
2	IA Managed (sf)- Average Per Parcel	22,392	2	IA Managed (sf)- Average Per Parcel	200,757
3	IA NPDES (sf)- Average Per Parcel	0	3	IA NPDES (sf)- Average Per Parcel	1,540
4	GA Managed (sf)- Average Per Parcel	20,998	4	GA Managed (sf)- Average Per Parcel	200,964
5	GA Open Space (sf)- Average Per Parcel	84,619	5	GA Open Space (sf)- Average Per Parcel	495,567
6	GA NPDES (sf)- Average Per Parcel	0	6	GA NPDES (sf)- Average Per Parcel	6,213

- Projection of Additional GA/IA Managed Parcels – As indicated in Figure 4, the 5-year average for number of parcels that were issued GA/IA managed credits between FY 2016 and FY 2020 for the Non-Surface and Surface Discharge types were 29 and 13 parcels, respectively.
 - Discussions with the Water Department staff indicated that recent short-term drops in credit enrollment are not believed to be indicative of longer-term trends; therefore, a more reasonable assumption would be to utilize the longer-term growth in parcels receiving credit to project overall program growth, for each succeeding fiscal year of the Study Period.
 - Based on the above, the number of parcels with GA/IA managed credits at the end of FY 2020 (798 parcels for Non-Surface Discharge and 310 parcels for Surface Discharge types) was assumed to be the baseline.
 - The 5-year annual growth in parcels was used to incrementally increase the total number of parcels receiving credit each succeeding fiscal year for the Study Period.

For each stormwater discharge and credit type, the annual growth in parcels is multiplied by the average IA and GA credit per parcel (sf) to estimate the IA and GA managed credits respectively during the Study Period.

Table A-2 in the Appendix presents the historical non-surface and surface credits along with the annual growth rate and average credits awarded per parcel.

Table SW-5 in Schedule BV-3 presents the estimated additional number of parcels projected to receive credit for the GA/IA Management Practices, and the associated square footage of GA and IA managed credits, for the Study Period.

SMIP and GARP – As defined earlier, SMIP and GARP are the two grant programs offered by the Water Department to incentivize private stormwater management. Properties that receive SMIP/GARP grants ultimately receive stormwater credit⁷. Therefore, the reduction in billable GA and IA sf resulting from SMIP/GARP grants needs to be estimated for the Study Period.

The annual SMIP/GARP grant budget is \$15 million in FY 2021 and remain at \$25 million per year throughout from FY2022 to FY2026. This annual budget includes program administration costs and services which amount to roughly \$600,000, therefore the budget available for reward is reduced accordingly, as summarized in **Table SW-6**.

Estimation of Potential GA and IA Credits

The potential GA and IA credits resulting from the SMIP/GARP awards are estimated through a two-step approach:

- **STEP 1:** Estimate the amount of “greened acres” that could result from the annual SMIP and GARP award amounts.
- **STEP 2:** Estimate the amount of GA and IA credits for the greened acres deployed.

STEP 1: Based on a review of the completed SMIP/GARP project data as provided by the Department provided as well as discussions with the SMIP/GARP technical review team, the following assumptions were used in projecting greened acres:

- The average grant amount awarded per greened acre for the SMIP/ GARP projects was estimated to be \$185,000 for FY 2020.
- The average grant amount awarded per greened acre is escalated 4-percent annually based upon anticipated increases in construction costs. The resulting average grant award amount in FY 2021 is \$192,400. The average grant awarded is escalated for each year of the Study Period.
- The runoff depth to be managed by each resulting project is 1.5 inches, as per PWD’s credits policies.

Using the average award per greened acre, the available grant award amount (which is calculated as the annual SMIP/GARP program budget less administration costs) is then translated to estimate the number of resulting greened acres.

Then the estimated number of resulting greened acres is translated into managed GA and IA square footage by converting acres to square feet and accounting for the depth of runoff managed.

STEP 2: The GA and IA managed credits are calculated for the estimated managed area determined in Step 1, for each fiscal year, taking into account the following factors:

⁷ Upon the completion and verification of the Stormwater Management Practice (SMP) installation.

- SMIP/GARP projects are currently estimated to take 24 months to complete construction and begin receiving credit (from the award date); and
- Projects are assumed to be awarded credit based upon the managed impervious area (per current stormwater credit policies) at 80% for IA and 80% GA for the corresponding GA.

The total GA and IA credits for each fiscal year are then calculated as the sum of the GA and IA credits estimated for the SMIP/ GARP projects.

Table SW-9 in Schedule BV-3 presents the estimated additional square footage of GA and IA managed credits, resulting from SMIP/GARP grant awards for the Study Period.

B. Adjustments for Stormwater Appeals

Stormwater adjustment appeals, which customers can seek for inaccurate property classification, and GA and IA data exceptions, have the potential to cause a reduction in the billable GA and IA units of service; these adjustments primarily occur for the Non-residential and customer class. The potential reduction in GA and IA due to stormwater appeals, was estimated for the Study Period.

- A review of the appeals data for FY 2015 through FY 2020 obtained from the Water Department indicates a year-to-year decrease in the number of appeals in all years except in FY 2016. The two-year average (FY 2019 & FY 2020) decrease in number of appeals was 59.
- The two-year average (FY 2019 & FY 2020) total number of parcels was used to establish a baseline estimate for the number of appeals in FY 2021; thereafter, it is estimated that during each year of the Study Period, the number of appeals will gradually decrease, as shown in the inset box, based upon the average decrease in number of appeals.
- The two year (FY 2019 & FY 2020) average reduction in GA and IA sf per appeal is 4,385 sf and 3,865 sf, respectively. These values are applied to the estimated number of appeals to determine the reduction in billable GA and IA units of service for each year of the Study Period.

Number of Appeals	
Actual	Projected
FY 2015: 335	FY 2021: 168
FY 2016: 393	FY 2022: 109
FY 2017: 332	FY 2023: 50
FY 2018: 237	FY 2024: 0
FY 2019: 216	FY 2025: 0
FY 2020: 120	FY 2026: 0

Table A-3 in the Appendix presents the historical appeals along with the annual change in growth rate and average appeals granted per parcel.

Table SW-3 in Schedule BV-3 shows the reduction in billable GA and IA for the non-residential class due to stormwater appeals.

C. Other Adjustments

Community Gardens – Approved community gardens (Community Gardens) receive a 100% discount on their stormwater bill. This is reflected as a reduction in billable GA and IA units of service. Therefore, the potential reduction in GA and IA due to Community Gardens applications approved is estimated for the Study Period.

- A review of the community gardens tracking data for FY 2017 through FY 2020 provided by the Water Department indicates a year-to-year increase in the number of approved community gardens. For projection purposes, it is assumed that the number of parcels receiving the community gardens discount will continue to grow by 17 parcels per year (based upon the most recent annual increase in number of community gardens). The number of community gardens parcels estimated for the Study Period is shown in the inset box.
- The FY 2020 average reduction in GA and IA square footage per community garden parcel is 11,380 and 454, respectively. These values are applied to the estimated number of community garden parcels to determine the reduction in billable GA and IA units of service for each year of the Study Period.

<u>Number of Community Gardens</u>	
Actual	Projected
FY 2017: 14	FY 2021: 174
FY 2018: 101	FY 2022: 191
FY 2019: 140	FY 2023: 208
FY 2020: 157	FY 2024: 225
	FY 2025: 242
	FY 2026: 259

Table A-4 in the Appendix presents the historical community gardens information along with the annual change in growth rate and average discount granted per parcel, as expressed in terms of IA and GA square footage.

Tables SW-2, SW-3 and SW-4 in the Schedule BV-3 present the projections of reduction in the number of parcels; the reduction in billable GA and the reduction in billable IA by customer class due to ‘Other Adjustment’ appeals.

Step 3 - Projection of Billable GA and IA Units of Service

The third and final step in the units of service analysis is to compute the final billable GA and IA units of service for each of the three customer classes. The final billable GA and IA units of service are derived by deducting the total units of service adjustments from the Initial GA and IA units of service.

Table SW-10 presents a summary of the billable number of parcels, the billable GA, and the billable IA estimated for each customer class and for each year of the Study Period.

In summary, while the total billable IA and billable GA for Residential customer class are projected to remain relatively flat throughout the majority Study Period, the billable IA and GA for the non-residential and condominium classes are projected to decrease due to credits, appeals and other adjustments. In total:

- Billable IA is projected to decrease overall from 1,175 million square feet in FY 2021 to 1,156 million square feet by FY 2026.
- Billable GA is projected to decrease from 2,103 million square feet in FY 2021 to 2,028 million square feet in FY 2026.

APPENDIX A – HISTORICAL DATA

Table A-1 – Historical IAR Credits (FY 2013-2020)

Line No.	Fiscal Year Ending June 30	Total No. of Parcels	IA Loss (sf)	Parcel Growth/ Change	IA Loss Per Parcel
1	2013	255	5,097,161		19,989
2	2014	272	4,251,503	17	15,631
3	2015	324	4,559,863	52	14,074
4	2016	412	5,024,187	88	12,195
5	2017	378	4,415,022	(34)	11,680
6	2018	579	6,209,567	201	10,725
7	2019	597	6,041,082	18	10,119
8	2020	616	5,531,161	19	8,979
9	5-Yr Average	516	5,444,204	58	10,739

Notes:

For credit projections, 5-Year average projection factors are being used.

Table A-2 – Historical Credits for Non- Surface and Surface Discharge Eligible Properties (FY 2013-2020)

CREDITS FOR NON SURFACE DISCHARGE ELIGIBLE PROPERTIES																	
	Fiscal Year Ending	Number of				Total						Parcel	Open Space GA	IA Managed		IA NPDES	GA NPDES
Line #	June 30,	Parcels	Gross Area	Impervious Area	Total Gross Credit	Impervious Credit	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Growth/Change	Credit (Per Parcel)	Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	Credit (Avg per parcel)	GA NPDES Credit (Avg per parcel)
1	2013	604	223,367,443	61,793,808	84,520,414	17,965,807	67,429,822	11,563,893	10,305,605	-	-		111,639	19,146	17,062	-	-
2	2014	653	257,321,475	76,969,015	94,009,369	20,633,398	55,499,304	12,668,858	11,410,570			49	84,991	19,401	17,474	-	-
3	2015	670	264,384,894	83,734,431	100,305,627	25,029,525	54,712,505	13,777,050	12,373,766	-	-	17	81,660	20,563	18,468	-	-
4	2016	695	308,606,388	110,633,550	119,638,164	33,170,833	60,658,419	16,434,037	15,025,143			25	87,278	23,646	21,619	-	-
5	2017	767	348,805,332	118,146,821	138,022,843	33,920,101	72,445,173	15,539,131	14,141,507	-	-	72	94,453	20,260	18,437	-	-
6	2018	823	314,434,590	113,476,770	144,822,988	39,742,752	72,337,150	19,141,871	17,744,247	-	-	56	87,894	23,259	21,560	-	-
7	2019	782	310,134,440	115,126,357	149,679,885	41,344,307	62,542,914	16,212,413	15,425,254			(41)	79,978	20,732	19,725	-	-
8	2020	813	322,039,967	120,201,957	160,913,257	45,539,961	59,748,724	19,565,431	19,223,758	-	-	31	73,492	24,066	23,645	-	-
9	5-Yr Average	776	320,804,143	115,517,091	142,615,427	38,743,591	65,546,476	17,378,577	16,311,982	-	-	29	84,619	22,392	20,998	-	-
CREDITS FOR SURFACE DISCHARGE ELIGIBLE PROPERTIES																	
	Fiscal Year Ending	Number of				Total						Parcel	Open Space GA	IA Managed		IA NPDES	GA NPDES
Line #	June 30,	Parcels	Gross Area	Impervious Area	Total Gross Credit	Impervious Credit	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Growth/Change	Credit (Per Parcel)	Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	Credit (Avg Per parcel)	GA NPDES Credit (Avg per parcel)
10	2013	152	220,024,320	79,752,423	129,107,867	47,612,306	80,471,840	43,703,240	43,717,412	1,500,062	2,575,193		529,420	287,521	287,615	9,869	16,942
11	2014	212	272,919,261	91,624,837	170,699,769	53,693,207	114,259,551	49,493,761	49,668,409	1,580,879	2,681,653	60	538,960	233,461	234,285	7,457	12,649
12	2015	246	283,413,656	98,224,301	176,930,329	60,226,500	122,127,335	55,736,478	47,311,404	1,524,473	2,590,089	34	496,453	226,571	192,323	6,197	10,529
13	2016	273	253,507,206	84,881,856	192,946,835	61,024,331	127,568,199	58,166,690	58,101,140	250,387	428,721	27	467,283	213,065	212,825	917	1,570
14	2017	312	289,520,162	88,550,428	223,008,811	63,952,942	151,024,452	61,284,210	61,338,258	242,176	423,291	39	484,053	196,424	196,597	776	1,357
15	2018	318	331,071,935	98,430,878	227,585,196	66,195,369	149,779,130	62,881,606	62,901,801	726,596	3,097,451	6	471,004	197,741	197,804	2,285	9,740
16	2019	308	340,151,826	95,665,431	241,876,061	65,118,503	165,977,231	62,023,047	62,089,933	621,466	2,942,661	(10)	538,887	201,374	201,591	2,018	9,554
17	2020	312	330,347,932	93,855,746	236,698,310	64,145,133	161,182,489	60,896,113	61,152,874	531,051	2,759,029	4	516,611	195,180	196,003	1,702	8,843
18	5-Yr Average	305	308,919,812	92,276,868	224,423,043	64,087,256	151,106,300	61,050,333	61,116,801	474,335	1,930,231	13	495,567	200,757	200,964	1,540	6,213

Table A-3 – Historical Appeals, IA and GA Loss (FY 2013-2020)

SUMMARY TABLE 2A: HISTORICAL APPEALS								
Line No.	Fiscal Year Ending June 30	Total No. of Parcels	IA Loss (sf)	GA Loss (sf)	Parcel Reduction/ Change	IA Loss Per Parcel (sf)	GA Loss Per Parcel (sf)	
1	2013	531	4,314,593	570,367	262	8,130	1,070	
2	2014	423	1,497,566	385,468	108	3,540	910	
3	2015	335	989,841	2,168,335	88	2,950	6,470	
4	2016	393	1,560,294	14,863	(58)	3,970	40	
5	2017	332	655,318	(151,566)	61	1,970	(460)	
6	2018	237	896,103	1,292,493	95	3,780	5,450	
7	2019	216	913,347	1,132,098	21	4,230	5,240	
8	2020	120	419,553	424,065	96	3,500	3,530	
9	2-Yr Average	168	666,450	778,082	59	3,865	4,385	

Table A-4 – Historical Community Gardens Parcels, IA and GA (FY 2017-2020)*

Line No.	Fiscal Year Ending June 30	Total No. of Parcels	IA (sf)	GA (sf)	Parcel Growth/ Change	IA Per Parcel (sf)	GA Per Parcel (sf)
1	2017	14	687	62,131		49	4,438
2	2018	101	65,346	1,157,491	87	647	11,460
3	2019	140	70,094	1,753,443	39	501	12,525
4	2020	157	71,228	1,786,600	17	454	11,380
5	Recent Year	157	71,228	1,786,600	17	454	11,380

*Data compiled beginning in 2017, following the rate determination in 2016 Special Rate Proceeding authorizing the Community Gardens special rate (which became effective January 1, 2017).

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COST RECOVERY OF DISCOUNTS, CREDITS, GRANTS, AND TAP

SCHEDULE BV-6: WP-3

This memorandum outlines the cost recovery approach used for billing discounts, stormwater credits, incentives, grants and the Tiered Assistance Program (TAP). These approaches were used in development of the Fiscal Year (FY) 2021 - FY 2026 financial plan in conjunction with the FY 2022 - FY 2023 Rate Proceeding.

Program Name	Cost Recovery Approach
Discounts	<ul style="list-style-type: none"> Proportionate recovery from all retail service types. Includes discounts provided to senior citizens, the Philadelphia Housing Authority (PHA) and charities (including schools, universities, colleges, hospitals, and places used for actual religious worship).
Utility Emergency Services Fund (UESF) Grants	<ul style="list-style-type: none"> Proportionate recovery from all retail service types.
Tiered Assistance Program (TAP)	<ul style="list-style-type: none"> Proportionate recovery of program administration and support from all retail service types. Discounts provided to TAP customers (i.e., TAP lost revenue referred to as TAP Costs in the TAP Rate Rider) recovered via the TAP Rate Rider surcharge rates, which are included in the overall water and sewer quantity charges.
Stormwater Management Incentives Program (SMIP) & Greened Acre Retrofit Program (GARP) Grants	<ul style="list-style-type: none"> Recovered by Wastewater (<i>Sanitary Sewer & Stormwater</i>) revenues. Proportionate recovery from applicable wastewater wholesale customers¹ and all retail service types.
Stormwater Credits	<ul style="list-style-type: none"> Recovered via <u>Stormwater</u> Revenues. Proportionate recovery from <u>all</u> retail service types. Includes Community Gardens.
Stormwater Customer Assistance Program (CAP)	<ul style="list-style-type: none"> Recovered by <u>Non-residential service type</u> Stormwater Revenues.

Notes:

- SMIP/GARP is recovered from wastewater wholesale customers in accordance with their contract terms.

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SENIOR CITIZEN INCOME THRESHOLD ADJUSTMENT SCHEDULE BV-6: WP-4

This document provides the approach for the determination of income threshold for the senior citizens discount per the Code of General Ordinances of the City of Philadelphia (the Philadelphia Code) and also as reflected in the Philadelphia Water Department’s (PWD or the Water Department) Rates and Charges.

Background

The senior citizen discount is codified in the Philadelphia Code Chapter 19-1900. Section 19-1901 of the Philadelphia Code defines an “Eligible Senior Citizen” as follows:

“A residential customer of record of the Water Department age sixty-five (65) or older residing in the City of Philadelphia whose gross annual household income does not exceed as set forth below;

An amount not to exceed fourteen thousand (\$14,000) dollars, except as adjusted to reflect the net change in the Consumer Price Index (All Urban Consumers (CPI-U) for Philadelphia (All Items)), such adjustment to occur from time to time at the discretion of the Water Commissioner, but no less often than at each general residential customer rate determination.”

Methodology

Per the Philadelphia Code, Black & Veatch Management Consulting, LLC (Black & Veatch) has evaluated the senior citizen income discount threshold for inclusion in the current rate proceeding. Described below is the calculation methodology followed to determine the appropriate threshold level.

Baseline Income Threshold

The baseline income threshold for senior citizen discount utilized was \$14,000 in fiscal year (FY) 1987, the year Section 19-1901, as amended, went into effect. Each year thereafter, this amount was escalated, as described in the paragraph below. Per the FY 2019 - FY 2020 Rate Determination (the Rate Determination), the current senior citizen income threshold, as stated in Section 5.2(b)(1)(iii) of the Water Department’s Rates and Charges (Effective September 1, 2020), is \$32,300.

Escalation Factor

The escalation factor is determined using the Consumer Price Index (CPI) data obtained from the Bureau of Labor Statistics (BLS) website. The report generated from the BLS website is for item and regional indices as specified in the ordinance above. The report specifications are:

CPI-All Urban Consumers (Current Series) Original Data Value Not Seasonally Adjusted Area: Philadelphia-Wilmington-Atlantic City, PA-NJ All Items Base Period: 1982-84=100 Years: 1982 to 2020

We use the index for April to determine the escalation factor applied to the baseline income threshold because it is the latest month for which data is available to update the threshold before the start of the next fiscal year.

Calculation of New Income Threshold

Black & Veatch calculated the new income threshold for senior citizen discounts by escalating the baseline income threshold with the escalation factor determined above. The calculated amount calculated is rounded up to the nearest \$100.

For purposes of income threshold projections in future years, Black & Veatch recommends projecting the escalation factor as the average annual change in the CPI over the most recent five years. The most recent CPI Escalation Factor is multiplied by the average change in CPI to calculate the projected escalation factors. Following the same process, as used in the current proceeding, we would then determine the new threshold for senior citizen discount by escalating the baseline threshold (i.e., \$14,000) by the resulting escalation factors. The amount calculated is then rounded up to the nearest \$100.

Results

The tables that follow present the results of the senior citizen discount income threshold calculations.

Table 1 presents the escalation factors, calculated income thresholds, and annual change in CPI from FY 1987 through FY 2021.

Table 1 Senior Citizen Discount – Income Threshold Calculation

Fiscal Year	CPI Reference Date	CPI Value	CPI Escalation Factor	CPI Adjusted Income	Annual Change in CPI Adjusted Income
1986	Apr 1985	108.100			
1987	Apr 1986	110.000	1.00	\$ 14,000.00	
1988	Apr 1987	115.500	1.05	\$ 14,700.00	5.00%
1989	Apr 1988	120.000	1.09	\$ 15,272.73	3.90%
1990	Apr 1989	126.700	1.15	\$ 16,125.45	5.58%
1991	Apr 1990	134.300	1.22	\$ 17,092.73	6.00%
1992	Apr 1991	140.800	1.28	\$ 17,920.00	4.84%
1993	Apr 1992	145.400	1.32	\$ 18,505.45	3.27%
1994	Apr 1993	149.600	1.36	\$ 19,040.00	2.89%
1995	Apr 1994	153.100	1.39	\$ 19,485.45	2.34%
1996	Apr 1995	157.800	1.43	\$ 20,083.64	3.07%
1997	Apr 1996	162.100	1.47	\$ 20,630.91	2.72%
1998	Apr 1997	166.000	1.51	\$ 21,127.27	2.41%
1999	Apr 1998	167.100	1.52	\$ 21,267.27	0.66%
2000	Apr 1999	171.100	1.56	\$ 21,776.36	2.39%
2001	Apr 2000	175.800	1.60	\$ 22,374.55	2.75%
2002	Apr 2001	181.200	1.65	\$ 23,061.82	3.07%
2003	Apr 2002	183.100	1.66	\$ 23,303.64	1.05%
2004	Apr 2003	187.200	1.70	\$ 23,825.45	2.24%
2005	Apr 2004	194.800	1.77	\$ 24,792.73	4.06%
2006	Apr 2005	203.300	1.85	\$ 25,874.55	4.36%
2007	Apr 2006	211.600	1.92	\$ 26,930.91	4.08%
2008	Apr 2007	215.270	1.96	\$ 27,398.00	1.73%
2009	Apr 2008	223.622	2.03	\$ 28,460.98	3.88%
2010	Apr 2009	221.686	2.02	\$ 28,214.58	-0.87%
2011	Apr 2010	227.432	2.07	\$ 28,945.89	2.59%
2012	Apr 2011	233.143	2.12	\$ 29,672.75	2.51%
2013	Apr 2012	237.782	2.16	\$ 30,263.16	1.99%
2014	Apr 2013	240.345	2.18	\$ 30,589.36	1.08%
2015	Apr 2014	243.694	2.22	\$ 31,015.60	1.39%
2016	Apr 2015	243.717	2.22	\$ 31,018.53	0.01%
2017	Apr 2016	245.300	2.23	\$ 31,220.00	0.65%
2018	Apr 2017	248.411	2.26	\$ 31,615.95	1.27%
2019	Apr 2018	251.850	2.29	\$ 32,053.64	1.38%
2020	Apr 2019	256.528	2.33	\$ 32,649.02	1.86%
2021	Apr 2020	256.353	2.33	\$ 32,626.75	-0.07%

Notes: CPI Adjusted Income for FY 1987 and CPI Indices as per the Philadelphia Code.

Table 2 presents the average change in CPI over the most recent 5-year, 10-year, 15-year, and 20-year timeframes.

Table 2 Average Annual Change in CPI

Description	Average Annual Change
5-Year Average	1.02%
10-Year Average	1.21%
15-Year Average	1.57%
20-Year Average	1.91%

Table 3 presents the projected senior citizen income thresholds using the 5-year average escalation factor.

Table 3 Projections for Senior Citizen Income Threshold

Fiscal Year	Annual CPI Income Change	CPI Escalation Factor Used	Projected CPI Adjusted Income	Projected Income Threshold for PWD Use
Current Threshold				\$32,300
2022	1.02%	2.35	\$32,959	\$33,000
2023	1.02%	2.38	\$33,295	\$33,300

Notes: CPI Escalation Factor used is based on the 5-year average change in CPI

Based upon the senior citizen income threshold of \$14,000 established by the Philadelphia Code for FY 1987 and the projected adjustments per CPI, Black & Veatch recommends that the senior income threshold be adjusted to \$33,300 in FY 2022 in conjunction with the upcoming rate proceeding for the requested rate period of FY 2022 to FY 2023.

MISCELLANEOUS FEES METHODOLOGY

SCHEDULE BV-6: WP-5

This document outlines the methodology used in updating the Philadelphia Water Department (“PWD”) miscellaneous fees for the FY 2022 - FY 2023 rate proceeding (“current rate proceeding”). Under the current rate proceeding, updates to 105 existing miscellaneous fees are proposed (including 22 corresponding overtime-related fees) as noted in Schedule BV-4: Tables M-1 and M-2. The methodology for calculating 104 of the cost-based fees miscellaneous fees is presented in Section 1 of this document. PWD is proposing two new miscellaneous fees, applicable to the Tiered Assistance Program (“TAP”) customers as part of the current proceeding. The methodology used for determining these two TAP related fees is presented in Section 2 of this document. An update to the Stormwater Management Fee In Lieu is also proposed; the associated methodology is presented in Section 3.

1. Methodology

The methodology used to calculate the miscellaneous fees in the current rate proceeding is consistent with the methodology utilized in calculating the fees adopted in 2018 Rate Determination, and further described in the following sections.

The water and wastewater miscellaneous fees were updated based on cost inputs provided by the PWD staff. The costs are categorized as follows and further documented in the appendix:

- i. Labor Costs
- ii. Equipment Costs
- iii. Materials Costs
- iv. Contractor Costs

The calculated charge is determined by summing all the cost inputs (as applicable) for a given miscellaneous fee. The following section further elaborates on the determination of each of the costs listed above. Appendix A provides the associated workpapers and calculations used to develop the proposed charges.

1.1 Labor Costs

The Labor costs use the average hourly rate for the staff position and the total labor hours spent on that task. The hourly rate for the position has a direct cost component and an indirect cost component.

- **Direct Cost Component:** This consists of the average hourly rate for the staff position based on the updated annual salary information provided by PWD and divided by 2,080 paid working hours per year for the work performed during PWD’s business hours (defined as weekdays between 9:00 a.m. and 4:45 p.m.). For work performed during non-business hours, an overtime component is added to the average hourly rate for eligible staff “covered” under the FLSA (Fair Labor Standards Act) to determine the direct labor cost component.

- Indirect Cost Component: This consists of the Indirect Cost Rate as per PWD’s FY 2018 Indirect Cost Rate Proposal, applied to the direct cost component above.

The sum of the direct and indirect labor costs is used to determine the fully burdened hourly rate for a given staff position. The labor hours used in this analysis reflect the overall effort to support these specific tasks as provided by PWD during the previous miscellaneous fees study conducted in 2017. These are the same labor hours estimates used to establish the miscellaneous fees adopted during the 2018 Rate Determination, except for the following Stormwater Plan Review Fees:

- Conceptual Stormwater Plan Approval
- Post Construction Stormwater Plan Submission
- Post Construction Stormwater Plan Approval (Additional Review Time)

The labor hour estimates and the staff positions utilized for these three fees were updated due to the change in the process followed by PWD since the prior Study, which included online submission of plans, elimination of contractor reviews and hiring new staff to assist with the process moving in-house. The total labor costs for a task is the sum of labor costs for all staff involved in the task.

1.2 Equipment Costs

The Equipment cost rate are based on the latest (2019) Federal Emergency Management Agency (“FEMA”) hourly rates published on the FEMA website and utilized City-wide for vehicle and equipment reimbursement. The equipment cost for the task is the product of the 2019 hourly rate for the specific equipment use and the total time spent on that task. As noted earlier, the time spent on a job and the various equipment used for the task is the same as that used in the miscellaneous fee study during the prior rate proceeding. The total equipment cost for the job reflects the sum of the expenses for all the equipment used for the particular task.

1.3 Materials Costs

The Materials cost reflect updated materials pricing provided by PWD. The type of materials and the quantity of the materials for any given task is the same as the prior study. The total material cost for the job is the sum of the expenses for all the material types used for the task.

1.4 Contractor Costs

The miscellaneous fees updated as part of the current rate proceeding do not have any contractor costs associated with them.

2. Methodology – Proposed TAP Customers Shutoff and Restoration Fee

The following new fees related to TAP customers are introduced in the current rate proceeding:

- a. Shutoff service for non-payment; and payment is tendered at the time of shut-off
- b. Restore water service after termination for non-payment or violation of service requirement

The new fees, applicable only to TAP customers, are not calculated per the methodology outlined above and are not cost of service based. Rather, these fees are set equal to the minimum bill (\$12) for the TAP customers as a matter of policy. These fees are separate from the customer’s monthly TAP bill and only incurred if a TAP customer’s service is shutoff for non-payment or service is restored after termination.

3. Stormwater Management Fee In Lieu

The Stormwater Management Fee In Lieu Exemption to Water Quality is not calculated based on the methodology outlined in Section 1. This fee is used when a developer/property owner has triggered PWD's stormwater management requirements and demonstrates it is not feasible to construct the required stormwater management practice on their site. In lieu of on-site management, PWD would have to construct an equivalent green stormwater infrastructure (GSI) practice at another location. This fee is calculated based on the life cycle cost of a GSI Practice inclusive of construction and maintenance. The construction cost is based upon PWD's average GSI construction costs. The maintenance costs are also based on PWD's experience and escalated annually at a constant rate over the life of the GSI Practice. The present value of this aggregate life cycle maintenance cost and the one-time construction cost together represent the Fee In Lieu, which is expressed as a unit cost per square feet of earth disturbance. These calculations, as provided by PWD, are included in Appendix A.

4. Summary

The mix of staff, type of equipment, and quantity of materials, as well as the task completion time, are the same for the miscellaneous fee calculations as the prior study, except for the stormwater plan review fees noted in Section 1.1. The unit costs for labor, equipment, and materials are updated based on the new information provided by PWD.

For fees with a calculated cost of service less than the existing charge, the proposed fee is transitioned in FY 2022 to reflect the calculated cost of service. For fees with a calculated cost of service higher than the existing charge, the proposed fees are phased-in by increasing the rate by 40% each fiscal year (to mitigate impact to the customer) or until the cost of service rate is achieved. The proposed miscellaneous charges are rounded to the nearest five or ten dollars. The phase-in and rounding approach described above is followed for all updated miscellaneous charges except for the two fees noted below:

- The miscellaneous charge for the Restoration of Water Service for Operating Service Valve 2-inch and Smaller Service Lines as stated under Section 6.4(c)(1)(i) of the Water Department's Rates and Charges is proposed to transition to full cost of service in FY2022 to align with the Site Visit for Non-payment fee as stated in Section 6.4(a), rather than limiting to the 40% phase-in approach.
- The miscellaneous charge for Exemption to the Water Quality Requirement – Stormwater Fee in Lieu, as stated under Section 8.2 (c)(1) Water Department's Rates and Charges is proposed to increase to \$25.00 (40% increase from existing rates and rounded to nearest \$5.00) in FY 2022, and is capped at the calculated cost of service of \$31.00 (not rounded up to the nearest \$5.00) in FY 2023, as recommended by PWD.

Table M-1 presents the list of 85 (83 updated and two new) miscellaneous fees applicable during regular business hours, and Table M-2 presents the list of 22 updated miscellaneous fees applicable outside of regular business hours. Except for the Stormwater Management Fee In Lieu and the TAP Customers-Shutoff and Restoration of Water Service fees, all the other fees are calculated based on the methodology described in Section 1 of this document. The two new TAP related fees are based on policy decision by PWD as described in Section 2. The Stormwater Management Fee In Lieu fees is based on the calculations performed by PWD as described in Section 3.

APPENDIX A

MISCELLANEOUS FEE STUDY WORKPAPERS

Overhead Rate Calculation

Line No.	Description	Operations	Engineering
1	Division, Indirect Labor		
a	Supervisory & Clerical	14%	18%
b	Paid Time Off	14%	14%
c	Supervisor, Clerical & Leave Fringe	28%	30%
2	Subtotal -Division, Indirect Labor	56%	62%
3	Division, Fringe	101%	101%
4	Indirect Divisions Allocation	103%	103%
5	Total Overhead Rate	260%	266%
6	Total Overhead Rate	260%	266%

Source: FY 2018 PWD Indirect Cost Rate Proposal dated July 1, 2019

Note:

- c In 2018, clerical and supervision were combined and reported as a consolidated percentage

Line No.	Description	Operations	Engineering
1			
	Annual No. of Working Hours	2080	2080

Hourly Salary and Overhead Rates

Overhead Group		Operations										
Line		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
1	Salary (Annual)	\$46,786	\$46,786	\$48,063	\$42,914	\$45,524	\$48,063	\$89,241	\$81,322	\$44,289	\$50,469	\$68,619
2	Salary (Hourly)	22.49	22.49	23.11	20.63	21.89	23.11	42.90	39.10	21.29	24.26	32.99
3	Division Ind Labor (Excl Overtime)	12.60	12.60	12.94	11.55	12.26	12.94	24.03	21.89	11.92	13.59	18.47
4	Division Ind Labor (Overtime)	11.25	11.25	0.00	10.32	10.94	11.55	0.00	0.00	10.65	12.13	0.00
5	Division Fringes	22.72	22.72	23.34	20.84	22.11	23.34	43.33	39.49	21.51	24.51	33.32
6	Indirect Division Allocation	23.17	23.17	23.80	21.25	22.54	23.80	44.19	40.27	21.93	24.99	33.98
7	Salary + Div Ind Labor (Excl Overtime)	35.09	35.09	36.05	32.19	34.14	36.05	66.93	60.99	33.22	37.85	51.46
8	Salary + Div Ind Labor (Overtime Premium)	46.34	46.34	36.05	42.50	45.09	47.60	66.93	60.99	43.86	49.98	51.46
9	Salary + Div Ind Labor + Fringes (Excl Overtime)	57.81	57.81	59.39	53.02	56.25	59.39	110.26	100.48	54.72	62.36	84.78
10	Salary + Div Ind Labor + Fringes (Overtime Premium)	69.05	69.05	59.39	63.34	67.19	70.94	110.26	100.48	65.37	74.49	84.78
11	Salary + Div Ind Labor + Fringes+ Ind Div Alloc (Excl Overtime)	80.98	80.98	83.19	74.27	78.79	83.19	154.46	140.75	76.65	87.35	118.76
12	Salary + Div Ind Labor + Fringes + Ind Div Alloc (Overtime Premium)	92.22	92.22	83.19	84.59	89.73	94.74	154.46	140.75	87.30	99.48	118.76

Hourly Salary and Overhead Rates

Overhead Group				Planning & Environmental Services			
Line		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmenta l Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op
1	Salary (Annual)	\$78,333	\$65,508	\$53,848	\$62,975	\$53,848	\$36,962
2	Salary (Hourly)	37.66	31.49	25.89	30.28	25.89	17.77
3	Division Ind Labor (Excl Overtime)	21.09	17.64	16.05	18.77	16.05	11.02
4	Division Ind Labor (Overtime)	0.00	15.75	0.00	0.00	12.94	8.89
5	Division Fringes	38.04	31.81	26.15	30.58	26.15	17.95
6	Indirect Division Allocation	38.79	32.44	26.67	31.18	26.67	18.30
7	Salary + Div Ind Labor (Excl Overtime)	58.75	49.13	41.94	49.05	41.94	28.79
8	Salary + Div Ind Labor (Overtime Premium)	58.75	64.88	41.94	49.05	54.88	37.67
9	Salary + Div Ind Labor + Fringes (Excl Overtime)	96.79	80.94	68.09	79.63	68.09	46.74
10	Salary + Div Ind Labor + Fringes (Overtime Premium)	96.79	96.69	68.09	79.63	81.03	55.62
11	Salary + Div Ind Labor + Fringes+ Ind Div Alloc (Excl Overtime)	135.58	113.38	94.75	110.81	94.75	65.04
12	Salary + Div Ind Labor + Fringes + Ind Div Alloc (Overtime Premium)	135.58	129.13	94.75	110.81	107.70	73.92

Equipment Rates

1	FEMA DESCRIPTION	Truck, Backhoe	Truck, Dump	Truck, Dump	Truck, Pickup	Automobile
2	FEMA CODE	8795	8725	8720	8801	8076
3	EQUIPMENT DESCRIPTION	Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van
4	UNIT	Per Hour	Per Hour	Per Hour	Per Hour	Per Hour
5	COST	\$34.56	\$91.65	\$57.70	\$12.78	\$23.99

Source
2019 FEMA Rates

Material Costs

No.	MATERIAL DESCRIPTION	UNIT	COST
1	Meter costs by meter size		
	5/8"	Each	\$147.82
	3/4" RFSS	Each	\$326.00
	1"	Each	\$240.05
	1" RFSS	Each	\$334.00
	1 1/2"	Each	\$618.55
	1 1/2" RFSS	Each	\$563.94
	2"	Each	\$718.91
	2" RFSS	Each	\$782.00
	3" Compound	Each	\$1,855.00
	3" Turbine	Each	\$968.72
	3" Fire Series	Each	\$2,856.18
	4" Compound	Each	\$2,269.07
	4" Turbine	Each	\$2,010.00
	4" Fire Series	Each	\$3,144.24
	4" Fire Assembly	Each	\$5,500.00
	6" Compound	Each	\$4,300.00
	6" Turbine	Each	\$3,550.00
	6" Fire Series	Each	\$4,795.03
	6" Fire Assembly	Each	\$7,400.00
	8" Turbine	Each	\$4,931.06
	8" Fire Series	Each	\$5,567.43
	8" Fire Assembly	Each	\$10,620.70
	10" Turbine	Each	\$7,272.17
	10" Fire Series	Each	\$8,000.00
	10" Fire Assembly	Each	\$14,784.42
	12" Turbine	Each	\$7,385.66
	12" Fire Series	Each	\$8,189.57
	12"	Each	\$15,655.08
2	Ferrule Costs		
	3/4"	Each	\$20.05
	1"	Each	\$29.73
	1 1/2"	Each	\$85.36
	2"	Each	\$138.11
3	Adapter for Ferrule		
	3/4"	Each	\$12.95
	1"	Each	\$24.29
4	Valve costs by size		
	3"	Each	\$375.00
	4"	Each	\$418.00
	6"	Each	\$509.00
	8"	Each	\$800.00
	10"	Each	\$1,230.00
	12"	Each	\$1,575.00
5	Sleeve costs by size		
	3"	Each	\$160.00
	4"	Each	\$200.00
	6"	Each	\$230.00
	8"	Each	\$300.00

Material Costs

No.	MATERIAL DESCRIPTION	UNIT	COST
	10"	Each	\$570.00
	12"	Each	\$710.00
6	3" or 4 " Sleeve costs by Main size		
	12" X 3" or 4"	Each	\$1,850.00
	16" X 3" or 4"	Each	\$5,200.00
	20" X 3" or 4"	Each	\$6,700.00
	24" X 3" or 4"	Each	\$8,300.00
	30" X 3" or 4"	Each	\$17,978.00
	36" X 3" or 4"	Each	\$23,140.00
7	6" or 8 " Sleeve costs by Main size		
	12" X 6" or 8"	Each	\$1,960.00
	16" X 6" or 8"	Each	\$5,400.00
	20" X 6" or 8"	Each	\$6,600.00
	24" X 6" or 8"	Each	\$8,300.00
	30" X 6" or 8"	Each	\$19,462.00
	36" X 6" or 8"	Each	\$26,560.00
8	10" or 12 " Sleeve costs by Main size		
	12" X 10" or 12"	Each	\$2,370.00
	16" X 10" or 12"	Each	\$5,400.00
	20" X 10" or 12"	Each	\$6,900.00
	24" X 10" or 12"	Each	\$8,400.00
	30" X 10" or 12"	Each	\$19,937.00
	36" X 10" or 12"	Each	\$28,582.00
9	Ductile Iron Pipe by size		
	3"	Per foot	\$44.80
	4"	Per foot	\$33.39
	6"	Per foot	\$35.20
	8"	Per foot	\$50.10
	10"	Per foot	\$65.70
	12"	Per foot	\$81.60
	Other Materials		
10	Curb Stop	Each	\$47.34
11	Concrete Block	Each	\$365.00
12	Blacktop	Per Bag	\$9.43
13	Hydrant Permit Materials		
	CCL Kit	1.0	\$351.00
	CCL Bonnet	1.0	\$20.75
	Operating Nut	1.0	\$39.00

Labor Cost Calculations

Line No.	Description	NUMBER OF PERSONNEL										
		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
Section 6- Miscellaneous Water Charges												
1	Meter Test Charges											
a	5/8"	2.25										
b	1",1.5",2"	2.00										
c	3",4",6",8",10",12"	3.00										
d	Field Tests 3" and above	3.00										
2	Charges for Furnishing and Installation of Water Meters											
a	Setting both Meter and Meter Interface Unit (MIU)											
	5/8"	1.00										
	3/4 RFSS	1.00										
	1"	2.00										
	1" RFSS	2.00										
	1 1/2	2.00										
	1 1/2 RFSS	2.00										
	2"	2.00										
	2" RFSS	2.00										
	3" Compound	3.00										
	3" Turbine	3.00										
	3" Fire Series	3.00										
	4" Compound	3.00										
	4" Turbine	3.00										
	4" Fire Series	3.00										
	4" Fire Assembly	3.00										
	6" Compound	3.00										
	6" Turbine	3.00										
	6" Fire Series	3.00										
	6" Fire Assembly	3.00										
	8" Turbine	3.00										
	8" Fire Series	3.00										
	8" Fire Assembly	3.00										
	10" Turbine	3.00										
	10" Fire Series	3.00										
	10" Fire Assembly	3.00										
	12" Turbine	3.00										
	12" Fire Series	3.00										
	12" Fire Assembly	3.00										
b	Furnishing and Setting Meter Interface Unit (MIU)											
	5/8"	1.00										
	3/4 RFSS	1.00										
	1"	2.00										
	1" RFSS	2.00										
	1 1/2	2.00										
	1 1/2 RFSS	2.00										

Labor Cost Calculations

Line No.	Description							Task Time (Hours)
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
Section 6- Miscellaneous Water Charges								
1	Meter Test Charges							
a	5/8"							1.00
b	1",1.5",2"							1.50
c	3",4",6",8",10",12"							2.50
d	Field Tests 3" and above							2.50
2	Charges for Furnishing and Installation of Water Meters							
a	Setting both Meter and Meter Interface Unit (MIU)							
	5/8"							1.00
	3/4 RFSS							1.00
	1"							1.00
	1" RFSS							1.00
	1 1/2							1.00
	1 1/2 RFSS							1.00
	2"							1.00
	2" RFSS							1.00
	3" Compound							2.00
	3" Turbine							2.00
	3" Fire Series							2.00
	4" Compound							2.00
	4" Turbine							2.00
	4" Fire Series							2.00
	4" Fire Assembly							2.00
	6" Compound							2.00
	6" Turbine							2.00
	6" Fire Series							2.00
	6" Fire Assembly							2.00
	8" Turbine							2.00
	8" Fire Series							2.00
	8" Fire Assembly							2.00
	10" Turbine							2.00
	10" Fire Series							2.00
	10" Fire Assembly							2.00
	12" Turbine							2.00
	12" Fire Series							2.00
	12" Fire Assembly							2.00
b	Furnishing and Setting Meter Interface Unit (MIU)							
	5/8"							1.00
	3/4 RFSS							1.00
	1"							1.00
	1" RFSS							1.00
	1 1/2							1.00
	1 1/2 RFSS							1.00

Labor Cost Calculations

Line No.	Description	Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	2"	2.00										
	2" RFSS	2.00										
	3" Compound	3.00										
	3" Turbine	3.00										
	4" Compound	3.00										
	4" Turbine	3.00										
	6" Compound	3.00										
	6" Turbine	3.00										
	8"	3.00										
	10"	3.00										
3	Tampering of Meter											
c	3" and larger	3.00										
4	Shut-Off and Restoration of Water Service											
a	Site Visit for Non-payment	1.00										
c	Operating service valve 2" and smaller service lines	1.00										
d	Operating service valve larger than 2" service lines		2.00									
e	Obstructed curb stop, missing access box, requires excavation		2.00									
f	Curb stop inoperable, requires installation of new curb stop		2.00									
g	Obstructed curb stop, missing access box, requires excavation and footway paving		2.00									
h	Curb stop inoperable, requires installation of new curb stop and footway paving		2.00									
i	Excavation and shutoff of ferrule at the water main			0.25	2.00							
6	Charges for Water Main Shutdown Service			0.25	2.00							
7	Water Connection Charges											
	Ferrule Connections											
a	3/4"			0.25	2.00							
b	1"			0.25	2.00							
c	1.5"			0.25	2.00							
d	2"			0.25	2.00							
	Valve Connections											
e	3" & 4"			0.25	3.00	1.00	1.00					
f	6" & 8"			0.25	3.00	1.00	1.00					
g	10" & 12"			0.25	3.00	1.00	1.00					
	Attachment to a Transmission Main											
	3" & 4" Sleeve											
	16" Main			0.25	3.00	1.00	1.00					
	20" Main			0.25	3.00	1.00	1.00					
	24" Main			0.25	3.00	1.00	1.00					
	30" Main			0.25	3.00	1.00	1.00					
	36" Main			0.25	3.00	1.00	1.00					
	6" & 8" Sleeve											
	16" Main			0.25	3.00	1.00	1.00					

Labor Cost Calculations

Line No.	Description	Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	Task Time (Hours)
	2"							1.00
	2" RFSS							1.00
	3" Compound							2.00
	3" Turbine							2.00
	4" Compound							2.00
	4" Turbine							2.00
	6" Compound							2.00
	6" Turbine							2.00
	8"							2.00
	10"							2.00
3	Tampering of Meter							
c	3" and larger							2.00
4	Shut-Off and Restoration of Water Service							
a	Site Visit for Non-payment							1.00
c	Operating service valve 2" and smaller service lines							1.00
d	Operating service valve larger than 2" service lines							2.00
e	Obstructed curb stop, missing access box, requires excavation							4.00
f	Curb stop inoperable, requires installation of new curb stop							4.00
g	Obstructed curb stop, missing access box, requires excavation and footway paving							4.00
h	Curb stop inoperable, requires installation of new curb stop and footway paving							4.00
i	Excavation and shutoff of ferrule at the water main							5.00
6	Charges for Water Main Shutdown Service							1.00
7	Water Connection Charges							
	Ferrule Connections							
a	3/4"							1.00
b	1"							1.00
c	1.5"							1.00
d	2"							1.00
	Valve Connections							
e	3" & 4"							32.00
f	6" & 8"							32.00
g	10" & 12"							36.00
	Attachment to a Transmission Main							
	3" & 4" Sleeve							
	16" Main							40.00
	20" Main							40.00
	24" Main							40.00
	30" Main							40.00
	36" Main							40.00
	6" & 8" Sleeve							
	16" Main							40.00

Labor Cost Calculations

Line No.	Description	Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	20" Main			0.25	3.00	1.00	1.00					
	24" Main			0.25	3.00	1.00	1.00					
	30" Main			0.25	3.00	1.00	1.00					
	36" Main			0.25	3.00	1.00	1.00					
	10" & 12" Sleeve											
	16" Main			0.25	3.00	1.00	1.00					
	20" Main			0.25	3.00	1.00	1.00					
	24" Main			0.25	3.00	1.00	1.00					
	30" Main			0.25	3.00	1.00	1.00					
	36" Main			0.25	3.00	1.00	1.00					
9	Hydrant Permits											
a	One Week				2.00				0.125			
b	Six Month				2.00				0.125			
10	Flow Tests							0.25	1.00	0.25	1.00	
	Section 7- Miscellaneous Sewer Charges											
5	Manhole Pump-out Permit							12.00				4.00
6	Trucked or Hauled Wastewater Permit							6.00				12.00
	Section 8- Miscellaneous Stormwater Charges											
1	Stormwater Plan Review Fees											
a	Conceptual Stormwater Plan Approval											
b	Post Construction Stormwater Plan Submission											
c	Post Construction Stormwater Plan Approval (Additional Review Time Fee)											
2	Stormwater Management Fee in Lieu											
a	Exemption to Water Quality Requirement											
	Other- Not in the Miscellaneous Charges Section											
1	Sewer Credit Application Fee							3.00				10.00
3	Stormwater Credit Application Fee-Discontinued											

Labor Cost Calculations

Line No.	Description	Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	Task Time (Hours)
	20" Main							40.00
	24" Main							40.00
	30" Main							40.00
	36" Main							40.00
	10" & 12" Sleeve							
	16" Main							40.00
	20" Main							40.00
	24" Main							40.00
	30" Main							40.00
	36" Main							40.00
9	Hydrant Permits							
a	One Week							2.00
b	Six Month							2.00
10	Flow Tests							3.00
	Section 7- Miscellaneous Sewer Charges							
5	Manhole Pump-out Permit	12.00	4.00					
6	Trucked or Hauled Wastewater Permit		0.00					
	Section 8- Miscellaneous Stormwater Charges							
1	Stormwater Plan Review Fees							
a	Conceptual Stormwater Plan Approval			6.25		0.50	7.25	
b	Post Construction Stormwater Plan Submission					0.66		
c	Post Construction Stormwater Plan Approval (Additional Review Time Fee)				1.00	0.05		
2	Stormwater Management Fee in Lieu							
a	Exemption to Water Quality Requirement							
	Other- Not in the Miscellaneous Charges Section							
1	Sewer Credit Application Fee	0.00	0.00					
3	Stormwater Credit Application Fee-Discontinued							

Labor Costs

Line No. Description		Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates-Not including Material)										
		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	Section 6- Miscellaneous Water Charges											
1	Meter Test Charges											
c	3",4",6",8",10",12"	607.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d	Field Tests 3" and above	607.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Charges for Furnishing and Installation of Water Meters											
a	Setting both Meter and Meter Interface Unit (MIU)											
	5/8"	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3/4 RFSS	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1" RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2 RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Fire Assembly	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Fire Assembly	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Fire Assembly	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Fire Assembly	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Fire Series	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Fire Assembly	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
b	Furnishing and Setting Meter Interface Unit (MIU)											
	5/8"	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3/4 RFSS	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1" RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2 RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" RFSS	161.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Labor Costs

Line No.	Description	ing Overtime), \$					Total Labor Cost
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	
	Section 6- Miscellaneous Water Charges						
1	Meter Test Charges						
c	3",4",6",8",10",12"	0.00	0.00	0.00	0.00	0.00	\$607.32
d	Field Tests 3" and above	0.00	0.00	0.00	0.00	0.00	\$607.32
2	Charges for Furnishing and Installation of Water Meters						
a	Setting both Meter and Meter Interface Unit (MIU)						
	5/8"	0.00	0.00	0.00	0.00	0.00	\$80.98
	3/4 RFSS	0.00	0.00	0.00	0.00	0.00	\$80.98
	1"	0.00	0.00	0.00	0.00	0.00	\$161.95
	1" RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95
	1 1/2	0.00	0.00	0.00	0.00	0.00	\$161.95
	1 1/2 RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95
	2"	0.00	0.00	0.00	0.00	0.00	\$161.95
	2" RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95
	3" Compound	0.00	0.00	0.00	0.00	0.00	\$485.85
	3" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	3" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Compound	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Fire Assembly	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Compound	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Fire Assembly	0.00	0.00	0.00	0.00	0.00	\$485.85
	8" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	8" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	8" Fire Assembly	0.00	0.00	0.00	0.00	0.00	\$485.85
	10" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	10" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	10" Fire Assembly	0.00	0.00	0.00	0.00	0.00	\$485.85
	12" Turbine	0.00	0.00	0.00	0.00	0.00	\$485.85
	12" Fire Series	0.00	0.00	0.00	0.00	0.00	\$485.85
	12" Fire Assembly	0.00	0.00	0.00	0.00	0.00	\$485.85
b	Furnishing and Setting Meter Interface Unit (MIU)						
	5/8"	0.00	0.00	0.00	0.00	0.00	\$80.98
	3/4 RFSS	0.00	0.00	0.00	0.00	0.00	\$80.98
	1"	0.00	0.00	0.00	0.00	0.00	\$161.95
	1" RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95
	1 1/2	0.00	0.00	0.00	0.00	0.00	\$161.95
	1 1/2 RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95
	2"	0.00	0.00	0.00	0.00	0.00	\$161.95
	2" RFSS	0.00	0.00	0.00	0.00	0.00	\$161.95

Labor Costs

Line No. Description		Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates-Not including										
		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	3" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Compound	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Turbine	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8"	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10"	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Tampering of Meter											
c	3" and larger	485.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Shut-Off and Restoration of Water Service											
a	Site Visit for Non-payment	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Operating service valve 2" and smaller service lines	80.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Operating service valve larger than 2" service lines	0.00	323.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Obstructed curb stop, missing access box, requires excavation	0.00	647.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Curb stop inoperable, requires installation of new curb stop	0.00	647.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Obstructed curb stop, missing access box, requires excavation and footway paving	0.00	647.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Curb stop inoperable, requires installation of new curb stop and footway paving	0.00	647.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Excavation and shutoff of ferrule at the water main	0.00	0.00	103.98	742.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Charges for Water Main Shutdown Service	0.00	0.00	20.80	148.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Water Connection Charges											
b	Ferrule Connections											
	3/4"	0.00	0.00	20.80	148.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	0.00	0.00	20.80	148.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.5"	0.00	0.00	20.80	148.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	0.00	0.00	20.80	148.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
c	Valve Connections											
	3" & 4"	0.00	0.00	665.49	7130.33	2521.33	2661.95	0.00	0.00	0.00	0.00	0.00
	6" & 8"	0.00	0.00	665.49	7130.33	2521.33	2661.95	0.00	0.00	0.00	0.00	0.00
	10" & 12"	0.00	0.00	748.67	8021.62	2836.50	2994.69	0.00	0.00	0.00	0.00	0.00
d	Attachment to a Transmission Main											
	3" & 4" Sleeve											
	16" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	30" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	36" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	6" & 8" Sleeve											
	16" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00

Labor Costs

Line No.	Description	ing Overtime), \$						Total Labor Cost
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
	3" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	3" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	4" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	6" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	8"	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
	10"	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
3	Tampering of Meter							
c	3" and larger	0.00	0.00	0.00	0.00	0.00	0.00	\$485.85
4	Shut-Off and Restoration of Water Service							
a	Site Visit for Non-payment	0.00	0.00	0.00	0.00	0.00	0.00	\$80.98
	Operating service valve 2" and smaller service lines	0.00	0.00	0.00	0.00	0.00	0.00	\$80.98
	Operating service valve larger than 2" service lines	0.00	0.00	0.00	0.00	0.00	0.00	\$323.90
	Obstructed curb stop, missing access box, requires excavation	0.00	0.00	0.00	0.00	0.00	0.00	\$647.81
	Curb stop inoperable, requires installation of new curb stop	0.00	0.00	0.00	0.00	0.00	0.00	\$647.81
	Obstructed curb stop, missing access box, requires excavation and footway paving	0.00	0.00	0.00	0.00	0.00	0.00	\$647.81
	Curb stop inoperable, requires installation of new curb stop and footway paving	0.00	0.00	0.00	0.00	0.00	0.00	\$647.81
	Excavation and shutoff of ferrule at the water main	0.00	0.00	0.00	0.00	0.00	0.00	\$846.72
6	Charges for Water Main Shutdown Service	0.00	0.00	0.00	0.00	0.00	0.00	\$169.34
7	Water Connection Charges							
b	Ferrule Connections							
	3/4"	0.00	0.00	0.00	0.00	0.00	0.00	\$169.34
	1"	0.00	0.00	0.00	0.00	0.00	0.00	\$169.34
	1.5"	0.00	0.00	0.00	0.00	0.00	0.00	\$169.34
	2"	0.00	0.00	0.00	0.00	0.00	0.00	\$169.34
c	Valve Connections							
	3" & 4"	0.00	0.00	0.00	0.00	0.00	0.00	\$12,979.09
	6" & 8"	0.00	0.00	0.00	0.00	0.00	0.00	\$12,979.09
	10" & 12"	0.00	0.00	0.00	0.00	0.00	0.00	\$14,601.48
d	Attachment to a Transmission Main							
	3" & 4" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	6" & 8" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87

Labor Costs

Line No.		Description	Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates-Not including Materials)									
			Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1
	30" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	36" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	10" & 12" Sleeve											
	16" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	30" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
	36" Main	0.00	0.00	831.86	8912.91	3151.66	3327.44	0.00	0.00	0.00	0.00	0.00
9	Hydrant Permits											
	One Week	0.00	0.00	0.00	297.10	0.00	0.00	0.00	35.19	0.00	0.00	0.00
	Six Month	0.00	0.00	0.00	297.10	0.00	0.00	0.00	35.19	0.00	0.00	0.00
10	Flow Tests	0.00	0.00	0.00	0.00	0.00	0.00	115.84	422.25	57.49	262.05	0.00
	Section 7- Miscellaneous Sewer Charges											
5	Manhole Pump-out Permit	0.00	0.00	0.00	0.00	0.00	0.00	1853.47	0.00	0.00	0.00	475.05
6	Trucked or Hauled Wastewater Permit	0.00	0.00	0.00	0.00	0.00	0.00	926.73	0.00	0.00	0.00	1425.16
	Section 8- Miscellaneous Stormwater Charges											
1	Stormwater Plan Review Fees											
	Conceptual Stormwater Plan Approval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Post Construction Stormwater Plan Submission	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Post Construction Stormwater Plan Approval (Additional Review Time)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Stormwater Management Fee in Lieu											
	Exemption to Water Quality Requirement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other- Not in the Miscellaneous Charges Section											
1	Sewer Credit Application Fee	0.00	0.00	0.00	0.00	0.00	0.00	463.37	0.00	0.00	0.00	1187.64
3	Stormwater Credit Application Fee Renewal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Labor Costs

Line No.	Description	Total Labor Cost (including Overtime), \$						Total Labor Cost
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	10" & 12" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$16,223.87
9	Hydrant Permits							
	One Week	0.00	0.00	0.00	0.00	0.00	0.00	\$332.28
	Six Month	0.00	0.00	0.00	0.00	0.00	0.00	\$332.28
10	Flow Tests	0.00	0.00	0.00	0.00	0.00	0.00	\$857.63
	Section 7- Miscellaneous Sewer Charges							
5	Manhole Pump-out Permit	1626.92	453.52	0.00	0.00	0.00	0.00	\$4,408.95
6	Trucked or Hauled Wastewater Permit	0.00	0.00	0.00	0.00	0.00	0.00	\$2,351.90
	Section 8- Miscellaneous Stormwater Charges							
1	Stormwater Plan Review Fees							
	Conceptual Stormwater Plan Approval	0.00	0.00	592.20	0.00	47.38	471.53	\$1,111.10
	Post Construction Stormwater Plan Submission	0.00	0.00	0.00	0.00	62.54	0.00	\$62.54
	Post Construction Stormwater Plan Approval (Additional Review Time)	0.00	0.00	0.00	110.81	4.74	0.00	\$115.55
2	Stormwater Management Fee in Lieu							
	Exemption to Water Quality Requirement	0.00	0.00	0.00	0.00	0.00	0.00	\$0.00
	Other- Not in the Miscellaneous Charges Section							
1	Sewer Credit Application Fee	0.00	0.00	0.00	0.00	0.00	0.00	\$1,651.00
3	Stormwater Credit Application Fee Renewal	0.00	0.00	0.00	0.00	0.00	0.00	\$1,462.29

Labor Costs (with overtime)

Line No.	Description	Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates i										
		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	Section 6- Miscellaneous Water Charges											
1	Meter Test Charges											
c	3",4",6",8",10",12"	691.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d	Field Tests 3" and above	691.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Charges for Furnishing and Installation of Water Meters											
a	Setting both Meter and Meter Interface Unit (MIU)											
	5/8"	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3/4 RFSS	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1" RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2 RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Fire Assembly	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Fire Assembly	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8" Fire Assembly	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10" Fire Assembly	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Fire Series	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	12" Fire Assembly	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
b	Furnishing and Setting Meter Interface Unit (MIU)											
	5/8"	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3/4 RFSS	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1" RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1 1/2 RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2" RFSS	184.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Labor Costs (with overtime)

Line No.	Description	including Overtime)						Total Labor Cost (with Overtime)
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
	Section 6- Miscellaneous Water Charges							
1	Meter Test Charges							
c	3",4",6",8",10",12"	0.00	0.00	0.00	0.00	0.00	0.00	\$691.67
d	Field Tests 3" and above	0.00	0.00	0.00	0.00	0.00	0.00	\$691.67
2	Charges for Furnishing and Installation of Water Meters							
a	Setting both Meter and Meter Interface Unit (MIU)							
	5/8"	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
	3/4 RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
	1"	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1" RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1 1/2	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1 1/2 RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	2"	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	2" RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	3" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	3" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	3" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Fire Assembly	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Fire Assembly	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	8" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	8" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	8" Fire Assembly	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	10" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	10" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	10" Fire Assembly	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	12" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	12" Fire Series	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	12" Fire Assembly	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
b	Furnishing and Setting Meter Interface Unit (MIU)							
	5/8"	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
	3/4 RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
	1"	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1" RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1 1/2	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	1 1/2 RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	2"	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	2" RFSS	0.00	0.00	0.00	0.00	0.00	0.00	\$184.44
	3" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33

Labor Costs (with overtime)

Line No.	Description	Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates i										
		Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1	Engineer 2
	3" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Compound	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6" Turbine	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	8"	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10"	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Tampering of Meter											
c	3" and larger	553.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Shut-Off and Restoration of Water Service											
a	Site Visit for Non-payment	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
c	Operating service valve 2" and smaller service lines	92.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
d	Operating service valve larger than 2" service lines	0.00	368.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
e	Obstructed curb stop, missing access box, requires excavation	0.00	737.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
f	Curb stop inoperable, requires installation of new curb stop	0.00	737.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g	Obstructed curb stop, missing access box, requires excavation and footway paving	0.00	737.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
h	Curb stop inoperable, requires installation of new curb stop and footway paving	0.00	737.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
i	Excavation and shutoff of ferrule at the water main	0.00	0.00	103.98	845.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Pumping of Properties	0.00	0.00	83.19	676.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Charges for Water Main Shutdown Service	0.00	0.00	20.80	169.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Water Connection Charges											
b	Ferrule Connections											
	3/4"	0.00	0.00	20.80	169.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1"	0.00	0.00	20.80	169.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.5"	0.00	0.00	20.80	169.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2"	0.00	0.00	20.80	169.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
c	Valve Connections											
	3" & 4"	0.00	0.00	665.49	8120.65	2871.51	3031.67	0.00	0.00	0.00	0.00	0.00
	6" & 8"	0.00	0.00	665.49	8120.65	2871.51	3031.67	0.00	0.00	0.00	0.00	0.00
	10" & 12"	0.00	0.00	748.67	9135.73	3230.45	3410.62	0.00	0.00	0.00	0.00	0.00
d	Attachment to a Transmission Main											
	3" & 4" Sleeve											
	16" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	30" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	36" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	6" & 8" Sleeve											
	16" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	30" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00

Labor Costs (with overtime)

Line No.	Description	Including Overtime)						Total Labor Cost (with Overtime)
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
	3" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	4" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Compound	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	6" Turbine	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	8"	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
	10"	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
3	Tampering of Meter							
c	3" and larger	0.00	0.00	0.00	0.00	0.00	0.00	\$553.33
4	Shut-Off and Restoration of Water Service							
a	Site Visit for Non-payment	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
c	Operating service valve 2" and smaller service lines	0.00	0.00	0.00	0.00	0.00	0.00	\$92.22
d	Operating service valve larger than 2" service lines	0.00	0.00	0.00	0.00	0.00	0.00	\$368.89
e	Obstructed curb stop, missing access box, requires excavation	0.00	0.00	0.00	0.00	0.00	0.00	\$737.78
f	Curb stop inoperable, requires installation of new curb stop	0.00	0.00	0.00	0.00	0.00	0.00	\$737.78
g	Obstructed curb stop, missing access box, requires excavation and footway paving	0.00	0.00	0.00	0.00	0.00	0.00	\$737.78
h	Curb stop inoperable, requires installation of new curb stop and footway paving	0.00	0.00	0.00	0.00	0.00	0.00	\$737.78
i	Excavation and shutoff of ferrule at the water main	0.00	0.00	0.00	0.00	0.00	0.00	\$949.88
5	Pumping of Properties	0.00	0.00	0.00	0.00	0.00	0.00	\$759.91
6	Charges for Water Main Shutdown Service	0.00	0.00	0.00	0.00	0.00	0.00	\$189.98
7	Water Connection Charges							
b	Ferrule Connections							
	3/4"	0.00	0.00	0.00	0.00	0.00	0.00	\$189.98
	1"	0.00	0.00	0.00	0.00	0.00	0.00	\$189.98
	1.5"	0.00	0.00	0.00	0.00	0.00	0.00	\$189.98
	2"	0.00	0.00	0.00	0.00	0.00	0.00	\$189.98
c	Valve Connections							
	3" & 4"	0.00	0.00	0.00	0.00	0.00	0.00	\$14,689.32
	6" & 8"	0.00	0.00	0.00	0.00	0.00	0.00	\$14,689.32
	10" & 12"	0.00	0.00	0.00	0.00	0.00	0.00	\$16,525.48
d	Attachment to a Transmission Main							
	3" & 4" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	6" & 8" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65

Labor Costs (with overtime)

Line No.		Description	Costs (Crew Size X Task Hours X Fully Burdened Personnel Rates i									
			Water Field Cust Serv Rep	Water Field Cust Serv Rep (D&R)	Crew Chief	Repair Worker	Equipment Operator	Heavy Equipment Operator	Engineer 3/ WTR Engineer 1	Engineering Specialist	Engineering Aid	Engineering Technician 1
	36" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	10" & 12" Sleeve											
	16" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	20" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	24" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	30" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
	36" Main	0.00	0.00	831.86	10150.81	3589.39	3789.58	0.00	0.00	0.00	0.00	0.00
9	Hydrant Permits											
	One Week	0.00	0.00	0.00	338.36	0.00	0.00	0.00	35.19	0.00	0.00	0.00
	Six Month	0.00	0.00	0.00	338.36	0.00	0.00	0.00	35.19	0.00	0.00	0.00
10	Flow Tests	0.00	0.00	0.00	0.00	0.00	0.00	115.84	422.25	65.48	298.45	0.00
	Section 7- Miscellaneous Sewer Charges											
5	Manhole Pump-out Permit	0.00	0.00	0.00	0.00	0.00	0.00	1853.47	0.00	0.00	0.00	475.05
6	Trucked or Hauled Wastewater Permit	0.00	0.00	0.00	0.00	0.00	0.00	926.73	0.00	0.00	0.00	1425.16
	Section 8- Miscellaneous Stormwater Charges											
1	Stormwater Plan Review Fees											
	Conceptual Stormwater Plan Approval	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Post Construction Stormwater Plan Submission	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Stormwater Management Fee in Lieu											
	Exemption to Water Quality Requirement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other- Not in the Miscellaneous Charges Section											
1	Sewer Credit Application Fee	0.00	0.00	0.00	0.00	0.00	0.00	463.37	0.00	0.00	0.00	1187.64
3	Stormwater Credit Application Fee Renewal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Labor Costs (with overtime)

Line No.	Description	including Overtime)						Total Labor Cost (with Overtime)
		Industrial Waste Control Supervisor	Industrial Waste Control Technician 2	Environmental Scientist 1	Engineer 1	Administrative Assistant	Engineering Co-Op	
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	10" & 12" Sleeve							
	16" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	20" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	24" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	30" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
	36" Main	0.00	0.00	0.00	0.00	0.00	0.00	\$18,361.65
9	Hydrant Permits							
	One Week	0.00	0.00	0.00	0.00	0.00	0.00	\$373.55
	Six Month	0.00	0.00	0.00	0.00	0.00	0.00	\$373.55
10	Flow Tests	0.00	0.00	0.00	0.00	0.00	0.00	\$902.01
	Section 7- Miscellaneous Sewer Charges							
5	Manhole Pump-out Permit	1626.92	516.51	0.00	0.00	0.00	0.00	\$4,471.94
6	Trucked or Hauled Wastewater Permit	0.00	0.00	0.00	0.00	0.00	0.00	\$2,351.90
	Section 8- Miscellaneous Stormwater Charges							
1	Stormwater Plan Review Fees							
	Conceptual Stormwater Plan Approval	0.00	0.00	592.20	0.00	53.85	535.94	\$1,181.99
	Post Construction Stormwater Plan Submission	0.00	0.00	0.00	0.00	71.08	0.00	\$71.08
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)	0.00	0.00	0.00	110.81	5.38	0.00	\$116.20
2	Stormwater Management Fee in Lieu							
	Exemption to Water Quality Requirement	0.00	0.00	0.00	0.00	0.00	0.00	\$0.00
	Other- Not in the Miscellaneous Charges Section							
1	Sewer Credit Application Fee	0.00	0.00	0.00	0.00	0.00	0.00	\$1,651.00
3	Stormwater Credit Application Fee Renewal	0.00	0.00	0.00	0.00	0.00	0.00	\$1,462.29

Equipment Cost Calculations

Line No.	Description						Task Time (Hours)
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	Section 6- Miscellaneous Water Charges						
1	Meter Test Charges						
c	3",4",6",8",10",12"				1.00		2.50
d	Field Tests 3" and above				1.00		2.50
2	Charges for Furnishing and Installation of Water Meters						
a	Setting both Meter and Meter Interface Unit (MIU)						
	5/8"					1.00	1.00
	3/4 RFSS					1.00	1.00
	1"					1.00	1.00
	1" RFSS					1.00	1.00
	1 1/2					1.00	1.00
	1 1/2 RFSS					1.00	1.00
	2"					1.00	1.00
	2" RFSS					1.00	1.00
	3" Compound				1.00		2.00
	3" Turbine				1.00		2.00
	3" Fire Series				1.00		2.00
	4" Compound				1.00		2.00
	4" Turbine				1.00		2.00
	4" Fire Series				1.00		2.00
	4" Fire Assembly				1.00		2.00
	6" Compound				1.00		2.00
	6" Turbine				1.00		2.00
	6" Fire Series				1.00		2.00
	6" Fire Assembly				1.00		2.00
	8" Turbine				1.00		2.00
	8" Fire Series				1.00		2.00
	8" Fire Assembly				1.00		2.00
	10" Turbine				1.00		2.00
	10" Fire Series				1.00		2.00
	10" Fire Assembly				1.00		2.00
	12" Turbine				1.00		2.00
	12" Fire Series				1.00		2.00
	12" Fire Assembly				1.00		2.00
b	Furnishing and Setting Meter Interface Unit (MIU)						

Equipment Cost Calculations

Line No.	Description						Task Time (Hours)
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	5/8"					1.00	1.00
	3/4 RFSS					1.00	1.00
	1"					1.00	1.00
	1" RFSS					1.00	1.00
	1 1/2					1.00	1.00
	1 1/2 RFSS					1.00	1.00
	2"					1.00	1.00
	2" RFSS					1.00	1.00
	3" Compound				1.00		2.00
	3" Turbine				1.00		2.00
	4" Compound				1.00		2.00
	4" Turbine				1.00		2.00
	6" Compound				1.00		2.00
	6" Turbine				1.00		2.00
	8"				1.00		2.00
	10"				1.00		2.00
3	Tampering of Meter						
c	3" and larger				1.00		2.00
4	Shut-Off and Restoration of Water Service						
a	Site Visit for Non-payment					1.00	1.00
c	Operating service valve 2" and smaller service lines					1.00	1.00
d	Operating service valve larger than 2" service lines			1.00		0.25	2.00
e	Obstructed curb stop, missing access box, requires excavation			1.00		0.25	4.00
f	Curb stop inoperable, requires installation of new curb stop			1.00		0.25	4.00
g	Obstructed curb stop, missing access box, requires excavation and footway paving			1.00		0.25	4.00
h	Curb stop inoperable, requires installation of new curb stop and footway paving			1.00		0.25	4.00
i	Excavation and shutoff of ferrule at the water main	1.00	1.00	1.00		0.25	5.00
6	Charges for Water Main Shutdown Service			1.00			1.00
7	Water Connection Charges						
b	Ferrule Connections						
	3/4"					1.25	1.00
	1"					1.25	1.00
	1.5"					1.25	1.00
	2"					1.25	1.00
c	Valve Connections						

Equipment Cost Calculations

Line No.	Description						Task Time (Hours)
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	3" & 4"	1.00			1.00	0.25	32.00
	6" & 8"	1.00			1.00	0.25	32.00
	10" & 12"	1.00			1.00	0.25	36.00
d	Attachment to a Transmission Main						
	3" & 4" Sleeve						
	16" Main	1.00			1.00	0.25	40.00
	20" Main	1.00			1.00	0.25	40.00
	24" Main	1.00			1.00	0.25	40.00
	30" Main	1.00			1.00	0.25	40.00
	36" Main	1.00			1.00	0.25	40.00
	6" & 8" Sleeve						
	16" Main	1.00			1.00	0.25	40.00
	20" Main	1.00			1.00	0.25	40.00
	24" Main	1.00			1.00	0.25	40.00
	30" Main	1.00			1.00	0.25	40.00
	36" Main	1.00			1.00	0.25	40.00
	10" & 12" Sleeve						
	16" Main	1.00			1.00	0.25	40.00
	20" Main	1.00			1.00	0.25	40.00
	24" Main	1.00			1.00	0.25	40.00
	30" Main	1.00			1.00	0.25	40.00
	36" Main	1.00			1.00	0.25	40.00
8	Discontinuance of Water	1.00			1.00		4.00
9	Hydrant Permits						
a	One Week			1.00			2.00
b	Six Month			1.00			2.00
10	Flow Tests					1.00	3.00
	Section 7- Miscellaneous Sewer Charges						
5	Manhole Pump-out Permit						0.00
6	Trucked or Hauled Wastewater Permit						0.00
	Section 8- Miscellaneous Stormwater Charges						
1	Stormwater Plan Review Fees						
	Conceptual Stormwater Plan Approval						0.00
	Post Construction Stormwater Plan Submission						0.00
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)						0.00

Equipment Cost Calculations

Line No.	Description						Task Time (Hours)
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
2	Stormwater Management Fee in Lieu						
	Exemption to Water Quality Requirement						0.00
Other- Not in the Miscellaneous Charges Section							
1	Sewer Credit Application Fee						0.00
3	Stormwater Credit Application Fee Renewal						0.00

Equipment Costs

Line No.	Description	Costs (No. of Equipment X Task Hours X Equipment Rates)					Total
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	Section 6- Miscellaneous Water Charges						
1	Meter Test Charges						
	3",4",6",8",10",12"	\$0.00	\$0.00	\$0.00	\$31.95	\$0.00	\$31.95
	Field Tests 3" and above	\$0.00	\$0.00	\$0.00	\$31.95	\$0.00	\$31.95
2	Charges for Furnishing and Installation of Water Meters						
a	Setting both Meter and ERT						
	5/8"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	3/4 RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1" RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1 1/2	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1 1/2 RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	2"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	2" RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	3" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	3" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	3" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Fire Assembly	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Fire Assembly	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	8" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	8" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	8" Fire Assembly	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	10" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	10" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	10" Fire Assembly	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	12" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	12" Fire Series	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	12" Fire Assembly	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
b	Furnishing and Setting Meter Interface Unit (MIU)						

Equipment Costs

Line No.	Description	Costs (No. of Equipment X Task Hours X Equipment Rates)					Total
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	5/8"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	3/4 RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1" RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1 1/2	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	1 1/2 RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	2"	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	2" RFSS	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	3" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	3" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	4" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Compound	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	6" Turbine	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	8"	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
	10"	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
3	Tampering of Meter						
	3" and larger	\$0.00	\$0.00	\$0.00	\$25.56	\$0.00	\$25.56
4	Shut-Off and Restoration of Water Service						
a	Site Visit for Non-payment	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	Operating service valve 2" and smaller service lines	\$0.00	\$0.00	\$0.00	\$0.00	\$23.99	\$23.99
	Operating service valve larger than 2" service lines	\$0.00	\$0.00	\$115.40	\$0.00	\$12.00	\$127.40
	Obstructed curb stop, missing access box, requires excavation	\$0.00	\$0.00	\$230.80	\$0.00	\$23.99	\$254.79
	Curb stop inoperable, requires installation of new curb stop	\$0.00	\$0.00	\$230.80	\$0.00	\$23.99	\$254.79
	Obstructed curb stop, missing access box, requires excavation and footway paving	\$0.00	\$0.00	\$230.80	\$0.00	\$23.99	\$254.79
	Curb stop inoperable, requires installation of new curb stop and footway paving	\$0.00	\$0.00	\$230.80	\$0.00	\$23.99	\$254.79
	Excavation and shutoff of ferrule at the water main	\$172.80	\$458.25	\$288.50	\$0.00	\$29.99	\$949.54
6	Charges for Water Main Shutdown Service	\$0.00	\$0.00	\$57.70	\$0.00	\$0.00	\$57.70
7	Water Connection Charges						
b	Ferrule Connections						
	3/4"	\$0.00	\$0.00	\$0.00	\$0.00	\$29.99	\$29.99
	1"	\$0.00	\$0.00	\$0.00	\$0.00	\$29.99	\$29.99
	1.5"	\$0.00	\$0.00	\$0.00	\$0.00	\$29.99	\$29.99
	2"	\$0.00	\$0.00	\$0.00	\$0.00	\$29.99	\$29.99
c	Valve Connections						

Equipment Costs

Line No.	Description	Costs (No. of Equipment X Task Hours X Equipment Rates)					Total
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	3" & 4"	\$1,105.92	\$0.00	\$0.00	\$408.96	\$191.92	\$1,706.80
	6" & 8"	\$1,105.92	\$0.00	\$0.00	\$408.96	\$191.92	\$1,706.80
	10" & 12"	\$1,244.16	\$0.00	\$0.00	\$460.08	\$215.91	\$1,920.15
d	Attachment to a Transmission Main						
	3" & 4" Sleeve						
	16" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	20" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	24" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	30" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	36" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	6" & 8" Sleeve						
	16" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	20" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	24" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	30" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	36" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	10" & 12" Sleeve						
	16" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	20" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	24" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	30" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
	36" Main	\$1,382.40	\$0.00	\$0.00	\$511.20	\$239.90	\$2,133.50
9	Hydrant Permits						
	One Week	\$0.00	\$0.00	\$115.40	\$0.00	\$0.00	\$115.40
	Six Month	\$0.00	\$0.00	\$115.40	\$0.00	\$0.00	\$115.40
10	Flow Tests	\$0.00	\$0.00	\$0.00	\$0.00	\$71.97	\$71.97
	Section 7- Miscellaneous Sewer Charges						
5	Manhole Pump-out Permit	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
6	Trucked or Hauled Wastewater Permit	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Section 8- Miscellaneous Stormwater Charges						
1	Stormwater Plan Review Fees						
	Conceptual Stormwater Plan Approval	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Post Construction Stormwater Plan Submission	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
2	Stormwater Management Fee in Lieu						

Equipment Costs

Line No. Description		Costs (No. of Equipment X Task Hours X Equipment Rates)					Total
		Backhoe	Large Dump Truck	Small Utility Truck	Crew Truck	SUV/ Van	
	Exemption to Water Quality Requirement	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
	Other- Not in the Miscellaneous Charges Section						
1	Sewer Credit Application Fee	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
3	Stormwater Credit Application Fee Renewal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Material Cost Calculations

Line No.	Description	Cost of Materials Used									Total Materials Cost
		Meter	Curb Stop	Ferrule	Adapter	Valve	Sleeve	Temp Paving	Street Restoration	Hydrant Permit	
	Section 6- Miscellaneous Water Charges										
1	Meter Test Charges										
a	5/8"										\$0.00
b	1",1.5",2"										\$0.00
c	3",4",6",8",10",12"										\$0.00
d	Field Tests 3" and above										\$0.00
2	Charges for Furnishing and Installation of Water Meters										
a	Setting both Meter and Meter Interface Unit (MIU)										
	5/8"	\$147.82									\$147.82
	3/4 RFSS	\$326.00									\$326.00
	1"	\$240.05									\$240.05
	1" RFSS	\$334.00									\$334.00
	1 1/2	\$618.55									\$618.55
	1 1/2 RFSS	\$563.94									\$563.94
	2"	\$718.91									\$718.91
	2" RFSS	\$782.00									\$782.00
	3" Compound	\$1,855.00									\$1,855.00
	3" Turbine	\$968.72									\$968.72
	3" Fire Series	\$2,856.18									\$2,856.18
	4" Compound	\$2,269.07									\$2,269.07
	4" Turbine	\$2,010.00									\$2,010.00
	4" Fire Series	\$3,144.24									\$3,144.24
	4" Fire Assembly	\$5,500.00									\$5,500.00
	6" Compound	\$4,300.00									\$4,300.00
	6" Turbine	\$3,550.00									\$3,550.00
	6" Fire Series	\$4,795.03									\$4,795.03
	6" Fire Assembly	\$7,400.00									\$7,400.00
	8" Turbine	\$4,931.06									\$4,931.06
	8" Fire Series	\$5,567.43									\$5,567.43
	8" Fire Assembly	\$10,620.70									\$10,620.70
	10" Turbine	\$7,272.17									\$7,272.17
	10" Fire Series	\$8,000.00									\$8,000.00
	10" Fire Assembly	\$14,784.42									\$14,784.42
	12" Turbine	\$7,385.66									\$7,385.66
	12" Fire Series	\$8,189.57									\$8,189.57
	12" Fire Assembly	\$15,655.08									\$15,655.08
b	Furnishing and Setting Meter Interface Unit (MIU)										
	5/8"										\$0.00
	3/4 RFSS										\$0.00
	1"										\$0.00
	1" RFSS										\$0.00
	1 1/2										\$0.00
	1 1/2 RFSS										\$0.00
	2"										\$0.00
	2" RFSS										\$0.00
	3" Compound										\$0.00
	3" Turbine										\$0.00
	4" Compound										\$0.00

Material Cost Calculations

Line No.	Description	Cost of Materials Used									Total Materials Cost
		Meter	Curb Stop	Ferrule	Adapter	Valve	Sleeve	Temp Paving	Street Restoration	Hydrant Permit	
	4" Turbine										\$0.00
	6" Compound										\$0.00
	6" Turbine										\$0.00
	8"										\$0.00
	10"										\$0.00
3	Tampering of Meter										
c	3" and larger										\$0.00
4	Shut-Off and Restoration of Water Service										
a	Site Visit for Non-payment										\$0.00
c	Operating service valve 2" and smaller service lines										\$0.00
d	Operating service valve larger than 2" service lines										\$0.00
e	Obstructed curb stop, missing access box, requires excavation										\$0.00
f	Curb stop inoperable, requires installation of new curb stop		\$47.34								\$47.34
g	Obstructed curb stop, missing access box, requires excavation and footway paving										\$0.00
h	Curb stop inoperable, requires installation of new curb stop and footway paving		\$47.34								\$47.34
i	Excavation and shutoff of ferrule at the water main								\$365.00		\$365.00
6	Charges for Water Main Shutdown Service										\$0.00
7	Water Connection Charges										
b	Ferrule Connections										
	3/4"			\$20.05	\$12.95						\$33.00
	1"			\$29.73	\$24.29						\$54.02
	1.5"			\$85.36							\$85.36
	2"			\$138.11							\$138.11
c	Valve Connections										
	3" & 4"					\$396.50	\$180.00	\$37.72	\$365.00		\$979.22
	6" & 8"					\$654.50	\$265.00	\$37.72	\$365.00		\$1,322.22
	10" & 12"					\$1,402.50	\$640.00	\$37.72	\$365.00		\$2,445.22
d	Attachment to a Transmission Main										
	3" & 4" Sleeve										
	16" Main						\$5,200.00	\$37.72	\$365.00		\$5,602.72
	20" Main						\$6,700.00	\$37.72	\$365.00		\$7,102.72
	24" Main						\$8,300.00	\$37.72	\$365.00		\$8,702.72
	30" Main						\$17,978.00	\$37.72	\$365.00		\$18,380.72
	36" Main						\$23,140.00	\$37.72	\$365.00		\$23,542.72
	6" & 8" Sleeve										
	16" Main						\$5,400.00	\$37.72	\$365.00		\$5,802.72
	20" Main						\$6,600.00	\$37.72	\$365.00		\$7,002.72
	24" Main						\$8,300.00	\$37.72	\$365.00		\$8,702.72
	30" Main						\$19,462.00	\$37.72	\$365.00		\$19,864.72
	36" Main						\$26,560.00	\$37.72	\$365.00		\$26,962.72
	10" & 12" Sleeve										
	16" Main						\$5,400.00	\$37.72	\$365.00		\$5,802.72
	20" Main						\$6,900.00	\$37.72	\$365.00		\$7,302.72
	24" Main						\$8,400.00	\$37.72	\$365.00		\$8,802.72
	30" Main						\$19,937.00	\$37.72	\$365.00		\$20,339.72
	36" Main						\$28,582.00	\$37.72	\$365.00		\$28,984.72

Material Cost Calculations

Line No.	Description	Cost of Materials Used									Total Materials Cost
		Meter	Curb Stop	Ferrule	Adapter	Valve	Sleeve	Temp Paving	Street Restoration	Hydrant Permit	
9	Hydrant Permits										
	One Week									\$410.75	\$410.75
	Six Month									\$4,043.31	\$4,043.31
10	Flow Tests										\$0.00
	Section 7- Miscellaneous Sewer Charges										
5	Manhole Pump-out Permit										\$0.00
6	Trucked or Hauled Wastewater Permit										\$0.00
	Section 8- Miscellaneous Stormwater Charges										
1	Stormwater Plan Review Fees										
	Conceptual Stormwater Plan Approval										\$0.00
	Post Construction Stormwater Plan Submission										\$0.00
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)										\$0.00
2	Stormwater Management Fee in Lieu										
	Exemption to Water Quality Requirement										\$0.00
	Other- Not in the Miscellaneous Charges Section										
1	Sewer Credit Application Fee										\$0.00
3	Stormwater Credit Application Fee Renewal										\$0.00

Fee Calculation (No Overtime)

Line No.	Description	Costs			
		Labor (No Overtime)	Equipment	Material/ Contractor	Total Cost (No Overtime)
	Section 6- Miscellaneous Water Charges				
1	Meter Test Charges				
	3",4",6",8",10",12"	\$607.32	\$31.95	\$0.00	\$639.27
	Field Tests 3" and above	\$607.32	\$31.95	\$0.00	\$639.27
2	Charges for Furnishing and Installation of Water Meters				
a	Setting both Meter and ERT				
	5/8"	\$80.98	\$23.99	\$147.82	\$252.79
	3/4 RFSS	\$80.98	\$23.99	\$326.00	\$430.97
	1"	\$161.95	\$23.99	\$240.05	\$425.99
	1" RFSS	\$161.95	\$23.99	\$334.00	\$519.94
	1 1/2	\$161.95	\$23.99	\$618.55	\$804.49
	1 1/2 RFSS	\$161.95	\$23.99	\$563.94	\$749.88
	2"	\$161.95	\$23.99	\$718.91	\$904.85
	2" RFSS	\$161.95	\$23.99	\$782.00	\$967.94
	3" Compound	\$485.85	\$25.56	\$1,855.00	\$2,366.41
	3" Turbine	\$485.85	\$25.56	\$968.72	\$1,480.13
	3" Fire Series	\$485.85	\$25.56	\$2,856.18	\$3,367.59
	4" Compound	\$485.85	\$25.56	\$2,269.07	\$2,780.48
	4" Turbine	\$485.85	\$25.56	\$2,010.00	\$2,521.41
	4" Fire Series	\$485.85	\$25.56	\$3,144.24	\$3,655.65
	4" Fire Assembly	\$485.85	\$25.56	\$5,500.00	\$6,011.41
	6" Compound	\$485.85	\$25.56	\$4,300.00	\$4,811.41
	6" Turbine	\$485.85	\$25.56	\$3,550.00	\$4,061.41
	6" Fire Series	\$485.85	\$25.56	\$4,795.03	\$5,306.44
	6" Fire Assembly	\$485.85	\$25.56	\$7,400.00	\$7,911.41
	8" Turbine	\$485.85	\$25.56	\$4,931.06	\$5,442.47
	8" Fire Series	\$485.85	\$25.56	\$5,567.43	\$6,078.84
	8" Fire Assembly	\$485.85	\$25.56	\$10,620.70	\$11,132.11
	10" Turbine	\$485.85	\$25.56	\$7,272.17	\$7,783.58
	10" Fire Series	\$485.85	\$25.56	\$8,000.00	\$8,511.41
	10" Fire Assembly	\$485.85	\$25.56	\$14,784.42	\$15,295.83
	12" Turbine	\$485.85	\$25.56	\$7,385.66	\$7,897.07
	12" Fire Series	\$485.85	\$25.56	\$8,189.57	\$8,700.98
	12" Fire Assembly	\$485.85	\$25.56	\$15,655.08	\$16,166.49
b	Furnishing and Setting ERT				

Fee Calculation (No Overtime)

Line No.	Description	Costs			
		Labor (No Overtime)	Equipment	Material/ Contractor	Total Cost (No Overtime)
	5/8"	\$80.98	\$23.99	\$0.00	\$104.97
	3/4 RFSS	\$80.98	\$23.99	\$0.00	\$104.97
	1"	\$161.95	\$23.99	\$0.00	\$185.94
	1" RFSS	\$161.95	\$23.99	\$0.00	\$185.94
	1 1/2	\$161.95	\$23.99	\$0.00	\$185.94
	1 1/2 RFSS	\$161.95	\$23.99	\$0.00	\$185.94
	2"	\$161.95	\$23.99	\$0.00	\$185.94
	2" RFSS	\$161.95	\$23.99	\$0.00	\$185.94
	3" Compound	\$485.85	\$25.56	\$0.00	\$511.41
	3" Turbine	\$485.85	\$25.56	\$0.00	\$511.41
	4" Compound	\$485.85	\$25.56	\$0.00	\$511.41
	4" Turbine	\$485.85	\$25.56	\$0.00	\$511.41
	6" Compound	\$485.85	\$25.56	\$0.00	\$511.41
	6" Turbine	\$485.85	\$25.56	\$0.00	\$511.41
	8"	\$485.85	\$25.56	\$0.00	\$511.41
	10"	\$485.85	\$25.56	\$0.00	\$511.41
3	Tampering of Meter				
	3" and larger	\$485.85	\$25.56	\$0.00	\$511.41
4	Shut-Off and Restoration of Water Service				
a	Site Visit for Non-payment	\$80.98	\$23.99	\$0.00	\$104.97
	Operating service valve 2" and smaller service lines	\$80.98	\$23.99	\$0.00	\$104.97
	Operating service valve larger than 2" service lines	\$323.90	\$127.40	\$0.00	\$451.30
	Obstructed curb stop, missing access box, requires excavation	\$647.81	\$254.79	\$0.00	\$902.60
	Curb stop inoperable, requires installation of new curb stop	\$647.81	\$254.79	\$47.34	\$949.94
	Obstructed curb stop, missing access box, requires excavation and footway paving	\$647.81	\$254.79	\$0.00	\$902.60
	Curb stop inoperable, requires installation of new curb stop and footway paving	\$647.81	\$254.79	\$47.34	\$949.94
	Excavation and shutoff of ferrule at the water main	\$846.72	\$949.54	\$365.00	\$2,161.26
6	Charges for Water Main Shutdown Service	\$169.34	\$57.70	\$0.00	\$227.04
7	Water Connection Charges				
b	Ferrule Connections				
	3/4"	\$169.34	\$29.99	\$33.00	\$232.33
	1"	\$169.34	\$29.99	\$54.02	\$253.35
	1.5"	\$169.34	\$29.99	\$85.36	\$284.69

Fee Calculation (No Overtime)

Line No.	Description	Costs			
		Labor (No Overtime)	Equipment	Material/ Contractor	Total Cost (No Overtime)
	2"	\$169.34	\$29.99	\$138.11	\$337.44
c	Valve Connections				
	3" & 4"	\$12,979.09	\$1,706.80	\$979.22	\$15,665.11
	6" & 8"	\$12,979.09	\$1,706.80	\$1,322.22	\$16,008.11
	10" & 12"	\$14,601.48	\$1,920.15	\$2,445.22	\$18,966.85
d	Attachment to a Transmission Main				
	3" & 4" Sleeve				
	16" Main	\$16,223.87	\$2,133.50	\$5,602.72	\$23,960.09
	20" Main	\$16,223.87	\$2,133.50	\$7,102.72	\$25,460.09
	24" Main	\$16,223.87	\$2,133.50	\$8,702.72	\$27,060.09
	30" Main	\$16,223.87	\$2,133.50	\$18,380.72	\$36,738.09
	36" Main	\$16,223.87	\$2,133.50	\$23,542.72	\$41,900.09
	6" & 8" Sleeve				
	16" Main	\$16,223.87	\$2,133.50	\$5,802.72	\$24,160.09
	20" Main	\$16,223.87	\$2,133.50	\$7,002.72	\$25,360.09
	24" Main	\$16,223.87	\$2,133.50	\$8,702.72	\$27,060.09
	30" Main	\$16,223.87	\$2,133.50	\$19,864.72	\$38,222.09
	36" Main	\$16,223.87	\$2,133.50	\$26,962.72	\$45,320.09
	10" & 12" Sleeve				
	16" Main	\$16,223.87	\$2,133.50	\$5,802.72	\$24,160.09
	20" Main	\$16,223.87	\$2,133.50	\$7,302.72	\$25,660.09
	24" Main	\$16,223.87	\$2,133.50	\$8,802.72	\$27,160.09
	30" Main	\$16,223.87	\$2,133.50	\$20,339.72	\$38,697.09
	36" Main	\$16,223.87	\$2,133.50	\$28,984.72	\$47,342.09
9	Hydrant Permits				
	One Week	\$332.28	\$115.40	\$410.75	\$858.43
	Six Month	\$332.28	\$115.40	\$4,043.31	\$4,490.99
10	Flow Tests	\$857.63	\$71.97	\$0.00	\$929.60
	Section 7- Miscellaneous Sewer Charges				
5	Manhole Pump-out Permit	\$4,408.95	\$0.00	\$0.00	\$4,408.95
6	Trucked or Hauled Wastewater Permit	\$2,351.90	\$0.00	\$0.00	\$2,351.90
	Section 8- Miscellaneous Stormwater Charges				
1	Stormwater Plan Review Fees				
	Conceptual Stormwater Plan Approval	\$1,111.10	\$0.00	\$0.00	\$1,111.10
	Post Construction Stormwater Plan Approval	\$62.54	\$0.00	\$0.00	\$62.54

Fee Calculation (No Overtime)

Line No.	Description	Costs			
		Labor (No Overtime)	Equipment	Material/ Contractor	Total Cost (No Overtime)
	Post Construction Stormwater Plan Approval (Additional Review Time	\$115.55	\$0.00	\$0.00	\$115.55
2	Stormwater Management Fee in Lieu				
	Exemption to Water Quality Requirement	\$0.00	\$0.00	\$0.00	\$0.00
	Other- Not in the Miscellaneous Charges Section				
1	Sewer Credit Application Fee	\$1,651.00	\$0.00	\$0.00	\$1,651.00
3	Stormwater Credit Application Fee Renewal	\$1,462.29	\$0.00	\$0.00	\$1,462.29

Fee Calculation (Overtime)

Line No.	Description	Costs			
		Labor (With Overtime)	Equipment	Material	Total Cost (Overtime)
	Section 6- Miscellaneous Water Charges				
1	Meter Test Charges				
	3",4",6",8",10",12"	\$691.67	\$31.95	\$0.00	\$723.62
	Field Tests 3" and above	\$691.67	\$31.95	\$0.00	\$723.62
2	Charges for Furnishing and Installation of Water Meters				
a	Setting both Meter and ERT				
	5/8"	\$92.22	\$23.99	\$147.82	\$264.03
	3/4 RFSS	\$92.22	\$23.99	\$326.00	\$442.21
	1"	\$184.44	\$23.99	\$240.05	\$448.48
	1" RFSS	\$184.44	\$23.99	\$334.00	\$542.43
	1 1/2	\$184.44	\$23.99	\$618.55	\$826.98
	1 1/2 RFSS	\$184.44	\$23.99	\$563.94	\$772.37
	2"	\$184.44	\$23.99	\$718.91	\$927.34
	2" RFSS	\$184.44	\$23.99	\$782.00	\$990.43
	3" Compound	\$553.33	\$25.56	\$1,855.00	\$2,433.89
	3" Turbine	\$553.33	\$25.56	\$968.72	\$1,547.61
	3" Fire Series	\$553.33	\$25.56	\$2,856.18	\$3,435.07
	4" Compound	\$553.33	\$25.56	\$2,269.07	\$2,847.96
	4" Turbine	\$553.33	\$25.56	\$2,010.00	\$2,588.89
	4" Fire Series	\$553.33	\$25.56	\$3,144.24	\$3,723.13
	4" Fire Assembly	\$553.33	\$25.56	\$5,500.00	\$6,078.89
	6" Compound	\$553.33	\$25.56	\$4,300.00	\$4,878.89
	6" Turbine	\$553.33	\$25.56	\$3,550.00	\$4,128.89
	6" Fire Series	\$553.33	\$25.56	\$4,795.03	\$5,373.92
	6" Fire Assembly	\$553.33	\$25.56	\$7,400.00	\$7,978.89
	8" Turbine	\$553.33	\$25.56	\$4,931.06	\$5,509.95
	8" Fire Series	\$553.33	\$25.56	\$5,567.43	\$6,146.32
	8" Fire Assembly	\$553.33	\$25.56	\$10,620.70	\$11,199.59
	10" Turbine	\$553.33	\$25.56	\$7,272.17	\$7,851.06
	10" Fire Series	\$553.33	\$25.56	\$8,000.00	\$8,578.89
	10" Fire Assembly	\$553.33	\$25.56	\$14,784.42	\$15,363.31
	12" Turbine	\$553.33	\$25.56	\$7,385.66	\$7,964.55
	12" Fire Series	\$553.33	\$25.56	\$8,189.57	\$8,768.46
	12" Fire Assembly	\$553.33	\$25.56	\$15,655.08	\$16,233.97
b	Furnishing and Setting ERT				

Fee Calculation (Overtime)

Line No.	Description	Costs			
		Labor (With Overtime)	Equipment	Material	Total Cost (Overtime)
	5/8"	\$92.22	\$23.99	\$0.00	\$116.21
	3/4 RFSS	\$92.22	\$23.99	\$0.00	\$116.21
	1"	\$184.44	\$23.99	\$0.00	\$208.43
	1" RFSS	\$184.44	\$23.99	\$0.00	\$208.43
	1 1/2	\$184.44	\$23.99	\$0.00	\$208.43
	1 1/2 RFSS	\$184.44	\$23.99	\$0.00	\$208.43
	2"	\$184.44	\$23.99	\$0.00	\$208.43
	2" RFSS	\$184.44	\$23.99	\$0.00	\$208.43
	3" Compound	\$553.33	\$25.56	\$0.00	\$578.89
	3" Turbine	\$553.33	\$25.56	\$0.00	\$578.89
	4" Compound	\$553.33	\$25.56	\$0.00	\$578.89
	4" Turbine	\$553.33	\$25.56	\$0.00	\$578.89
	6" Compound	\$553.33	\$25.56	\$0.00	\$578.89
	6" Turbine	\$553.33	\$25.56	\$0.00	\$578.89
	8"	\$553.33	\$25.56	\$0.00	\$578.89
	10"	\$553.33	\$25.56	\$0.00	\$578.89
3	Tampering of Meter				
	3" and larger	\$553.33	\$25.56	\$0.00	\$578.89
4	Shut-Off and Restoration of Water Service				
	Site Visit for Non-payment	\$92.22	\$23.99	\$0.00	\$116.21
	Operating service valve 2" and smaller service lines	\$92.22	\$23.99	\$0.00	\$116.21
	Operating service valve larger than 2" service lines	\$368.89	\$127.40	\$0.00	\$496.28
	Obstructed curb stop, missing access box, requires excavation	\$737.78	\$254.79	\$0.00	\$992.57
	Curb stop inoperable, requires installation of new curb stop	\$737.78	\$254.79	\$47.34	\$1,039.91
	Obstructed curb stop, missing access box, requires excavation and footway paving	\$737.78	\$254.79	\$0.00	\$992.57
	Curb stop inoperable, requires installation of new curb stop and footway paving	\$737.78	\$254.79	\$47.34	\$1,039.91
	Excavation and shutoff of ferrule at the water main	\$949.88	\$949.54	\$365.00	\$2,264.42
6	Charges for Water Main Shutdown Service	\$189.98	\$57.70	\$0.00	\$247.68
7	Water Connection Charges				
b	Ferrule Connections				
	3/4"	\$189.98	\$29.99	\$33.00	\$252.96
	1"	\$189.98	\$29.99	\$54.02	\$273.98
	1.5"	\$189.98	\$29.99	\$85.36	\$305.32

Fee Calculation (Overtime)

Line No.	Description	Costs			
		Labor (With Overtime)	Equipment	Material	Total Cost (Overtime)
	2"	\$189.98	\$29.99	\$138.11	\$358.07
c	Valve Connections				
	3" & 4"	\$14,689.32	\$1,706.80	\$979.22	\$17,375.34
	6" & 8"	\$14,689.32	\$1,706.80	\$1,322.22	\$17,718.34
	10" & 12"	\$16,525.48	\$1,920.15	\$2,445.22	\$20,890.85
d	Attachment to a Transmission Main				
	3" & 4" Sleeve				
	16" Main	\$18,361.65	\$2,133.50	\$5,602.72	\$26,097.87
	20" Main	\$18,361.65	\$2,133.50	\$7,102.72	\$27,597.87
	24" Main	\$18,361.65	\$2,133.50	\$8,702.72	\$29,197.87
	30" Main	\$18,361.65	\$2,133.50	\$18,380.72	\$38,875.87
	36" Main	\$18,361.65	\$2,133.50	\$23,542.72	\$44,037.87
	6" & 8" Sleeve				
	16" Main	\$18,361.65	\$2,133.50	\$5,802.72	\$26,297.87
	20" Main	\$18,361.65	\$2,133.50	\$7,002.72	\$27,497.87
	24" Main	\$18,361.65	\$2,133.50	\$8,702.72	\$29,197.87
	30" Main	\$18,361.65	\$2,133.50	\$19,864.72	\$40,359.87
	36" Main	\$18,361.65	\$2,133.50	\$26,962.72	\$47,457.87
	10" & 12" Sleeve				
	16" Main	\$18,361.65	\$2,133.50	\$5,802.72	\$26,297.87
	20" Main	\$18,361.65	\$2,133.50	\$7,302.72	\$27,797.87
	24" Main	\$18,361.65	\$2,133.50	\$8,802.72	\$29,297.87
	30" Main	\$18,361.65	\$2,133.50	\$20,339.72	\$40,834.87
	36" Main	\$18,361.65	\$2,133.50	\$28,984.72	\$49,479.87
9	Hydrant Permits				
	One Week	\$373.55	\$115.40	\$410.75	\$899.70
	Six Month	\$373.55	\$115.40	\$4,043.31	\$4,532.25
10	Flow Tests	\$902.01	\$71.97	\$0.00	\$973.98
	Section 7- Miscellaneous Sewer Charges				
5	Manhole Pump-out Permit	\$4,471.94	\$0.00	\$0.00	\$4,471.94
6	Trucked or Hauled Wastewater Permit	\$2,351.90	\$0.00	\$0.00	\$2,351.90
	Section 8- Miscellaneous Stormwater Charges				
1	Stormwater Plan Review Fees				
	Conceptual Stormwater Plan Approval	\$1,181.99	\$0.00	\$0.00	\$1,181.99
	Post Construction Stormwater Plan Approval	\$71.08	\$0.00	\$0.00	\$71.08

Fee Calculation (Overtime)

Line No.	Description	Costs			
		Labor (With Overtime)	Equipment	Material	Total Cost (Overtime)
	Post Construction Stormwater Plan Approval (Additional Review Time)	\$116.20	\$0.00	\$0.00	\$116.20
2	Stormwater Management Fee in Lieu				
	Exemption to Water Quality Requirement	\$0.00	\$0.00	\$0.00	\$0.00
	Other- Not in the Miscellaneous Charges Section				
1	Sewer Credit Application Fee	\$1,651.00	\$0.00	\$0.00	\$1,651.00
3	Stormwater Credit Application Fee Renewal	\$1,462.29	\$0.00	\$0.00	\$1,462.29

Philadelphia Water Department

Increase Decrease

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

			1	2	3	4	5	6
		PWD Rates and Charges Reference	PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)	Variance Proposed-FY 2022 to Existing Charges	% Variance Proposed-FY 2022 to Existing Charges
#	Miscellaneous Charge Description							
Section 6- Miscellaneous Water Charges								
1	Meter Test Charges	6.1						
	3",4",6",8",10",12"	6.1 (e)	\$660.00	\$639.27	\$640.00	\$640.00	(\$20.00)	-3.0%
	Field Tests 3" and above	6.1 (e)	\$660.00	\$639.27	\$640.00	\$640.00	(\$20.00)	-3.0%
2	Charges for Furnishing and Installation of Water Meters	6.2						
a	Setting both Meter and Meter Interface Unit (MIU)	6.2 (a)						
	5/8"	6.2 (a)	\$250.00	\$252.79	\$255.00	\$255.00	\$5.00	2.0%
	3/4 RFSS	6.2 (a)	\$430.00	\$430.97	\$435.00	\$435.00	\$5.00	1.2%
	1"	6.2 (a)	\$425.00	\$425.99	\$430.00	\$430.00	\$5.00	1.2%
	2" RFSS	6.2 (a)	\$965.00	\$967.94	\$970.00	\$970.00	\$5.00	0.5%
	3" Compound	6.2 (a)	\$2,380.00	\$2,366.41	\$2,370.00	\$2,370.00	(\$10.00)	-0.4%
	3" Turbine	6.2 (a)	\$1,495.00	\$1,480.13	\$1,485.00	\$1,485.00	(\$10.00)	-0.7%
	3" Fire Series	6.2 (a)	\$3,380.00	\$3,367.59	\$3,370.00	\$3,370.00	(\$10.00)	-0.3%
	4" Compound	6.2 (a)	\$2,795.00	\$2,780.48	\$2,785.00	\$2,785.00	(\$10.00)	-0.4%
	4" Turbine	6.2 (a)	\$2,535.00	\$2,521.41	\$2,525.00	\$2,525.00	(\$10.00)	-0.4%
	4" Fire Series	6.2 (a)	\$3,670.00	\$3,655.65	\$3,660.00	\$3,660.00	(\$10.00)	-0.3%
	4" Fire Assembly	6.2 (a)	\$6,025.00	\$6,011.41	\$6,015.00	\$6,015.00	(\$10.00)	-0.2%
	6" Compound	6.2 (a)	\$4,825.00	\$4,811.41	\$4,815.00	\$4,815.00	(\$10.00)	-0.2%
	6" Turbine	6.2 (a)	\$4,075.00	\$4,061.41	\$4,065.00	\$4,065.00	(\$10.00)	-0.2%
	6" Fire Series	6.2 (a)	\$5,320.00	\$5,306.44	\$5,310.00	\$5,310.00	(\$10.00)	-0.2%
	6" Fire Assembly	6.2 (a)	\$7,925.00	\$7,911.41	\$7,915.00	\$7,915.00	(\$10.00)	-0.1%
	8" Turbine	6.2 (a)	\$5,455.00	\$5,442.47	\$5,445.00	\$5,445.00	(\$10.00)	-0.2%
	8" Fire Series	6.2 (a)	\$6,090.00	\$6,078.84	\$6,080.00	\$6,080.00	(\$10.00)	-0.2%
	8" Fire Assembly	6.2 (a)	\$11,145.00	\$11,132.11	\$11,135.00	\$11,135.00	(\$10.00)	-0.1%
	10" Turbine	6.2 (a)	\$7,795.00	\$7,783.58	\$7,785.00	\$7,785.00	(\$10.00)	-0.1%
	10" Fire Series	6.2 (a)	\$8,525.00	\$8,511.41	\$8,515.00	\$8,515.00	(\$10.00)	-0.1%

Philadelphia Water Department

Increase Decrease

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

#	Miscellaneous Charge Description	PWD Rates and Charges Reference	1	2	3	4	5	6
			PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)	Variance Proposed-FY 2022 to Existing Charges	% Variance Proposed-FY 2022 to Existing Charges
	10" Fire Assembly	6.2 (a)	\$15,310.00	\$15,295.83	\$15,300.00	\$15,300.00	(\$10.00)	-0.1%
	12" Turbine	6.2 (a)	\$7,910.00	\$7,897.07	\$7,900.00	\$7,900.00	(\$10.00)	-0.1%
	12" Fire Series	6.2 (a)	\$8,715.00	\$8,700.98	\$8,705.00	\$8,705.00	(\$10.00)	-0.1%
	12" Fire Assembly	6.2 (a)	\$16,180.00	\$16,166.49	\$16,170.00	\$16,170.00	(\$10.00)	-0.1%
b	Furnishing and Setting Meter Interface Unit (MIU)	6.2 (b)						
	1"	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	1" RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	1 1/2	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	1 1/2 RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	2"	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	2" RFSS	6.2 (b)	\$185.00	\$185.94	\$190.00	\$190.00	\$5.00	2.7%
	3" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	3" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	4" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	4" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	6" Compound	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	6" Turbine	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	8"	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
	10"	6.2 (b)	\$525.00	\$511.41	\$515.00	\$515.00	(\$10.00)	-1.9%
3	Tampering of Meter	6.3						
	3" and larger	6.3 (a)	\$580.00	\$511.41	\$570.00	\$570.00	(\$10.00)	-1.7%
4	Shut-Off and Restoration of Water Service	6.4						
a	Site Visit for Non-payment	6.4 (a)	\$100.00	\$104.97	\$105.00	\$105.00	\$5.00	5.0%
c	Restoration of Water Service	6.4 (c)						
	Operating service valve 2" and smaller service lines	6.4 (c) (1) (i)	\$60.00	\$104.97	\$105.00	\$105.00	\$45.00	75.0%
	Operating service valve larger than 2" service lines	6.4 (c) (1) (ii)	\$200.00	\$451.30	\$280.00	\$395.00	\$80.00	40.0%

Philadelphia Water Department

Increase Decrease

TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

#	Miscellaneous Charge Description	PWD Rates and Charges Reference	1	2	3	4	5	6
			PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)	Variance Proposed-FY 2022 to Existing Charges	% Variance Proposed-FY 2022 to Existing Charges
	Obstructed curb stop, missing access box, requires excavation	6.4 (c) (2)	\$590.00	\$902.60	\$830.00	\$905.00	\$240.00	40.7%
	Curb stop inoperable, requires installation of new curb stop	6.4 (c) (3)	\$885.00	\$949.94	\$950.00	\$950.00	\$65.00	7.3%
	Obstructed curb stop, missing access box, requires excavation and footway paving	6.4 (c) (4)	\$820.00	\$902.60	\$905.00	\$905.00	\$85.00	10.4%
	Curb stop inoperable, requires installation of new curb stop and footway paving	6.4 (c) (5)	\$865.00	\$949.94	\$950.00	\$950.00	\$85.00	9.8%
	Excavation and shutoff of ferrule at the water main	6.4 (c) (6)	\$1,985.00	\$2,161.26	\$2,165.00	\$2,165.00	\$180.00	9.1%
	TAP Customers -Shut-off and Restoration of Water Service	Proposed 6.4 (e)						
	Shut off service for non-payment; and, payment is tendered at the time of the shut-off	6.4 (e) (1)	NA	NA	\$12.00	\$12.00	NA	NA
	Restore water service after termination for non-payment or violation of service requirements	6.4 (e) (2)	NA	NA	\$12.00	\$12.00	NA	NA
6	Charges for Water Main Shutdown Service	6.6	\$210.00	\$227.04	\$225.00	\$225.00	\$15.00	7.1%
7	Water Connection Charges	6.7						
b	Ferrule Connections	6.7 (b)						
	3/4"	6.7 (b) (2)	\$240.00	\$232.33	\$235.00	\$235.00	(\$5.00)	-2.1%
	1"	6.7 (b) (2)	\$270.00	\$253.35	\$255.00	\$255.00	(\$15.00)	-5.6%
	1.5"	6.7 (b) (2)	\$365.00	\$284.69	\$285.00	\$285.00	(\$80.00)	-21.9%
	2"	6.7 (b) (2)	\$430.00	\$337.44	\$340.00	\$340.00	(\$90.00)	-20.9%
c	Valve Connections	6.7 (c)						
	3" & 4"	6.7 (c) (1)	\$15,705.00	\$15,665.11	\$15,670.00	\$15,670.00	(\$35.00)	-0.2%
	6" & 8"	6.7 (c) (1)	\$15,945.00	\$16,008.11	\$16,010.00	\$16,010.00	\$65.00	0.4%
	10" & 12"	6.7 (c) (1)	\$18,605.00	\$18,966.85	\$18,970.00	\$18,970.00	\$365.00	2.0%
d	Attachment to a Transmission Main	6.7 (d)						
	3" & 4" Sleeve	6.7 (d) (2)						
	16" Main	6.7 (d) (2)	\$23,475.00	\$23,960.09	\$23,965.00	\$23,965.00	\$490.00	2.1%
	20" Main	6.7 (d) (2)	\$24,860.00	\$25,460.09	\$25,465.00	\$25,465.00	\$605.00	2.4%

Philadelphia Water Department

Increase	Decrease
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TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

#	Miscellaneous Charge Description	PWD Rates and Charges Reference	1	2	3	4	5	6
			PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)	Variance Proposed-FY 2022 to Existing Charges	% Variance Proposed-FY 2022 to Existing Charges
	24" Main	6.7 (d) (2)	\$26,475.00	\$27,060.09	\$27,065.00	\$27,065.00	\$590.00	2.2%
	30" Main	6.7 (d) (2)	\$36,845.00	\$36,738.09	\$36,740.00	\$36,740.00	(\$105.00)	-0.3%
	36" Main	6.7 (d) (2)	\$42,010.00	\$41,900.09	\$41,905.00	\$41,905.00	(\$105.00)	-0.2%
	6" & 8" Sleeve	6.7 (d) (2)						
	16" Main	6.7 (d) (2)	\$23,595.00	\$24,160.09	\$24,165.00	\$24,165.00	\$570.00	2.4%
	20" Main	6.7 (d) (2)	\$24,630.00	\$25,360.09	\$25,365.00	\$25,365.00	\$735.00	3.0%
	24" Main	6.7 (d) (2)	\$26,475.00	\$27,060.09	\$27,065.00	\$27,065.00	\$590.00	2.2%
	30" Main	6.7 (d) (2)	\$37,450.00	\$38,222.09	\$38,225.00	\$38,225.00	\$775.00	2.1%
	36" Main	6.7 (d) (2)	\$43,830.00	\$45,320.09	\$45,325.00	\$45,325.00	\$1,495.00	3.4%
	10" & 12" Sleeve	6.7 (d) (2)						
	16" Main	6.7 (d) (2)	\$22,445.00	\$24,160.09	\$24,165.00	\$24,165.00	\$1,720.00	7.7%
	20" Main	6.7 (d) (2)	\$23,295.00	\$25,660.09	\$25,665.00	\$25,665.00	\$2,370.00	10.2%
	24" Main	6.7 (d) (2)	\$24,485.00	\$27,160.09	\$27,165.00	\$27,165.00	\$2,680.00	10.9%
	30" Main	6.7 (d) (2)	\$38,805.00	\$38,697.09	\$38,700.00	\$38,700.00	(\$105.00)	-0.3%
	36" Main	6.7 (d) (2)	\$47,450.00	\$47,342.09	\$47,345.00	\$47,345.00	(\$105.00)	-0.2%
9	Hydrant Permits	6.9						
	One Week	6.9 (b) (1)	\$525.00	\$858.43	\$735.00	\$860.00	\$210.00	40.0%
	Six Month	6.9 (b) (2)	\$3,370.00	\$4,490.99	\$4,495.00	\$4,495.00	\$1,125.00	33.4%
10	Flow Tests	6.10	\$690.00	\$929.60	\$930.00	\$930.00	\$240.00	34.8%
Section 7- Miscellaneous Sewer Charges								
5	Manhole Pump-out Permit	7.5	\$1,960.00	\$4,408.95	\$2,745.00	\$3,845.00	\$785.00	40%
6	Trucked or Hauled Wastewater Permit	7.6	\$1,960.00	\$2,351.90	\$2,355.00	\$2,355.00	\$395.00	20%
Section 8- Miscellaneous Stormwater Charges								
1	Stormwater Plan Review Fees	8.1						

Philadelphia Water Department

Increase	Decrease
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TABLE M-1- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING BUSINESS HOURS)

#	Miscellaneous Charge Description	PWD Rates and Charges Reference	1	2	3	4	5	6
			PWD Existing Charges	Calculated Charges	PWD Miscellaneous Charges (Proposed - FY 2022)	PWD Miscellaneous Charges (Proposed - FY 2023)	Variance Proposed-FY 2022 to Existing Charges	% Variance Proposed-FY 2022 to Existing Charges
	Conceptual Stormwater Plan Approval	8.1 (a) (1)	\$1,160.00	\$1,111.10	\$1,115.00	\$1,115.00	(\$45.00)	-3.9%
	Post Construction Stormwater Plan Submission	8.1 (a) (2)	\$285.00	\$62.54	\$65.00	\$65.00	(\$220.00)	-77.2%
	Post Construction Stormwater Plan Approval (Additional Review Time Fee)	8.1 (a) (2)	\$150.00	\$115.55	\$120.00	\$120.00	(\$30.00)	-20.0%
2	Stormwater Management Fee in Lieu	8.2						
	Exemption to Water Quality Requirement	8.2 (c) (1)	\$15.00	\$30.82	\$25.00	\$31.00	\$10.00	66.7%
Other- Not in the Miscellaneous Charges Section (Section 3- Rates and Charges)								
1	Sewer Credit Application Fee	3.5 (c)	\$295.00	\$1,651.00	\$415.00	\$585.00	\$120.00	41%
3	Stormwater Credit Application Fee Renewal	4.5 (f) (4)	\$100.00	\$1,462.29	\$140.00	\$200.00	\$40.00	40%

Column Notes

- 1 From the PWD Regulations Chapter 3-Rates and Charges Effective September 1, 2020 (FY 2021 Charges)
- 2 Calculated charges for work performed during Water Department's regular business hours (9:00 a.m. to 4:45 p.m.) (i.e. not including overtime)
- 3,4 Proposed FY 2022 - FY 2023 Miscellaneous charges.

Row Notes

- Section 6.4 (e) As provided by PWD.
- Section 8.2 (c) (1) As provided by PWD.

Philadelphia Water Department

Increase

Decrease

TABLE M-2- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING NON BUSINESS HOURS)

			1	2	3	4	5	6
#	Miscellaneous Charge Description	PWD Rates and Charges Reference	PWD Existing Charges (Non Business Hours)	Calculated Charges (Non Business Hours)	PWD Miscellaneous Charges (Proposed-FY 2022)	PWD Miscellaneous Charges (Proposed-FY 2023)	Variance between Existing and Proposed-FY 2022	% Variance between Existing and Proposed-FY 2022
Section 6- Miscellaneous Water Charges								
7	Water Connection Charges							
	Ferrule Connections	6.7 (b)						
	3/4"	6.7 (b) (3)	\$250.00	\$252.96	\$255.00	\$255.00	\$5.00	2.0%
	1"	6.7 (b) (3)	\$280.00	\$273.98	\$275.00	\$275.00	(\$5.00)	-1.8%
	1.5"	6.7 (b) (3)	\$375.00	\$305.32	\$310.00	\$310.00	(\$65.00)	-17.3%
	2"	6.7 (b) (3)	\$440.00	\$358.07	\$360.00	\$360.00	(\$80.00)	-18.2%
	Valve Connections	6.7 (c)						
	3" & 4"	6.7 (c) (2)	\$16,450.00	\$17,375.34	\$17,380.00	\$17,380.00	\$930.00	5.7%
	6" & 8"	6.7 (c) (2)	\$16,690.00	\$17,718.34	\$17,720.00	\$17,720.00	\$1,030.00	6.2%
	10" & 12"	6.7 (c) (2)	\$19,440.00	\$20,890.85	\$20,895.00	\$20,895.00	\$1,455.00	7.5%
	Attachment to a Transmission Main	6.7 (d)						
	3" & 4" Sleeve	6.7 (d) (3)						
	16" Main	6.7 (d) (3)	\$24,410.00	\$26,097.87	\$26,100.00	\$26,100.00	\$1,690.00	6.9%
	20" Main	6.7 (d) (3)	\$25,790.00	\$27,597.87	\$27,600.00	\$27,600.00	\$1,810.00	7.0%
	24" Main	6.7 (d) (3)	\$27,405.00	\$29,197.87	\$29,200.00	\$29,200.00	\$1,795.00	6.5%
	30" Main	6.7 (d) (3)	\$37,775.00	\$38,875.87	\$38,880.00	\$38,880.00	\$1,105.00	2.9%
	36" Main	6.7 (d) (3)	\$42,940.00	\$44,037.87	\$44,040.00	\$44,040.00	\$1,100.00	2.6%
	6" & 8" Sleeve							
	16" Main	6.7 (d) (3)	\$24,525.00	\$26,297.87	\$26,300.00	\$26,300.00	\$1,775.00	7.2%
	20" Main	6.7 (d) (3)	\$25,560.00	\$27,497.87	\$27,500.00	\$27,500.00	\$1,940.00	7.6%
	24" Main	6.7 (d) (3)	\$27,405.00	\$29,197.87	\$29,200.00	\$29,200.00	\$1,795.00	6.5%
	30" Main	6.7 (d) (3)	\$38,380.00	\$40,359.87	\$40,360.00	\$40,360.00	\$1,980.00	5.2%

TABLE M-2- SUMMARY OF MISCELLANEOUS CHARGES (FOR WORK PERFORMED DURING NON BUSINESS HOURS)

			1	2	3	4	5	6
#	Miscellaneous Charge Description	PWD Rates and Charges Reference	PWD Existing Charges (Non Business Hours)	Calculated Charges (Non Business Hours)	PWD Miscellaneous Charges (Proposed-FY 2022)	PWD Miscellaneous Charges (Proposed-FY 2023)	Variance between Existing and Proposed-FY 2022	% Variance between Existing and Proposed-FY 2022
	36" Main	6.7 (d) (3)	\$44,760.00	\$47,457.87	\$47,460.00	\$47,460.00	\$2,700.00	6.0%
	10" & 12" Sleeve							
	16" Main	6.7 (d) (3)	\$23,375.00	\$26,297.87	\$26,300.00	\$26,300.00	\$2,925.00	12.5%
	20" Main	6.7 (d) (3)	\$24,225.00	\$27,797.87	\$27,800.00	\$27,800.00	\$3,575.00	14.8%
	24" Main	6.7 (d) (3)	\$25,415.00	\$29,297.87	\$29,300.00	\$29,300.00	\$3,885.00	15.3%
	30" Main	6.7 (d) (3)	\$39,735.00	\$40,834.87	\$40,835.00	\$40,835.00	\$1,100.00	2.8%
	36" Main	6.7 (d) (3)	\$48,380.00	\$49,479.87	\$49,480.00	\$49,480.00	\$1,100.00	2.3%

Column Notes

- 1 From the PWD Regulations Chapter 3 Rates and Charges Effective September 1, 2020
- 2 Calculated charges for work performed outside of Water Department's business hours (business hours are from 9:00 a.m. to 4:45 p.m.)
Includes overtime costs.
- 3,4 Proposed FY 2022 - FY 2023 Miscellaneous charges for work performed during non-business hours.

PWD Fee-in-Lieu Cost of Service Template Calculation

INPUTS

Inputs	Description
40	- Yrs. of Cashflow Consideration
2021	- Year of Fee-in-Lieu Payment
3.0%	- PV Factor
2021	- PY Year
10,756	- Impervious Area (IA) - SF
\$339,000	- FY20 Average Design and Construction Cost (DCC) - \$/Acre
\$17,000	- FY20 Average Maintenance Cost - \$/Acre
4.0%	- Maintenance Escalation Factor - %

CALCULATION

Year	Design and Construction Cost (DCC)	PV of DCC Cost	Maintenance Cost	PV of Maintenance Cost	Total PV Cost w/ 1.5x Factor	FIL Rate PV Cost
					331,524	\$ 30.82
						FY22
2021	83,707	83,707		-		
2022	-	-	4,366	4,238		
2023	-	-	4,540	4,280		
2024	-	-	4,722	4,321		
2025	-	-	4,911	4,363		
2026	-	-	5,107	4,405		
2027	-	-	5,311	4,448		
2028	-	-	5,524	4,491		
2029	-	-	5,745	4,535		
2030	-	-	5,975	4,579		
2031	-	-	6,214	4,624		
2032	-	-	6,462	4,668		
2033	-	-	6,721	4,714		
2034	-	-	6,989	4,760		
2035	-	-	7,269	4,806		
2036	-	-	7,560	4,852		
2037	-	-	7,862	4,899		
2038	-	-	8,177	4,947		
2039	-	-	8,504	4,995		
2040	-	-	8,844	5,044		
2041	-	-	9,198	5,093		
2042	-	-	9,566	5,142		
2043	-	-	9,948	5,192		
2044	-	-	10,346	5,242		
2045	-	-	10,760	5,293		
2046	-	-	11,190	5,345		
2047	-	-	11,638	5,396		
2048	-	-	12,104	5,449		
2049	-	-	12,588	5,502		
2050	-	-	13,091	5,555		
2051	-	-	13,615	5,609		
2052	-	-	14,159	5,664		
2053	-	-	14,726	5,719		
2054	-	-	15,315	5,774		
2055	-	-	15,927	5,830		
2056	-	-	16,565	5,887		
2057	-	-	17,227	5,944		
2058	-	-	17,916	6,002		
2059	-	-	18,633	6,060		
2060	-	-	19,378	6,119		
2061	-	-	20,153	6,178		

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**In the Matter of the Philadelphia Water
Department's Proposed Change in Water,
Wastewater and Stormwater Rates and Related
Charges**

Fiscal Years 2022-2023

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-7

Dated: January 15, 2021

Company Description

Black & Veatch Holding Company is a leading, global engineering, construction and consulting company specializing in infrastructure development in the fields of energy, water and information. Our Mission sets the bar high—***Building a World of Difference®***. We live up to this ideal by delivering reliable and innovative infrastructure solutions to our client's most complex challenges, helping to improve and sustain the quality of life around the world.

Founded in 1915, Black & Veatch is an employee-owned company based in Overland Park, Kansas that has approximately 11,000 professionals operating out of more than 110 offices worldwide. Through this network of collaboratively connected offices, we have served our clients—many of whom we have provided services to for decades. We value long lasting relationships and believe that rapport enables superior customer service and support.

BLACK & VEATCH MANAGEMENT CONSULTING, LLC

Black & Veatch Management Consulting, LLC is a wholly-owned subsidiary of Black & Veatch Holding Company that brings together more than 200 professionals. These professionals include experienced industry executives, senior analysts and technology experts from across the electric, water, oil, natural gas and technology industries. This experience—combined with seamless access to the company's world-class engineering, procurement, construction and operations capabilities, experienced senior executives, economists, senior policy experts and regulatory officials, engineers and internationally respected subject-matter experts—makes Black & Veatch uniquely qualified to assist clients with their most complex challenges.

Black & Veatch's diverse consulting service offerings span financial, process, and technology solutions, and many of our experienced professionals possess cross functional skills including asset management, cost of service/rate design, business process/workflow analysis, and implementation services.

Black & Veatch Team Resumes

Ann Bui

Managing Director

Ms. Bui has more than 30 years of experience working with utilities on more than 400 engagements and has provided financial and business planning services for public and investor-owned utilities across the US of all different sizes ranging from those with less than 5,000 service connections to those that serve populations over 5 million.

Ms. Bui is a Managing Director and the Water Market Lead for Black & Veatch Management Consulting. She is responsible for the growth and strategy of advisory and financial planning, operational technologies, and asset management services for all water clients. She has also provided services to agencies located internationally in the United Arab Emirates, Chile, Hong Kong, and Singapore.

Her recent assignments have focused on water insecurity; addressing affordability and assistance program needs; 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 more than \$8 billion of revenue bond sales and more than \$3 billion in state revolving fund loans.

Ms. Bui has completed due diligence engagements for entities of many internationally well-established companies such as KKR, Macquarie Capital, Credit Suisse, Morgan Stanley, J.P. Morgan, Goldman Sachs, Bank of America Merrill Lynch, Rothschild, Canada Pension Plan Investment Board, Barclays, Fiera Infrastructure, Alma Global, and PGGM. Her due diligence efforts have supported successful buy-side/sell-side water and wastewater assets totaling over \$10 billion.

Over the past two decades, Ms. Bui has provided expert witness testimony in front of the California Public Utilities Commission, the Indiana Utilities Regulatory Commission, and the Kentucky Public Service Commission. Additionally, she has served as an expert witness in front of utility rate commissions for such clients as Philadelphia Water Department and Washington Suburban Sanitary Commission.

An active proponent of advancing the water industry, Ms. Bui is a long-standing member of several industry associations. She is a past Chair of the American Water Works Association (AWWA) Finance, Accounting, and Management Controls (FAMC) Committee and is involved with AWWA's Strategic Practices Committee, AWWA's Rates and Charges Committee, the National Association of Clean Water Agency's (NACWA's) Utility Management Committee, and with the Water Environment Federation (WEF).

EDUCATION

Masters, Business Administration, Finance, University of California – Davis, 1995

MS, Chemical, University of California Los Angeles, 1989

BS, Chemical, British Columbia University, 1986, Canada

YEARS EXPERIENCE

31

PROFESSIONAL REGISTRATION

License, Engineer-In-Training, #XE094654, California, 1995

PROFESSIONAL ASSOCIATIONS

AWWA

Past Chair - AWWA's Finance, Accounting & Management Controls Committee

Member - AWWA's Strategic Management Practices Committee

Member – AWWA's Rates & Charges

WEF

NACWA's Utility Management Committee

RELEVANT EXPERTISE

Financial & Management Consulting Services; Debt Issuance Support; Elasticity Studies; Cost of Service & Rate Design; Institutional & Organizational Studies; Alternative Financing; Valuations/M&A

Under her six-year tenure as FAMC Vice-Chair and Chair, she was a lead author and editor for AWWA's book ***Financial Management for Water Utilities: Principles of Finance, Accounting and Management Controls***. Additionally, she has been an author or peer reviewer for AWWA's M1 – Principles of Water Rates, Fees and Charges, the current update to M1, the current update of WEF's Manual of Practice 27, Financing and Charges for Wastewater Systems, and WEF's User-Fee Funded Stormwater Program. She is presently leading the update for AWWA's M29 – Water Capital Financing.

Ms. Bui is the coordinating editor for Journal AWWA's ***Money Matters***, a column focused on financial issues in the water industry.

REPRESENTATIVE PROJECT EXPERIENCE

Philadelphia Water Department; Water, Wastewater and Stormwater Cost of Service Studies; Pennsylvania; 2003 – 2006; 2015-Ongoing

Project Director. Ms. Bui has worked with the City of Philadelphia since 2003 and currently serves as the Project Director for Black & Veatch's multi-utility cost of service work with the Philadelphia Water Department (PWD). The 2018 Rate Case incorporated program costs for PWD's long-term control plan, green infrastructure, public-private grants to incentivize stormwater improvements, and restructuring of the City's assistance programs. The 2018 Rate Case also included development of a customer assistance rate rider as well as changes in public fire protection cost recovery.

Washington Suburban Sanitary Commission; Comprehensive Water and Wastewater Rate Study; Laurel, Maryland, United States; 2016-In-Progress

Project Director. Ms. Bui is directing the completion of a comprehensive water and wastewater rate study for WSSC. Phase 1 of the project included analysis of WSSC's current rate structure as well as numerous alternative rate structures, and extensive public outreach to a bi-county working group as well as a stakeholder representatives group. Workshops included explanation of the rate-making process, WSSC priorities and goals for rate setting, and discussion of stakeholder issues and concerns. Phase 2 included a comprehensive cost of service and rate design study for WSSC's water and wastewater utilities. The Black & Veatch team continues to advise WSSC on alternative rate structures as management and the Board consider a new rate structure that better addresses WSSC's goals and objectives.

County of San Diego's Department of Public Works | Cost of Service Study; California | 2012-2013 and 2018-present

Project Director. Ms. Bui served as the Project Director for Black & Veatch's engagement with the County of San Diego's Department of Public Works. The cost of service study focused on creating a unitary wastewater rate for its customers, as well as examined the same possibility for its capacity fee. Black & Veatch was also tasked with providing recommendations on reserve policies; capital asset management; and examining the feasibility of moving charges to the property tax rolls.

City of San Diego; Pure Water Funding Support, California; 2017 - 2018

Lead Economist and Project Director. Provided technical and economic services supporting the City's Water Storage Investment Program application. Led the economic analysis for the monetization of ecosystem, water, emergency resources, and recreational benefits. Monetization efforts included incorporating all hydraulic

modeling generated by the team, as well as identifying the avoided cost, least cost, and willingness to pay values for 11 identified benefits supporting a total funding request of \$220 million.

Great Lakes Water Authority; Un-Metered Customers and Water Audit Phase I; Michigan; 2017.

Technical Advisor. Ms. Bui served as the Technical Advisor and Project Director for the Phase I on this engagement. The work involves developing peaking factors for un-metered customers and a review of all peaking elements for customers served by GLWA. Black & Veatch analyzed over 3 years of AMI data and developed new cost allocations for water loss and units of service for the 87 wholesale communities.

Water Supplies Department; Water Conservation and Loss Analysis; Hong Kong, China; 2016

Technical Reviewer. Ms. Bui is serving as the lead reviewer and subject matter expert for the regulatory and infrastructure governance aspect of Black & Veatch’s engagement with the Hong Kong Water Supplies Department (WSD) as part of a larger Total Water Management program. The WSD supplies more than 7 million people. Under this part of the engagement, Ms. Bui reviewed recommendations made to improvement the organization’s governance and structure to meet current and future regulatory needs.

American Water Company; Automated Metering Infrastructure Rate Case Support and Water-Budget Rate Setting Expert Witness; California; 2016 – 2018

Expert Witness and Project Director. Served as the Project Director for California American Water’s (CAW’s) Rate Case petition for an Automated Metering Infrastructure (AMI) program in front of the California Public Utilities Commission (CPUC) and served as an expert witness for CAW’s separate CPUC rate petition regarding its water budget-based rate design for the Monterey service area.

City of San Diego; Cost of Service Study and System Development Charge Update; San Diego, CA ; 2012 - 2016

Project Director. Comprehensive cost of service studies for water and wastewater, including update of system development charges. Conducted over 70 stakeholder meetings to support successful adoption of rate structure changes and multi-year rate increases.

Western US - Water, Wastewater, Stormwater, & Solid Waste Utility Enterprise Financial Planning, Rate & Cost-of-Service Studies, Indirect Cost Allocations, Management Audits /Organizational Assessment Studies, & Business Planning Activities

- | | | |
|------------------------------------|---|--|
| ● City of Glendale, AZ | ● City of Long Beach, CA | ● Marin Municipal Water District, CA |
| ● City of Phoenix, AZ | ● City of Orange, CA | ● Helix Water District, CA |
| ● City of Tucson, AZ | ● City of Palo Alto, CA | ● Rancho California Water District, CA |
| ● City of Flagstaff, AZ | ● City of Napa, CA | ● Indio Water Authority, CA |
| ● City of Scottsdale, AZ | ● City of South Gate, CA | ● City of San Clemente, CA |
| ● City of Henderson, NV | ● City of San Diego, CA | ● City of Soledad, CA |
| ● City of Las Vegas, NV | ● County of San Diego, CA | ● San Joaquin County, CA |
| ● City of Santa Monica, CA | ● Cambria Community Services District, CA | ● City of Port Hueneme, CA |
| ● Los Angeles Bureau of Sanitation | | |

- Santa Ynez River Water Conservation District, CA
- Guam Waterworks Authority
- City of Salem, OR
- City of Oxnard, CA
- City of Los Angeles, Stormwater Division
- City of San Juan Capistrano, CA
- City of Downey, CA
- Camrosa Water District, CA
- City of Pico Rivera, CA
- Leucadia Water District
- City of Orange, CA
- City of Yuba City, CA
- City of Antioch, CA
- Encinitas Wastewater Authority, CA
- City of Escondido, CA
- Dublin San Ramon Service District, CA
- Padre Dam Municipal Water District, CA
- Sweetwater Authority, CA
- Western Municipal Water District, CA
- Cucamonga Valley Water District, CA
- City of Patterson, CA
- City of Chino Hills, CA
- Riverside Public Utilities, CA
- Vallecitos Water District, CA
- City of Fountain Valley, CA
- City of Westminster, CA
- City of Santa Ana, CA
- City of Lomita, CA
- Atascadero Mutual Water Company, CA
- Golden States Water Company
- California American Water
- City of Ontario, CA
- City of San Jose, CA
- County of San Bernardino, CA
- Goleta Water District
- Burbank Water & Power, CA
- Metropolitan Water District of Southern California
- City of Tacoma, WA
- Cherry Hills Sanitation District, CO
- Parker Water and Sanitation District, CO
- Waste Management Inc., CO
- Vallejo Flood Control District, CA
- Central Contra Costa Sanitation District, CA
- LA DWP
- City of Santa Clara, CA
- City of Menlo Park, CA
- Olivehain Municipal Water District
- Port of San Diego
- Simi Valley Sanitation, CA
- Las Campanas Water & Sewer Cooperative, NM

Midwestern & Eastern US - Water, Wastewater, Stormwater, Solid Waste & Gas Utility Enterprise Financial Planning, Rate & Cost-of-Service Studies, System Development Charges, Indirect Cost Allocations, & Business Planning Activities

- City of Dayton, OH
- Greater Cincinnati Water Works, OH
- Metropolitan Sewer District of Hamilton County, OH
- City of Mason, OH
- City of Columbia, OH
- City of Wyoming, MI
- City of Detroit, MI
- Great Lakes Water Authority, MI
- City of Grand Rapids, MI
- City of Holland, MI
- Philadelphia Water Department, PA
- Philadelphia Gas Works, PA
- Sewerage and Water Board of New Orleans, LA
- Puerto Rico Aqueduct and Sewer Authority, PR

- Northern Kentucky Water District, KY
- Louisville Water Company, KY
- Warren County, KY
- Alleghany County Sanitary Authority, PA
- Johnson County Wastewater, KS
- Unified Government of Wyandotte County, KS
- WaterOne, KS
- City of Kansas City, MO
- City of Jasper, AL
- City of Highland, IL
- City of Bloomington Department of Utilities, IN
- City of Columbus, SC
- City of Charleston, SC
- Charleston Water System, SC
- Beaufort-Jasper Water and Sewer Authority, SC
- Regional Water Authority, SC
- Gulf Coast Water Authority, TX
- San Antonio Water System, TX
- City of Arlington, TX
- North Texas Municipal Water Authority, TX
- Washington Suburban Sanitary Commission
- New Jersey American Water

PUBLICATIONS & PRESENTATIONS

“Customer-centricity for Utilities” Zyprme Webinar, October 29, 2020.

“Can’t Pay; Won’t Pay: COVID Implications for Water Utility Funding” Water Online, September 16, 2020

“How Much is it Worth? An Overview of Valuing Water Utilities” Journal AWWA, August 2020.

“Municipal Water and Privatization” Bank of America Merrill Lynch Water Investors Conference, December 2019

“Water Reuse Cost Allocations and Pricing” Journal AWWA, November 2019.

“A Smoother Road to AMI: Leveraging applicable lessons from the Power Industry” Journal AWWA, September 2017.

“What is a World-Class Utility and How Does Yours Become One? Water Online, July 25, 2017

“Where are We Heading Next? Strategic Directions in the Water Industry”, presented at the Conference of Infrastructure Financing Agencies, Federal Policy Meeting in Washington, D.C., April 2017.

“What’s in Your Wallet? Ways to Address Aging Infrastructure and Lack of Money.” Annual Utility Management Conference. June 2016

“No More Sacred Cows”, published in Journal AWWA, January 2016.

“Business Risks to the Capital Financing Process”, published in AWWA’s Opflow magazine, September 2015.

“Securing Solid Revenues Streams for Water Utilities is Crucial for Financial Resilience”, published in Breaking Energy, September 10, 2015.

“Revenues and Expenses and Ratios, Oh My! A Finance Primer for Non-Finance Professionals”, presented at the Annual Utility Management Conference in Glendale, Ariz., March 2013.

Bui, Ann T., Editor, Financial Management for Water Utilities: Principles of Finance, Accounting and Management Controls, 2012, published by AWWA, Denver, Colo.

“Checks and Balances: An Overview of the New Financial Management for Water Utilities Handbook”, presented at the Annual AWWA Conference in Dallas, Tex., June 2012.

“Introduction to Financial Planning” presented at the Pacific Northwest Section of the Clean Water Association Winter Short Course University, Portland, Oreg., February 2010.

“Money Makes the World Go ‘Round: An Overview of the New Financial Management for Water Utilities Handbook,” presented at the Annual AWWA Conference in San Diego, Calif., June 2009.

“Key Performance Indicators” presented at the Annual AWWA Conference in San Diego, Calif., June 2009.

“Everything You Ever Wanted to Know About Finance Management but were Afraid to Ask: An Overview of the New Financial Management for Water Utilities Manual”, presented at the Annual AWWA Conference in Atlanta, Ga., June 2008.

“Alternative Funding Sources” presented at the Regional Water Authority Conference in Rancho Cordova, Calif., April 2007.

“Financial Benchmarks” presented at the Annual AWWA Conference in San Francisco, Calif., June 2005.

“Maximize Debt Market Options – Minimize Revenue Adjustments” presented at the Kentucky/Tennessee AWWA/WEF Conference in Nashville, Tenn., August 2004.

“Quantification and Reduction of Risk from Hazardous Air Emissions - Key note address,” presented at the AIChE Annual Conference in San Francisco, Calif., November 1994.

Dave Jagt

Manager, Consulting

Mr. Jagt, a Manager with Black & Veatch Management Consulting, LLC., has over 30 years of experience, spanning a variety of projects, including utility revenue forecasting, estimation and projection of revenue requirements, financial planning and rate design, capital improvement program review and financing, computer rate modeling, fixed-asset record keeping and present worth analyses. Dave also has experience with civil engineering projects, such as hydraulic design, computer hydraulic modeling, structural design, building plan review, and preparation of specifications and bid documents.

EDUCATION

BS, Civil Engineering, Virginia Polytech Inst St U, 1987

YEARS' EXPERIENCE

33

EXPERTISE

Bond Feasibility; Computer Modeling; Financial Planning; Fixed Asset Recordkeeping; Rate Design

REPRESENTATIVE PROJECT EXPERIENCE

Philadelphia Water Department; Water and Wastewater Financial Rate Study; Philadelphia, Pennsylvania; 2007-Present

Project Manager/Task Lead. Mr. Jagt has performed comprehensive studies of revenue requirements, costs of service and rates for water and wastewater utilities. The cost of service studies involved allocation of costs of service and determination of charges for 10 municipal wholesale wastewater customers and two wholesale water customers in accordance with the terms of wholesale service contractual agreements with these customers. He assisted with the development of the Tiered Assistance Program Rate Rider Surcharge (TAP-R), a rate rider concept to recover costs related to the PWD's Tiered Customer Assistance Program (TAP), and supported the TAP-R reconciliation. He assisted with contract negotiations with municipal wholesale customers, including the development of exceedance charges. He assisted with issuance of revenue bonds, including preparation of required engineering and financial feasibility studies, presentations before bond rating agencies and preparation of official statements.

Mr. Jagt has participated in enhancements to stormwater cost allocation and rate methodologies and the impacts of the alternative rates on various representative customers. The City's evolving geographic information system network and new billing system facilitated the establishment of stormwater charges based upon the customer's impervious and gross property area.

Mr. Jagt served as a task lead for the Water Department's Alternative Rate Structure study, which consisted of a review of the existing water and stormwater rate structures, supporting policies and programs, as well as an evaluation of a potential rider for pension expenses. The study also included discussions with various stakeholders and prior rate proceeding participants to gather feedback on potential alternatives. A report was issued to the Rate Board in the Fall of 2019.

City of Norfolk Department of Utilities, Norfolk, Virginia | Water Utility Wholesale Contract True-up Calculations | 1995–2003 and 2010–2020

Project Manager/Project Advisor. Mr. Jagt managed and assisted with the preparation of biennial rate projections and revenue true-up calculations during the period of 1995 to 2003 and 2010 to 2020 for Norfolk's wholesale water contracts with the City of Virginia Beach and the U.S. Navy. A Black & Veatch-developed computer model facilitated the comparisons of adopted rates (using budget projections) with recalculated rates (using actual

costs) to determine amounts of revenue to be reserved for use by the annual audit and to meet the contract-specified two-year, or biennial true-up, periods.

As stipulated by the contracts, adopted wholesale rates were based on budget projections and specified formulas recognizing the utility basis of cost allocations. The true-up comparisons revealed actual costs of wholesale service based on audited financial results.

City of Columbia, South Carolina – Department of Utilities & Engineering | Water, Sewer and Stormwater Rate Study | 2017 - 2020

Water and Sewer Study Task Lead. Mr. Jagt assisted with the comprehensive study of water and sewer utility rates for FY 2018 and FY 2020. The study covered multi-year projections of revenue and revenue requirements, cost of service by customer class, design rate schedules of rates for the sale of water to retail and wholesale service customers, and sewer service. Additionally, Mr. Jagt provided support to the City during public sessions related to educating and informing existing stakeholders about the City's FY 2018 water and sewer financial plan and rates.

Department of Utilities, Norfolk, Va. | Water Revenue Bond Feasibility Studies | 1993–2015

Project Manager/Project Advisor. Mr. Jagt managed and assisted with Black & Veatch's evaluations of the Norfolk Department of Utilities' ability to issue water revenue bonds (Series 1993, 1995, 1998, 2001, 2010, 2012, 2013, 2014, and 2015). The studies included a formal review of system facilities for sound operating conditions, current regulatory compliance, sufficient treated and raw water capacity, and adequate staffing. A detailed review and projection of all revenue requirements including operation and maintenance expense, recurring capital, existing debt service, cost of new debt, maintenance of required reserve funds, Payment in Lieu of Taxes (PILOT), transfers to General Fund, and anticipated major capital improvements was also performed.

Key West, Florida | Wholesale Wastewater Rates Assessment and Contract Review | 2016

Task Leader. Mr. Jagt was a task leader for a cost of service analysis for wholesale wastewater service and assisted with a review of the existing wholesale wastewater services agreement and drafting an updated wholesale wastewater agreement. This study included an assessment and analysis of the existing wholesale wastewater rate furnished to the US Navy, the development of a proposed wholesale wastewater rate for Key Haven, a new service territory that was acquired and operated by the Florida Key Aqueduct Authority (FKAA), and an update of the existing Navy Wholesale Wastewater Agreement.

City of Wilmington, Delaware | Water, Wastewater, Stormwater Utility Annual Financial Planning and Rate Study | 2016

Technical Advisor. As Technical Advisor, Mr. Jagt assisted with the rate support efforts for the wholesale wastewater treatment rates. The study involved assisting with the development of a presentation of the wholesale wastewater treatment cost of service analysis methodology and results and assisting with providing responses to the wholesale customer queries regarding the proposed cost of service rates.

Harford County, Maryland | Comprehensive Utility Revenue Rate Study | 2015

Task Leader. Mr. Jagt was a task leader for a comprehensive water/sewer utility revenue study for Harford County. This comprehensive study included eight (8) interrelated work items comprising of 13 tasks. The work items included Operating and Capital Funding Analysis; Infrastructure Reinvestment Forecasting; Billing Period Modification Analysis; Labor Resource Analysis; Connection Fee Study; Electronic Bill Payment Investigation; Rate Benchmarking; and Rate Seminar. The objective of this comprehensive revenue study is to prepare a six-year financial plan incorporating the financial results from all of the other work items, to determine the magnitude of

annual revenue adjustments required during the six-year study period, and its impact on rates. Mr. Jagt was the task lead for the Operating and Capital Funding Analysis and Connection Fee Study work items.

Pittsburgh Water and Sewer Authority, Pittsburgh | Stormwater Management and Rate Structure Project | 2012

Consultant. Mr. Jagt assisted with the development of stormwater cost allocation analysis, financial planning, user fee funding options evaluation and Equivalent Residential Unit (ERU) rate development as part of the stormwater utility feasibility evaluation. The study included concept development, development of combined sewer cost allocation methodology for debt service and O&M costs, analysis of annual stormwater revenue requirements and funding options and the development of stormwater Equivalent Residential Unit (ERU) rates.

Philadelphia Water Department | Stormwater Implementation Services, City of Philadelphia, Pennsylvania | 2009–2011

Consultant. Mr. Jagt provided assistance with the implementation of Philadelphia Water Department's parcel area based stormwater charges. The implementation assistance included reviewing the Credit and Appeals manual, frequently asked questions documents, and parcel fact sheets, which were provided to non-residential customers as part of the public outreach program. The parcel area based stormwater charge bill is to go live on July 1, 2010.

Henrico County, Richmond, VA | Stormwater Utility Study | 2011

Consultant. Mr. Jagt performed the stormwater financial planning, and funding options evaluation. The study included program review and level of service alternatives evaluation, financial planning and funding options analysis, impervious area analysis and rate structure evaluation. The study also included a preliminary review of credits program, appeals process and billing options evaluation.

Public Utilities Department, Chesapeake, Va. | Water Revenue Bond Feasibility Study | 2010

Project Manager. Mr. Jagt managed Black & Veatch's evaluation of the ability of the City of Chesapeake to issue \$36.4 million in water and sewer revenue bonds, Series 2010. The project included conducting site inspections of water and sewer system facilities to evaluate their adequacy to provide utility service, projection of revenue requirements and revenues; cash flow financial planning analyses; evaluation of adequate working capital balances; and debt service coverage analyses, including system maximum and annual debt ratios.

Mr. Jagt also participated in the bond working group for official statement and agreement of trust reviews and in developing presentations to bond rating agencies. He prepared a final engineering report included in the bond issue's official statement.

City of Dallas, Texas | Stormwater Fee Study | 2009–2010

Task Leader. Mr. Jagt assisted with the effort to update the stormwater user fee program for the City of Dallas. He led the financial planning and cost of service analyses. The study involved the following key tasks:

- *Financial Planning:* Developed stormwater revenue requirements for a multi-year financial plan utilizing an Excel based model. Revenue requirements developed served as the basis for the Utility's FY 2009 budget.
- *Parcel Data Analysis:* Involved an extensive parcel data analysis of the City's parcel data received from Dallas County along with billing data received from the new billing system (SAP Pay1) and the previous billing system (CIABS). Analysis also provided an estimation of the runoff coefficient for parcels. A review of the billing mechanism and procedures for ongoing maintenance were reviewed as well as an update of parcel impervious data.

- *User Fee Methodology*: Reviewed various stormwater user fee billing methodologies and alternative rate structures. Defined a methodology based on impervious area for residential, and runoff coefficient based impervious area for the non-residential parcels.
- *Rate Schedule*: Defined a rate schedule with a five-tiered rate structure for the residential parcels and an individually computed fee for commercial parcels. Unimproved (vacant) land parcels saw an increase applicable to the level of uncapped/capped gross area square footage.

Water Revenue Bureau, City of Philadelphia, Pennsylvania | Utility Billing Appeals Process Optimization | 2009

Consultant. Mr. Jagt assisted in conducting a Utility Billing Appeals Process Optimization study for the Water Revenue Bureau (WRB). The purpose of the study was to do a comprehensive review of the existing billing dispute/appeals and hearing process to facilitate better alignment of business processes with Philadelphia Water Department (PWD) regulations; and to streamline policies, staffing, and workflow to enhance the overall operations for meeting desired service levels. The key elements of the study included the following:

- Formation of a WRB Advisory Group;
- Review of existing business processes and workflow, and policies and regulations;
- Gap analysis on processes, technology, policy, and staffing issues/constraints;
- Optimization of business workflow and technology utilization;
- Staffing and workload analysis to determine staffing needs;
- Development of recommendations for requisite policy changes; and
- Development of procedures to integrate the stormwater utility billing appeals with the water/sewer appeals processes.

Department of Utilities, Lynchburg, Va. | Water and Wastewater Financial Planning Model, Water Wholesale Cost-of-Service Study, and CSO Compliance Report Certification | 2006–2007

Project Manager. Mr. Jagt managed Black & Veatch's effort to develop financial planning models that would allow the City to conduct water and wastewater utility financial planning and rate analyses. The models allowed the City staff to analyze historical customer account and billed volumes, revenues and revenue requirements; develop projections of customer accounts and billed volumes, revenue under existing rates and revenue requirements; prepare cash-based flow of funds statements for each utility; develop financial plans for each utility; and calculate test year rates necessary to provide the net revenue requirements of each utility as established by the financial plans.

In addition, Black & Veatch assisted the City in conducting a cost-of-service water rate study for purposes of developing the cost of service and rates for the City's wholesale water service to the Counties of Amherst, Bedford and Campbell. Black & Veatch determined revenue requirements and units of service; evaluated revenue requirement basis and cost allocation methodologies; allocated revenue requirements to functional cost components; distributed functional cost component costs to customer classes; determined proposed rates for wholesale service; and assisted with the development of a wholesale service water rate agreement.

Black & Veatch also reviewed and certified the City-prepared Annual CSO Compliance Report. Black & Veatch checked the accuracy of the current year data on each of the provided schedules. The City's Annual CSO

Compliance Report also includes verification that the annual residential wastewater bill based on 700 cubic feet per month is greater than or equal to 1.25 percent of median household income to ensure that enough funds are being spent on wastewater projects.

Department of Utilities, Chesapeake, Va. | Comprehensive Water and Wastewater Rate Study | 2005–2006

Project Manager. Mr. Jagt managed Black & Veatch’s comprehensive analysis of the City’s water and wastewater rates. The study includes the development of a 10-year financial plan for water and wastewater separately and combined, cost of service for the identified test year and cost-of-service rate design to equitably recover costs from customers based on their identified service requirements. Black & Veatch also developed a sophisticated financial planning and rate model for the City.

SELECTED PUBLICATIONS

Co-presented paper entitled, *“Sustainable Wet Weather Funding Can Be Achieved by Developing Multi-Objective Stormwater Utility Programs,”* at WEFTEC 2014 in New Orleans, La., September 2014.

Presented technical presentation entitled, *“Building Financial Resiliency: The Critical Role of Establishing and Adhering to Financial Performance Metrics,”* at the 2014 Tri-Association Conference in Ocean City, MD., August 2014.

Coauthored paper on *“Fairfax County, Virginia OWM’s Approach to Sewer Utility Financial and Operational Planning,”* Presented at Chesapeake Water Environment Association and The Water and Waste Operations Association of Maryland, Delaware and District of Columbia 30th Joint Annual Conference, Ocean City, Md., July 1999.

Coauthored paper on *“A Combined Water and Wastewater Utility Approach to Meeting Increasing Costs While Operating Efficiently”* presented to WEF/AWWA Joint Conference in March 1999.

Coauthored paper on *“Useful Marketing Strategies Necessary for Bond Issue Preparedness,”* Presented to Chesapeake AWWA in September 1998. and 1998 Annual VA Section AWWA Conference, Roanoke, Va., October 1998.

Coauthored paper entitled, *“Fairfax County, Virginia OWM’s Approach to Sewer Utility Financial & Operational Planning,”* presented at Annual WEFTEC “96”, in Dallas, Texas, October 1996.

Co-presented paper entitled, *“Norfolk’s Use of Computer Models During Water Sales Contract Negotiations,”* at AWWA’s 1995 Computer Conference in Norfolk, Va., April 1995.

Coauthored article entitled, *“Long Range and Short Range Planning: Fairfax County OWM’s Approach to Today’s Decision Making,”* published in Virginia Review, September/October 1994.

Brian Merritt

Manager, Consulting

Civil/water resources project management professional with over 18 years of experience in the engineering and consulting industry. Extensive experience in project management, stormwater fee implementation and development, cost of service, financial planning and rate design, engineering design, permitting, public outreach, program evaluations and planning, and funding strategy implementation.

REPRESENTATIVE PROJECT EXPERIENCE

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Financial Planning and Cost of Service Study | 2019-Present

Project Manager. Mr. Merritt served as project manager for the Water Department's Alternative Rate Structure study, which consisted of a review of the existing water and stormwater rate structures, supporting policies and programs, as well as an evaluation of a potential rider for pension expenses. The study also included discussions with various stakeholders and prior rate proceeding participants to gather feedback on potential alternatives. A report was issued to the Rate Board in the Fall of 2019. During this time Mr. Merritt also supported the 2019 and 2020 reconciliation of the Tiered Assistance Program Rate Rider Surcharge (TAP-R). Current work includes the financial planning, stormwater cost of service analysis, and rate study update for the Philadelphia Water Department (PWD). The study involves a six-year financial planning, cost of service analysis, cost allocation analysis, policy issues review, rate design, and rate case support.

City of Newark, New Jersey | Stormwater and Sewer Rate Study | 2020-Present

Project Support. Mr. Merritt serves as project manager to City of Newark, New Jersey's Department of Water and Sewer Utilities' Stormwater and Sewer Rate Study. The primary objective of the study was to evaluate the impact of the implementation of a stormwater fee on Newark's sewer rates and to evaluate customer bill impacts ahead of further consideration by City leadership. Work is currently ongoing with draft results provided to City staff in late 2020. Refinements are expected in early 2021 with additional discussion with City Administration forthcoming.

New Jersey Future, Trenton, NJ | On-call Stormwater Utility Expert Support Services | 2019-2020

Project Manager. Mr. Merritt worked with NJ Future to develop the New Jersey Stormwater Utility Resource Center, providing technical input and guidance, narrative development as well as content review. He assisted in on-call service support, providing assistance and feedback to NJ Future staff on stormwater utility related policy matters. Mr. Merritt, along with other Black & Veatch staff, conducted stormwater utility training sessions for NJ Future staff, municipal staff and advocacy organizations.

EDUCATION

MS, Civil & Environmental Engineering, Lehigh University, 2007

BS, Civil & Environmental Engineering, Lehigh University, 2000

YEARS' EXPERIENCE

18

EXPERTISE

Stormwater Fee and Utility Implementation; Stormwater Management; Strategic Planning; Hydraulics; Hydrology; Green Infrastructure Planning and Design; Credit Program Development; Rate Structure Analysis and Design; Stormwater Financial Planning; Public Outreach and Stakeholder Engagement; Stormwater Needs Assessments.

City of Norfolk Department of Utilities, Norfolk, Virginia | Water Utility Wholesale Contract True-up Calculations | 2019

Project Support. Mr. Merritt aided in the preparation of biennial revenue true-up calculations for Norfolk's wholesale water contract with the City of Virginia Beach for the periods of FY 2018 and FY 2019. As stipulated by the contract, adopted wholesale rates were based on budget projections and specified formulas recognizing the utility basis of cost allocations. The true-up comparisons revealed actual costs of wholesale service based on audited financial results. Mr. Merritt supported the review of updated fixed asset listings to update utility basis cost allocations, revisions to demand based allocations, updates to annual O&M expenses, as well as review of billing and revenue adjustments.

Metropolitan St. Louis Sewer District (MSD), St. Louis, Missouri | Rate Consultant to MSD Rate Commission | 2019

Project Support. Black & Veatch has served as a rate consultant to MSD's Rate Commission the last two rate cycles. MSD establishes rates through a thorough stakeholder engagement process, whereby a broad cross section of stakeholders serve as a Rate Commission to evaluate MSD's Rate Proposal, supporting documentation, and testimony. In response to a request made by the Rate Commission, Mr. Merritt supported the Black & Veatch team in the development of wastewater rate comparisons of MSD's wastewater rates and rate structure to those of selected peer utilities across the country. This work included a review of industry trends, as well as the costs of wastewater collection and treatment, underlying infrastructure needs, regulatory requirements, revenue sources, rate structures as well as resulting customer rates and bill impacts.

City of Takoma Park, Maryland | Stormwater Rate Study | 2018-2019

Project Manager. Mr. Merritt has been working with the City of Takoma Park, Maryland to complete a review of their stormwater billing information and associated stormwater rates. The City had not holistically re-evaluated its stormwater rate structure since initial implementation in the late 1990s. In addition, the City had obtained updated impervious area data (i.e. planimetric data) for the entire service area. Mr. Merritt worked with the City to assess impacts of the updated data set on the existing rate structure and identify potential rate adjustments needed to maintain revenue sufficiency for the stormwater program. Customer bills were also evaluated to assess potential impacts on the various stormwater customer classes. In addition, alternative rate structures were developed to help improve the public understanding and improve the overall equity of the stormwater rate structure. A rate study report was delivered to staff in late 2018, with consideration by City Council expected to follow.

City of Jonesboro, Arkansas | Stormwater Feasibility Study | 2018-2019

Project Support. Mr. Merritt has been assisting in the evaluation of a dedicated stormwater fee for the City of Jonesboro, Arkansas. This involves the evaluation of policies related to stormwater revenue requirements, impervious area development, customer classification, rate structure development, billing and enforcement as well as credit and appeals. Work also includes establishing stormwater units of service and analyzing the operations, capital and other costs to determine the revenue requirements. The funding approach is currently under consideration by City staff and leadership.

Unified Government of Wyandotte County and Kansas City, Kansas | Stormwater Feasibility Study | 2018-2019

Project Support. Mr. Merritt has been assisting in the development and evaluation of an impervious area based stormwater user fee for the Unified Government of Wyandotte County and Kansas City, Kansas (UG). UG currently charges all customer a flat fee for stormwater services. Work includes the review of available data

sources, evaluation of stormwater rate structures, development of stormwater customers classifications, establishing stormwater units of service as well as the development of credit and appeals policies. Other areas of work have included the development of updates stormwater revenue requirements including an assessment of operation and maintenance, capital improvement and capital financing need. As of March 2019, the impervious area based stormwater fee is still under development, with recommendations expected to be delivered to the UG Board of Commissioners by mid-2019.

City of Columbia, South Carolina – Department of Utilities & Engineering | Stormwater Bond Feasibility Study | 2018

Project Support. Mr. Merritt worked with the City of Columbia, South Carolina to perform a five-year financial feasibility analysis of the City's Stormwater System operating results associated with the issuance of Stormwater System Revenue Bonds. The analysis included a forecast of revenues and revenue requirements, to determine the financial feasibility of the City issuing the Series 2018 Bonds.

City of Newark, New Jersey | Stormwater Utility Feasibility Study | 2017-2019

Project Support. Mr. Merritt has been assisting in the evaluation of a stormwater utility for the City of Newark, New Jersey. The project involves a review of the City's current stormwater management program, identification of program improvements and level of service enhancements, as well as capital improvements needs. Part of the evaluation includes the allocation of combined sewer related costs between sewer and stormwater revenue requirements. Work also includes impervious area development, customer classification, rate structure development, policy development including credits, appeals, as well as billing and enforcement. Work is currently ongoing with recommendations were provided to City leadership in Mid-2019 along with anticipated planned public outreach and education efforts.

City of Newark, Delaware | Stormwater Utility Implementation | 2016-2018

Project Support. Mr. Merritt has been assisting in the development and implementation of a stormwater utility for the City of Newark, Delaware. This involves the evaluation of policies related to stormwater revenue requirements, impervious area development, customer classification, rate structure development, billing and enforcement as well as credit and appeals. Work also includes establishing stormwater units of service and analyzing the operations, capital and other costs to determine the revenue requirements. During 2017, Mr. Merritt assisted with the implementation phase of the project helping the City with the finalization of customer service processes including credit and appeals, billing integration and parcel account mapping. The City began billing for stormwater in January 2018.

City of Cincinnati, Ohio – Stormwater Management Utility | Stormwater Rate Study | 2016-2018

Project Manager. Mr. Merritt has been working with the City of Cincinnati Ohio's Stormwater Management Utility (SMU) to complete a comprehensive review of their stormwater rates. Current work includes the evaluation of projected revenue requirements and anticipated system-wide revenue increases due to the anticipated need for a large capital program to rehabilitate and/or replace components of the City's Barrier Dam as well as other critical stormwater infrastructure. Additional costs associated with NPDES MS4 Phase II permit requirements, increased operation and maintenance costs, were also evaluated. A financial plan report was delivered to staff in and City Council ultimately adopted updated stormwater rates to support the revenue requirements of SMU.

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Financial Planning and Cost of Service Study | 2017-2018

Project Manager. Mr. Merritt supported the financial planning, stormwater cost of service analysis, and rate study update for the Philadelphia Water Department (PWD). The study involved a six-year financial planning, cost of service analysis, cost allocation analysis, policy issues review, rate design, and rate case support. Mr. Merritt aided in the development of the financial plan, cost of service analysis including: sewer cost of service, system-wide billing units estimates, stormwater cost allocation, user fee methodology, credit, incentive and customer assistance program cost recovery. Mr. Merritt worked with the project team to develop a rate rider concept to recover costs related to the PWD's Tiered Customer Assistance Program (TAP). Mr. Merritt led the stakeholder engagement support services provided under this contract. Mr. Merritt also helped with drafting testimony for the rate proceedings.

City of Columbia, South Carolina – Department of Utilities & Engineering | Water, Sewer and Stormwater Rate Study | 2017

Stormwater Task Lead. Mr. Merritt assisted with a water, sewer and stormwater rate study for the City of Columbia, South Carolina's Department of Utilities & Engineering. Mr. Merritt led the stormwater portion of the study. Project work included: development of a multi-year financial plan, revenue and revenue requirements review, stormwater rate structure alternatives analysis, development of financial metrics, review of capital program needs and financing. The project included the development of a Stormwater Rate Study report and presentation of the Rate Study findings and recommendations to City Council. Based upon the study's findings, the City adopted a series (i.e. multi-year) stormwater rate increases.

City of Havre de Grace, Maryland | Water and Sewer Rate Study | 2016-2017

Project Manager. Mr. Merritt served as project manager for the City of Havre de Grace, Maryland's comprehensive review of their current water and sewer rates. The project integrated an asset renewal forecast with the rate study and development of alternative funding mechanisms (such as an asset reinvestment charge) to alleviate the current deficit fiscal position and adequately fund water and sewer operations and capital program obligations. Work also included: Preparation of a reasonable estimate of repair and renewal forecast for all of the water system treatment, storage, transmission, and distribution assets; Development a five-year financial plan for the water/sewer enterprise fund to assure financial self-sufficiency; Review of the existing rate structure and design rate schedules to enable a defensible recovery of fixed and variable costs of the water and sewer utilities; and presentation of the Rate Study findings and recommendations to the Water and Sewer Rate Commission and to the City Administration and Council.

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Stormwater Cost of Service and Rate Study | 2015-2016

Project Support. Mr. Merritt supported the stormwater cost of service analysis, and rate study update for the Philadelphia Water Department. The study involved a six-year financial planning, cost allocation analysis, stormwater fee policy issues review, rate design, and rate case support. Mr. Merritt aided in the development of stormwater related analysis including: sewer cost of service, system-wide billing units estimates, stormwater cost allocation, user fee methodology, credit, incentive and customer assistance program cost recovery. Mr. Merritt helped with drafting testimony for the rate proceedings.

Pittsburgh Water and Sewer Authority, Pittsburgh | Stormwater Management and Rate Structure Project | 2015-2019

Project Manager. Mr. Merritt is currently serving as Project Manager for Black & Veatch's portions of the Pittsburgh Water and Sewer Authority's (PWSA) Stormwater User Fee Development and Implementation project. Phase 2 builds from work previously conducted in 2012, and is intended to take the decisions and recommendations developed during Phase I- Feasibility Study up to the development of a draft ordinance for consideration by Pittsburgh City Council. Project work includes updates to the stormwater cost allocation analysis, financial planning, user fee funding and rate structure finalization. Mr. Merritt is providing technical advice and input into PWSA's public outreach efforts.

South Fayette Township, Allegheny County, Pennsylvania | Stormwater Program Needs Assessment | 2015

Project Manager, while with a former employer, assisting South Fayette Township in a comprehensive needs assessment of their existing stormwater program. The goal of the project was to define an enhanced program that meets the future needs and priorities of the community while addressing operation and maintenance, infrastructure replacement, and MS4 compliance responsibilities. All of the main streams, which run through the Township, are impaired. Impairments include acid mine drainage, nutrients, PCBs, and sediments. Actions to address these pollutants must be considered as part of the next MS4 permit cycle. A stormwater needs assessment committee was conveyed to gain public input into which program areas needed the most attention and to develop a five-year plan on which to evaluate funding options.

White Township, Indiana County, Pennsylvania | Stormwater Assessment Feasibility Study | 2014-2015

Project Manager, while with a former employer, assisting White Township in a program evaluation process that could result in the implementation of a stormwater user fee in the Township. This fee would be used to support enhancements to the Township's stormwater management program with resources directed to meet community-wide goals and needs. The project was intended to provide the Township with sufficient information on the viability of implementing a stormwater user fee, prior to investing in full implementation. Responsible for program evaluation and planning, billing system and data evaluation, impervious area data analysis, parcel and account review, rate structure development, initial rate estimates, public/Board of Commissioners presentations as well as overall project and client management. White Township implemented their stormwater fee in early 2016.

Radnor Township, Montgomery County, Pennsylvania | Stormwater Program and Fee Implementation | 2012-2013

Project Manager, while with a former employer, for the evaluation and development of an updated stormwater management program and funding mechanism for Radnor Township, PA. Led project team working with the Township personnel to develop a dedicated funding source to help meet the community's goals for infrastructure maintenance, flood mitigation, and green infrastructure. Services included stormwater program assessment and level of services analysis, financial analysis, data and master account file development, stakeholder meeting facilitation, rate evaluation, rate structure and ordinance development. Radnor convened a stormwater advisory committee to provide input into key policy issues such as the stormwater program needs, level of service considerations, the overall program plan, rate structure, credit and incentive program options and public education requirements. Assisted the Township with appeals policy development, billing system implementation support, customer service training, draft credit program development, and public education efforts. The stormwater user fee was approved by the Radnor Board of Commissioners in September 2013.

City of Meadville, Crawford County, Pennsylvania | Stormwater Program and Fee Implementation Project | 2012-2013

Project Manager, while with a former employer, for the evaluation and development of an updated stormwater management program for the City of Meadville, PA. Assessed the current stormwater program with the goal of establishing a functioning stormwater funding mechanism that fully accounts for the City's stormwater program costs. Tasks included a review of the City's current level of service, evaluation of the stormwater program's organizational structure, future needs assessment, current cost estimation, facilitation of Citizen's Advisory Groups, ordinance development, credit and appeals policy and program development, customer service training, management of public outreach and education activities as well as GIS and billing database development. Two separate Citizen's Advisory Groups were convened, one to provide input on the initial stormwater fee policies and the second to help develop a detailed stormwater credit and appeals program to enhance the equity of the fee and provide incentivizes to private property owners to better manage stormwater on-site. The Meadville stormwater fee was approved by their City Council in November 2012 and the first bills were processed in 2013.

SELECTED PUBLICATIONS AND PRESENTATIONS**Presentations – Stormwater Utility Implementation**

- "Road to Resiliency: Integrated Stormwater Management Planning and Funding," NJ Future, May 2015
- New Jersey Watershed Institute Stormwater Seminar, June 2019
- Government Finance Officers Association of Pennsylvania, April 2015
- Villanova University Guest Lecturer – Sustainability & Science, 2014
- St Joseph's University Stormwater Workshop, 2014
- Villanova University Stormwater Symposium, 2013
- 3 Rivers Wet Weather, 2013
- Erie County GIS Workshop, 2013
- PA Northwest City Manager's Meeting, 2012

Publications

"Sustainable Stormwater Programs and Financing", Pennsylvania Borough News, October 2014