

2018 Rate Document

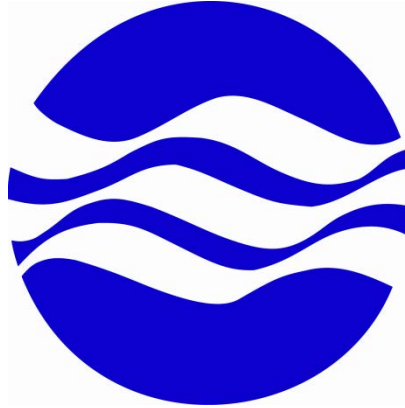


Boston Water and Sewer Commission

BOSTON WATER AND SEWER COMMISSION

Boston, Massachusetts

2018 Rate Document



COMMISSIONERS

Michael J. Woodall, Chair
Muhammad Ali-Salaam
Cathleen Douglas Stone

Henry F. Vitale
Executive Director

Nelson W. Piacenza
CFO and Treasurer

Robert Capogreco
Director of Finance

Prepared by the Finance Division

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I. Executive Summary	
Background.....	1
Mission	3
Commission Organization	3
Water Distribution and Sewer Systems	6
2018 Rates	8
Financial Planning and Year-End Position	10
Rate Setting Methodology	10
2018 Current Expense Budget	11
2018-2020 Capital Improvement Program	12
II. 2018 Rates	
2018 Rates	13
Exhibit A – Water and Sewer Rates	15
Exhibit B – Customer Charges	16
Exhibit C – Special Service Fee Schedule	17
Exhibit D – Special Fire Pipe Service Fees	21
Exhibit E – Late Payment Charges	21
Exhibit F – Discount for Elderly and Fully Disabled	21
Exhibit G – Fine for Failure to Allow Inspection Of Premises.....	22
III. Financial Planning Process	
The Financial Planning Process.....	23
The Goal Setting Process.....	23
CIP Budget Setting Process.....	24
Direct Expense and CEB Development Process.....	24
Rate Setting Process	25
Projected 2017 Year End Position	26
IV. Rate Setting Methodology	
Rate Setting Methodology	29
Exhibit H – Calculation of the Rate Revenue Requirement	34
Water and Sewer Allocation of Costs.....	35
Exhibit I – Revenue Analysis for Water Rates	37
Exhibit J – Revenue Analysis for Sewer Rates.....	38
V. Rate History and Projections	
Background.....	39
BWSC/MWRA Rate History.....	40
Exhibit K – Rate History	42
BWSC/MWRA Rate Projections.....	44
VI. Current Expense Budget	
2018 Current Expense Budget.....	47
Exhibit L – Estimated Revenue from Special Service Fees.....	51
Impact of CEB on Rates	56
VII. Capital Improvement Program	
2018-2020 Capital Improvement Program	57
Impact of CIP on Rates.....	60
VIII. Program Goals and Objectives	
Program Based Budgeting	61

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Background

The Boston Water and Sewer Commission (the “Commission”) was created pursuant to a home rule petition enacted by the Massachusetts Legislature. This legislation is known as the Boston Water and Sewer Reorganization Act of 1977, Chapter 436 of the Acts of 1977 (the “Enabling Act”). The Enabling Act established the Commission as a public instrumentality, a body politic and corporate, and a political subdivision of the Commonwealth, separate and apart from the City of Boston. The Enabling Act transferred the responsibility for the operation and maintenance of the water distribution system (the “Water Distribution System”) and the wastewater collection and stormwater drainage systems (the “Sewer System”), which serve the City of Boston to the Commission. Prior to the Commission assuming this responsibility, retail water and sewer services in Boston were provided by the City of Boston's Department of Public Works (“DPW”).

The Enabling Act empowers the Commission to independently set rates and charges for the water and sewer services that it provides. The Commission is required to establish fees, rates, rents, assessments and other charges at a level and amount at least sufficient to pay the principal, premium and interest on bonds issued by the Commission, to maintain its reserve funds as stipulated by its General Bond Resolution, to provide funds for paying the cost of all necessary repairs, replacements and renewals of the water and sewer systems and to pay any and all other amounts which the Commission, by law or by contract, is obligated to pay. The Commission's rates must comply with all applicable laws and statutes and the rates must be set in a manner to ensure eligibility for any federal and state funding.

Other provisions of the Enabling Act mandate discounts for persons sixty-five years of age or older and for fully disabled persons. None of the fees, rates, rents or other charges established by the Commission is subject to supervision or regulation by any department, division, commission, board, bureau or agency of the Commonwealth or any of its political subdivisions, or by the City of Boston or any of its political subdivisions. In keeping with the Legislative mandates of the Enabling Act, the Commission has established specific policies that set the parameters necessary for decisions of a financial nature. These policies establish guidelines for operation in accordance with the requirements of the Enabling Act.

The Policy for the Development, Monitoring and Amendment of the Current Expense Budget (“CEB”) states that the CEB should provide for the Commission's essential services and current priorities. The Commission uses the CEB development and monitoring process to minimize total costs of operations, consistent with its responsibilities to operate reliable and efficient water and sewer systems, conserve water and protect the natural resources available to the City.

The Enabling Act and the Commission's General Bond Resolution (the “Resolution”) of December 6, 1984 and supplemental resolutions require that the Commission, on an annual basis, develop a three-year Capital Improvement Program (“CIP”). As stated in the Commission's Policy for the Development, Monitoring and Amendment of the Capital Improvement Program, the CIP is a comprehensive plan for the enhancement of basic infrastructure and support facilities necessary to provide water distribution, wastewater collection and storm drainage services throughout the City. The primary goals of the CIP are to protect the public health and the

environment, improve the reliability of water, wastewater and storm drainage systems and minimize the long-term costs of operating these systems.

The largest component of the Water Distribution System CIP is the program to replace water mains. The replacement program replaces aged, undersized or structurally deteriorated pipe. The program also includes rehabilitation of pipe by structural lining.

In 2011, the Commission completed a Water Distribution Study, which provided a thorough understanding of the water system and how to best manage it. The study gave all stakeholders a better sense of the history of Boston's water infrastructure and provided key insights into current conditions. The study has been responsible for the development of best management practices in value maintenance, main flushing and more effective methodology of selecting pipe to be replaced under the Capital improvement Plan. Not only do these tools assist current Commission employees with an understanding of the system, they provide future employees with a roadmap for optimal system maintenance.

The CIP for the Sewer Systems include in-kind replacement and rehabilitation of sewer pipes, installation or replacement of sewers and storm drains that increase the overall capacity of the system, separation of combined sewers, identification and reduction of infiltration and inflow and compliance with permit requirements in the areas of combined sewer overflows and stormwater discharges.

Major sewer system improvements have resulted in increased system capacity and the virtual elimination of dry weather overflows from combined sewers into Boston Harbor and the Neponset, Charles and Mystic Rivers. These improvements have also increased water quality and improved accessibility to all waterways.

The Commission's Policy for the Establishment of Water and Sewer Rates, Fees and Other Charges states that the Commission shall set its rates and charges in accordance with generally accepted accounting principles, generally accepted rate-setting practices of the utility industry and applicable federal and state law. The Commission has established the following rate-setting objectives in addition to the above requirements:

1. Minimize the financial burden on its customers, consistent with the Commission's statutory responsibilities to operate the water and sewer systems in an efficient and financially self-sustaining manner.
2. Ensure that cash receipts and net revenues are at least sufficient to meet the operating costs, fund transfers, debt service coverage ratios and reserve provisions required by the Commission's Resolution and the CEB
3. Design its rates in order to promote the conservation, protection and improvement of water sources.
4. Establish fees, rates and charges that will protect and preserve the natural resources available to the people of the City.

Strict adherence to these and other financial policies has allowed the Commission to reduce operating expenses wherever possible, continue to maintain and improve the water and sewer infrastructure and maintain rates as required by the enabling act.

Mission

The Commission was created to maintain and improve the long-term quality and reliability of water and sewer services for all users in the City and to assure adequate funding for the Systems. The Commission is committed to four primary goals:

- ✓ Maintain and improve the Water Distribution and Wastewater Collection Systems.
- ✓ Establish and administer a billing and collection system that is fair and efficient.
- ✓ Maintain a strong financial structure.
- ✓ Sustain the effectiveness of investments and comply with regulations.

Commission Organization

A three-member Board of Commissioners, appointed by the Mayor of the City, subject to confirmation by the City Council, oversees the Commission's activities. The Board's primary responsibility is to ensure the sound, economical and efficient maintenance of the Systems, and the provision of water and sewer services to the City of Boston. The Board of Commissioners is also responsible for setting clear financial and operational policy directives.

The Commission consists of five divisions: Executive, Operations, Engineering, Administration and Finance.

The Executive Division provides executive management for the entire Commission, which includes policy formation and strategic planning. The Executive Division also represents the Commission in all legislative lobbying efforts pertaining to securing federal and state funded rate relief. This Division is also responsible for implementing and monitoring the Commission's affirmative action plans and ensuring the participation of women and minority owned businesses in obtaining goods and services contracts. Additional responsibilities of the Executive Division include representing the Commission in all litigation, overseeing and directing Safety & Training, and providing its employees with proactive personnel services.

The Operations Division ensures the ongoing maintenance and emergency repairs to the Commission's water and sewer mains, service connections, hydrants and drains. The Division is also responsible for inventory control and management and maintenance of the Commission's automotive fleet for the entire Commission.

On August 23, 2012, the Commission entered in a Consent Decree with the Environmental Protection Agency ("EPA"). Under the terms of the Consent Decree the Commission implemented a Capacity, Maintenance, Operations and Management ("CMOM") self-assessment study in 2012 that analyzed all aspects of the Commission's sanitary sewer and storm drainage facility operations and maintenance. The Commission finalized a CMOM Corrective Action Plan in July 2013 and developed a CMOM Program Document in May 2014. The CMOM Program will synchronize infrastructure maintenance and operations goals with long-term CIP planning to achieve Clean Water Act ("CWA") compliance with the Commission's National Pollutant Discharge Elimination System (NPDES) permit and ultimately improve water quality.

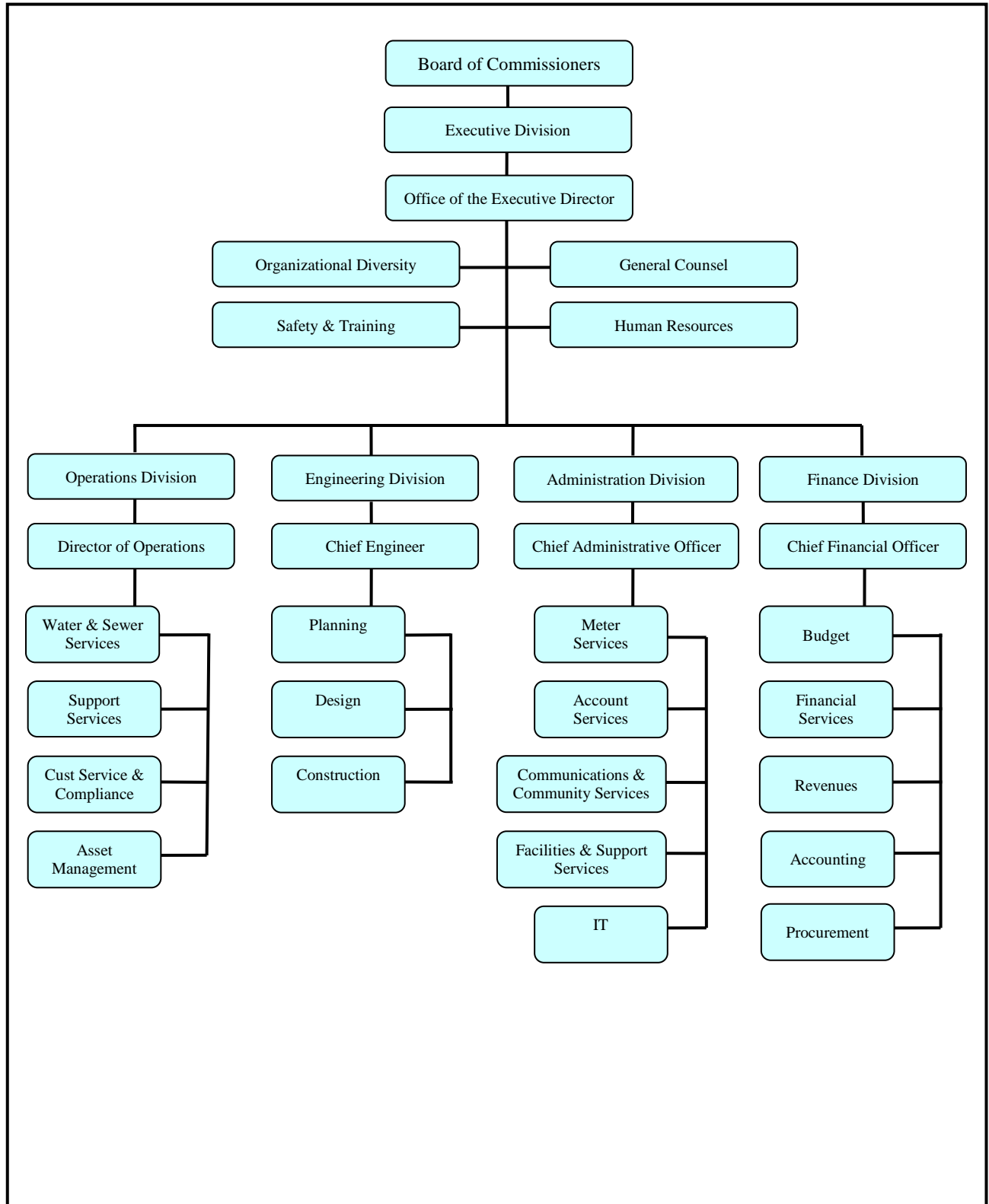
As part of the CMOM Corrective Action Plan filed with the EPA, the Commission must increase its inspection and assessment of its sewer and drainage systems. The program represents progressive increases in the amount of pipes cleaned and televised with an end goal of completing approximately 10% of the system annually.

The Engineering Division ensures the provision of high quality, reliable water and sewer and drainage services. This is done by effectively planning, designing, managing and providing contract compliance for the construction of the Commission's capital projects.

The Administration Division provides support functions for the Commission and its customers with administrative support services. The Division handles the management and maintenance of the Commission's facilities and support services. This Division is also responsible for maintaining collections and customer services. Management of Commission activities as well as reporting to the public information regarding specific activities is also handled by this Division. A major responsibility of this Division is the installation and repair of water meters throughout the City of Boston and is responsible for the preservation of the Commission's technical infrastructure.

The Finance Division is responsible for the establishment of policies to provide maintenance of a strong financial structure designed to provide the lowest possible cost of water, wastewater and storm drainage services, establish a billing methodology that is fair and equitable to all rate payers, advance security for the Commission's bond holders, design and implement an internal control structure intended to provide reasonable security for the safeguard of Commission's assets.

Commission Organization



Water Distribution and Sewer Systems

The Commission's water distribution system serves approximately 90,000 active accounts throughout the City of Boston. Service is provided to the City's schools, hospitals, residential population, businesses, industries and public and private institutions. In addition to the residential population of nearly 646,000 the daytime population of Boston is increased by approximately 375,590 commuting workers, 52,000 shoppers, 44,530 commuting students, 13,940 overnight guests in hotels and homes, 11,600 tourists, 67,480 combined for conventions, trade shows, and sporting events, and 31,830 hospital patients and visitors.

The Commission currently owns and operates a system for the distribution of potable water to customers throughout the City of Boston. The Commission purchases finished water (fluoridated and disinfected) from the MWRA. The MWRA is a wholesale provider of water to 52 communities in the metropolitan Boston area.

Boston's early settlers relied on water from cisterns and underground wells, but the quality was poor and the supply inadequate. The first attempt to provide an alternative came from a private company. In 1796, the Aqueduct Corporation began delivering water from Jamaica Pond through a system of wooden pipes.

In 1848, the City of Boston obtained its first municipal water supply from Lake Cochituate via the Cochituate Aqueducts and the Brookline Reservoir. In order to meet the growing needs of Boston and the necessary system expansion, construction began in 1866 on the Chestnut Hill Reservoir and construction of reservoirs on the Sudbury River to feed the Chestnut Hill Reservoir through the Sudbury Aqueduct soon followed. The Metropolitan Water District was formed in 1895 and by 1908 the Wachusett Dam, Reservoir and Aqueduct were completed.

By the early 1900s, it was apparent that the Boston metropolitan area required additional water supplies and a more comprehensive plan to ensure its delivery. The Metropolitan District Commission ("MDC") Water Supply Division was created in 1926 as a solution to this problem and was responsible for building many MDC facilities, among them Quabbin Reservoir, the Quabbin Aqueduct and the Hultman Aqueduct.

On July 1, 1985, legislation was effected which transferred the possession, control and operation of the MDC Water and Sewerage Divisions to the newly created MWRA. However, the MDC remains responsible for the operation and maintenance of the watershed at the Quabbin and Wachusett Reservoirs, the expenses of which are reimbursed to the MDC by the MWRA.

The Water Distribution System supplies water to the City through five independent water main networks based on pressure needs and geographical location. Approximately 90% of the water consumed in the City is distributed through two of these networks. The Commission's current water distribution system consists of approximately 1,010 miles of pipes with diameters ranging from 4 to 48 inches; 17,526 valves; 12,681 hydrants; and 16 miles of high-pressure fire pipe.

The Commission purchases its water supply from the MWRA through 29 active metered connections located at various delivery points throughout the Water Distribution System. The

MWRA obtains its water supply from the Quabbin and Wachusett Reservoirs, which have a combined capacity of approximately 490 billion gallons. All major watershed areas are located in central Massachusetts. Water is delivered to the metropolitan Boston area from the Quabbin and Wachusett Reservoir systems, located approximately 65 and 35 miles west of Boston through aqueducts to the Loring Road Tanks and Norumbega Reservoirs, and then through MWRA transmission tunnels and pipes into the Commission's five service networks. The Quabbin Reservoir is located at an elevation of approximately 530 feet above the mean elevation of the City. This elevation differential creates a natural gravitational flow through most of the MWRA's Waterworks System. This location insulates the MWRA and consequently the Commission from the cost of energy, which would otherwise be needed to pump the water to the Commission's Water Distribution System.

The Commission owns and operates a system for the collection and transport of wastewater and storm drainage in the City of Boston. The original backbone of the sewer system was the Boston Main Drainage System ("BMDS"). The BMDS was constructed from 1877 to 1884 under the direction of a special committee established by the City of Boston for that specific purpose. The original system consisted of five combined interceptors, the Calf Pasture pumping station and the Dorchester Bay Tunnel (the pumping station and the tunnel is no longer in use). The BMDS interceptors were initially designed to carry a peak dry weather sanitary flow together with an allowance for stormwater. In 1988, construction of the New Boston Main Interceptor and the New East Side Interceptor was completed, replacing portions of the original system.

The Commission's Sewer System collects wastewater and stormwater in the City. The Sewer System consists of approximately 1,539 miles of sewers, including 707 miles of sanitary sewers, 669 miles of storm drains and 165 miles of combined sewers. Sanitary sewers range in size from six-inch clay pipes to 20ft by 15 ½ft reinforced concrete interceptors. The overall sewer system includes 147 regulators and 191 tide-gates. Separate sanitary sewers and storm drains serve approximately 35 square miles, or 83 percent of the City. There are 253 stormwater outfalls. Other facilities include nine pumping stations and two gatehouses.

The Commission's sanitary and combined flows are transported to the MWRA's secondary treatment plant on Deer Island. Flows from the southwestern neighborhoods and part of Brighton were formerly conveyed to the MWRA's Nut Island treatment plant in Quincy. In the summer of 1999, the Nut Island plant was replaced with new head-works, and the new inter-island tunnel was activated to convey flows from Nut Island across Boston Harbor to Deer Island.

2018 Rates

The 2018 Water and Sewer Rate Schedule is presented on page 9. The 2018 Water and Sewer Rate Revenue will be increased by 4.75%.

The water and sewer rate revenue structure adopted for 2018 is in accordance with the Commission's Rate Setting Methodology described on page 10. The average combined water and sewer rate revenue will be \$18.61 per 1,000 gallons. Analysis of the Commission's anticipated expenditures as outlined in the 2017 CEB and revenues from sources other than rates indicates that the current rate structure will generate revenues sufficient to meet the Commission's projected 2018 expenses and all other legal and contractual funding requirements.

The 2018 Special Service Fees, as described on pages 17-22. Please note that the cost of Water & Sewer Pipe Inspections, Water & Sewer Construction (Per Diem), Fire Flow Test, Meter Test and Replacement Cost, Frozen Meters Replacement Cost, and some Hydrant Meter & Parts Replacement Cost have increased while one was decreased. The Special Service Fee Schedule is presented through Exhibits C, D, E, F, G.

Water and Sewer Rates

Implemented January 1, 2018 and effective through December 31, 2018

Consumption (Cu. Ft./Day)	Water Rate		Sewer Rate	
	Per 1,000 Cubic Feet	Per 1,000 Gallons	Per 1,000 Cubic Feet	Per 1,000 Gallons
First 19	\$51.59	\$6.897	\$72.85	\$9.739
Next 20	\$54.01	\$7.220	\$75.09	\$10.039
Next 50	\$56.24	\$7.519	\$76.61	\$10.242
Next 260	\$59.80	\$7.994	\$80.82	\$10.805
Next 950	\$62.39	\$8.341	\$85.29	\$11.402
Over 1299	\$64.57	\$8.633	\$88.23	\$11.795

The average one family customer using 180 gallons per day (“GPD”) in 2018 will be charged \$93.57 per 31-day month or approximately \$1,101.57 annually. A multi-unit residence using 600 GPD will be charged \$323.12 per 31-day month or approximately \$3,803.89 annually. A small commercial property using 4,000 GPD will be charged \$2,343.14 per 31-day month or approximately \$27,587.77 annually. The Water and Sewer charges for various levels of consumption are presented in Exhibit B.

Financial Planning Process and Year End Position

The Commission executes an annual financial planning process. This process adheres to established procedures in completing each phase of the Commission's comprehensive financial plan. These phases (Goal Setting, Capital Improvement Program, Budget Process, Direct Expense and CEB Development and Rate Setting) result in the determination of the level of expenses for which the Commission must allocate financial resources, along with the identification of the sources of funding. The primary source for funding the direct expenses for each fiscal year is customer water and sewer charges.

Rate Setting Methodology

In accordance with legislative and policy mandates, using generally accepted rate setting practices of the utility industry, the Commission follows a specific annual process in developing and setting water and sewer rates. The Commission's Rate Setting Methodology consolidates the following phases: Legislative/Policy Analysis; Water Demand Analysis; Financial Analysis; and the Water and Sewer Rate Calculation. Legislative/Policy Analysis must be performed annually to ensure that the Rate Setting Process is conducted in compliance with all generally accepted accounting principles, generally accepted rate making practices and that it adheres to all existing legal and policy directives mandated by the Enabling Act and the General Bond Resolution. The Water Demand Analysis evaluates factors that may have an impact on consumption levels. Analysis of changes in the composition of the Commission's customer base, the occurrence of extreme weather conditions, economic trends, water conservation efforts and the impact on consumption, if any rate change is performed. The third component of the Rate Setting Methodology is the Financial Analysis phase, which evaluates the past, present and projected financial position of the Commission. This analysis is used as an aid in determining a projection of revenues, adjustments to revenues and expenses for a given year. Completion of this analysis results in the total projected level of expenses for the ensuing year and the determination of the rate revenue requirement for that year. The final phase of this process is Water and Sewer Rate Calculation. The rate revenue requirement is allocated to water and sewer costs to derive a water revenue requirement and a sewer revenue requirement. Rate increases, if required, are determined by dividing the water and sewer rate revenue requirement by the estimated revenue from current water and sewer rates. The estimated percent increases are then applied to current water and sewer rates resulting in the calculation of new water and sewer rates.

Another important factor in the annual Rate Setting Process is the projection of rate increases for the ensuing four-year period. In order to project the level of future rate increases, the Commission must estimate the level of expenditures required to operate and maintain the system, provide basic services and meet all legal and contractual obligations for the following four years. Utilizing the latest MWRA projections of future rate increases and estimating the level of Direct and Indirect Expenses, the Commission is able to project the combined water and sewer rate increase for a given four year period. Utilizing this methodology, the Commission currently projects combined water and sewer rates will increase by the following percentages through 2022.

Projected Water and Sewer Rate Revenue Increase

2019	4.75%
2020	4.75%
2021	4.75%
2022	4.75%

2018 Current Expense Budget

The 2018 CEB outlines \$368.1 million in anticipated revenues and expenses. This represents an increase of \$6.8 million, or 1.9% from the 2017 CEB. The revenue outlined in the 2018 CEB is derived from the following sources: Water and Sewer Rate Revenue (less Adjustments, Discounts and Bad Debt), Prior Year Surplus, Miscellaneous Income and Investment Income.

Water and Sewer Net Rate Revenue, which represents customer water and sewer charges less any adjustments and discounts, is projected to be approximately \$345.9 million, or 93.9% of the total revenues projected for 2018. Miscellaneous Income, which consists of Special Service Fee billings, Late Payment Income, monies from Recognition of Deferred Revenue and Fire Pipe Income constitutes approximately \$18.2 million, or 5.1% of total revenue. Investment Income comprises \$3.4 million, or 0.9% of revenue. Prior Year Surplus makes up approximately \$0.6 million, or 0.1% of the total revenue projected for 2018.

Expenditures are categorized as Direct and Indirect. Direct Expenses are the costs associated with the daily operations of the Commission. Direct expenses in the 2018 CEB are \$71.7 million, an increase of \$2.0 million, or 2.9% from the 2017 CEB. Indirect expenses in the 2018 CEB are budgeted at \$296.4 million, an increase of \$4.7 million, or 1.6% from the 2017 CEB amount of \$291.7 million. MWRA Assessment is the largest line item expense contained in the CEB. The MWRA Assessment is budgeted at \$226.1 million, or 61.4% of total expenses.

Indirect Expenditures include MWRA Assessment, Capital Improvements, Debt Service, Contractual Funding Obligations and SDWA Assessment. The amount budgeted for these line items in FY18 are as follows: MWRA Assessment totals \$226.1 million, Capital Improvements total \$17.2 million, Debt Service totals \$51.0 million, Contractual Funding Obligations total \$1.9 million and SDWA Assessment totals \$0.2 million.

2018-2020 Capital Improvement Program

Under the Enabling Act and the General Bond Resolution, the Commission must annually prepare a three-year CIP. The overall objectives of the Commission's CIP are to ensure the delivery of high quality potable water for consumption and fire protection, the efficient and hygienic collection of sewage for transport to a treatment facility or for approved discharge. In addition, the CIP includes projects to improve the overall efficiency of the Commission and to enhance the Commission's ability to provide services to its customers. Projects included in the CIP are intended to accomplish these objectives in the most efficient and cost effective manner. In general, water and sewer system projects must have a useful life of at least ten years, facility improvements at least seven years and equipment purchases at least five years to be included in the CIP. The 2018-2020 CIP represents a continued commitment by the Commission to ensure the uninterrupted delivery of water and sewer services while working to reduce unnecessary water loss and minimize pollution of Boston Harbor and tributary waters.

The 2018-2020 CIP identifies \$219.1 million in total capital expenditures over the three years of the program. The projects outlined in the 2018-2020 CIP are divided into four categories: Water Distribution System projects total \$97.6 million, or 44.6% of the total; Sewer System projects account for \$96.5 million, or 44.0% of the total program, Support projects total \$18.1 million, or 8.3% of the total; and \$6.9 million or 3.1% is attributable to Stormwater projects.

The CIP has financed most additions to and major rehabilitation necessary for the current sound operation of the Systems. The 2018-2020 CIP is dedicated primarily to system rehabilitation, system sewer separation, and I/I reduction. Funding sources include proceeds from the sale of General Revenue Bonds, which total \$129.3 million, or 59.0% of the funding. Current year Rate Revenue will fund \$58.1 million, or 61.3%, of total expenditures over the three year program. Additional funding sources include financial assistance provided by the MWRA amounting to \$40.2 million.

2018 Rates

Exhibit A on page 15 sets forth the 2018 Water and Sewer Rate Schedule. The rates, which become effective on January 1, 2018, represent a combined 4.75% increase in rate revenue. The average combined water and sewer rate for 2018 will be \$18.61 per 1,000 gallons. The average water rate will be \$7.84 per 1,000 gallons and the average sewer rate will be \$10.77 per 1,000 gallons. The average one-family customer using 180 gallons of water per day in 2018 will be charged approximately \$93.57 per 31-day month or approximately \$1,101.57 annually.

In 2005, the Commission completed a rate structure study in which it was determined that the rate structure should be reduced to six blocks. The consumption ranges in the six block structure reflect more accurately the current usage patterns of residential, commercial and industrial customers. The smaller number of blocks still provides an economic incentive for water conservation. At the same time, the reduction in blocks makes billing calculations easier to understand. Generally, utilities that use an inclining block rate structure use three to four blocks, and no MWRA community besides Boston uses more than five blocks. The Commission will continue the utilization of the six-tiered inclining block rate structure, which was implemented in 2006.

In addition to the water and sewer rates outlined in Exhibit A, the rate structure allows the Commission to recover the cost of special services that are provided to specific users. In accordance with generally accepted rate making practices, the Commission recovers from individual users of special services, the full cost of providing these services, without burden to the general ratepayer. This is accomplished through the Commission's Special Service Fees. Exhibit C contains a list of the Special Service Fees for 2018. Specific information regarding Special Service Fees, Fire Pipe Service Fees, Late Payment Charges and Discounts is detailed below.

- Examples of Special Services include Water and Sewer Lien Certificates, Cross Connection Inspections and Special Meter Tests. Water and Sewer Lien Certificates are necessary for the transfer of ownership of property. Cross Connection Inspections are mandated by the Department of Environmental Protection ("DEP") for the protection of the potable water supply against backflow of contaminants. Special Meter Tests are provided to customers for the purpose of verifying the accuracy of their water meter. The Commission forecasts the level of revenue generated by Special Service Fee billings in 2018 at \$7.7 million. The Special Service Fee Schedule is set forth in Exhibit C.
- The Commission also provides water service for fire pipe connections and charge customers separately for this service. The Fire Pipe Fees for four or smaller, six and eight or larger inch will not change. Fire pipe connections service internal sprinkler systems and standpipes that are utilized for fire protection in buildings. The Special Fire Pipe Service Fees are outlined in Exhibit D.

The Commission has approximately 7,912 fire pipe connections in the City. Generally accepted rate making practices recommend the imposition of special fire service fees for private fire protection. The American Water Works Association states that:

"The cost of providing private fire-protection service to individual properties represents a service not directly benefiting the general customer population of the utility. Such a service provides a measurable benefit that can reasonably be charged for through a system of rates and charges to those customers receiving private fire-protection service." ¹

The installation of a private fire-protection system has value to property owners and tenants. The private fire protection system reduces the risk of personal injury and property damage, enhances fire-fighting capabilities and reduces fire insurance premiums. Fire pipe revenue in 2018 is forecast at \$4.7 million.

- The Commission will continue to assess a Late Payment Charge for delinquent amounts outstanding. The purpose of the Late Payment Charge is to encourage the prompt payment of water and sewer bills by all customers and to avoid any subsidization to slow paying customers from timely paying customers. This charge is equal to 0.03836% per day, or 14% annually, and is applied to amounts outstanding greater than 45 days from the original bill date. The preceding information is also shown in Exhibit E. Late payment charges are forecast at \$1.4 million for 2018.
- As required by the Enabling Act, the Commission will continue to offer a discount to qualified elderly and disabled customers. The level of the Elderly and Disabled Discount is 30% on the water portion of the bill, and is offered to elderly/fully disabled resident homeowners of one to four family dwellings. Exhibit F on page 21 outlines the Elderly and Disabled Discount Program.

¹ American Water Works Association, Manual M26, "Water Rates and Related Charges," 1986, p. 7.

Exhibit A
Water and Sewer Rates

Implemented January 1, 2018 and effective through December 31, 2018

Consumption (Cu. Ft./Day)	Water Rate		Sewer Rate	
	Per 1,000 Cubic Feet	Per 1,000 Gallons	Per 1,000 Cubic Feet	Per 1,000 Gallons
First 19	\$51.59	\$6.897	\$72.85	\$9.739
Next 20	\$54.01	\$7.220	\$75.09	\$10.039
Next 50	\$56.24	\$7.519	\$76.61	\$10.242
Next 260	\$59.80	\$7.994	\$80.82	\$10.805
Next 950	\$62.39	\$8.341	\$85.29	\$11.402
Over 1299	\$64.57	\$8.633	\$88.23	\$11.795

Exhibit B
Customer Class Charges at Varying Consumption Rates
Per 31 Day Period
Implemented January 1, 2018 and effective through December 31, 2018

Customer Class	Gallons Day (1)	Rate Block (2)	Water Rate	Sewer Rate	Combined (3)
1 Family	75	1	\$16	\$23	\$39
1 Family	180	2	\$39	\$55	\$94
1 Family	220	2	\$48	\$67	\$115
2 Family	300	3	\$66	\$92	\$158
3 Family	400	3	\$89	\$124	\$213
4 Family	500	3	\$112	\$156	\$268
6 Family	600	3	\$136	\$187	\$323
Condo - 12 Units	1,500	4	\$358	\$488	\$846
Small Commercial	4,000	5	\$992	\$1,351	\$2,343
Apartment - 20 Units	5,000	5	\$1,251	\$1,704	\$2,955
Commercial	7,500	6	\$1,897	\$2,588	\$4,485
Medium Government Building	10,000	6	\$2,546	\$3,475	\$6,021
Small Industrial	15,000	6	\$3,884	\$5,303	\$9,188
Apartment - 200+ Units	22,000	6	\$5,757	\$7,863	\$13,620
Medium Office Building	35,000	6	\$9,236	\$12,617	\$21,853
Laundry	45,000	6	\$11,912	\$16,273	\$28,185
Medical Building	80,000	6	\$21,279	\$29,071	\$50,350
Large Store	100,000	6	\$26,631	\$36,384	\$63,015
Large Office Building	150,000	6	\$40,011	\$54,667	\$94,678
Large Institute	225,000	6	\$60,081	\$82,092	\$142,173

(1) 1 Gallon = 0.13369 Cubic Feet

(2) Represents the final rate block into which daily consumption falls

(3) Combined Column may not add up due to rounding

Exhibit C Special Service Fee Schedule

Implemented January 1, 2018 and effective through December 31, 2018

<u>Type</u>	<u>Fee</u>
Water and Sewer Lien Certificate (1)	\$150.00 Maximum
Return Payment Processing Fee	\$15.00
Cross Connection Inspection Fee (2)	\$110.00
Administrative Processing Fee (2a)	\$65.00
Installation Application Fee	Size of pipe
5/8"	Cost Basis
1"	Cost Basis
1- 1/2"	Cost Basis
Excavation	Cost Basis (\$900.00 deposit)
Fire Pipe Excavation	Cost Basis (\$2,500.00 deposit)
Water Pipe Inspection: (3)	
Monday - Saturday, regular hours	\$259.00 per connect or disconnect
Monday – Saturday, overtime rate	\$306.00 per connect or disconnect
Sunday and Holidays	\$353.00 per connect or disconnect
Sewer Pipe Inspection: (3)	
Monday - Saturday, regular hours	\$259.00 per connect or disconnect
Monday - Saturday, overtime rate	\$306.00 per connect or disconnect
Sunday and Holidays	\$353.00 per connect or disconnect
Water and Sewer Construction:	
Multi-day Inspection (4)	\$752.00 per diem
Multi-day Inspection (4), overtime rate	\$890.00 per diem
Multi-day Inspection (4), Sunday & Holiday	\$1,027.00 per diem
Water Turn-off (5)	\$40.00
Water Turn-on (6)	\$40.00
Termination Notice Fee (7)	\$80.00
Fire Flow Test	\$442.00
Temporary Connection (Hydrant Permit) (8)	\$50.00 per 90-day period or fraction thereof, plus water usage (\$750.00 deposit)
Street Sweeper Hydrant Permit	\$1,575.00 Annually
Special Meter Test (9)	Cost Basis
Drain Layer's License: New	\$50.00
Renewal	\$15.00
Construction Plans and Drawings (10)	\$6.00
Frozen Meter Replacement (11)	Cost Basis
Water Meter 3 Inches and Larger Installed	Cost Basis
Sewer Abatement Meter Installed	Cost Basis
Meter Transmission Unit Installed (MTU)	Cost Basis
Off Hour Meter Service	Cost Basis
Leak Up To Owner (LUTO) and Lead Pipe Replacement (12)	Cost Basis
General Service Application (13)	Deposit Required (\$500.00 - \$5,000.00)
Grease Trap Permit Fee	\$200.00 annually
Hydrants (14)	Cost Basis
Industrial Stormwater Inspection Fee (15)	Cost Basis
Creation of As-built Plans (16)	\$200.00

Special Service Fee Schedule (continued)

Implemented January 1, 2018 and effective through December 31, 2018

- (1) *In accordance with M.G.L. Chapter 60, Section 23B:*
"...for land of less than one acre upon which there is no permanent structure, a fee of twenty-five dollars; for land upon which is situated no more than a single family residence and outbuildings, a fee of twenty-five dollars; for land upon which is situated no more than a two family residence and outbuildings, a fee of twenty-five dollars; for land upon which is situated no more than a three family residence with outbuildings, a fee of twenty-five dollars; for land upon which is situated a residence for four or more families, a fee of one hundred dollars; for land upon which is situated a commercial, industrial or public utility structure, a fee of one hundred and fifty dollars; for farms, forest land and all other real property, a fee of fifty dollars. In no case shall the fee exceed one half of one percent of the assessed value of the real estate...."
- (2) Annual inspection is required for all double-check valve assembly type backflow prevention devices. All other types require semi-annual inspection.
- (2a) Fee charged when property owner performs inspection but Commission processes the paperwork.
- (3) For inspections that take place during regular work hours, will be charged \$259.00, inspections done outside regularly scheduled work hours (overtime), will be charged \$306.00, inspections that are done on Sundays or holidays, will be charged \$353.00 per connection or disconnection.
- (4) Assessed daily while providing water and sewer inspection services on construction projects of one or more day's duration.
- (5) Not applicable if account was terminated for non-payment of charges (included in Termination Notice Fee).
- (6) Applicable to any account requesting water turn-on services.
- (7) Charge for mailing and posting final termination notice and demand for payment pursuant to the Billing, Termination and Appeal Regulations of the Commission.
- (8) The Commission currently requires a \$750.00 deposit for hydrant meters issued to private contractors. The deposits are refundable upon return of hydrants less any usage fees or charges for damage to the meter. On occasion, a hydrant meter is not returned to the Commission because it has been lost, stolen or misplaced. Other times a hydrant meter may be returned with a broken, damaged or frozen insert that causes it to under-register or not register water consumption at all. In both these instances, the Commission is unable to calculate the amount of water used. A standard \$400.00 water usage fee will be applied in these circumstances.

Special Service Fee Schedule (continued)

Implemented January 1, 2018 and effective through December 31, 2018

<u>Hydrant Meter & Parts</u>	<u>Replacement Cost</u>
Check Valve	\$100.00
Hose Cap Reducer 2 1/2x3/4	\$100.00
Hose Nipple	\$150.00
Hydrant Cap	\$240.00
Hydrant Meter	\$1,000.00
Hydrant Wrench	\$100.00
Meter Insert	\$400.00

- (9) No charge if meter is over-registering based on American Water Works Association standards, or if Commission ordered test. Breakdown of the meter test fee listed below.

<i>Size of Meter</i>	<i>Test Fee</i>
5/8-inch	\$280.00
1-inch	\$346.00
1 ½ -inch	\$510.00
2-inch	\$625.00
3-inch or larger	Cost plus Materials

- (10) Maps, drawings and prints may be obtained from the Commission on request. Public agencies and Commission consultants and contractors (on bid projects only) receive maps at no charge. The cost per map is detailed below:

<i>Type</i>	<i>Cost</i>
Base Maps	
Prints	\$6.00/sheet
Paper Sepias	\$6.00/sheet
Mylar Sepias*	\$50.00/set plus printer's charge
Wash off Mylars*	\$50.00/set plus printer's charge
Water and Sewer Maps	
Prints	\$6.00/sheet
Paper Sepias	\$6.00/sheet
Mylar Sepias	Not Available
Wash off Mylars	Not Available

*Sold to government agencies only

Special Service Fee Schedule (continued)

Implemented January 1, 2018 and effective through December 31, 2018

<i>Item</i>	<i>Description</i>	<i>Citywide Area</i>	<i>By Tile Area</i>
Digital Images:	Orthophotographs 1 foot resolution: (Mr. SID)	\$300.00	Not Available
	100' scale .PDFs of Water and Sewer Facilities	\$250.00	\$6.00/map tile
Data Layers:	Personal Geodatabase	\$150.00 Each Layer	\$20.00
	AutoCAD DXF format: Water	\$250.00	\$5.00
	AutoCAD DXF format: Sewer	\$250.00	\$5.00
	AutoCAD DXF format: Landbase	\$250.00	\$5.00

- (11) For replacement of frozen meters.

<i>Size of Meter</i>	<i>Replacement Fee</i>
5/8-inch	\$231.00
1-inch	\$300.00
1 ½ -inch	\$461.00
2-inch	\$575.00
3-inch or larger	Cost plus Materials

- (12) Leak up to Owner (LUTO) & Lead Pipe Replacement associated for services on annual contract bid.
- (13) In addition to the inspection fees, a deposit based on the size of the water service or Fire-pipe connection must accompany the GSA submission. Upon receipt of the appropriate deposit, the Commission will establish a water and sewer account and assign an account number to the property.

The following deposits shall be required:

Water and Sewer Applications:

Service Sizes:

Less than 1 inch
 1 inch but less than 3 inch
 3 inch or greater

Deposit

initial \$500.00 and \$100.00 each additional tap
 initial \$1,000.00 and \$500.00 each additional tap
 initial \$5,000.00 and \$1,500.00 each additional tap

Sewer and/or Drain Application:

All Service Sizes:

Deposit

\$1,000.00

- (14) The Commission requires that hydrants used for private fire protection be purchased from the Commission at cost.

- (15) Industrial stormwater inspections are scheduled to be conducted bi-annually. The inspections are required by the Environmental Protection Agency (EPA) for the prevention of pollution to rivers, lakes, streams and oceans. This is an Industrial Facility Stormwater Pollution Program Inspection Fee Schedule:

<i>Industrial Facility Type</i>	<i>Initial Inspection</i>	<i>Bi Annual Inspection</i>	<i>Certificate of No Exposure Inspection</i>
Major Industry 1 acre or greater	\$260.00	\$225.00	\$115.00
Minor Industry/Business Less than an acre	\$150.00	\$150.00	\$75.00

- (16) The Commission requires an as-built plan for each approved site plan. The as-built plans are to be submitted by the owner for all projects deemed complex by the Commission. All other as-built plans will be created by the Commission for a fee of \$200.00 per site. The Commission will determine which site plans will require an as-built plan submitted by the owner or an as-built plan to be created by the Commission for \$200.00.

Exhibit D

Special Fire Pipe Service Fees (Internal Sprinklers and Standpipes)

Implemented January 1, 2018 and effective through December 31, 2018

<i>Size of Pipe</i>	<i>Daily Charge</i>
4-inch or smaller	\$0.91
6-inch	\$2.07
8-inch or larger	\$3.68

Exhibit E

Late Payment Charges

Implemented January 1, 2018 and effective through December 31, 2018

A Late Payment Charge of 0.03836% per day (14% per annum) compounded with each billing on all amounts past due (greater than 45 days from the billing date).

Exhibit F

Discount for Elderly and Fully Disabled

Implemented January 1, 2018 and effective through December 31, 2018

A 30% discount on all water charges billed. This discount is applicable only to qualified, owner-occupied residential structures with one to four dwelling units.

Exhibit G

Fine for Failure to Allow Inspection of Premises

Implemented January 1, 2018 and effective through December 31, 2018

A fine will be charged to customers who refuse to allow Commission personnel permission to enter the premises to make inspections regarding the water or sewer system. Such inspections could be to resolve questions about meters, leaks up to owner, or cracked or broken sewer or drain laterals. The fee, which will be a 10% surcharge of the average daily use of the property, would apply only to properties to which the Commission is prohibited from terminating service, such as hospitals or nursing homes.

The Financial Planning Process

The Commission executes an annual financial planning process. This process adheres to established procedures in completing each phase of the Commission's comprehensive financial plan. These phases (Goal Setting, the CIP Budget Process, Direct Expense and CEB Development and Rate Setting) result in the determination of the level of expenses the Commission must allocate financial resources, along with the identification of the sources of funding. The primary source for funding the direct expenses for each fiscal year is customer water and sewer charges.

The Goal Setting Process

The Goal Setting Process commences in June each year. Over the past several years, the Commission has made considerable strides in reducing overall operating costs as well as dramatically improving the delivery of quality water and sewer services to its ratepayers. These accomplishments are the result of the Commission's ability to effectively utilize limited resources to maintain and improve the essential programs and activities of the Commission. The Commission meets the challenge of internal cost control and reduction through the Goal Setting Process. The annual Goal Setting Process promotes planning, provides performance criteria and encourages communication and coordination. The Goal Setting Process compels managers to anticipate future challenges, to be prepared to adapt to changing conditions, to determine weaknesses in their organizational structure and to identify courses of action to strengthen areas requiring improvement. Each program is expected to outline goals, which upon successful completion will reduce costs, gain operating efficiencies and ultimately increase the level of service to customers.

Division Chiefs and Department Managers submit preliminary goals and objectives to the Budgeting and Financial Planning Department staff ("Budget staff") for review. The goals are categorized as Monthly Management Report Goals, Goals included in the Commission-wide Report Status Update, Tactical Goals and Strategic Goals. Monthly Management Report Goals are those that carry out the core duties and responsibilities of an operating unit within the Commission for delivery of basic water and sewer services. Goals included in the Commission-wide Report Status Update are reports submitted by staff for internal distribution or as required by law or permit to be completed and submitted to any external agency. Tactical Goals are one-time improvements and/or enhancements to a technical or service-oriented process. Strategic Goals outline the long-range plans and direction of each division and department at the Commission. In each case, the Division Chiefs and Department Managers must declare goals and objectives which meet at least one of the following criteria: cost control, revenue enhancement, service improvement or environmental protection. After review by Budget staff, goals are forwarded to the Chief Financial Officer ("CFO") for review and comment. The final goals for the ensuing year are then reviewed and approved by the Executive Director.

The Capital Improvement Program Budget Setting Process

Under the Enabling Act and the General Bond Resolution, the Commission must annually prepare a three-year CIP. The CIP process, which also begins in June each year, outlines the improvements necessary to maintain and enhance the infrastructure. The overall objectives of the CIP are to ensure the adequate delivery of high quality potable water for consumption and fire protection and the efficient and environmentally sound collection of wastewater for transport and delivery to a treatment facility or for approved discharge. The projects included in the CIP are divided into three categories: water distribution system projects, sewer system projects and support projects. Commission staffs establish a time line for the design and construction phases of each project along with cash flow requirements based on engineering information and a priority ranking system. As a part of the CIP development process, the Commission solicits input from private and public entities regarding planned capital projects and any potential impact on the Commission's systems and/or CIP. Project information is then submitted to Budget staff for review and compilation into the annual CIP. The CIP is then forwarded to the CFO for review and comment, after which it is forwarded to the Executive Director for review and approval.

In accordance with the Enabling Act, the CIP must be delivered to the Mayor of the City of Boston on or before November 1. Prior to adoption of the CIP, the Enabling Act requires that the Commission hold a public hearing on its CIP for the purpose of allowing interested parties the opportunity to review and comment. After the public hearing, the Commission maintains a fifteen-day open comment period for the public to present views or arguments on the CIP. The Commission responds to these public comments and the final CIP is presented to the Board of Commissioners for adoption in December each year.

Direct Expense and Current Expense Budget Development Process

The process for the Direct Expense Budget and CEB Development begins in July. Initially, Division Chiefs and Department Managers submit requests for the funding necessary to fulfill the duties, responsibilities and new goals for the following fiscal year. Budget staff evaluates the requests in light of the current level of spending, historical spending patterns, availability of resources and the tactical and strategic goals declared by each department. Based on this analysis, Budget staff determines a recommended level of funding. This recommendation is then submitted to the CFO and Executive Director for review and modification before finalizing the Direct Expense Budget.

The Commission then determines the total level of expenditures, which will be required to operate and maintain the systems, provide basic services and fulfill all financial obligations for the next fiscal year. Staff considers all financial obligations such as the wholesale costs of water and sewer services paid to the MWRA ("MWRA Assessment"), the Direct Expenses as determined above, rate revenue funded costs of renewal and replacement of the water and sewer systems as included in the CIP, the Safe Drinking Water Act ("SDWA") Assessment, total debt service expense on outstanding general revenue bonds ("Debt Service") and required deposits to

various reserve funds which are stipulated by the General Bond Resolution (“Contractual Funding Obligations”). Once the level of these expenses is determined, the Commission must calculate the level of revenue required to meet these expenses and to meet the debt service coverage test that is covenanted in the Resolution.

The Rate Setting Process

The Rate Setting Process completes the final phase of the annual financial planning process by evaluating all the financial obligations of the Commission and determining the rate revenue requirement for the ensuing fiscal year. In accordance with legislative and policy mandates, the Commission adheres to an annual process in developing and setting the level of water and sewer rates for a given year.

The Commission's Rate Setting Methodology incorporates the following four phases: Legislative/Policy Analysis; Water Demand Analysis; Financial Analysis and the Water and Sewer Rate Calculation. The result of this phase is the total projected level of expenses for the ensuing year, which is used to determine the rate revenue requirement for that year. In the rate calculation segment of this phase, the rate revenue requirement is allocated between water and sewer costs to derive a water revenue requirement and a sewer revenue requirement. The percent change in rates is determined by dividing the water and sewer rate revenue requirement by the estimated revenue from current water and sewer rates. The estimated percent changes are then applied to current water and sewer rates resulting in the calculation of new water and sewer rates.

Projected 2017 Year End Position

The 2017 CEB identified \$361.3 million in total expenses, matched by an equal amount of revenue. During 2016, the Commission experienced variances from the budgeted level of revenues and expenditures.

Table 1, below, outlines the 2017 budgeted levels and the projected 2017 year-end actual levels for each category of revenue and expense included in the CEB. Expenditure variances by category are as follows:

Table 1
Projected 2017 Budget vs. Actual Expenditures

	<i>2017</i> <i>BUDGET</i>	<i>UNAUDITED</i> <i>2017</i> <i>PROJECTED</i>	<i>VARIANCE</i>
REVENUES			
Water & Sewer Revenues	\$352,320,637	\$345,829,615	(6,491,022)
Less: Adjustments	(8,808,016)	(9,627,564)	(819,548)
Discounts	(1,494,155)	(1,220,207)	273,948
Bad Debt	(352,321)	(37,091)	315,230
Net Operating Revenue	<u>\$341,666,145</u>	<u>\$334,944,753</u>	<u>(\$6,721,392)</u>
Other Income			
Prior Year Surplus	693,227	689,086	(4,141)
Miscellaneous Income	15,732,222	14,323,716	(1,408,506)
Investment Income	3,239,523	3,412,837	173,314
TOTAL REVENUES	<u>\$361,331,117</u>	<u>\$353,370,392</u>	<u>(\$7,960,725)</u>
EXPENSES			
Direct Operating Expenses	\$69,609,154	\$67,905,466	\$1,703,688
Nonoperating Expenses			
MWRA	219,125,991	218,461,866	664,126
Renewal & Replacement	15,877,000	14,942,070	934,930
Debt Service	51,095,966	50,344,971	750,995
Contractual Funding Obligations	5,420,347	945,000	4,475,347
SDWA Assessment	202,659	202,659	0
TOTAL EXPENSES	<u>\$361,331,117</u>	<u>\$352,802,032</u>	<u>\$8,529,085</u>
Surplus	<u>\$0</u>	<u>\$568,361</u>	<u>\$568,361</u>

MWRA Assessment

The 2017 CEB included funding for MWRA Assessments of \$219.1 million. Since the MWRA fiscal year begins July 1, the level of the MWRA expense, which the Commission must budget, is based on MWRA rates for two different fiscal years. The Commission's 2017 rates were finalized in December of 2016. The budgeted number of \$219.1 million consisted of an actual rate increase from the MWRA's FY17 of 2.4% and its projection for FY18 rates to increase by 3.8%.

The actual rate increase promulgated from the MWRA for FY18 to the Commission was 3.2%. The Commission projects expenses to equal \$218.5 million, \$0.7 or 0.3% greater than budgeted.

Direct Expenses

Direct Expenses are those expenses which are directly associated with the activities of providing water and sewer services to the Commission's customers. Direct Expenses include: Wages and Salaries, Labor Related Costs/Benefits, Supplies and Materials, Repair and Maintenance, Insurance, Inventory and Capital Outlay.

The 2017 Direct Expense Budget totaled \$69.6 million. During 2017, through strict cost control measures, the Commission projects expenses to equal \$67.9 million, \$1.7 million, or 2.4% lower than budget.

Capital Improvements

Capital Improvements represent the costs associated with the rate revenue funded portion of projects undertaken in the annual Capital Improvement Program. The 2017 budget included \$15.9 million for Renewal and Replacement based on the project detail outlined in the 2017-2019 CIP. Projected 2017 rate basis R&R spending is anticipated to be \$14.9 million.

Debt Service

Debt Service payments for 2017 were budgeted at \$51.1 million, based on principal and interest payments due on \$506.8 million in General Revenue Bonds outstanding at the end of 2016, as well as debt service relating to the MWRA and Massachusetts Abatement Trust Programs. Actual debt service expenses are projected to be \$50.3 million at the end of 2017.

Contractual Funding Obligations

The Commission maintains several reserve funds, including an Operating Reserve Fund, a Renewal and Replacement Reserve Fund, an Insurance Reserve Fund and a Rate Stabilization Fund. The Commission is annually required to maintain a balance in the Operating Reserve Fund an amount equal to one-sixth of the Commission's operating and maintenance expenses and the accrued MWRA Assessments for that year.

The Commission made \$0.9 million in deposits to Contractual Funding Obligations.

Rate Stabilization Fund

The Rate Stabilization Fund, as established in the Resolution, is to be used to minimize the rate impact of extraordinary cost increases such as large increases in the MWRA Assessments to the Commission or significant increases in interest rates on the Commission's variable rate debt. The Stabilization Fund Requirement is defined in the Resolution as an amount equal to four percent (4.0%) of the aggregate principal amount of Outstanding Variable Rate Bonds (referred to as the "Stabilization Fund Resolution Requirement"). The Resolution also provides discretion to the Commission to make additional deposits to the Stabilization Fund and to withdraw amounts as needed to fund Commission expenses.

Current Commission policy, amended in December 2000, further states that the amount on deposit in the Stabilization Fund shall equal the greater of the Rate Stabilization Fund Resolution Requirement or 10% of the previous fiscal year's net-billed charges. If, at the start of the fiscal year, the balance of the Rate Stabilization Fund is projected to exceed such requirements, then the Commission, on the last business day of the current fiscal year, may transfer to the Revenue Fund an amount up to the greater of 20% of such excess or \$20 million, but in either case, an amount not to exceed \$20 million in any one fiscal year.

The Commission has been aggressive in managing the funding and utilization of the Rate Stabilization Fund to have the greatest impact on future rate mitigation. An amendment to the policy ensures that funds are withdrawn at a sensible pace that mitigates sharp ratepayer increases. This amendment also permits the availability of the surplus balance for future fiscal years.

Rate Setting Methodology

The Commission is guided in its Rate Setting Process by legislative mandates, Commission policy directives, financial requirements and generally accepted rate making principles. Each area is carefully examined as part of the Commission's Rate Setting Methodology. This section describes the process used annually to develop the Commission's water and sewer rates for the following year.

The methodology used annually to develop the level of rates for the following year includes the following four steps.

- 1) Legislative/Policy Analysis - This step consists of a review of relevant legislation affecting the Commission's rate setting process and all Commission policy directives relating to the establishment of rates. Specific legislation includes the Commission's Enabling Act and the MWRA's Enabling Act. A review of pertinent policy includes examining the current rate structure used by the Commission. This step ensures that both the process and the resulting rates conform to the legal and policy directives governing the Commission.
- 2) Water Demand Analysis - Next, staff must estimate the quantity of water to be consumed by the Commission's customers in the following year. The demand for water is affected by several factors including user population, weather, price and economic activity and water conservation efforts.
- 3) Financial Analysis - This step involves detailed financial analysis including projections of the financial position of the Commission at year-end and forecasts of the level of revenues and expenses for the following year. This analysis is required for the calculation of the "net rate revenue requirement" for a given year which dictates the level at which rates must be set.
- 4) Water and Sewer Rate Calculation - Staff develops the water and sewer rate schedule for a given year, guided by the findings of the Legislative/Policy Review and utilizing the information derived from the Water Demand Analysis and the Financial Analysis.

Legislative/Policy Analysis

Water and sewer rate development includes a review of pertinent legislation, Commission policy and the rate covenants of the Commission's General Revenue Bond Resolution. This review establishes the framework and guidelines for setting rates. The primary sections of legislation governing the Commission's rates are the Commission's Enabling Act and the legislation establishing the MWRA.

Under the Commission's Enabling Act, the Commission has the authority to independently set rates and charges. These rates must be set at a level to provide revenues at least sufficient to pay

all current expenses, debt service, any reserve requirements, renewals and replacements of the water and sewer systems and any and all other amounts that the Commission may be obligated to pay by law or contract. Other provisions of the Enabling Act include:

- A mandate to bill all users for water and sewer service, except for public firefighting.
- A provision for a discount on water service to elderly and disabled customers.
- A requirement to conduct a public hearing prior to implementing new rates.
- A prohibition on the use of a volume discount rate structure.
- A requirement that any surplus generated from fiscal operations be either applied to offset rates in the succeeding year (which the Commission has done since its inception), or turned over to the City of Boston.

The MWRA Enabling Act granted the Commission the authority to change from the flat rate structure authorized by the Commission's Enabling Act to an inclining block rate structure. The inclining block rate structure provides conservation incentives by charging more per unit as consumption increases. On August 1, 1985, the Commission adopted an inclining block rate structure composed of ten tiers and continued the use of this rate structure until a new rate structure was implemented in 2006, which condensed the previous ten block structure into the current six block structure.

Finally, the Commission has covenanted under its Resolution to maintain fees and charges in each fiscal year at levels sufficient to provide net revenues on a cash basis at least equal to 125% of the debt service to be paid during that fiscal year. The Resolution also establishes a Rate Stabilization Fund to be used to mitigate the impacts of extraordinary rate increases. The Commission has systematically made deposits to the Rate Stabilization Fund over the past few years with the intent of utilizing those monies to mitigate rate increases from 2006 through 2010 which are the years projected by the MWRA to correspond with significant rate increases to member communities.

Water Demand Analysis

The next step in developing the rates is to forecast the amount of water that will be consumed by the Commission's customers. The demand for water is affected by the size and composition of the user population, weather, price, economic activity and water conservation efforts.

User Population

The Commission serves a mixed population of residential, commercial and tax exempt institutional customers. It is estimated that the population of 646,000 increases each day to over one million through the addition of approximately 375,590 workers, 52,000 shoppers, 44,530

commuting students, 13,940 overnight guests in hotels and homes, 11,600 tourists, 67,480 combined for conventions, trade shows, and sporting events and 31,830 hospitals patients and visits. These figures have remained relatively constant and are not expected to vary widely in 2018.

Weather

Weather plays a role in the variations of water demand from year to year. During a hot, dry year, water demand is greater than that occurring during a cool, wet year. During hot summers, seasonal increase in water usage may be due to increased lawn watering by the residential population and continuous usage of cooling towers and air conditioning systems by the commercial/industrial user population. The Commission minimizes the impact of weather conditions on water demand forecasting by anticipating a historic "normal" weather year. Variations in the weather pattern over the course of the year may result in slight variations from the projected level of consumption.

Price and Economic Activity

Price and Economic Activity are interrelated components of demand and exert varying degrees of impact on consumption in each of the customer classes. Price affects residential water use patterns. Economic activity, on the other hand, affects commercial and industrial class water use patterns.

The potential effects of price and economic activity on the level of water sales have become evident as water and sewer rates have increased. The retail water sales have decreased approximately 34.3%, from a level of 81.3 MGD in 1985, to the 2017 year-end level of approximately 53.4 MGD. (During the same time period, the Commission's water purchases from the MWRA have declined more rapidly resulting in a decline in unbilled water.) While total retail sales have declined, sales among customer classes, i.e. retail, commercial and industrial, have remained relatively stable as a percentage of total sales.

This long-run decline in sales is mainly attributable increased conservation efforts on the part of all customers as a result of previous rate increases and the rise in the general level of conservation. As more media attention was placed on water and sewer rate increases in general, a heightened awareness of conservation issues continued to dominate the residential segment, thus reducing their demand for water. For the non-residential segment, price is less of a factor since water and sewer charges typically represent only a small percentage of total operating expenses. For these users, reductions in consumption patterns are evident as a result of the impact of the economy. Increases in office space and hotel vacancies and slowdowns in production, which typically occur in times of recession, have considerable impact on the level of consumption. The most recent data, as of the third quarter of 2017, shows that Boston is experiencing an Office Vacancy Rate of 10.9%. The Hotel Occupancy Rate is at 82.3%.

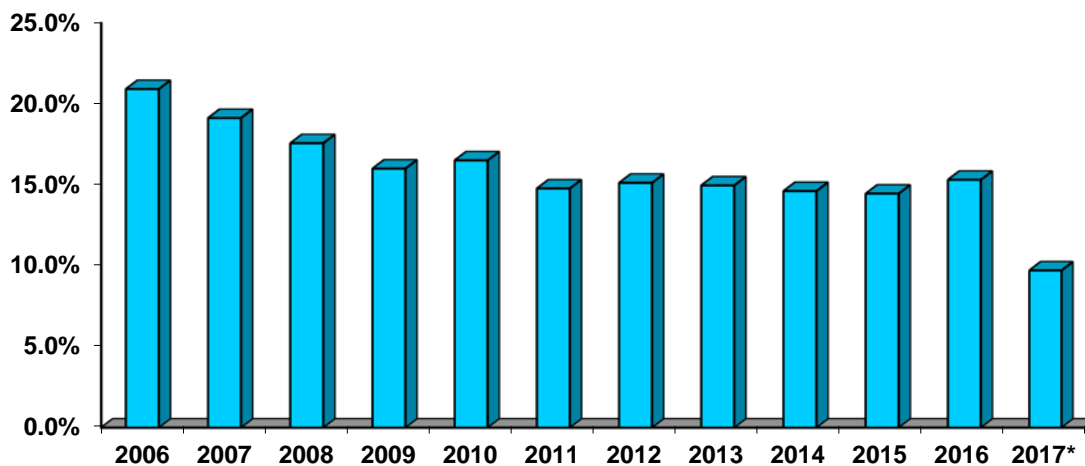
Water Conservation

Although the cost of water and sewer service serves as an incentive to conservation, awareness and education play similarly important roles. The Commission has participated in a program with the City of Boston and MWRA called "Operation Water Sense" that educates customers on the benefits of conservation and provides methods of conserving water. This program has assisted over 60,000 households through the installation of low flow showerheads, faucet aerators, toilet dams and leak detection.

The Commission has also placed a heightened priority on water conservation, which is especially important due to the nature of older water systems such as Boston's. The system inherited by the Commission experienced large water losses through leaks. In 1977, only 52.0% of the wholesale water purchased was actually sold to retail customers. In an effort to improve this situation, the Commission undertook, and continues to undertake, leak detection, system repairs and metering replacement programs. Together these efforts are designed to reduce the amount of water purchased from the MWRA and increase billed consumption in order to reduce costs to the ratepayers. The success of these efforts has led to a significant reduction in unbilled-for water, which is illustrated below in Graph 1 for the years 2006-2017.

Wholesale water purchases have declined from 146.1 MGD in 1977 to approximately 63.0 MGD in 2017 a decrease of 56.7%. At the same time, the level of water billed to retail customers has increased from 52.0% in 1977 to approximately 90.3% in 2017. The remaining portion of unbilled water, the difference between the wholesale purchases and retail sales, is due to unbilled public usage such as firefighting, meter slippage, temporary by-pass lines due to pipe reconstruction and unavoidable leakage.

Graph 1
Unbilled-Water
(2006-2017)



*Projected

Water Demand Forecast

For 2018, the Commission is projecting a modest decrease in sales to 52.60 MGD when compared to 2017 sales of 54.40 MGD. This represents 1.80 MGD lower than 2017 sales.

A review of five-year historic usage patterns for the different customer classes reveals a slight overall decreasing trend for water sales. Each of the factors described above exert different pressures on the level of sales.

Financial Analysis

The next phase of the Rate Setting Process is the Financial Analysis phase. In order to determine the level of water and sewer rates for a given year, the Commission must first determine what the "Rate Revenue Requirement" will be for that year. The determination of the Rate Revenue Requirement involves the projection of the level of Direct and Indirect Expenses for the ensuing year. The Commission carefully reviews each line item of the CEB to develop the overall level of expenses. In addition, the Commission must project the total level of Adjustments to Revenue, which will result from Billing Adjustments, Elderly and Disabled Discounts, and any allowance for Bad Debt.

Next, the Commission estimates the level of "non-rate" revenue, which is derived from Special Service Fees, Investment Income, Late Payment Charges, Fire Pipe Charges, Prior Year Net Operating Income, if any, and any other Miscellaneous Income. The amount of "non-rate" revenue is applied to the level of expenses plus the level of Adjustments to Revenue and the resulting shortfall is the Rate Revenue Requirement for that year. The Rate Revenue Requirement is then allocated to water and sewer rates, proportionately based on the level of expenses attributable to the operations of water distribution and wastewater collection and transport systems. The calculation of the Rate Revenue Requirement is outlined in Exhibit H.

Exhibit H Calculation of the Rate Revenue Requirement

MWRA Assessments	\$	226,148,398
SDWA Assessment	\$	206,846
Contractual Funding Obligations	\$	1,851,226
Direct Expenses	\$	71,655,604
Capital Costs:		
Debt Service	\$	50,993,290
Renewal and Replacement	\$	17,236,000
Plus		
Revenue Adjustments		
Billing Adjustments	\$	8,919,314
Elderly and Fully Disabled Discounts	\$	1,506,734
Bad Debt Allowance	\$	356,772
Less		
Other Revenues		
Investment Income	\$	(3,362,129)
Miscellaneous Revenues	\$	-
Special Service Fees	\$	(12,052,979)
Late Payment Charges	\$	(1,427,090)
Fire Pipe Service Fees	\$	(4,691,071)
Prior Period Surplus/Deficit	\$	(568,361)
Equals		
Rate Revenue Requirement	\$	356,772,554

Water and Sewer Allocation of Costs

The Commission classifies each CEB line item as water-related, sewer-related or a proportional amount attributable to both. Many costs are clearly distinguishable as either a water service or sewer service cost. MWRA (Water and Sewer Assessments), and Debt Service classifications are made according to the applied purpose of the bond, which generated the payment. R&R expense is allocated appropriately to the water and sewer capital projects as outlined in the CIP. This classification enables the Commission to properly allocate total expenses. Table 2 below shows the water and sewer cost classifications. Since some administrative and other indirect costs do not fall neatly into water or sewer cost category, the Commission allocates these costs based upon the proportion of direct costs attributable to water and sewer services. For 2018, based on the line item allocations shown in Table 2, total current expenses are allocated at 43% for water and 57% for sewer, respectively.

Table 2
2018 Classification of Water and Sewer Costs

	<i>Water</i>	<i>Sewer</i>	<i>Total</i>
<i>Billed Charges</i>	\$150,673,371	\$206,099,184	\$356,772,555
<i>Adjustments</i>	(1,337,897)	(7,581,417)	(8,919,314)
<i>Discounts</i>	(1,506,734)	0	(1,506,734)
<i>Bad Debt</i>	(153,412)	(203,361)	(356,773)
<i>Prior Year Surplus</i>	244,395	323,966	568,361
<i>Fire Pipe</i>	4,691,071	0	4,691,071
<i>Late Payment</i>	613,649	813,441	1,427,090
<i>Miscellaneous Income</i>	5,182,781	6,870,198	12,052,979
<i>Investment Income</i>	1,445,715	1,916,414	3,362,129
<i>Total</i>	\$159,852,939	\$208,238,425	\$368,091,364
<i>Direct Expenses</i>	\$35,827,802	\$35,827,802	71,655,604
<i>MWRA Assessment</i>	87,668,885	138,479,513	226,148,398
<i>Renewal & Replacement</i>	2,062,000	15,174,000	17,236,000
<i>Debt Service</i>	33,365,428	17,627,862	50,993,290
<i>Contractual Funding Obligation</i>	721,978	1,129,248	1,851,226
<i>SDWA Assessment</i>	206,846	0	206,846
<i>Total</i>	\$159,852,939	\$208,238,425	\$368,091,364

Water and Sewer Rate Revenue Calculation

A Rate calculation can be performed, once the Rate Revenue Requirement has been determined and apportioned. To determine if an increase in water and sewer rates is necessary, the water and sewer rate revenue requirements are divided by the estimated revenues from the current water and sewer rates. The estimated revenues are derived by calculating projected total consumption at each of the six tiers in the rate structure. The total revenue calculated from all six tiers is then compared with the Rate Revenue Requirement. If the total revenues generated at this consumption level are deficient to meet the revenue requirement, the appropriate rate increase is calculated and applied evenly to all six tiers of the rate structure until the resulting forecasted revenue equal the net revenue requirement. It is important to note that all tiers of the rate structure are increased evenly so as not to adversely affect different customer classes.

Exhibits I and J, on the following pages, show the revenue expected by each tier block for both water and sewer services from the rate increase. The Commission has determined that the revenue generated based on the projected level of sales, with the 2018 Rates in place, is sufficient to meet all current expenses for 2018.

Exhibit I
2018 Revenue Analysis for Water Rates

Cubic Feet Per Day Usage Block	Estimated Billed Usage (Cubic Feet)	Estimated Billed Usage (Gallons)	Percent of Billed Usage	Water Rate (\$/1000 CF)	Estimated Revenue Per Block
0-19	516,350,766	3,862,303,730	19.06%	\$ 51.59	\$28,718,345
20-39	300,749,795	2,249,608,467	11.25%	\$ 54.01	\$16,950,754
40-89	302,316,737	2,261,329,193	11.60%	\$ 56.24	\$17,478,111
90-349	481,458,449	3,601,309,199	17.80%	\$ 59.80	\$26,819,860
350-1299	522,480,850	3,908,156,758	19.57%	\$ 62.39	\$29,486,779
Over 1299	496,320,911	3,712,480,414	20.72%	\$ 64.57	\$31,219,522

Exhibit J
2018 Revenue Analysis for Sewer Rates

Cubic Feet Per Day Usage Block	Estimated Billed Usage (Cubic Feet)	Estimated Billed Usage (Gallons)	Percent of Billed Usage	Sewer Rate (\$/1000 CF)	Estimated Revenue Per Block
0-19	514,427,732	3,847,919,435	19.25%	\$ 72.85	\$39,674,093
20-39	299,634,573	2,241,266,606	11.41%	\$ 75.09	\$23,515,917
40-89	300,465,229	2,247,479,913	11.24%	\$ 76.61	\$23,165,548
90-349	475,904,810	3,559,767,979	18.09%	\$ 80.82	\$37,283,342
350-1299	512,993,172	3,837,188,927	19.49%	\$ 86.29	\$40,168,731
Over 1299	428,030,965	3,201,671,618	20.52%	\$ 88.23	\$42,291,552
2018 Revenue Water Rates					\$150,673,371
2018 Revenue Sewer Rates					\$206,099,183
2018 Total Revenue					\$356,772,554

Background

Water and sewer services to consumers in Boston were previously provided by the DPW. Although consumers were charged for these services, rates did not supply full cost recovery of providing these services. The cost of providing water and sewer services was included in the City budget and rates were subsidized by property taxes. During the period of 1960 to 1977, sewer rates were never increased and water rates were increased only three times. The physical condition and financial situation were greatly deteriorated, with the system experiencing an unbilled-for water rate of 48% in 1977. The Commission was created in 1977 with passage of the Enabling Act, specifically to maintain and improve the water and sewer systems, with the ability to do so predicated on full cost recovery.

In addition to full cost recovery, the Commission was required by the Enabling Act to use a flat rate structure (a fixed unit cost regardless of consumption) after December 31, 1977 and to provide a discount to elderly and fully disabled customers. The flat rate structure was adopted by the Commission in 1978. Prior to that time declining rates (unit costs decreased as consumption rose) were permitted. The elderly and disabled discount for qualified homeowners was implemented in 1978 at a 10% discount on the water portion of the bill. In 1979, this discount was increased to 15%, in 1988, to 25% and in 2015 it was increased to the present level of 30%.

MWRA Background

The MWRA was created by Chapter 372 of the Acts of 1984 of the Commonwealth, as amended ("the MWRA Act") as a body politic and corporate and public instrumentality of the Commonwealth on December 19, 1984. Effective July 1, 1985 the ownership, possession and control of all personal comprising the MDC water and sewer systems were transferred to the MWRA. It was recognized at the time that the MDC was unable to effectively manage the collection, treatment and disposal of sewage in the metropolitan Boston area. The MWRA has several main objectives. One Objective is to construct and maintain sewage treatment facilities, which ensure that the MWRA sewer system's wastewater discharges to Boston Harbor and meet federal and state pollution control requirements. Another objective is to maintain, operate and improve an adequate water supply distribution system and provide water in conformance with all applicable state and federal regulations. Furthermore the MWRA establishes programs for leak detection and reduction of I/I within the service areas of the MWRA as well as repair, replace, rehabilitate and extend the MWRA waterworks system and the MWRA sewer system (collectively, the "MWRA Systems"). The MWRA provides professional management, system-wide planning and establishes and administer charges on a basis, which will foster the conservation of water and improve the quality of the environment. The MWRA finances the capital and operating expenses arising from its operations on a self-sustaining basis.

BWSC/MWRA Rate History

In 1985, the Commission undertook a comprehensive review of its rate policies to determine what, if any, changes were necessary and prudent. The Commission studied the impact of the existing flat rate structure in light of its conservation policies and practices and other alternative rate structures that had been authorized for use by the MWRA's enabling legislation. The results of this review indicated that an economic incentive was needed to promote water conservation efforts among its customers, and therefore the use of an inclining block rate structure was adopted in August 1985.

The Commission obtains its water supply and sewer treatment services from the MWRA. The MWRA provides water services to 52 cities, towns and special purpose entities and wastewater treatment to 43 cities, towns and special purpose entities located throughout central and eastern Massachusetts. Since the MWRA Assessment is the largest single expense of the Commission on an annual basis, increases in MWRA rates have a significant impact on the level at which the Commission's rates must be set.

The MWRA was empowered to establish charges for its services and commodities without supervision by other agencies or governmental bodies and to collect it. One of the basic goals achieved by the MWRA Act was the substitution of assessments, or user fees, to the member communities for the prior tax-based system of charges.

The Commission is the MWRA's largest single customer. For the MWRA fiscal year 2018, the Commission will be assessed 35.4% of the water system charges and 28.6% of the sewer system charges. On a combined basis, the Commission will pay 30.9% of the total MWRA assessments.

Assessments for water services are calculated by the MWRA based on the metered water use in the calendar year immediately preceding the MWRA fiscal year. The Commission's water charges for MWRA fiscal year 2018 total \$85,905,357 based on the Commission's calendar year 2016 metered water use.

Sewer Assessments allocate operating and maintenance costs based on total metered annual flow and total annual average strength, seepage contributions and high strength flow loads. Septage contributions are allocated based on volume, total suspended solids ("TSS") and biochemical oxygen demand ("BOD") loadings. High strength flow loads are generated by those permitted entities whose flows exceed 25,000 gallons per day and whose TSS and/or BOD concentrations exceed 400 milligrams per liter.

Capital or debt service costs are allocated as follows: two-eighths based on maximum month metered flow and total annual average strength, septage and high strength flow loads; three-eighths based upon contributing (sewered) population; and three-eighths based on census population. Metered wastewater flow from the immediately preceding calendar year is used in calculating assessments.

The Commission's sewer assessment for fiscal year 2018 based on calendar year 2016 data totals \$135,974,820. Total assessments for water and sewer charges for MWRA fiscal year 2018 are \$221,880,177. The history of the MWRA Assessments to the Commission as a percentage of total Commission operating expenses is depicted in Graph 2, on the next page.

Rate History and Projections

Since the inception of the MWRA in 1985, the MWRA Assessment has grown from 38.0% of total expenses to a projected level of 61.4% in 2018. The most current projections available indicate that in 2022 the MWRA Assessment will represent 61.9% of the Commission's total expenses.

Exhibit K on page 41 presents the history of water and sewer rates for the City of Boston from 1977 to 2016. In each year since its inception, the rates established by the Commission have been based on recovering the full projected costs of operating, maintaining and improving the water and sewer systems. As is evident from Exhibit K, retail water rates actually decreased during the period from 1977 through 1983 from a level of \$1.02 per thousand gallons purchased, to a level of \$1.00 per thousand gallons purchased. During this same period, retail sewer rates increased from \$0.13 per thousand gallons to \$0.73 per thousand gallons. Rates did not increase from 1994-2001 due to effective management control of expenditures, as well as a steady flow of revenues. However, the Commission experienced increasing financial obligations and decrease in revenues due to drop in consumption in 2001 through 2003. As a result, rates increased by 8.9% in 2002 and 2003. Due to the cut of the state debt service assistance program and mid-year special assessment from the MWRA, the Commission increased rates by 3.9% effective April 1, 2003. There was a total rate increase of 5.8% in 2004, which remained in place for 2005. The rates for 2006 represent an average 9.85% increase after conversion to the six block inclining rate structure. The rates for 2007 represent an average increase of 9.25%. The rates for 2008 represent an average increase of 5.6%. The rates for 2009 represent an average increase of 3.48%. The rates for 2010 represent an average increase of 3.95%. The rates for 2011 represent an average increase of 2.9%. The rates for 2012 represent an average increase of 6.25%. The rates for 2013 represent an average increase of 3.9%. The rates for 2014 represent an average increase of 4.8%. The rates for 2015 represent an average increase of 5.05%. The rates for 2016 represent an average increase of 3.0%. The rates for 2017 represent an average increase of 2.4%. The rates for 2018 represent an average increase of 4.75%.

Graph 2
MWRA Assessment v. BWSC Expenses
2009-2018

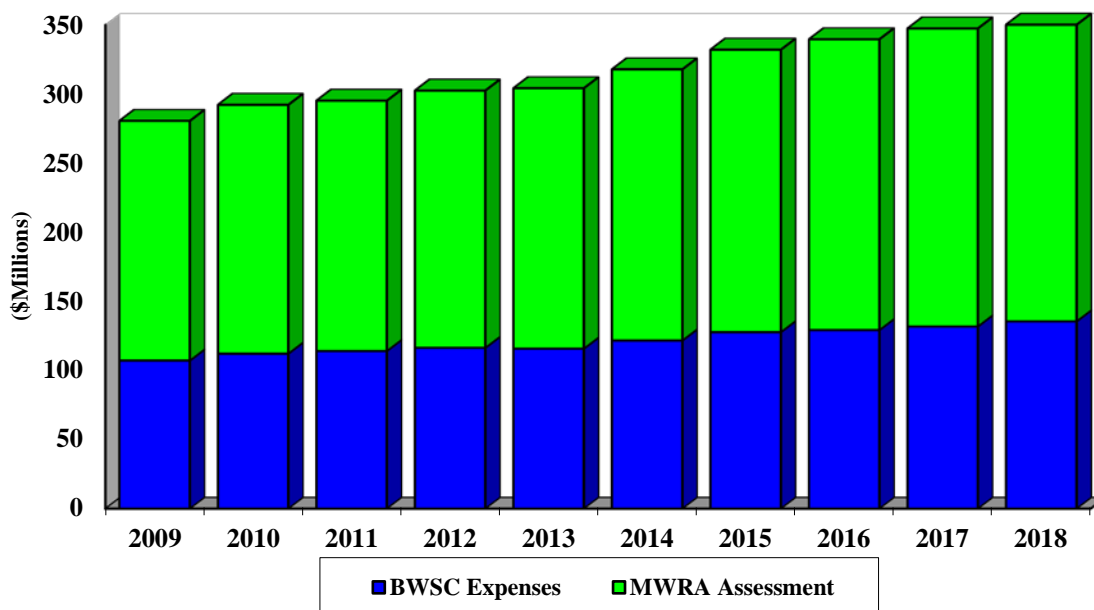


Exhibit K
Rate History
 (Per 1,000 Gallons)

	Water Rate	Sewer Rate	Combined Rate	% Change from Prior Year
1977(1)	\$1.02	\$0.13	\$1.16	-
1978	\$1.19	\$0.53	\$1.72	48.6%
1979	\$1.01	\$0.48	\$1.49	-13.4%
1980	\$1.01	\$0.54	\$1.55	4.0%
1981	\$1.01	\$0.54	\$1.55	0.0%
1982	\$1.01	\$0.66	\$1.67	7.7%
1983	\$1.00	\$0.73	\$1.73	3.7%
1984	\$1.02	\$0.84	\$1.86	7.5%
1985(2)	\$1.03	\$0.96	\$1.99	7.0%
1986(2)	\$1.16	\$1.27	\$2.43	21.9%
1987(2)	\$1.19	\$1.42	\$2.61	7.5%
1988(2)	\$1.65	\$1.68	\$3.33	27.8%
1989(2)	\$1.99	\$2.28	\$4.27	28.0%
1990(2)	\$2.03	\$2.64	\$4.68	9.6%
1991(2)	\$2.26	\$3.14	\$5.40	15.5%
1992(2)(3)	\$2.59	\$4.14	\$6.73	24.5%
1993(2)	\$2.69	\$4.80	\$7.49	11.3%
1994-2001(4)	\$2.69	\$4.80	\$7.49	0.0%
2002(5)	\$3.35	\$4.80	\$8.15	8.9%
2003(6)	\$3.78	\$5.10	\$8.88	8.9%
2003(7)	\$3.80	\$5.43	\$9.23	3.9%
2004(8)	\$4.12	\$5.73	\$9.85	5.8%
2005(9)	\$4.12	\$5.73	\$9.85	0.0%
2006(10)	\$4.94	\$5.91	\$10.85	9.85%
2007 (11)	\$5.26	\$6.62	\$11.88	9.25%
2008 (12)	\$5.55	\$6.98	\$12.53	5.6%
2009 (13)	\$5.74	\$7.22	\$12.96	3.48%
2010 (14)	\$5.97	\$7.50	\$13.47	3.95%
2011 (15)	\$6.14	\$7.72	\$13.86	2.9%
2012 (16)	\$6.53	\$8.20	\$14.73	6.25%
2013 (17)	\$6.78	\$8.52	\$15.30	3.9%
2014 (18)	\$7.12	\$8.96	\$16.08	4.8%
2015 (19)	\$7.46	\$9.38	\$16.84	5.05%
2016 (20)	\$7.46	\$9.89	\$17.35	3.00%
2017 (21)	\$7.50	\$10.27	\$17.77	2.40%
2018 (22)	\$7.84	\$10.77	\$18.61	4.75%

Rate History and Projections

- (1) Water and sewer rates were established by the City prior to the creation of the Boston Water and Sewer Commission in 1977.
- (2) Due to the shift to the inclining block rate structure in 1985, the water and sewer rates shown since then represent simple averages.
- (3) For consistency, all percentage increases are calculated on a simple average basis. Originally, 1992 was presented as a weighted average, which yields a 24.3% increase.
- (4) Effective January 1, 1993. There were no rate increases from 1994-2001.
- (5) Water and sewer rate revenues increased by a combined 8.9%. Water increased by 24.4% and sewer was not increased.
- (6) Water and sewer rate revenues increased by a combined 8.9%. Water increased by 12.7% and sewer was not increased.
- (7) Water and sewer rate revenues increased by a combined 3.9%. Water increased by 0.7% and sewer increased 6.4%. This was due to a mid-year assessment by the MWRA.
- (8) Water and sewer rate revenues increased by a combined 5.8%. Water increased by 8.0% and sewer increased 4.2%.
- (9) There was no water and sewer rate increase in 2005.
- (10) Percent increase is calculated as the change after conversion to a six block inclining rate structure. Because of the different number of blocks, the simple average is not directly comparable to previous years.
- (11) Water and sewer rate revenues increased by a combined 9.25%. Water increased by 6.55% and sewer increased 11.95%.
- (12) Both water and sewer rate revenues increased by 5.6%.
- (13) Both water and sewer rate revenues increased by 3.48%.
- (14) Both water and sewer rate revenues increased by 3.95%
- (15) Both water and sewer rate revenues increased by 2.9%
- (16) Both water and sewer rate revenues increased by 6.25%
- (17) Both water and sewer rate revenues increased by 3.9%
- (18) Both water and sewer rate revenues increased by 4.8%
- (19) Both water and sewer rate revenues increased by 5.05%
- (20) Water and sewer rate revenues increased by a combined 3.0%. Water increased by 0.0% and sewer increased 5.6%.
- (21) Both water and sewer rate revenues increased by 2.4%. Water increased by 0.74% and sewer increased 3.66%.
- (22) Both water and sewer rate revenues increased by 4.75%. Water increased by 4.52% and sewer increased 4.92%.

In an effort to mitigate the impact of increasing water and sewer rates, the Commission began an aggressive program to update and improve the water system in 1978. The program included replacing old, inefficient water mains and aggressive leak detection and repair. These efforts, which continue today, combined with the inclining rate structure, have had the net effect of reducing the overall level of water purchased by the Commission from 146.1 MGD in 1977 to the present level of 63.0 MGD in 2017. In addition to reducing the level of water purchases from the MWRA, the Commission continues to pursue increasing billable consumption through its ongoing meter replacement and meter downsizing programs. All these efforts have combined to reduce the level of unbilled-for water from 26.2% in 1993 to approximately 10.3 in 2017. Graph 3, on page 44, illustrates the success that the Commission has realized in reducing purchases, maximizing billings and reducing unbilled-for water, the result of which is a reduced level of rate increases, which must be passed on to its ratepayers.

BWSC/MWRA Rate Projections

As part of the annual financial planning process, the Commission establishes water and sewer rates for the next fiscal year and forecasts the combined rate increases for the ensuing four years. In compiling these projections, the Commission must estimate the level of expenditures required in each of the following four years to operate and maintain the systems, provide basic services and meet all its financial obligations. The major expenses, which must be estimated annually, include Direct Operating Expenses, the MWRA Assessment, Capital Improvement, the Safe Drinking Water Act Assessment, Debt Service, and Contractual Funding Obligations. In addition, estimates of water demand, based on recent actual trends, are made to calculate water and sewer rate revenue. Since the MWRA Assessment is the largest single expense in the CEB, the annual increase in the assessment has a substantial impact on the rate projections of the Commission. As a result of the federally mandated cleanup of Boston Harbor, the MWRA has been required to undertake the construction of new primary and secondary wastewater treatment facilities at Deer Island, an inter-island tunnel connecting Deer Island and Nut Island, a 9 mile effluent outfall tunnel and a sewerage residuals management facility. Beginning in MWRA FY1998, waterworks system improvements mandated by the Safe Drinking Water Act and Surface Water Treatment Rule added significantly to MWRA rate revenue requirements. These extensive capital projects and the operation and maintenance of the regional water distribution and wastewater collection systems, have caused the MWRA's funding requirements to increase significantly. Consequently, rate increases are likely to continue while these projects are underway and become implemented. Again, in developing future rate projections, the Commission utilizes the most current rate projections, which have been issued by the MWRA. These MWRA projections listed below are based on the MWRA fiscal year, which begins on July 1, 2017.

Projected MWRA Assessments

2018	3.2%
2019	3.8%
2020	3.8%
2021	3.8%

Rate History and Projections

Boston Water and Sewer Commission rate projections for the years 2019-2022 are outlined below. These future rate projections of the Commission are based on the best data available during the 2017 Financial Planning Process.

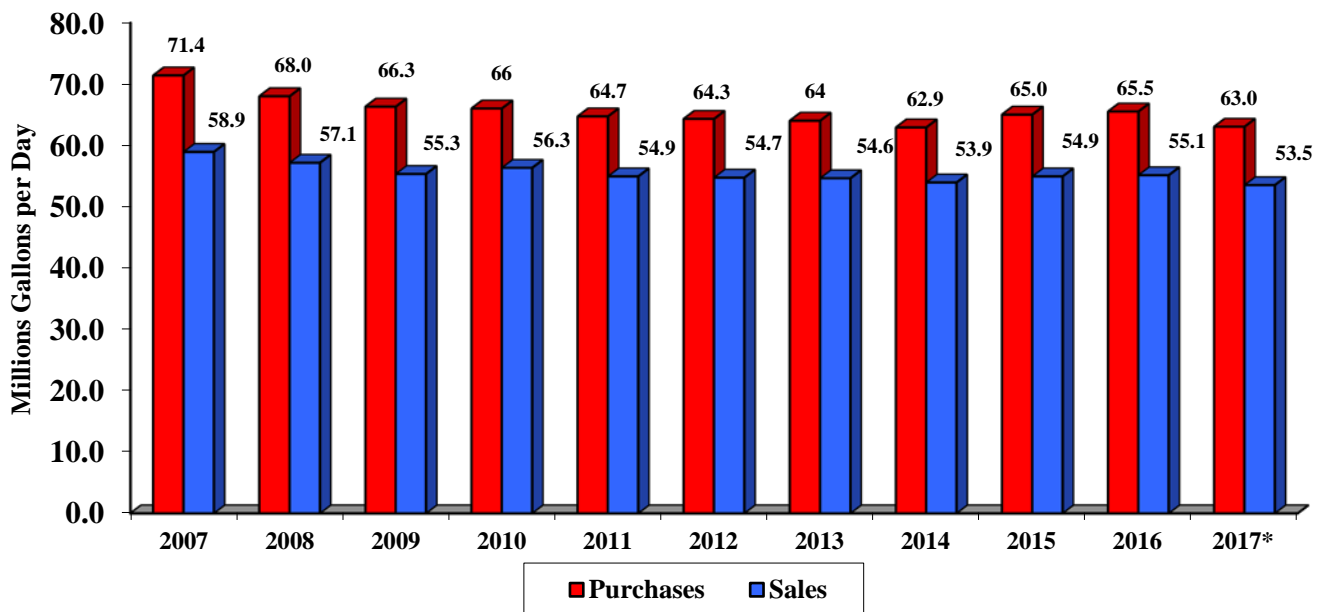
Projected Water and Sewer Rate Revenue Increases

2019	4.75%
2020	4.75%
2021	4.75%
2022	4.75%

The Commission continues to be aggressive in attempting to secure federal and state rate relief funding and to control direct expenses through managerial improvements and increased efficiencies. These efforts will contribute to minimizing the level of required future rate increases. Table 3 illustrates the Commission's pro forma financial projections for the years 2017 to 2022. This table details the estimated revenues and expenses for the period and the corresponding rate increases required allowing the Commission to meet all its financial obligations.

Graph 3

Water Purchased v. Water Sold, 2007-2017



*Projected

Table 3
Five Year Financial Pro Forma (\$000)

	<i>Unaudited</i>					
	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>
REVENUES						
Water	\$145,908	\$150,673	\$156,252	\$162,037	\$168,885	\$176,022
Sewer	199,921	206,099	213,730	221,643	231,010	240,773
LESS:						
Adjustments	(9,627)	(8,919)	(9,250)	(9,592)	(9,997)	(10,419)
Discounts	(1,220)	(1,507)	(1,563)	(1,620)	(1,689)	(1,760)
Bad Debt	(37)	(357)	(369)	(384)	(400)	(417)
NET BILLED CHARGES	334,945	345,989	358,800	372,084	387,809	404,199
Prior Year Surplus	689	568	0	0	0	0
Late Charges	1,173	1,427	1,480	1,535	1,599	1,667
Fire Pipe	4,691	4,691	4,691	4,861	5,067	5,281
Investment Earnings	3,413	3,362	3,290	3,258	3,313	3,395
Other Income	8,459	12,054	14,442	8,384	8,636	8,895
SUBTOTAL	18,425	22,102	23,903	18,038	18,615	19,238
TOTAL REVENUE	\$353,370	\$368,091	\$382,703	\$390,122	\$406,424	\$423,437
EXPENSES						
Operating	\$67,905	\$71,655	\$73,715	\$75,836	\$78,022	\$80,272
MWRA Assessment	218,462	226,149	234,849	243,894	253,286	262,088
Capital Improvement	14,942	17,236	19,736	12,564	16,512	17,338
Debt Service	50,345	50,993	51,780	54,433	55,298	57,915
Contractual Funding Obligations	945	1,851	2,418	3,192	3,105	5,623
SDWA Assessment	203	207	205	203	201	201
TOTAL OPERATING EXPENSES	\$352,802	\$368,091	\$382,703	\$390,122	\$406,424	\$423,437
NET INCOME	\$568	0	0	0	0	0
Average Combined Rate (\$/1000gal)	\$17.77	\$18.61	\$19.50	\$20.42	\$21.39	\$22.41
Annual Increase (%)	2.80%	3.50%	3.80%	3.90%	3.90%	3.50%
Typical Household Bill	\$1,052	\$1,102	\$1,154	\$1,209	\$1,266	\$1,326

2018 Current Expense Budget

The Commission annually outlines its anticipated level of revenues and expenses for the following fiscal year. The Commission's 2018 Current Expense Budget is shown in relation to the 2017 CEB in Table 4 below. The 2018 CEB consists of \$368.1 million in revenues and expenses which represent a \$6.8 million, or 1.9% increase over the 2017 level.

Table 4
Current Expense Budget 2017 vs. 2018

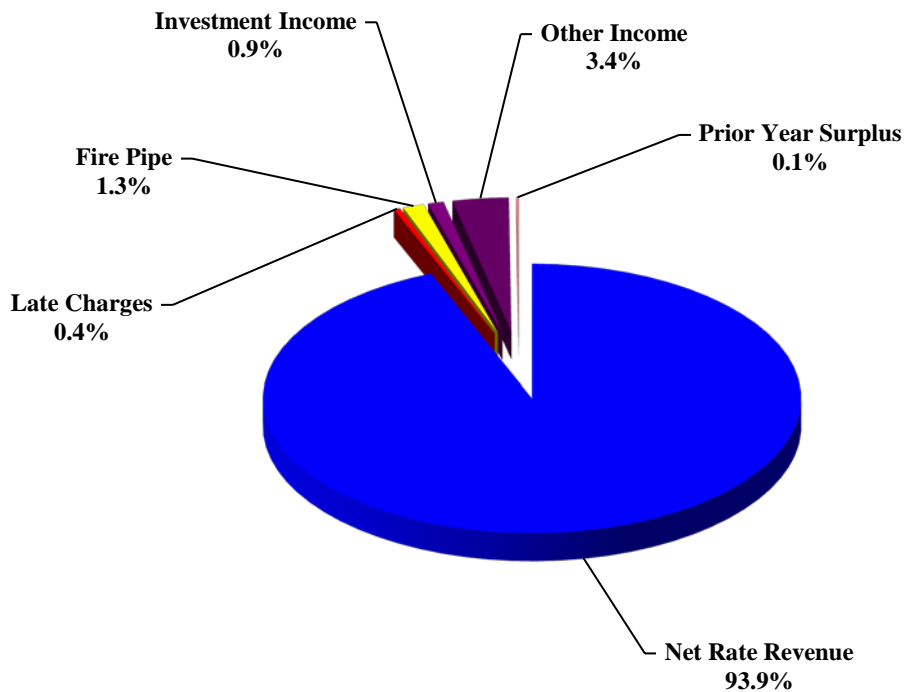
	<i>BUDGET</i>		<i>VARIANCE</i>	
	<i>2017</i>	<i>2018</i>	<i>\$</i>	<i>%</i>
REVENUES				
Water	\$ 149,415,548	\$ 150,673,371	\$ 1,257,823.00	0.8%
Sewer	202,905,089	206,099,183	3,194,094	1.6%
SUBTOTAL	352,320,637	356,772,554	4,451,917	1.3%
LESS:				
Adjustments	(8,808,016)	(8,919,314)	(111,298)	1.3%
Discounts	(1,494,155)	(1,506,734)	(12,579)	0.8%
Bad Debt	(352,321)	(356,773)	(4,452)	1.3%
NET BILLED CHARGES	341,666,145	345,989,733	4,323,588	1.3%
PRIOR YEAR SURPLUS	693,227	568,361	(124,866)	-18.0%
MISCELLANEOUS INCOME:				
Late Charges	1,409,283	1,427,090	17,807	1.3%
Fire Pipe	4,590,020	4,691,071	101,051	2.2%
Investment Earnings	3,239,523	3,362,129	122,606	3.8%
Other Income	9,732,919	12,052,980	2,320,061	23.8%
TOTAL REVENUE	\$ 361,331,117	\$ 368,091,364	\$ 6,760,247	1.9%
EXPENSES				
Operating	69,609,154	71,655,604	2,046,450	2.9%
MWRA Assessment	219,125,991	226,148,398	7,022,407	3.2%
Capital Improvement	15,877,000	17,236,000	1,359,000	8.6%
Debt Service	51,095,966	50,993,290	(102,676)	-0.2%
Contractual Funding Obligations	5,420,347	1,851,226	(3,569,121)	-65.8%
SDWA Assessment	202,659	206,846	4,187	2.1%
TOTAL OPERATING EXPENSES	\$ 361,331,117	\$ 368,091,364	\$ 6,760,247	1.9%

Net rate revenues provide 93.9% of the funding for current expenses. These net rate revenues are the total rate revenues generated for water and sewer services less adjustments, which include Billing Adjustments, Elderly and Disabled Discounts and provision for Bad Debt. The 2018 CEB also includes anticipated fees for Special Services, Late Payment Income, and Fire Pipe Charges.

2018 Revenues

The 2018 CEB identifies \$368.1 million in total revenues from the following sources: Water and Sewer Rate Revenue (less Adjustments, Discounts and Bad Debt), Prior Year Surplus, Miscellaneous Income, Investment Income and additional transfer from the Stabilization Fund. Graph 4 below illustrates the sources of funds contained in the 2018 CEB. Revenue source details follow.

Graph 4
2018 Revenue Sources



Water and Sewer Rate Revenue and Adjustments

The 2018 CEB includes \$356.8 million in Water and Sewer Rate Revenue derived from customer charges. This is an increase of \$4.5 million, or 1.3% from the 2017 CEB. The Rate Revenue included in the 2018 CEB is based on recent sales levels and analysis of usage patterns for various customer classifications.

The 2018 CEB includes Adjustments of \$8.9 million. Adjustments represent corrections to customer accounts due to a variety of reasons. Other causes of Adjustments include corrections of erroneous meter readings, and sale readings resulting from transfers of ownership of property. The majority of adjustments are Sewer Abatements. According to the Commission's Sewer Abatement Policy, the Commission will provide sewer credits for water usage, which is not returned to the sewer system for treatment. Total Adjustments for 2018 have been estimated to equal 2.5% of the total billed charges.

The Commission is required under the Enabling Act to offer a discount on water charges to eligible elderly and fully disabled customers. Elderly homeowners, 65 years of age or older and fully disabled homeowners, living in structures with one to four dwelling units, are currently eligible for a 30% discount on the water charge portion of their bills. The estimated total expense associated with Discounts in 2018 is \$1.5 million.

The 2018 CEB includes a Bad Debt expense of \$0.4 million. Bad Debt expense represents the uncollectible amount of adjusted billed charges and is budgeted at 0.1% of billed charges to reflect the continued success of the Commission's Integrated Collections Program.

Prior Year Surplus

Under the Enabling Act, the Commission is required to use any surplus income generated in a fiscal year to offset expenses the following year, or to transfer that surplus to the City of Boston. Conversely, if the Commission experienced a deficit in any year, it is required to recover that deficit in the following year's rates. The Commission has produced a surplus in every year since its inception and has consistently used those monies to reduce the required rates in the following year. The 2018 CEB includes a Prior Year Surplus of approximately \$0.6 million. The primary factors that contributed to this level of net operating income were savings in both Direct and Indirect Expenses. The detail regarding these savings is presented in the 2017 Year-End Position section beginning on page 25.

Miscellaneous Income

In 2018 Miscellaneous Income is budgeted at approximately \$18.2 million (not including Investment Income). Miscellaneous Income consists of revenue generated by: Other Income (\$12.1 million), Fire Pipe Charges (\$4.7 million), and Late Payment Charges (\$1.4 million).

Other Income includes the revenue generated by special services. Special services are provided to customers, costs which are recovered without a burden to the general ratepayer. Special Service Fees cover services such as Cross Connection Inspections, Fire Flow Tests, Water and Sewer Lien Certificates and Special Meter Tests. The 2018 CEB includes \$12.1 million in Other Income generated by the imposition of Special Service Fees. Exhibit L on the following page outlines the estimated 2018 revenue generated by Special Service Fees.

The Commission has approximately 7,912 fire pipe connections in the City. Generally accepted rate making practices recommend the imposition of Fire Pipe Fees for private fire protection service which are set to recover the costs from those customers benefiting from the service. The 2018 CEB includes \$4.7 million in anticipated revenue from Fire Pipe Charges.

The 2018 CEB estimates Late Payment Charges will be \$1.4 million. The Commission imposes a charge of 0.03836% per day, or approximately 14% annually, compounded with each billing on all amounts that are past due greater than 45 days. The purpose of the Late Payment Charge is to encourage the prompt payment of bills and to avoid any subsidy to slow paying customers by customers who pay their bills on time.

Investment Income

The Commission has a number of large annual expenditures which must be paid in lump sum installments, such as the MWRA Assessment and principal and interest payments associated with outstanding debt. By utilizing effective cash management techniques, the Commission can maximize the Investment Income, which is earned on the funds accumulated to meet those large expenses. In addition, the reserve requirements of certain trust indentures are also available for investment purposes. In 2018, the Commission estimates investment income at \$3.4 million. This level of Investment Income is based on an estimated average return on investable balances of 1.75%.

Exhibit L

2018 Estimated Revenue from Special Service Fees

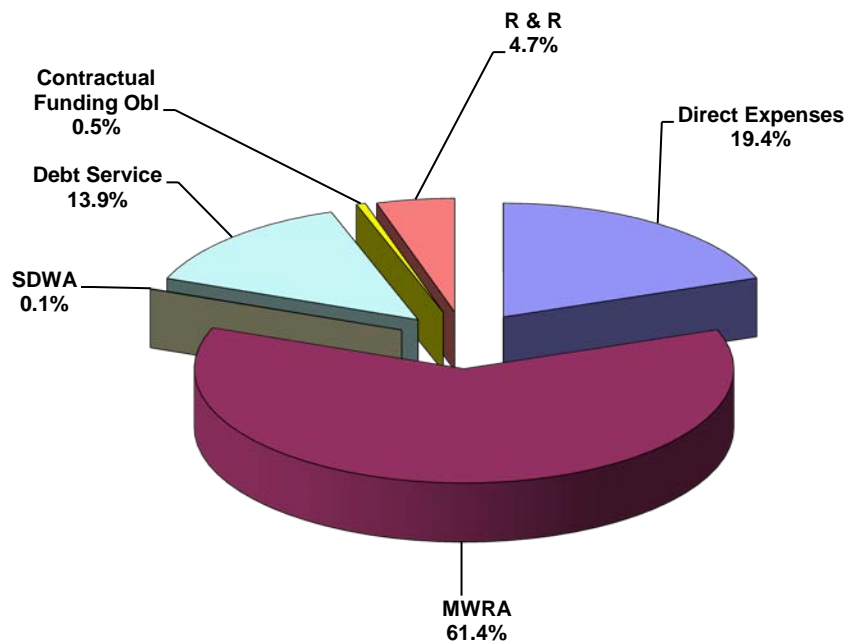
	Fee	Estimated Frequency	Revenue
Fire Flow Test	\$442	400	\$ 176,800
Return Check Fee	\$15	840	\$ 12,600
Temporary Connection*	\$435	1,000	\$ 435,000
Water Pipe Inspection - Normal Work Hours	\$259	340	\$ 88,060
Water Pipe Inspection - Overtime Rate	\$306	70	\$ 21,420
Water Pipe Inspection - Sundays and Holidays	\$353	7	\$ 2,471
Sewer Pipe Inspection – Normal Work Hours	\$359	330	\$ 118,470
Sewer Pipe Inspection - Overtime Rate	\$306	80	\$ 24,480
Sewer Pipe Inspection - Sundays and Holidays	\$353	5	\$ 1,765
Special Meter Test	\$130	140	\$ 18,200
Drain Layer’s License - New	\$50	125	\$ 6,250
Drain Layer’s License - Renewal	\$15	345	\$ 5,175
Multi Day Construction Inspection	\$752	95	\$ 71,440
Multi Day Construction Inspection - Overtime	\$890	80	\$ 71,200
Multi Day Construction Inspection - Sundays and Holidays	\$1,027	70	\$ 71,890
Lien Certificate**	\$50	3,000	\$ 150,000
Scrap Sales	-	-	\$ 24,000
Water Turn On/Off	\$40	1,500	\$ 60,000
Termination Notice Fee	\$80	6,250	\$ 500,000
Construction Plans	\$6	1,801	\$ 10,806
Frozen Meter Replacement	\$231	800	\$ 184,800
Cross Connection Inspection	\$110	22,728	\$ 2,500,080
Grease Trap Permits	\$200	2,000	\$ 400,000
General Service Applications	-	-	\$ 1,800,000
Hydrant Permits	-	-	\$ 360,000
Luto and Lead Pipe	-	-	\$ 600,000
Stormwater Industrial Inspection***	\$205	147	\$ 30,135
As-built Plans	\$200	300	\$ 60,000
Total			\$ 7,805,042

* Average Cost Per Connection ** Average Unit Cost *** Average Inspection Cost

2018 Expenses

The 2018 CEB identifies \$368.1 million in total current expenses. The categories of expenses, detailed below, include Direct Expenses, MWRA Assessments, Capital Improvements, the Safe Drinking Water Act Assessment, Debt Service and Contractual Funding Obligations. Graph 5 illustrates the breakdown of 2018 expenses.

Graph 5
2018 Uses of Funds



MWRA Assessments	\$226,148,398
Capital Improvements	\$17,236,000
Debt Service	\$50,993,290
Contractual Funding Obligations	\$1,851,226
SDWA Assessment	\$206,846
Direct Expenses	\$71,655,604
Total Expenses	\$368,091,346

MWRA Assessment

The MWRA assessment for 2018 is budgeted at \$226.1 million. This represents a 3.2% increase from the 2017 budget of \$219.1 million. The 2018 MWRA Assessment is based on the MWRA's actual FY17 rate increase to the Commission of 3.2% and a projected MWRA FY19 rate increase to the Commission of 3.8%, which is scheduled to become effective July 1, 2018. The MWRA Assessment expense is the largest single component of the Commission's budget, projected to be approximately 61.4% of total expenses in 2018.

Direct Expenses

Direct Expenses are those expenses directly attributable to the daily operations of the Commission. These expenses represent the costs of providing water and sewer service to the Commission's customers and also the costs associated with the five operating units of the Commission. The Direct Expense Budget is divided into two categories of expenditures. The Labor Costs category includes Wages and Salaries; Overtime; and Labor Related Costs/Benefits. The Other Costs category includes expenses for Supplies and Materials; Repair and Maintenance; Utilities; Professional Services; Space and Equipment Rentals; Other Services; Insurance; Inventory; Capital Outlay; Training, Seminars and Travel; and Damage Claims. The Commission has implemented a number of initiatives, which were designed to reduce the level of Direct Expenses. Program Based Budgeting, expansion of the number of employees subject to merit based salary increases, reduction in the amount of wage increases secured through collective bargaining agreements and standardization of functionality throughout its operations workforce has enabled the Commission to increase operating efficiency while reducing costs. The result of these efforts is a 2018 Direct Expense budget of \$71.7 million, which is a 2.9% increase to the 2017 budget. Table 5 on the following page shows the divisional breakdown of the 2018 Direct Expense Budget by line item.

Continued emphasis will be placed on cost control through managerial improvements, streamlining processes and creating efficiency improvements wherever possible. This is particularly important as projected wholesale water and sewer rates imposed by the MWRA continue to escalate.

**Table 5
2018 Budget
By Division**

<i>LINE ITEM</i>	<i>EXECUTIVE</i>	<i>OPERATIONS</i>	<i>ENGINEERING</i>	<i>ADMIN</i>	<i>FINANCE</i>	<i>TOTAL</i>
Wages & Salaries	\$6,841,556	\$16,307,992	\$2,296,625	\$10,029,333	\$4,123,451	\$39,598,957
Overtime	-	436,017	196,800	100,557	7,435	740,809
Fringe Benefits	8,679,393	159,075	141,706	111,704	121,645	9,213,523
Total Labor Cost	\$15,520,949	\$16,903,084	\$2,635,131	\$10,241,594	\$4,252,531	\$49,553,289
Supplies & Materials	\$31,100	\$1,760,150	\$83,794	\$523,605	\$634,604	\$3,033,253
Repair & Maintenance	34,000	7,693,800	25,000	1,988,240	171,500	9,912,540
Utilities	0	0	0	1,696,480	0	1,696,480
Professional Services	1,263,000	1,552,500	229,000	599,500	508,000	4,152,000
Space & Equipment Rental	0	7,500	0	279,164	0	286,664
Other Services	160,000	762,000	11,000	1,100,600	111,650	2,145,250
Insurance	546,128	0	0	0	0	546,128
Inventory	0	23,000	0	0	0	23,000
Capital Outlay	0	50,000	0	29,000	0	79,000
Training/Seminar/ Travel	13,500	13,000	24,500	22,000	5,000	78,000
Damage Claims	150,000	0	0	0	0	150,000
Total Other Cost	\$2,197,728	\$11,861,950	\$373,294	\$6,238,589	\$1,430,754	\$22,102,315
TOTAL DIRECT EXPENSES	\$17,718,677	\$28,765,034	\$3,008,425	\$16,480,183	\$5,683,285	\$71,655,604

Capital Improvements

Capital Improvements refers to the projects included in the CIP which are specifically designed to renew or rehabilitate the water and sewer systems serving the City. These Capital Improvements or R&R projects are funded using current year rate revenue and have a significant impact upon the level at which the Commission must set its rates. This item is discussed in more detail in the Capital Improvement Program section that begins on page 57.

The 2018 CEB includes approximately \$17.2 million for R&R. This level of expenditures is based on the project detail of ongoing and new water and sewer main rehabilitation which is scheduled to take place in 2018 as outlined in the 2018-2020 CIP. This level of expenditures represents an increase of \$1.4 million, or 8.6%, from the 2017 budgeted level of \$15.9 million.

Debt Service

The Commission issues General Revenue Bonds in support of its annual CIP Program. The 2018-2020 CIP outlines total expenditures of \$219.1 million, of which \$129.3 million, or 59.0%, is scheduled to be funded by the proceeds from the issuance of bonds. At the end of 2017, the Commission has \$485.2 million of General Revenue Bonds outstanding with different maturity dates on which there will be required principal and interest payments during 2018. In addition to its debt service obligations associated with General Revenue Bonds, the Commission must pay debt service relating to the MWRA. The 2018 budget for Debt Service is \$51.0 million, a decrease of approximately 0.2% from the 2017 budget level.

Contractual Funding Obligations

The Commission, as required by its Bond Resolution, maintains an Operating Reserve Fund, a Renewal and Replacement Reserve Fund, an Insurance Reserve Fund and a Stabilization Fund. The Contractual Funding Obligation line item represents mandated funding of all of these funds, for example, the Operating Reserve Fund at a level equal to one-sixth of the Direct Expenses and the accrued MWRA Assessment for the year. In addition, this line item reflects deposits that may be made to any of the other reserve funds, which are maintained by the Commission. The 2018 budget for Contractual Funding Obligation is \$1.9 million.

Safe Drinking Water Act Assessment

The 2018 CEB includes \$0.2 million for the SDWA Assessment. This assessment is necessitated by the requirements of the federally mandated SDWA. Massachusetts has opted to oversee the implementation of the SDWA throughout the Commonwealth ("Primacy"). As a result, the Legislature implemented a funding mechanism for Primacy, which entails an assessment to all public water suppliers. The Commission's assessment for 2018 of \$0.2 million is calculated as \$0.0085 per thousand gallons of water purchased

Impact of Current Expense Budget on Rates

The CEB development process determines the level of expenditures for the following fiscal year. Every expense included in the CEB impacts on rates and charges. Since the Commission is required to set rates and charges at a level sufficient to recover the full costs of operation and maintenance, and provide for net revenues equal to at least 125% of the maximum principal and interest payments due in that year, increases in any CEB line item have a direct impact on rates. The greater the level of projected expenditures, the greater the rate revenue requirement and the level at which water and sewer rates must be set to meet these expenses. Since the MWRA Assessment, Direct Expenses and Debt Service combined represent 94.8% of total expenses for 2018, the Commission has been aggressively pursuing methods of minimizing, where possible, the level of these expenses and the resulting impact on rates.

The Commission has been at the forefront of rate relief efforts to minimize the impact of continued increases in water and sewer assessments from the MWRA. The Commission has participated in the creation of the Massachusetts Clean Water Council and the National Water Funding Council, two public-private organizations dedicated to seeking state and federal rate relief funding. In addition to legislative lobbying efforts to secure rate relief, the Commission has maintained an increased awareness of the need to minimize its direct expenses.

As a result of continued managerial and efficiency improvements, the Commission has been able to generate a surplus in each year of operations since inception and has consistently used that surplus to mitigate any required rate increase. The 2018 CEB increased \$6.8 million, or 1.9% from the 2017 CEB.

2018–2020 Capital Improvement Program

The Enabling Act and the Commission’s General Revenue Bond Resolution, adopted December 6, 1984 (“the Resolution”) require that the Commission, on an annual basis, develop a three-year Capital Improvement Program (“CIP”). The CIP outlines the scheduling and implementation of the capital projects necessary to maintain and improve the water and sewer systems for the ensuing three-year period.

In keeping with the requirements of the Enabling Act and the Resolution, the CIP presented here identifies capital expenditures totaling \$219.1 million for the three-year period 2018-2020. Expenditures are divided into four categories: Water Distribution System projects; Sewer System projects; and Support projects. Water Distribution System projects account for \$97.6 million, or 44.6% of the 2018-2020 CIP. Sewer System projects comprise \$96.5 million, or 44.0%, Support projects total \$18.1 million, or 8.3% of the expenditures outlined in the program, and Stormwater projects account \$6.9 million or 3.1% of the 2018-2020 CIP.

The tables on this and the following page present the funding sources and cash flows expenditures for the Commission’s 2018-2020 CIP. Total capital expenditures of \$94.7 million are outlined for 2018. Water Distribution projects comprise \$41.4 million, or 43.7%, Sewer System projects account for \$41.7 million or 44.0%, Support projects account for \$7.9 million or 8.4% of the 2018 amount. Stormwater projects totaling \$3.7 million consist of the remaining 3.9% of the 2018 amount.

Table 6
2018-2020 Capital Improvement Program
Funding Sources

<i>Funding Source</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2018-2020</i>
BWSC Bonds	\$58,113,000	\$46,484,000	\$24,732,000	\$129,329,000
Rate Revenue	\$17,236,000	\$19,736,000	\$12,564,000	\$49,536,000
MWRA Water Assistance	\$8,303,000	\$9,335,000	\$3,355,000	\$20,993,000
MWRA I/I Assistance	\$11,097,000	\$5,260,000	\$2,845,000	\$19,202,000
Total	\$94,749,000	\$80,815,000	\$43,496,000	\$219,060,000

Table 7
2018-2020 Capital Improvement Program
Cash Flows

<i>Program</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2018-2020</i>
Water	\$41,403,000	\$38,057,000	\$18,095,000	\$97,555,000
Sewer	\$41,749,000	\$34,842,000	\$19,886,000	\$96,477,000
Support	\$7,925,000	\$5,810,000	\$4,400,000	\$18,135,000
Stormwater	\$3,672,000	\$2,106,000	\$1,115,000	\$6,893,000
Total	\$94,749,000	\$80,815,000	\$43,496,000	\$219,060,000

Project Highlights

The Commission's CIP includes projects to improve the overall efficiency of the Commission and to enhance the Commission's ability to provide services to its customers. The projects included in this CIP are intended to accomplish these objectives in the most efficient and cost effective manner. The Commission intends to enhance Boston's water and sewer infrastructure with several targeted projects included in the 2018-2020 Capital Improvement Program. Some of the major projects are listed below:

- Water Main Replacement Program
- Inspection and Rehabilitation of Steel Water Mains
- Sewer and Drain Replacement Program
- Sewer & Drain Rehabilitation & Replacement in the North End
- Sewer Separation and System Improvements in South Boston
- Sewer Separation in Roxbury
- City-wide Illegal Connections Investigations
- Upgrades to Union Park Pumping Station & Satellite Stations
- Upgrade of Automatic Metering Infrastructure (AMI)
- Projects affiliated the Consent Decree; including cleaning and televising ninety miles of sewer and drains
- Implement Stormwater/Green Infrastructure designed to improve water quality, the environment and manage stormwater resources.
- Improvements to Information Technology

The projects planned for the next three years are presented in three categories: Water Distribution System Projects, Sewer System Projects and Support Projects. Each category is further grouped according to the primary type of work to be accomplished.

The 2018-2020 CIP for the Water Distribution System continues the investments necessary to maintain and improve the water distribution infrastructure. As in the past, projects are planned in the following areas: the rehabilitation or replacement of water mains, including the replacement of water pipes and the upgrade of valves and hydrants. Also included are water mains that are replaced as part of the Commission's sewer separation work.

The primary purpose of the Water Main Replacement Program is to ensure the quality and quantity of water provided by the Commission to its customers. Over long periods of time the internal and external surfaces of water mains are subject to corrosion and deterioration. Internal corrosion of water mains can affect water quality, particularly taste, odor and color as well as reduce the hydraulic capacity of the pipe. Internal and external corrosion can also reduce the structural integrity of pipe, causing potential leakage and main breaks.

The Commission completed its Wastewater and Storm Drainage System Facilities Plan in 2015. A major objective of the Wastewater and Storm Drainage System Facilities Plan was to develop facility plans for the operation of the Commission's sewer and storm drains that are aligned with the Commission's primary service goals and supported by effective operations, maintenance, and engineering practices.

In addition to establishing a sustainable framework for planning and management, the Wastewater and Storm Drainage Facilities Plan project includes a broad spectrum of data collection, engineering evaluation and tool development.

Projects associated with the Plan in the Sewer System CIP include the rehabilitation or replacement of approximately 8.5 miles of deteriorated or collapsed sanitary sewers and storm drains and the television inspection of approximately 90 miles of sewer pipe. Also included are drainage improvements in the replacements of faulty tide-gates.

The CIP continues funding for the separation of combined sewers and for the reduction of infiltration and inflow into the sanitary system. Infiltration and inflow ("I/I") are extraneous quantities of water, which enter the sanitary sewers and reduce the capacity of the system to transport sanitary sewage. Reduction of I/I also decreases the quantity of water transported to the Massachusetts Water Resource Authority ("MWRA") wastewater treatment facilities, thereby reducing overall transportation costs, treatment costs and BWSC sewer assessments.

Impact of Capital Improvement Programs on Rates

The impact that the annual CIP has on the rate setting process is seen in two specific areas. First, present Commission policy dictates that capital projects, which rehabilitate or replace existing systems are funded using rate revenue generated by user water and sewer charges. The complete funding of projects which rehabilitate or replace existing systems has a direct impact on the level at which rates must be set each year. As the Commission continues its efforts annually to relay and reline water mains in accordance with the findings of the 2011 Water Distribution System Study, the level of annual rate revenue funded expenditures included in the CIP will remain fairly constant through the year 2018, after which it will decline based on a revised water main replacement program. The 2018-2020 CIP includes \$49.5 million in scheduled rate revenue funded expenditures over the three-year period.

The second area where the Capital Improvement Program has direct impact on rates is Debt Service. The Commission secures the majority of the funding required to undertake the annual CIP through the issuance of general revenue bonds. The total bond debt that the Commission currently has outstanding as of December 31, 2017 is \$485.2 million, the annual repayment of which is recovered through rate revenues. In addition to its debt service obligations associated with General Revenue Bonds, the Commission must pay debt service on MWRA loans, grants and SRF loans. The 2018 projected Debt Service Expense is \$51.0 million. Substantial increases in either of these items will cause a direct increase in the amount of rate revenue required for a given year and ultimately result in increased rates.

Program Based Budgeting

The first phase of the financial planning process is the Goal Setting Process. In 1989, the Commission implemented the "Program Based Budgeting" methodology. Under this program, each operating unit within the Commission identifies areas of concern on an annual basis and declares new goals and objectives that outline the mission and the duties of each operating unit. These program goals and objectives, when successfully completed, will result in continuing our efforts to reduce costs and gain operating efficiencies wherever possible.

The goals and objectives are divided into four categories: Goals included in the Monthly Management Report, Goals included in the Commission-wide Report Status Update, Tactical Goals and Strategic Goals. The Monthly Management Report is a compilation of data on essential programs and activities necessary for basic delivery of water and sewer services to its ratepayers. The Commission-wide Report Status Update is a listing of all reports submitted by staff for internal distribution or as required by law or permit to be completed and submitted to any external agency. Tactical Goals are one-time improvements and/or enhancements to a technical or service oriented process. Strategic Goals outline the long-range plans and direction of each department and the Commission. The focus of tactical and strategic goals is on cost control, service improvement, environmental protection and revenue enhancement.

Each goal must be clearly defined; costs justified and include discernable measurement criteria and deadlines. The cost of implementing any new tactical or strategic goal should be carefully evaluated before submission. Additional funding requests, which are submitted in conjunction with tactical and strategic goals, are reviewed by Budget staff for cost/benefit analyses. The overall program is designed to hold every employee accountable for his/her level of performance related to the goals and objectives identified for his/her operating unit. As the Commission has instituted a merit-based scale for salary increases for most of its workforce, the annual development and achievement of goals and objectives serves as the basis from which performance is measured. In addition, progress toward achieving goals and objectives is monitored throughout the year by Budget staff and is used to assess the status of goals and to address achievement concerns. Division Chiefs and Department Managers meet with employees several times during the year to discuss the status of goals and what efforts are needed to improve performance. The following objectives are illustrative of Tactical and Strategic Goals to be achieved in 2018.

Executive Division

Organizational Diversity:

Review, implement and administer the Commission's Affirmative Action Program so that equal employment opportunity is provided to all in hiring, training and promotion of minorities, women, disabled persons and Vietnam era veterans. Maintain throughout the city of Boston and its environs contact with appropriate persons and groups to recruit members of protected groups.

General Counsel:

Review the insurance requirements for all Commission contracts; develop better communication between other Commission Departments and the Legal Department to ensure that contractors' insurance requirements are met; streamline the insurance certificate process; and ensure that employees completely and correctly fill out automobile accident reports for insurance purposes.

Human Resources:

Develop content encompassing a wide variety of topics pertaining to human resources matters, such as employment, benefits, policies and procedures. Provide content to be disseminated via the electronic bulletin boards throughout the Commission.

Safety & Training:

Design and Implement a hands-on, in-house training program that will ensure all Commission employees have the skills necessary to complete everyday tasks, safely and efficiently.

Operations Division

Water and Sewer Services:

The Commission has two television vehicles for sewer inspections. These vehicles will be used to increase the number miles of sewers inspected to assist in the goal of televising 10% per year of the Commission's sanitary system.

Support Services:

Manage the Design/Build for Pump Station Improvement Contract –Phase II. This work includes pump replacement and upgrades to the controls, electrical and mechanical functions of the Commission owned pump stations.

Customer Service & Compliance:

Develop a procedure to review the Cross Connection testing on a quarterly basis using the Checkmate and BESS software's.

Asset Management:

Pilot the use of mobile functionality of the Commission's newly implemented work order management system, City Works, to perform manhole inspections to comply with the Commission's Capacity, Management, Operations and Maintenance (CMOM) goals.

Engineering Division

Planning:

Coordinate and oversee collaboration between the Commission, Boston Public Schools (BPS) and the Commission's consultant to provide design services and oversight for the construction of Green Infrastructure at five Boston public schools.

Design:

Create an on-boarding packet of materials to assist new hires and co-ops in their orientation to the Commission. These materials will serve as a guide to Commission systems such as GIS, CAD, SCREAM, and other programs used daily by Design and CAD staff.

Construction:

Implement a review process with the Design Engineers on contract change orders and quantity overruns and underruns upon completion of each contract. This process will include review of the contract drawings with actual field conditions to determine the source of errant utility mapping. Also, review the current standards for contract estimating for major contract items.

Administration Division

Meter Services:

In Conjunction with Aclara Technologies replace the batteries, 4G / LTE card, and T - Board on the 62 Data Collection Units (DCUs) located throughout the City.

Account Services:

In conjunction with BWSC's IT Department and Itineris, assist with testing the functionality of business processes and requirements in the new UMAX System.

Communications and Community Service:

Review and update website content to inform impacted residents of construction and maintenance activities in their neighborhood. Regularly update and simplify language on the slider and with content that is informative and user friendly. Enhance the education section with games and videos.

Facilities and Support Services:

Develop a Facilities handbook listing protocols to be followed during failures of major system functions (HVAC, fire and sprinkler, electricity, etc.) at the Commission.

IT:

The IT Department will be upgrading the Commission website to the latest technology.

Finance Division

Budget and Financial Planning:

The Budget Department will review delinquent Sage accounts and subsequently present analysis to the Chief Financial Officer for potential write-offs.

Payroll:

Transfer Payroll records from paper to digital files and continue to preserve the records in that format going forward (calendars, timesheets, overtime sheets and sign-in sheets). This is an ongoing project.

Revenue Audit & Analysis/Billings and Adjustments:

In conjunction with IT Department, continue with implementation of UMAX, BWSC's selected new CIS/Billing System.

Accounting:

Utilize new features in the PeopleSoft system to make the process of performing quarterly reconciliations of accounts more efficient.

Procurement:

Develop and Implement a training program on the new functions associated with the PeopleSoft Financials upgrade to version 9.2



BOSTON WATER AND SEWER COMMISSION
980 HARRISON AVENUE BOSTON, MA. 02119
(617) 989-7000
www.bwsc.org