

BEFORE THE

INDIANA UTILITY REGULATORY COMMISSION

**PETITION OF CWA AUTHORITY, INC. FOR (1))
AUTHORITY TO INCREASE ITS RATES AND)
CHARGES FOR WASTEWATER UTILITY SERVICE)
IN THREE PHASES AND APPROVAL OF NEW)
SCHEDULES OF RATES AND CHARGES)
APPLICABLE THERETO; (2) APPROVAL OF A) CAUSE NO. 45151
LOW-INCOME CUSTOMER ASSISTANCE)
PROGRAM; AND (3) APPROVAL OF CERTAIN)
CHANGES TO ITS GENERAL TERMS AND)
CONDITIONS FOR WASTEWATER SERVICE.)**

**DIRECT TESTIMONY
of
PRABHA N. KUMAR**

**On
Behalf of
Petitioner,
CWA Authority, Inc.**

Petitioner's Exhibit No. 9

1 **INTRODUCTION**

2 **Q1. PLEASE STATE YOUR NAMES AND BUSINESS ADDRESS.**

3 A1. My name is Prabha N. Kumar and my business address is 489 Fifth Avenue, 14th
4 Floor, New York, NY 10017.

5 **Q2. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?**

6 A2. I am a Director in the firm of Black & Veatch Management Consulting LLC (Black &
7 Veatch), 8400 Ward Parkway, Kansas City, Missouri.

8 **Q3. PLEASE DESCRIBE THE FIRM OF BLACK & VEATCH MANAGEMENT
9 CONSULTING, LLC (BLACK & VEATCH).**

10 A3. Founded in 1915 and headquartered in Overland Park, Kansas, Black & Veatch serves
11 its clients through a network of regional offices. The employee owned company has
12 approximately 10,000 professionals with over 100 offices worldwide. The firm's
13 clients include: public and investor owned utilities; industrial and commercial
14 businesses; municipalities, ranging from small townships to large metropolitan
15 regions; local, state, and Federal agencies, international agencies, and governments of
16 other nations.

17 Black & Veatch is a wholly-owned subsidiary of Black & Veatch Holding
18 Company and brings together over 200 professionals, including experienced industry
19 executives, senior specialists, and technology experts from across the electric, water,
20 oil, natural gas and technology industries. The services we provide include utility

1 financial planning, cost of service rate studies, bond feasibility studies, affordability
2 analysis, systems valuation, expert testimony during rate proceedings, litigation
3 support, regulatory review, utility business efficiency and transformation services,
4 operations technology planning and integration services, and customer engagement
5 and advanced metering/billing solutions implementation.

6 **Q4. MS. KUMAR, WILL YOU PLEASE SUMMARIZE YOUR EDUCATIONAL**
7 **BACKGROUND AND PROFESSIONAL EXPERIENCE?**

8 A4. I graduated from the University of California, Riverside with a Master of Business
9 Administration degree. I have been with Black & Veatch since 1999 and have served
10 in increasing levels of responsibility from staff consultant, project manager, principal
11 consultant and currently a director in the Water Advisory & Planning practice. I
12 currently lead the stormwater utility consulting practice within Black & Veatch.

13 I specialize in directing and managing water and wastewater financial planning
14 and cost of service rate studies, wholesale contract pricing and budget/true-up
15 analysis, stakeholder engagement facilitation, and stormwater utility development and
16 implementation. In addition to serving as an expert witness in multiple rate cases for
17 the Philadelphia Water Department, I have provided water, wastewater and
18 stormwater utility consulting services to various clients including Unified Government
19 of Wyandotte County, KS; Suez Water NY; DC Water, Washington D.C.; Harford
20 County, Maryland; City of Havre de Grace, Maryland; Pittsburgh Water and Sewer

1 Authority, Pennsylvania; City of Wilmington, Delaware; City of Newark, Delaware;
2 City of Springfield, Ohio; and City of Dallas, Texas.

3 In addition, I am also involved in directing business operations efficiency and
4 implementation services, billing systems evaluation, mediation and litigation support,
5 and benchmarking studies. I am currently a member of the American Water Works
6 Association (AWWA), the Water Environment Federation (WEF), and an active
7 member within the Strategic Practices Management Committee of AWWA. I am also
8 a member of the Stormwater Committee of the National Association of Clean Water
9 Agencies (NACWA).

10 I am a lead author for the chapter on Wet Weather Financing and Cost
11 Recovery in the *Wastewater Financing and Charges, Manual of Practice 27*
12 (MoP27) published in February 2018 by WEF, and also the lead author for the *User*
13 *Fee Funded Stormwater Program Manual*, published in 2011 by WEF. I have also
14 presented in multiple webinars, seminars, and conferences sponsored by organizations
15 such as the AWWA, WEF, Storm Solutions, and the New Jersey Watershed Institute.

16
17 **Q5. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

18 A5. The purpose of my testimony is to discuss the underlying methodology used to
19 conduct the wastewater cost of service study filed by Petitioner, CWA Authority, Inc.
20 (“CWA”), and to present the results of that cost of service study in this proceeding.

1 My testimony also presents and explains CWA's design of wastewater rates and
2 charges proposed in this proceeding for Phase 1, Phase 2, and Phase 3.

3 **Q6. PLEASE BRIEFLY DESCRIBE THE PERIODS FOR WHICH A COST OF**
4 **SERVICE ANALYSIS WAS PERFORMED AND FOR WHICH THE RATES**
5 **AND CHARGES ARE BEING PROPOSED.**

6 A6. Black & Veatch performed the cost of service analysis for three distinct revenue
7 requirement periods namely Phase 1, Phase 2 and Phase 3. CWA's witness John R.
8 Brehm describes the proposed timing for placing the resulting rates in effect.

9 **Q7. PLEASE IDENTIFY THE ATTACHMENTS YOU ARE SPONSORING IN**
10 **THIS PROCEEDING.**

11 A7. I am sponsoring the following Attachments, and will discuss each Attachment in the
12 applicable sections of my testimony:

13 PNK-1 Educational Background, Business Experience, and Qualifications

14 PNK-2 Wastewater Cost of Service Study

15 PNK-3 Proposed Wastewater Rates and Charges for Phase 1

16 PNK-4 Proposed Wastewater Rates and Charges for Phase 2

17 PNK-5 Proposed Wastewater Rates and Charges for Phase 3

18 PNK-6 Memorandum on Capacity Factor Evaluation

19 PNK-7 Memorandum on Infiltration & Inflow ("I/I") Analysis

20 **Q8. WHAT IS GENERALLY INCLUDED IN EACH OF THE ATTACHMENTS?**

1 A8. Attachment PNK-1 summarizes my educational and business background with respect
2 to performing retail and wholesale cost of service and rate studies, as well as other
3 financial and management work for water and wastewater utilities, and my overall
4 qualifications and contributions to the utility industry.

5 Attachment PNK-2 consists of 10 schedules and presents the wastewater cost
6 of service study, which includes a summary of the Phase 1 net revenue requirements
7 to be recovered from rates and charges, as well as the applicable schedules that
8 present the overall analytical approach and results.

9 Attachment PNK-3 consists of 6 schedules that present the cost of service
10 wastewater rates and charges, the proposed wastewater rates and charges to recover
11 the Phase 1 net revenue requirement, and the alignment between Phase 1 cost of
12 service and the estimated revenues from proposed rates.

13 Attachment PNK-4 consists of 7 schedules that present the cost of service
14 wastewater rates and charges and the proposed wastewater rates and charges to
15 recover the Phase 2 net revenue requirement, and the alignment between Phase 2 cost
16 of service and the estimated revenues from proposed rates.

17 Attachment PNK-5 consists of 7 schedules that present the cost of service
18 wastewater rates and charges and the proposed wastewater rates and charges to
19 recover the Phase 3 net revenue requirement, and the alignment between Phase 3 cost
20 of service and the estimated revenues from proposed rates.

1 Attachment PNK-6 consists of a memorandum on capacity factor evaluation.

2 Attachment PNK-7 consists of a memorandum on I/I analysis.

3 **ATTACHMENT PNK-2 PETITIONER'S COST OF SERVICE STUDY**

4 **Q9. WHAT IS COST OF SERVICE?**

5 A9. Cost of service is the total annual cost a utility incurs or revenue requirements a
6 utility needs to provide services to its customers. Total cost of service, for CWA's
7 wastewater utility, is equal to the total revenue requirements, of a defined time period,
8 of the wastewater system. This includes Operations & Maintenance ("O&M")
9 expense, debt service, Payment in Lieu of Taxes ("PILOT"), and extensions and
10 replacements for the wastewater system.

11 The cost of service to be recovered from wastewater rates and charges is the
12 *net revenue requirement* that is apportioned to the various customer classes. The net
13 revenue requirement is determined as the total wastewater revenue requirements less
14 wastewater related other revenues and adjustments. The other revenues and
15 adjustments include other operating revenues, interest income, and capital revenues
16 such as connection fee capital revenues.

17 **Q10. DOES BLACK & VEATCH SPECIALIZE IN WASTEWATER COST OF**
18 **SERVICE AND RATE STUDIES?**

19 A10. Yes. Black & Veatch has many professionals who have conducted several wastewater
20 cost of service studies similar to the study performed for this rate proceeding.

1 Additionally, Black & Veatch subject matter experts in cost of service rate studies
2 have contributed as lead authors to the development of the manuals of practice for
3 cost of service and rate design for both the water and wastewater utility industries
4 over the past several decades.

5 **Q11. DID BLACK & VEATCH PERFORM A COST OF SERVICE STUDY FOR**
6 **THIS RATE PROCEEDING?**

7 A11. Yes, Black & Veatch completed a wastewater cost of service study during the period
8 of August 2018 through September 2018. The results of the cost of service study are
9 presented in Schedules 1 through 10, in Attachment PNK-2. Schedule 1 of
10 Attachment PNK-2 presents the total *net* O&M and Capital revenue requirements to
11 be recovered from rates and charges for Phase 1 of this rate case. The total net
12 revenue requirements related to Phase 2 and Phase 3 of this rate proceeding are
13 presented in Schedule 1 of Attachment PNK-4 and Schedule 1 of Attachment PNK-5,
14 respectively.

15 **Q12. PLEASE DESCRIBE IF ANY WASTEWATER INDUSTRY ACCEPTED**
16 **COST OF SERVICE PRINCIPLES EXIST, AND INDICATE IF THESE**
17 **PRINCIPLES ARE UTILIZED IN THIS RATE FILING.**

18 A12. Yes. The manual for the wastewater cost of service is WEF's "*Financing and*
19 *Charges for Wastewater Systems*" Manual of Practice M27, also known as MoP 27.
20 Industry rate practitioners use this manual in developing cost of service studies as this

1 manual provides generally accepted industry guidelines for performing such studies.
2 The principles and overall methodology that Black & Veatch used in performing the
3 cost of service study for this rate proceeding align with the guidelines provided in
4 MoP 27, and also are consistent with the cost of service analysis methodology used in
5 CWA's previous rate proceedings.

6 **Q13. IN PERFORMING THE COST OF SERVICE STUDY, DID BLACK &**
7 **VEATCH BECOME FAMILIAR WITH CWA'S WASTEWATER SYSTEM?**

8 A13. Yes. Some of Black & Veatch's study team members, including me, visited CWA's
9 Southport Advanced Wastewater Treatment Plant, a portion of the Deep Rock
10 Tunnel Connector system and associated pumping facilities, and met with operational
11 personnel and management. In addition, the Black & Veatch study team reviewed,
12 during the course of performing the cost of service study, various documents CWA
13 provided, including a summary asset listing, contract and settlement agreements, and
14 other relevant financial pro forma financial information.

15 **Q14. WHAT OTHER ACTIONS HAVE YOU TAKEN IN PREPARATION OF**
16 **PERFORMANCE OF THE COST OF SERVICE STUDY?**

17 A14. Black & Veatch conducted two studies to facilitate discussions, required under the
18 Settlement Agreement in Cause No. 44685, which were to take place "at least three
19 (3) months prior to CWA's anticipated filing of its next rate case." Those studies are

1 a capacity factor evaluation, which is Attachment PNK-6 and an analysis of I/I, which is
2 Attachment PNK-7.

3 **Q15. PLEASE EXPLAIN THE GENERAL APPROACH BLACK & VEATCH**
4 **USED TO COMPLETE THE WASTEWATER COST OF SERVICE STUDY.**

5 A15. As indicated in response to Question 12, Black & Veatch used the cost of service
6 allocation and rate design guidelines provided in MoP 27. The general approach we
7 used to perform the cost of service study involved several sequential analytical steps,
8 as follows:

9 (i) determined the total annual pro forma O&M and capital *cost of service*
10 to be recovered from wastewater rates and charges;

11 (ii) delineated annual O&M expense and wastewater utility Plant in
12 Service investments into various system *functional elements* based on cost data and
13 input provided by CWA, which elements include functions such as: collection mains,
14 collection pumping, preliminary treatment, primary sedimentation,
15 aeration/nitrification, and sludge handling;

16 (iii) allocated the cost of each system functional element to *functional cost*
17 *components* ("cost components") such as Volume, Capacity, and Strength
18 components, primarily using the design basis methodology outlined in MoP 27;

19 (iv) determined the *units of service* for each cost component, by retail
20 customer classes and satellite customers;

1 (v) derived the *O&M* and *capital unit cost* for each cost component based
2 on the O&M and capital net revenue requirements that were allocated to cost
3 components, and determined the units of service for each cost component;

4 (vi) distributed the cost of each cost component to individual customer
5 classes in accordance with their respective service requirements for each cost
6 component using the unit costs, to determine each customer class' *cost of service*
7 *responsibility*;

8 (vii) designed the *proposed wastewater rates and charges* to recover the
9 cost of service to the extent practical, in an equitable manner, from each customer
10 class; and

11 (viii) compared the revenue expected from the proposed rates with the
12 allocated costs of service by customer class to affirm that the proposed rates and
13 charges will recover the cost of service allocated to each customer class.

14 **Q16. PLEASE DESCRIBE SCHEDULE 1 OF ATTACHMENT PNK-2.**

15 A16. Schedule 1 of Attachment PNK-2 summarizes the Phase 1 revenue requirements to be
16 recovered from wastewater rates and charges in this proceeding. Black & Veatch
17 determined the revenue requirements and offsetting miscellaneous revenues from
18 CWA's Attachment KLK-1 sponsored by witness Korlon L. Kilpatrick. The total
19 wastewater net revenue requirements or cost of service to be recovered from Phase 1

1 wastewater rates and charges are \$305,506,900. Including other operating revenue of
2 \$2,373,100, the total operating revenue determined for Phase 1 is \$307,880,000.

3 **Q17. CAN YOU PLEASE EXPLAIN THE REVENUES PRESENTED IN**
4 **SCHEDULE 2 OF ATTACHMENT PNK-2?**

5 A17. Yes. Schedule 2 of Attachment PNK-2 presents the pro forma revenue under existing
6 rates and charges as determined by CWA and sponsored by CWA's witness Korlon L.
7 Kilpatrick. This schedule also includes the billing units for each retail customer class
8 and the wholesale satellite customer classes. The billing units presented in this
9 schedule are also utilized for designing rates and charges and for affirming recovery of
10 revenue requirements under the proposed rates and charges. Schedule 2 also presents
11 a summary of the estimated *contributed volume* by class, which is used in the cost of
12 service analysis to determine each class's volume-related component cost.

13 **Q18. FOR THE COST OF SERVICE STUDY, WHAT ARE THE COST**
14 **COMPONENTS THAT HAVE BEEN RECOGNIZED?**

15 A18. In the cost of service study, Black & Veatch has recognized as cost components the
16 following: the wastewater flow parameters of Volume; Capacity or peak rates of flow;
17 the wastewater strength parameters of Biochemical Oxygen Demand ("BOD"), Total
18 Suspended Solids ("TSS"), Ammonia-Nitrogen ("NH₃-N"), Fats, Oils, and Grease
19 ("FOG"); and the wastewater customer parameters of Customer Billing and

1 Collecting. These cost components are consistent with those that were recognized in
2 CWA's last rate case, Cause No. 44685.

3 **Q19. PLEASE EXPLAIN THE GENERAL BASIS FOR ALLOCATING COSTS OF**
4 **SERVICE TO COST COMPONENTS.**

5 A19. Generally, wastewater utility O&M and capital costs are allocated to cost components
6 which influence or drive the level of cost incurred (referred to as "cost-causative
7 components" in MoP 27). As indicated in the WEF MoP 27, in a cost of service
8 analysis, costs can be allocated to cost components based on the *design basis* or based
9 on the *functional basis* of cost allocations.

10 For instance, the net plant investment costs can be allocated to the cost
11 component(s) on the basis of each component's influence on facility size (design
12 capacity) or on the basis of the purpose (function) for which the investment in a
13 facility was made. For example, in a wastewater treatment plant, effluent pumping
14 facilities must be designed primarily to accommodate peak rates of flow discharged
15 from the treatment plant. Therefore, the capital costs or investments associated with
16 these facilities are allocated 100% to the capacity cost component. Similarly,
17 aeration/nitrification facilities are designed to remove certain levels of BOD and NH₃-
18 N to meet permit compliance, and hence the capital costs of these facilities are
19 apportioned between BOD and NH₃-N.

1 In the case of O&M expenses, while some costs such as collection system
2 purchased power costs are allocated to both Volume and Capacity components, some
3 other O&M expenses are allocated to cost components on a basis that only indirectly
4 influence the magnitude of the expense. For example, the Administrative and General
5 O&M expense is allocated to all the cost components based on the sum of directly
6 allocable O&M costs less the O&M cost of Purchased Power, Chemicals, and Fuel.

7 Schedule 3 of Attachment PNK-2 presents the various allocation factors used
8 to develop the overall allocation of Plant in Service and the allocation of applicable
9 O&M functional costs to cost components.

10 **Q20. WHAT PROCEDURES WERE FOLLOWED IN THE DEVELOPMENT OF**
11 **CAPITAL AND OPERATIONS & MAINTENANCE REVENUE**
12 **REQUIREMENT COST ALLOCATIONS?**

13 A20. Black & Veatch first allocated the Wastewater Plant in Service costs of the various
14 asset categories to the applicable cost components. We then calculated the
15 wastewater Net Plant in Service as the cost of plant in service, less accumulated
16 depreciation and contributions in aid of construction (if any). The accumulated
17 depreciation costs are allocated to each cost component using the same distribution
18 resulting from the allocation of the Plant in Service costs.

19 The Net Plant in Service allocations provides a reasonable basis for allocating
20 CWA's Net Capital Revenue Requirements for Phase 1. The net capital revenue

1 requirements include debt service, extensions and replacements, PILOT, and other
2 capital revenues. In Schedule 4 of Attachment PNK-2, Line 31 presents the
3 allocations of Net Plant in Service to the cost components, and Line 37 presents the
4 allocation of Net Capital Revenue Requirements (determined in Line 10 of PNK-2,
5 Schedule 1) to cost components.

6 Similarly, a multi-step process was used to develop the O&M Revenue
7 Requirement allocations to cost components. Line 17 in Schedule 5 of Attachment
8 PNK-2 presents the allocation of Total O&M Revenue Requirements, and Line 23
9 presents the allocation of Net O&M Revenue Requirements (determined in Line 10 in
10 Schedule 1 of Attachment PNK-2) to cost components.

11 **Q21. CAN YOU EXPLAIN HOW THE NET PLANT IN SERVICE WAS**
12 **ALLOCATED TO COST COMPONENTS?**

13 A21. Yes. CWA provided Black & Veatch a list of assets categorized by system functional
14 elements, such as gravity mains, force mains, pumping, treatment-related functional
15 assets including primary clarifiers, filters, and other general assets. For each asset, the
16 asset listing included the original cost of plant in service. Each functional element
17 cost was then allocated to the appropriate cost components of Volume, Capacity,
18 BOD, TSS, NH₃-N, and FOG based on the primary design criteria that influenced the
19 investment made in each asset.

1 For example, collection and force mains, collection system pumping, wet
2 weather storage, disinfection and effluent pumping, are all designed primarily to
3 handle peak wastewater flow; therefore, these costs were allocated primarily to the
4 *Capacity* cost component. Primary clarifiers are designed primarily to handle average
5 day flow while also being able to handle the resulting sedimentation. Hence as
6 indicated in Line 23 of Schedule 3 in Attachment PNK-2, 80% of that asset class cost
7 is allocated to the Volume cost component with a 10% allocation each to the TSS and
8 FOG components. Sludge disposal facilities are primarily designed to process
9 wastewater sludge that results from the various treatment processes and hence the
10 costs of these assets are allocated to BOD, TSS, and NH₃-N based on plant design
11 and loading criteria, as indicated in Line 26 of Schedule 3 in Attachment PNK-2.

12 Lines 1 through 22 in Schedule 4 of Attachment PNK-2 present the allocation
13 of the various Plant in Service costs to the cost components. CWA also provided us
14 with accumulated depreciation by plant system functional elements. Black & Veatch
15 allocated the accumulated depreciation of collection mains, collection system
16 pumping, treatment, and general assets, to the cost components, based on the same
17 distribution as the plant in service cost allocation for those categories.

18 Line 31 presents the results of the allocation of the Net Plant in Service to cost
19 components and is derived as the Plant in Service cost allocation (Line 22), less
20 accumulated depreciation cost allocation (Line 30).

1 **Q22. CAN YOU EXPLAIN HOW THE NET CAPITAL REVENUE**
2 **REQUIREMENT WAS ALLOCATED TO COST COMPONENTS?**

3 A22. As explained in response to Q21, Black & Veatch first performed the allocations of
4 Net Plant in Service to the various cost components (Line 31 of Schedule 4,
5 Attachment PNK-2). We then used the resulting distribution of the Net Plant in
6 Service cost allocations as a basis for allocating the capital revenue requirements of
7 debt service, extensions and replacements, and PILOT, and also for allocating the
8 Other Revenues, to cost components. The Other Revenues primarily consist of
9 revenues from connection fees and miscellaneous income. Lines 32 through 35 of
10 Schedule 4 in Attachment PNK-2, present the allocations of the capital revenue
11 requirements and Line 36 presents the allocation of the Other Revenue to the cost
12 components. Then finally, the allocation of the Net Capital Revenue Requirement to
13 cost components, presented in Line 37, is determined by deducting the Other Revenue
14 allocation (Line 36) from the sum of the Capital Revenue Requirement allocations
15 (Lines 32 through 35).

16 **Q23. WHY ARE SOME WASTEWATER PLANT IN SERVICE COSTS IN**
17 **SCHEDULE 4 OF ATTACHMENT PNK-2 ALLOCATED BETWEEN**
18 **“CAPACITY COMMON TO ALL” AND “CAPACITY RETAIL”?**

19 A23. CWA receives and treats wastewater flows from six wholesale customers (“Satellite
20 Customers”), and therefore, the cost of service study incorporates flows from those

1 Satellite Customers. In Cause No. 44685 S1 (Order approved on July 26, 2017, the
2 Commission approved a Settlement Agreement entered into among CWA, the Indiana
3 Office of Utility Consumer Counselor (OUCC), and certain intervenor Satellite
4 Customers. The Settlement Agreement had as attachments for Commission approval
5 Sewer Rate No. 6, which is applicable to wholesale service and Special Contracts for
6 certain Satellite Customers (i.e., Ben Davis Conservancy District; City of Greenwood;
7 City of Beech Grove; and City of Lawrence).

8 The Settling Parties in Cause No. 44685 S1 agreed that any future proposed
9 CWA rate increases impacting Sewer Rate No. 6 shall incorporate the following four
10 (4) allocation methodologies:

- 11 (a) include Satellite Customers' actual flow, estimated peak day flow,
12 and associated pollutant loadings for determining the Satellite
13 Customers' portion of net capital revenue requirements; (b) exclude
14 the Satellite Customers from the allocation of CWA system inflow and
15 infiltration; (c) exclude the Satellite Customers from the allocation of
16 costs attributable to the CWA plant in service collection mains (i.e.,
17 collection mains other than consolidating sewers or relief sewers) with
18 diameters less than 66-inches; and (d) exclude the Satellite Customer
19 class from the allocation of costs or reallocation of revenue resulting
20 from the implementation by CWA of a residential rate based on

1 qualification for state or federal income related assistance, an
2 alternative residential rate or a substantially similar rate.

3 In accordance with the terms of the foregoing Settlement Agreement, Black & Veatch
4 allocated the Plant in Service costs associated with very large sewer mains, of
5 diameters of 66-inches or greater, to the Capacity Common to All cost component
6 and the plant in service cost associated with other sewer mains, of diameters of less
7 than 66-inches, to the Capacity Retail cost component.

8 Additionally, CWA identified large pumping facilities that handle wastewater
9 flows from both the wholesale and retail customers. CWA also identified smaller
10 pumping facilities that primarily handle the wastewater flows from the localized retail
11 customers. Black & Veatch allocated the collection system pumping and lift stations
12 plant in service costs between Capacity Common to All and Capacity Retail cost
13 components based on the foregoing size distinctions.

14 **Q24. DID BLACK & VEATCH APPLY THE OTHER COST OF SERVICE**
15 **METHODOLOGY STIPULATIONS AGREED UPON IN CAUSE NO. 44685**
16 **S1 TO THE COST OF SERVICE ALLOCATIONS AND PROPOSED RATE**
17 **DESIGN OF THIS CURRENT RATE PROCEEDING?**

18 A24. Yes. In addition to complying with the 66-inch main stipulation, Black & Veatch has
19 incorporated each of the other three considerations in preparation of this cost of
20 service study. As CWA witness Korlon L. Kilpatrick notes in his testimony, the

1 proposed Low Income Customer Assistance Program (“LICAP”) Rider is not
2 applicable to Sewer Rate No. 6, consistent with the fourth consideration set forth
3 above.

4 **Q25. WHAT IS THE BASIS FOR ALLOCATING STRENGTH RELATED NET**
5 **PLANT IN SERVICE COSTS TO THE BOD, TSS, NH₃-N, AND FOG COST**
6 **COMPONENTS?**

7 A25. The various treatment assets within a wastewater treatment plant are designed to
8 handle one or more of the wastewater flow and/or strength cost components. Hence,
9 consistent with WEF MoP 27 guidelines, Black & Veatch allocated the Net Plant in
10 Service costs of the various treatment system elements to one or more strength cost
11 components.

12 For treatment facilities such as primary clarifiers (Schedule 4 at Line 10), costs
13 are primarily allocated 80% to the Volume cost component, 10% to the TSS cost
14 component, and 10% to the FOG cost component to recognize that the asset must be
15 designed to not only handle the volume of flow, but also handle the removal of settled
16 TSS and handle the impact of FOG.

17 In a similar manner, secondary clarifiers costs (Schedule 4 at Line 12) are
18 allocated 90% to Volume, 9.2% to BOD, and 0.80% to NH₃-N. Aeration/nitrification
19 basins (Schedule 4 at Line 11) are designed primarily to remove BOD and NH₃-N
20 pollutants, and hence those costs are allocated 92% to BOD and 8% to NH₃-N.

1 With respect to sludge handling and incineration plant in service (Schedule 4,
2 at Line 18), Black & Veatch reviewed plant design criteria and historical plant loading
3 data for the Belmont and Southport Advanced Wastewater Treatment Plants for the
4 most recent three calendar years. Based on this analysis, it was determined that an
5 appropriate allocation basis for sludge handling and incineration costs was: 43%
6 BOD; 54% TSS; and 3% NH₃-N.

7 These strength related allocation percentages for each treatment facility asset
8 class are presented in Schedule 3 of Attachment PNK-2.

9 **Q26. WHY IS TREATMENT FOG INCLUDED AS A COST COMPONENT IN**
10 **THE NET PLANT IN SERVICE COST ALLOCATION?**

11 A26. FOG results from residual food waste, as well as oils and lubricants that can be found
12 in many waste discharges. Wastewater treatment facilities are not primarily designed
13 to treat FOG waste, but still must be able to handle FOG and its impact on treatment
14 processes.

15 CWA has included Treatment FOG as a separate cost component for the
16 following reasons: (i) any normal wastewater discharge could include FOG that
17 impacts treatment costs; and (ii) CWA has a distinct rate for Septic and Non-Grease
18 Haulers who collect sewage and other wastewater, and discharge it directly at the
19 Belmont Advanced Wastewater Treatment Plant. The wastewater collected could
20 include FOG-type waste, and hence delineating treatment FOG provides a reasonable

1 basis to include FOG costs in the determination of the Septic and Non-Grease Haulers
2 rate.

3 The main treatment processes impacted by FOG include the preliminary
4 treatment processes (headworks, screening, and grit chambers), as well as the primary
5 clarifiers. Therefore, a FOG allocation factor of 10% is used for these assets.

6 **Q27. CAN YOU SUMMARIZE HOW PHASE 1 PRO FORMA O&M EXPENSES**
7 **ARE ALLOCATED IN SCHEDULE 5 OF ATTACHMENT PNK-2?**

8 A27. Similar to the asset listing data, CWA provided Black & Veatch with a detailed listing
9 of personnel and non-personnel itemized O&M costs for the key functional categories
10 of Treatment Operations, Treatment Maintenance, Collections Operations,
11 Collections Maintenance, and other CWA O&M. Further, for each itemized cost
12 within the functional category, CWA provided a percentage breakdown by
13 wastewater sub-functional elements such as Mains, Headworks, Wet Weather
14 Pumping, Lift Stations, FOG, etc.

15 Black & Veatch then allocated each of these sub-functional element O&M
16 costs to the various cost components of Volume, Capacity Common to All, (including
17 treatment, large mains, and pumping), Wastewater Strength (BOD, TSS, and NH₃-N),
18 Capacity Retail, BOD, TSS, NH₃-N, FOG, and Customer costs, in a manner similar to
19 the corresponding facility's plant in service cost allocation to cost components. For
20 example, both the O&M costs of Air Nitrification systems were allocated 92% to

1 BOD and 8% to NH₃-N based on the same distribution used for the allocation of the
2 Aeration and Nitrification Plant in Service costs.

3 Customer costs related to billing, collecting, and customer service are
4 presented in Line 12 and are allocated directly to the Customer Billing and Collecting
5 cost component. Additionally, O&M expenses applicable to Industrial Surveillance, is
6 allocated directly to the Industrial Surveillance cost component as presented in Line
7 13, and O&M costs related to CWA's monitoring program for inspecting commercial
8 customers that have food service licenses is allocated directly to Collection FOG, as
9 presented in Line 14.

10 Administrative and General costs presented in Line 15 are allocated on the
11 previously allocated O&M costs. The total O&M revenue requirements (Line 17),
12 plus pro forma bad debt expense (Line 18), and a provision for additional bad debt
13 expense related to the Phase 1 increase (Line 19) are offset by miscellaneous
14 operating revenues (Line 22). This results in the net O&M to be recovered from
15 wastewater rates and charges as presented in Line 23.

16 Lines 1 through 15 in Schedule 5 of Attachment PNK-2, present the results of
17 the cost allocation to cost components for each O&M functional expense category.
18 Lines 1 through 16 in Schedule 3 of Attachment PNK-2, present the effective
19 resulting allocation percentage to cost components for each O&M functional expense
20 category.

1 **Q28. PLEASE EXPLAIN WHETHER THERE WERE ANY CHANGES IN THE**
2 **DELINEATION OF COST DATA THAT CWA PROVIDED FOR THIS COST**
3 **OF SERVICE STUDY RELATIVE TO THE PREVIOUS COST OF SERVICE**
4 **STUDY FILED IN CAUSE 44685.**

5 A28. In the previous cost of service study for CWA, SUEZ (formerly United Water)
6 provided a percentage breakdown of its base and incentive fees by plant function,
7 which Black & Veatch then used to further allocate to the cost components in a
8 manner similar to the distribution of plant in service, presented in Attachment PNK-2,
9 Schedule 4. However, SUEZ is no longer operating the treatment and collection
10 facilities, as explained in the response to Question 27. Therefore, for this cost of
11 service study, CWA provided Black & Veatch with a complete list of pro forma
12 itemized O&M expense data, categorized into Treatment Operations, Treatment
13 Maintenance, Collections Operations, Collections Maintenance, and other functions.

14 **Q29. HOW ARE CWA'S WASTEWATER COLLECTION AND PUMPING O&M**
15 **COSTS ALLOCATED TO COST COMPONENTS?**

16 A29. CWA provided an itemized listing of O&M costs related to Collections Operations
17 and Collections Maintenance, along with an activity level breakdown percentage by
18 cost components, e.g., Collection Retail, Collection Common to All, Force Mains,
19 Pumping and Lift Stations, FOG Common to All, and Administrative and General.

1 These costs were then aggregated to develop the allocation factors presented in Lines
2 13 through 14 in Schedule 3 of Attachment PNK-2.

3 **Q30. HOW ARE CWA'S WASTEWATER TREATMENT O&M COSTS**
4 **ALLOCATED TO COST COMPONENTS?**

5 A30. As mentioned in response to Q27, CWA provided Black & Veatch with a detailed
6 itemized O&M expense for Treatment Operations and Treatment Maintenance, along
7 with a breakdown percentage by wastewater treatment by plant function, e.g.,
8 headworks, primary settling, aeration and nitrification, secondary settling, etc. Black
9 & Veatch used this data and aggregated the activity level O&M expense under the
10 appropriate function. We then allocated each function level cost to the cost
11 components in a manner similar to the distribution of the corresponding facility's Plant
12 in Service cost.

13 Purchased power costs related to the treatment plants are allocated using
14 information from CWA with respect to power costs by plant component, e.g.,
15 headworks, aeration/nitrification, and sludge processing. Lines 6 through 10 in
16 Schedule 5 of Attachment PNK-2 present the Treatment and Disposal O&M cost
17 allocations to the various cost components.

18 **Q31. WHAT ARE THE PROPOSED CUSTOMER CLASSES FOR THIS COST OF**
19 **SERVICE STUDY?**

1 A31. The proposed customer classes are generally consistent with CWA's current rates and
2 charges. The Non-Industrial class consists of customers that generally discharge
3 domestic strength wastewater and are billed based on their metered water
4 consumption. Typical customers in this class are residential, commercial, or multi-
5 family type customers. This class also includes the unmetered residential and
6 commercial customers. Residential and multi-family customers are currently billed
7 based on their actual usage during the winter months (i.e., November through April)
8 and winter period average usage during the summer months (i.e., May through
9 October).

10 The Self-Reporter and Industrial class generally consists of industrial and
11 other customers who measure their wastewater discharge to the CWA system and
12 self-report the volumes to CWA on a monthly basis. The volume charge for these
13 customers includes a surveillance charge related to CWA's cost for monitoring these
14 self-reporting customers. Self-Reporter customers also report excess loadings of
15 BOD, TSS, and NH₃-N above CWA's established limits of 250 milligrams per liter
16 (mg/l) BOD; 300 mg/l TSS; and 20 mg/l of NH₃-N.

17 Wastewater Haulers consist of Septic and Non-grease Haulers who bring
18 trucked waste directly to the Belmont Advanced Wastewater Treatment Plant where
19 it is discharged for treatment and disposal. The concentration of discharge BOD, TSS,
20 and NH₃-N is typically much higher than normal strength wastewater.

1 Fats, Oil, and Grease customers are generally Non-Industrial, commercial-type
2 customers that are licensed to cook and prepare food. CWA monitors these customers
3 for the proper disposal of grease from their operations.

4 Satellite Customers are communities adjacent to the CWA system that own
5 and operate their own wastewater collection systems. These customers discharge their
6 wastewater to CWA for conveyance and treatment. CWA provides service to some of
7 these customers via Special Contracts for service and to others via Sewer Rate No. 6.

8
9 The Surcharge class includes Self-Reporter customers and Satellite Customers
10 who exceed one or more of the surcharge limits and they are charged for the
11 additional pounds of BOD, TSS, or NH₃-N.

12 **Q32. PLEASE EXPLAIN THE WASTEWATER UNITS OF SERVICE**
13 **PRESENTED IN SCHEDULE 6 OF ATTACHMENT PNK-2.**

14 A32. Schedule 6 of Attachment PNK-2 presents the units of service by customer class for
15 CWA's wastewater system. The contributed volume from each customer class is
16 presented in Column 1 and the Infiltration & Inflow ("I/I") volume allocated to each
17 customer class is presented in Column 2. It is important to note that pursuant to the
18 Settlement Agreement in Cause No. 44685 S1, I/I flows are not allocated to the
19 Satellite Customers. Based on a review of historical plant flows at the Belmont and
20 Southport Advanced Wastewater Treatment Plants and compared with the estimated

1 contributed wastewater volumes, it is estimated that I/I volume accounts for
2 approximately 49.5% of the total flow to the treatment plants.

3 Columns 4 and 9 present the units of Capacity Common to All and Capacity
4 Retail, respectively. The capacity units include the peak volume of contributed flow
5 and the peak volume of I/I. Contributed peak volumes for each class are determined
6 by applying an estimated capacity factor of 133% of average day contributed volumes.
7 Peak demands for I/I are determined by applying an estimated capacity factor of
8 450% of average day I/I. The capacity factors used for determining the peak
9 contributed volume and peak I/I demands are consistent with the factors evaluated in
10 the capacity factor analysis presented in Attachment PNK-6.

11 Columns 5 through 8 present the loadings of BOD, TSS, NH₃-N, and FOG.
12 The total loadings include both estimated loadings from I/I and the loadings from
13 contributed volumes. I/I is assumed to have wastewater strengths of 48 milligrams per
14 liter (mg/l) for BOD, 135 mg/l for TSS, 9 mg/l for NH₃, and 10 mg/l for FOG.
15 Contributed retail volumes are estimated to have normal wastewater strengths of 250
16 mg/l for BOD, 300 mg/l for TSS, 20 mg/l for NH₃-N, and 50 mg/l for FOG.

17 The loadings for the Satellite Customers for BOD, TSS, NH₃-N, and FOG are
18 also calculated based on the retail normal wastewater strengths, as the Satellite
19 Customers are no longer assigned a portion of the I/I volumes, and therefore, there is

1 no potential for any determination of strengths lower than normal wastewater
2 strengths.

3 The loadings for Wastewater Haulers are estimated using strengths of 6,000
4 mg/l for BOD, 15,000 mg/l for TSS, 400 mg/l for NH₃-N, and 8,000 mg/l for FOG.

5 Columns 10 and 11 present the estimated number of customers and bills for
6 each customer class. Column 12 presents the contributed volume for the Self-
7 Reporter class. The contributed volume is used for the purposes of allocating CWA's
8 industrial surveillance costs to these customers. Column 13 presents the number of
9 bills for Non-Industrial customers that are assessed CWA's FOG charge.

10 **Q33. HOW ARE CONTRIBUTED VOLUMES FOR EACH CUSTOMER CLASS**
11 **DETERMINED?**

12 A33. Contributed volumes provide an estimate of the amount of wastewater that is
13 contributed to the system by individual customer classes. For Non-Industrial
14 customers, the contributed wastewater volume is determined from the pro forma
15 billing data provided by CWA. Non-Industrial contributed volumes generally reflect
16 the pro forma billed volume for the Non-Industrial class, less billed volume related to
17 determining minimum bill revenue for Non-Industrial customers. Non-Industrial
18 contributed volume also includes an estimate for volume related to unmetered
19 customers.

1 Self-Reporter and Industrial class contributed volumes are based on their self-
2 reported wastewater volumes submitted to CWA each month, less the minimum
3 usage. Contributed volumes for Satellite Customers are based on the pro forma
4 volumes determined by CWA.

5 **Q34. PLEASE EXPLAIN HOW I/I IS APPORTIONED TO THE CUSTOMER**
6 **CLASSES IN SCHEDULE 6 OF ATTACHMENT PNK-2.**

7 A34. I/I consists of groundwater or rainfall that enters the wastewater system through
8 direct connections, manhole covers, service laterals, or cracks that occur throughout
9 the collection and conveyance system. For purposes of a wastewater cost of service
10 study, I/I volumes and strengths are typically allocated to the customer classes using a
11 combination of two parameters, namely, the number of customers and the contributed
12 volumes by class. This basis is used in the cost of service study to equitably apportion
13 the I/I to applicable customer classes.

14 Approximately 75% of I/I units of service are allocated to the classes based on
15 their respective number of customers, with the number of bills used as the calculation
16 determinant. The other 25% of I/I units of service are allocated based on the
17 contributed volume by class relative to the total system contributed volume. These
18 allocation factors are based on an I/I analysis that CWA requested Black & Veatch
19 perform pursuant to the Settlement Agreement entered into in Cause No. 44685.
20 Based on this I/I analysis in which the potential impact of I/I allocation was evaluated

1 and presented in Attachment PNK-7, CWA and Black & Veatch have deemed it
2 reasonable and appropriate to allocate I/I costs based on 75% of the costs being
3 allocated on the basis of the number of customers and 25% being allocated on the
4 basis of volume.

5 **Q35. PLEASE EXPLAIN HOW COST OF SERVICE IS DETERMINED FOR**
6 **SATELLITE CUSTOMERS.**

7 A35. As explained in my response to Question 23, Black & Veatch incorporated the
8 applicable stipulations in the cost of service analysis, per the Settlement Agreement
9 approved under Cause No. 44685 S1. In recognition of the Settlement Agreement
10 stipulations, and as explained in my response to Question 23, Black & Veatch
11 determined the Satellite Customer cost of service by first determining capital revenue
12 requirements and O&M costs that are Common to All (both retail and satellite
13 customers), and those that are applicable only to retail customers.

14 Black & Veatch then developed the units of service for the Satellite Customers
15 for the cost components of Volume, Capacity, BOD, TSS, NH₃-N, and Treatment
16 FOG, as indicated in Line 8 and 9 of Schedule 6 in Attachment PNK-2. Black &
17 Veatch then applied the system unit costs determined, for the cost components, for
18 the net capital revenue requirements (Line 3 in Schedule 7) and system unit costs
19 determined for the net O&M revenue requirements (Line 3 in Schedule 8), to the
20 Satellite Customers' units of service for the applicable cost components, to determine

1 the overall capital cost of service and O&M cost of service for the Satellite
2 Customers. Lines 17 and 19 in Schedule 7 and Lines 17 and 19 in Schedule 8 present
3 the capital and O&M cost of service for the satellite customers, respectively.

4 **Q36. PLEASE EXPLAIN HOW THE NET CAPITAL REVENUE**
5 **REQUIREMENTS ARE ALLOCATED TO SATELLITE CUSTOMERS IN**
6 **THE COST OF SERVICE STUDY IN SCHEDULE 7 OF ATTACHMENT**
7 **PNK-2.**

8 A36. The Net Capital Revenue Requirements are allocated to the Satellite Customers and
9 retail customer classes through a multi-step process. First, the net capital revenue
10 requirement allocated to the various cost components in Line 37 of Schedule 4 in
11 Attachment PNK-2 is presented again by cost component on Line 1 of Schedule 7.
12 Then, using this net capital cost allocation and the total system units of service (Line
13 2), a system capital unit cost for each cost component is developed. The resulting
14 system Capital unit costs of service are shown on Line 3. This system capital unit
15 cost is then consistently used as appropriate to apportion the total net capital revenue
16 requirements to all customer classes including the Satellite Customers, based on each
17 customer class's units of service.

18 The Satellite Customers' units of service for the flow and strength cost
19 components are presented in Lines 16 and 18 in Schedule 7. These units of service for
20 each cost component are then multiplied by the system capital unit cost to allocate the

1 net capital revenue requirement to the Satellite Customers. Lines 17 and 19 in
2 Schedule 7 of Attachment PNK-2 present the net capital revenue requirement
3 allocated to Satellite-Special Contract and Satellite-Tariff customers. The sum of
4 these two, which equates to \$18,336,000 is the total net capital revenue requirement
5 allocated to Satellite Customers. The remaining net capital revenue requirement of
6 \$209,649,000 to be recovered from the retail customer classes is presented in Line 20.

7 **Q37. HOW ARE NET CAPITAL REVENUE REQUIREMENTS ALLOCATED TO**
8 **RETAIL CUSTOMER CLASSES IN THE COST OF SERVICE STUDY IN**
9 **SCHEDULE 7 OF ATTACHMENT PNK-2?**

10 A37. The approach used to allocate the net capital revenue requirements to each of the
11 retail classes is very similar to that of the Satellite Customer allocations.

12 The units of service for the flow and strength cost components, for each retail
13 class, are presented in Schedule 7. These units of service for each cost component are
14 then multiplied by the system capital unit cost to allocate the net capital revenue
15 requirement to Satellite Customers. Line 20 in Schedule 7 presents the total net
16 capital revenue requirement of \$209,649,000 allocated to the retail customer classes.

17 **Q38. PLEASE DESCRIBE HOW NET O&M REVENUE REQUIREMENTS ARE**
18 **ALLOCATED TO RETAIL CUSTOMER CLASSES AND SATELLITE**
19 **CUSTOMERS IN SCHEDULE 8 OF ATTACHMENT PNK-2.**

1 A38. The Net O&M Revenue Requirements are allocated to the Satellite Customers and
2 retail customer classes through a multi-step process. First, the net O&M revenue
3 requirement allocated to the various cost components in Line 23 of Schedule 5 in
4 Attachment PNK-2 is presented again by cost component on Line 1 of Schedule 8.
5 Then, using this net O&M cost allocation and the total system units of service (Line
6 2), a system O&M unit cost for each cost component is developed. The resulting
7 system O&M unit costs of service are shown on Line 3. This system O&M unit cost is
8 then consistently used, as appropriate, to apportion the total net O&M revenue
9 requirements to all customer classes, including the Satellite Customers, based on each
10 customer class's respective units of service.

11 Schedule 8, Columns 2 through 12, present the allocation of O&M expenses
12 to each cost component, and Column 1 presents the Total O&M cost of service
13 allocated to each retail class and the Satellite Customer classes.

14 **Q39. PLEASE EXPLAIN WHY THE SATELLITE COST OF SERVICE**
15 **ADJUSTMENT IS REALLOCATED TO RETAIL CUSTOMER CLASSES IN**
16 **SCHEDULE 9 OF ATTACHMENT PNK-2.**

17 A39. As indicated in my response to Q24, the Settlement Agreement approved in Cause
18 No. 44685 S1 includes specific stipulations to be used with respect to cost allocations,
19 and adherence to the provisions of the Special Contracts with four of the six Satellite
20 Customer communities. The Special Contracts stipulate a Target Treatment Rate for

1 the period of January 1, 2019 through January 1, 2025, which is lower than the cost
2 of service rates. Therefore, the difference between the actual allocated cost of
3 service amount and the revenue that can be generated based on the Special Contract
4 rates (referred to as “Satellite Customer Subsidy”) is re-allocated to the retail
5 customer classes. Over time, the Satellite Customer Subsidy will be reduced in
6 accordance with the terms of a Settlement Agreement approved by the Commission
7 on July 18, 2016 in Cause No. 44685. That Settlement Agreement provides that
8 reductions to the Satellite Customer Subsidy are to be applied to the other classes as
9 follows:

10 With respect to the Satellite Customer . . . , the Settling Parties agree
11 that any reduction to the Satellite Customer Subsidy as a result of the
12 Final Order in Cause No. 44685-SI should be allocated to the Non
13 Industrial, Self-Reporter, and Surcharge (BOD, TSS & NH3-N) rate
14 classes in order to reduce the agreed upon revenue allocations set
15 forth above, and that new rates should be implemented within thirty
16 five days of entry of that Final Order The reduction shall be
17 based on each class' respective percentage of total revenues from the
18 Non-Industrial, Self-Reporter and Surcharge (BOD, TSS & NH3-N)
19 rate classes allocated to it at the time such reduction is ordered (i.e.
20 Phase 1 or Phase 2), as shown in the Tables set forth [below].

CLASS	REVENUE	PERCENT SUBSIDY ALLOCATION
Non-Industrial	\$232,295,072	84.4%
Self-Reporter	\$25,813,972	9.4%
Surcharges		5.6%
BOD	\$15,366,908	.5%
TSS	\$1,464,151	.2%
NH3-N	\$413,497	0%

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Q40. PLEASE DESCRIBE THE SATELLITE CUSTOMER SUBSIDY ADJUSTMENT MADE IN THIS PROCEEDING.

A40. Lines 1 through 7 in Schedule 9 of Attachment PNK-2, present the calculations for the determination of the total Satellite Customer Subsidy amount. The revenues of Satellite-Special Contracts presented in Line 4 and the revenues of Satellite-Tariff customers presented in Line 5, reflect the pro forma revenue from Satellite Customers. Line 6 presents a satellite-tariff adjustment of approximately \$172,800 to reflect the fact that two of the Satellite Customers adjust their respective rates based on the cost-based adjustment increase. As Line 7 in Column 1 indicates, the total Satellite Customer Subsidy amount to be reallocated to retail classes is \$16,783,100.

Line 9 presents the unit cost of the Satellite Customer Subsidy, which is determined based on the Satellite Customer Subsidy apportioned to each cost

1 component and the retail units of service determined for those cost components. To
2 reallocate the Satellite Customer Subsidy amount, these unit costs of service of
3 Satellite Customer Subsidy are then applied to each retail class's units of service in the
4 manner described above (except FOG class).

5 Schedule 9 presents the details of the re-allocation of the Satellite Customer
6 Subsidy amount to cost components for the applicable retail customer classes, and
7 Column 2 in Schedule 10 of Attachment PNK-2, presents the summary results of the
8 re-allocation of the Satellite Customer Subsidy to each of the retail customer classes.
9 As Line 9, in Column 3 in Schedule 10, of Attachment PNK-2 indicates, the total
10 Satellite Customer Subsidy amount to be reallocated to retail classes is \$1,275,200.
11 Lines 1 through 5 in Column 3, present the summary results of the re-allocation of the
12 Satellite Customer Subsidy amount to applicable retail customer classes.

13 **Q41. PLEASE SUMMARIZE THE OVERALL COST OF SERVICE RESULTS.**

14 A41. Schedule 10 of Attachment PNK-2 presents a comparison of the cost of service
15 results by class with each class' revenue under existing rates for Phase 1 of this rate
16 proceeding. As indicated in Line 11, Column 6 in Schedule 10, CWA's request for a
17 system wide overall revenue requirement increase is 14.87%. However, the cost of
18 service analysis indicates that while some customer classes may experience an increase
19 that is higher than 14.87%, a few other classes may have a lower level of increase.

1 Among the retail customer classes, the Non-Industrial class has a proposed
2 increase of approximately 17.58% when compared with their revenues under existing
3 rates. For the Self-Reporter class, the cost of service analysis results in a proposed
4 increase of 6.87% when compared with revenues under existing rates. With respect
5 to the extra-strength surcharge class, the cost of service analysis actually indicates a
6 decrease of approximately 9.25%, and 14.18% for BOD, and NH₃-N, respectively
7 when compared with that class's revenue under existing rates, and a small increase of
8 3.77% for TSS. Similarly, when compared with revenue under existing rates, the cost
9 of service analysis indicates a significant decrease of 80.60% for the FOG class, and a
10 decrease of 11.07% for the Wastewater Haulers.

11 For the FOG class, the significant decrease in the cost of service relative to its
12 revenue under existing rate is largely due to the fact that in the last rate general
13 proceeding (Cause No. 44685), the approved FOG rates were set higher than the cost
14 of service.

15 **ATTACHMENT PNK-3 PHASE 1 RATE DESIGN**

16 **Q42. WHAT WAS BLACK & VEATCH'S APPROACH TO DESIGNING THE**
17 **PROPOSED SCHEDULE OF WASTEWATER RATES AND CHARGES FOR**
18 **PHASE 1?**

19 A42. Black & Veatch's overall approach to designing the proposed schedule of rates and
20 charges for Phase 1 was to attempt to achieve cost of service recovery from each

1 customer class and from the overall wastewater system, while at the same time
2 mitigate, to the extent practical, significant increases in customer bills that can result
3 when transitioning to cost of service rates.

4 **Q43. DID CWA DEFINE ANY OBJECTIVES FOR THE RATE DESIGN?**

5 A43. Yes. Black & Veatch discussed a few primary objectives for the rate design based on
6 the cost of service analysis. First, we confirmed with CWA that the existing rate
7 structure would be retained for this rate proceeding. Next, CWA concurred that a
8 balancing of rates among the retail customer classes would be necessary to facilitate a
9 gradual transition to cost of service rates and to mitigate monthly bill impact.

10 As discussed in response to Q41, while the overall system increase for Phase 1
11 is approximately 14.87%, the cost of service analysis indicates a higher than system
12 increase for Non-Industrial customers. We confirmed with CWA that the design of
13 rates and charges over the three phases, for the Non-Industrial class, should continue
14 to support the gradual transition to their cost of service, and not an immediate full
15 transition to cost of service. To mitigate the bill impact on the Non-Industrial class,
16 CWA suggested that Black & Veatch strive to set the Phase 1 rates in a manner as to
17 recover as close to cost of service as practical, with the intent of eventually
18 transitioning to full cost of service recovery.

19 To facilitate the gradual transition to cost of service for the Non-Industrial
20 class, CWA also suggested retaining the existing rates for the FOG and Septic and

1 Non-Grease Hauler classes without decreasing their rates to achieve their level of cost
2 of service.

3 **Q44. DID BLACK & VEATCH INCORPORATE CWA'S RATE DESIGN**
4 **OBJECTIVES INTO THE RATE DESIGN PROCESS?**

5 A44. Yes. Black & Veatch used its experience and judgment to develop a rate design that
6 would recover the overall wastewater system revenue requested by CWA in this rate
7 proceeding. For each retail customer class, we evaluated the cost of service result
8 and its potential impact on the required increase or decrease relative to revenue under
9 existing rates. Based on CWA's suggested overall rate design objectives, Black &
10 Veatch designed the rates and charges to enable a gradual transition to cost of service,
11 while assuring recovery of the overall system revenue requirements.

12 **Q45. PLEASE EXPLAIN THE WASTEWATER COST OF SERVICE RATES AND**
13 **CHARGES SCHEDULE PRESENTED IN ATTACHMENT PNK-3,**
14 **SCHEDULE 1.**

15 A45. The cost of service rates for the customer classes are presented in Schedule 1 of
16 Attachment PNK-3. Black & Veatch determined the cost of service rates by dividing
17 each class's respective cost of service by their associated pro forma billing units.

18 The cost of service rate structures for the Non-Industrial and Self-Reporter
19 classes include a monthly base charge, plus a volume charge per 1,000 gallons.

1 Lines 1 through 6 in Column 2, present the cost of service rates and charges
2 for the Non-Industrial class. The monthly base charge per bill of \$52.15, for the Non-
3 Industrial class, includes costs related to billing, collections and customer-related I/I.
4 The volume rate of \$4.6481 per 1,000 gallons is designed to recover all other costs,
5 including volume-related I/I. The associated monthly minimum bill for a customer
6 using less than 3,000 gallons or 4 hundred cubic feet (Ccf) per month is \$66.10
7 (\$52.15 + 3*\$4.6481). Charges for unmetered customers are calculated based on the
8 metered cost of service rates and charges and using the estimated volumes from
9 CWA's pro forma rates and charges.

10 Lines 7 through 12 in Column 3, present the cost of service rates and charges
11 for the Self-Reporter and Industrial class. The monthly base charge per bill of \$52.10,
12 for the Self-Reporter and Industrial class, includes costs related to billing, collecting,
13 and customer-related I/I. Consistent with the existing rate design, there is a
14 surveillance charge for this class of \$0.1279 per 1,000 gallons. The volume rate of
15 \$4.8988 per 1,000 gallons is designed to recover all of the other costs. The associated
16 monthly minimum charge for customers using less than 3,000 gallons or 4 Ccf per
17 month is \$67.18 (\$52.10+3*(\$4.8988+\$0.1279)).

18 Lines 19 through 21, in Column 3, present the cost of service rates for Extra
19 Strength Surcharge, which include a BOD charge of \$0.3908 per pound, a TSS
20 charge of \$0.1603 per pound, and a NH₃-N charge of \$0.3981 per pound.

1 Line 22 in Column 4, presents the cost of service rate for Sewer Rate No. 6.
2 The cost of service rate for Satellite-Tariff is \$3.1109 per 1,000 gallons.

3 Lines 23 through 25, in Column 5 and 6, present the cost of service rates for
4 FOG and Wastewater Haulers.

5 **Q46. DID BLACK & VEATCH PERFORM A BILL IMPACT ANALYSIS USING**
6 **THE PHASE 1 COST OF SERVICE RATES?**

7 A46. Yes. Columns 2 through 5 in Schedule 3 of Attachment PNK-3, present the bill
8 impact comparison for various customer classes and different levels of monthly usage
9 volume, using existing rates and the cost of service rates. As the bill impact analysis
10 indicates, transitioning to full cost of service rates immediately in Phase 1 would result
11 in a large shift in cost recovery from larger volume users that are typically non-
12 residential customers to smaller volume users that are typically residential.

13 A residential customer with a metered usage of 4,000 gallons per month
14 would have an increase of approximately 52.85%, due to an increase in the portion of
15 costs recovered from base charge along with a significant portion of the Satellite
16 Customer Subsidy being reallocated to the Non-Industrial class. Larger volume Self-
17 Reporter and Non-Industrial customers would have comparatively lower increases in
18 their monthly bills as the magnitude of variance between revenues at their existing
19 rates and the cost of service rates is lower than that of the Non-Industrial customer
20 class.

1 **Q47. WHAT WAS THE NEXT STEP IN DETERMINING THE PROPOSED**
2 **RATES AND CHARGES FOR PHASE 1?**

3 A47. A. The next step in the rate design process for Phase 1 was to develop a schedule
4 of rates and charges that: (i) recovers the total CWA revenue requirement; (ii)
5 continues the transition of each class's rates toward cost of service rates, while
6 mitigating significant bill increases; and (iii) incorporates the rate design objectives
7 CWA suggested, as described in my response to Q43.

8 The design of rates and charges that transitions the classes closer to cost of
9 service is consistent with the Verified Direct Testimony of Michael C. Borchers in
10 Cause No. 44685. In that Cause, Mr. Borchers testified that a gradual approach to
11 cost of service recovery by class, over a period of multiple rate proceedings, was
12 necessary to mitigate significant bill increases on customers (see Verified Direct
13 Testimony of Petitioner's Witness Michael C. Borchers in Cause No. 44685, Page 27,
14 Lines 12 through 14).

15 Consistent with the bill impact mitigation approach recommended and
16 approved in Cause No. 44685, and with Petitioner's request for an overall Phase 1
17 system increase of approximately 14.87% in this case, Black & Veatch recommends a
18 continued gradual approach to transition to cost of service rates in Phase 1, Phase 2
19 and Phase 3.

1 **Q48. PLEASE DESCRIBE THE PROPOSED RATE DESIGN FOR THE NON-**
2 **INDUSTRIAL CLASS.**

3 A48. Column 2 in Schedule 2 of Attachment PNK-3 presents the proposed Phase 1 rate
4 design for the Non-Industrial class. The monthly base charge is set at \$21.95 per bill.
5 The Tier 1 volume charge is set at \$8.0577 per 1,000 gallons or \$6.0433 per Ccf. The
6 Tier 2 volume charge is set at \$8.7225 per 1,000 gallons or \$6.5419 per Ccf. A
7 minimum bill is proposed at \$46.12 per month for customers that use less than 3,000
8 gallons per month or 4 Ccf.

9 The Non-Industrial rates result in an overall class level revenue increase,
10 which is approximately 2.2% higher than the overall wastewater system increase. The
11 proposed rates also help to further transition the Non-Industrial customers to recover
12 nearly 99.57% of the class's cost of service, as presented in Column 6, Line 1 in
13 Schedule 5 of Attachment PNK-3.

14 **Q49. PLEASE DESCRIBE THE PROPOSED RATE DESIGN FOR THE SELF-**
15 **REPORTER CLASS IN THIS PROCEEDING.**

16 A49. Column 3 in Schedule 2 of Attachment PNK-3 presents the proposed Phase 1 rate
17 design for the Self-Reporter and Industrial class. As Schedule 5 of Attachment PNK-
18 3 indicates, the proposed rates and charges, for this class are designed to recover the
19 full cost of service determined for this class. The proposed rates and charges for this
20 class result in a revenue increase of 6.87% when compared with the revenues under

1 existing rates. This revenue increase is reasonably close to the revenue increase that
2 the cost of service analysis indicated, which is presented in Schedule 10 of Attachment
3 PNK-2.

4 The proposed base charges are presented in Lines 7 through 10, and are
5 \$25.68 for Tier 1, \$56.06 for Tier 2, \$268.12 for Tier 3, and \$1,852.42 for Tier 4.
6 The proposed minimum charges are presented in Lines 11 through 14 and are \$40.14
7 for Tier 1, \$70.52 for Tier 2, \$282.58 for Tier 3, and \$1,866.88 for Tier 4. The
8 proposed volume charge is \$4.6166 per 1,000 gallons or \$3.4625 per Ccf. Instead of
9 decreasing the Surveillance Charge per the results of the cost of service analysis, we
10 propose that CWA retain the Surveillance Charge at \$0.2022 per 1,000 gallons
11 (\$0.1517 per Ccf).

12 **Q50. HOW WAS THE MONTHLY BASE CHARGE FOR SELF-REPORTER**
13 **CUSTOMERS ESTABLISHED?**

14 A50. In Cause No. 44685, Black & Veatch worked with CWA to segment the Self-
15 Reporter and Industrial customer class into four tiers based on billing data, to set the
16 base charge. The resulting tiers, which are based on annual volume, include Tier 1
17 with annual volume of 0 to 450 thousand gallons; Tier 2 with annual volume of 450 to
18 3,600 thousand gallons; Tier 3 with annual volume of 3,600 to 27,000 thousand
19 gallons; and Tier 4 with annual volume in excess of 27,000 thousand gallons.

1 In this rate proceeding, these tiers have been retained, and the proposed base
2 charge for each tier is calculated based on the average revenue increase indicated for
3 the Self-Reporter and Industrial class. Column 3 in Schedule 2 of Attachment PNK-
4 3, presents the graduated monthly base charge, which ranges from \$25.68 per month
5 for Tier 1 to \$1,852.42 per month for Tier 4.

6 **Q51. WHAT ARE THE PROPOSED CHARGES FOR SURCHARGE**
7 **CUSTOMERS THAT REPORT EXCESS STRENGTH?**

8 A51. A. Lines 19 through 21, in Column 3 in Schedule 2 of Attachment PNK-3,
9 present the proposed charges per pound of BOD, TSS, and NH₃-N. These charges are
10 set at the cost of service charge of \$0.3908 per pound for BOD, \$0.1603 per pound
11 for TSS, and \$0.3981 per pound for NH₃-N.

12 **Q52. WHAT ARE THE PROPOSED RATES FOR THE OTHER CUSTOMER**
13 **CLASSES?**

14 A52. Columns 4 through 6, in Schedule 2 of Attachment PNK-3, present the proposed
15 rates for the other customer classes. For Satellite-Tariff customers (Column 4, Line
16 22), the proposed rate is \$3.1109 per 1,000 gallons. For FOG customers (Column 5,
17 Line 23), the proposed monthly charge is \$30.00, which is the same as the existing
18 rate. For Septic and Non-Grease Haulers (Column 6, Line 24), the proposed rate per
19 1,000 gallons is set at \$56.24, which is the existing rate. For Grease Haulers, CWA

1 has decided to retain, for this rate proceeding, the existing rate per 1,000 gallons of
2 \$422.08 (Column 6, Line 25).

3 **Q53. WHY IS CWA PROPOSING TO MAINTAIN EXISTING RATES FOR**
4 **SEPTIC AND NON-GREASE HAULERS, GREASE HAULERS AND FOG?**

5 A53. Black & Veatch did not perform a cost of service analysis for the Grease Hauler class.
6 While CWA prefers to not incentivize receipt of grease waste at its Belmont
7 Advanced Wastewater Treatment Plant, CWA intends to continue accepting grease
8 waste, should haulers have an urgent need for grease disposal. Therefore, CWA has
9 decided to retain the existing Grease Hauler rate. With respect to Septic and Non-
10 grease Haulers and FOG, CWA has decided to retain the existing rate, even though it
11 is slightly higher than cost of service, as this helps mitigate to some extent the
12 magnitude of increases necessary from the Non-Industrial customer class.

13 **Q54. DID BLACK & VEATCH PREPARE A BILL COMPARISON TO ASSESS**
14 **THE IMPACT OF THE PROPOSED RATES ON CUSTOMER CLASSES?**

15 A54. Yes. Columns 2, and 6 through 8, in Schedule 3 of Attachment PNK-3, present a bill
16 comparison for each customer class, for a range of volumes, based on existing and
17 proposed rates. As the bill comparison indicates, a residential customer within the
18 Non-Industrial class, who uses approximately 4,000 gallons per month, would have a
19 monthly increase of \$7.90, or 17.07%. Larger volume Non-Industrial customers are
20 also likely to have bill increases of approximately 17.07%.

1 However, Self -Reporter and Industrial class customers would have a lower
2 magnitude of bill increases ranging between 6.86% and 6.87%, depending on the
3 volume of water usage.

4 **Q55. HOW DOES THE PROPOSED RATE DESIGN COMPARE TO THE CWA'S**
5 **PRIMARY OBJECTIVES?**

6 A55. Consistent with CWA's primary objectives described in response to Q43, from an
7 overall system perspective, the proposed rates recover the system revenue
8 requirements of \$305.5 Million that CWA seeks in this rate proceeding. As discussed
9 in response to Q53, retaining the existing rates for a few customer classes without
10 decreasing those to cost of service rates, helps mitigate to some extent the monthly
11 bill impact for the Non-Industrial customer class, while transitioning the Non-
12 Industrial class very close to their cost of service.

13 **Q56. HAVE YOU EXAMINED THE PROJECTED REVENUES UNDER**
14 **PROPOSED RATES AND ITS ALIGNMENT WITH COST OF SERVICE BY**
15 **CUSTOMER CLASS?**

16 A56. Yes. Column 3 in Schedule 4 of Attachment PNK-3, presents the projected revenues
17 by customer class under the proposed rates. The proposed rates (Column 1), when
18 applied to the pro forma billing units (Column 2), result in the recovery of the
19 wastewater system's total cost of service of \$305.5 Million, presented in Line 26. This
20 total cost of service generated from proposed rates and charges when combined with

1 other operating revenue presented in Line 11, in Schedule 1 of Attachment PNK-2,
2 yields the total amount of operating revenue of \$307.9 Million that CWA has
3 requested in Phase 1, in this rate proceeding.

4 Schedule 5 of Attachment PNK-3, provides a comparison of revenue under
5 proposed rates (Column 4) by class with the adjusted cost of service (Column 2) and
6 with revenues under existing rates (Column 1). Column 6 presents the extent of cost
7 of service amount that is recovered from each class, under the proposed rates. As
8 Column 6 indicates, under the proposed rates, most classes recover 100% of their
9 allocated cost of service while the Non-Industrial class transitions very close to their
10 cost of service, as 99.57% of their cost of service responsibility is recovered.

11 **ATTACHMENT PNK-4 PROPOSED WASTEWATER RATES FOR PHASE 2**

12 **Q57. WHAT OTHER ANALYSIS DID BLACK & VEATCH PREPARE DURING**
13 **THE COST OF SERVICE STUDY?**

14 A57. CWA is seeking a Phase 2 additional increase in wastewater revenue requirements,
15 and an associated increase in customer rates that is estimated to go into effect on
16 August 1, 2020. The testimony of Petitioner's witness Korlon L. Kilpatrick provides
17 the details on the Phase 2 increase in revenue requirements. Black & Veatch updated
18 its cost of service study to recover this proposed increase in revenue requirements.

1 **Q58. WHAT STEPS DID BLACK & VEATCH PERFORM TO DETERMINE THE**
2 **COST OF SERVICE ALLOCATIONS AND PROPOSED RATES FOR THE**
3 **PHASE 2 INCREASE?**

4 A58. Similar to the analysis we completed for the Phase 1 rate increase, we updated our
5 cost of service analysis to incorporate the additional revenue under proposed rates
6 from Phase 1, as well as the additional revenue requirements related to Phase 2. Line
7 10 in Schedule 1 of Attachment PNK-4, presents the net revenue requirements (Total
8 Cost of Service) to be recovered from wastewater rates and charges, in Phase 2. The
9 total cost of service to be recovered, in Phase 2 from rates and charges, is
10 \$320,221,100. The Other Operating Revenue presented in Line 11 is held at the same
11 level as in Phase 1. With the inclusion of the other operating revenue, the total
12 revenue that CWA seeks in Phase 2 of this rate proceeding is \$322.6 Million.

13 **Q59. DID BLACK & VEATCH USE SIMILAR COST OF SERVICE**
14 **ALLOCATION FACTORS AND RATE DESIGN PROCEDURES IN PHASE 2**
15 **AS IN PHASE 1?**

16 A59. Yes. To provide a consistent basis for designing proposed rates, we utilized the same
17 plant in service and O&M cost allocation factors and rate design process as we did in
18 Phase 1. Schedule 2 of Attachment PNK-4 presents a comparison of the Phase 2 cost
19 of service (Column 1) with the proposed revenue under Phase 1 rates (Column 4). As

1 Line 12 indicates, in Phase 2, CWA is seeking a total wastewater system revenue
2 increase of 4.82%, relative to Phase 1 revenues.

3 The cost of service allocations indicate that, similar to Phase 1, the Non-
4 Industrial class's cost of service increase, relative to their Phase 1 revenues, is
5 approximately 5.02%, which is slightly higher than the overall wastewater system
6 Phase 2 cost of service increase. Similarly, in Phase 2, all other customer classes,
7 except Wastewater Haulers and FOG classes, will have a cost of service increase in
8 the range of 2.45% to 4.21%. Similar to Phase 1, the FOG class's cost of service is
9 well below its revenue under Phase 1 proposed rates.

10 Similar to Phase 1, the cost of service allocations for Satellite-Tariff customers
11 (Column 4, Line 11) reflects a cost of service increase of 4.88% relative to their Phase
12 1 revenues under proposed rates.

13 **Q60. HOW DID BLACK & VEATCH DESIGN PROPOSED RATES FOR PHASE**
14 **2?**

15 A60. Columns 2 through 6, in Schedule 3 of Attachment PNK-4, present the proposed
16 rates for Phase 2. The rate design continues with a gradual transition to cost of
17 service rates and charges. For Non-Industrial customers, under the Phase 2 proposed
18 rates, both the monthly base charge and the volume charge (for usage up to 10 Ccf or
19 7,500 gallons) is proposed to increase by approximately 4.74% to continue with a
20 gradual transition to recover 100% of the class cost of service. The volume charge for

1 metered usage over 10 Ccf or 7,500 gallons is proposed to increase approximately
2 4.72%. The rates for unmetered Non-Industrial customers are set to be the same as
3 the metered Non-Industrial customers.

4 For Self-Reporter and Industrial class customers, the monthly base charge is
5 proposed to increase by 4.21% for the first tier. The volume charge for Self-Reporter
6 and Industrial class customers is proposed to increase approximately 4.40%. With
7 this proposed increase in charges, the Self-Reporter and Industrial customer proposed
8 revenues under Phase 2 aligns with that class' cost of service determined for Phase 2.

9 For the Extra-Strength Surcharge class, the charges for BOD, TSS, and NH₃-
10 N are proposed to remain at the same level as Phase 1.

11 For Phase 2, CWA proposes to maintain the FOG rate at the existing rate of
12 \$30.00 per month. Similarly, it is proposed that the Wastewater Hauler rates be
13 maintained at the existing rates. For these two customer classes, consistent with what
14 is proposed for Phase 1, CWA has decided to retain the existing rates, even though
15 they are slightly higher than cost of service, as this helps mitigate to some extent the
16 magnitude of increases necessary from the Non-Industrial customer class.

17 **Q61. DID BLACK & VEATCH PERFORM A BILL COMPARISON FOR PHASE**
18 **2?**

19 A61. Yes. Schedule 4 of Attachment PNK-4 presents a bill comparison under Phase 2
20 proposed rates. As presented in Columns 2 and 6 through 8, at the lowest levels of

1 usage, a residential-type customer would have an increase from their Phase 1 monthly
2 bill of approximately \$2.18 per month, or about 4.73%. Larger volume Non-
3 Industrial customers with usage volume in Tier 2 would have an increase of 4.72% in
4 their monthly bill when compared with their Phase 1 monthly bill, and Self-Reporter
5 customers would have an increase of 4.21% in their monthly bills relative to their
6 Phase 1 monthly bill. All of these increases are very close to the wastewater system
7 increase of 4.82% that CWA has sought in this proceeding for Phase 2.

8 **Q62. PLEASE DESCRIBE THE FINDINGS ON THE RECOVERY OF COST OF**
9 **SERVICE OF PHASE 2 UNDER THE PROPOSED PHASE 2 RATES.**

10 A62. Column 3 in Schedule 5 of Attachment PNK-4, presents the projected revenues by
11 customer class under the proposed rates. The proposed rates (Column 1), when
12 applied to the pro forma billing units (Column 2), result in the recovery of the
13 wastewater system's total cost of service of \$320.2 Million, presented in Line 26. This
14 total cost of service generated from proposed rates and charges when combined with
15 other operating revenue presented in Line 12, in Schedule 1 of Attachment PNK-4,
16 yields the total amount of operating revenue of \$322.6 Million that CWA has
17 requested in Phase 2 of this rate proceeding.

18 The Phase 2 revenues for Satellite Customer class presented in Line 24,
19 reflects their anticipated pro forma revenue, and the Phase 2 revenues for Satellite-

1 Tariff customer class reflects revenues based on their proposed Phase 2 cost of
2 service rates.

3 Schedule 6 of Attachment PNK-4, provides a comparison of revenue under
4 the proposed Phase 2 rates (Column 4) by class with the adjusted cost of service
5 (Column 1) and with revenues under existing rates (Column 2). Column 6 presents the
6 extent of cost of service amount that is recovered from each class, under the proposed
7 rates. As Column 6 indicates, under the proposed rates, most classes recover 100%
8 of their allocated cost of service, while the Non-Industrial class transitions very close
9 to its cost of service, as 99.72% of its cost of service responsibility is recovered.

10 The Self-Reporter class's proposed revenue under Phase 2 rates reflects a cost
11 recovery that is approximately the same as its Phase 2 cost of service amount, and
12 reflects an overall revenue increase of 4.21% relative to its revenue under Phase 1
13 proposed rates. As the Phase 2 rates for the Septic and Non-Grease Haulers and
14 FOG customer classes are retained at their existing rates, those two classes continue
15 to reflect a cost recovery that is higher than their actual cost of service.

16 Overall, these results reflect a continued approach to a gradual transition to
17 cost of service and balancing of rates and charges among the retail classes so as to
18 mitigate the monthly bill impact.

19 **Q63. DO YOU BELIEVE THE PROPOSED PHASE 2 RATES ARE REASONABLE**
20 **AND JUST FROM A COST OF SERVICE STANDPOINT?**

1 A63. Yes. The Phase 2 rates continue to transition the customer classes to cost of service
2 rate recovery, albeit in a gradual manner to minimize significant bill impacts on the
3 smaller volume users of the Non-Industrial class.

4 **ATTACHMENT PNK-5 PROPOSED WASTEWATER RATES FOR PHASE 3**

5 **Q64. DID BLACK & VEATCH PERFORM ANY OTHER ANALYSIS DURING**
6 **THE COST OF SERVICE STUDY?**

7 A64. Yes. CWA is seeking an additional increase in wastewater revenue requirements in
8 Phase 3, and an associated increase in customer rates that would go into effect upon
9 the issuance of additional debt service, increased PILOT payments, and increased
10 revenue-funded extensions and replacements. The testimony of Petitioner's witness
11 Korlon L. Kilpatrick provides the details on the Phase 3 increase in revenue
12 requirements. Black & Veatch updated its cost of service study to recover this
13 proposed increase in revenue requirements for Phase 3.

14 **Q65. WHAT STEPS DID BLACK & VEATCH PERFORM TO DETERMINE THE**
15 **COST OF SERVICE AND RATES FOR THE PHASE 3 INCREASE?**

16 A65. Similar to the analysis we completed for the Phase 1 and Phase 2 rate increases, we
17 updated our cost of service analysis to incorporate the additional revenue under
18 proposed rates from Phase 2, as well as the additional revenue requirements related to
19 Phase 3. Line 10 in Schedule 1 of Attachment PNK-5, presents the net revenue
20 requirements (Total Cost of Service) to be recovered from wastewater rates and

1 charges, in Phase 3. The total cost of service to be recovered, in Phase 3 from rates
2 and charges, is \$331,551,200. The Other Operating Revenue presented in Line 11 is
3 held at the same level as in Phase 1 and Phase 2. With the inclusion of the other
4 operating revenue, the total revenue that CWA seeks in Phase 3 of this rate
5 proceeding is \$333.9 Million.

6 **Q66. DID BLACK & VEATCH USE SIMILAR COST OF SERVICE**
7 **ALLOCATION FACTORS AND RATE DESIGN PROCEDURES IN PHASE 3**
8 **AS IN PHASE 1 AND PHASE 2?**

9 A66. Yes. To provide a consistent basis for designing proposed rates, we utilized the same
10 plant in service and O&M cost allocation factors and rate design process as we did in
11 Phase 1 and Phase 2. Schedule 2 of Attachment PNK-5 presents a comparison of the
12 Phase 3 cost of service (Column 1) with the proposed revenue under Phase 1 rates
13 (Column 4). As Line 12 indicates, in Phase 3, CWA is seeking a total wastewater
14 system revenue increase of 3.54%, relative to Phase 2 revenues.

15 The cost of service allocations indicate that the cost of service increase in
16 Phase 3 relative to the revenues under Phase 2 rates, for the Non-Industrial class is
17 approximately 3.46%, which is on par with the overall wastewater system Phase 3
18 cost of service increase. Similarly, in Phase 3, the Self-Reporter and all other
19 customer classes, except Septic and Non-Grease Haulers and FOG classes, would
20 have a cost of service increase in the range of 2.85% to 4.35%. Similar to Phase 2,

1 the FOG class's cost of service is well below its revenue under Phase 2 proposed
2 rates.

3 Similar to Phase 2, the cost of service allocations for Satellite-Tariff customers
4 (Column 4, Line 11) reflects a cost of service increase of 3.54% relative to their Phase
5 2 revenues under proposed rates.

6 **Q67. HOW DID BLACK & VEATCH DESIGN PROPOSED RATES FOR PHASE**
7 **3?**

8 A67. Columns 2 through 6, in Schedule 3 of Attachment PNK-5, present the proposed
9 rates for Phase 3. The rate design continues with a gradual transition to cost of
10 service rates and charges. For Non-Industrial customers, under the Phase 3 proposed
11 rates, both the monthly base charge and the volume charge (for usage up to 10 Ccf or
12 7,500 gallons) are proposed to increase by approximately 3.26% to continue with a
13 gradual transition to recover 100% of the class cost of service. The volume charge for
14 metered usage over 10 Ccf or 7,500 gallons is proposed to increase approximately
15 3.26%. The rates for unmetered Non-Industrial customers are set to be the same as
16 the metered Non-Industrial customers.

17 For Self-Reporter and Industrial class customers, the monthly base charge is
18 proposed to increase by 2.84% for the first tier. The volume charge for Self-Reporter
19 and Industrial class customers is proposed to increase approximately 2.97%. With
20 this proposed increase in charges, the Self-Reporter and Industrial customer proposed

1 revenues under Phase 3 rates help to continue the gradual transition of these classes to
2 align with that class' cost of service determined for Phase 3.

3 For the Extra-Strength Surcharge class, the charges for BOD and NH3-N are
4 proposed to remain at the same level. The TSS charge is set to its cost of service
5 level for, consistent with what was proposed in Phase 2.

6 For Phase 3, CWA proposes to maintain the FOG rate at the existing rate of
7 \$30.00 per month. Similarly, it is proposed that the Septic and Non-Grease Hauler
8 rates be maintained at the existing rates. For these two customer classes, consistent
9 with what is proposed for Phase 2, CWA has decided to retain the existing rates, even
10 though it is slightly higher than cost of service, as this helps mitigate to some extent
11 the magnitude of increases necessary from the Non-Industrial customer class.

12 **Q68. DID BLACK & VEATCH PERFORM A BILL COMPARISON FOR PHASE**
13 **3?**

14 **A68.** Yes. Schedule 4 of Attachment PNK-5 presents a bill comparison under Phase 3
15 proposed rates. As presented in Columns 2 and 6 through 8, at the lowest levels of
16 usage, a residential-type customer would have an increase from Phase 2 monthly bill
17 of approximately \$1.58 per month, or about 3.27% when compared with the monthly
18 bill under the proposed Phase 2 rates and charges. Larger volume Non-Industrial
19 customers with usage volume in Tier 2 would have an increase of 3.26% in their
20 monthly bill when compared with their Phase 2 monthly bill, and Self-Reporter

1 customers would have an increase of 2.85% in their monthly bill relative to their
2 Phase 2 monthly bill. All of these increases are either on par with or lower than the
3 wastewater system increase of 3.54% that CWA has sought for Phase 3 in this
4 proceeding.

5 **Q69. PLEASE DESCRIBE THE FINDINGS ON THE RECOVERY OF COST OF**
6 **SERVICE OF PHASE 3 UNDER THE PROPOSED PHASE 3 RATES.**

7 A69. Column 3 in Schedule 5 of Attachment PNK-5, presents the projected revenues by
8 customer class under the proposed rates. The proposed rates (Column 1), when
9 applied to the pro forma billing units (Column 2), result in the recovery of the
10 wastewater system's total cost of service of \$331.5 Million, presented in Line 26. This
11 total cost of service generated from proposed rates and charges when combined with
12 other operating revenue presented in Line 12, in Schedule 1 of Attachment PNK-5,
13 yields the total amount of operating revenue of \$333.9 Million that CWA has
14 requested in Phase 3, in this rate proceeding.

15 The Phase 3 revenues for Satellite-Special Contract customer class presented
16 in Line 24, reflects their anticipated pro forma revenue, and the Phase 3 revenues for
17 Satellite-Tariff customer class reflects revenues based on their proposed Phase 3 cost
18 of service rates.

19 Schedule 6 of Attachment PNK-5, provides a comparison of revenue under
20 the proposed Phase 3 rates (Column 4) by class with the adjusted cost of service

1 (Column 1) and with revenues under existing rates (Column 2). Column 6 presents the
2 extent of cost of service amount that is recovered from each class, under the proposed
3 rates. As Column 6 indicates, under the proposed rates, most classes recover 100%
4 of their allocated cost of service while the Non-Industrial class transitions very close
5 to its cost of service, as 99.81% of that class's cost of service responsibility is
6 recovered. The indicated revenue increase of 3.26% for the Non-Industrial class,
7 presented in Column 7, is slightly lower than the total wastewater system increase of
8 3.54%.

9 Similarly, the overall revenue increase of 2.85, relative to the Phase 2 revenue
10 for the Self-Reporter class, is slightly lower than the Phase 3 system increase of
11 3.54%. As the Phase 3 rates for the Septic and Non-Grease Haulers and FOG
12 customer classes are retained at their existing rates, those two classes continue to
13 reflect a cost recovery that is higher than their actual cost of service.

14 Overall, these results reflect a continued approach to a gradual transition to
15 cost of service and balancing of rates and charges among the retail classes so as to
16 mitigate the monthly bill impact.

17 **Q70. DO YOU BELIEVE THE PROPOSED PHASE 3 RATES ARE REASONABLE**
18 **AND JUST FROM A COST OF SERVICE STANDPOINT?**

19 A70. Yes. The Phase 3 rates continue to transition the customer classes to cost of service
20 rate recovery in a gradual manner to minimize significant bill impacts on the smaller

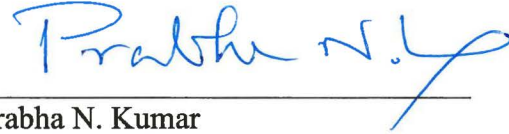
1 volume users of the Non-Industrial class. Black & Veatch envisions further small
2 adjustments to class rates and charges in future rate proceedings to ultimately design
3 rates that help recover 100% of the cost of service from each class. The rates and
4 charges proposed for Phases 1, 2, and 3 of this proceeding help with a practical and
5 timely transition from existing rates and charges to cost of service rates and charges.

6 **Q71. DOES THIS CONCLUDE YOUR TESTIMONY IN THIS PROCEEDING?**

7 A71. Yes, it does.

VERIFICATION

The undersigned affirms under the penalties for perjury that the foregoing testimony is true to the best of her knowledge, information and belief.



Prabha N. Kumar

Prabha N. Kumar, M.B.A

Ms. Kumar is a Director in Black & Veatch’s Management Consulting, LLC. She leads the water, wastewater, and stormwater utilities offering within the Advisory & Planning group. Ms. Kumar’s comprehensive utility consulting expertise includes financial planning, cost of service, and rate design studies, strategic planning, business process review and transformation, and providing expert witness and litigation support services in municipal utility rate cases and utility litigation matters.

Ms. Kumar also specializes in stormwater utility feasibility studies, utility development, and implementation, and helping utilities with both internal stakeholder education and engagement, and external public education and outreach. She has assisted various large and small water and wastewater utilities with business process reengineering, and with designing, implementing, and tracking improvement initiatives in the areas of utility metering, billing, customer engagement, and field services operations.

Ms. Kumar is an active member of the Stormwater Committee within the National Association of Clean Water Agencies (NACWA) and an active member of the Water Environment Federation. She contributed as a Lead Author for the updates to the 2nd edition of the WEF manual, “*User Fee Funded Stormwater Programs*”.

PROJECT EXPERIENCE

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Water, Sewer, Stormwater Cost of Service and Rate Study | 2018

Technical Director. Ms. Kumar directed the water, sewer, stormwater cost of service analysis, and rate study update and bond feasibility services for the Philadelphia Water Department. The study involved a six-year financial planning, bond issuance support, cost of service analysis, wholesale and retail rates update, rate case testimony and expert witness services. The 2018 rate case hearings were successfully completed and rates were approved by the Rate board. This study also included the design of a “Tiered Assistance Program (TAP) Rate Rider” to address potential financial impact due to over or under performance of the TAP, which Philadelphia launched in July 2017. We designed a TAP Surcharge Rate which is to be reconciled and adjusted at the end of each rate period.

City of Wilmington, Delaware | Water, Wastewater, Stormwater Utility Annual Financial Planning and Rate Study | 2018

Project Director. As Project Director, Ms. Kumar has continually managed the water, wastewater and stormwater annual financial planning and cost of service study services for the City of Wilmington since 2006. The latest financial plan which was developed for Fiscal year 2019 through 2024, involved projection of

DIRECTOR

Expertise:

Financial Planning
Rate Studies
Business Operations
Review & Optimization
Stormwater Utility
Development
Stakeholder Engagement
Database Applications
Development &
Implementation
Billing Systems Needs
Assessment

Education

- M.B.A, MIS & Marketing
- University of California, Riverside
- M.Phil., English Literature
- Madras University, India
- M.A., English Lang. & Literature
- Madras University, India
- B.A., English Lang. & Literature
- Madurai-Kamaraj University, India

Professional Associations

- American Water Works Association
- NACWA Stormwater Committee
- Water Environment Federation

Total Years of Experience

20.6 Years

Black & Veatch Years of Experience

19.5 Years

Office Location

New York, New York, USA: Un States

revenues and revenues requirements; CIP review and financing; cash flow analysis; cost of service analysis; water, sewer, and stormwater rates update; wholesale wastewater treatment fee true-up, and benchmarking. The annual study also included briefings and presentations to the Utility Citizen's Advisory Board (UCAB) and to the City Council. The City Council approved the FY 2019 rates along with changes to the minimum usage allowance.

City of Wilmington, Delaware | Stakeholder Education and Engagement Services | 2018

Project Manager. Ms. Kumar directs the stakeholder engagement and education on water, sewer, stormwater services for the City of Wilmington's *Utilities Citizens Advisory Board* (UCAB). As part of this task, Ms. Kumar conducts monthly stakeholder meetings with the UCAB members and the City's Executive Management to educate, engage, and solicit feedback on a variety of utility related issues including financial planning, rate setting, capital program planning and financing, asset management, business optimization, and water loss management. Ms. Kumar is responsible for the preparation of presentation materials and whitepapers, and facilitates the discussions.

Unified Government of Wyandotte County, Kansas | Stormwater Rate Transition Study | 2017

Technical Director. Ms. Kumar is currently directing the stormwater utility rate transition study. She is providing technical guidance on stormwater utility policy decisions; financial plan development; parcel data analysis and estimation of billable units of service, rate design; billing integration, and stormwater credits and appeals program.

City of Newark, Delaware | Comprehensive Water, Wastewater, Stormwater Utility Cost of Service and Rate Study | 2017

Project Director. As Project Director, Ms. Kumar directed the water and wastewater cost of service rate study and the development of a new stormwater utility for the City. The cost of service study involved projection of revenues and revenues requirements; CIP review and financing; cash flow analysis; and determination of multi-year revenue adjustments. The stormwater utility development study included stormwater cost allocation; development of impervious area based rate methodology and stormwater rate structure, user fee and billing policies, and implementation plan. The study included four City Council workshops, and the Council has approved the water/sewer rate increase and the implementation of a new stormwater utility.

Ms. Kumar also directed all the tasks associated with the implementation of the stormwater user fee and associated credits/appeals program, and the stormwater database application. The fee went live on January 1, 2018.

City of Jonesboro, Arkansas | Stormwater Utility Feasibility Study | 2017

Technical Director. Ms. Kumar is currently providing technical guidance for a stormwater utility feasibility study for the City. This study includes determination of revenue requirements; financial plan development; parcel data analysis and estimation of billable units of service, rate structure development; and the development of a stormwater parcel data analysis database. The study also includes presentations to the City administration and Council, and the Stormwater Management Board.

City of Newark, New Jersey | Stormwater Utility Feasibility Study | 2017

Technical Director. Ms. Kumar is currently providing technical guidance for a stormwater utility feasibility study for the City. This study includes a detailed program assessment to delineate stormwater O&M and capital costs; development of a five-year financial plan; parcel data analysis and estimation of billable units of service, rate structure development. This phase of the study also includes presentations to the City administration and the stakeholder advisory group.

Washington Suburban Sanitary Commission | Water and Sewer Cost of Service Study and Evaluation of Alternative Rate Structure | 2016

Project Director. Ms. Kumar is currently serving as a technical director for the ongoing water and sewer cost of service rate study. A key component of this study is the evaluation of alternative water/sewer rate structures. Seven alternative rate structures were evaluated and presented to stakeholder groups for their review and input. Three bi-county stakeholder working group workshops and three Stakeholder Representative Group (SRG) workshops were completed recently. The cost of service study involves projection of revenues and revenues requirements; CIP review and financing; cash flow analysis; and determination of multi-year revenue adjustments. This part of the work is in progress. Cost of service analysis is to be performed for the three rate structure alternatives that have been shortlisted from the seven that were evaluated.

New York City Department of Environmental Protection | Stormwater Utility Feasibility Study | 2016

Technical Advisor. Ms. Kumar served as the technical advisor for the stormwater user fee feasibility study. She provided technical guidance on all aspects of the study including stormwater utility policy workshop, stormwater cost allocation, impervious area analysis to develop stormwater units of service, development of a five-year stormwater revenue requirements, and the development of stormwater rate structure. This work was performed under a subcontract to another engineering firm.

DC Water | Budget Cost Allocation for the Maturity Model | 2016

Project Director. Ms. Kumar directed the development of a budget cost allocation model for the Human Resources and IT cost centers for DC Water.

The purpose of this cost allocation was twofold – (i) map the existing business process to the newly defined business processes under the Business Maturity Model; and (ii) reallocate the FY 2016 O&M and capital equipment budgets from the existing activity units to each of the new business processes. An extensive matrix of activity mapping and personnel and non-personnel cost delineations by activity were developed to accomplish the re-allocation of FY 2016 budget to the new business processes that DC Water will use going forward for the HR and IT functions. A technical report and model on the cost re-allocation were provided.

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Water, Sewer, Stormwater Cost of Service and Rate Study | 2016

Technical Director. Ms. Kumar directed the water, sewer, stormwater cost of service analysis, and rate study update and bond feasibility services for the Philadelphia Water Department. The study involved a six-year financial planning, bond issuance support, cost of service analysis, wholesale and retail rates update, rate case testimony and expert witness services. The 2016 rate case hearings were successfully completed and rates were approved. In March 2015, bond engineering and feasibility report was provided to support the issuance of Series 2015 bonds of \$417.0 Million. In 2012, Ms. Kumar was involved in 10 Citizens Advisory Committee (CAC) meetings that were held to review several stormwater policy and technical issues. The diverse issues included stormwater cost allocation, user fee method, direct discharges, residential rate structure, credit program and incentives program. Ms. Kumar collaborated with the Water Department in the design of the non-residential stormwater customer assistance program.

City of Wilmington, Delaware | Non-revenue Water Management and AMR Meter Read Performance Analytics | 2016

Project Manager. Ms. Kumar currently leads the annual consumption analysis and IWA/AWWA method based annual Water Audit, and supports the design and implementation of business performance initiatives to minimize non-revenue water.

Pittsburgh Water and Sewer Authority (PWSA), Pittsburgh | Stormwater Management and Rate Structure Project | 2012 & 2016

Technical Advisor. In 2012, Ms. Kumar assisted in the Phase-1 Stormwater Feasibility Study. During this phase, she directed the tasks pertaining to the development of combined sewer cost allocation analysis, stormwater revenue requirements analysis, user fee funding options evaluation and Equivalent Residential Unit (ERU) rate development. Ms. Kumar also assisted with Phase 2 – Stormwater User Fee Development and Implementation. This phase involved stormwater program assessment, updates to the stormwater cost allocation and revenue requirements, policy development, development of a five-year financial

plan, stormwater rate structure development and Citizens Advisory Group and PWSA Board education and engagement.

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Utility Billing Appeals and Informal Hearings Mediation Support | 2016

Project Director. In 2014 - 2015, Ms. Kumar assisted the Water Department and the Water Revenue Bureau during the mediation of utility billing appeals and informal hearings issues with the City's Public Advocate namely the Community Legal Services. This task involved educating the mediator and the participating entities on the facts pertaining to business process, policies, regulations, and technical issues. In 2016, Ms. Kumar directed the implementation of the business process, policies, and technical recommendations that resulted from the mediation efforts.

Pittsburgh Water and Sewer Authority (PWSA), Pittsburgh | Stormwater Management and Rate Structure Project | 2016

Technical Director. In 2016, Ms. Kumar directed the Phase 2 – Stormwater User Fee Development and Implementation. This phase involved stormwater program assessment, updates to the stormwater cost allocation and revenue requirements, user fee and billing policy development, development of a five-year financial plan, stormwater rate structure development and PWSA Board education and engagement. This work was performed under a subcontract to another firm.

Harford County, Maryland | Comprehensive Utility Rate Study | 2015

Project Manager. Ms. Kumar lead a comprehensive water/sewer utility revenue study for Harford County. This comprehensive study 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 financial results from the diverse tasks were integrated in to a comprehensive six-year financial plan, and cost of service analysis. A new "Asset Reinvestment Charge" was developed to generate a stable and dedicated funding for water and sewer infrastructure renewal and rehabilitation. A significant component of this study was the successful education of the City Administration and City Council on utility financial planning and rate setting, through a series of workshops and comprehensive presentations. The Council approved a series of five annual increases (FY 2016 through FY 2020).

Philadelphia Water Department, City of Philadelphia, Pennsylvania | Stormwater Utility Operations Knowledge Management | 2014

Technical Director. Ms. Kumar recently assisted the Water Department's stormwater utility management team with a comprehensive knowledge capture of the stormwater utility billing, credits, incentives, and retrofits programs. The initiative involved facilitating a series of twelve (12) workshops with the Water

Department staff to document workflows, enhance business processes, and define policies, and determine key issues that need to be resolved.

City of Providence, Rhode Island | Upper Narragansett Bay Regional Stormwater Authority Feasibility Study – Phase 1 | 2014

Technical Lead: Ms. Kumar provided subject matter expertise in defining alternative frameworks for the regional stormwater authority feasibility study that included six municipalities. She assisted with presentations and discussions with the steering and stakeholder committees to evaluate the alternatives. Ms. Kumar contributed to both the organization and the content of the feasibility report and also assisted with developing the three phased “feasibility to implementation” framework that was incorporated in to the hurricane sandy coastal resiliency grant application.

City of Olathe, Kansas | Stormwater Rate Restructure Study | 2013

Technical Director: Ms. Kumar provided technical guidance for the stormwater rate restructure implementation project for the City of Olathe. Black & Veatch team assisted the City in transitioning from gross area based rates to impervious area based rates and charges for the City’s stormwater utility. Ms. Kumar lead the issues and policies meeting with the City at the beginning of the project to review and refine policies pertaining to user fee methodology and billing.

Miami-Dade County Water and Sewer Department (WASD), Miami | Review of Meter Reading and Billing Practices | 2012

Technical Advisor. Ms. Kumar directed a management review of the meter reading; meter services; and billing operations for WASD. The study included a comprehensive and objective review of business processes and workflows, policies, technology and resource issues; an identification of improvement opportunities; and the development of improvement strategies.

Utility Wide Energy Plan, Philadelphia Water Department, City of Philadelphia, Pennsylvania | 2012

Ms. Kumar lead the Organizational Capacity / Change Management phase of the Utility Wide Energy Plan project for the Philadelphia Water Department (PWD). The purpose of the project is to develop a comprehensive utility wide energy plan to enable PWD to achieve its vision of becoming a model energy efficient water/wastewater utility.

This Comprehensive Energy Plan addressed energy management for twelve facilities – five treatment plants and seven pump stations. This study included four major phases: (1) Rate Tariff Alternatives and Economic Analysis; (2) Energy Demand Analysis and Process Optimization; (3) Renewable Energy Evaluation; (4) Organizational Capacity & Change Management.

The Organizational Capacity/Change Management task included the following:

- Assist PWD define its vision, objectives, policies and goals to support energy management
- Facilitate development of the requisite organizational capacity including defining the organizational structure, roles and responsibilities, needed and personnel
- Define performance management initiatives that are aligned with the overall objectives, policies and goals established for utility wide energy management

Henrico County, Richmond, VA | Stormwater Utility Study | 2011

Task Lead. As a Task Lead, Ms. Kumar directed the policy development, 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.

City of Springfield, Ohio | Stormwater Utility Feasibility Study | 2011

Technical Director. As a technical director, Ms. Kumar completed a stormwater utility feasibility study. She provided technical guidance on stormwater utility policy development; parcel data analysis and estimation of billable units of service, rate design; stormwater database development, billing integration, and stormwater credits and appeals program. Ms. Kumar facilitated the policy workshop and user fee methodology workshops that the City conducted for the Stormwater Advisory Committee.

City of New London, Connecticut | Stormwater Utility Feasibility Study | 2010

Technical Director: As a technical director, Ms. Kumar directed a stormwater utility feasibility study, which was completed in 2011. In the feasibility study, Ms. Kumar provided technical guidance on financial planning; stormwater utility policy development; parcel data analysis and estimation of billable units of service, rate design; stormwater database development, billing integration, and stormwater credits and appeals program.

Philadelphia Water Department | Stormwater Implementation Management Services, City of Philadelphia, Pennsylvania | 2009 – 2011

Project Manager. Ms. Kumar served as the implementation manager for the Philadelphia Water Department in its parcel area based stormwater charge billing implementation. Phase 1 of the consulting services included stormwater cost allocation analysis, rate restructuring, and rate case testimonies. During Phase 2, implementation management, Ms. Kumar lead and coordinated the activities of six teams as follows: (i) Stormwater Database Application Development (ii) Billing Integration; (iii) Bill Design; (iv) Credits and Appeals

program development; (v) Commercial Customer Service; and (vi) Public Outreach/Education.

Water Revenue Bureau, City of Philadelphia, Pennsylvania | Utility Billing Appeals Process Optimization | 2009

Project Manager. Ms. Kumar conducted a Utility Billing Appeals Process Optimization study for the Water Revenue Bureau (WRB). The key elements of the study included the following:

- Review of existing business processes, workflows, policies and regulations
- Gap analysis on processes, technology, policy, and staffing issues/constraints
- Optimization of business workflow and technology utilization and development of recommendations for requisite policy and process changes and implementation support

City of Dallas, Texas | Stormwater Rate Study | 2009

Technical Advisor. Ms. Kumar served as a technical advisor in this study. Ms. Kumar led the parcel analysis and determination of stormwater units of service efforts for the City of Dallas Stormwater Rate Study update project. The study involved an evaluation of user fee methodology and alternative rate structures; distribution analysis for tiered rate structure; development of recommendations for proposed changes to user fee methods and rate structure, parcel analysis to develop billable stormwater units of service; and report development.

City of Wilmington, Delaware | Storm Water User Fee Program Development and Implementation | 2006 – 2008

Project Manager. As Project Manager, Ms. Kumar completed the development and implementation of a stormwater utility and credit program for the City of Wilmington. Phase I involved the design and development of a stormwater utility. This included the implementation of a stormwater billing program along with a stormwater credits and appeals program, and the implementation of a stormwater billing database application. The study also involved extensive public outreach activities including conducting “high impact” customer meetings, and presentations to the City’s Mayor’s Office, Administrative Board, and to the City Council.

Cost-of-Service and Rate Design Study, Metropolitan Wastewater Department (MWW), City of San Diego, California | 2002

As Lead Consultant, Ms. Kumar conducted a comprehensive wastewater cost-of-service and rate design study for the City of San Diego. The goal of the study was to devise a wastewater rate structure that would incorporate the Chemical Oxygen Demand (COD) parameter, as mandated by the California State Water Resources Control Board (SWRCB). The COS study involved five-year financial planning, mass balance analysis, cost of service allocations to cost-causative

components, unit cost of service analysis, and design of alternative rate structures, development of a rate schedule, and a detailed study report.

SELECTED PUBLICATIONS

“Wastewater Financing and Charges, Manual of Practice 27”. 2nd Edition. (2018).
Lead Author for Chapter 9 – Wet Weather Financing and Cost Recovery.
Water Environment Federation, Alexandria, VA.

“Wastewater Financing and Charges, Manual of Practice 27”. 2nd Edition. (2018).
Lead Author for Chapter 9 – Wet Weather Financing and Cost Recovery.
Water Environment Federation, Alexandria, VA.

“Harford County’s Integrated Management and Innovation Drives the Transition from Financial Crisis to Financial Resilience”. Presented at the 2016 Utility Management Conference, February, Tampa, Florida.

“Transformational Financial Planning and Rate Setting: The New Paradigm in Building Financial Resiliency and Customer Acceptance”. Presented at the 2016 Association of Metropolitan Water Agencies Annual Conference, Scottsdale, Arizona.

“Tools to Improve Utility Performance – Financial Resilience through Integrated Financial Management”. Presented at the 2016 Maine Water Utilities Association Conference, Portland, Maine.

“Agile Stormwater Programs and Incentives Drive Cost Effective Long Term Control Plan Compliance”. Presented at the October 2015 New England Water Environment Association Specialty Conference, Lowell, Massachusetts.

“Developing Stormwater Program Requirements and Rate Structures”. Presented at the September 2015 WEFTEC Conference, Chicago, Illinois.

“Sustainable Wet Weather Funding Can be Achieved by Designing and Managing Multi-objective Stormwater Utility Programs”. Presented at the 2014 WEFTEC Conference, New Orleans, Louisiana.

“Building Financial Resiliency in Challenging Times: Can Be Done With Proactive Stakeholder Engagement”. Presented at the 2014 Utility Management Conference, February, Savannah, Georgia.

“User Fee Funded Stormwater Utilities Manual”. 2nd Edition. (2013). Lead Author for Chapter 3 – Stormwater Feasibility Study. Water Environment Federation, Alexandria, VA.

“Regional Collaboration: A 2009 Survey Findings”. Report on the survey conducted by the Strategic Management Practices Committee of AWWA. Presented at the 2010 Utility Management Conference, February, San Francisco, CA

“Promoting Sustainable Stormwater Management: The Role of a Stormwater Credit Program”. Presented at the 2009 Stormcon Conference, August, Anaheim, CA.

“Look Before you Leap: Developing Policies for Stormwater User Fee Implementation,” Presented at the August 2008 Stormcon Conference, Orlando, FL.

Kumar, Prabha, White, Anna. (2008). *“Know Your Way – Policy Development in Stormwater User Fee Implementation,”* Published in the May 2008 issue of Stormwater, Vol 9. No.3.

“Stormwater User Fee Financing: Charge the Runoff, not the Usage,” Presented at the 2007 AWWA-WEF Joint Management Conference, Portland, Ore.

ATTACHMENT PNK-2 - Schedule 1
Total Phase 1 Cost of Service to be Recovered from Wastewater Rates and Charges

Line No.	Description	(1) O&M Expense \$	(2) Capital Costs \$	(3) Total \$
Revenue Requirements				
1	Operating Expense	78,161,900		78,161,900
2	Debt Service Requirements		139,508,600	139,508,600
3	PILOT & Other Taxes (a)	1,733,100	26,777,700	28,510,800
4	Extensions and Replacements		72,000,000	72,000,000
5	Total	79,895,000	238,286,300	318,181,300
Revenue Requirements Met from Other Sources				
6	Other Operating Revenue and Adjustments	(2,373,100)		(2,373,100)
7	Connection Fees		(8,121,100)	(8,121,100)
8	Interest and Other Miscellaneous Income		(2,180,200)	(2,180,200)
9	Total	(2,373,100)	(10,301,300)	(12,674,400)
10	Total Cost of Service to be Recovered From Rates	77,521,900	227,985,000	305,506,900
11	Plus: Other Operating Revenue			2,373,100
12	Total Operating Revenue			307,880,000

Notes

(a) O&M Expense includes cost for Test Year Taxes other than PILOT, Payroll Taxes, and Non-Recurring Expense

ATTACHMENT PNK-2 - Schedule 2
Existing Rates and Charges, Adjusted Billing Units, and Contributed Volumes

Line No.	Description	(1) Rates	(2) Units	(3) Revenue	(4) Contributed Volume
Non Industrial (a)					
1	Monthly Base Charge	\$ 18.75 /Month	2,899,732 Bills	\$ 54,370,000	
Metered Volumes					
2	Non Industrial (First 7,500 gal.)	\$ 6.8828 /Mgal	12,084,585 Mgal.	\$ 83,175,800	10,850,518 Mgal.
3	Non Industrial (Over 7,500 gal.)	\$ 7.4507 /Mgal	11,104,734 Mgal.	82,738,000	11,104,734 Mgal.
4	Total Non Industrial Volume		23,189,319	\$ 165,913,800	21,955,252
5	Total Non Industrial Revenue			\$ 220,283,800	
Self Reporter & Industrial					
Monthly Base Charge					
6	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 24.03 /Month	1,024 Bills	\$ 24,600	
7	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 52.46 /Month	1,356 Bills	\$ 71,100	
8	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 250.88 /Month	1,168 Bills	\$ 293,000	
9	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,733.34 /Month	430 Bills	\$ 745,000	
10	Self Reporter & Industrial Volume	\$ 4.5092 /Mgal	4,835,851 Mgal.	21,805,800	4,829,038 Mgal.
			4,835,851	\$ 21,805,800	4,829,038
11	Subtotal Self Reporter & Industrial			\$ 22,939,500	
Extra Strength Surcharge					
12	BOD in Excess of 250 mg/l	\$ 0.4306 /lbs	28,314,146 lbs	\$ 12,192,100	
13	TSS in Excess of 300 mg/l	\$ 0.1545 /lbs	14,795,572 lbs	2,285,900	
14	NH ₃ -N in Excess of 20 mg/l	\$ 0.4640 /lbs	604,634 lbs	280,600	
15	Subtotal Surcharge			\$ 14,758,600	
16	Total Self Reporter and Surcharge			\$ 37,698,100	
Fats, Oils, and Grease					
17	Services	\$ 30.00 /Month	45,821 Traps	\$ 1,374,600	
Wastewater Haulers					
18	Septic and Non-Grease Haulers	\$ 56.24 /Mgal	2,714 Mgal.	\$ 152,600	
19	Grease Haulers	\$ 422.08 /Mgal	0 Mgal.	-	
20	Total Revenue			\$ 152,600	
21	Satellite - Special Contract	\$ 0.7959 /Mgal	7,249,565 Mgal.	\$ 5,769,900	7,249,565 Mgal.
22	Satellite - Tariff	\$ 2.4852 /Mgal	276,088 Mgal.	\$ 686,100	
23	Other Operating Revenue			\$ 2,373,100	
24	Total Operating Revenue			\$ 268,337,800	

Note

(a) Non Industrial includes Commercial and Residential Unmetered customers

ATTACHMENT PNK-2 - Schedule 3
Summary of Allocation Factors Used for Allocating Net Plant in Service and O&M Expenses

Allocation Reference	Allocation Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
		Common to All Wastewater Customers						Customer					
		Volume Related	Capacity Common To All	Wastewater Strength				Capacity Retail	Meters	Billing and Collecting	Surveillance	FOG	
O&M													
1	Capacity - All		100.00%										
2	Capacity Retail							100.00%					
3	Volume - All	100.00%											
4	FOG - Treatment						100.00%						
5	FOG - Collection											100.00%	
6	Surveillance - All										100.00%		
7	General O&M	2.59%	26.98%	13.26%	11.30%	1.08%	0.29%	27.26%		15.83%	0.99%	0.43%	
8	Treatment - Operations	7.71%	22.30%	35.81%	31.27%	2.91%							
9	Treatment - Maintenance	3.89%	13.36%	45.57%	33.49%	3.70%							
10	Customer									100.00%			
11	Purchased Power - Treatment	38.27%	4.25%	48.94%	4.89%	3.65%							
12	Purchased Power - Other	90.00%	10.00%										
13	Collection/Pumping - Operations		44.22%					55.78%					
14	Collection/Pumping - Maintenance		28.25%				3.35%	68.40%					
15	O&M & Capital Allocation	7.35%	43.68%	12.68%	6.41%	1.03%	0.63%	24.60%		3.31%	0.21%	0.09%	
16	Total O&M	13.63%	22.65%	16.25%	9.74%	1.28%	0.23%	22.18%		12.88%	0.81%	0.35%	
Capital													
17	Collection - Mains		8.58%					91.42%					
18	Pumping - Collection		70.93%					29.07%					
19	Pumping - Collection - Depreciation		67.03%					32.97%					
20	Capacity - All		100.00%										
21	Preliminary Treatment		80.00%		10.00%		10.00%						
22	Preliminary Solids Removal				90.00%		10.00%						
23	Primary Settling	80.00%			10.00%		10.00%						
24	Secondary Settling	90.00%		9.20%		0.80%							
25	Aeration/Nitrification			92.00%		8.00%							
26	Sludge Disposal			43.00%	54.00%	3.00%							
27	General Treatment	14.78%	31.10%	32.08%	17.21%	2.63%	2.21%						
28	General Treatment - Depreciation	14.74%	29.92%	31.49%	19.08%	2.55%	2.22%						
29	General Plant	5.34%	37.69%	11.59%	6.22%	0.95%	0.80%	37.41%					
30	General Plant - Depreciation	5.49%	25.36%	11.73%	7.11%	0.95%	0.83%	48.54%					
31	Net Plant in Service for Allocations	5.18%	50.95%	11.45%	5.26%	0.95%	0.77%	25.44%					

ATTACHMENT PNK-2 - Schedule 4
Allocation of Net Plant in Service and Net Capital Revenue Requirements to Functional Cost Components

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Total	Volume Related	Capacity Common To All	Common to All Wastewater Customers				Capacity Retail	Schedule 3 Allocation Reference
					Wastewater Strength					
		\$	\$	\$	BOD \$	TSS \$	NH ₃ -N \$	FOG \$	\$	
Plant in Service										
Collection and Pumping										
1	Collection Mains	1,194,725,800	-	101,663,300	-	-	-	-	1,093,062,500	17
2	Collection Pumping	247,321,400	-	175,415,400	-	-	-	-	71,906,000	18
3	Collection Structures	546,769,600	-	546,769,600	-	-	-	-	-	20
4	Subtotal Collection and Pumping	1,988,816,800	-	823,848,300	-	-	-	-	1,164,968,500	
Treatment										
5	Preliminary Treatment	65,662,700	-	52,530,100	-	6,566,300	-	6,566,300	-	21
6	Mechanical Bar Screens	9,334,800	-	-	-	8,401,300	-	933,500	-	22
7	Grit Removal	18,202,300	-	-	-	16,382,100	-	1,820,200	-	22
8	Wet Weather Pumping	18,437,700	-	18,437,700	-	-	-	-	-	20
9	Wet Weather Storage	41,401,700	-	41,401,700	-	-	-	-	-	20
10	Primary Clarifiers	71,773,000	57,418,400	-	-	7,177,300	-	7,177,300	-	23
11	Aeration/Nitrification	176,504,100	-	-	162,383,800	-	14,120,300	-	-	25
12	Secondary Clarifiers	58,663,500	52,797,200	-	5,397,000	-	469,300	-	-	24
13	Disinfection	9,007,800	-	9,007,800	-	-	-	-	-	20
14	Filters	45,515,300	-	45,515,300	-	-	-	-	-	20
15	UV Disinfection	27,575,200	-	27,575,200	-	-	-	-	-	20
16	Effluent Pumping	36,740,100	-	36,740,100	-	-	-	-	-	20
17	Outfall	727,200	-	727,200	-	-	-	-	-	20
18	Sludge Handling and Incineration	166,332,800	-	-	71,523,100	89,819,700	4,990,000	-	-	26
19	Subtotal Treatment	745,878,200	110,215,600	231,935,100	239,303,900	128,346,700	19,579,600	16,497,300	-	
20	General Treatment	379,474,900	56,073,500	117,999,900	121,748,900	65,298,000	9,961,400	8,393,200	-	27
21	General Plant	12,013,800	641,500	4,528,200	1,392,900	747,000	114,000	96,000	4,494,200	29
22	Total Plant in Service	3,126,183,700	166,930,600	1,178,311,500	362,445,700	194,391,700	29,655,000	24,986,500	1,169,462,700	
Accumulated Depreciation										
23	Collection Mains	830,095,700	-	72,063,500	-	-	-	-	758,032,200	17
24	Collection Pumping	83,216,400	-	55,780,100	-	-	-	-	27,436,300	19
25	Collection Structures	102,230,500	-	102,230,500	-	-	-	-	-	20
26	Subtotal Collection and Pumping	1,015,542,600	-	230,074,100	-	-	-	-	785,468,500	
27	Treatment Plant and Equipment	386,857,900	57,039,300	115,741,700	121,823,600	73,817,300	9,865,800	8,570,200	-	28
28	General Treatment	215,825,600	31,821,900	64,571,600	67,964,600	41,182,200	5,504,100	4,781,200	-	28
29	General Plant	1,484,200	81,500	376,400	174,100	105,500	14,100	12,200	720,400	30
30	Total Accumulated Depreciation	1,619,710,300	88,942,700	410,763,800	189,962,300	115,105,000	15,384,000	13,363,600	786,188,900	
31	Net Plant in Service for Allocations	1,506,473,400	77,987,900	767,547,700	172,483,400	79,286,700	14,271,000	11,622,900	383,273,800	
Allocation of Net Revenue Requirements										
32	Debt Service	139,508,600	7,222,200	71,079,600	15,973,000	7,342,400	1,321,600	1,076,300	35,493,500	Line 31 Sch 4
33	Extensions and Replacements	72,000,000	3,727,300	36,684,000	8,243,600	3,789,400	682,100	555,500	18,318,100	Line 31 Sch 4
34	Phase 2 & 3 Incremental Extensions & Replacements	-	-	-	-	-	-	-	-	32
35	PILOT	26,777,700	1,386,300	13,643,200	3,065,900	1,409,300	253,700	206,600	6,812,700	Line 31 Sch 4
36	Less: Other Revenue	(10,301,300)	(533,300)	(5,248,500)	(1,179,400)	(542,100)	(97,600)	(79,500)	(2,620,900)	Line 31 Sch 4
37	Net Capital Revenue Requirements	227,985,000	11,802,500	116,158,300	26,103,100	11,999,000	2,159,800	1,758,900	58,003,400	

ATTACHMENT PNK-2 - Schedule 5
Allocation of Net Operation & Maintenance Expenses to Functional Cost Components

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Common to All Wastewater Customers											Schedule 3 Allocation Reference
		Total	Volume Related	Capacity Common To All	Wastewater Strength			FOG Treatment	Capacity Retail	Customer Billing and Collecting	Industrial Surveillance	FOG Collection	
\$	\$	\$	BOD	TSS	NH ₃ -N	\$	\$	\$	\$	\$	\$	\$	
Collection & Pumping													
1	Operations	12,044,700	-	5,326,300	-	-	-	-	6,718,400	-	-	-	13
2	Maintenance	2,694,300	-	761,300	-	-	-	90,200	1,842,800	-	-	-	14
3	Purchased Power	1,671,100	1,504,000	167,100	-	-	-	-	-	-	-	-	12
4	Fuel & Chemicals	82,100	82,100	-	-	-	-	-	-	-	-	-	3
5	Subtotal	16,492,200	1,586,100	6,254,700	-	-	-	90,200	8,561,200	-	-	-	
Treatment & Disposal													
6	Operations	10,313,100	761,100	2,200,400	3,533,200	3,085,200	286,700	-	-	-	-	-	8
7	Maintenance	1,384,400	53,800	184,900	630,900	463,600	51,200	-	-	-	-	-	9
8	Purchased Power	8,799,600	3,367,600	374,000	4,306,500	430,300	321,200	-	-	-	-	-	11
9	Fuel	1,237,900	1,237,900	-	-	-	-	-	-	-	-	-	3
10	Chemicals	2,790,200	2,790,200	-	-	-	-	-	-	-	-	-	3
11	Subtotal	24,525,200	8,210,600	2,759,300	8,470,600	3,979,100	659,100	-	-	-	-	-	
12	Customer Billing & Meter Reading	4,970,200	-	-	-	-	-	-	-	4,970,200	-	-	10
13	Industrial Surveillance	-	-	-	-	-	-	-	-	-	312,400	-	6
14	FOG Customer Inspections	-	-	-	-	-	-	-	-	-	-	134,100	5
15	Administrative & General	32,760,800	850,000	8,838,200	4,343,600	3,701,800	352,500	94,100	8,930,300	5,184,500	325,900	139,900	7
16	Purchased Power	114,000	102,600	11,400	-	-	-	-	-	-	-	-	12
17	Total O&M	78,862,400	10,749,300	17,863,600	12,814,200	7,680,900	1,011,600	184,300	17,491,500	10,154,700	638,300	274,000	
18	Plus: Proforma Bad Debt	767,800	56,400	335,400	97,400	49,200	7,900	4,900	188,900	25,400	1,600	700	15
19	Plus: Phase 1 Bad Debt Expense	264,900	19,400	115,700	33,600	17,000	2,700	1,700	65,200	8,800	600	200	15
20	Plus: Phase 2 Bad Debt Expense	-	-	-	-	-	-	-	-	-	-	-	15
21	Plus: Phase 3 Bad Debt Expense	-	-	-	-	-	-	-	-	-	-	-	15
22	Less: Miscellaneous Revenue	(2,373,100)	(323,700)	(537,500)	(385,600)	(231,100)	(30,400)	(5,500)	(526,300)	(305,600)	(19,200)	(8,200)	16
23	Net Operation and Maintenance Expense	77,522,000	10,501,400	17,777,200	12,559,600	7,516,000	991,800	185,400	17,219,300	9,883,300	621,300	266,700	

**ATTACHMENT PNK-2 - Schedule 6
Wastewater Units of Service**

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
		Common to All Wastewater Customers												
		Volume			Capacity	Wastewater Strength					Capacity Retail	Number of Customers	Number of Bills	Surveillance
Contributed Volume	I/I	Total	Comm To All	BOD	TSS	NH ₃ -N	FOG Treatment	Mgal./day	Mgal.	Mgal.				
		Mgal.	Mgal.	Mgal.	Mgal./day	lbs	lbs	lbs	lbs	Mgal./day	Customers	Bills	Mgal.	Bills
Wastewater														
1	NON INDUSTRIAL	21,955,252	32,055,275	54,010,527	475,203	57,005,000	89,151,600	6,068,200	11,828,700	475,203	241,644	2,899,732	-	-
2	SELF REPORTER & INDUSTRIAL	4,829,038	1,549,071	6,378,109	36,694	10,611,100	13,736,000	921,800	2,142,900	36,694	331	3,977	4,829,038	-
3	SURCHARGE (a)	-	-	-	-	28,314,100	14,795,600	604,600	-	-	-	-	-	-
4	SEPTIC AND NON-GREASE HAULERS	-	-	-	-	135,800	339,500	9,100	181,100	-	-	-	-	-
5	GREASE HAULERS	-	-	-	-	-	-	-	-	-	-	-	-	-
6	FATS, OILS, AND GREASE	-	-	-	-	-	-	-	-	-	-	-	-	45,821
7	Subtotal Retail	26,784,290	33,604,346	60,388,636	511,897	96,066,000	118,022,700	7,603,700	14,152,700	511,897	241,975	2,903,709	4,829,038	45,821
8	SATELLITE - SPECIAL CONTRACT	7,249,565	-	7,249,565	63,955	8,109,700	12,365,000	838,700	1,655,700	-	4	48	-	-
9	SATELLITE - TARIFF	276,088	-	276,088	2,436	308,800	470,900	31,900	63,100	-	2	24	-	-
10	Total System	34,309,944	33,604,346	67,914,290	578,288	104,484,500	130,858,600	8,474,300	15,871,500	511,897	241,981	2,903,781	4,829,038	45,821

Note

Mgal. = thousand gallons

(a) Includes both Retails and Satellite Surcharge

ATTACHMENT PNK-2 - Schedule 7
Allocation of Net Capital Revenue Requirements to All Customers

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Total	Volume Related Mgal.	Capacity Common To All Mgal./day	Common to All Wastewater Customers				Capacity Retail Mgal./day
					Wastewater Strength				
					BOD lbs	TSS lbs	NH ₃ -N lbs	FOG lbs	
Capital Costs									
1	Net Capital Costs	227,985,000	11,802,500	116,158,300	26,103,100	11,999,000	2,159,800	1,758,900	58,003,400
2	Number of Units - Total System		67,914,290	578,288	104,484,500	130,858,600	8,474,300	15,871,500	511,897
3	Unit Cost - \$/unit - Total System		0.17379	200.86583	0.24983	0.09169	0.25486	0.11082	113.31069
Wastewater									
NON INDUSTRIAL									
4	Units		54,010,527	475,203	57,005,000	89,151,600	6,068,200	11,828,700	475,203
5	Costs - \$	183,957,400	9,386,100	95,452,000	14,241,400	8,174,900	1,546,600	1,310,800	53,845,600
SELF REPORTER & INDUSTRIAL									
6	Units		6,378,109	36,694	10,611,100	13,736,000	921,800	2,142,900	36,694
7	Costs - \$	17,019,800	1,108,500	7,370,600	2,651,000	1,259,500	234,900	237,500	4,157,800
EXTRA STRENGTH SURCHARGE									
8	Units		-	-	28,314,100	14,795,600	604,600	-	-
9	Costs - \$	8,584,400	-	-	7,073,700	1,356,600	154,100	-	-
SEPTIC AND NON-GREASE HAULERS									
10	Units		-	-	135,800	339,500	9,100	181,100	-
11	Costs - \$	87,400	-	-	33,900	31,100	2,300	20,100	-
GREASE HAULERS									
12	Units		-	-	-	-	-	-	-
13	Costs - \$	-	-	-	-	-	-	-	-
FATS, OILS, AND GREASE									
14	Units		-	-	-	-	-	-	-
15	Costs - \$	-	-	-	-	-	-	-	-
SATELLITE - SPECIAL CONTRACT									
16	Units		7,249,565	63,955	8,109,700	12,365,000	838,700	1,655,700	-
17	Costs - \$	17,663,300	1,259,900	12,846,400	2,026,000	1,133,700	213,800	183,500	-
SATELLITE - TARIFF									
18	Units		276,088	2,436	308,800	470,900	31,900	63,100	-
19	Costs - \$	672,700	48,000	489,300	77,100	43,200	8,100	7,000	-
20	RETAIL Total Costs - \$	209,649,000	10,494,600	102,822,600	24,000,000	10,822,100	1,937,900	1,568,400	58,003,400
21	SATELLITE Total Costs - \$	18,336,000	1,307,900	13,335,700	2,103,100	1,176,900	221,900	190,500	-
22	Total - Costs - \$	227,985,000	11,802,500	116,158,300	26,103,100	11,999,000	2,159,800	1,758,900	58,003,400

ATTACHMENT PNK-2 - Schedule 8
Allocation of Net Operation and Maintenance Expenses to All Customers

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Total	Common to All Wastewater Customers							Customer			FOG Collection
			Volume Related	Capacity Common To All	Wastewater Strength				Capacity Retail	Meters	Billing and Collecting	Surveillance	
		Mgal.	Mgal./day	BOD lbs	TSS lbs	NH ₃ -N lbs	FOG lbs	Mgal./day	Customers	Bills	Mgal.	Bills	
Operating Expense													
1	Net O&M Costs \$	77,522,000	10,501,400	17,777,200	12,559,600	7,516,000	991,800	185,400	17,219,300	-	9,883,300	621,300	266,700
2	Number of Units - Total System		67,914,290	578,288	104,484,500	130,858,600	8,474,300	15,871,500	511,897	241,981	2,903,781	4,829,038	45,821
3	Unit Cost - \$/unit - Total System		0.15463	30.74108	0.12021	0.05744	0.11704	0.01168	33.63821	-	3.40360	0.12866	5.82048
Wastewater													
NON INDUSTRIAL													
4	Units		54,010,527	475,203	57,005,000	89,151,600	6,068,200	11,828,700	475,203	241,644	2,899,732	-	-
5	Costs - \$	61,635,700	8,351,500	14,608,300	6,852,400	5,120,600	710,100	138,300	15,985,000	-	9,869,500	-	-
SELF REPORTER & INDUSTRIAL													
6	Units		6,378,109	36,694	10,611,100	13,736,000	921,800	2,142,900	36,694	331	3,977	4,829,038	-
7	Costs - \$	6,180,600	986,200	1,128,000	1,275,500	788,900	107,900	25,000	1,234,300	-	13,500	621,300	-
EXTRA STRENGTH SURCHARGE													
8	Units		-	-	28,314,100	14,795,600	604,600	-	-	-	-	-	-
9	Costs - \$	4,324,100	-	-	3,403,500	849,800	70,800	-	-	-	-	-	-
SEPTIC AND NON-GREASE HAULERS													
10	Units		-	-	135,800	339,500	9,100	181,100	-	-	-	-	-
11	Costs - \$	39,000	-	-	16,300	19,500	1,100	2,100	-	-	-	-	-
GREASE HAULERS													
12	Units		-	-	-	-	-	-	-	-	-	-	-
13	Costs - \$	-	-	-	-	-	-	-	-	-	-	-	-
FATS, OILS, AND GREASE													
14	Units		-	-	-	-	-	-	-	-	-	-	45,821
15	Costs - \$	266,700	-	-	-	-	-	-	-	-	-	-	266,700
SATELLITE - SPECIAL CONTRACT													
16	Units		7,249,565	63,955	8,109,700	12,365,000	838,700	1,655,700	-	4	48	-	-
17	Costs - \$	4,889,700	1,121,000	1,966,000	974,800	710,200	98,200	19,300	-	-	200	-	-
SATELLITE - TARIFF													
18	Units		276,088	2,436	308,800	470,900	31,900	63,100	-	2	24	-	-
19	Costs - \$	186,200	42,700	74,900	37,100	27,000	3,700	700	-	-	100	-	-
20	RETAIL Total Costs - \$	72,446,100	9,337,700	15,736,300	11,547,700	6,778,800	889,900	165,400	17,219,300	-	9,883,000	621,300	266,700
21	SATELLITE Total Costs - \$	5,075,900	1,163,700	2,040,900	1,011,900	737,200	101,900	20,000	-	-	300	-	-
22	Total - Costs - \$	77,522,000	10,501,400	17,777,200	12,559,600	7,516,000	991,800	185,400	17,219,300	-	9,883,300	621,300	266,700

ATTACHMENT PNK-2 - Schedule 9
Allocation of Satellite Adjustments to Retail Customers

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Total	Volume Related Mgal.	Capacity Common To All Mgal./day	Common to All Wastewater Customers Wastewater Strength				Customer Billing and Collecting Bills
					BOD lbs	TSS lbs	NH ₃ -N lbs	FOG lbs	
Summary of Satellite Cost of Service									
1	Capital Cost of Service - \$ (Sch. 7)	18,336,000	1,307,900	13,335,700	2,103,100	1,176,900	221,900	190,500	-
2	O&M Cost of Service - \$ (Sch. 8)	5,075,900	1,163,700	2,040,900	1,011,900	737,200	101,900	20,000	300
3	Total Satellite Cost of Service - \$	23,411,900	2,471,600	15,376,600	3,115,000	1,914,100	323,800	210,500	300
4	Less: Satellite - Special Contract - Revenue Under Existing Rates - \$	(5,769,900)	(609,100)	(3,789,600)	(767,700)	(471,700)	(79,800)	(51,900)	(100)
5	Less: Satellite - Tariff - Revenue Under Existing Rates - \$	(686,100)	(72,400)	(450,600)	(91,300)	(56,100)	(9,500)	(6,200)	-
6	Less: Tariff COS Adjustment - \$	(172,800)	(18,200)	(113,500)	(23,000)	(14,100)	(2,400)	(1,600)	-
7	Difference to be Recovered by Retail - \$	16,783,100	1,771,900	11,022,900	2,233,000	1,372,200	232,100	150,800	200
8	Number of Units - Retail		60,388,636	511,897	96,066,000	118,022,700	7,603,700	14,152,700	2,903,709
9	Unit Cost - \$/unit - Retail		0.02934	21.53343	0.02324	0.01163	0.03053	0.01066	0.00007
Wastewater									
NON INDUSTRIAL									
10	Units		54,010,527	475,203	57,005,000	89,151,600	6,068,200	11,828,700	2,899,732
11	Costs - \$	14,490,800	1,584,800	10,232,800	1,325,100	1,036,600	185,200	126,100	200
SELF REPORTER & INDUSTRIAL									
12	Units		6,378,109	36,694	10,611,100	13,736,000	921,800	2,142,900	3,977
13	Costs - \$	1,434,400	187,100	790,100	246,600	159,700	28,100	22,800	-
EXTRA STRENGTH SURCHARGE									
14	Units		-	-	28,314,100	14,795,600	604,600	-	-
15	Costs - \$	848,600	-	-	658,100	172,000	18,500	-	-
SEPTIC AND NON-GREASE HAULERS									
16	Units		-	-	135,800	339,500	9,100	181,100	-
17	Costs - \$	9,300	-	-	3,200	3,900	300	1,900	-
GREASE HAULERS									
18	Units		-	-	-	-	-	-	-
19	Costs - \$	-	-	-	-	-	-	-	-
FATS, OILS, AND GREASE									
20	Units		-	-	-	-	-	-	-
21	Costs - \$	-	-	-	-	-	-	-	-
22	Total - Costs - \$	16,783,100	1,771,900	11,022,900	2,233,000	1,372,200	232,100	150,800	200

ATTACHMENT PNK-2 - Schedule 10
Comparison of Phase 1 Cost of Service With Revenue Under Existing Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)
		Phase 1 Allocated Cost of Service	Satellite Contracts Adjustment	Satellite Special Contract Settlement Adjustment	Phase 1 Adjusted Cost of Service	Revenue Under Existing Rates	Indicated Revenue Increase
		\$	\$	\$	\$	\$	%
Wastewater							
1	Non Industrial	245,593,100	14,490,800	(1,074,900)	259,009,000	220,283,400	17.58
2	Self Reporter & Industrial Extra Strength Surcharge	23,200,400	1,434,400	(119,900)	24,514,900	22,939,500	6.87
3	BOD	10,477,200	658,100	(71,400)	11,063,900	12,192,100	(9.25)
4	TSS	2,206,400	172,000	(6,400)	2,372,000	2,285,900	3.77
5	NH ₃ -N	224,900	18,500	(2,600)	240,800	280,600	(14.18)
6	Septic and Non-Grease Haulers	126,400	9,300	-	135,700	152,600	(11.07)
7	Grease Haulers	-	-	-	-	-	-
8	Fats, Oils, and Grease	266,700	-	-	266,700	1,374,600	(80.60)
		<u>282,095,100</u>	<u>16,783,100</u>	<u>(1,275,200)</u>	<u>297,603,000</u>	<u>259,508,700</u>	<u>14.68</u>
9	Satellite - Special Contract	22,553,000	(16,783,100)	1,275,200	7,045,100	5,769,900	22.10
10	Satellite - Tariff	858,900	-	-	858,900	686,100	25.19
11	Total	<u>305,507,000</u>	<u>-</u>	<u>-</u>	<u>305,507,000</u>	<u>265,964,700</u>	<u>14.87</u>
12	Other Operating Revenue	<u>2,373,100</u>			<u>2,373,100</u>	<u>2,373,100</u>	
13	Total Operating Revenue	<u>307,880,100</u>			<u>307,880,100</u>	<u>268,337,800</u>	<u>14.74</u>

ATTACHMENT PNK-3 - Schedule 1
Phase 1 Wastewater Cost of Service Rates and Charges

Line No.	Description	(1) Existing Rates	Cost of Service			
			(2) Non Industrial	(3) Self Reporter & Industrial	(4) Satellite - Tariff	(5) Fats, Oils, and Grease
Non Industrial (a)						
1	Monthly Base Charge	\$ 18.75	\$ 52.15			
2	Minimum Charge: (Monthly)	\$ 39.40	\$ 66.10			
Volume Charge: (\$/1,000 gallons)						
3	First 7,500 gal	\$ 6.8828	\$ 4.6481			
4	Over 7,500 gal	\$ 7.4507	\$ 4.6481			
Volume Charge: (\$/Ccf)						
5	First 10 Ccf	\$ 5.1621	\$ 3.4861			
6	Over 10 Ccf	\$ 5.5880	\$ 3.4861			
Self Reporter & Industrial						
Monthly Base Charge (Based on Prior Year Average)						
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 24.03		\$ 52.10		
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 52.46		\$ 52.10		
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 250.88		\$ 52.10		
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,733.34		\$ 52.10		
Minimum Charge: (Monthly)						
11	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 37.56		\$ 67.18		
12	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 65.99		\$ 67.18		
13	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 264.41		\$ 67.18		
14	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,746.87		\$ 67.18		
15	Volume Charge: (\$/1,000 gallons)	\$ 4.3070		\$ 4.8988		
16	Surveillance Charge: (\$/1,000 gallons)	\$ 0.2022		\$ 0.1279		
17	Volume Charge (\$/Ccf)	\$ 3.2303		\$ 3.6741		
18	Surveillance Charge (\$/Ccf)	\$ 0.1517		\$ 0.0959		
Extra Strength Surcharge						
19	BOD Charge: (\$/lb)	\$ 0.4306		\$ 0.3908		
20	TSS Charge: (\$/lb)	\$ 0.1545		\$ 0.1603		
21	NH ₃ -N Charge: (\$/lb)	\$ 0.4640		\$ 0.3981		
22	Satellite - Tariff (\$/1,000 gallons)	\$ 2.4852		\$ 3.1109		
23	Fats, Oils, and Grease (Monthly)	\$ 30.00			\$ 5.82	
Wastewater Haulers						
24	Septic and Non-Grease Haulers: (\$/1,000 gal.)	\$ 56.24				\$ 50.04
25	Grease Haulers: (\$/1,000 gal.)	\$ 422.08				\$ -

Note

(a) Non Industrial includes Commercial and Residential Unmetered customers

ATTACHMENT PNK-3 - Schedule 2
Proposed Phase 1 Wastewater Rates and Charges

Line No.	Description	(1) Existing Rates	(2) Non Industrial	(3) Self Reporter & Industrial	(4) Satellite - Tariff	(5) Fats, Oils, and Grease	(6) Wastewater Haulers	(7) Ref.
Non Industrial								
1	Monthly Base Charge	\$ 18.75	\$ 21.95					(a)
2	Minimum Charge: (Monthly)	\$ 39.40	\$ 46.12					
Volume Charge: (\$/1,000 gallons)								
3	First 7,500 gal	\$ 6.8828	\$ 8.0577					
4	Over 7,500 gal	\$ 7.4507	\$ 8.7225					
Volume Charge: (\$/Ccf)								
5	First 10 Ccf	\$ 5.1621	\$ 6.0433					
6	Over 10 Ccf	\$ 5.5880	\$ 6.5419					
Self Reporter & Industrial								
Monthly Base Charge (Based on Prior Year Average)								
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 24.03		\$ 25.68				(b)
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 52.46		\$ 56.06				(c)
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 250.88		\$ 268.12				(d)
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,733.34		\$ 1,852.42				(e)
Minimum Charge: (Monthly)								
11	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 37.56		\$ 40.14				
12	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 65.99		\$ 70.52				
13	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 264.41		\$ 282.58				
14	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,746.87		\$ 1,866.88				
15	Volume Charge: (\$/1,000 gallons)	\$ 4.3070		\$ 4.6166				
16	Surveillance Charge: (\$/1,000 gallons)	\$ 0.2022		\$ 0.2022				
17	Volume Charge (\$/Ccf)	\$ 3.2303		\$ 3.4625				
18	Surveillance Charge (\$/Ccf)	\$ 0.1517		\$ 0.1517				
Extra Strength Surcharge								
19	BOD Charge: (\$/lb)	\$ 0.4306		\$ 0.3908				
20	TSS Charge: (\$/lb)	\$ 0.1545		\$ 0.1603				
21	NH ₃ -N Charge: (\$/lb)	\$ 0.4640		\$ 0.3981				
22	Satellite - Tariff (\$/1,000 gallons)	\$ 2.4852			\$ 3.1109			
23	Fats, Oils, and Grease (Monthly)	\$ 30.00				\$ 30.00		
Wastewater Haulers								
24	Septic and Non-Grease Haulers: (\$/1,000 gal.)	\$ 56.24					\$ 56.24	
25	Grease Haulers: (\$/1,000 gal.)	\$ 422.08					\$ 422.08	

- (a) Non Industrial includes Commercial and Residential Unmetered customers
- (b) Based on prior year total volume of 0 to 450 1,000 gal. (0 to 600 Ccf)
- (c) Based on prior year total volume of 451 to 3,600 1,000 gal. (601 to 4,800 Ccf)
- (d) Based on prior year total volume of 3,601 to 27,000 1,000 gal. (4,801 to 36,000 Ccf)
- (e) Based on prior year total volume over 27,000 1,000 gal. (Over 36,000 Ccf)

ATTACHMENT PNK-3 - Schedule 3
Comparison of Monthly Bills Under Existing Rates With Proposed Rates and Charges
Under Phase 1 Rates and Charges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Line No.	Monthly Volume 1,000 gal	Existing Rates	COS Rates			Proposed Rates Phase 1 Rates		
			Amount \$	Increase \$	Increase %	Amount \$	Increase \$	Increase %
Residential:								
1	0	39.40	66.10	26.70	67.77	46.12	6.72	17.06
2	2	39.40	66.10	26.70	67.77	46.12	6.72	17.06
3	4	46.28	70.74	24.46	52.85	54.18	7.90	17.07
4	8	74.10	89.34	15.24	20.57	86.74	12.64	17.06
5	12	103.90	107.93	4.03	3.88	121.63	17.73	17.06
6	25	200.76	168.35	(32.41)	(16.14)	235.03	34.27	17.07
7	30	238.01	191.60	(46.41)	(19.50)	278.64	40.63	17.07
Multi-Family:								
8	0	39.40	52.15	12.75	32.36	46.12	6.72	17.06
9	10	89.00	98.63	9.63	10.82	104.19	15.19	17.07
10	50	387.03	284.56	(102.47)	(26.48)	453.09	66.06	17.07
11	100	759.56	516.96	(242.60)	(31.94)	889.21	129.65	17.07
Commercial:								
12	0	39.40	66.10	26.70	67.77	46.12	6.72	17.06
13	21	170.96	149.76	(21.20)	(12.40)	200.14	29.18	17.07
14	50	387.03	284.56	(102.47)	(26.48)	453.09	66.06	17.07
15	90	685.05	470.48	(214.57)	(31.32)	801.99	116.94	17.07
16	350	2,622.24	1,679.00	(943.24)	(35.97)	3,069.84	447.60	17.07
17	750	5,602.52	3,538.26	(2,064.26)	(36.85)	6,558.84	956.32	17.07
Self Reporter & Industrial:								
18	0	37.56	67.18	29.62	78.86	40.14	2.58	6.87
19	10	69.12	102.37	33.25	48.10	73.87	4.75	6.87
20	40	232.83	253.17	20.34	8.74	248.81	15.98	6.86
21	100	503.38	554.77	51.39	10.21	537.94	34.56	6.87
22	150	728.84	806.11	77.27	10.60	778.88	50.04	6.87
23	200	954.30	1,057.44	103.14	10.81	1,019.82	65.52	6.87
24	250	1,179.76	1,308.78	129.02	10.94	1,260.76	81.00	6.87
25	301	1,608.15	1,565.14	(43.01)	(2.67)	1,718.58	110.43	6.87
26	401	2,059.07	2,067.81	8.74	0.42	2,200.46	141.39	6.87
27	501	2,509.99	2,570.48	60.49	2.41	2,682.34	172.35	6.87
28	600	2,956.40	3,068.12	111.72	3.78	3,159.40	203.00	6.87
29	750	3,632.78	3,822.13	189.35	5.21	3,882.22	249.44	6.87
30	1,000	4,760.08	5,078.80	318.72	6.70	5,086.92	326.84	6.87
31	1,500	7,014.68	7,592.15	577.47	8.23	7,496.32	481.64	6.87
32	2,000	9,269.28	10,105.50	836.22	9.02	9,905.72	636.44	6.87
33	2,251	11,883.55	11,367.20	(516.35)	(4.35)	12,699.54	815.99	6.87
34	20,000	91,917.34	100,586.10	8,668.76	9.43	98,228.42	6,311.08	6.87

ATTACHMENT PNK -3 -Schedule 4
Wastewater Revenue Under Proposed Phase 1 Rates

Line No.	Description	(1) Proposed Rates	(2) Units	(3) Revenue
Non Industrial				
1	Monthly Base Charge	\$ 21.95 /Month	2,899,732 Bills	\$ 63,649,000
2	Metered Volumes			
3	Non Industrial (First 7,500 gal.)	\$ 8.0577 /Mgal.	12,084,585 Mgal.	\$ 97,373,800
4	Non Industrial (Over 7,500 gal.)	\$ 8.7225 /Mgal.	11,104,734 Mgal.	\$ 96,860,900
5	Subtotal		23,189,319 Mgal.	\$ 194,234,700
6	Total Non Industrial Revenue			\$ 257,883,700
Self Reporter & Industrial				
Monthly Base Charge (Based on Prior Year Average)				
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 25.68 /Month	1,024 Bills	\$ 26,300
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 56.06 /Month	1,356 Bills	\$ 76,000
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 268.12 /Month	1,168 Bills	313,200
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,852.42 /Month	430 Bills	796,200
11	Subtotal		3,977	\$ 1,211,700
12	Self Reporter & Industrial Volume	\$ 4.8188 /Mgal.	4,835,851 Mgal.	23,303,000
13	Subtotal			\$ 23,303,000
14	Subtotal Self Reporter & Industrial			\$ 24,514,700
Extra Strength Surcharge				
15	BOD in Excess of 250 mg/l	\$ 0.3908 /lbs.	28,314,146 lbs.	\$ 11,065,200
16	TSS in Excess of 300 mg/l	\$ 0.1603 /lbs.	14,795,572 lbs.	2,371,700
17	NH ₃ -N in Excess of 20 mg/l	\$ 0.3981 /lbs.	604,634 lbs.	240,700
18	Subtotal			\$ 13,677,600
19	Total Self Reporter and Surcharge Revenue			\$ 38,192,300
20	Fats, Oils, and Grease	\$ 30.00 /Month	45,821 Bills	\$ 1,374,600
Wastewater Haulers				
21	Septic and Non-Grease Haulers	\$ 56.24 /Mgal.	2,714 Mgal.	\$ 152,600
22	Grease Haulers	\$ 422.08 /Mgal.	0 Mgal.	-
23	Total Wastewater Haulers Revenue			\$ 152,600
24	Satellite - Special Contract	\$ 0.9718 /Mgal.	7,249,565 Mgal.	\$ 7,045,100
25	Satellite - Tariff	\$ 3.1109 /Mgal.	276,088 Mgal.	\$ 858,900
26	Total Rate Revenue			\$ 305,507,200
27	Other Operating Revenue			\$ 2,373,100
28	Total Operating Revenue			\$ 307,880,300

ATTACHMENT PNK-3 - Schedule 5
Comparison of Adjusted Cost of Service with Revenues Under Existing and Proposed Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Revenue Under Existing Rates	Phase 1 Adjusted Cost of Service	Revenue Under Cost of Service Rates	Revenue Under Proposed Rates	Cost of Service Revenue as a Percent of COS	Proposed Phase 1 Revenue as a % of COS	Indicated Rev Inc Over Existing Rates
		\$	\$	\$	\$	%	%	%
Wastewater								
1	NON INDUSTRIAL	220,283,400	259,009,000	259,010,300	257,883,700	100.00	99.57	17.07
2	SELF REPORTER & INDUSTRIAL	22,939,500	24,514,900	24,515,700	24,514,700	100.00	100.00	6.87
EXTRA STRENGTH SURCHARGE								
3	BOD	12,192,100	11,063,900	11,065,200	11,065,200	100.01	100.01	(9.24)
4	TSS	2,285,900	2,372,000	2,371,700	2,371,700	99.99	99.99	3.75
5	NH ₃ -N	280,600	240,800	240,700	240,700	99.96	99.96	(14.22)
6	SEPTIC AND NON-GREASE HAULERS	152,600	135,700	135,800	152,600	100.07	112.45	0.00
7	GREASE HAULERS	-	-	-	-	0.00	0.00	0.00
8	FATS, OILS, AND GREASE	1,374,600	266,700	266,700	1,374,600	100.00	515.41	0.00
9	Subtotal	259,508,700	297,603,000	297,606,100	297,603,200	100.00	100.00	14.68
10	SATELLITE - SPECIAL CONTRACT	5,769,900	7,045,100	7,045,100	7,045,100	100.00	100.00	22.10
11	SATELLITE - TARIFF	686,100	858,900	858,900	858,900	100.00	100.00	25.19
12	Total System	265,964,700	305,507,000	305,510,100	305,507,200	100.00	100.00	14.87
13	OTHER OPERATING REVENUE	2,373,100	2,373,100	2,373,100	2,373,100			
14	Total Operating Revenue	268,337,800	307,880,100	307,883,200	307,880,300	100.00	100.00	14.74

ATTACHMENT PNK-3 - Schedule 6
Wastewater Bill Comparison Using Phase 1 Rates

Line No.	Description	(1) Wastewater
1	Revenue Under Existing Rates	\$ 265,964,700
2	Revenue Under Proposed Phase 1 Rates	\$ 305,507,200
3	Percent Increase	14.87%
4	Monthly Residential Bill - Existing Rates - 4 Mgal.	\$ 46.28
5	Monthly Residential Bill - Proposed Phase 1 Rates - 4 Mgal.	\$ 54.18
6	Percent Increase	17.07%
7	Monthly Commercial - Existing Rates - 21 Mgal.	\$ 171
8	Monthly Commercial - Proposed Phase 1 Rates - 21 Mgal.	\$ 200
9	Percent Increase	17.07%
10	Monthly Commercial - Existing Rates - 750 Mgal.	\$ 5,603
11	Monthly Commercial - Proposed Phase 1 Rates - 750 Mgal.	\$ 6,559
12	Percent Increase	17.07%
13	Monthly Self Reporter & Industrial Bill - Existing Rates - 750 Mgal.	\$ 3,633
14	Monthly Self Reporter & Industrial Bill - Proposed Phase 1 Rates - 750 Mgal.	\$ 3,882
15	Percent Increase	6.87%
16	Monthly Self Reporter & Industrial Bill - Existing Rates - 20,000 Mgal.	\$ 91,917
17	Monthly Self Reporter & Industrial Bill - Proposed Phase 1 Rates - 20,000 Mgal.	\$ 98,228
18	Percent Increase	6.87%

Note: Mgal. = thousand gallons

ATTACHMENT PNK-4 - Schedule 1
Total Phase 2 Cost of Service to be Recovered from Wastewater Rates and Charges

Line No.	Description	(1) O&M Expense \$	(2) Capital Costs \$	(3) Total \$
Revenue Requirements				
1	Operating Expense	78,260,500		78,260,500
2	Debt Service Requirements		148,578,100	148,578,100
3	PILOT & Other Taxes (a)	1,733,100	28,323,800	30,056,900
4	Extensions and Replacements		76,000,000	76,000,000
5	Total	<u>79,993,600</u>	<u>252,901,900</u>	<u>332,895,500</u>
Revenue Requirements Met from Other Sources				
6	Other Operating Revenue and Adjustments	(2,373,100)		(2,373,100)
7	Connection Fees		(8,121,100)	(8,121,100)
8	Interest and Other Miscellaneous Income		(2,180,200)	(2,180,200)
9	Total	<u>(2,373,100)</u>	<u>(10,301,300)</u>	<u>(12,674,400)</u>
10	Total Cost of Service to be Recovered From Rates	77,620,500	242,600,600	320,221,100
11	Plus: Other Operating Revenue			<u>2,373,100</u>
12	Total Operating Revenue			<u>322,594,200</u>

Notes

(a) O&M Expense includes cost for Test Year Taxes other than PILOT, Payroll Taxes, and Non-Recurring Expense

ATTACHMENT PNK-4 - Schedule 2
Comparison of Phase 2 Cost of Service with Revenue under Phase 1 Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)
		Phase 2 Allocated Cost of Service	Satellite Contracts Adjustment	Satellite Special Contract Settlement	Phase 2 Allocated Cost of Service	Revenue Under Phase 1 Rates	Indicated Revenue Increase
		\$	\$		\$	\$	%
Wastewater							
1	NON INDUSTRIAL	257,692,000	14,357,300	(1,224,100)	270,825,200	257,883,700	5.02
2	SELF REPORTER & INDUSTRIAL	24,266,800	1,415,500	(136,500)	25,545,800	24,514,700	4.21
3	EXTRA STRENGTH SURCHARGE						
4	BOD	10,809,300	640,700	(81,300)	11,368,700	11,065,200	2.74
5	TSS	2,270,200	167,000	(7,300)	2,429,900	2,371,700	2.45
6	NH ₃ -N	232,100	18,000	(2,900)	247,200	240,700	2.70
7	SEPTIC AND NON-GREASE HAULERS	130,500	9,100	-	139,600	152,600	(8.52)
8	GREASE HAULERS	-	-	-	-	-	-
9	FATS, OILS, AND GREASE	266,800	-	-	266,800	1,374,600	(80.59)
		<u>295,667,700</u>	<u>16,607,600</u>	<u>(1,452,100)</u>	<u>310,823,200</u>	<u>297,603,200</u>	4.44
10	SATELLITE - SPECIAL CONTRACT	23,652,700	(16,607,600)	1,452,100	8,497,200	7,045,100	20.61
11	SATELLITE - TARIFF	900,800	-	-	900,800	858,900	4.88
12	Total	<u>320,221,200</u>	-	-	<u>320,221,200</u>	<u>305,507,200</u>	4.82
13	OTHER OPERATING REVENUE	<u>2,373,100</u>			<u>2,373,100</u>	<u>2,373,100</u>	
14	Total Operating Revenue	<u>322,594,300</u>			<u>322,594,300</u>	<u>307,880,300</u>	4.78

**ATTACHMENT PNK-4 - Schedule 3
Proposed Phase 2 Wastewater Rates**

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	Ref.
		Phase 1 Rates	Non Industrial	Self Reporter & Industrial	Satellite - Tariff	Proposed Fats, Oils, and Grease		
Non Industrial								
1	Monthly Base Charge	\$ 21.95	\$ 22.99					(a)
2	Minimum Charge: (Monthly)	\$ 46.12	\$ 48.30					
Volume Charge: (\$/1,000 gallons)								
3	First 7,500 gal	\$ 8.0577	\$ 8.4382					
4	Over 7,500 gal	\$ 8.7225	\$ 9.1344					
Volume Charge: (\$/Ccf)								
5	First 10 Ccf	\$ 6.0433	\$ 6.3287					
6	Over 10 Ccf	\$ 6.5419	\$ 6.8508					
Self Reporter & Industrial								
Monthly Base Charge (Based on Prior Year Average)								
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 25.68		\$ 26.76				(b)
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 56.06		\$ 58.42				(c)
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 268.12		\$ 279.41				(d)
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,852.42		\$ 1,930.41				(e)
Minimum Charge: (Monthly)								
11	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 40.14		\$ 41.83				
12	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 70.52		\$ 73.49				
13	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 282.58		\$ 294.48				
14	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,866.88		\$ 1,945.48				
15	Volume Charge: (\$/1,000 gallons)	\$ 4.6166		\$ 4.8195				
16	Surveillance Charge (\$/1,000 gallons)	\$ 0.2022		\$ 0.2022				
17	Volume Charge: (\$/Ccf)	\$ 3.4625		\$ 3.6146				
18	Surveillance Charge (\$/Ccf)	\$ 0.1517		\$ 0.1517				
Extra Strength Surcharge								
19	BOD Charge: (\$/lb)	\$ 0.3908		\$ 0.3908				
20	TSS Charge: (\$/lb)	\$ 0.1603		\$ 0.1603				
21	NH ₃ -N Charge: (\$/lb)	\$ 0.3981		\$ 0.3981				
22	Satellite - Tariff	\$ 3.1109			\$ 3.2627			
23	Fats, Oils, and Grease (Monthly)	\$ 30.00				\$ 30.00		
Wastewater Haulers								
24	Septic and Non-Grease Haulers: (\$/1,000 gal.)	\$ 56.24					\$ 56.24	
25	Grease Haulers: (\$/1,000 gal.)	\$ 422.08					\$ 422.08	

- (a) Non Industrial includes Commercial and Residential Unmetered customers
- (b) Based on prior year total volume of 0 to 450 1,000 gal. (0 to 600 Ccf)
- (c) Based on prior year total volume of 451 to 3,600 1,000 gal. (601 to 4,800 Ccf)
- (d) Based on prior year total volume of 3,601 to 27,000 1,000 gal. (4,801 to 36,000 Ccf)
- (e) Based on prior year total volume over 27,000 1,000 gal. (Over 36,000 Ccf)

ATTACHMENT PNK-4 - Schedule 4
Comparison of Monthly Bills Under Existing Rates With Proposed Rates and Charges
Under Phase 2 Rate and Charges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Line No.	Monthly Volume 1,000 gal	Phase 1 Rates	COS Phase 2 Rates			Proposed Phase 2 Rates		
			Amount \$	Increase \$	Increase %	Amount \$	Increase \$	Increase %
Residential:								
1	0	46.12	69.17	23.05	49.98	48.30	2.18	4.73
2	2	46.12	69.17	23.05	49.98	48.30	2.18	4.73
3	4	54.18	74.02	19.84	36.62	56.74	2.56	4.72
4	8	86.74	93.41	6.67	7.69	90.84	4.10	4.73
5	12	121.63	112.81	(8.82)	(7.25)	127.38	5.75	4.73
6	25	235.03	175.84	(59.19)	(25.18)	246.13	11.10	4.72
7	30	278.64	200.09	(78.55)	(28.19)	291.80	13.16	4.72
Multi-Family:								
8	0	46.12	54.62	8.50	18.43	48.30	2.18	4.73
9	10	104.19	103.11	(1.08)	(1.04)	109.11	4.92	4.72
10	50	453.09	297.06	(156.03)	(34.44)	474.49	21.40	4.72
11	100	889.21	539.50	(349.71)	(39.33)	931.21	42.00	4.72
Commercial:								
12	0	46.12	69.17	23.05	49.98	48.30	2.18	4.73
13	21	200.14	156.45	(43.69)	(21.83)	209.59	9.45	4.72
14	50	453.09	297.06	(156.03)	(34.44)	474.49	21.40	4.72
15	90	801.99	491.01	(310.98)	(38.78)	839.86	37.87	4.72
16	350	3,069.84	1,751.71	(1,318.13)	(42.94)	3,214.81	144.97	4.72
17	750	6,558.84	3,691.23	(2,867.61)	(43.72)	6,868.57	309.73	4.72
Self Reporter & Industrial:								
18	0	40.14	70.28	30.14	75.09	41.83	1.69	4.21
19	10	73.87	106.95	33.08	44.78	76.98	3.11	4.21
20	40	248.81	264.08	15.27	6.14	259.29	10.48	4.21
21	100	537.94	578.34	40.40	7.51	560.59	22.65	4.21
22	150	778.88	840.23	61.35	7.88	811.68	32.80	4.21
23	200	1,019.82	1,102.11	82.29	8.07	1,062.76	42.94	4.21
24	250	1,260.76	1,364.00	103.24	8.19	1,313.85	53.09	4.21
25	301	1,718.58	1,631.12	(87.46)	(5.09)	1,790.94	72.36	4.21
26	401	2,200.46	2,154.89	(45.57)	(2.07)	2,293.11	92.65	4.21
27	501	2,682.34	2,678.66	(3.68)	(0.14)	2,795.28	112.94	4.21
28	600	3,159.40	3,197.19	37.79	1.20	3,292.43	133.03	4.21
29	750	3,882.22	3,982.85	100.63	2.59	4,045.69	163.47	4.21
30	1,000	5,086.92	5,292.27	205.35	4.04	5,301.11	214.19	4.21
31	1,500	7,496.32	7,911.12	414.80	5.53	7,811.96	315.64	4.21
32	2,000	9,905.72	10,529.97	624.25	6.30	10,322.81	417.09	4.21
33	2,251	12,699.54	11,844.63	(854.91)	(6.73)	13,234.26	534.72	4.21
34	20,000	98,228.42	104,808.57	6,580.15	6.70	102,364.41	4,135.99	4.21

ATTACHMENT PNK-4 - Schedule 5
Revenue Under Proposed Phase 2 Rates

Line No.	Description	(1) Rates	(2) Units	(3) Revenue
Non Industrial				
1	Monthly Base Charge	\$ 22.99 /Month	2,899,732 Bills	\$ 66,664,700
2	Metered Volumes			
3	Non Industrial (First 7,500 gal.)	\$ 8.4382 /Mgal.	12,084,585 Mgal.	\$ 101,972,000
4	Non Industrial (Over 7,500 gal.)	\$ 9.1344 /Mgal.	11,104,734 Mgal.	101,434,900
5	Subtotal		<u>23,189,319</u>	<u>\$ 203,406,900</u>
6	Total Non Industrial Revenue			\$ 270,071,600
Self Reporter & Industrial				
Monthly Base Charge				
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 26.76 /Month	1,024 Bills	\$ 27,400
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 58.42 /Month	1,356 Bills	\$ 79,200
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 279.41 /Month	1,168 Bills	326,400
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,930.41 /Month	430 Bills	829,700
11	Subtotal		<u>3,977</u>	<u>\$ 1,262,700</u>
12	Self Reporter & Industrial Volume	\$ 5.0217 /Mgal.	4,835,851 Mgal.	24,284,200
13	Subtotal			<u>\$ 24,284,200</u>
14	Subtotal Industrial			\$ 25,546,900
Extra Strength Surcharge				
15	BOD in Excess of 250 mg/l	\$ 0.3908 /lbs.	28,314,146 lbs.	\$ 11,065,200
16	TSS in Excess of 300 mg/l	\$ 0.1603 /lbs.	14,795,572 lbs.	2,371,700
17	NH ₃ -N in Excess of 20 mg/l	\$ 0.3981 /lbs.	604,634 lbs.	240,700
18	Subtotal Industrial Surcharge			<u>\$ 13,677,600</u>
19	Total Industrial Revenue			\$ 39,224,500
20	Fats, Oils, and Grease	\$ 30.00 /Month	45,821 Bills	\$ 1,374,600
Wastewater Haulers				
21	Septic and Non-Grease Haulers	\$ 56.24 /Mgal.	2,714 Mgal.	\$ 152,600
22	Grease Haulers	\$ 422.08 /Mgal.	0 Mgal.	-
23	Total Wastewater Haulers Revenue			<u>\$ 152,600</u>
24	Satellite - Special Contract	\$ 1.1721 /Mgal.	7,249,565 Mgal.	\$ 8,497,200
25	Satellite - Tariff	\$ 3.2627 /Mgal.	276,088 Mgal.	\$ 900,800
26	Total Revenue			\$ 320,221,300
27	Other Operating Revenue			<u>\$ 2,373,100</u>
28	Total Operating Revenue			<u>\$ 322,594,400</u>

ATTACHMENT PNK-4 - Schedule 6

Comparison of Phase 2 Adjusted Cost of Service with Revenues Under Phase 1 and Proposed Phase 2 Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Phase 2 Adjusted Cost of Service	Revenue Under Phase 1 Rates	Revenue Under Phase 2 Cost of Service Rates	Revenue Under Proposed Phase 2 Rates	Cost of Service Revenue as a Percent of COS	Proposed Phase 2 Revenue as a % of COS	Indicated Rev Inc Over Phase 1 Rates
		\$	\$	\$	\$	%	%	%
Wastewater								
1	NON INDUSTRIAL	270,825,200	257,883,700	270,825,600	270,071,600	100.00	99.72	4.73
2	SELF REPORTER & INDUSTRIAL	25,545,800	24,514,700	25,545,800	25,546,900	100.00	100.00	4.21
EXTRA STRENGTH SURCHARGE								
3	BOD	11,368,700	11,065,200	11,368,100	11,065,200	99.99	97.33	0.00
4	TSS	2,429,900	2,371,700	2,429,400	2,371,700	99.98	97.60	0.00
5	NH ₃ -N	247,200	240,700	247,200	240,700	100.00	97.37	0.00
6	SEPTIC AND NON-GREASE HAULERS	139,600	152,600	139,600	152,600	100.00	109.31	0.00
7	GREASE HAULERS	-	-	-	-	0.00	0.00	0.00
8	FATS, OILS, AND GREASE	266,800	1,374,600	266,800	1,374,600	100.00	515.22	0.00
9	Subtotal	310,823,200	297,603,200	310,822,500	310,823,300	100.00	100.00	4.44
10	SATELLITE - SPECIAL CONTRACT	8,497,200	7,045,100	8,497,200	8,497,200	100.00	100.00	20.61
11	SATELLITE - TARIFF	900,800	858,900	900,800	900,800	100.00	100.00	4.88
12	Total System	320,221,200	305,507,200	320,220,500	320,221,300	100.00	100.00	4.82
13	OTHER OPERATING REVENUE	2,373,100	2,373,100	2,373,100	2,373,100			
14	Total Operating Revenue	322,594,300	307,880,300	322,593,600	322,594,400	100.00	100.00	4.78

ATTACHMENT PNK-4 - Schedule 7
Wastewater Bill Comparison Using Phase 2 Rates

		(1)
Line No.	Description	Wastewater
1	Revenue Under Phase 1 Rates	\$ 305,507,200
2	Revenue Under Proposed Phase 2 Rates	\$ 320,221,300
3	Percent Increase	4.82%
4	Monthly Residential Bill - Phase 1 Rates - 4 Mgal.	\$ 54.18
5	Monthly Residential Bill - Proposed Phase 2 Rates - 4 Mgal.	\$ 56.74
6	Percent Increase	4.72%
7	Monthly Commercial - Phase 1 Rates - 21 Mgal.	200
8	Monthly Commercial - Proposed Phase 2 Rates - 21 Mgal.	210
9	Percent Increase	4.72%
10	Monthly Commercial - Phase 1 Rates - 750 Mgal.	6,559
11	Monthly Commercial - Proposed Phase 2 Rates - 750 Mgal.	6,869
12	Percent Increase	4.72%
13	Monthly Self Reporter & Industrial Bill - Phase 1 Rates - 750 Mgal.	\$ 3,882
14	Monthly Self Reporter & Industrial Bill - Proposed Phase 2 Rates - 750 Mgal.	\$ 4,046
15	Percent Increase	4.21%
16	Monthly Self Reporter & Industrial Bill - Phase 1 Rates - 20,000 Mgal.	\$ 98,228
17	Monthly Self Reporter & Industrial Bill - Proposed Phase 2 Rates - 20,000 Mgal.	\$ 102,364
18	Percent Increase	4.21%

ATTACHMENT PNK-5 - Schedule 1
Total Phase 3 Cost of Service to be Recovered from Wastewater Rates and Charges

Line No.	Description	(1) O&M Expense \$	(2) Capital Costs \$	(3) Total \$
Revenue Requirements				
1	Operating Expense	78,336,400		78,336,400
2	Debt Service Requirements		155,210,400	155,210,400
3	PILOT & Other Taxes (a)	1,733,100	28,945,700	30,678,800
4	Extensions and Replacements		80,000,000	80,000,000
5	Total	80,069,500	264,156,100	344,225,600
Revenue Requirements Met from Other Sources				
6	Other Operating Revenue and Adjustments	(2,373,100)		(2,373,100)
7	Connection Fees		(8,121,100)	(8,121,100)
8	Interest and Other Miscellaneous Income		(2,180,200)	(2,180,200)
9	Total	(2,373,100)	(10,301,300)	(12,674,400)
10	Total Cost of Service to be Recovered From Rates	77,696,400	253,854,800	331,551,200
11	Plus: Other Operating Revenue			2,373,100
12	Total Operating Revenue			333,924,300

Notes

(a) O&M Expense includes cost for Test Year Taxes other than PILOT, Payroll Taxes, and Non-Recurring Expense

ATTACHMENT PNK-5 - Schedule 2
Comparison of Phase 3 Cost of Service with Revenue under Phase 2 Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)
		Phase 3 Allocated Cost of Service	Satellite Contracts Adjustment	Satellite Special Contract Settlement	Phase 3 Adjusted Cost of Service	Revenue Under Phase 2 Rates	Indicated Revenue Increase
		\$	\$	\$	\$	\$	%
Wastewater							
1	NON INDUSTRIAL	267,060,600	13,840,800	(1,483,300)	279,418,100	270,071,600	3.46
2	SELF REPORTER & INDUSTRIAL	25,080,500	1,359,800	(165,400)	26,274,900	25,546,900	2.85
3	EXTRA STRENGTH SURCHARGE						
4	BOD	11,036,300	608,400	(98,500)	11,546,200	11,065,200	4.35
5	TSS	2,313,800	158,300	(8,800)	2,463,300	2,371,700	3.86
6	NH ₃ -N	237,100	17,100	(3,500)	250,700	240,700	4.15
7	SEPTIC AND NON-GREASE HAULERS	133,300	8,600	-	141,900	152,600	(7.01)
8	GREASE HAULERS	-	-	-	-	-	-
9	FATS, OILS, AND GREASE	266,800	-	-	266,800	1,374,600	(80.59)
		<u>306,128,400</u>	<u>15,993,000</u>	<u>(1,759,500)</u>	<u>320,361,900</u>	<u>310,823,300</u>	<u>3.07</u>
10	SATELLITE - SPECIAL CONTRACT	24,490,200	(15,993,000)	1,759,500	10,256,700	8,497,200	20.71
11	SATELLITE - TARIFF	932,700	-	-	932,700	900,800	3.54
12	Total	<u>331,551,300</u>	<u>-</u>	<u>-</u>	<u>331,551,300</u>	<u>320,221,300</u>	<u>3.54</u>
13	OTHER OPERATING REVENUE	<u>2,373,100</u>			<u>2,373,100</u>	<u>2,373,100</u>	
14	Total Operating Revenue	<u>333,924,400</u>			<u>333,924,400</u>	<u>322,594,400</u>	<u>3.51</u>

**ATTACHMENT PNK-5 - Schedule 3
Proposed Phase 3 Wastewater Rates**

Line No.	Description	(1)	(2)	(3)	(4)	(5)	(6)	Ref.
		Phase 2 Rates	Non Industrial	Self Reporter & Industrial	Satellite - Tariff	Fats, Oils, and Grease	Wastewater Haulers	
Proposed								
Non Industrial								
1	Monthly Base Charge	\$ 22.99	\$ 23.74					(a)
2	Minimum Charge: (Monthly)	\$ 48.30	\$ 49.88					
Volume Charge: (\$/1,000 gallons)								
3	First 7,500 gal	\$ 8.4382	\$ 8.7135					
4	Over 7,500 gal	\$ 9.1344	\$ 9.4324					
Volume Charge: (\$/Ccf)								
5	First 10 Ccf	\$ 6.3287	\$ 6.5351					
6	Over 10 Ccf	\$ 6.8508	\$ 7.0743					
Self Reporter & Industrial								
Monthly Base Charge (Based on Prior Year Average)								
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 26.76		\$ 27.52				(b)
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 58.42		\$ 60.08				(c)
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 279.41		\$ 287.37				(d)
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,930.41		\$ 1,985.43				(e)
Minimum Charge: (Monthly)								
11	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 41.83		\$ 43.01				
12	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 73.49		\$ 75.57				
13	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 294.48		\$ 302.86				
14	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,945.48		\$ 2,000.92				
15	Volume Charge: (\$/1,000 gallons)	\$ 4.8195		\$ 4.9626				
16	Surveillance Charge (\$/1,000 gallons)	\$ 0.2022		\$ 0.2022				
17	Volume Charge: (\$/Ccf)	\$ 3.6146		\$ 3.7220				
18	Surveillance Charge (\$/Ccf)	\$ 0.1517		\$ 0.1517				
Extra Strength Surcharge								
19	BOD Charge: (\$/lb)	\$ 0.3908		\$ 0.3908				
20	TSS Charge: (\$/lb)	\$ 0.1603		\$ 0.1603				
21	NH ₃ -N Charge: (\$/lb)	\$ 0.3981		\$ 0.3981				
22	Satellite - Tariff	\$ 3.2627			\$ 3.3782			
23	Fats, Oils, and Grease (Monthly)	\$ 30.00				\$ 30.00		
Wastewater Haulers								
24	Septic and Non-Grease Haulers: (\$/1,000 gal.)	\$ 56.24					\$ 56.24	
25	Grease Haulers: (\$/1,000 gal.)	\$ 422.08					\$ 422.08	

- (a) Non Industrial includes Commercial and Residential Unmetered customers
- (b) Based on prior year total volume of 0 to 450 1,000 gal. (0 to 600 Ccf)
- (c) Based on prior year total volume of 451 to 3,600 1,000 gal. (601 to 4,800 Ccf)
- (d) Based on prior year total volume of 3,601 to 27,000 1,000 gal. (4,801 to 36,000 Ccf)
- (e) Based on prior year total volume over 27,000 1,000 gal. (Over 36,000 Ccf)

ATTACHMENT PNK-5 - Schedule 4
Comparison of Monthly Bills Under Existing Rates With Proposed Rates and Charges
Under Phase 3 Rate and Charges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Line No.	Monthly Volume 1,000 gal	Phase 2 Rates	COS Phase 3 Rates			Proposed Phase 3 Rates		
			Amount \$	Increase \$	Increase %	Amount \$	Increase \$	Increase %
Residential:								
1	0	48.30	71.42	23.12	47.87	49.88	1.58	3.27
2	2	48.30	71.42	23.12	47.87	49.88	1.58	3.27
3	4	56.74	76.41	19.67	34.67	58.59	1.85	3.26
4	8	90.84	96.38	5.54	6.10	93.81	2.97	3.27
5	12	127.38	116.34	(11.04)	(8.67)	131.54	4.16	3.27
6	25	246.13	181.23	(64.90)	(26.37)	254.16	8.03	3.26
7	30	291.80	206.19	(85.61)	(29.34)	301.32	9.52	3.26
Multi-Family:								
8	0	48.30	56.44	8.14	16.85	49.88	1.58	3.27
9	10	109.11	106.36	(2.75)	(2.52)	112.67	3.56	3.26
10	50	474.49	306.02	(168.47)	(35.51)	489.97	15.48	3.26
11	100	931.21	555.59	(375.62)	(40.34)	961.59	30.38	3.26
Commercial:								
12	0	48.30	71.42	23.12	47.87	49.88	1.58	3.27
13	21	209.59	161.26	(48.33)	(23.06)	216.43	6.84	3.26
14	50	474.49	306.02	(168.47)	(35.51)	489.97	15.48	3.26
15	90	839.86	505.68	(334.18)	(39.79)	867.26	27.40	3.26
16	350	3,214.81	1,803.46	(1,411.35)	(43.90)	3,319.69	104.88	3.26
17	750	6,868.57	3,800.04	(3,068.53)	(44.67)	7,092.65	224.08	3.26
Self Reporter & Industrial:								
18	0	41.83	72.55	30.72	73.44	43.01	1.18	2.82
19	10	76.98	110.26	33.28	43.23	79.17	2.19	2.84
20	40	259.29	271.87	12.58	4.85	266.67	7.38	2.85
21	100	560.59	595.10	34.51	6.16	576.56	15.97	2.85
22	150	811.68	864.46	52.78	6.50	834.80	23.12	2.85
23	200	1,062.76	1,133.81	71.05	6.69	1,093.04	30.28	2.85
24	250	1,313.85	1,403.17	89.32	6.80	1,351.28	37.43	2.85
25	301	1,790.94	1,677.91	(113.03)	(6.31)	1,841.97	51.03	2.85
26	401	2,293.11	2,216.62	(76.49)	(3.34)	2,358.45	65.34	2.85
27	501	2,795.28	2,755.33	(39.95)	(1.43)	2,874.93	79.65	2.85
28	600	3,292.43	3,288.65	(3.78)	(0.11)	3,386.25	93.82	2.85
29	750	4,045.69	4,096.72	51.03	1.26	4,160.97	115.28	2.85
30	1,000	5,301.11	5,443.49	142.38	2.69	5,452.17	151.06	2.85
31	1,500	7,811.96	8,137.04	325.08	4.16	8,034.57	222.61	2.85
32	2,000	10,322.81	10,830.59	507.78	4.92	10,616.97	294.16	2.85
33	2,251	13,234.26	12,182.75	(1,051.51)	(7.95)	13,611.39	377.13	2.85
34	20,000	102,364.41	107,798.39	5,433.98	5.31	105,281.43	2,917.02	2.85

**ATTACHMENT PNK-5 - Schedule 5
Revenue Under Proposed Phase 3 Rates**

Line No.	Description	(1) Rates	(2) Units	(3) Revenue
Non Industrial				
1	Monthly Base Charge	\$ 23.74 /Month	2,899,732 Bills	\$ 68,839,500
2	Metered Volumes			
3	Non Industrial (First 7,500 gal.)	\$ 8.7135 /Mgal.	12,084,585 Mgal.	\$ 105,298,800
4	Non Industrial (Over 7,500 gal.)	\$ 9.4324 /Mgal.	11,104,734 Mgal.	104,744,100
5	Subtotal		23,189,319	\$ 210,042,900
6	Total Non Industrial Revenue			\$ 278,882,400
Self Reporter & Industrial				
Monthly Base Charge				
7	Self Reporter & Industrial Tier 1 (450 1000 gal.)	\$ 27.52 /Month	1,024 Bills	\$ 28,200
8	Self Reporter & Industrial Tier 2 (3,600 1000 gal.)	\$ 60.08 /Month	1,356 Bills	\$ 81,400
9	Self Reporter & Industrial Tier 3 (27,000 1000 gal.)	\$ 287.37 /Month	1,168 Bills	335,700
10	Self Reporter & Industrial Tier 4 (>27,000 1000 gal.)	\$ 1,985.43 /Month	430 Bills	853,400
11	Subtotal		3,977	\$ 1,298,700
12	Self Reporter & Industrial Volume	\$ 5.1648 /Mgal.	4,835,851 Mgal.	24,976,200
13	Subtotal			\$ 24,976,200
14	Subtotal Industrial			\$ 26,274,900
Extra Strength Surcharge				
15	BOD in Excess of 250 mg/l	\$ 0.3908 /lbs.	28,314,146 lbs.	\$ 11,065,200
16	TSS in Excess of 300 mg/l	\$ 0.1603 /lbs.	14,795,572 lbs.	2,371,700
17	NH ₃ -N in Excess of 20 mg/l	\$ 0.3981 /lbs.	604,634 lbs.	240,700
18	Subtotal Industrial Surcharge			\$ 13,677,600
19	Total Industrial Revenue			\$ 39,952,500
20	Fats, Oils, and Grease	\$ 30.00 /Month	45,821 Bills	\$ 1,374,600
Wastewater Haulers				
21	Septic and Non-Grease Haulers	\$ 56.24 /Mgal.	2,714 Mgal.	\$ 152,600
22	Grease Haulers	\$ 422.08 /Mgal.	0 Mgal.	-
23	Total Wastewater Haulers Revenue			\$ 152,600
24	Satellite - Special Contract	\$ 1.4148 /Mgal.	7,249,565 Mgal.	\$ 10,256,700
25	Satellite - Tariff	\$ 3.3782 /Mgal.	276,088 Mgal.	\$ 932,700
26	Total Revenue			\$ 331,551,500
27	Other Operating Revenue			\$ 2,373,100
28	Total Operating Revenue			\$ 333,924,600

ATTACHMENT PNK-5 - Schedule 6

Comparison of Phase 3 Adjusted Cost of Service with Revenues Under Phase 2 and Proposed Phase 3 Rates

Line No.	Customer Class	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Phase 3 Adjusted Cost of Service	Revenue Under Phase 2 Rates	Revenue Under Phase 3 Cost of Service Rates	Revenue Under Proposed Phase 3 Rates	Cost of Service Revenue as a Percent of COS	Proposed Phase 3 Revenue as a % of COS	Indicated Rev Inc Over Phase 2 Rates
		\$	\$	\$	\$	%	%	%
Wastewater								
1	NON INDUSTRIAL	279,418,100	270,071,600	279,419,700	278,882,400	100.00	99.81	3.26
2	SELF REPORTER & INDUSTRIAL	26,274,900	25,546,900	26,275,400	26,274,900	100.00	100.00	2.85
EXTRA STRENGTH SURCHARGE								
3	BOD	11,546,200	11,065,200	11,546,500	11,065,200	100.00	95.83	0.00
4	TSS	2,463,300	2,371,700	2,463,500	2,371,700	100.01	96.28	0.00
5	NH ₃ -N	250,700	240,700	250,600	240,700	99.96	96.01	0.00
6	SEPTIC AND NON-GREASE HAULERS	141,900	152,600	142,000	152,600	100.07	107.54	0.00
7	GREASE HAULERS	-	-	-	-	0.00	0.00	0.00
8	FATS, OILS, AND GREASE	266,800	1,374,600	266,800	1,374,600	100.00	515.22	0.00
9	Subtotal	320,361,900	310,823,300	320,364,500	320,362,100	100.00	100.00	3.07
10	SATELLITE - SPECIAL CONTRACT	10,256,700	8,497,200	10,256,700	10,256,700	100.00	100.00	20.71
11	SATELLITE - TARIFF	932,700	900,800	932,700	932,700	100.00	100.00	3.54
12	Total System	331,551,300	320,221,300	331,553,900	331,551,500	100.00	100.00	3.54
13	OTHER OPERATING REVENUE	2,373,100	2,373,100	2,373,100	2,373,100			
14	Total Operating Revenue	333,924,400	322,594,400	333,927,000	333,924,600	100.00	100.00	3.51

ATTACHMENT PNK-5 - Schedule 7
Wastewater Bill Comparison Using Phase 3 Rates

Line No.	Description	(1) Wastewater
1	Revenue Under Phase 2 Rates	\$ 320,221,300
2	Revenue Under Proposed Phase 3 Rates	\$ 331,551,500
3	Percent Increase	3.54%
4	Monthly Residential Bill - Phase 2 Rates - 4 Mgal.	\$ 56.74
5	Monthly Residential Bill - Proposed Phase 3 Rates - 4 Mgal.	\$ 58.59
6	Percent Increase	3.26%
7	Monthly Commercial - Phase 2 Rates - 21 Mgal.	210
8	Monthly Commercial - Proposed Phase 3 Rates - 21 Mgal.	216
9	Percent Increase	3.26%
10	Monthly Commercial - Phase 2 Rates - 750 Mgal.	6,869
11	Monthly Commercial - Proposed Phase 3 Rates - 750 Mgal.	7,093
12	Percent Increase	3.26%
13	Monthly Self Reporter & Industrial Bill - Phase 2 Rates - 750 Mgal.	\$ 4,046
14	Monthly Self Reporter Bill & Industrial - Proposed Phase 3 Rates - 750 Mgal.	\$ 4,161
15	Percent Increase	2.85%
16	Monthly Self Reporter & Industrial Bill - Phase 2 Rates - 20,000 Mgal.	\$ 102,364
17	Monthly Self Reporter & Industrial Bill - Proposed Phase 3 Rates - 20,000 Mgal.	\$ 105,281
18	Percent Increase	2.85%

TECHNICAL MEMORANDUM

To: Debi Bardhan and Korlon Kilpatrick
From: Mathew Powis, Prabha Kumar
Subject: I/I and Contributed Volume Capacity Factors
Date: June 21, 2018

The CWA Authority, Inc (“CWA”) requested that Black & Veatch Management Consulting, LLC (“Black & Veatch”) assist them with completing requirements related to the CWA Order in Cause No. 44685 (“CWA Authority, Inc. Rate Order”). The CWA wanted an evaluation of wastewater class capacity factors for contributed volume and wastewater customer class infiltration and inflow (“I/I”) factors.

COST OF SERVICE OVERVIEW

The costs of wastewater service are analyzed by system function in order to properly allocate the costs to various classes of customers. Functional cost components recognized in the Cost of Service (COS) Study include:

- Wastewater volume,
- Capacity or peak rates of flow,
- Wastewater strengths:
 - Biochemical oxygen demand (“BOD”),
 - Total suspended solids (“TSS”),
 - Ammonia-nitrogen (“NH₃”),
 - Fats, oils, and grease (“FOG”), and
- Total number of customers and bills.

Generally, wastewater utility costs are allocated to the function(s) primarily responsible for the level of cost incurred, or, in the case of net plant in service, to the principal component(s) which impact the size (design capacity) or purpose for which the investment was made. The focus of this memo is on functional costs related to volume and capacity.

Volume related costs are those which vary directly with the quantity of wastewater contributed and include capital costs related to investment in system facilities which are sized on the basis of

wastewater volume, O&M expense related to those facilities, and the expense of volume related treatment chemicals and electric power associated with the volume of wastewater treated.

Capacity related costs include capital costs related to investment in system facilities which are sized on the basis of maximum rates of wastewater flow and the operation and maintenance expense related to those facilities. As a simple example, effluent pumping must be designed to accommodate peak rates of flow for a treatment plant. Therefore, the costs or investment for these facilities are allocated to the capacity cost component.

Wastewater collected and treated by the utility is comprised of two elements: (1) contributed sanitary sewer flow and (2) infiltration/inflow (I/I) of ground water and surface water into the sewers. Contributed sanitary sewer volume is that portion of the billable annual water use of each class estimated to enter the sanitary sewer system. The balance of sewer flow processed by the treatment plants is assumed to be I/I. Based on a review of historical plant flows at the Belmont and Southport treatment plants compared with the estimated contributed wastewater volumes, it is estimated that I/I volume accounts for approximately 51% of the total flow to the treatment plants.

Capacity requirements are based on estimated contributed wastewater and I/I rates of flow. As an example, the Wastewater Systems WEF MOP 27: WEF Manual of Practice No. 27 (“WEF Manual”) uses a 150% capacity ratio for contributed flows and a 400% capacity ratio for I/I. For CWA, the contributed peak volumes for each customer class in Table 1, except Satellite, result in a contributed ratio close to that used in the WEF Manual; therefore, a capacity factor of 150% of average day contributed volumes was used for the COS study. As shown in Table 1, a rounded capacity factor of 220% of average day contributed volumes was used for Satellite customers based on contract capacities. As shown in Table 2, the Estimated Peaking Day volume from the Non-Industrial, Self Reporter, Satellite customer classes, and I/I of 400% (from the WEF Manual) results in an Estimated Peak Day that approximates the actual Average Peak Day for 2012, 2013, and 2014. As a result, a capacity factor of 400% was used to estimate the I/I compared to average day I/I. The factors in Table 1 and Table 2 are all based on estimates derived from actual plant data.

Table 1 Contributed Flow Ratios

DESCRIPTION	YEAR	MAX DAY	AVERAGE DAY	RATIO	RATIO USED
Pumping Data (Winter Quarter)	2012-2014	150.7	113.7	1.33	1.50
Total Satellite Contract Capacities	2014	55.8	26.1	2.14	2.20

Table 2 Estimated Peaking Day Volumes

CLASS	VOLUME (MGD) (A)	CAPACITY RATIO	ESTIMATED PEAKING DAY (MGD) (B)
Non-Industrial	55.1	1.5	82.6
Self-Reporter	14.8	1.5	22.1
Satellite	16.9	2.2	37.2
I/I	91.8	4.0	367.3
Total Estimated Peak Day			509.2
Average Peak Day Flow at Plants 2012-2014			474.1

(A) Volume Data for Non-Industrial, Self-Reporter, and Satellite are based on 2014 Billing Data. I/I is based on the difference between Average Plant Flows from 2012-2014 and 2014 Billing Data.

(B) Estimated Peaking Day represents the class portion of peak day flows on the system (Volume X Capacity Ratio) and the Average Peak Day Flow is the average of the Plant Peak Days for 2012, 2013, and 2014.

Contributed and I/I volumes are multiplied by the appropriate capacity factor and divided by the number of days in the year to determine the total units for capacity ((Contributed Volume x Contributed Capacity Factor + I/I Volume x I/I Capacity Factor) / 365 = Capacity Units). The total cost allocated to each functional cost component is then divided by the total applicable units of service. This results in a total unit cost for each of the functional components discussed earlier (volume, capacity, wastewater strengths, and customer). The customer class responsibility for service is obtained by multiplying the total unit costs of service by the number of units for which the customer class is responsible. An example is shown in Table 3 and Table 4 presents the results for all functional costs.

Table 3 Allocation of Net Operation and Maintenance Expenses to Non-Industrial

CLASS	VOLUME	CAPACITY	WASTEWATER STRENGTH				CUSTOMER
			BOD	TSS	NH3	FOG	
Units	Mgal.	Mgal./Day	lbs	lbs	lbs	lbs	Cust./Bills
Total Unit Costs	\$0.20	\$20	\$0.15	\$0.05	\$0.15	\$0.04	\$2.00
Multiply	x	x	x	x	x	x	x
Customer Units	10,000	500	10,000	20,000	5,000	500	2,000
Customer Unit Costs	\$2k	\$10k	\$1.5k	\$1k	\$750	\$20	\$4k

Table 4 Cost of Service by Customer Class

CLASS	PHASE 2: SUBDOCKET SETTLEMENT FILING
Non-Industrial	\$217,938,000
Self-Reporter	\$27,541,500
Extra Strength	
BOD	\$15,846,700
TSS	\$1,378,700
NH3-N	\$404,000
Septic Haulers	\$53,900
Grease Haulers	\$12,400
Commercial FOG	\$431,600
Satellite	\$15,323,000
Total	\$278,929,800

UPDATED CAPACITY FACTORS

As part of completing requirements related to the CWA Order in Cause No. 44685, the CWA requested an updated evaluation of wastewater class capacity factors for contributed volume and wastewater customer class I/I. In conducting the analysis, Black & Veatch evaluated plant data from 2012 through 2016 as shown in Table 5 and Table 6. Based on the analysis, the contributed peak volumes for each class, except Satellite, was calculated based on an estimated capacity factor of 133% of average day contributed volumes. This is a change from the previous analysis, described above, which indicated a capacity factor of 150%. A capacity factor of 320% of average day contributed volumes was calculated for Satellite customers, as compared to 220% in the previous analysis as actual flow data was used in the updated analysis rather than contract capacities. Based on an analysis of peak demands for customers and average peak flow at the treatment plants, the peak demand for I/I was estimated to be 450% of average day I/I, as compared to 400% in the previous analysis.

Table 5 Contributed Flow Ratios

DESCRIPTION	YEAR	MAX DAY	AVERAGE DAY	RATIO	RATIO USED
Pumping Data (Winter Quarter)	2012-2016	150.7	113.2	1.33	1.33
Satellite Flow Data (A)	2014-2016	62.7	19.5	3.21	3.20

(A) The Ratio of 3.21 is based on actual flow data. If the contract capacities were used like Table 1, then the Ratio would be 2.57.

Table 6 Estimated Peaking Day Volumes

CLASS	VOLUME (MGD) (A)	CAPACITY RATIO	ESTIMATED PEAKING DAY (MGD) (B)
Non-Industrial	62.7	1.33	83.5
Self-Reporter	14.6	1.33	19.4
Satellite	16.9	3.20	54.1
I/I	84.4	4.50	379.7
Total Estimated Peak Day			536.6
Average Peak Day Flow at Plants 2015-2016			535

(A) Volume Data for Non-Industrial, Self-Reporter, and Satellite based on 2015 Billing Data. I/I based on the difference between Average Plant Flows from 2012-2016 less 2015 Billing Data.

(B) Estimated Peaking Day represents the class portion of peak day flows on the system (Volume X Capacity Ratio) and the Average Peak Day Flow is the average of the Plant Peak Days for 2015 and 2016.

Table 7 summarizes the impact of the updated analysis on calculated cost of service by customer class. As the capacity factors changed, the amounts shown in the Capacity column for each customer class in Table 3 would change as well. This results in no change to the overall total cost of service; however, Satellite increases by 13.51% and Non-Industrial and Self-Reporter decrease by 0.46% and 3.86%, respectively. The table represents the impact on customer classes if the revised capacity factors had been used in the Subdocket Settlement Filing.

Table 7 Dollar Impact of Capacity Factor Changes to Cost of Service

CLASS	PHASE 2: SUBDOCKET SETTLEMENT FILING	ADJUSTED PHASE 2: SUBDOCKET SETTLEMENT FILING	DIFFERENCE
Non-Industrial	\$217,938,000	\$216,933,400	-0.46%
Self-Reporter	\$27,541,500	\$26,478,700	-3.86%
Extra Strength			
BOD	\$15,846,700	\$15,843,600	-0.02%
TSS	\$1,378,700	\$1,378,500	-0.01%
NH3-N	\$404,000	\$403,900	-0.02%
Septic Haulers	\$53,900	\$53,900	0.00%
Grease Haulers	\$12,400	\$12,400	0.00%
Commercial FOG	\$431,600	\$431,600	0.00%
Satellite	\$15,323,000	\$17,393,800	13.51%
Total	\$278,929,800	\$278,929,800	0.0%



BLACK & VEATCH MANAGEMENT CONSULTING, LLC
8415 ALLISON POINTE BOULEVARD, SUITE 410, INDIANAPOLIS, IN 46236
+1-913-458-1538 | KUMARPN@BV.COM

DRAFT MEMORANDUM

To: Korlon Kilpatrick and Debi Bardhan, CWA Authority, Inc.

From: Mathew Powis, Prabha Kumar

Subject: High Level Infiltration and Inflow Analysis for Cost Allocation Purposes

Date: June 21, 2018

Background

During the past two rate cases for CWA Authority, Inc. (“CWA”), Black & Veatch Management Consulting, LLC (“Black & Veatch”) prepared a cost of service study that followed guidelines outlined in the 2005 edition of the Water Environment Federation’s (“WEF”) Manual of Practice Number 27: Financing and Charges for Wastewater Systems (“WEF MOP 27”). One specific portion of the cost of service study that has been particularly disputed by the CWA Industrial Group intervenor is the allocation of wastewater system Infiltration and Inflow (“I/I”) to various classes of service. I/I occurs in all wastewater systems and it is recognized that there are costs for handling I/I that must be recovered from wastewater system customers. In general, the percentage of system I/I allocated to a certain customer class results in more wastewater system costs to be recovered by that class. WEF MOP 27 provides potential approaches for allocating I/I costs to various customer classes, including:

- Use of customer class contributed volumes
- Use of customer number of connections
- Use of land area
- Use of property valuation (if user charges are based on ad valorem taxes)

WEF MOP 27 states that “the most common approaches have been to use contributed wastewater flow, the number of connections (or customers), or a combination of the two to allocate I/I related costs.” Black & Veatch allocates system I/I to the customer classes using a combination of number of customers/connections and contributed volume, i.e. 67% of I/I is allocated based on a customer class’ number of connections (number of bills is used as a proxy); and 33% of I/I is allocated based on a customer class’ contributed volume. Similar allocation bases have been used by Black & Veatch in other cost of service studies and Black & Veatch feels it is a reasonable approach. Additionally, this is the basis used by WEF MOP 27 in its cost of service examples. Using the Cause No. 44685-S1 Satellite Subdocket Settlement Cost of Service Model, the 67%/33% approach results in the following I/I allocation to the Non-Industrial and Self-Reporter classes.

Table 1 Resulting I/I Allocation Using 67% Customer; 33% Volume Allocation Basis

Class	Infiltration and Inflow (1,000 gal.)	Percentage
Non Industrial	28,825,763	93.60%
Self-Reporter	1,971,460	6.40%
Total Retail	30,797,223	100.00%

As can be seen, the approach used by Black & Veatch results in approximately 6.4% of system I/I being allocated to the Self-Reporter class.

During the Settlement in Cause No. 44685, the CWA Industrial Group argued that the allocation of I/I should be established using 90% Customer; 10% Volume basis. This allocation basis results in following I/I allocated to the Non-Industrial and Self-Reporter classes.

Table 2 Resulting I/I Allocation Using 90% Customer; 10% Contributed Volume Allocation Basis

Class	Infiltration and Inflow (1,000 gal.)	Percentage
Non Industrial	30,168,038	97.96%
Self-Reporter	629,185	2.04%
Total Retail	30,797,223	100.00%

As can be seen, the 90% Customer; 10% Volume allocation basis results in approximately 2.04% of system I/I being allocated to the Self-Reporter class, which is more favorable to that class compared to the Table 1 results. It results in less I/I allocated to the Self-Reporter class and accordingly results in a lower cost of service, with the balance generally being recovered by the Non-Industrial class.

Current I/I Analysis

During the Settlement in Cause No. 44685, the parties agreed to discuss certain cost of service issues, including an analysis of I/I allocations. As the historical disagreements between the parties have been related to the allocation of I/I, Black & Veatch has been requested by CWA to perform a high level analysis to determine whether the 67% Customer; 33% Volume allocation basis is reasonable, or whether it should be adjusted.

To perform the I/I analysis, Black & Veatch looked at providing a calculation that incorporates several elements including length of wastewater system mains; diameter of mains; number of connections; and contributed volume. The calculation and resulting allocation of I/I by customer class can be compared to the percentages in Table 1 and Table 2 above to assess for comparability and reasonableness.

INCH-FEET ANALYSIS

I/I is known to enter the wastewater system in several ways including:

- Customer connections via the lateral sewer connection from the property to the utility's sewer main
- Manholes
- Pipe joints
- Cracks or other deficiencies that allow leaks to occur
- Direct inflow in the combined sewer area

To develop a high level allocation of I/I, Black & Veatch segmented the collection system between small mains (mains that are less than 24-inch diameter) and large mains (mains that are 24-inch and greater in diameter). In general, small mains reflect the portion of the collection system where the vast majority of customers are connected. The small main system is also reflective of the general expanse of the wastewater system. This provides a reasonable basis for determining I/I allocation in these mains on a per customer basis. Large mains reflect conveyance or intercepting sewers which consolidate flows from the smaller sewer mains serving multiple areas of the system for delivery to the wastewater treatment plants. They are designed to handle wastewater contributed volumes, as well as I/I, and have far fewer direct customer connections associated with them. Therefore, contributed volume provides a reasonable basis for determining I/I allocation responsibility related to these large mains.

CWA provided a summary of the lengths of wastewater collection system main by diameter. Black & Veatch multiplied the feet of main by the diameter in inches to derive an inch-feet quantity related to small mains and large mains. The following reflects a summary of the inch-feet quantities by small mains and large mains:

Table 3 Summary of Inch-Feet of Main by Small Main vs. Large Main Categories

Line No.	Collection System Mains	Quantity (Inch-Feet)	Percentage
1	Small Mains (Less Than 24-Inch Diameter)	139,620,386	54.17%
2	Large Mains (24-Inch and Greater Diameter)	118,111,573	45.83%
3	Total	257,731,959	100.00%

CWA provided a summary of the number of connections by diameter of main. For small mains, there are approximately 174 Self-Reporter connections out of a total of 215,131 connections for mains less than 24-inch diameter, or 0.08%. The remaining 214,957 connections are Non-Industrial class-related and reflect a percentage of 99.92%.

For allocating I/I related to large mains, Black & Veatch utilized the pro forma contributed volumes from the cost of service model for the Cause No. 44685 S1 settlement. The Self-Reporter contributed volume is 5,324,473 1,000 gal. out of total retail contributed volume of 28,204,626 1,000 gal., or 18.88%. The remaining 22,880,153 1,000 gal. is the Non-Industrial contributed volume, or 81.12% of total retail contributed volume.

The following Table summarizes the resulting allocation of wastewater system I/I to the retail customer classes.

Table 4 Estimated I/I by Class – Inch-Feet of Collection Main Basis

	(1)	(2)	(3)	(4)	(5)
Line No.	Description	Non-Industrial	Self-Reporter	Total	Reference
1	Small Main Percentage	54.17%	54.17%		
2	Percentage of Connections	99.92%	0.08%		
3	Small Main Weighted %	54.13%	0.04%		Line 1 X Line 2
4	Small Main I/I	16,670,537	12,319	16,682,856	30,797,223 X Line 3
5	Large Main Percentage	45.83%	45.83%		
6	Percentage of Volume	81.12%	18.88%		
7	Large Main Weighted %	37.18%	8.65%		Line 5 X Line 6
8	Large Main I/I	11,450,408	2,663,960	14,114,368	30,797,223 X Line 7
9	Total I/I	28,120,945	2,676,279	30,797,224	Line 4 + Line 8

As the results of Table 4 show, the Self-Reporter I/I estimate of 2,676,279 is approximately 35% higher than the current cost of service basis that uses the 67% Customer; 33% Volume basis. It is approximately 425% higher than the 90% Customer; 10% Volume basis advocated by the CWA Industrial Group.

TOTAL LENGTH ANALYSIS

As an additional analysis, Black & Veatch utilized a breakout of the collection system between small and large mains based on just the total length of the system, i.e., not based on the inch-feet quantity. The purpose of this analysis is to reflect a scenario that assumes that the small mains and associated connections impact the majority of the system I/I. The percentage of system categorized as large mains is much less in this scenario, but is still allocated on a contributed volume basis. The following Table summarizes the length of main by small mains vs. large mains.

Table 5 Summary of Length of Main by Small Main vs. Large Main Categories

Line No.	Collection System Mains	Quantity (Feet)	Percentage
1	Small Mains (Less Than 24-Inch Diameter)	13,406,046	83.72%
2	Large Mains (24-Inch and Greater Diameter)	2,606,570	16.28%
3	Total	16,012,616	100.00%

Similar to the Inch-Feet analysis above, the following Table estimates the amount of I/I applicable to the Non-Industrial and Self-Reporter classes on the basis of the number of connections for small mains, and the class contributed volume for large mains.

Table 6 Estimated I/I by Class – Total Length of Collection Main Basis

	(1)	(2)	(3)	(4)	(5)
Line No.	Description	Non-Industrial	Self-Reporter	Total	Reference
1	Small Main Percentage	83.72%	83.72%		
2	Percentage of Connections	99.92%	0.08%		
3	Small Main Weighted %	83.65%	0.07%		Line 1 X Line 2
4	Small Main I/I	25,761,877	21,558	25,783,435	30,797,223 X Line 3
5	Large Main Percentage	16.28%	16.28%		
6	Percentage of Volume	81.82%	18.88%		
7	Large Main Weighted %	13.21%	3.07%		Line 5 X Line 6
8	Large Main I/I	4,068,313	945,475	5,013,788	30,797,223 X Line 7
9	Total I/I	29,830,190	967,033	30,797,222	Line 4 + Line 8

As the results of Table 6 show, the Self-Reporter I/I estimate of 967,033 is approximately 51% lower than the current cost of service basis that uses the 67% Customer; 33% Volume basis. It is approximately 53% higher than the 90% Customer; 10% Volume basis advocated by the CWA Industrial Group.

LAND USE ANALYSIS

As noted above, one method for allocating I/I to customer classes is based on land use. Black & Veatch utilized data from CWA's Geographical Information System (GIS) to understand the wastewater collection system with respect to land use categories.

Data for CWA-owned mains was reviewed to determine the length of mains by land use category. The diameter of main was also available so Black & Veatch reviewed the inch-feet of main by land use category. The following Table provides a summary of the CWA mains by land use category.

Table 7 Summary of CWA Wastewater Mains by Land Use Category

Line No.	Land Use Category	Length of Main (Feet)	Inch-Feet of Main	% of Length	% of Inch-Feet
1	Agriculture	255,956	7,051,554	1.58%	2.72%
2	Commercial	2,068,549	40,528,774	12.76%	15.62%
3	Exempt	1,632,182	41,394,834	10.07%	15.95%
4	Industrial	717,502	17,135,965	4.43%	6.60%
5	Residential	11,382,806	149,005,300	70.21%	57.42%
6	Utilities	155,904	4,372,840	0.96%	1.69%
7	Total	16,212,899	259,489,267	100.00%	100.00%

As can be seen in the Table above, the Industrial land use category accounts for approximately 4.4% of wastewater system mains by length, and approximately 6.6% of wastewater mains (Inch-Feet basis). Applying these percentages to the total system I/I results in approximately 1,363,000 1,000 gal. and 2,034,000 1,000 gal., respectively.

Acreege by Rate Class

CWA also provided data related to land use acreage summarized by rate code. The data reflects that approximately 2.43% of wastewater system acreage is related to Rate Class 5 and Rate Class 2 customers. These two classes comprise self-reporter and other industrial-type customers.

SYSTEM SIZE DIFFERENTIAL ANALYSIS

Another option for determining the allocation of system I/I between classes is to consider how much larger the collection system is to handle volumes from the Self-Reporter class. The reasoning behind allocating some of the I/I cost based on the contributed volumes from the Self-Reporter class is that their discharges require larger sewers for conveyance, which can result in more I/I entering into the system as those sewers develop defects. Assuming that collection system-size is proportional to the I/I volume (i.e., larger collection systems have more I/I volume), a calculation that determines how much larger the collection system is due to the Self-Reporter class can provide a basis for allocating I/I costs.

The system unit of measure used for this analysis is the inch-diameter*mile (IDM), which is the diameter of the sewer segment in inches multiplied by the length of the sewer in miles. The data provided by CWA for the analysis included the following:

- Collection system data for the entire system
- Parcel data for the CWA service area spatially-related to connected dischargers
- CWA dry weather model simulation results for a typical week (not all manholes and pipes in the collection system have been modeled)
- Average daily discharges for the Self-Reporter customers

The following describes the calculation procedure performed by Black & Veatch:

1. Subtracted out the Self-Reporter parcel areas to determine the typical discharger service area (acres)
2. Divided the typical discharger average daily flow by the typical discharger service area to determine the typical discharger intensity (MGD/acre)
3. Multiplied the Self-Reporter parcel area by the average discharger intensity to determine the Self-Reporter discharge that would be typical for the service area
4. Subtracted the Self-Reporter discharge typical for the service area from the Self-Reporter discharge. This provides the estimate of the flow increase attributable to the self-reporters
5. Located the nearest collection system model manhole to each Self-Reporter parcel to determine where flows in the current system would be lower if Self-Reporter discharges were similar to a typical discharger
6. Using the CWA collection system model results for average daily flows, subtracted out the high flows attributed to the Self-Reporters. This determines the average daily flow results in only average flows (MGD) for typical dischargers
7. Used Manning's equation to calculate the new sewer diameter that would be needed to handle a similar percentage of dry weather capacity (percent dry weather capacity equals the average dry weather flow divided by the sewer capacity)
8. The difference between the current system IDM and the typical discharger system IDM is the difference in system size attributable to the Self-Reporters

There were approximately 249 Self-Reporter parcels located in the parcel dataset, which represented about 58% of the Self-Reporter customer volume. The calculation determined that the collection system is 1,031 IDM larger due to the high Self-Reporter customers. Black & Veatch accounted for the Self-Reporters not located by assuming a proportional increase in system IDM to 1,778 IDM. From the CWA sanitary sewer collection system data, the total collection system size is approximately 48,900 IDM. Therefore, assuming the I/I volume is proportional to the increased collection system size attributed to the Self-Reporters, then

approximately 3.6 % of the I/I volume could be attributed to the high flows of the Self-Reporter class (1,778 IDM divided by 48,900 IDM is 3.6%).

SUMMARY OF CURRENT I/I ANALYSIS

The following Table presents a summary of the high level I/I analysis performed by Black & Veatch. As can be seen, Lines 1 through Line 6 present the estimated Self-Reporter annual I/I using the methods outlined above. Line 7 presents the average of the method results in Lines 1 through 6. Line 8 presents the estimated Self-Reporter I/I using the methods proposed by the CWA Industrial Group and the Black & Veatch in the previous cost of service study, respectively.

As can be seen, the I/I analysis results in equivalent allocation basis ranging from 54.5% Customer; 45.5% Volume to 87.9% Customer; 12.1% Volume. Within this range of results is the allocation basis utilized in previous CWA rate filings of 66.7% Customer; 33.3% Volume. In Black & Veatch's opinion, the allocation bases that utilize an inch-feet basis (Line 1, Line 3, and Line 6) in lieu of length only (Line 2 and Line 4) are generally more reasonable as they better reflect that collection systems are designed to handle both the number of customers and the associated volumes expected from the customers.

The results below reflect that the 66.7% Customer; 33.3% Volume system I/I allocation basis used in the last two CWA rate filings is reasonable. The System Size Differential analysis, which relies on an assessment of Self-Reporter parcels and adjacent system mains, provides an estimate of approximately 80.4% Customer; 19.6% Volume.

Table 8 Summary of High Level I/I Analysis Reflecting Self-Reporter I/I Allocation

Line No.	Method	Self-Reporter I/I Estimate (1,000 gal.)		Equivalent System I/I Allocation Basis
1	Inch-Feet Collection Main Basis	2,676,279		54.5% Customer; 45.5% Volume
2	Length (Feet) Collection Main Basis	967,033		84.1% Customer; 15.9% Volume
3	Land Use Inch-Feet Basis	2,034,000		65.6% Customer; 34.4% Volume
4	Land Use Length (Feet) Basis	1,363,000		77.6% Customer; 22.4% Volume
5	Acreage by Rate Code	748,300		87.9% Customer; 12.1% Volume
6	System Size Differential	1,180,700		80.4% Customer; 19.6% Volume
Summary				
7	Average of Methods (Average Line 1-6)	1,494,885		75.0% Customer; 25.0% Volume
8	Range Cause No. 44685 S1 Model	629,185 ¹	1,971,460 ²	

¹ Reflects Self-Reporter I/I allocation at 90% Customer; 10% Volume basis.

² Reflects Self-Reporter I/I allocation at 67% Customer; 33% Volume basis.

Potential Cost of Service Impact

Lines 1 through 6 in Table 8 above provide the potential I/I allocation percentages applicable to Self-Reporter and Non-Industrial customers. To assess the potential cost of service impact, Black & Veatch applied these percentages to its Case in Chief rate model for Cause No. 44685 for Phase 1 cost of service (excluding adjustments for Satellite class subsidy recovery). The following Table reflects the cost of service for both Non-Industrial and Self-Reporter classes.

Table 9 Estimated Cost of Service Impact of Different I/I Analyses

Line No.	I/I Allocation Basis	Non-Industrial	Self-Reporter
1	54.5% Customer; 45.5% Volume	\$209,341,100	\$31,515,300
2	84.1% Customer; 15.9% Volume	\$219,336,600	\$22,914,600
3	65.6% Customer; 34.4% Volume	\$213,168,300	\$28,211,600
4	77.6% Customer; 22.4% Volume	\$217,198,900	\$24,746,400
5	87.9% Customer; 12.1% Volume	\$220,573,100	\$21,857,100
6	80.4% Customer; 19.6% Volume	\$218,123,600	\$23,953,400
CASE IN CHIEF AT 66.7% CUSTOMER; 33.3% VOLUME			
7	66.7% Customer; 33.3% Volume	\$213,542,300	\$27,889,400

As is shown in Table 9, when the I/I allocation is based in larger part on the number of customers by class, the Self-Reporter class has a lower cost of service when compared to the CWA case in chief result in Line 7. When the I/I allocation is based in larger part on the contributed volume by class, the Self-Reporter class has a higher cost of service when compared to Line 7. If an average of the I/I allocation bases was used of approximately 75% Customer; 25% Volume, the equivalent cost of service for Non-Industrial and Self-Reporter classes would be \$216,333,800 and \$25,488,600, respectively.

Allocation of I/I by Other Wastewater Utilities

With respect to the system I/I allocation basis used for CWA, it is useful to understand the system I/I allocation basis used by other national wastewater utilities. Black & Veatch queried its project managers to derive the following summary of system I/I allocation basis used by other national wastewater utilities.

Table 10 Summary of I/I Allocation Basis Used by Other Utilities

Line No.	Utility / Community	Customer	Volume
1	St. Joseph, MO	60%	40%
2	Kansas City, MO	40%	60%

3	Metropolitan Sewerage District of Greater Cincinnati	75.0%	25.0%
4	Allegheny County Sanitary Authority (ALCOSAN)	66.7%	33.3%
5	Shreveport, LA	66.7%	33.3%
6	Charleston, SC	66.7%	33.3%
7	Columbus, OH	0.0%	100.0%
8	Washington Suburban Sanitary Commission	50.0%	50.0%
9	Philadelphia Water Department	15.0%	85.0%

As can be seen, the I/I allocation basis used by other utilities varies, although many approximate or utilize a basis similar to the 66.7% Customer; 33.3% Volume basis utilized in the CWA cost of service studies. The majority of the above utilities are not regulated by state public utility commissions and establish their I/I allocation basis using consultant recommendations or via their own policy decisions.

Conclusions and Recommendations

The approach utilized in this memorandum provides a reasonable indication of system-wide I/I allocable between the Self-Reporter and Non-Industrial classes. Black & Veatch performed several different analyses to determine an appropriate basis for allocating system I/I to wastewater customer classes. The analyses show that the estimate utilized in CWA's past two rate cases is reasonable for cost of service purposes.

Black & Veatch also researched other utilities to understand the I/I allocation basis used by those utilities. In general, the allocation basis used by other utilities varies, but is generally more in line with the allocation basis of 66.7% Customer; 33.3% Volume used in the CWA rate filings as compared to the 90% Customer; 10% Volume basis proposed by the CWA Industrial Group intervener.

In consideration of the abovementioned analyses, Black & Veatch recommends that for CWA's next rate proceeding, an I/I allocation basis of 75% Customer; 25% Volume be used to allocate system-wide I/I for cost of service purposes.