2018-2020
Boston Water and Sewer Commission
Capital Improvement Budget Program

BOSTON WATER AND SEWER COMMISSION CAPITAL IMPROVEMENT PROGRAM 2018-2020

Henry F. Vitale
Executive Director
December 2017

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Prepared by the Finance Division

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EXECUTIVE SUMMARY

The Boston Water and Sewer Commission ("the Commission" or "BWSC") is a, a body politic and corporate and political subdivision of the Commonwealth created by Chapter 436 of the Acts of 1977 ("Enabling Act"). The Enabling Act abolished the water and sewer divisions within the City of Boston Public Works Department and transferred the ownership, operation and control of the water, sewer and storm drain systems to the Commission. As a public instrumentality, the Commission performs an essential public function in providing water and sewer services to the residents of the City of Boston. The Act authorizes the Commission to construct and make improvements to the water and sewer systems, establish and collect rates and charges for its services and finance its operations and improvements through revenue collections and the sale of bonds and notes payable solely from the Commission's revenues. The Act further provides that any revenue surpluses earned by the Commission in any Fiscal Year shall be credited to the next year's rates or returned to the City of Boston. Since its inception, the Commission has generated a surplus in each year of its operations and has credited the surplus to the reduction of the next year's rates.

The Enabling Act and the Commission's General Revenue Bond Resolution, adopted December 6, 1984 ("the Resolution") require the Commission, on an annual basis, to develop a three-year Capital Improvement Program ("CIP"). Information generated by the Commission's ongoing monitoring programs for the Systems and from various engineering data files, together with information concerning the development needs of the City, is used to compile a list of pipes, conduits, transmission mains and other System components to be either renewed, replaced, relocated or added to the Systems each year. The CIP outlines the schedule and implementation of the capital projects necessary to maintain and improve the water and sewer systems for the ensuing three-year period.

The Commission in compliance with the requirements of the Enabling Act and the Resolution, project costs of the Commission's Capital Improvement Program from Fiscal Years 2018 through 2020 total approximately, $219.1 million.

Since the Commission's inception in 1977, the Commission has set forth its Capital Improvement Plan to provide for long-term capital improvements to its water distribution and sewer collection systems, governed by a core commitment to prudent fiscal management. Comprehensive and well planned water distribution system maintenance and planning has sustained superior water service for our customers and resulted in a low incidence of system failures. The Commission has also led the industry in implementing effective water conservation measures, including dedication to deploying the most efficient technologies and practices enabling the Commission to maximize cost savings.

The Commission utilizes effective conservation measures through continued efforts to eliminate leaks across the system through advanced leak detection technology and proactive maintenance of the system's water mains.

DISCUSSION OF MANAGEMENT OBJECTIVES AND ACCOMPLISHMENTS

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 operation and maintenance of the systems. For the purposes of this document, "Systems" include the water distribution system (including potable water and fire suppression facilities) and sewer system (including separate sanitary sewers, separate storm water drains and combined sewers) and the related appurtenances and fixtures. The Commission is committed to four primary goals:

- To maintain and improve the Water Distribution and Wastewater Collection Systems. The Commission is committed to a number of improvements to the Water Distribution and Sewer Systems, including following an aggressive renewal and replacement program, reducing unaccounted for water, encouraging conservation and improving the environment.

- To establish and administer a billing and collections system that is fair and efficient. The Commission has worked to establish a rate structure that fully reflects its costs, fairly distributes the financial obligation concerning its customer base and encourages water conservation. The metering, billing and collection process is a central focus of the Commission's full management team and the Commission is committed to maintaining its strong record in this area.

- To maintain a strong financial structure. The Commission consistently employs conservative financial projections and budgeting assumptions, maintains adequate reserves and strikes a balance between debt funding and rate funding of capital expenses.

- Sustaining Effectiveness of Investments / Compliance of Regulations. The Commission is committed to complying with all its regulatory obligations under federal and state laws, including the Safe Drinking Water Act ("SDWA"), Clean Water Act ("CWA") and its National Pollutant Discharge Elimination System ("NPDES") permitting obligations for both its stormwater system and combined sewer system. Compliance obligations also extend to meeting and exceeding the goals and requirements of the Boston Harbor Decree and the Consent Decree executed in 2012 with the Environmental Protection Agency ("EPA") related to stormwater discharges.

In planning its CIP, the Commission balances the recognized need for ongoing renewal and replacement and preservation of its Systems with the desirability of specific improvements to accommodate development or redevelopment plans for the City. Wherever feasible, capital improvements are scheduled in cooperation with the street rebuilding and reconstruction activities of the City's Department of Public Works, the Boston Planning and Development Agency and the Commonwealth of Massachusetts Highway Department.

OBJECTIVES

The overall objectives of the Commission 2018-2020 CIP are to ensure the delivery of high quality potable water for consumption and fire protection, as well as the efficient collection of sewage for transport and delivery to a treatment facility or for approved discharge. In addition, the CIP includes projects to improve overall efficiency of the Commission and to enhance the Commission's ability to provide services to its customers.

A new Stormwater category was created in 2017 that focuses on Stormwater management. The primary purpose of the Stormwater Category in the 2018-2020 Capital Improvement Program is to encourage participation in the Boston Harbor pollution abatement projects and implement green infrastructure to improve the water quality of discharges to the local receiving waters. The goal is also to study existing conditions and make recommendations for placement of new best management practices designed to promote improved water quality, ensure compliance with state and federal regulations, minimize flooding and strategically manage Stormwater throughout the City of Boston.

CIP expenditures are divided into four categories: Water Distribution System projects, Sewer System projects, Support projects and Stormwater 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 for $6.9 million, or 3.1% of the 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.

Tables 1 and 2 represent the cash flow expenditures and funding sources for the Commission's 2018-2020 CIP.

Table 1 - 2018-2020 CIP Cash Flows

Program	2018	2019	2020	2018-2020
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

NOTE: *Although expenditures decrease from periods 2019 to 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

Table 2 - 2018-2020 CIP Funding Souces

Program	2018	2019	2020	2018-2020
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

NOTE: *Although expenditures decrease from periods 2019 to 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

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
- ✓ Projects affiliated with the Consent Decree; includes cleaning and televising ninety miles of sewer and drains
- ✓ Implement Stormwater/Green Infrastructure Program designed to improve water quality, the environment and manage stormwater resources
- ✓ Improvements to Information Technology

WATER DISTRIBUTION SYSTEM

Since its creation the Boston Water and Sewer Commission has provided the City of Boston with reliable, quality water. A program, which began as an aggressive 17 miles of water pipe replaced or rehabilitated yearly based on age and the City's construction schedule, has transformed into a successful asset management approach. When combined with an aggressive leak detection and flushing program the results have been undeniable. The Commission has averaged just over 34 water pipe failures per year, and has witnessed its unbilled water drop from 48% to 15%. The Commission utilizes effective conservation measures through continued efforts to eliminate leaks across the system through advanced leak detection technology and proactive maintenance of the system's water mains.

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 three-year study was divided into two phases. The first phase was to have both Commission staff and a hired contractor collect 93 pipe samples (coupons). The samples were taken from every neighborhood and varied in size and pipe material. The age of the water pipes ranged from 18 years old to 147 years old and included cast iron, ductile iron and a mix of cement lined and unlined. The pipes and soil sample which were also taken from the location were analyzed. The analysis consisted of physical observations and measurements, microscopic examination, mechanical properties test, and chemical composition analysis. The soil sample obtained at each location was also analyzed to determine its corrosiveness. The results of the tests performed were matched with locations on Commission maps, and corrosion rates were correlated with fill areas, electrified rail locations and groundwater levels.

The second phase was to create a sustainable distribution system by developing a risk-based measure for selecting pipe to be included in the annual CIP budget. This phase employed sophisticated models that levered all the data collected in phase one, data the Commission collects in its GIS, Citiworks, and hydraulic model to determine the appropriate level of pipe rehabilitation and replacement needed to achieve the Commission's goals. The pipe selected is based on a risk-based assessment. The framework is derived from asset management principles, which consider the highest risk of pipe to be the probability of a failure, and what the consequences of an event occurring could be (hospital flooding or critical customers without water).

In addition to the samples taken during the three-year study, the Commission obtains 20 pipe and soil samples every year. Once the results of the analysis are received the information is uploaded into the Commission's database to continue selecting the most vulnerable pipe.

Water distribution system improvements made since 1978 include the replacement of 350.1 miles of older water mains, the cleaning and lining of 274.8 miles of water mains, hydrant replacements and valve upgrades and replacements.

Over the three years of the CIP, the Commission is projected to expend $97.6 million on improvements to the Water Distribution System. The majority of these expenditures will occur in the replacement of water mains.

The projects scheduled for initiation in 2018 will result in the replacement of 8 miles of water mains.

Table 3 presents a summary of the 2018-2020 capital expenditures for the Water Distribution System.

Table 3 - Water Distribution System Expenditures by Program Category

Program	2018	2019	2020	2018-2020
Water Replacement	34,458,000	33,322,000	14,860,000	82,640,000
Water Special	6,945,000	4,735,000	3,235,000	14,915,000
Total	41,403,000	38,057,000	18,095,000	97,555,000

NOTE: *Although expenditures decrease for 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

SEWER SYSTEM

The CIP for the Sewer System includes a total of $96.5 million for various types of system improvements. These 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.

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 and the replacement 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 is extraneous quantities of water, which enters the sanitary sewers and reduces 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's sewer assessments.

Table 4 presents a summary of the 2018-2020 capital expenditures for the Sewer System.

Table 4 - Sewer System Expenditures by Program Category

Program	2018	2019	2020	2018-2020
Sewer R & R	24,988,000	25,755,000	13,700,000	64,443,000
Increased Capacity	799,000	-	-	799,000
Separation	12,964,000	6,309,000	3,834,000	23,107,000
Infiltration/Inflow	-	100,000	100,000	200,000
Sewer Special	2,998,000	2,678,000	2,252,000	7,928,000
Total	41,749,000	34,842,000	19,886,000	96,477,000

NOTE: *Although expenditures decrease for 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

CONSENT DECREE

On August 23, 2012, the Commission entered in a Consent Decree with the Environmental Protection Agency. 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 synchronizes infrastructure maintenance and operations goals with long-term CIP planning to achieve ("CWA") compliance with the Commission's 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 Commission has embraced the Consent Decree requirements from senior management through all divisions and departments. The Commission views the requirements as an opportunity to enhance its current practices and procedures in operating and maintaining the sewer system. Staffing leadership changes have been implemented; for instance a CMOM director and an SSO manager were hired in 2013 to ensure compliance with the requirements enforced by the Consent Decree.

The Consent Decree offers an unprecedented opportunity for the Commission to increase its role as an environmental steward for Boston's waterways. The Commission is committed to meeting and surpassing the benchmarks outlined in the Consent Decree. To fulfill this commitment, the Commission has begun implementing both short-term and long-term measures that are designed to improve water quality, increase public awareness, and protect the environment.

The City of Boston, the Commission and its ratepayers have helped clean up Boston Harbor and Boston's waterways to a level where they are accessible for the public use 98% of the time, South Boston's beaches are recognized as the cleanest urban beaches in the U.S. and the Charles River has been recognized by the EPA and internationally as one of the cleanest urban rivers in America. The Commission's illicit discharge detection protocol and sampling program have been cited as an example and standard by EPA. These achievements are a direct result of the Commission's investment in improved sewer and stormwater infrastructure, implementation of best management practices and working with other stakeholders in the City of Boston. The Commission will continue on a tenable, sustainable path to improve water quality and maintain outstanding access to the City's waterways.

PROJECTS ASSOCIATED WITH THE CONSENT DECREE & WATER QUALITY IMPROVEMENTS

There are several projects that the Commission is performing and planning to undertake to fulfill and exceed recommendations of the Environmental Protection Agency ("EPA") under the Consent Decree. The following projects will support the Commission's goal of compliance with the Consent Decree and improved water quality discharges and the environment:

Consent Decree

Sewer R & R

Cleaning and Inspections of Sewers and Storm Drains (CMOM-Capacity Management Operations and Maintenance)

Separation

Citywide Illegal Connection Investigation Program Phase IV (Contract 16-206-001)

Augment Drain Model to Characterize Water Quality

Sewer Special

CCTV of Sewers and Storm Drains (Contamination Investigation)

Stormwater

Construct BMPs & Green Infrastructure at City Hall Plaza

Construct BMPs & Green Infrastructure at Audubon Circle

Water Quality Improvements

Separation

Separation of Sewer House Laterals (Contract 14-309-007 & 17-309-003)

Owner Correction of Illegal Connections

Sewer Special

Urban Runoff Water Quality Evaluation

Interactive Training Tool

Fort Point Channel Implementation of Recommendations

Model Improvements

Stormwater

Constructed Wetland in Stormwater Tributary Area

Green Infrastructure Low Impact Development Area I (North Beacon St.)

Green Infrastructure Low Impact Development Area II (Stony Brook)

Green Infrastructure Low Impact Development Area III (Canterbury Brook)

Stormwater Utility Evaluation

Wastewater/Drainage Facilities Plan

Design of Constructed Wetland in Stormwater Tributary Area (Daisy Field)

Design of Constructed Rain Gardens

Constructed Rain Gardens

NOTE: *Full description and forecasted budgets of individual projects are available in the Sewer R & R, Sewer Separation, Sewer Special & Stormwater sections.*

WASTEWATER AND STORM DRAINAGE FACILITIES PLAN

The Commission completed its **Wastewater and Storm Drainage System Facilities Plan** in 2015. A major objective of the 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. This plan has reviewed all aspects of the Commission Sewer System, including the Commission's design standards, assets, mapping, maintenance and operational practices and future impacts of climate change on the Commission's facilities.

Critical elements of this Plan include:

- ✓ **Assessment of the Commission's Service Goals and other factors affecting long-term planning including** changing regulatory requirements, climate change and financial conditions
- ✓ **Systematic use of Risk-based tools** to govern prioritization of investments in condition assessments, repairs and replacements
- ✓ **Integration of Business Processes** needed to sustain effective **C**apacity, **M**anagement, **O**peration and **M**aintenance (CMOM) Programs for sanitary sewer collections systems and engineering programs
- ✓ **Training and Education** to embrace the use of new tools and business processes and to sustain knowledge of the system and its operations

In addition to establishing a sustainable framework for planning and management, the plan includes a broad spectrum of data collection, engineering evaluation and tool development activities.

SUPPORT PROJECT EXPENDITURES

The capital projects included in the Support category contribute to the overall efficient operation of the Commission and improve the Commission's ability to manage/administer projects and collect revenues. Monies allocated for Support projects in the 2018-2020 CIP total $18.1 million.

Monies budgeted in this section of the CIP are included expenditures for Advanced Meter Infrastructure, Information Technology, and various Administrative Equipment.

Table 5 presents a summary of the 2018-2020 capital expenditures for the Support projects.

Table 5 - Support Expenditures By Project Category

Program	2018	2019	2020	2018-2020
Metering	1,515,000	1,015,000	1,015,000	3,545,000
IT	3,555,000	2,740,000	2,305,000	8,600,000
Admin Equip	2,855,000	2,055,000	1,080,000	5,990,000
Total	7,925,000	5,810,000	4,400,000	18,135,000

NOTE: *Although expenditures decrease for 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

STORMWATER PROJECT EXPENDITURES

The primary purpose of the Stormwater Program is to encourage participation in the Boston Harbor pollution abatement projects and implement green infrastructure to improve the water quality of discharges to the local receiving waters. The goal is also to study existing conditions and make recommendations for placement of new best management practices designed to promote improved water quality, ensure compliance with state and federal regulations, minimize flooding and manage stormwater throughout the City of Boston. Monies allocated for Stormwater projects in the 2018-2020 CIP total $6.9 million.

Table 6 presents a summary of the 2018-2020 capital expenditures for the Stormwater projects.

Table 6 - Stormwater Expenditures By Project Category

Program	2018	2019	2020	2018-2020
Stormwater	3,672,000	2,106,000	1,115,000	6,893,000
Total	3,672,000	2,106,000	1,115,000	6,893,000

NOTE: *Although expenditures decrease for 2020, it is anticipated that funding for 2020 will be equal to or greater than funding presented in 2019. The decrease in 2020 is primarily due to the CIP being a one-year cash flow, over a three-year budget period.*

MASSACHUSETTS WATER RESOURCES AUTHORITY (MWRA)

The Commission obtains its water supply and wastewater treatment services from MWRA. MWRA provides water services to 52 cities, towns and special purpose entities ("Local Bodies") including the Commission and wastewater treatment to nearly half of the State's population in 43 cities, towns and special purpose entities located throughout central and eastern Massachusetts.

MWRA Background

In December 1984, MWRA was created by Chapter 372 of the Acts of 1984 ("the Act"). In accordance with the provisions of the Act effective July 1, 1985 the ownership, possession and control of all property comprising the Metropolitan District Commission ("MDC") water and sewer systems was transferred to MWRA. The Act authorizes MWRA to repair, replace, rehabilitate, modernize and extend the water delivery system and the sewage collection, disposal and treatment systems on a self-sustaining basis. The Act also allows for the issuance of bonds and notes to finance any of its corporate activities.

On January 31, 1985, a suit commonly referred to as the Boston Harbor case, was brought against the MDC, the Commonwealth, MWRA (as successor to the MDC) and the Commission alleging water pollution of and alleged illegal discharges into Boston Harbor in violation of the Clean Water Act. As the successor to the MDC, MWRA assumed responsibility for taking the Court-ordered actions to achieve and maintain compliance with the CWA. Such large-scale projects are financed through the issuance of revenue bonds, proceeds of federal and state grants and operating revenues.

MWRA Rates and Charges

Under the Act, MWRA was empowered to establish charges for its services and commodities. 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 largest single customer for MWRA. For 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 MWRA based on the metered water use in the calendar year immediately preceding the MWRA fiscal year. The Commission's water charges for the MWRA fiscal year 2018 total $85.9 million based on the Commission's calendar year 2016 metered water use.

As of fiscal year 1995, sewer assessments were calculated by a formula using, among other things, population and population equivalents. In accordance with legislation enacted in 1993, the MWRA Advisory Board developed a new sewer rate methodology for calculating assessments beginning in fiscal year 1996. The new methodology allocates operating and maintenance costs based on total metered annual flow and total annual average strength, septage 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 (sewer) population; and three-eighths based 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 $136.0 million. Total assessments for water and sewer charges for MWRA fiscal year 2018 are $221.9 million.

As the largest of MWRA's Local Bodies, BWSC represents 36.1 percent of the current demand on the MWRA water supply. BWSC's water comes from the Quabbin Reservoir and the Wachusett Reservoir, located about 65 miles and 35 miles west of Boston. The two reservoirs combined supplied an average of 203.7 mgd (millions of gallon per day) to consumers in 2015. The safe yield of the reservoir system is 300 mgd.

Water distributed to the Boston metropolitan area is conveyed from the reservoirs through the Cosgrove or Wachusett Aqueducts and treated at the MWRA's John J. Carroll Water Treatment Plant at Walnut Hill in Marlborough. Treatment includes ozone disinfection, pH adjustment with sodium bicarbonate and the addition of chloramines and fluoride. Water leaves the plant through the Metrowest Water Supply Tunnel and is stored in covered storage tanks, such as Norumbega Reservoir and the Loring Road Tanks, where it is held for delivery to BWSC's service networks. MWRA mains distribute water to the BWSC system at 29 metered delivery points.

Today, Boston is one of 52 Local Bodies that purchases water wholesale from MWRA. BWSC's water distribution system currently provides service to approximately 90,000 active accounts throughout the City. Boston's resident population of nearly 646,000 almost doubles each day by commuting workers and students, shoppers, tourists, conventioneers, hospital patients and visitors.

MWRA has completed construction of major transmission and treatment facilities to service the Greater Boston area including the Metro West Tunnel. These improvements will ensure that Boston receives a reliable source of clean water.

FUNDING SOURCES AND FINANCIAL IMPACT

Funding for the Commission's CIP is provided through four sources: Commission general revenue bonds, rate revenues and two grant/loan programs provided by MWRA.

The primary funding source for the three-year capital program is the sale of Commission general revenue bonds. Over the three-year plan, general revenue bonds will comprise $129.3 million, or 59.0% of the total funding requirement. In 2018, bonds will make up $58.1 million, or 61.3% of the funding required for that year.

As in past CIP's, the 2018-2020 program funds renewal and replacement ("R&R") work from current rate revenues. Renewal and replacement projects include water main relining, water main replacement (only replacement with the same size pipe), sewer pipe rehabilitation. The 2018-2020 CIP outlines R&R expenditures of $49.6 million, or 22.6% of total expenditures over the three years of the program. In 2018, approximately $17.2 million, or 18.2% will be expended out of current rate revenues for CIP projects.

Each year the Commission participates in the MWRA's I/I program for Infiltration/Inflow and Separation projects. Since 1993, the Commission has received $83.7 million in MWRA funding for various Infiltration/Inflow and Separation projects. The Commission plans to continue to take advantage of MWRA funding over the 2018-2020 period. $19.2 million in funding is anticipated to be used for projects that are ongoing along with new projects for the three years 2018-2020.

In 2010, the MWRA Board voted to authorize the development of an interest free loan program to assist its member communities in the performance of water system improvement projects. The program is the MWRA Local Water System Assistance Program (LWSAP). The program offers interest-free loans payable over a ten-year period and is designed to improve water quality in local distribution systems. The amount of funds available in the program is $34.3 million dollars per year with Boston receiving a share of approximately $5.3 million dollars per year. The loans will be repaid to the MWRA over a ten-year period. Loan funds are approved for distribution from fiscal year 2011 through fiscal year 2020. The Commission has applied for loan funding for certain water main replacement projects awarded through the remainder of this program. Project costs incurred since January 1, 2010 have been considered for eligibility in applications under the LWSAP. From 2010-2017 the Commission has received $27.1 million in LWSAP funding.

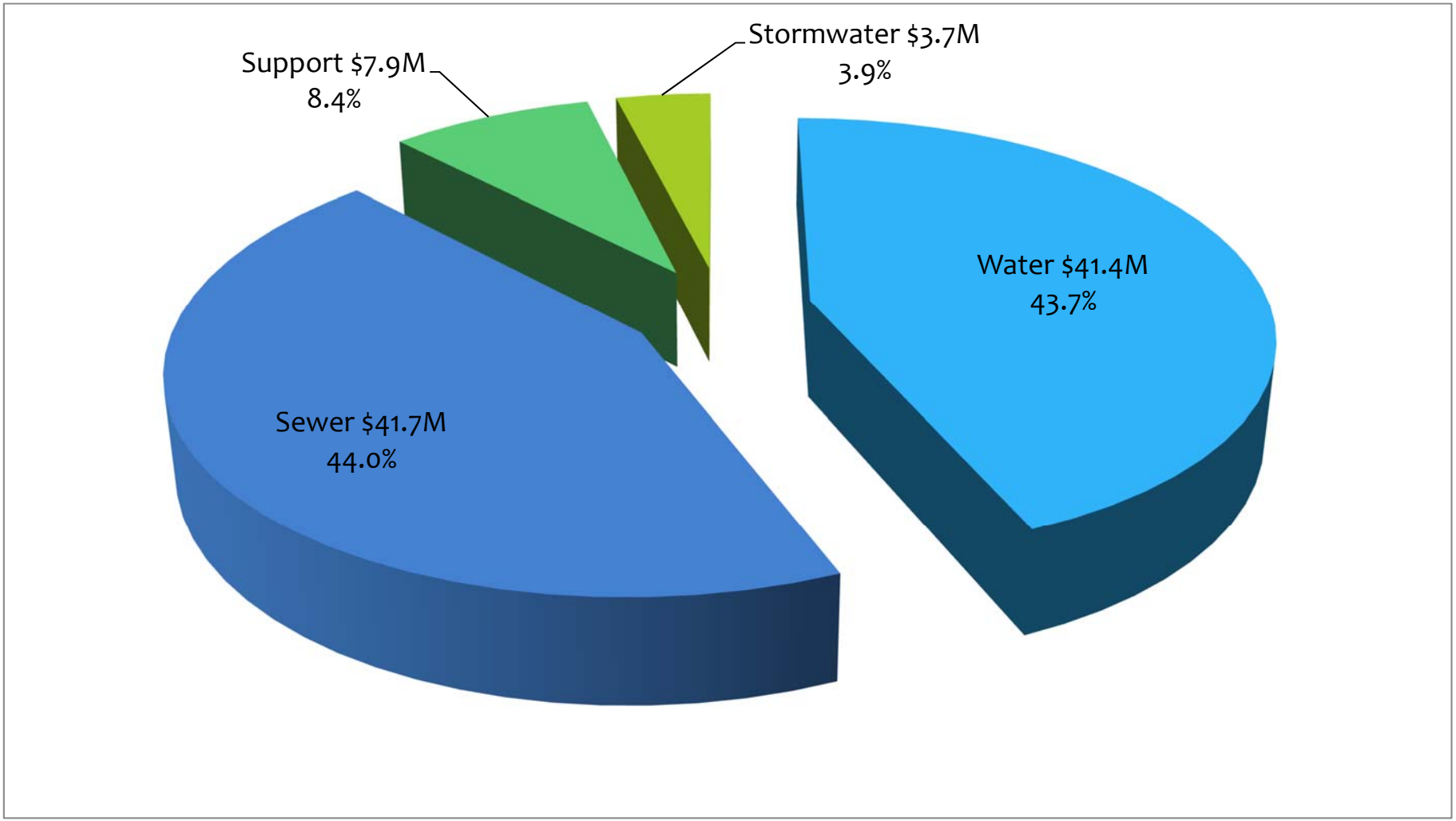
It is anticipated in the 2018-2020 Capital Improvement Program $21.0 million will be funded using the LWSAP Program.

Tables 7 on page 15 represents the cash flow expenditures by category and funding source for the Commission's 2018-2020 CIP.

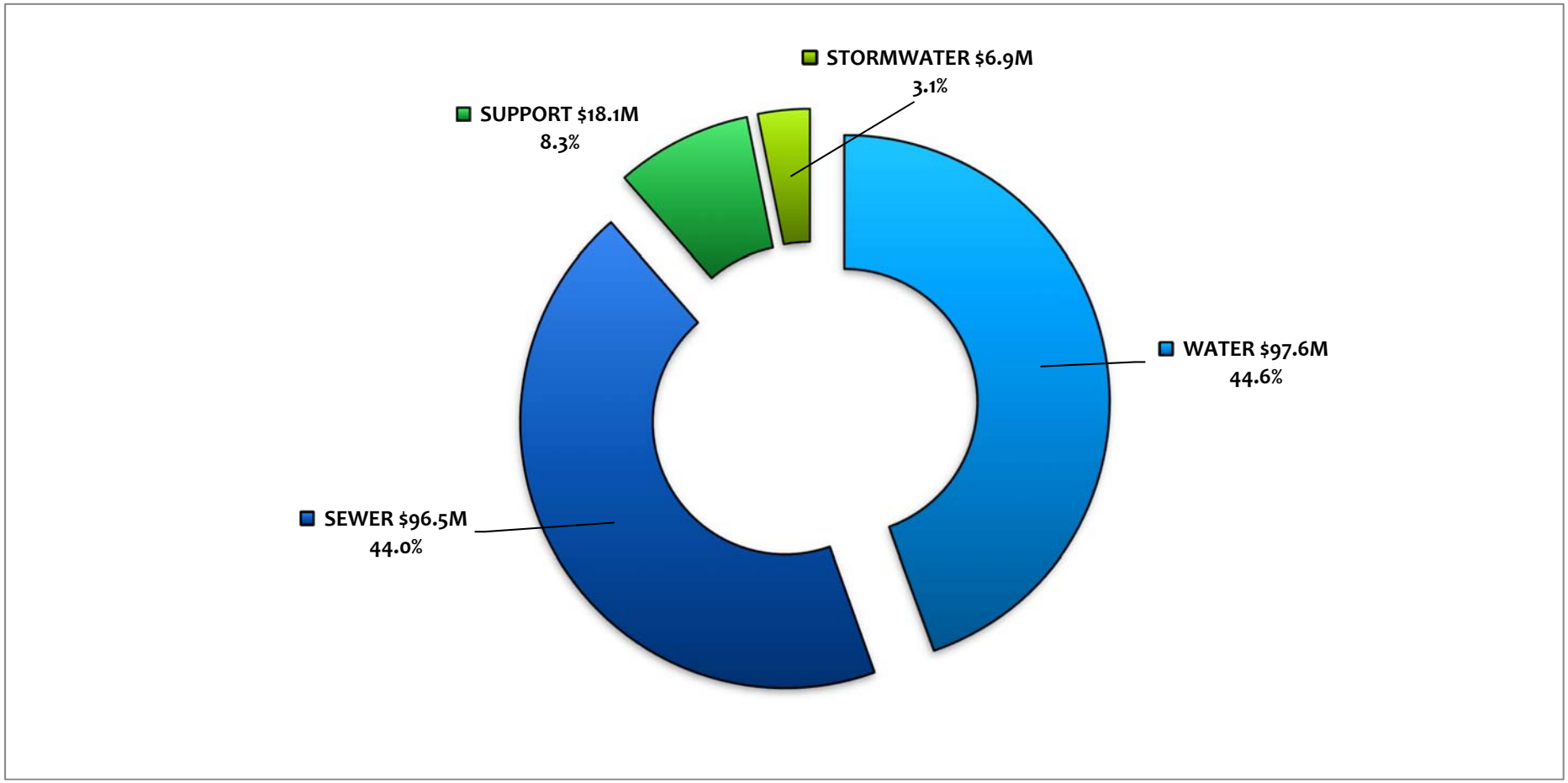
Capital Improvement Program
2018 - 2020
Totals by Category and Funding Source

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
Water Total	$ 252,000	$ 341,000	$ 528,000	$ 552,000	$ 2,721,000	$ 5,225,000	$ 6,225,000	$ 6,157,000	$ 5,505,000	$ 5,395,000	$ 4,497,000	$ 4,005,000	$ 41,403,000	$ 38,057,000	$ 18,095,000	$ 97,555,000
Bonds	242,000	341,000	453,000	552,000	2,497,000	4,476,000	4,769,000	4,379,000	3,828,000	3,739,000	2,882,000	2,880,000	31,038,000	27,230,000	14,065,000	72,333,000
Rate	10,000	-	-	-	102,000	104,000	411,000	602,000	249,000	217,000	217,000	150,000	2,062,000	1,492,000	675,000	4,229,000
LWSAP	-	-	75,000	-	122,000	645,000	1,045,000	1,176,000	1,428,000	1,439,000	1,398,000	975,000	8,303,000	9,335,000	3,355,000	20,993,000
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sewer Total	$ 1,987,000	$ 1,397,000	$ 1,567,000	$ 1,379,000	$ 2,986,000	$ 4,015,000	$ 4,577,000	$ 4,990,000	$ 5,192,000	$ 5,705,000	$ 4,430,000	$ 3,524,000	$ 41,749,000	$ 34,842,000	$ 19,886,000	$ 96,477,000
Bonds	1,109,000	531,000	546,000	504,000	1,694,000	1,530,000	1,476,000	1,586,000	1,998,000	2,388,000	1,095,000	1,021,000	15,478,000	11,338,000	5,152,000	31,968,000
Rate	272,000	272,000	428,000	281,000	698,000	1,637,000	1,752,000	2,052,000	1,943,000	2,165,000	2,183,000	1,491,000	15,174,000	18,244,000	11,889,000	45,307,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	606,000	594,000	593,000	594,000	594,000	848,000	1,349,000	1,352,000	1,251,000	1,152,000	1,152,000	1,012,000	11,097,000	5,260,000	2,845,000	19,202,000
Support Total	$ 250,000	$ 375,000	$ 1,512,000	$ 450,000	$ 460,000	$ 978,000	$ 400,000	$ 750,000	$ 1,210,000	$ 438,000	$ 452,000	$ 650,000	$ 7,925,000	$ 5,810,000	$ 4,400,000	$ 18,135,000
Bonds	250,000	375,000	1,512,000	450,000	460,000	978,000	400,000	750,000	1,210,000	438,000	452,000	650,000	7,925,000	5,810,000	4,400,000	18,135,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stormwater Total	$ 195,000	$ 132,000	$ 132,000	$ 214,000	$ 349,000	$ 374,000	$ 339,000	$ 463,000	$ 498,000	$ 422,000	$ 309,000	$ 245,000	$ 3,672,000	$ 2,106,000	$ 1,115,000	$ 6,893,000
Bonds	195,000	132,000	$ 132,000	$ 214,000	$ 349,000	$ 374,000	$ 339,000	$ 463,000	$ 498,000	$ 422,000	$ 309,000	$ 245,000	$ 3,672,000	$ 2,106,000	$ 1,115,000	$ 6,893,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**$ 2,684,000**	**$ 2,245,000**	**$ 3,739,000**	**$ 2,595,000**	**$ 6,516,000**	**$ 10,592,000**	**$ 11,541,000**	**$ 12,360,000**	**$ 12,405,000**	**$ 11,960,000**	**$ 9,688,000**	**$ 8,424,000**	**$ 94,749,000**	**$ 80,815,000**	**$ 43,496,000**	**$ 219,060,000**
Bonds	1,796,000	1,379,000	2,643,000	1,720,000	5,000,000	7,358,000	6,984,000	7,178,000	7,534,000	6,987,000	4,738,000	4,796,000	58,113,000	46,484,000	24,732,000	129,329,000
Rate	282,000	272,000	428,000	281,000	800,000	1,741,000	2,163,000	2,654,000	2,192,000	2,382,000	2,400,000	1,641,000	17,236,000	19,736,000	12,564,000	49,536,000
LWSAP	-	-	75,000	-	122,000	645,000	1,045,000	1,176,000	1,428,000	1,439,000	1,398,000	975,000	8,303,000	9,335,000	3,355,000	20,993,000
I/I	606,000	594,000	593,000	594,000	594,000	848,000	1,349,000	1,352,000	1,251,000	1,152,000	1,152,000	1,012,000	11,097,000	5,260,000	2,845,000	19,202,000
Total	**$ 2,684,000**	**$ 2,245,000**	**$ 3,739,000**	**$ 2,595,000**	**$ 6,516,000**	**$ 10,592,000**	**$ 11,541,000**	**$ 12,360,000**	**$ 12,405,000**	**$ 11,960,000**	**$ 9,688,000**	**$ 8,424,000**	**$ 94,749,000**	**$ 80,815,000**	**$ 43,496,000**	**$ 219,060,000**

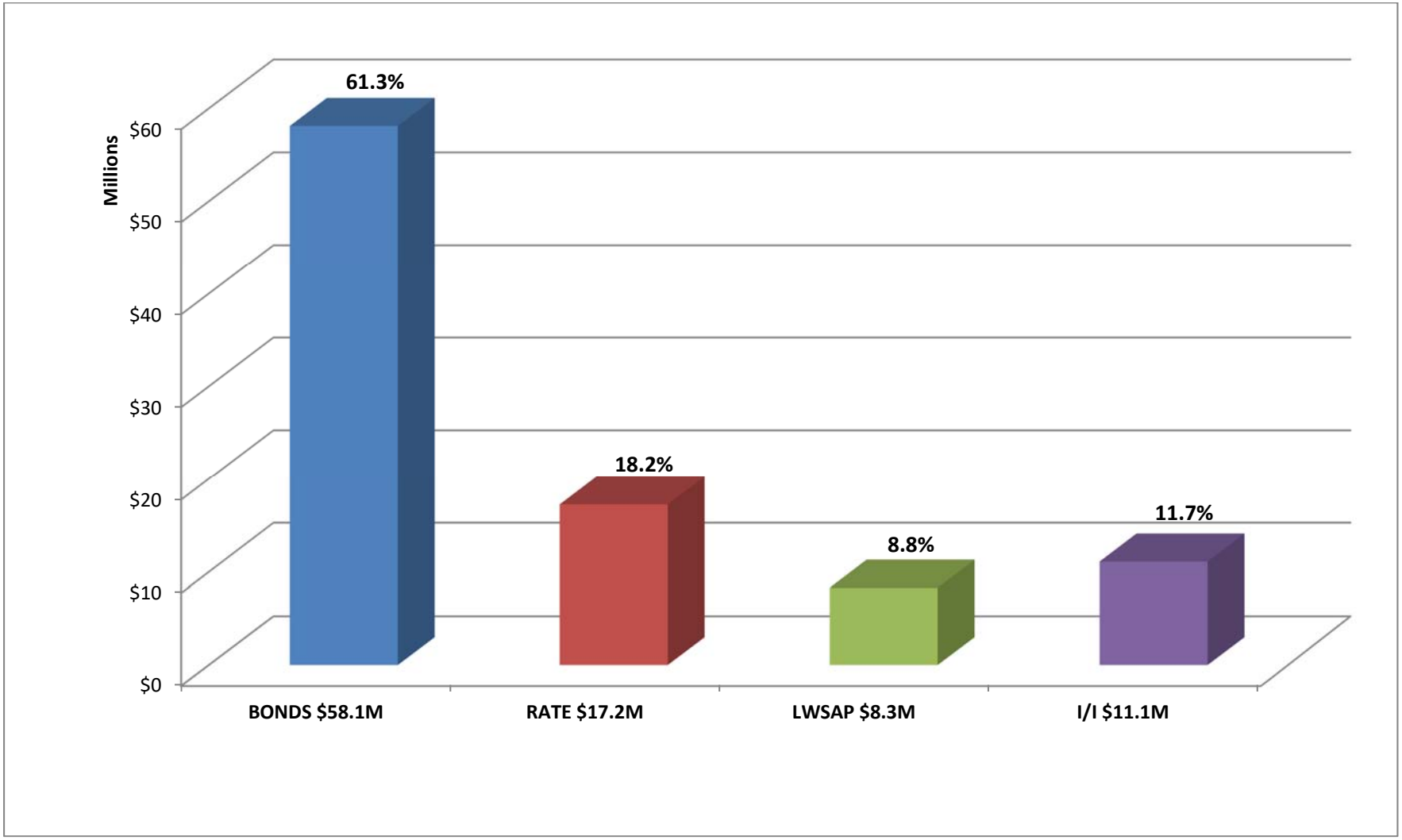
Graph 1 - 2018 CIP Total Expenditures $94.7 Million



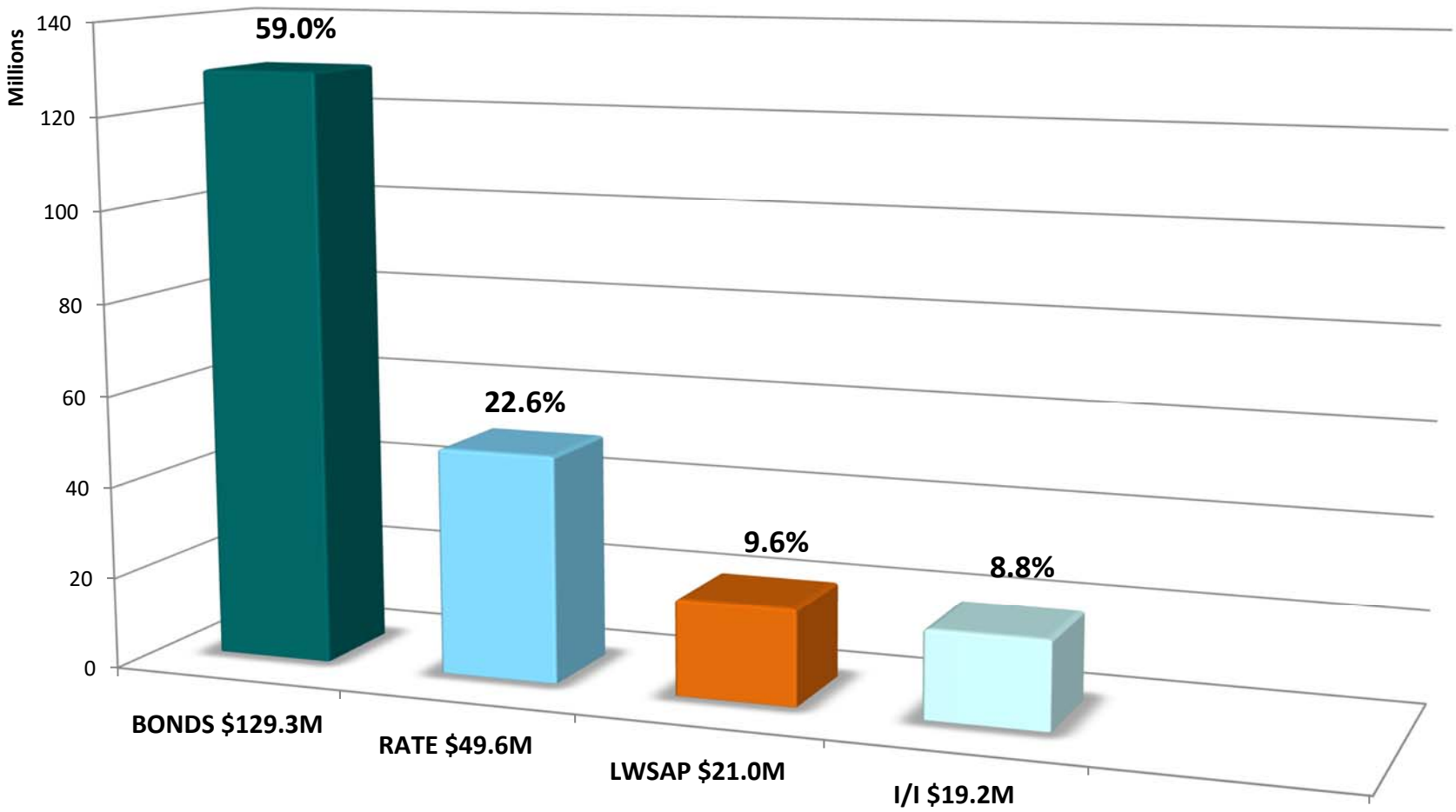
Graph 2 - 2018-2020 CIP Total Expenditures $219.1 Million



Graph 3 – 2018 CIP Total Expenditures by Funding $94.7 Million



Graph 4 - 2018-2020 Total Expenditures by Funding Source $219.1 Million



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WATER DISTRIBUTION SYSTEM

The system serves approximately 90,000 accounts through five major service networks: Southern Low Service, which serves City Proper, South Boston and parts of Roxbury; Northern Low Service which serves Allston/Brighton, Charlestown and East Boston; Southern High Service, which serves City Proper, Allston/Brighton, Dorchester, Hyde Park, Roslindale, and parts of Jamaica Plain, Roxbury and West Roxbury; and Southern Extra-High Service which serves portions of Jamaica Plain, West Roxbury and Hyde Park. In addition, a relatively small area in the Orient Heights section of East Boston is served by a single connection to the MWRA Northern High Service System.

Approximately 90% of the water consumed in the city is delivered through the Southern Low Service and Southern High Service, with most of the remainder delivered through the Northern Low Service. These service networks are supplied with potable water purchased from MWRA at 29 metered delivery points. This water is drawn from the Quabbin and Wachusett Reservoirs located in western and central Massachusetts. Supply is conveyed via aqueducts from these reservoirs to the Loring Road Tanks and Norumbega Reservoirs, where it is held for delivery to the Commission's service networks.

The Commission's current water distribution system consists of the following:

APPURTENANCES		WATER MAIN CITY WIDE		PRESSURE ZONE	
Hydrants	12,681	Total Linear Feet	5,334,918	High Pressure Fire System	16 Miles
		Total Linear Miles	1,010	Northern High	4 Miles
				Northern Low	89 Miles
		Pumping Stations	1		
Gate Valves *	17,526			Southern Extra High	80 Miles
				Southern High	562 Miles
				Southern Low	259 Miles

** Includes only facilities owned by BWSC*

OBJECTIVES

The primary objectives of the 2018-2020 Water Distribution System CIP are:

- To ensure a continued adequate supply of high quality, potable water at adequate pressure for consumption by Commission's customers and for fire protection;
- To reduce the amount of non-revenue producing water and to reduce the long-term maintenance costs of the system;
- To improve the operability of valves and appurtenances so as to advance the efficient operation of the water system;
- To reduce public inconvenience by coordinating the scheduling of system improvements with related projects of other public agencies;

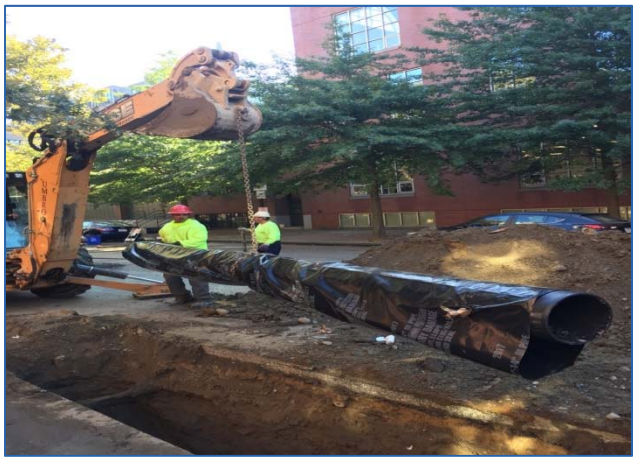
To ensure the above stated objectives are attained, the Commission has implemented projects of the rehabilitation and replacement water mains, the replacement of valves and hydrants and the installation or replacement of water mains associated with bridge reconstruction projects.

Over the last ten years, the Commission has completed a total of $247.4 million in water distribution system improvements. These improvements have resulted in the replacement of 103.1 miles of water mains, and cement lining of 26.3 miles of water mains.

2018-2020 WATER DISTRIBUTION SYSTEM CAPITAL PROGRAM

The Commission's 2018-2020 CIP for the Water Distribution System continues the investments necessary to maintain and improve the water distribution infrastructure. 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. Together, these planned program activities will result in significant improvements to the water distribution system.

Table 8 and Graph 5 present the 2018-2020 capital expenditures for the Water Distribution System. Graph 6 depicts the funding source application of the 2018-2020 capital expenditures. Graph 7 illustrates the spending by the program for 2018. Three-year expenditures are projected to be $97.6 million, of which $41.4 million is anticipated to occur in 2018. The three-year amounts are distributed in the Water Program as follows: Replacement $82.7 million or 84.7%, Reline $0, and Special $14.9 million or 15.3%.



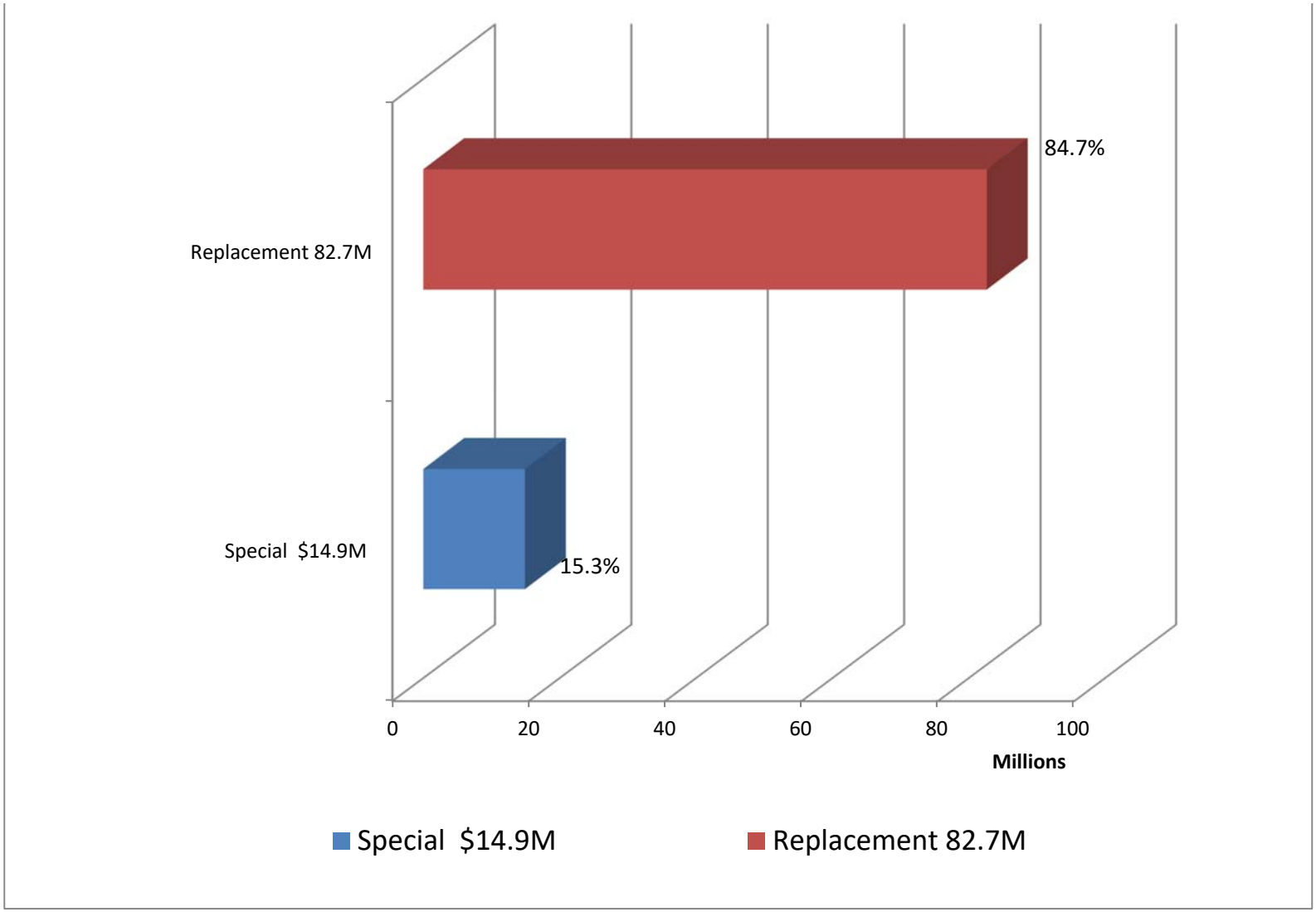
Water Main Replacement in the South End

Table 8 - Water Distribution System by Category

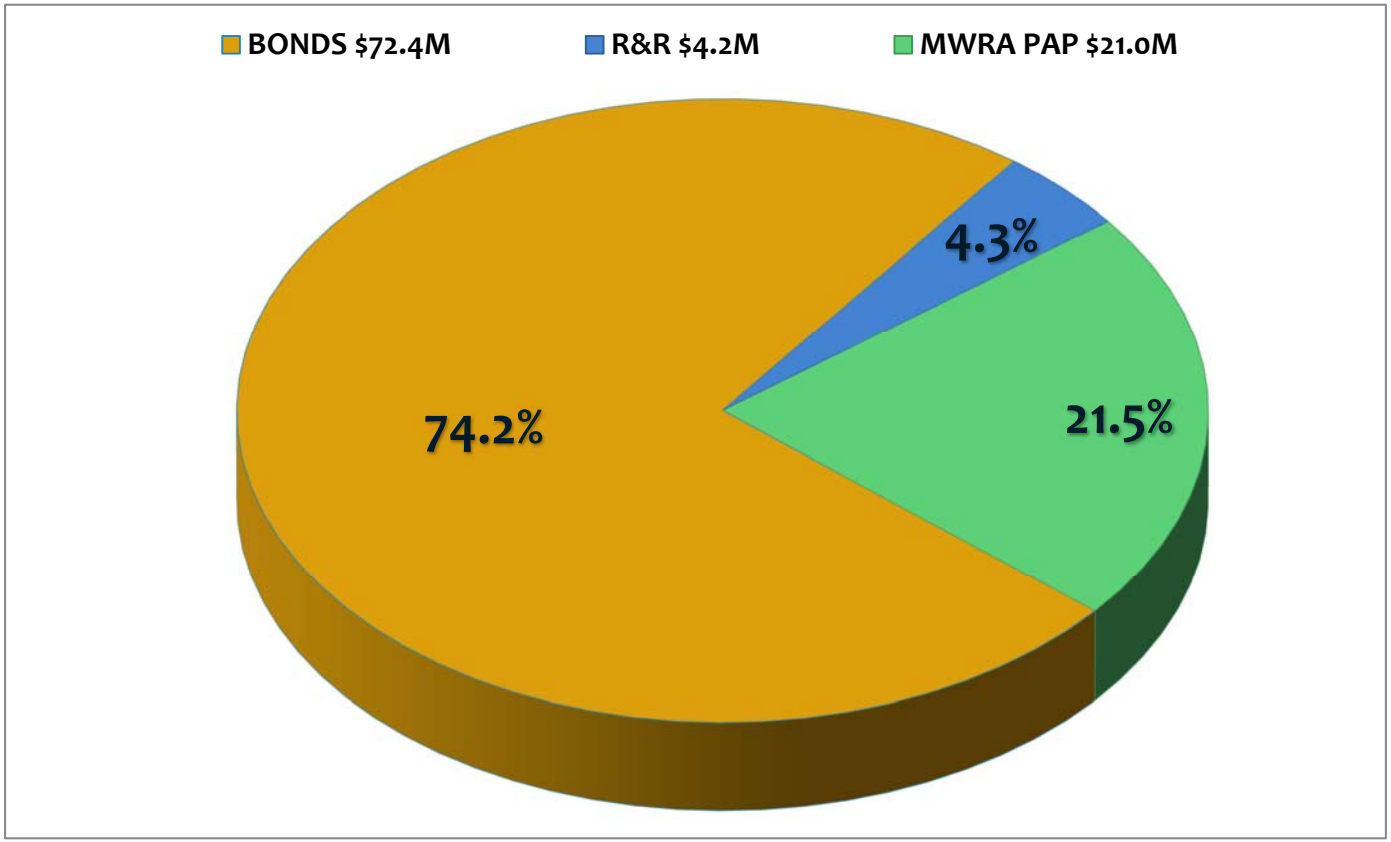
Capital Improvement Program
2018 - 2020
Water Total

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
Water Replacement																
Bonds	100,000	56,000	264,000	264,000	2,232,000	3,723,000	4,014,000	3,625,000	3,073,000	2,986,000	2,129,000	2,227,000	24,693,000	23,120,000	11,455,000	59,268,000
Rate	-	-	-	-	72,000	74,000	369,000	234,000	219,000	187,000	187,000	120,000	1,462,000	867,000	50,000	2,379,000
LWSAP	-	-	75,000	-	122,000	645,000	1,045,000	1,176,000	1,428,000	1,439,000	1,398,000	975,000	8,303,000	9,335,000	3,355,000	20,993,000
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Relay Total	$ 100,000	$ 56,000	$ 339,000	$ 264,000	$ 2,426,000	$ 4,442,000	$ 5,428,000	$ 5,035,000	$ 4,720,000	$ 4,612,000	$ 3,714,000	$ 3,322,000	$ 34,458,000	$ 33,322,000	$ 14,860,000	$ 82,640,000
Water Special																
Bonds	142,000	285,000	189,000	288,000	265,000	753,000	755,000	754,000	755,000	753,000	753,000	653,000	6,345,000	4,110,000	2,610,000	13,065,000
Rate	10,000	-	-	-	30,000	30,000	42,000	368,000	30,000	30,000	30,000	30,000	600,000	625,000	625,000	1,850,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Special Total	$ 152,000	$ 285,000	$ 189,000	$ 288,000	$ 295,000	$ 783,000	$ 797,000	$ 1,122,000	$ 785,000	$ 783,000	$ 783,000	$ 683,000	$ 6,945,000	$ 4,735,000	$ 3,235,000	$ 14,915,000
Water Total	**$ 252,000**	**$ 341,000**	**$ 528,000**	**$ 552,000**	**$ 2,721,000**	**$ 5,225,000**	**$ 6,225,000**	**$ 6,157,000**	**$ 5,505,000**	**$ 5,395,000**	**$ 4,497,000**	**$ 4,005,000**	**$ 41,403,000**	**$ 38,057,000**	**$ 18,095,000**	**$ 97,555,000**
Bonds	242,000	341,000	453,000	552,000	2,497,000	4,476,000	4,769,000	4,379,000	3,828,000	3,739,000	2,882,000	2,880,000	31,038,000	27,230,000	14,065,000	72,333,000
Rate	10,000	-	-	-	102,000	104,000	411,000	602,000	249,000	217,000	217,000	150,000	2,062,000	1,492,000	675,000	4,229,000
LWSAP	-	-	75,000	-	122,000	645,000	1,045,000	1,176,000	1,428,000	1,439,000	1,398,000	975,000	8,303,000	9,335,000	3,355,000	20,993,000
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$ 252,000**	**$ 341,000**	**$ 528,000**	**$ 552,000**	**$ 2,721,000**	**$ 5,225,000**	**$ 6,225,000**	**$ 6,157,000**	**$ 5,505,000**	**$ 5,395,000**	**$ 4,497,000**	**$ 4,005,000**	**$ 41,403,000**	**$ 38,057,000**	**$ 18,095,000**	**$ 97,555,000**

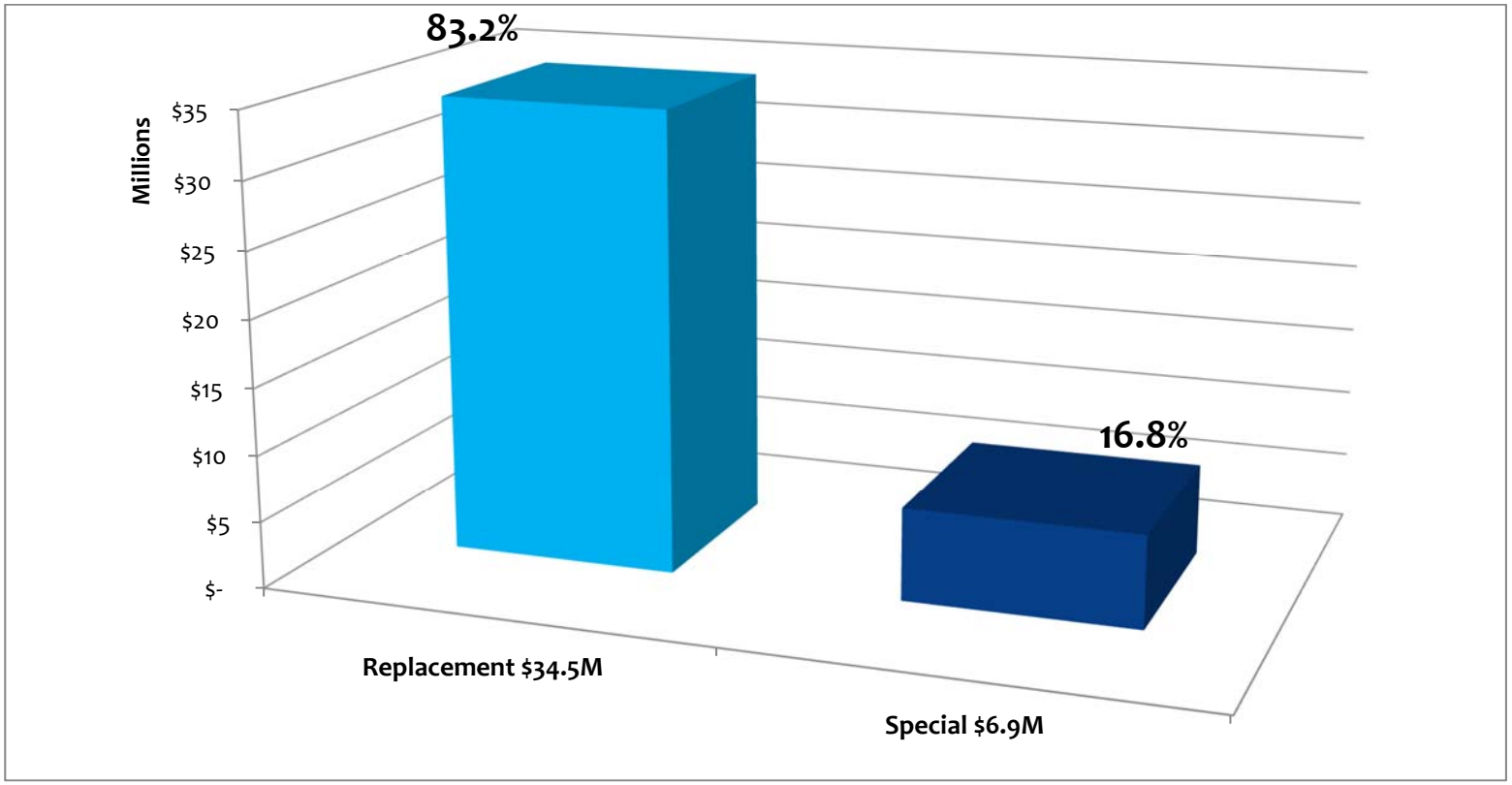
Graph 5 - 2018-2020 Total Water Expenditures by Program $97.6 Million



Graph 6 - 2018-2020 Total Water Expenditures by Funding Source
$97.6 Million



Graph 7 – 2018 Total Water Distributions $41.4 Million



WATER MAIN REPLACEMENT PROGRAM

DESCRIPTION AND JUSTIFICATION

Funding is provided in the 2018-2020 CIP for the continuation of the Commission's Water Main Rehabilitation Program. The program consists of the replacement of unlined cast-iron water mains and water mains that have reached the end of their useful life.

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 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.

The 2018-2020 CIP for the Water Distribution System continues programs for the replacement of water mains, the replacement of older or defective hydrants as necessary on all replacement projects, the replacement of water mains on new or reconstructed bridges and various design services, permits and paving fees associated with the capital funded projects.

The Water Main Replacement Program accomplishes the following:

- Reduces the occurrence of main breaks, public inconvenience, loss of water and associated costs
- Decreases water leakage
- Increases the capacity of water mains
- Reduces discolored water conditions associated with water main tuberculation
- Reduces long-term maintenance costs
- Contributes in the control of bio-film in complying with the requirements of the Safe Drinking Water Act

In 2011, the Commission completed a Water Distribution Study, which analyzed the effectiveness and stability of the water system. Incorporating a progressive approach to understanding system needs, the new study outlines a detailed maintenance and improvement plan.

This study provided a multi-faceted methodology for strategic investments over the next twenty years. As part of the Water Distribution Study all pipes in the BWSC system were placed in a ranking system through specialized software utilizing several factors including pipe age, material, soil conditions, break history and consequence of failure. The study recommended replacing 11 miles of pipe per year. This ranking system was updated in 2016 resulting in a recommendation to replace and rehabilitate 8 miles of pipe per year.

This system is used in the selection of pipes for replacement under the Capital Improvement Program. Pipes with the higher ranking are considered for replacement. Pipes are also selected within proximity to other selected pipe to create geographic based contracts. All streets are coordinated with City and State Paving Programs.

Using the latest technology solutions, we are identifying new areas where BWSC can make sustainable improvement to the quality of our environment and services.

WATER MAIN REPLACEMENT PROGRAM 2018 SUMMARY

The projects scheduled for initiation in 2018 will result in the replacement of approximately 8 miles of water mains.

Prior to construction, the Commission inspects sewer and drain pipes in streets where water pipes are scheduled to be replaced. All sewer and drain replacement and rehabilitation work is then performed along with the water pipe replacement. This coordination avoids disruption of the streets and saves project costs. Funding for the sewer and drain work is included in the sewer section of the CIP.

METHODOLOGY FOR SELECTING WATER MAINS FOR REHABILITATION

The Commission conducts an annual evaluation of its water distribution system to determine and prioritize water main rehabilitation needs. Based on this annual evaluation staff prepares a priority list of pipes to be replaced.

Candidates are based on: information and recommendations from the 2016 update of the pipe ranking system as well as water main breaks, customer complaints concerning water quality or pressure deficiency; BWSC maintenance records; pressure and fire-flow tests; and construction work planned by other agencies.

To the highest extent possible, The Commission coordinates the replacement and lining of water mains with roadway and highway construction, urban development, housing development and mass transit work planned by state or local government entities.

For example, if the City of Boston PWD is planning to resurface a roadway within the next few years, the Commission would make every effort to replace the older water main in that street before it is resurfaced.

The coordination of the Commission's capital programs with other infrastructure improvements minimizes temporary construction related impacts to Boston's residential neighborhoods and commercial centers.

WATER REPLACEMENT

The following pages contain a brief summary of each on-going and new water replacement projects included in the 2018-2020 CIP.

NEW PROJECTS

Water Main Replacement in City Proper – Contract No. 18-308-001: This project includes the replacement of older cast iron water mains that have reached their useful life in the City Proper. Construction is projected to commence April 2019 and be completed by October 2020. The total three-year budget for this project is $6,700,000.

Water Main Replacement in City Proper, Back Bay, and Roxbury – Contract No. 18-308-002: This project includes the replacement of older cast iron water mains that have reached their useful life in City Proper, Back Bay, and Roxbury. Project involves the rehabilitation by trenchless methods of large diameter steel mains. Also included is the dewatering and inspection of a 42-inch steel water pipe which lies beneath the Copley Place Development to determine its condition. Construction is projected to commence June 2019 and be completed by May 2020. The total three-year budget for this project is $9,000,000.

Water Main Replacement in Dorchester – Contract No. 18-308-003: This project includes the replacement of older cast iron water mains that have reached their useful life in Dorchester. Construction is projected to commence April 2019 and be completed by September 2019. The total three-year budget for this project is $1,000,000.

Water Main Replacement in Fenway – Contract No. 18-309-001: This project includes the replacement of older cast iron water mains that have reached their useful life in Fenway. Construction is projected to commence May 2019 and be completed by June 2020. The total three-year budget for this project is $3,330,000.

Water Main Replacement in Hyde Park, Fenway, and Roslindale – Contract No. 18-309-003: This project includes the replacement of older cast iron water mains that have reached their useful life in Hyde Park, Fenway, and Roslindale. Construction is projected to commence July 2019 and be completed by November 2020. The total three-year budget for this project is $3,000,000.

ONGOING PROJECTS

Water Main Replacement in East Boston – Contract No. 17-308-001: This project includes the replacement of older cast iron water mains that have reached the end of their useful life in East Boston. Construction is projected to commence May 2019 and be completed by November 2020. The total three-year budget for this project is $3,700,000.

Water Main Replacement in Dorchester and Roxbury – Contract No. 17-308-002: This project includes the replacement of older cast iron water mains that have reached the end of their useful life in Dorchester and Roxbury. Construction is projected to commence May 2018 and be completed by May 2019. The total three-year budget for this project is $2,300,000.

Water Main Replacement in Jamaica Plain, Mattapan, Hyde Park and West Roxbury – Contract No. 17-308-003: This project includes the replacement of older cast iron water mains that have reached their useful life in Jamaica Plain, Mattapan, Hyde Park and West Roxbury. Construction is projected to commence June 2018 and be completed by May 2019. The total three-year budget for this project is $2,100,000.

Water Main Replacement in City Proper (North Washington St.) – Contract No. 17-308-004: This project includes the replacement of 2,310 linear feet of older cast iron water mains that have reached their useful life in City Proper. Construction is projected to commence April 2018 and be completed by September 2018. The total three-year budget for this project is $2,700,000.

Water Main Replacement in City Proper (Bowdoin St.) – Contract No. 17-308-04A: This project includes the replacement of 5,275 linear feet of older cast iron water mains that have reached their useful life in City Proper. Construction is projected to commence September 2018 and be completed by May 2020. The total three-year budget for this project is $4,314,000.

Water Main Replacement in the South End – Contract No. 17-308-005: This project includes the replacement of older cast iron water mains that have reached their useful life in the South End as well as associated sewers and drains that are in disrepair. Construction is projected to commence May 2018 and be completed by November 2019. The total three-year budget for this project is $3,400,000.

Water Main Replacement in Curlew St., West Roxbury: This project includes the replacement of older cast iron water mains that have reached their useful life on Curlew Street in West Roxbury. Construction is projected to commence April 2018 and be completed by July 2018. The total three-year budget for this project is $127,000.

Water Main Replacement in Dorchester and Roxbury – Contract No. 17-309-002: This project includes the replacement of older cast iron water mains that have reached the end of their useful life in Dorchester. Construction is projected to commence in May 2018 and be completed by September 2018. The total three-year budget for this project is $700,000.

Water Main Replacement Citywide– Contract No. 17-309-02A: This project includes the replacement of 7,659 linear feet of older cast iron water mains that have reached their useful life throughout the City. Construction is projected to commence April 2019 and be completed by October 2020. The total three-year budget for this project is $3,510,000.

Water Main Replacement in East Boston – Contract No. 17-309-005: This project includes the replacement of older cast iron water mains that have reached their useful life in East Boston. Construction is projected to commence May 2018 and be completed by November 2019. The total three-year budget for this project is $835,000.

Water Main Replacement in Roxbury – Contract No. 17-309-011: This project includes the replacement of older cast iron water mains that have reached their useful life in Roxbury. Construction is projected to commence August 2018 and be completed by December 2019. The total three-year budget for this project is $150,000.

Water Portion of Sewer Separation Contract in Roxbury – No. 15-309-011: This project includes the replacement of water mains as part of the sewer separation in Roxbury. Construction commenced in August 2016 and is projected to be completed by July 2018. The total three-year budget for this project is $372,000.

Water Portion of Sewer Separation in East Boston Contract 16-309-005: This project includes the replacement of older cast iron water mains that have reached their useful life in the East Boston. Construction is projected to commence May 2018 and a completion date of June 2019. The total three-year budget for this project is $740,000.

Water Main Replacement in East Boston Contract No. 16-308-001: This project includes the replacement of 7,140 linear feet of older cast iron water mains that have reached their useful life in East Boston. Construction commenced in September 2017 and is projected to be completed by September 2019. The three-year budget for this project is $3,308,000.

Water Main Replacement in Roxbury Contract No. 16-308-002: This project includes the replacement of approximately 6,000 linear feet of older cast iron water pipes in Roxbury. Construction is projected to commence in April 2018 and be completed by May 2019. The total three-year budget for this project is $1,700,000.

Water Main Replacement in Hyde Park, Mattapan, Roslindale, and West Roxbury – Contract No. 16-308-003: This project includes the replacement of 5,980 linear feet of older cast iron water mains that have reached their useful life in Hyde Park, Mattapan, Roslindale, and West Roxbury. Construction is projected to commence April 2018 and be completed by July 2019. The total three-year budget for this project is $1,700,000.

Water Main Replacement in the Fenway– Contract No. 16-308-004: This project includes the replacement of older iron water mains in the Fenway. Construction commenced April 2017 and is projected to be completed by September 2018. The total three-year budget for this project is $798,000.

Water Main Replacement in Dorchester and the South End – Contract No. 16-308-005: This project includes the replacement of 6,320 feet older cast iron water mains in Dorchester and the South End. Construction is projected to commence in April 2018 and is projected to be completed in October 2019. The total three-year budget for this project is $3,500,000.

Water Main Replacement in Dorchester and the South End – Contract No 16-308-006: This project includes replacement of 4,625 feet older cast iron water mains in Dorchester and the South End. Construction is projected to commence April 2018 and is projected to be completed in October 2019. The total three-year budget for this project is $1,800,000.

Water Main Replacement City-wide – Contract No. 16-309-002: This project includes the replacement of older cast iron water mains that have reached the end of their useful life throughout Boston. Construction commenced in April 2017 and be completed by October 2018. The total three-year budget for this project is $212,000.

Water Main Replacement in Roxbury – Contract No. 16-309-011: This project includes the replacement of older cast iron water mains that have reached the end of their useful life in Roxbury. Construction commenced in August 2017 and is projected to be completed by December 2018. The total three-year budget for this project is $226,000.

Water Main Replacement in Fenway/Kenmore Square Contract No. 15-308-001: This project includes the replacement of 3,640 linear feet of older cast iron water mains that have reached their useful life in Fenway/Kenmore and City Proper. Construction is commenced in August 2017 and is projected to be completed by May 2019. The total three-year budget for this project is $3,178,000.

Water Main Replacement in the South End, Roxbury and City Proper Contract No. 15-308-004: This project includes the replacement of 3,640 linear feet of older cast iron water mains that have reached their useful life in the South End, Roxbury and City Proper. Construction commenced July 2017 with a completion date of August 2018. The total three-year budget for this project is $1,979,000.

Dorchester, Hyde Park, Roslindale, South End & Roxbury Contract No. 15-308-005: This project includes the replacement of approximately 8,800 linear feet of water pipes in Dorchester and Hyde Park. Construction commenced September 2017 with a completion date of June 2019. The total three-year budget for this project is $1,744,000 for water only.

Water Main Replacement in Allston/Brighton & Charlestown Contract No. 15-308-006: This project includes the replacement of older cast iron water mains that have reached their useful life in Allston/Brighton and Charlestown. Construction commenced in April 2017 and is projected to be completed by June 2018. The total three-year budget for this project is $2,075,000.

Water Main Replacement in Roslindale, Hyde Park, & West Roxbury Contract No. 15-308-007: This project includes the replacement of older cast iron water mains that have reached their useful life in Roslindale, Hyde Park, and West Roxbury. This Project commenced in August 2017 and is projected to be completed by September 2018. The total three-year budget for this project is $1,630,000.

Water Main Replacement in Dorchester, East Boston and Mattapan – Contract No. 15-309-001: This project includes the replacement of older cast iron water mains that have reached their useful life in Dorchester, East Boston and Mattapan. Construction is commenced August 2017 and scheduled to be completed by July 2019. The total three-year budget for this project is $428,000.

Water Main Replacement in West Roxbury Contract No. 14-308-003: This project includes the replacement of 15,655 linear feet of older cast iron water mains that have reached their useful life in West Roxbury. Construction is projected to commence in April 2018 and be completed by October 2020. The total three-year budget for this project is $5,600,000.

Water Main Replacement in Fenway/Kenmore, Jamaica Plain, & Roxbury Contract No. 14-308-004: This project includes the replacement of approximately 6,300 linear feet of older cast iron water mains that have reached their useful life in Fenway/Kenmore, Jamaica Plain, and Roxbury. Construction commenced in October 2016 and is projected to be completed by November 2018. The total three-year budget for this project is $56,000.

Water Main Replacement in South Boston, East Boston & Hyde Park Contract No. 14-308-005: This project includes the replacement of approximately 9,000 linear feet of water pipes in East Boston, South Boston and Hyde Park. Construction commenced in August 2016 and was completed in August 2017. A budget of $50,000 will be established in 2018 to cover the closing costs of this contract.

Allston/Brighton, Dorchester Contract No. 14-308-006: This project includes the replacement of approximately 5,300 linear feet of water pipes in Allston/Brighton and Dorchester. Construction is projected to commence in February 2018 and be completed by Oct 2018. The total three-year budget for this project is $2,375,000.

Water Main Replacement Citywide – Contract No. 14-309-001: This project includes the replacement of 4,840 linear feet of older cast iron water mains that have reached their useful life throughout the City. Construction is projected to commence April 2018 and be completed by August 2020. The total three-year budget for this project is $2,178,000.

Water Main Replacement in City Proper Contract No. 12-308-008: This project included the replacement of approximately 2,735 linear feet of older cast iron water mains in City Proper. Construction commenced in March 2015 and was completed in June 2016. A budget of $75,000 will be established in 2018 to cover the closing costs of this contract.

Water Main Replacement in City Proper Contract No. 11-308-010: This project included the replacement of approximately 5,150 linear feet of older cast iron water mains in City Proper. Construction commenced in July 2013 and was completed in November 2014. A budget of $50,000 will be established in 2018 to cover the closing costs of this contract.

PROJECT CASH FLOW

Table 9 on page 35 presents cash flow expenditures for Water Replacement Projects for the period from 2018-2020. The total expenditures for the three-year period are $82,640,000. The expenditures for 2018 are anticipated to be $34,458,000.

Table 9 - Water Replacement

Capital Improvement Program
2018 - 2020
Water Pipe Replacement

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
Water Main Replacement in City Proper	-	-	-	-	-	-	-	-	-	-	-	-	-	3,000,000	3,700,000	6,700,000
Water Main Replacement in City Proper, Back Bay & Roxbury	-	-	-	-	-	-	-	-	-	-	-	-	-	6,000,000	3,000,000	9,000,000
Water Main Replacement in Dorchester	-	-	-	-	-	-	-	-	-	-	-	-	-	1,000,000	-	1,000,000
Water Main Replacement in Fenway	-	-	-	-	-	-	-	-	-	-	-	-	-	2,330,000	1,000,000	3,330,000
Water Main Replacement in Hyde Park, Mattapan & Roslindale	-	-	-	-	-	-	-	-	-	-	-	-	-	1,500,000	1,500,000	3,000,000
Water Main Replacement in South End	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ongoing Projects																
Water Main Replacement in East Boston	-	-	-	-	-	-	-	-	-	-	-	-	-	2,800,000	900,000	3,700,000
Water Main Replacement in Dorchester and Roxbury	-	-	-	-	-	-	300,000	400,000	400,000	400,000	400,000	100,000	2,000,000	300,000	-	2,300,000
Water Main Replacement in Jamaica Plain and Mattapan	-	-	-	-	-	-	-	-	253,000	254,000	253,000	253,000	1,013,000	1,087,000	-	2,100,000
Water Main Replacement in North Washington St.	-	-	-	-	-	578,000	385,000	385,000	385,000	577,000	-	-	2,310,000	390,000	-	2,700,000
Water Main Replacement in Bowdoin St. & Lincoln St.	-	-	-	-	-	-	-	-	-	-	180,000	720,000	900,000	2,514,000	900,000	4,314,000
Water Main Replacement in the South End	-	-	-	-	-	-	500,000	500,000	500,000	500,000	500,000	500,000	3,000,000	400,000	-	3,400,000
Curlew St Betterment	-	-	-	-	-	-	-	-	42,000	42,000	43,000	-	127,000	-	-	127,000
Water Port of Sewer R & R in Dorchester (Fendale St.)	-	-	-	-	-	-	100,000	130,000	130,000	140,000	100,000	100,000	700,000	0	-	700,000
Water Main Replacement in East Boston (Barnes St. & Bennington St.)	-	-	-	-	-	-	-	-	-	-	-	-	-	1,755,000	1,755,000	3,510,000
Water Pipe Replacement in East Boston (Assoc w/ Separation)	-	-	-	-	-	-	70,000	70,000	70,000	70,000	70,000	67,000	417,000	418,000	-	835,000
Water Main Replacement in Upper Roxbury Phase III	-	-	-	-	-	-	-		-	-	-	-	-	100,000	50,000	150,000
Wat Port Sew Sep Roxbury Contract 1	-	-	-	-	290,000	15,000	13,000	-	-	54,000	-	-	372,000	-	-	372,000
Wat Port Sew Sep in East Boston	-	-	-	-	-	-	200,000	100,000	75,000	50,000	50,000	25,000	500,000	240,000	-	740,000
Water Main Replacement in E. Bost	-	-	-	-	122,000	245,000	245,000	246,000	245,000	245,000	245,000	122,000	1,715,000	1,593,000		3,308,000
Water Main Replacement in Roxbury	-	-	-	-	-	-		300,000	300,000	300,000	300,000	300,000	1,500,000	200,000	-	1,700,000
Water Main Replacement in Matt, H Park, JP & West Rox	-	-	-	-	-	200,000	200,000	200,000	200,000	200,000	-	-	1,000,000	700,000	-	1,700,000
Water Main Replacement in the Fenway	-	-	-	-	217,000	232,000	158,000	-	-	153,000	-	38,000	798,000	-	-	798,000
Water Main Replacement in Dorchester & the South End	-	-	-	-	-	200,000	200,000	200,000	200,000	200,000	200,000	200,000	1,400,000	1,400,000	700,000	3,500,000
Water Main Replacement in South End & Dorchester	-	-	-	-	-	200,000	200,000	200,000	200,000	200,000	200,000	200,000	1,400,000	400,000	-	1,800,000
Wat Pipe Replacement City Wide	-	-	-	-	126,000	75,000	6,000	5,000	-	-	-	-	212,000	0	-	212,000
Sewer Separation Roxbury Contract 2 Water Portion	-	-	-	-	29,000	28,000	28,000	28,000	28,000	28,000	29,000	28,000	226,000	-	-	226,000
Wat Mn Replace in Fenway and Kenmore Square	-	-	-	-	163,000	326,000	326,000	326,000	326,000	326,000	326,000	163,000	2,282,000	896,000	-	3,178,000
Water Main Replacement in the South End, Roxbury & City Proper	-	-	-	-	89,000	173,000	167,000	173,000	173,000	168,000	173,000	42,000	1,158,000	821,000	-	1,979,000
Water Main Replacement in Dorchester, Hyde Park, Roslindale	-	-	-	-	370,000	308,000	320,000	445,000	81,000	-	-	176,000	1,700,000	44,000	-	1,744,000
Water Main Replacement in Allston/Brighton	-	-	-	-	453,000	805,000	553,000	211,000	-	53,000	-	-	2,075,000	-	-	2,075,000
Water Main Replacement in Ros, H Park and West Rox	-	-	-	-	260,000	340,000	550,000	245,000	230,000	5,000	-	-	1,630,000	-	-	1,630,000
Wat Pipe Replacement Port of Sewer and Drain Replace & Rehab	-	-	-	-	43,000	46,000	71,000	36,000	46,000	39,000	38,000	-	319,000	109000	-	428,000
Water Main Replacement in West Roxbury	-	-	-	-	-	227,000	455,000	454,000	455,000	227,000	227,000	228,000	2,273,000	2,500,000	827,000	5,600,000
Water Main Replacement in Fen/Ken & JP	-	56,000	-	-	-	-	-	-	-	-	-	-	56,000	-	-	56,000
Water Main Replacement in E. Bost, Hyde Park & S. Bost	50,000	-	-	-	-	-	-	-	-	-	-	-	50,000	-	-	50,000
Water Main Replacement in Allst/Brig & Dor	-	-	264,000	264,000	264,000	264,000	264,000	264,000	264,000	264,000	263,000	-	2,375,000	-	-	2,375,000
Wat Port of Sewer and Drain Renewal & Replacement for 2014	-	-	-	-	-	180,000	117,000	117,000	117,000	117,000	117,000	60,000	825,000	825,000	528,000	2,178,000
Water Main Replacement in City Proper (Beach St., North Bennett St.)	-	-	75,000	-	-	-	-	-	-	-	-	-	75,000	-	-	75,000
Water Main Replacement in City Proper (Kneeland St.)	50,000	-	-	-	-	-	-	-	-	-	-	-	50,000	-	-	50,000
Totals	**$100,000**	**$56,000**	**$339,000**	**$264,000**	**$2,426,000**	**$4,442,000**	**$5,428,000**	**$5,035,000**	**$4,720,000**	**$4,612,000**	**$3,714,000**	**$3,322,000**	**$34,458,000**	**$33,322,000**	**$14,860,000**	**$82,640,000**
Bonds	100,000	56,000	264,000	264,000	2,232,000	3,723,000	4,014,000	3,625,000	3,073,000	2,986,000	2,129,000	2,227,000	24,693,000	23,120,000	11,455,000	59,268,000
Rate	-	-	-	-	72,000	74,000	369,000	234,000	219,000	187,000	187,000	120,000	1,462,000	867,000	50,000	2,379,000
LWSAP	-	-	75,000	-	122,000	645,000	1,045,000	1,176,000	1,428,000	1,439,000	1,398,000	975,000	8,303,000	9,335,000	3,355,000	20,993,000
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$100,000**	**$56,000**	**$339,000**	**264,000.00**	**$2,426,000**	**$4,442,000**	**$5,428,000**	**$5,035,000**	**$4,720,000**	**$4,612,000**	**$3,714,000**	**$3,322,000**	**$34,458,000**	**$33,322,000**	**$14,860,000**	**$82,640,000**

WATER DISTRIBUTION SYSTEM SPECIAL PROJECTS

DESCRIPTION AND JUSTIFICATION

Special Projects includes funding for a variety of system planning and other studies, professional services associated with the rehabilitation and operation of the water system, and for the engineering design and construction of the installation or replacement of water mains associated with bridge improvement projects undertaken by other agencies. Also included are the associated design and engineering services required for the implementation of capital projects and the permanent paving fees for ongoing and future capital improvements.

Overall, the objectives of the Water Distribution System Special Projects are to extend the useful life of water mains, reduce long-term maintenance and repair costs, reduce the occurrence of main breaks and the resulting impacts, conserve drinking water and coordinate improvements with other agencies to minimize disruptions.

NEW PROJECTS

None

ONGOING PROJECTS

Traffic Management Services Contract No. 15-206-008: In support of the capital plan, on occasion it is necessary to develop traffic management plans for construction phasing of water, sewer, and drain replacement projects. This project allows the commission to utilize transportation engineers to develop these plans in accordance with BTD regulations. The total three-year budget for this project is $125,000.

(CWS)Leak Detection – Large Mains: This project will be a pilot program to test the installation of a permanent leak detection system on large diameter transmission water mains. By monitoring these mains, unnoticeable leaks can be detected early and repaired before catastrophic failure of the pipe occurs and sensors can be installed to monitor for indicators of possible drinking water contamination. This contract will survey 165 miles of BWSC's large mains ranging in size from 48" to 16" water main. There will also be a pilot to test a fixed network for large main detection. Construction for this project commenced in July 2017 with a completion date of September 2020. The total three-year budget for this project is $1,230,000.

Water Pipe Testing Services Contract No. 15-206-010: The Commission has developed an on-going pipe sampling and testing program to analyze water pipe for failure causes and likelihood which supports the water capital plan. This is a three year contract which began in August 2015 and is set to be completed in August 2018. The total three-year budget for this project is $300,000.

Water Main Flushing Program Contract No. 14-203-001: This project involves the implementation and maintenance of a water main flushing program for the Commission's water distribution system by a qualified professional engineering consulting firm. Since 1997, the Commission has maintained a system-wide water main flushing program to ensure water quality throughout its entire water distribution system. The flushing program was initiated as part of the Commission's Biofilm Corrective Action Plan developed in response to a 1996 violation of the total Coliform Rule, a national primary drinking water regulation. Since implementation of the water main flushing program, the Commission has had no Coliform bacteria violations.

The Commission unidirectional water main flushing program is designed to flush all meter sections individually and includes water main pipes less than 16-inches in diameter. Unidirectional water main flushing is achieved by closing valves to isolate water mains from the actual main being flushed. After isolating the desired pipe and creating one intake main, hydrant(s) are flowed downstream from a dead-end valve. Water main flushing is intended to bring stronger chloramines residuals into areas where it is low and scour pipe walls of biofilm and tuberculation.

Annually, the Commission flushes approximately 200 miles of water main with the intended goal of flushing 800 miles over a four year cycle. This project commenced in April 2015 with a completion date of December 2018. This program will be continued in 2019 with another four year contract. The total three-year budget for this project is $750,000.

Subsurface Investigation Services Contract No. 14-206-004: In support of capital projects it is necessary to gain information on the location, depth, and size of underground facilities such as manholes, pipes, and structures. This contract supplements BWSC staff in these efforts. During the construction of capital projects it is often necessary to install Commission facilities in areas with a great deal of utilities. This project includes services for non-destructive excavation with electronic detection to locate subsurface utilities during the design phase in streets included in the Capital Improvement Program. Knowledge of the locations of other underground utilities helps to alleviate change orders during construction. This is a three-year professional services contract. The total three-year budget for this project is $300,000.

Hydrant Replacement Contract 13-103-004: Replacement of defective and inoperative hydrants is essential to maintain public safety and reduce unaccounted-for-water resulting from hydrant leaks. Older fire hydrants, many of which are impossible to repair due to unavailability of replacement parts, must be replaced to ensure Public Safety. Standardization of hydrants also reduces the number and styles of hydrant repair parts needed to be stored in inventory. Large quantity purchases significantly reduce unit costs and assure cost over a three year period. Construction is projected to commence in January 2018 with a completion date of December 2020. New Hydrants will be installed through the

Annual Area Emergency Contracts, Construction Projects and by Operations personnel. Custodian-equipped hydrants discourage illegally-opened hydrants and reduce unaccounted-for-water loss by preventing water theft. The total three-year budget for this project is $975,000.

City of Boston Street Opening Permit Fees: The Boston Water and Sewer Commission is required by the City of Boston's regulations to obtain street opening permits for any construction activity that will require the removal of existing street and/or sidewalk material in the public way. This project involves obtaining street opening permits from the City of Boston for excavation activities performed by the Commission forces in the public way. The City of Boston Public Works Department issues the street opening permits for which the Commission reimburses the City. This project is renewed annually. The three-year budget totals $6,000,000.

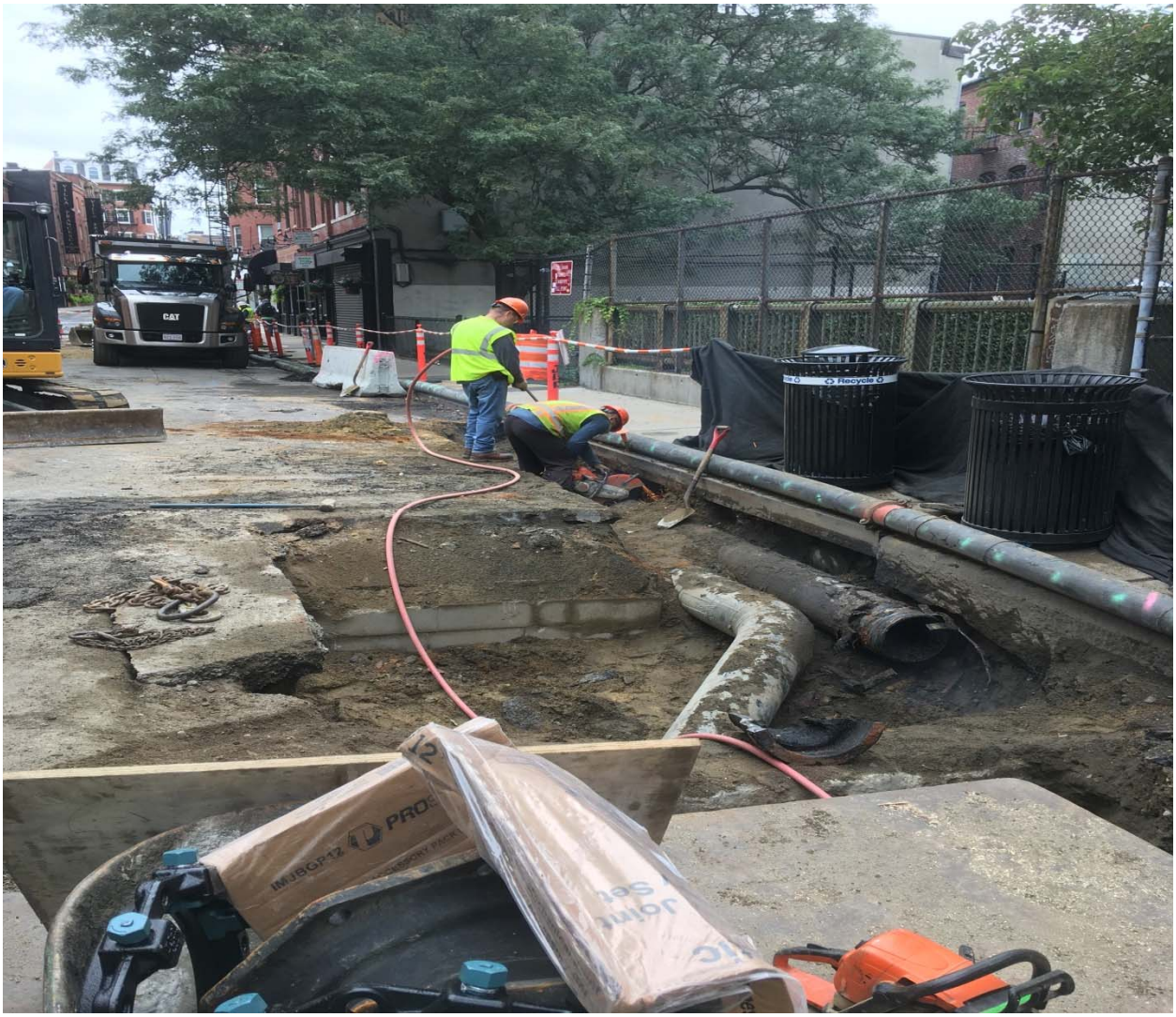
City of Boston Paving Restoration: The Boston Water and Sewer Commission is responsible for the permanent restoration of streets and sidewalks excavated during construction activities. On an annual basis, the Commission publicly advertises and awards to private contractors permanent restoration work. In addition, the Commission is required to reimburse City of Boston's contractors for the repairs and/or replacement of the Commission's castings as a result of the permanent restoration of the streets under the City contracts. The three-year budget totals $5,235,000.

Streets	2018	2019	2020	2018-2020 Total
Permits	2,000,000	2,000,000	2,000,000	$6,000,000
Paving	3,735,000	1,500,000	-	$5,235,000
Total	$5,735,000	$3,500,000	$2,000,000	$11,235,000

Total projected three-year expenditures for permit and paving equal $15,791,000.

PROJECT CASH FLOW

Table 10 on page 40 illustrates the cash flow information for the Water Special Program for 2018-2020. Three-year expenditures for this program total $14,915,000, of which $6,945,000 will be spent in 2018.



Water Main Replacement in the North End

Table 10 - Water Special

Capital Improvement Program
2018 - 2020
Water Special

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
Ongoing Projects																
Traffic Management Services	-	-	-	-	-	-	12,000	13,000	-	-	-	-	25,000	50,000	50,000	125,000
(CWS) Leak Detection - Large Mains	35,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	34,000	35,000	410,000	410,000	410,000	1,230,000
Water Pipe Testing Services	7,000	8,000	9,000	8,000	9,000	8,000	9,000	8,000	9,000	8,000	9,000	8,000	100,000	100,000	100,000	300,000
Water Main Flushing Program	10,000	-	-	-	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	250,000	250,000	250,000	750,000
Subsurface Investigation	-	-	-	11,000	11,000	11,000	12,000	12,000	12,000	11,000	10,000	10,000	100,000	100,000	100,000	300,000
Hydrant Replacement	-	-	-	-	-	-	-	325,000	-	-	-	-	325,000	325,000	325,000	975,000
Operations Permits	100,000	100,000	100,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	100,000	2,000,000	2,000,000	2,000,000	6,000,000
Paving	-	143,000	46,000	35,000	11,000	500,000	500,000	500,000	500,000	500,000	500,000	500,000	3,735,000	1,500,000	-	5,235,000
Totals	**$152,000**	**$285,000**	**$189,000**	**$288,000**	**$295,000**	**$783,000**	**$797,000**	**$1,122,000**	**$785,000**	**$783,000**	**$783,000**	**$683,000**	**$6,945,000**	**$4,735,000**	**$3,235,000**	**$14,915,000**
Bonds	142,000	285,000	189,000	288,000	265,000	753,000	755,000	754,000	755,000	753,000	753,000	653,000	6,345,000	4,110,000	2,610,000	13,065,000
Rate	10,000	-	-	-	30,000	30,000	42,000	368,000	30,000	30,000	30,000	30,000	600,000	625,000	625,000	1,850,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$152,000**	**$285,000**	**$189,000**	**$288,000**	**$295,000**	**$783,000**	**$797,000**	**$1,122,000**	**$785,000**	**$783,000**	**$783,000**	**$683,000**	**$6,945,000**	**$4,735,000**	**$3,235,000**	**$14,915,000**

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THE SEWER SYSTEM

The Commission owns and operates a system for the collection and transport of wastewater 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. Neither the pumping station, nor the tunnel is in use today. 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 were completed, replacing portions of the original system. The interceptors serve the sewer needs of downtown Boston, the South End, Roxbury, Dorchester, and South Boston. These improvements have increased capacity, eliminated dry weather overflows, and lowered the volume of wet weather overflows.

Other collection facilities provide sewer services to different parts of the City. Charlestown is served by a separated system, except for one small area. East Boston, City Proper, South Boston and Roxbury are served mainly by combined systems; however, major portions of each area have been or are in the process of being separated. The South End has been partially separated under a program initiated by the City's urban renewal program, and continued by the Commission where feasible and cost effective. Allston/Brighton, Roslindale, West Roxbury, Hyde Park, Mattapan and portions of Dorchester and Jamaica Plain, all of which are located in the southern part of the City, are served by separate systems.

The backbone of the Commission's sewer system is a number of major interceptors which convey flows from the Commission's system to the MWRA's interceptors. The New East Side Interceptor and the New Boston Main Interceptor completed in 1988, and the New Albany Interceptor completed in 1990, serve downtown Boston, South Boston, South End and Dorchester. The other interceptors and the neighborhoods they serve are:

Interceptor	Neighborhood Served
Boston Main Interceptor	South End, Roxbury and North Dorchester
Dorchester Interceptor	Dorchester and Neponset
East Side Interceptor	Downtown and North End
Faneuil Street Trunk Sewer	Allston/Brighton
Roslindale Interceptor	Roslindale and West Roxbury
South Boston Interceptors	South Boston
Southwest Corridor Interceptor	Roxbury and Jamaica Plain
Stony Brook Interceptor Stony Brook Valley Sewer	Roxbury Roxbury and Jamaica Plain
West Side Interceptor	Back Bay, Beacon Hill and West End
Talbot Avenue High Level Sewer	Dorchester, Mattapan and Roslindale
Hyde Park Trunk Sewer	Hyde Park
East Boston Low Level Sewer	East Boston
Dorchester High Level Sewer	Mattapan and Hyde park

The sewer system is comprised of the following:

APPURTENANCES		SEWER PIPES CITY WIDE		TYPE OR DESIGNATION	
Catch Basins	30,273	Total Linear Feet	8,126,629	Combined Sewer	159 Miles
Manholes	49,379	Total Linear Miles	1,539	Combined Sewer Overflow	3 Miles
Outfalls	253	Pumping Stations	9	Sanitary Sewer	707 Miles
Regulators	147			Storm Drain	669 Miles
Tide gates	191				

All wastewater collected by Commission facilities is conveyed to the MWRA's Deer Island Treatment Plant.

DEDICATED INFILTRATION INFLOW 4:1 PROJECTS

In 2004, the Massachusetts Department of Environmental Protection ("DEP"), in conjunction with the MWRA and its member communities implemented a program to help remove stormwater infiltration and inflow: I/I from the sewer system. Private developments may add substantial flows to the sewer collection system, requiring additional MWRA treatment.

In order to offset the effect of these additions, the Massachusetts DEP previously recommended to the Massachusetts Environmental Policy Act Office and the Executive Office of Environmental Affairs that new developments with a sewerage flow estimated at greater than 50,000 GPD be required to remove I/I at a 4:1 ratio from the sanitary sewer system, as part of the requirements by the Secretary of Environmental Affairs.

The Commission conducts investigations to identify sources of I/I to the Commission's system. These projects identify both public and private sector sources of I/I. Commission staff initially planned on developing a database with locations of I/I sources, which would be provided to a developer. The developer would correct sources from that list in order to fulfill their I/I removal requirement.

However, the Commission staff believed that this process would be unwieldy and unmanageable. Subsequently, at the July 28, 2005 Commission meeting, the Commission approved the establishment of a Dedicated Infiltration/Inflow ("DEDII") account into which developers assessed a 4:1 I/I reduction requirement by the DEP would contribute funds to fulfill their requirements. These funds will be used by the Commission to fund I/I identification and reduction projects.

During private project design, Engineering Customer Services receives and reviews a Site Plan for conformance with the Commission's Engineering Design and Construction standards. The Commission will confirm if the project is subject to the 4:1 compliance requirement as required by the new regulations

The Engineering Customer Service department will coordinate with the Planning Department of the most current estimated wastewater flow that has been submitted by the developer. The developer will coordinate with the Commission how to comply with the proposed assessment. The developer can either remove sources of I/I or make a requisite monetary contribution to the Commission.

In April 2014, the DEP promulgated new regulations. These regulations require the Commission to mitigate the impacts of development of all new sewer connections exceeding 15,000 gpd by removing four gallons of I/I for each new gallon of wastewater flow. For example, if a proposed project's calculated new daily wastewater flow is 100,000 gallons per day (gpd), the developer must remove 400,000 gpd of I/I from the sewer system.

To date, the Commission has implemented five contracts, which are funded by the 4:1 I/I Infiltration Inflow Reduction Mitigation Account. Contracts 09-309-008, 10-206-005 and 10-309-004 are complete and Contracts 14-206-002, 15-206-001 and the Infiltration and Inflow SSES project are ongoing. All costs "DEDII") account and are 100% reimbursable; therefore are not included in the 2018-2020 cashflow.

OPEN CONTRACTS

Roxbury Sewer Separation Design Contract 14-206-002: This project includes the final design and subsequent construction for sewer separation in the Dudley Square of Roxbury. Sewer Separation removes gross inflow from the sewer system and is the most direct and efficient form of I/I reduction. It avoids the need for expensive I/I studies and flow monitoring. Sewer Separation decreases the Commission's sewer payments to MWRA and decreases CSO activity. Work includes construction of new sewer and drains. The design phase of this project began in July 2014 and is expected to be completed in June 2018. The three-year budget for the project is $75,000.

***Infiltration and Inflow Analysis SSES (Dorchester) Contract 17-206-004*:** The Massachusetts Department of Environmental Protection (DEP) developed regulations requiring sewer system operators to create and implement a long term infiltration and inflow (I/I) reduction plan to remove extraneous flows from the wastewater collection system. The I/I reduction plan was completed in May of 2017. The I/I reduction plan recommends that the Commission conduct sewer system evaluation surveys in sections of the wastewater collection system exhibiting excessive flows. This project is intended to identify sources of extraneous flows in the portion of the wastewater collection system tributary to the Dorchester Interceptor. This project will entail an infiltration and inflow sewer system evaluation survey (SSES) to identify sources of extraneous flow in the area tributary to the Dorchester Interceptor. The SSES may include flow monitoring, manhole inspections, smoke testing, dyed water testing, and television inspection of sewer pipes. The finding will be provided to the Commission in a report with recommendation for capital improvements to eliminate the sources of extraneous flows. The planning phase of this project commenced in in January 2017 and is estimated to be completed in December 2018. The three-year budget is $1,050,000.

Infiltration and Inflow Analysis SSES (Roslindale) Contract N/A: The Massachusetts Department of Environmental Protection (DEP) developed regulations requiring sewer system operators to conduct an infiltration and inflow (I/I) analysis of thier wastewater collection system and implement long term plan to identify and remove extraneous flows. The I/I analysis was completed and the final report was delivered to the Commission in May of 2017. The report's long term plan divided the wastewater collection system into 11 regions and recommended that the BWSC conduct a sewer system evaluation survey (SSES) in one region each year. This project is initiated to identify sources of extraneous flows in the Roslindale region of the wastewater collection system. This project will entail an Infiltration and Inflow sewer system evaluation survey (SSES) to identify sources of extraneous flow in the Commission's wastewater collection system. The SSES may include flow monitoring, manhole inspections, smoke testing, dyed water testing, and television inspection of sewer pipes. The finding will be provided to the Commission in a report with recommendation for capital improvements to eliminate the sources of extraneous flows. The planning phase of this project is expected to commence in in February 2018 and is estimated to be completed in June 2020. The three-year budget is $1,500,000.

Contract	Description	Cost	Status
09-309-008	Dorchester Brook Regulator Relocation	$6,924,672.92	Complete
10-206-005	Roxbury Separation Design Contract	$1,732,975.60	Complete
10-309-004	East Boston Separation	$504,381.30	Complete
14-206-002	Roxbury Separation Design Contract	$1,049,954.00	Active
15-206-001	Infiltration and Inflow Analysis	$1,998,970.00	Active
17-206-004	Infiltration and Inflow Analysis	$1,050,000.00	Active
N/A	Infiltration and Inflow SSES	$1,500,000.00	Active

OBJECTIVES

The primary objectives of the Sewer System Capital Improvement Program for 2018-2020 are to provide uninterrupted wastewater transport and storm drainage services to the residents, businesses and visitors of Boston and to improve water quality in Boston Harbor and its tributary waters. The 2018-2020 CIP has five major programs for the Sewer System: the sewer renewal and replacement program, the increased capacity program, the sewer separation and storm drainage program, the Infiltration/Inflow program, and sewer special program.

The Commission's CMOM Program utilizes closed circuit TV camera inspection equipment and software to assess the structural and maintenance condition of pipes and identify areas of excessive infiltration and inflow. The SCREAM software system is utilized to prioritize these inspection results for repair and replacement by Commission crews and under its Capital Improvement Program. The CMOM Program includes the cleaning and inspection of approximately 80 miles of sewer pipe in 2018. This along with TV inspection under other programs will result in the inspection of 80 miles of pipe in 2018 with a goal of completing the entire system over a ten year period.

Projects included in the Sewer System CIP include the repair or replacement of approximately 9 miles of deteriorated or collapsed sanitary sewers and storm drains. Work is included under contracts 18-309-001, 18-309-002, 18-309-003, 18-309-004, 18-309-009, 18-309-010 and CMOM for future contracts (TBD – to be determined).

In addition, all sewers and drains on streets where water mains are to be replaced will be inspected prior to replacement. All defective pipes will then be replaced or rehabilitated in the water main replacement contract.

The primary objectives of the 2018-2020 Sewer CIP are:

- Implement and manage contracts affiliated with the Consent Decree
- Implement Green Infrastructure Projects
- Comply with the requirements of the Commission's National Pollutant Discharge Elimination System ("NPDES") and Municipal permits
- Minimize infiltration and inflow into the sanitary system, which will increase system capacity and decrease treatment costs
- Reduce combined sewer overflows by reducing wet weather discharges and minimizing sea water intrusions
- Provide sufficient hydraulic capacity for current and projected flows
- Protect the structural integrity of the wastewater collection and storm drainage systems
- Coordinate sewer system improvements with the related projects of other public agencies

2018-2020 SEWER SYSTEM CAPITAL PROGRAM

The sewer system objectives will be carried out through the continuation of the following program activities renewal and replacement of sewer pipes, rehabilitation of sewers and drains, separation of combined sewers, improvements that will result in an increase in system capacity, an infiltration/inflow reduction program including the disconnection of downspouts and a number of special projects necessary to improve the efficiency and effectiveness of the sewer system.

WASTEWATER PROJECTS HIGHLIGHTS

- Replacement and Rehabilitation of Sewer and Drains Citywide
- CCTV of Sewers and Storm Drains/CMOM Program
- North End Replacement and Rehabilitation Phase II & III
- Replacement of Tidegates
- Sewer Separation in Roxbury (Contract 1, 2 & 3)
- Infiltration/Inflow Analysis
- Downspout Disconnection Program

PROJECT CASH FLOW

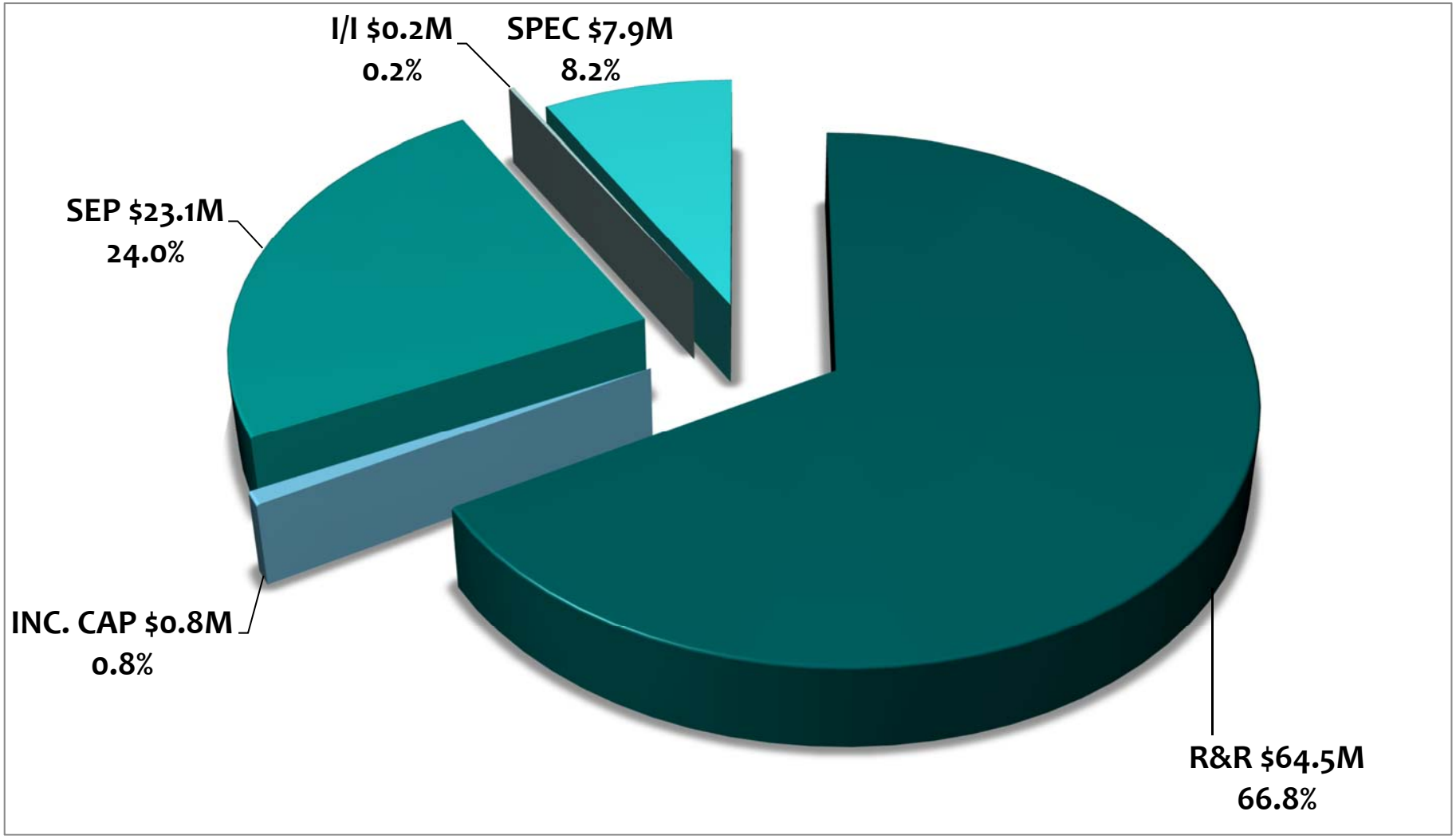
Table 11 on page 48 illustrates Sewer Distribution System by Category. Graph 8 on page 49 illustrates the capital expenditures by program of the Total Sewer Program for 2018-2020. Three-year total expenditures are $96.5 million, of which $41.7 million is anticipated to be spent in 2018. Graph 9 on page 50 illustrates by the Funding Source for 2018-2020. Graph 10 on page 51 illustrates the Sewer Distribution by Program for 2018.

Table 11 - Sewer Distribution System by Category

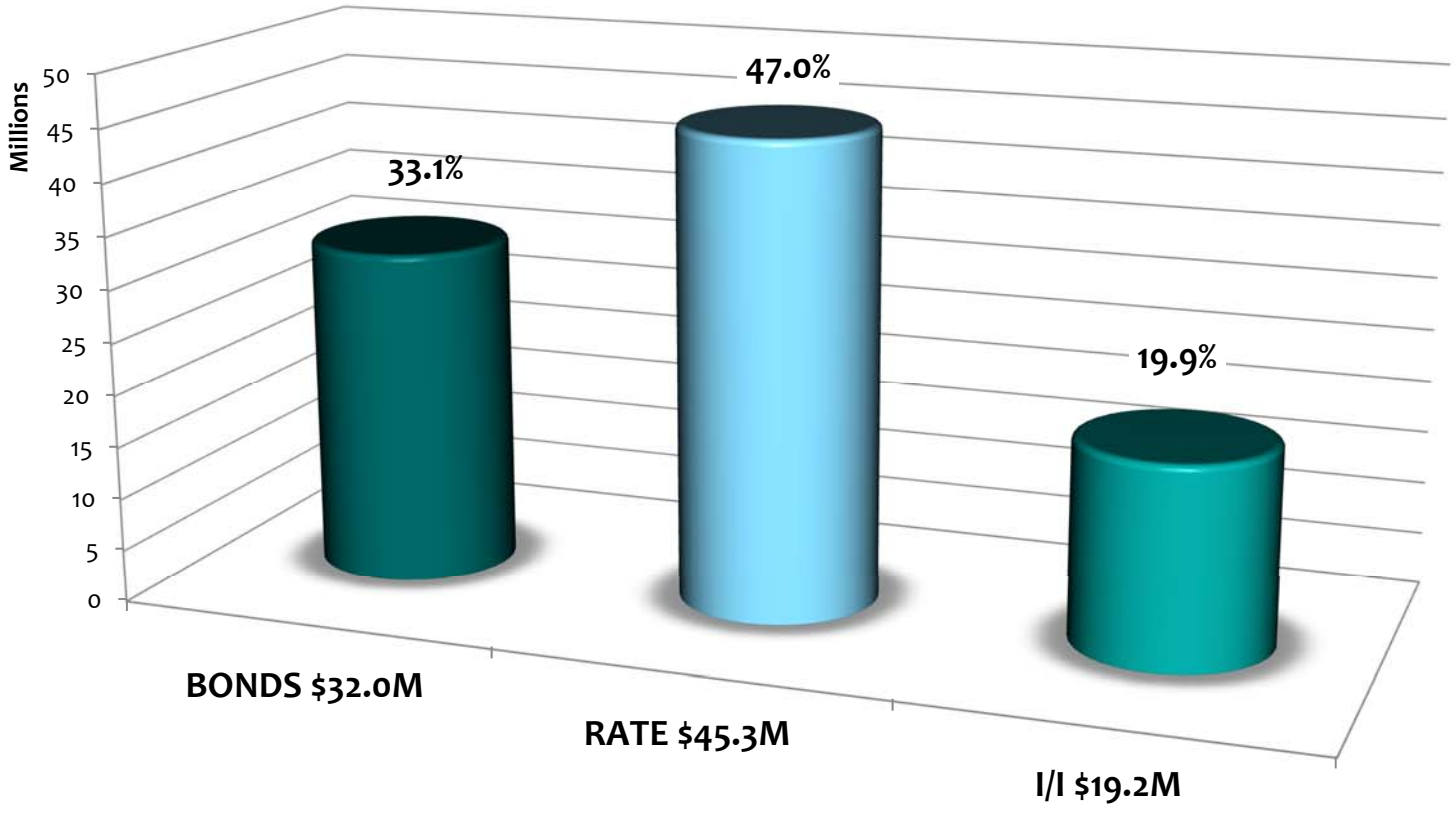
Capital Improvement Program
2018 - 2020
Sewer Total

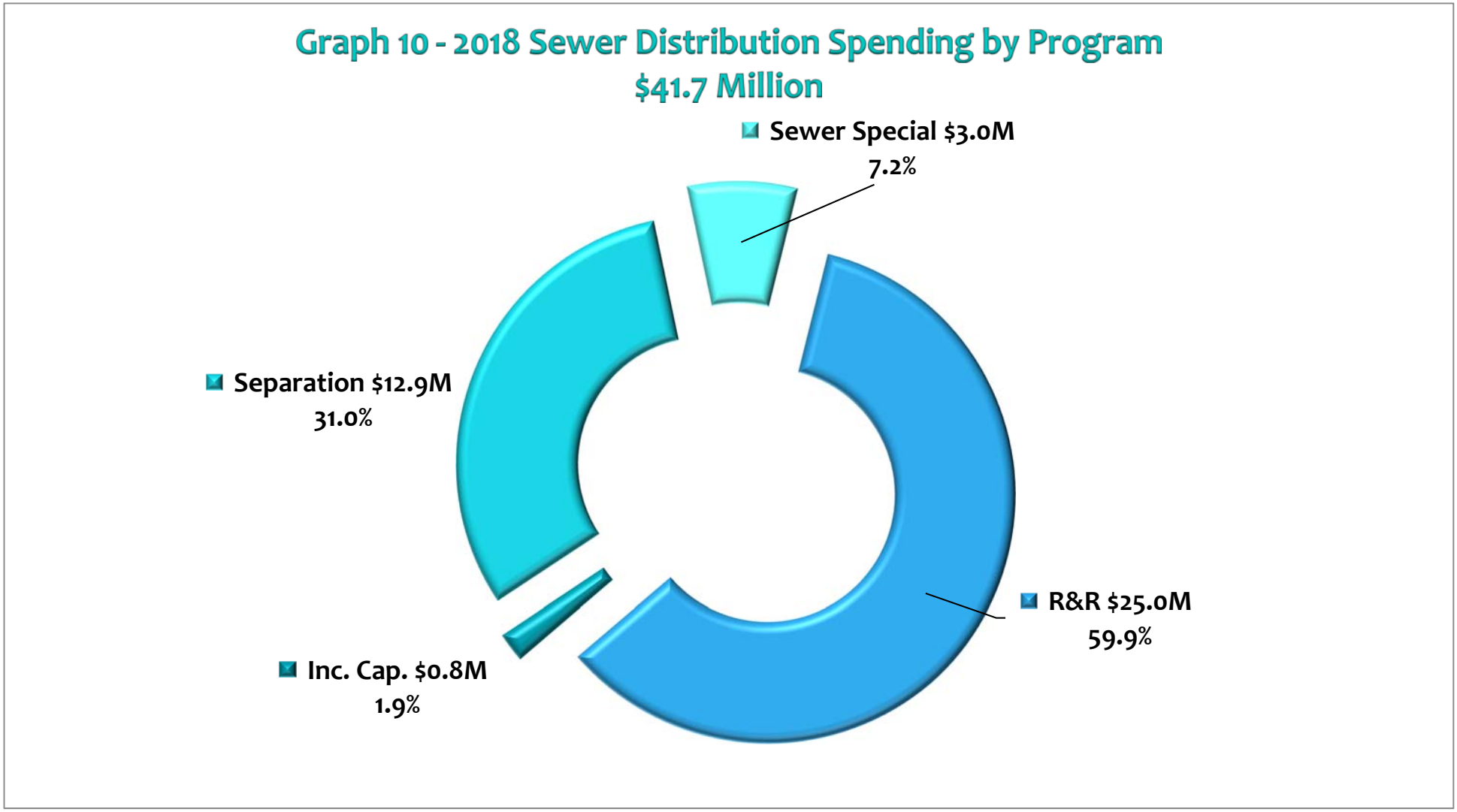
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
Sewer R&R																
Bonds	558,000	240,000	231,000	185,000	1,400,000	954,000	1,052,000	1,184,000	1,571,000	1,924,000	768,000	790,000	10,857,000	8,761,000	3,061,000	22,679,000
Rate	231,000	231,000	387,000	240,000	656,000	1,520,000	1,635,000	1,860,000	1,751,000	1,973,000	2,066,000	1,374,000	13,924,000	16,994,000	10,639,000	41,557,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	12,000	-	-	-	-	-	45,000	45,000	36,000	27,000	27,000	15,000	207,000	-	-	207,000
Totals	801,000	471,000	618,000	425,000	2,056,000	2,474,000	2,732,000	3,089,000	3,358,000	3,924,000	2,861,000	2,179,000	$ 24,988,000	$ 25,755,000	$ 13,700,000	$ 64,443,000
Increased Capacity																
Bonds	145,000	-	-	-	-	145,000	145,000	151,000	71,000	71,000	71,000	-	799,000	-	-	799,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$ 145,000	$ -	$ -	$ -	$ -	$ 145,000	$ 145,000	$ 151,000	$ 71,000	$ 71,000	$ 71,000	$ -	$ 799,000	-	0	$ 799,000
Separation																
Bonds	293,000	190,000	177,000	185,000	190,000	92,000	75,000	45,000	51,000	179,000	44,000	53,000	1,574,000	549,000	489,000	2,612,000
Rate	41,000	41,000	41,000	41,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	500,000	500,000	500,000	1,500,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	594,000	594,000	593,000	594,000	594,000	848,000	1,304,000	1,307,000	1,215,000	1,125,000	1,125,000	997,000	10,890,000	5,260,000	2,845,000	18,995,000
Totals	$ 928,000	$ 825,000	$ 811,000	$ 820,000	$ 826,000	$ 982,000	$ 1,421,000	$ 1,394,000	$ 1,308,000	$ 1,346,000	$ 1,211,000	$ 1,092,000	$ 12,964,000	$ 6,309,000	$ 3,834,000	$ 23,107,000
Infiltration/Inflow																
Bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	100,000	100,000	200,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 100,000	$ 100,000	$ 200,000
Sewer Special																
Bonds	113,000	101,000	138,000	134,000	104,000	339,000	204,000	206,000	305,000	214,000	212,000	178,000	2,248,000	1,928,000	1,502,000	5,678,000
Rate	-	-	-	-	-	75,000	75,000	150,000	150,000	150,000	75,000	75,000	750,000	750,000	750,000	2,250,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$ 113,000	$ 101,000	$ 138,000	$ 134,000	$ 104,000	$ 414,000	$ 279,000	$ 356,000	$ 455,000	$ 364,000	$ 287,000	$ 253,000	$ 2,998,000	$ 2,678,000	$ 2,252,000	$ 7,928,000
Sewer Total	**$ 1,987,000**	**$ 1,397,000**	**$ 1,567,000**	**$ 1,379,000**	**$ 2,986,000**	**$ 4,015,000**	**$ 4,577,000**	**$ 4,990,000**	**$ 5,192,000**	**$ 5,705,000**	**$ 4,430,000**	**$ 3,524,000**	**$ 41,749,000**	**$ 34,842,000**	**$ 19,886,000**	**$ 96,477,000**
Bonds	1,109,000	531,000	546,000	504,000	1,694,000	1,530,000	1,476,000	1,586,000	1,998,000	2,388,000	1,095,000	1,021,000	15,478,000	11,338,000	5,152,000	31,968,000
Rate	272,000	272,000	428,000	281,000	698,000	1,637,000	1,752,000	2,052,000	1,943,000	2,165,000	2,183,000	1,491,000	15,174,000	18,244,000	11,889,000	45,307,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	606,000	594,000	593,000	594,000	594,000	848,000	1,349,000	1,352,000	1,251,000	1,152,000	1,152,000	1,012,000	11,097,000	5,260,000	2,845,000	19,202,000
Totals	**$ 1,987,000**	**$ 1,397,000**	**$ 1,567,000**	**$ 1,379,000**	**$ 2,986,000**	**$ 4,015,000**	**$ 4,577,000**	**$ 4,990,000**	**$ 5,192,000**	**$ 5,705,000**	**$ 4,430,000**	**$ 3,524,000**	**$ 41,749,000**	**$ 34,842,000**	**$ 19,886,000**	**$ 96,477,000**

Graph 8 - 2018-2020 Total Sewer Expenditures by Program
$96.5 Million



Graph 9 - 2018-2020 Total Sewer Expenditures by Funding Source $96.5 Million




Graph 10 - 2018 Sewer Distribution Spending by Program
$41.7 Million
Sewer Special $3.0M
7.2%
Separation $12.9M
31.0%
R&R $25.0M
59.9%
Inc. Cap. $0.8M
1.9%

SEWER RENEWAL AND REPLACEMENT

DESCRIPTION AND JUSTIFICATION

Renewal and replacement projects involve the trenchless rehabilitation or replacement of sewers and storm drains in response to persistent malfunction, structural deterioration, excessive emergency repairs and other operation and maintenance problems.

The Commission identifies sewer and drain lines that require renewal or replacement through television inspections, sewer system evaluation surveys and routine maintenance activities. Renewal and replacement projects are coordinated with the Boston DPW's Roadway Reconstruction Program to ensure that the Commission avoids excavating newly resurfaced street, unless under emergency circumstances.

The objectives of the renewal and replacement program are to: insure the operability of sewers and storm drains, protect the structural integrity of the sewer system, reduce long-term capital and maintenance costs and minimize disruptions of service caused by sewerage back-ups or other related problems.

NEW PROJECTS

CCTV OF Sewers and Storm Drains/CMOM Citywide Contract 18-309-009: This project includes the inspection of sewers and drains through the use of closed circuit TV cameras utilizing the SCREAM coding system in order to assess the structural condition of the pipes. Approximately ninety (90) miles of various pipes will be cleaned and inspected throughout the City. Construction is projected to commence in April 2018 and is expected to be completed by March 2019. The three-year budget $1,100,000.

CCTV OF Sewers and Storm Drains/CMOM Citywide Contract 18-309-010: This project includes the inspection of sewers and drains through the use of closed circuit TV cameras utilizing the SCREAM coding system in order to assess the structural condition of the pipes. Approximately ninety (90) miles of various pipes will be cleaned and inspected throughout the City. Construction is projected to commence in April 2018 and is expected to be completed by March 2019. The three-year budget $1,100,000.

Sewer & Drain Replacement and Rehabilitation in Roslindale, Hyde Park and Mattapan 18-309-004: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Roslindale, Hyde Park and Mattapan. Pipes in this contract have been found defective and in need of

repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2019 and is projected to be completed by July 2020. The budgeted amount is $3,285,000.

Future CCTV OF Sewers and Storm Drains/CMOM Citywide Multiple Contracts: This project includes the inspection of sewers and drains through the use of closed circuit TV cameras utilizing the SCREAM coding system in order to assess the structural condition of the pipes. Approximately ninety (90) miles of various pipes will be cleaned and inspected throughout the City. Construction commenced in 2019-2020 and is projected to be completed by 2019-2020. The three-year budget $4,400,000.

Sewer & Drain Replacement and Rehabilitation in Fenway 18-309-001: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Fenway. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2019 and is projected to be completed by July 2020. The budgeted amount is $3,690,000.

Sewer & Drain Replacement and Rehabilitation in Allston and Brighton 18-309-002: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Allston and Brighton. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2019 and is projected to be completed by July 2020. The budgeted amount is $2,170,000.

Sewer & Drain Replacement and Rehabilitation in Roslindale, Hyde Park and Mattapan 18-309-003: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Roslindale, Hyde Park and Mattapan. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2019 and is projected to be completed by July 2020. The budgeted amount is $3,690,000.

ONGOING PROJECTS

Sewer & Drain Replacement and Rehabilitation in City Proper, Dorchester, Hyde Park, South Boston and West Roxbury 17-309-001: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in City Proper, Dorchester, Hyde Park, South Boston and West

Roxbury. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in July 2018 and is projected to be completed by September 2019. The budgeted amount is $4,100,000.

Sewer & Drain Replacement and Rehabilitation in Dorchester 17-309-002: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Dorchester. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2018 and is projected to be completed by September 2018. The budgeted amount is $1,095,000.

Rehabilitation and Inspection of Large Sewer & Drain Conduits in City Proper and South Boston 17-309-006: This project includes the trenchless structural rehabilitation of large conduits found to be in disrepair during recent inspections in City Proper and South Boston. The project is scheduled to commence May 2018 and is projected to be completed in August 2018. The three-year budget for the project is $1,890,000.

Sewer & Drain Inspection for 2017 Citywide 17-309-007: This project includes the inspection of sewer and drain pipes due for future replacement using closed circuit television cameras throughout the City. The project is scheduled to commence in January 2018 and is projected to be completed by July 2018. The budget for the project is $341,000.

CCTV OF Sewers and Storm Drains/CMOM Citywide Contract 17-309-009: This project includes the inspection of sewers and drains through the use of closed circuit TV cameras utilizing the SCREAM coding system in order to assess the structural condition of the pipes. Approximately ninety (90) miles of various pipes will be cleaned and inspected throughout the City. Construction commenced in January 2018 and is projected to be completed by March 2018. The three-year budget $250,000.

CCTV OF Sewers and Storm Drains/CMOM Citywide Contract 17-309-010: This project includes the inspection of sewers and drains through the use of closed circuit TV cameras utilizing the SCREAM coding system in order to assess the structural condition of the pipes. Approximately ninety (90) miles of various pipes will be cleaned and inspected throughout the City. Construction commenced in January 2018 and is projected to be completed by March 2018. The three-year budget $250,000.

Replacement of a Private Sewer in the South End on Alley 521 17-309-012: This project includes the replacement of a private sewer in the South End on Alley 521. The project is expected to commence in June 2018 and is projected to be completed by September 2018. The three-year budget for the project is $1,200,000.

Replacement of Combined Sewer in Back Bay 17-309-013: This project includes the installation of sewer and drains in the Back Bay. The project is expected to commence in October 2017 and is projected to be completed by November 2017. The three-year budget for the project is $12,000.

Installation of Sewers and Drains in Roxbury Contract 16-309-011: This project includes the installation of sewers and drains in Roxbury. The project commenced in August 2017 and is projected to be completed by December 2018. The three-year budget for the project is $146,000.

Sewer R & R in City Proper (North Washington St.) – Contract No. 17-308-004: This project includes the installation of sewer & drains in City Proper. Construction is projected to commence April 2018 and be completed by September 2018. The total three-year budget for this project is $368,000.

Sewer R & R in City Proper (Bowdoin St.) – Contract No. 17-308-04A: This project includes the installation of sewer & drains in City Proper. Construction is projected to commence September 2018 and be completed by May 2020. The total three-year budget for this project is $786,000.

Sewer R & R in the South End – Contract No. 17-308-005: This project includes the installation of sewer & drains in the South End. Construction is projected to commence May 2018 and be completed by November 2019. The total three-year budget for this project is $900,000.

Replacemennt of Sewer & Drain Pipes in Dorchester Contract 17-309-02A: This project includes the replacement sewer and drain pipes in need of structural repair as identified by various Commission inspection programs in Dorchester. The project is scheduled to commence in April 2019 and is projected to be completed by November 2020. The budgeted amount is $6,979,000.

Sewer & Drain Replacement and Rehabilitation and Engineering/Design Citywide 17-206-002: This project includes the engineering services and the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in Citywide. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in July 2018 and is projected to be completed by September 2019. The budgeted amount is $714,000.

Sewer & Drain Rehabilitation Citywide Contract 16-309-001: This project includes the trenchless rehabilitation of sewer and drain pipes. Each of the pipes in this contract was inspected and found to be in poor condition, but are able to be rehabilitated through trenchless methods. The pipes selected for inspection were found to be defective through CMOM and other inspection programs as well as those in the areas of chronic maintenance problems. Construction commenced in April 2017 and was completed in June 2017. A small budget worth $15,000 will be established in 2018 to cover closing costs of this contract.

***Sewer R & R Portion of Roxbury Separation Contract 1 Contract 15-309-011*:** This project includes the replacement and rehabilitation of sanitary sewer affiliated with sewer separation in Roxbury. Construction commenced in August 2016 and is projected to be completed by July 2018. The three-year budget is $828,000.

Sewer and Drain Pipe R & R Citywide Contract 16-309-002: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes throughout the City of Boston. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. Construction commenced in April 2017 and is projected to be completed by October 2018. The three-year budget is $1,913,000.

North End Sewer Phase III 16-309-006: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in the North End. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in February 2019 and is projected to be completed by March 2019. The budgeted amount is $2,530,000.

Sewer & Drain Replacement and Rehabilitation in East Boston 16-309-005: This project includes the replacement and rehabilitation of sanitary sewer, storm drain and combined sewer pipes in need of structural repair as identified by various Commission inspection programs in East Boston. Pipes in this contract have been found defective and in need of repair or replacement as determined by cleaning and CCTV inspection under various programs including SSO investigations, CMOM contracts, and illegal connection inspection. The project is scheduled to commence in May 2018 and is projected to be completed by June 2019. The budgeted amount is $195,000.

Sewer R & R Portion in East Boston Contract No. 16-308-001: This project includes the installation of sewer & drains in East Boston. Construction commenced in September 2017 and is projected to be completed by September 2019. The three-year budget for this project is $1,612,000.

Sewer R & R Portion in Roxbury Contract No. 16-308-002: This project includes the installation of sewer & drains in Roxbury. Construction is projected to commence in April 2018 and be completed by May 2019. The total three-year budget for this project is $1,006,000.

Sewer R & R Portion in Dorchester and the South End – Contract No. 16-308-005: This project includes the installation of sewer & drains in Dorchester and the South End. Construction is projected to commence in April 2018 and is projected to be completed in October 2019. The total three-year budget for this project is $800,000.

Sewer R & R Portion in Dorchester and the South End – Contract No 16-308-006: This project includes the installation of sewer & drains in Dorchester and the South End. Construction is projected to commence April 2018 and is projected to be completed in October 2019. The total three-year budget for this project is $800,000.

Sewer and Drain Replacement and Rehabilitation in Dorchester, Mattapan and East Boston Contract 15-309-001: This project includes the replacement and rehabilitation of sewer and drain pipes in Dorchester, Mattapan and East Boston that have been found through inspection to be in need of repair

or replacement. Construction commenced in August 2017 and is projected to be completed by July 2019. The three-year budget is $3,285,000.

Sewer and Drain Replacement and Rehabilitation in City Proper Contract 15-309-007: This project includes the replacement and rehabilitation of sewer and drain pipes in City Proper. Construction commenced in October 2016 and is projected to be completed July 2018. The three-year budget is $344,000.

Sewer R & R in Fenway/Kenmore Square Contract No. 15-308-001: This project includes the replacement and rehabilitation of sewer and drain pipes in Fenway/Kenmore and City Proper. Construction is commenced in August 2017 and is projected to be completed by May 2019. The total three-year budget for this project is $1,866,000.

Sewer R & R in the South End, Roxbury and City Proper Contract No. 15-308-004: This project includes the replacement and rehabilitation of sewer and drain pipes in the South End, Roxbury and City Proper. Construction commenced July 2017 with a completion date of August 2018. The total three-year budget for this project is $2,022,000.

Sewer and Drain Renewal & Replacement for Contract 14-309-001: This project includes the replacement of 7,120 linear feet of sewer and drain pipe and the rehabilitation of 8,730 linear feet of sewer and drain pipes, along with spot repairs and illicit connection correction. All pipes in this contract have been inspected using closed circuit TV and have found to be defective where possible trenchless methods of rehabilitation will be used, otherwise damaged pipes will be replaced. Several Neighborhoods are affected by this work. Construction is scheduled to commence in April 2018 and be completed by August 2020. The three-year budget is $5,340,000.

Sewer and Drain Renewal & Replacement in West Roxbury for Contract 14-308-003: This project includes the replacement of 2,750 linear feet of sewer and drain pipe and the rehabilitation of 1,355 linear feet of sewer and drain pipes, along with spot repairs and illicit connection correction in West Roxbury. All pipes in this contract have been inspected using closed circuit TV and have found to be defective where possible trenchless methods of rehabilitation will be used, otherwise damaged pipes will be replaced. Construction is scheduled to commence in April 2018 and be completed by October 2020. The three-year budget is $1,963,000.

Sewer R & R Portion in Allston/Brighton, Dorchester & Jamaica Plain Contract No. 14-308-006: This project includes the replacement of approximately 1,900 linear feet of sewer & drains as well as rehabilitation of approximately 8,700 linear feet of sewer & drains in Allston/Brighton, Dorchester & Jamaica Plain. Construction is projected to commence in February 2018 and be completed by Oct 2018. The total three-year budget for this project is $1,458,000.

PROJECT CASH FLOW

Table 12 on the page 59 presents the cash flow expenditures for the Sewer Renewal and Replacement Program. Total 2018-2020 expenditures are $64,443,000. Expenditures for 2018 are expected to be $24,988,000.

Table 12 - Sewer Renewal & Replacement

Capital Improvement Program
2018 - 2020
Sewer Renewal and Replacement

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
CCTV of Sewers and Storm Drains/CMOM	-	-	-	-	100,000	100,000	125,000	125,000	100,000	100,000	100,000	100,000	850,000	250,000	-	1,100,000
CCTV of Sewers and Storm Drains/CMOM	-	-	-	-	100,000	100,000	125,000	125,000	100,000	100,000	100,000	100,000	850,000	250,000	-	1,100,000
Sewer R & R Roslindale, Hyde Park & Mattapan	-	-	-	-	-	-	-	-	-	-	-	-	-	2,628,000	657,000	3,285,000
Future CCTV of Sewers & Storm Drains/CMOM Contracts	-	-	-	-	-	-	-	-	-	-	-	-	-	2,200,000	2,200,000	4,400,000
Sewer R & R in Fenway	-	-	-	-	-	-	-	-	-	-	-	-	-	1,640,000	2,050,000	3,690,000
Sewer R & R in Roslindale, Hyde Park & Mattapan	-	-	-	-	-	-	-	-	-	-	-	-	-	1,736,000	434,000	2,170,000
Sewer R & R in Allston/Brighton	-	-	-	-	-	-	-	-	-	-	-	-	-	1,640,000	2,050,000	3,690,000
Ongoing Projects																
Sewer R& R City Proper, Dor, Hyd Pk, SB & W. Rox	-	-	-	-	-	-	-	-	352,000	352,000	352,000	353,000	1,409,000	2,114,000	577,000	4,100,000
Sewer & Drain Rehabilitation Citywide	-	-	-	-	-	-	-	208,000	208,000	208,000	208,000	263,000	1,095,000	-	-	1,095,000
Rehab of Large Sewer & Drain Conduits	-	-	-	-	-	-	449,000	449,000	449,000	543,000	-	-	1,890,000	-	-	1,890,000
Sewer & Drain Inspection for 2017	-	-	94,000	47,000	47,000	47,000	47,000	59,000	-	-	-	-	341,000	-	-	341,000
CMOM Program (Fenway & Mattapan)	100,000	100,000	50,000	-	-	-	-	-	-	-	-	-	250,000	-	-	250,000
CMOM Program (Hyde Park & West Roxbury	100,000	100,000	50,000	-	-	-	-	-	-	-	-	-	250,000	-	-	250,000
Replacement of a Private Sewer in Alley 521	-	-	-	-	-	-	-	400,000	400,000	300,000	100,000	-	1,200,000	-	-	1,200,000
Lining of Fairfield Street Combined Sewer	12,000	-	-	-	-	-	-	-	-	-	-	-	12,000	-	-	12,000
Sewer R & R Portion of Separation Roxbury Contract 2	31,000	31,000	31,000	31,000	2,000	3,000	3,000	3,000	3,000	3,000	2,000	3,000	146,000	-	-	146,000
Sewer R & R in Endicott St.	-	-	-	-	-	92,000	61,000	61,000	62,000	92,000	-	-	368,000	-	-	368,000
Sewer R & R in Derne St.	-	-	-	-	-	-	-	-	-	-	131,000	33,000	164,000	458,000	164,000	786,000
Sewer R & R in the South End	-	-	-	-	-	-	100,000	100,000	100,000	100,000	100,000	-	500,000	400,000	-	900,000
Sewer R & R in Dorchester	-	-	-	-	-	-	-	-	-	-	-	-	-	3,490,000	3,489,000	6,979,000
Design Services for S & D Reconstruction Projects	59,000	60,000	59,000	60,000	59,000	60,000	59,000	60,000	59,000	60,000	59,000	60,000	714,000	-	-	714,000
Sewer & Drain Rehabilitation Citywide	15,000	-	-	-	-	-	-	-	-	-	-	-	15,000	-	-	15,000
Sew R & R Port Sew Sep Roxbury Contract 1	146,000	130,000	113,000	125,000	131,000	35,000	28,000	-	-	120,000	-	-	828,000	-	-	828,000
S & D Reconstruction Projects	-	-	-	-	926,000	552,000	40,000	35,000	-	287,000	-	73,000	1,913,000	-	-	1,913,000
North End Phase III	-	-	-	-	-	-	-	-	-	-	-	-	-	2,530,000	-	2,530,000
Sewer R & R in East Boston affil w/ Separation Work	-	-	-	-	-	-	45,000	45,000	36,000	27,000	27,000	15,000	195,000	-	-	195,000
Sewer R & R in East Boston	-	-	-	-	60,000	119,000	119,000	120,000	119,000	120,000	119,000	60,000	836,000	776,000	-	1,612,000
Sewer R & R in Roxbury	-	-	-	-	0	0	144,000	144,000	143,000	144,000	144,000	144,000	863,000	143,000	-	1,006,000
Sewer R & R in Dorch, Roxb & S. Boston	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000	75,000	75,000	400,000	400,000		800,000
Sewer R & R in Allst/Bri, B Bay, Bc Hll & Cty Prp	-	-	-	-	-	50,000	50,000	50,000	50,000	50,000	75,000	75,000	400,000	400,000	-	800,000
Sewer and Drain Replacement and Rehabilitation	103,000	-	-	-	284,000	307,000	476,000	240,000	311,000	262,000	257,000	304,000	2,544,000	741,000	-	3,285,000
North End Phase II	235,000	50,000	59,000	-	-	-	-	-	-	-	-	-	344,000	-	-	344,000
Sewer R & R in Fenwa/Kenmore	-	-	-	-	96,000	191,000	192,000	191,000	192,000	191,000	192,000	95,000	1,340,000	526,000	-	1,866,000
Sewer R & R in the South End	-	-	-	-	89,000	173,000	168,000	173,000	173,000	168,000	173,000	84,000	1,201,000	821,000	-	2,022,000
Sewer and Drain Renewal & Replacement for 2014	-	-	-	-	-	433,000	289,000	289,000	289,000	289,000	289,000	145,000	2,023,000	2,023,000	1,294,000	5,340,000
Sewer & R in West Roxbury	-	-	-	-	-	-	-	-	-	196,000	196,000	197,000	589,000	589,000	785,000	1,963,000
Sewer R & R in Allst/Brig & Dor	-	-	162,000	162,000	162,000	162,000	162,000	162,000	162,000	162,000	162,000	-	1,458,000	-	-	1,458,000
S&D Replacement Assoc w/ Water Mains	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$801,000**	**$471,000**	**$618,000**	**$425,000**	**$2,056,000**	**$2,474,000**	**$2,732,000**	**$3,089,000**	**$3,358,000**	**$3,924,000**	**$2,861,000**	**$2,179,000**	**$24,988,000**	**$25,755,000**	**$13,700,000**	**$64,443,000**
Bonds	558,000	240,000	231,000	185,000	1,400,000	954,000	1,052,000	1,184,000	1,571,000	1,924,000	768,000	790,000	10,857,000	8,761,000	3,061,000	22,679,000
Rate	231,000	231,000	387,000	240,000	656,000	1,520,000	1,635,000	1,860,000	1,751,000	1,973,000	2,066,000	1,374,000	13,924,000	16,994,000	10,639,000	41,557,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	12,000	-	-	-	-	-	45,000	45,000	36,000	27,000	27,000	15,000	207,000	-	-	207,000
Totals	**$801,000**	**$471,000**	**$618,000**	**$425,000**	**$2,056,000**	**$2,474,000**	**$2,732,000**	**$3,089,000**	**$3,358,000**	**$3,924,000**	**$2,861,000**	**$2,179,000**	**$24,988,000**	**$25,755,000**	**$13,700,000**	**$64,443,000**

INCREASED CAPACITY PROJECTS

DESCRIPTION AND JUSTIFICATION

During the 1980s, the Commission completed the construction of several new major interceptors including the New Boston Main and New East Side Interceptors. They provided increased system capacity, which reduced wet weather combined sewer overflow discharges and virtually eliminated dry weather discharges to Boston Harbor and its tributary waters.

Since their completion, the Commission has continued to make capital investments to increase system capacity in some areas and maximize the existing capacity of the system in other areas. The Commission's efforts to increase system capacity are designed to ensure sufficient hydraulic flow in all areas of the city, reduce long-term maintenance costs, minimize the frequency and volume of CSO discharges and ensure the continued structural integrity of the wastewater collection system.

In 1994, the EPA issued a policy nationwide on CSOs that requires communities with CSOs to implement nine minimum controls to reduce the frequency and volume of CSO discharges. Maximizing the use of in-system storage, or system capacity, is one of the nine controls. The Commission continues its efforts to increase system capacity. The projects presented in the CIP Increased Capacity Program seek to fulfill that objective.

NEW PROJECTS

No New Projects

ONGOING PROJECTS

Curlew St. Betterment and Sewer Pipe Replacement in West Roxbury: This project includes sewer betterment and replacement of a sewer pipe that has reached its useful life in West Roxbury on Curlew Street. Construction is projected to commence April 2018 and be completed by July 2018. The total budget for this project is $213,000.

Installation of New Tidegates Contract 16-309-004: This project includes the installation of new tidegates for drainage systems not currently protected by a tidegate. This is part of a long range plan for protection of the Commission's drainage system from tidal inflow from high tides and storm surges for predicted higher tides. Construction commenced in August 2017 and is projected to be completed by May 2018. The three-year budget for this project is $586,000.

PROJECT CASH FLOW

Table 13 on page 62 illustrates the 2018-2020 cash flow projection for Increased Capacity projects. Total 2018-2020 expenditures are $799,000. Monies allocated for 2018 total $799,000.

Table 13 - Increased Capacity

Capital Improvement Program
2018 - 2020
Increased Capacity

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
Ongoing Projects																
Curlew St Betterment	-	-	-	-	-	-	-	-	71,000	71,000	71,000	-	213,000	-	-	213,000
Installation of New Tidegates	145,000	-	-	-	-	145,000	145,000	151,000	-	-	-	-	586,000	-	-	586,000
Totals	**145,000.00**	**-**	**-**	**-**	**-**	**$145,000**	**$145,000**	**$151,000**	**$71,000**	**$71,000**	**$71,000**	**-**	**$799,000**	**$0**	**$0**	**$799,000**
Bonds	145,000	-	-	-	-	145,000	145,000	151,000	71,000	71,000	71,000	-	799,000	-	-	799,000
Rate		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$145,000**	**-**	**-**	**-**	**-**	**$145,000**	**$145,000**	**$151,000**	**$71,000**	**$71,000**	**$71,000**	**-**	**$799,000**	**$0**	**-**	**$799,000**

SEWER SEPARATION

DESCRIPTION AND JUSTIFICATION

The Commission's separation program involves the replacement of combined sanitary and storm sewers with two separate systems, one for sanitary sewage and one for stormwater. The purpose of the separation program is to reduce the frequency and volume of wet weather CSO discharges and ensure the continued compliance with state and federal permits. Combined systems will be separated where it is appropriate and cost effective to do so. Sewer separation work most often involves converting the combined sewer to a separate sanitary sewer and constructing a new storm drain.

In addition to addressing CSO concerns, the Commission is identifying sanitary sewage that is being discharge into the storm drain system. Between 1986 and September 28, 2016, the Commission removed more than 682 illegal connections, eliminating the discharge of an estimated 774,938 gallons of wastewater per day to the storm drainage system and receiving waters.

NEW PROJECTS

No New Projects

ONGOING PROJECTS

Reconnection of Sanitary Sewer Laterals and Sewer Separation 17-309-003: Reconnect 100 sanitary sewer laterals to the sanitary sewer system building connections that are found connected to storm drains. This contract will involve reconnection of these laterals to sanitary sewers. This project commenced in October 2017 and is projected to be completed by September 2020. The three-year budget is $1,557,000.

Sewer Separation in East Boston Phase II Contract 17-309-005: This project will include the Separation of combined sewers in East Boston. This is phase 2 of a 3-phased program. Work will also include replacement or rehabilitation of water and sewer pipes as necessary. Construction scheduled to commence in May 2018 and is projected to be completed by November 2019. The three-year budget is $3,405,000.

Sewer Separation Roxbury Phase 3 Contract 17-309-011: This project includes the installation of sewers and drains for sewer separation in Roxbury. Construction is scheduled to commence in August 2018 and is projected to be completed by December 2019. The three-year budget is $5,000,000.

Sewer Separation East Boston Contract 16-309-005: This project includes the separation of combined sewers in a portion of East Boston. Construction is scheduled to commence in May 2018 and is projected to be completed by June 2019. The three-year budget is $2,966,000.

Sewer Separation Roxbury Contract 2 Contract 16-309-011: This project includes the installation of sewers and drains for sewer separation in Roxbury. Construction commenced in August 2017 and is projected to be completed by December 2018. The three-year budget is $7,624,000.

***Sewer Separation Roxbury Phase 1 Contract 15-309-011*:** This project includes the installation of sewers and drains for sewer separation in Roxbury. Construction commenced in August 2016 and is projected to be completed by July 2018. The three-year budget is $924,000.

Separation of Sanitary House Lateral Connections to Storm Drains Contract 14-309-007: This project includes the separation of house laterals connected to storm drains citywide. Construction commenced in October 2014 and was completed in September 2017. A small budget worth $86,000 will be created in 2018 to cover closing costs.

City-wide Illegal Connections Investigation Contract 16-206-001: This project is a continuation of the Commission's Citywide Illegal Connection Investigation Program. Under this program illicit sanitary sewer connection to storm drains are identified using manhole inspections and sandbagging, water quality sampling, and dye tests of buildings. This program also includes wet and dry weather outfall screening to prioritize drainage sub-catchments for investigation. Though the project duration is four years, the three year budget is 1,500,000.

Owner Fix of Illegal Connections: Illegal connections are usually corrected by a Commission contractor on public property. There are a few instances where the homeowner must alter the internal plumbing to correct the problem. In these instances, the Commission will reimburse the homeowner for the work and avoid having Commission contractors working on private property. Illegal connections are a violation of Federal Law and must be promptly corrected. This program was instituted and approved by the Commission to assist homeowners with costly repairs to correct these violations. The Commission reimbursed each homeowner up to $7,500. The average need is four per year for $30,000. Capital reserved for this project totals $45,000 for three years.

PROJECT CASH FLOW

Table 14 on page 65 illustrates the cash flow for the Sewer Separation for 2018-2020. Total expenditures over the three-years of the program are expected to be $23,107,000, of which $12,964,000 is budgeted for expense in 2018.

Table 14 - Sewer Separation

Capital Improvement Program
2018 -2020
Sewer Separation

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
Ongoing Projects																
Correction of Illicit Sanitary Building Connections	44,000	45,000	44,000	45,000	44,000	45,000	44,000	45,000	44,000	45,000	44,000	45,000	534,000	534,000	489,000	1,557,000
Sewer Sepapartion in East Boston Phase II	-	-	-	-	-	255,000	255,000	258,000	258,000	258,000	258,000	258,000	1,800,000	1,260,000	345,000	3,405,000
Sewer Separation Roxbury Contract 3	-	-	-	-	-	-	-	-	-	-	-	-	-	2,500,000	2,500,000	5,000,000
Sewer Separation East Boston	-	-	-	-	-	-	455,000	455,000	364,000	273,000	273,000	146,000	1,966,000	1,000,000	-	2,966,000
Sewer Separation Roxbury Contract 2	594,000	594,000	593,000	594,000	594,000	593,000	594,000	594,000	593,000	594,000	594,000	593,000	7,124,000	500,000	-	7,624,000
Sewer Separation Roxbury Contract 1	163,000	145,000	126,000	140,000	146,000	39,000	31,000	-	-	134,000	-	-	924,000			924,000
Separation of Sanit House Lat Conn to Storm Drains	86,000	-	-	-	-	-	-	-	-	-	-	-	86,000	-	-	86,000
City-wide Illegal Connections Investigation (PH IV)	41,000	41,000	41,000	41,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	500,000	500,000	500,000	1,500,000
Owner Fix of Illegal Connections	-	-	7,000	-	-	8,000	-	-	7,000	-	-	8,000	30,000	15,000	-	45,000
Totals	**$928,000**	**$825,000**	**$811,000**	**$820,000**	**$826,000**	**$982,000**	**$1,421,000**	**$1,394,000**	**$1,308,000**	**$1,346,000**	**$1,211,000**	**$1,092,000**	**$12,964,000**	**$6,309,000**	**$3,834,000**	**$23,107,000**
Bonds	293,000	190,000	177,000	185,000	190,000	92,000	75,000	45,000	51,000	179,000	44,000	53,000	1,574,000	549,000	489,000	2,612,000
Rate	41,000	41,000	41,000	41,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	42,000	500,000	500,000	500,000	1,500,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	594,000	594,000	593,000	594,000	594,000	848,000	1,304,000	1,307,000	1,215,000	1,125,000	1,125,000	997,000	10,890,000	5,260,000	2,845,000	18,995,000
Totals	**$928,000**	**$825,000**	**$811,000**	**$820,000**	**$826,000**	**$982,000**	**$1,421,000**	**$1,394,000**	**$1,308,000**	**$1,346,000**	**$1,211,000**	**$1,092,000**	**$12,964,000**	**$6,309,000**	**$3,834,000**	**$23,107,000**

INFILTRATION AND INFLOW

DESCRIPTION AND JUSTIFICATION

Infiltration and inflow (I/I) are extraneous quantities of water, which enter the sanitary sewer system and reduce the capacity of the system to transport sanitary sewage to a treatment plant. Infiltration is groundwater that leaks into the sanitary sewerage system through pipe joints and defects. Inflow refers to stormwater that enters sewers through catch basins, sump pumps, downspouts, basement drains and defective manholes. Water inflow can also enter the sewer system through defective tide gates that are subject to tidal inflow.

All sewer systems are subject to some level of I/I. The Commission has performed sewer system evaluation surveys ("SSES") to determine the quantity of excessive I/I and the cost-effectiveness of removing the excessive I/I from the collection system. The purpose of a SSES is to identify and quantify specific I/I sources and recommend the structural improvements necessary to eliminate them. The Commission has completed several SSESs. The recommendations from the SSESs have been incorporated into annual renewal and replacement and other system rehabilitation construction contracts.

The Commission's I/I reduction program is funded using the MWRA I/I Local Financial Assistance Program. For all eligible I/I projects, the Commission will perform an analysis of the costs and benefits associated with undertaking the project using each of these funding sources.

NEW PROJECTS

No New Projects

ONGOING PROJECTS

Downspout Disconnection: This project includes the disconnection of downspouts connected to the sanitary sewer system or the combined sewer system. Downspouts connected to the sanitary sewer system or the combined sewer system contributes unnecessary flow to the MWRA treatment works. The Commission pays MWRA for each gallon sent to the treatment works. Downspout flows to the sanitary sewer and the combined sewer also contribute to SSOs and CSOs. Eliminating downspout flows to these two systems solves these two problems. Construction is scheduled to commence in April 2020 and is expected to be completed by December 2020. The three-year budget for this project is $200,000.

PROJECT CASH FLOW

Table 15 on page 68 illustrates the cash flow expenditures for Infiltration and Inflow for 2018-2020. Total expenditures for the three-years of the plan equal $200,000. The anticipated expenditure in 2018 is $0

Table 15 - Inflow & Infiltration

Capital Improvement Program
2018 - 2020
Sewer Infiltration/Inflow

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
No new Projects																
Ongoing Projects																
Downspout Disconnection	-	-	-	-	-	-	-	-	-	-	-	-	-	100,000	100,000	200,000
Totals	-	-	-	-	-	-	-	-	-	-	-	$0	$0	$100,000	$100,000	$200,000
Bonds	-	-	-	-	-	-	-	-	-	-	-	-	-	100,000	100,000	200,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	-	-	-	-	-	-	-	-	-	-	-	$0	$0	$100,000	$100,000	$200,000

SEWER SYSTEM SPECIAL

DESCRIPTION AND JUSTIFICATION

The Sewer System Special Projects category provides funding for a variety of system planning and other studies and for professional services associated with the rehabilitation and operation of the sewer system.

Overall, the objectives of the Sewer System Special Projects are to extend the useful life of the Commission's wastewater facilities, comply with the requirements of the NPDES Permit regulations and plan for future sewer system projects.

NEW PROJECTS

CCTV of Sewers and Storm Drains: IDDE: The purpose of this project is to continue testing sewer laterals to determine whether they leak sewage into drains and to inspect sewers and drains using CCTV to evaluate their condition and aid in locating illicit connections. The project is scheduled to commence in January 2018 and is projected to be completed by January 2020. The three-year budget is $800,000.

Metering and Modeling of Dorchester Interceptor: The purpose of this project is to identify how the Dorcehster Interceptor operates during wet weather. The project will meter and model flows over a three year period. Flow meters will supplement existing data. The Commission's model will attempt to simulate flows in real time. The modeling and metering efforts will help to determine if the interceptor is too small. The project is scheduled to commence in April 2018 and is projected to be completed by March 2021. The three-year budget is $1,805,000.

Austin Street Pump Station Improvements: This project includes the upgrade or replacement of essential equipment and components related to the Commission's Pump Stations. The upgrades will commence in January 2018 and is projected to be completed by December 2020. The three-year budget is $25,000.

Port Norfolk Pump Station Improvements: This project includes the upgrade or replacement of essential equipment and components related to the Commission's Pump Stations. The upgrades will commence in January 2018 and is projected to be completed by December 2020. The three-year budget is $120,000.

ONGOING PROJECTS

Trilling Way Pump Station Improvemnts: This project includes the upgrade or replacement of essential equipment and components related to the Commission's Pump Stations. The upgrades will commence in January 2018 and is projected to be completed by December 2020. The three-year budget is $120,000.

Sampling and Metering for Drain Model Calibration: The purpose of this project is to acquire information about phosphorus levels in three major storm drains, all of which discharge into the Charles River. These three drains convey a significant amount of phosphorus according to the 2012 Drain Model Report. The proposed project will acquire data to be used to calibrate the Drain Model in the future. The proposed program will run over a three year period. The Planning stage is scheduled to commence in March 2018 with a projected completion date of February 2021. The three-year budget is $174,000.

Metering Flows Tributary to Columbus Park Headworks: This program has two goals: (1) to acquire data from the Commission's inceptors that convey flows into the MWRA'a Columbus Park Headworks and (2) to test whether the flow data will be appropriate for the Commission's future Operations Center. The Operations Center will be used by the Operations Department to monitor conditions in the collection system during large storms. It has been thought that actions taken by MWRA effect conditions upstream in the Commissions interceptors. The metering devices will be able to detect the influence of conditions downstream at the MWRA headworks. The Planning stage will commence April 2018 and is projected to be completed by March 2021. The three-year budget is $224,000.

Discharge Notification for CSO's Contract 16-206-002: The proposed project will be an extension of an earlier project, CSO Public Notification which was a pilot program. During the pilot program, it became apparent that identifying overflows could be done more effectively by eliminating locations that did not overflow during the pilot. The proposed program will run over a three year period and replace the two year pilot program. The purpose of this project is to comply with the Commission's CSO NPDES Permit which requires the Commission to notify the public of discharges from its combined sewer system. Professional metering services will be used to determine when an overflow began and when it ended. A web site will be maintained for the public to access the overflow information. The planning stage of the proposed project commenced in July 2016 and is estimated to be completed in June 2019. The three-year budget is $130,000.

System Operations Monitoring Center: This project involves the development and implementation of a real-time supervisory control and data acquisition (SCADA) monitoring of critical BWSC and MWRA systems. Construction is scheduled to commence in May 2019 and is projected to be completed in February 2020. The three-year budget is $450,000.

Urban Runoff Water Quality Evaluation Contract 15-206-011: This project includes evaluating the quality of urban runoff in Boston and its impact on stormwater discharges from the Commission's drainage system and on receiving waters. Wet weather water quality samples will be collected from

various locations, such as roads (gutters), catch basins, parking lots, roof-tops, city parks, open spaces, and swales. The sample results will be compared with wet and dry weather samples collected from storm drain manholes, outfalls, receiving waters and wetlands. Samples will be analyzed for bacteria, metals and nutrients, as well as other parameters. Alternative methods for determining whether bacteria in the environment and storm drains are from human versus non-human sources will be explored. Numerous studies by the Commission in the past have evaluated bacterial concentrations in wet and dry weather discharges and in receiving waters. The bacteria were generally assumed to be from human sources, i.e. due to illicit connections or combined sewer overflows. Recent outfall and storm drain sampling has indicated that although those sources have largely been eliminated, elevated concentrations of bacteria were present in the flow. Studies by experts in the storm water field have suggested that non-human sources may contribute significant concentrations of bacteria to dry weather flows and urban wet weather discharges. EPA has asked the Commission to explore methods for determining whether some of the elevated levels of bacteria in its storm drains could be due to non-human sources. The planning stage commenced in November 2015 and is estimated to be completed in January 2018. The three-year budget is $12,000.

Interactive Training Tool: This project includes the development of an interactive training tool that will support knowledge sharing specific to the operation of the Commission's sewer and drainage systems and relevant components of the MWRA's wastewater collection system. The Planning stage is scheduled to commence in September 2020 and is projected to be completed in December 2021. The three-year budget is $100,000.

Fort Point Channel Implementation of Recomendations Contract 16-206-004: Despite numerous sewer separation projects in the combined sewer systems tributary to the Fort Point Channel in the last decade, water quality in the Channel continues to be impaired. In 2014, the Commission completed a water quality assessment of the Fort Point Channel and its tributaries and developed recommendations for further investigations aimed water quality improvements. This project will implement the recommendations developed under the 2014 water quality assessment project. The Planning stage commenced in November 2016 and is projected to be completed in May 2018. The three-year budget is $200,000.

CCTV of Sewers and Drains IDDE Sewer Contract 16-309-012: This project entails testing sewer laterals to determine whether they leak sewage into drains and CCTV inspection of sewers and drains evaluate their condition and aid in locating illicit connections. Under the Consent Decree with EPA the Commission must adhere to strict deadlines for completing illicit discharge investigations. Testing of sewer laterals will verify whether the laterals leak sewage to the storm drain system. CCTV of sewers and drains will aid in identifying illicit connections and structural deficiencies in the pipes. The Planning stage commenced in January 2017 and is projected to be completed in January 2017. The three-year budget is $75,000.

Model Improvements Contract 13-206-010: This project will improve the sewer model developed in 2006 and maintain the Drain model. The improvements will include the delineation of tributary areas in select locations along with recalibration. The goal of this project is to improve the sewer model with data collected from other projects. It is anticipated that the improvements will also improve the confidence of those using the model, which was developed before a number of important separation projects were completed. The Planning stage of this project began in January 2015 and is estimated to be completed in June 2018. This is a three-year project with a projected budget of $68,000.

BWSC Union Park Pump Station Improvements: This project includes the upgrade or replacement of essential equipment and components related to the Commission's Pump Stations. The upgrades will commence in January 2018 and is projected to be completed by December 2020. The three-year budget is $525,000.

Diving Services 17-206-003: This project includes Professional Diving services to inspect and repair large conduits and other underwater facilities. This is a professional services contract. In many instances it is necessary to inspect and repair Commission facilities, which are underwater and thus inaccessible. This needs to be accomplished through the use of professional qualified divers. The three-year budget is $100,000.

Sediment Analysis Services Contract 17-206-001: This project includes professional services to analyze the composition of sediments to be removed from sewers and drains scheduled for cleaning. This contract also includes recommendations for disposal options. In order to legally dispose of sediments from sewers and drains it is required to collect and analyze sediment samples. The project is scheduled to commence in January 2017 and is projected to be completed by December 2019. This is a professional services contract for three-years. The three-year budget is $35,000.

Geotechnical Service Contract 15-206-002: This project includes professional geotechnical services related to Commission projects. Services include soil borings and engineering analysis to design pipe and soil support systems. This is a professional services contract. In order to install sewer and drain pipe in deep locations and in certain soils it is required to sample and analyze the soils in order to determine the correct method of support for the pipes and excavations. The three-year budget is $300,000.

Land Survey Services Contract 17-206-002: This project includes surveys for Capital Improvement Projects after construction is completed. This is used to supplement Commission staff with their surveys for busier roadways and difficult to access locations. These services are necessary to complete contracts for the Capital Improvement Program. The three-year budget is $195,000.

Castings & Gratings: Payments to Boston Public Works Department for adjustment of BWSC Water and sewer castings during roadway reconstruction contracts. Construction is projected to commence in January 2017 and a completion date of December 2019. The three-year budget is $2,250,000.

Survey Services for CIP Projects Contract 15-206-009: This project includes total station surveys for Capital Improvement Projects. This is used to augment Commission staff with their surveys. These services are necessary to complete contracts for the Capital Improvement Program. The three-year budget is $220,000.

PROJECT CASH FLOW

Table 16 on page 74 illustrates the cash flow expenditures for Sewer Special Projects for the period 2018-2020. The total expenditures for the Sewer Special program are $7,928,000. The expenditures for 2018 are anticipated to be $2,998,000.

Table 16 - Sewer Special

Capital Improvement Program
2018 - 2020
Sewer Special

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
CCTV of Sewers and Storm Drains: IDDE	-	-	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	350,000	425,000	25,000	800,000
Metering & Modeling of Dorchester Interceptor	-	-	-	-	-	45,000	60,000	60,000	60,000	60,000	60,000	60,000	405,000	700,000	700,000	1,805,000
Austin St. Pump Station Improvements	-	-	-	-	-	10,000	-	-	5,000	-	-	-	15,000	5,000	5,000	25,000
Port Norfolk Pump Station Improvements	-	-	-	-	-	10,000	-	-	10,000	-	-	-	20,000	50,000	50,000	120,000
Ongoing Projects													-			
Trilling Way Pump Station Improvements	-	-	15,000.00	-	-	30,000	-	-	15,000	-	-	-	60,000	30,000	30,000	120,000
Sampling & Metering for Drain Model Calibration	-	-	-	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	54,000	60,000	60,000	174,000
Metering Flows Tributary to Columbus Park Headworks	-	-	-	7,000	7,000	6,000	7,000	7,000	6,000	7,000	7,000	7,000	61,000	81,000	82,000	224,000
Discharge Notification for CSOs	6,000	7,000	6,000	7,000	6,000	7,000	6,000	7,000	6,000	7,000	6,000	7,000	78,000	52,000	-	130,000
Systems Operations Monitoring Center	-	-	-	-	-	-	50,000	50,000	50,000	75,000	75,000	50,000	350,000	50,000	50,000	450,000
Urban Runoff Water Quality Evaluation	-	12,000	-	-	-	-	-	-	-	-	-	-	12,000	-	-	12,000
Interactive Training Tool	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100,000	100,000
Fort Point Channel Implementation of Recommendations	40,000	40,000	40,000	40,000	40,000	-	-	-	-	-	-	-	200,000	-	-	200,000
CCTV of Sewers and Storm Drains: IDDE	50,000	25,000	-	-	-	-	-	-	-	-	-	-	75,000	-	-	75,000
Model Improvements	17,000	17,000	17,000	17,000	-	-	-	-	-	-	-	-	68,000	-	-	68,000
Upgrades to UPPS & Satellite Stat	-	-	25,000	-	-	125,000	-	-	50,000	-	-	-	200,000	175,000	150,000	525,000
Diving Services	-	-	-	-	-	25,000	-	-	25,000	-	-	-	50,000	50,000	-	100,000
Sediment Analysis	-	-	-	-	-	5,000	5,000	5,000	-	-	-	-	15,000	10,000	10,000	35,000
Geotechnical Services	-	-	-	12,000	-	13,000	12,000	13,000	12,000	13,000	12,000	13,000	100,000	100,000	100,000	300,000
Land Survey Services	-	-	-	10,000	10,000	10,000	11,000	11,000	13,000	-	-	-	65,000	65,000	65,000	195,000
Castings and Gratings	-	-	-	-	-	75,000	75,000	150,000	150,000	150,000	75,000	75,000	750,000	750,000	750,000	2,250,000
Survey Services for Capital Projects	-	-	-	-	-	12,000	12,000	12,000	12,000	11,000	11,000	-	70,000	75,000	75,000	220,000
Totals	$ 113,000	$ 101,000	$ 138,000	$ 134,000	$ 104,000	$ 414,000	$ 279,000	$ 356,000	$ 455,000	$ 364,000	$ 287,000	$ 253,000	$ 2,998,000	$ 2,678,000	$ 2,252,000	$ 7,928,000
Bonds	113,000	101,000	138,000	134,000	104,000	339,000	204,000	206,000	305,000	214,000	212,000	178,000	2,248,000	1,928,000	1,502,000	5,678,000
Rate	-	-	-	-	-	75,000	75,000	150,000	150,000	150,000	75,000	75,000	750,000	750,000	750,000	2,250,000
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$ 113,000	$ 101,000	$ 138,000	$ 134,000	$ 104,000	$ 414,000	$ 279,000	$ 356,000	$ 455,000	$ 364,000	$ 287,000	$ 253,000	$ 2,998,000	$ 2,678,000	$ 2,252,000	$ 7,928,000

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SUPPORT PROJECTS

Various Support Projects are included in the 2018-2020 CIP, which the Commission firmly believes will improve the overall efficiency of Commission's functions and enhance its ability to collect revenues and track information. Funds are also allocated for software licenses and upgrades, hardware and peripheral equipment, metering, and vehicles.

OBJECTIVES

The primary objectives of the Support category for 2018–2020 are as follows:

- Upgrade of Automatic Meter Reading System Data Collectors
- Upgrade Work Order Management System
- Replace Customer Information & Billing System
- Replacement of Commission Vehicles

Support Projects are divided into three sections. These sections are:

- Metering
- Information Technology
- Administrative Equipment

Table 17 on page 76 illustrates the Support Projects in the 2018-2020 Capital Improvement Program total $18.1 million. Monies allocated for 2018 total $7.9 million. Graph 11 on page 77 illustrates the Total Support expenditures for 2018-2020. Graph 12 on page 78 illustrates Support Distributions Spending by category for 2018.

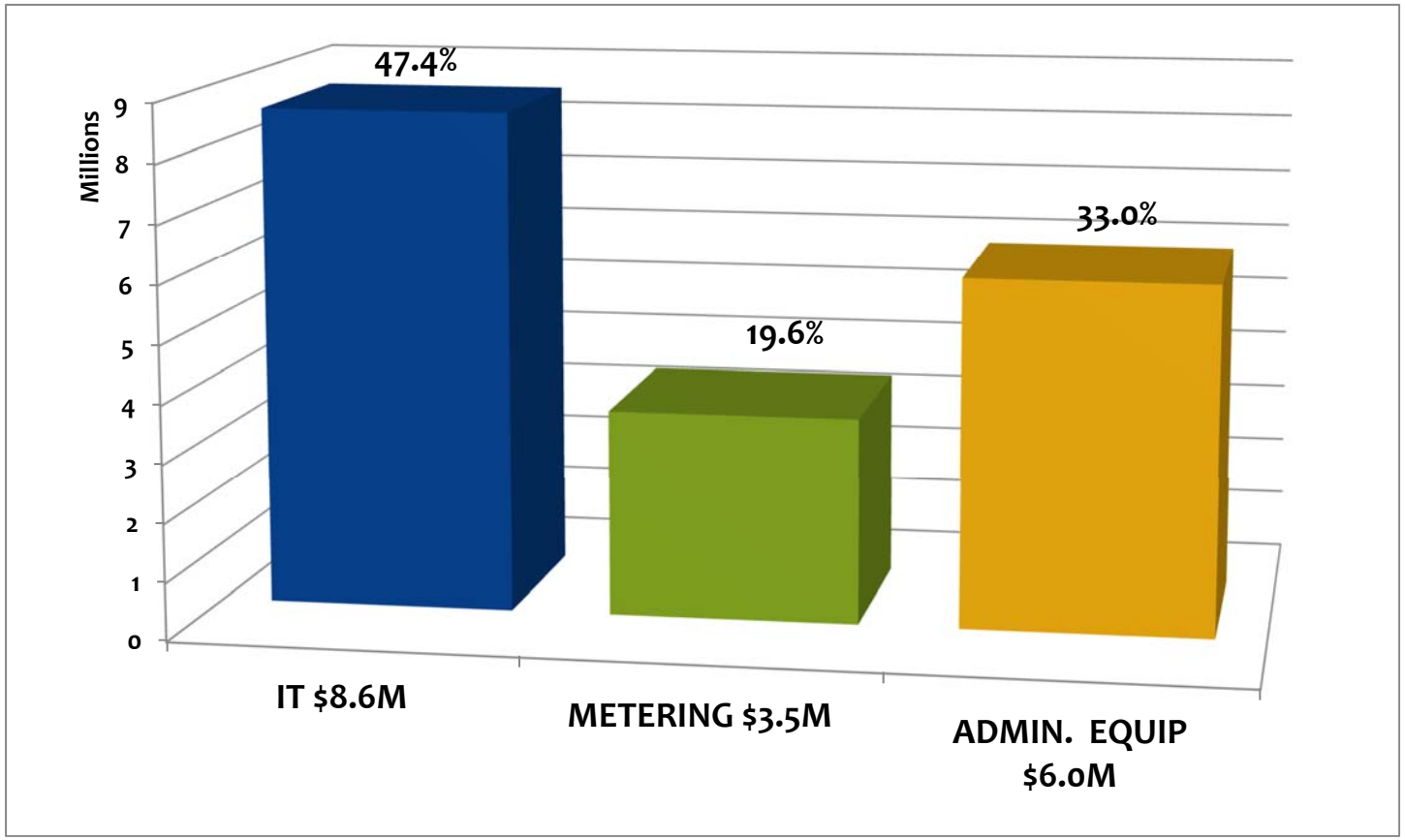
Table 17 - Support Category

Capital Improvement Program
2018 - 2020
Support Total

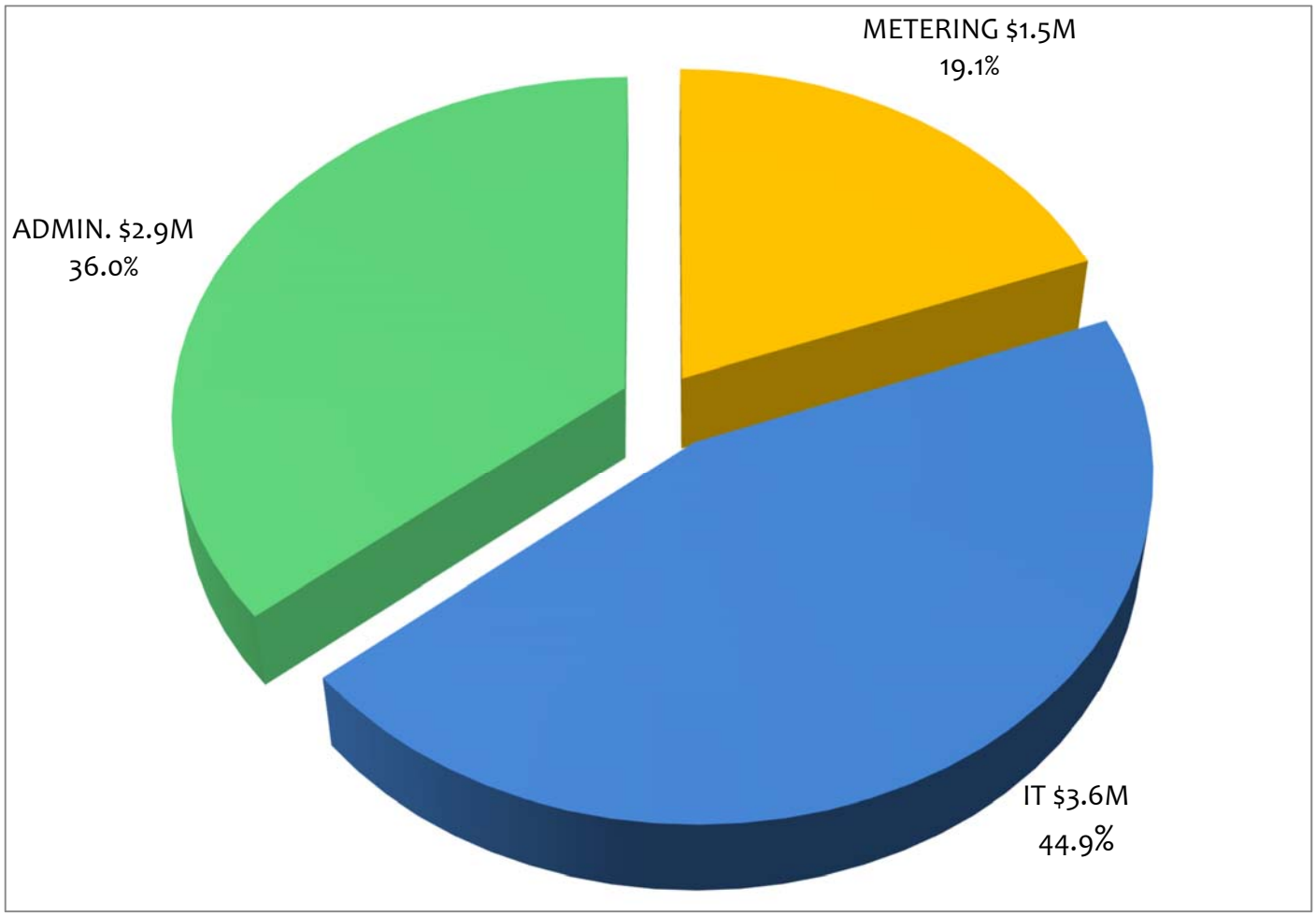
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
Metering																
Bonds	-	-	800,000	-	-	315,000	-	-	400,000	-	-	-	1,515,000	1,015,000	1,015,000	3,545,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$0	$0	$ 800,000	$0	$0	$ 315,000	$0	$0	$ 400,000	$0	0	$ -	$ 1,515,000	$ 1,015,000	$ 1,015,000	$ 3,545,000
Information Technology																
Bonds	250,000	265,000	360,000	310,000	300,000	370,000	300,000	350,000	435,000	200,000	215,000	200,000	3,555,000	2,740,000	2,305,000	8,600,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$ 250,000	$ 265,000	$ 360,000	$ 310,000	$ 300,000	$ 370,000	$ 300,000	$ 350,000	$ 435,000	$ 200,000	$ 215,000	$ 200,000	$ 3,555,000	$ 2,740,000	$ 2,305,000	$ 8,600,000
Administrative Equipment																
Bonds	-	110,000	352,000	140,000	160,000	293,000	100,000	400,000	375,000	238,000	237,000	450,000	2,855,000	2,055,000	1,080,000	5,990,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	$0	$110,000	$352,000	$ 140,000	160000	$ 293,000	100000	$400,000	$375,000	$238,000	$237,000	$450,000	$ 2,855,000	2,055,000	1,080,000	$ 5,990,000
Support Total	**$ 250,000**	**$ 375,000**	**$ 1,512,000**	**$ 450,000**	**$ 460,000**	**$ 978,000**	**$ 400,000**	**$ 750,000**	**$ 1,210,000**	**$ 438,000**	**$ 452,000**	**$ 650,000**	**$ 7,925,000**	**$ 5,810,000**	**$ 4,400,000**	**$ 18,135,000**
Bonds	250,000	375,000	1,512,000	450,000	460,000	978,000	400,000	750,000	1,210,000	438,000	452,000	650,000	7,925,000	5,810,000	4,400,000	18,135,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**$ 250,000**	**$ 375,000**	**$ 1,512,000**	**$ 450,000**	**$ 460,000**	**$ 978,000**	**$ 400,000.00**	**$ 750,000**	**$ 1,210,000**	**$ 438,000**	**$ 452,000**	**$ 650,000**	**$ 7,925,000**	**$ 5,810,000**	**$ 4,400,000**	**$ 18,135,000**

GRAPH 11 -2018-2020 TOTAL SUPPORT EXPENDITURES
$18.1 MILLION

Spending by Category



GRAPH 12 -2018 SUPPORT DISTRIBUTION SPENDING $7.9 MILLION



METERING

DESCRIPTION AND JUSTIFICATION

Metering programs include meter downsizing, which involves the replacement of large meters with smaller meters, where hydraulically feasible. On an annual basis, the Meter Services Department repairs, replaces, tests and installs water meters and automatic reading devices and maintains all field components of the Commission's Automatic Meter Reading system. All meters that are removed are tested on a fully equipped test bench, which was purchased in 2009. Meters 3" and larger are field tested, based on size, at intervals of: every year (6" to 10", every other year (4") and every three years (3"), in accordance with American Water Works Association standards. In addition, usage is evaluated utilizing the AMR system and recommendations are made to downsize identified meters to more accurately account for low flow.

Since 2012, the Commission has been working with Aclara Technologies to upgrade the current AMR system, originally installed in 2002, with a second generation system with greater functionality. In 2013, a new infrastructure of Data Collection Units ("DCUs") was installed that provides:

- Backwards capability allowing the new DCUs to obtain reads from old and new Meter Transmitter Units ("MTUs")
- The transmission of additional data to a new Network Control Computer ("NCC") for analysis and reporting, using enhanced software, and,
- Potential two-way communication with newer MTUs (MTU IIs)

In October of 2013, the Commission began the deployment of MTUs II, which transmit five times more data than previous units and provide the ability for programming at read intervals as short as 15 minutes. As of November 2017, the Commission has installed over 89,665 new MTU IIs (approximately 99% of all its accounts).

Commission employees are presently replacing the few remaining MTUs and are projected to have all accounts completed by the end of the second quarter in 2018.

In 2018, the Commission will be upgrading the cell phone boards and replacing the batteries in sixty-two DCU's located throughout the city

NEW PROJECTS

No New Projects

ONGOING PROJECTS

MTU and DCU Maintenance/Repair/Replacements and Upgrades: This project includes the following: Meter transmission Units (MTU) and Data Collection Units (DCU) software upgrade, Data Collection Units maintenance and MTU Programmer parts or replacements. The MTU and DCU program is an on-going project to replace or repair MTUs, DCUs and MTU programmer units (2018 -2020). Upgrade current DCU's with new boards and batteries (2018). Upgrade the current Aclara database to Acalara One Software or Aclara One MDM (2019 – 2020). The project is ongoing and continuing from January 2018 through 2020 and has a three year budget of $1,500,000.

Large Meter Replacement (Water): Meter Replacement Program 3 inch and larger. The three year budget for this project is $945,000.

Residential Metering (Water): The residential metering program is an ongoing project to replace approximately 4,000 residential meters sizes 5/8" through 2"**.** The three year budget for this project is $1,100,000.

PROJECT CASH FLOW

Table 18 on page 81 illustrates cash flow for Metering projects for 2018-2020 CIP totals $3,545,000. Metering expenditures allocated for 2018 total 1,515,000.

Table 18 - Metering Category

Capital Improvement Program
2018 - 2020
Metering

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
No New Projects																
Ongoing Projects																
MTUs and Data Collection Units	-	-	300,000	-	-	-	-	-	400,000	-	-	-	700,000	400,000	400,000	1,500,000
Large Meters	-	-	-	-	-	315,000	-	-	-	-	-	-	315,000	315,000	315,000	945,000
Residential Meters	-	-	500,000	-	-	-	-	-	-	-	-	-	500,000	300,000	300,000	1,100,000
Totals	**-**	**-**	**800,000**	**-**	**-**	**315,000**	**-**	**-**	**400,000**	**-**	**-**	**-**	**1,515,000**	**1,015,000**	**1,015,000**	**3,545,000**
Bonds	-	-	800,000	-	-	315,000	-	-	400,000	-	-	-	1,515,000	1,015,000	1,015,000	3,545,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**-**	**-**	**800,000**	**-**	**-**	**315,000**	**-**	**-**	**400,000**	**-**	**-**	**-**	**1,515,000**	**1,015,000**	**1,015,000**	**$3,545,000**

INFORMATION TECHNOLOGY

Effective use of the right technologies enables BWSC to provide more efficient and high-quality water and sewer services to the City of Boston. Strategic planning, careful selection of technological tools, and effective use of such tools has enabled BWSC to continue to improve the level of service associated with emergency responses, preventative maintenance, infrastructure improvements, and most importantly, quality customer service. Providing staff with appropriate training and utilizing the right mix of hardware and software is something BWSC continues to assess and act upon as new technologies continue to evolve.

BWSC utilizes a five-year Strategic Information Technology Plan as a roadmap for maintaining technical infrastructure and implementing new technologies. Based on technology trends, it is necessary to periodically reevaluate BWSC's computing infrastructure and the technologies currently in use. In 2012, BWSC contracted with a professional services firm to provide assistance in revising its five-year Strategic Information Technology Plan. The latest plan was finalized in 2013 and runs through the end of 2018.

A number of mission critical software applications are utilized to support BWSC's daily operations and provide for emergency response services 24 hours a day, 7 days a week.

In 2017 BWSC began upgrading its Oracle databases to Oracle 12C. This process is ongoing and will be completed in 2018.

BWSC is currently replacing its Automatic Vehicle Location System (AVL). The new AVL system will allow BWSC to track the location of vehicles in its fleet in real-time and automate fleet maintenance schedules.

BWSC is currently in the process of replacing our Customer Information/Billing System. A CIS vendor was selected in 2017 and is expected to complete the system configuration in 2018. Go-live is scheduled for April 2019. The new CIS is based on Microsoft technology.

BWSC is currently upgrading its Human Resource and Financial management systems. The project began in the 3rd quarter of 2017 and is scheduled to be completed by June 2018.

BWSC will be upgrading its website in 2018. The new site will be based on the latest technology creating a responsive more interactive site.

BWSC has recently completed an IT Disaster Recovery project and is currently backing-up its IT systems to a remote Disaster Recovery site. If a disaster renders BWSC's data center at its headquarters on Harrison Avenue unusable BWSC will have the ability to transfer to the remote backup site within hours.

NEW PROJECTS

New Projects included in Software and Hardware line items are included in the tables below.

ONGOING PROJECTS

Server / Network Hardware & Peripheral Equipment: New Server/Network Hardware is used to upgrade and add to the Commission's Computing Infrastructure, which provides sufficient capacity and performance to support computing activities including: billing, HRIS, payroll, financials, work order system and GIS. The total three-year budget for this project is $705,000. Monies are budgeted for the following items:

- SCSI Disk/Tape drives & Controllers
- Communications/Networking
- Windows Server Upgrades
- B&W Network Printers
- Disaster Recovery Hardware
- Replace/Upgrade PC's (20/25/25)
- Tablets/Ipads/Phones (35/50/35)
- Peripherals (cables,adapters,cases ect.)
-

Server/Network Software Licenses and Upgrades: Funding is included for software upgrades and additions to the Commission's Computer Infrastructure. Software and related upgrades to support Commission computing activities include: Billing, HRIS, Payroll, Financials, Work Order Management System, GIS, Document Management and Construction Management System. The total three-year budget for this project is $7,895,000. Software and upgrades consist of the following:

- Workorder Mgt. System
- CIS Replacement
- Database Software
- Application Development Tools
- Construction Management Software
- Web-Site Upgrade
- Firewall Software
- GIS Software
- Peoplesoft Upgrades
- Information Security
- Disaster Recovery Software & Services
- Microsoft Licensing
- AutoCAD & Design Software/upgrades

PROJECT CASH FLOW

Table 19 on page 85 illustrates cash flow expenditures for IT projects for 2018-2020. Total three year budget is $8,600,000. Expenditures for 2018 total $3,555,000.

Table 19 - Information Technology Category

Capital Improvement Program
2018 - 2020
Infomation Technology

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New																
No New Projects																
Ongoing																
Server/Network Hardware	-	15,000	-	10,000	-	10,000	-	50,000	100,000	-	15,000	-	200,000	245,000	260,000	705,000
Server/Network Software	250,000	250,000	360,000	300,000	300,000	360,000	300,000	300,000	335,000	200,000	200,000	200,000	3,355,000	2,495,000	2,045,000	7,895,000
Totals	**250,000**	**265,000**	**360,000**	**310,000**	**300,000**	**370,000**	**300,000**	**350,000**	**435,000**	**200,000**	**215,000**	**200,000**	**3,555,000**	**2,740,000**	**2,305,000**	**8,600,000**
Bonds	250,000	265,000	360,000	310,000	300,000	370,000	300,000	350,000	435,000	200,000	215,000	200,000	3,555,000	2,740,000	2,305,000	8,600,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**250,000**	**265,000**	**360,000**	**310,000**	**300,000**	**370,000**	**300,000**	**350,000**	**435,000**	**200,000**	**215,000**	**200,000**	**3,555,000**	**2,740,000**	**2,305,000**	**8,600,000**

ADMINISTRATIVE EQUIPMENT

DESCRIPTION AND JUSTIFICATION

The projects contained in the administrative equipment category provide funding for improvements to administrative facilities and equipment. The Fleet department manages and coordinates all activities required for the efficient operation and maintenance of the Commission's fleet of vehicles including heavy equipment. In order to minimize fleet total cost of ownership (operating and capital cost) and ensure the ability to provide required customer services using reliable transportation and equipment, vehicles should be replaced at regular intervals, derived from optimal replacement cycle analyses. Vehicle replacement cycles provide the basis for long-term replacement plans for year-to-year replacement earmarking and budgeting. A recent study of the Commission's fleet by a professional management consulting firm has determined that optimum replacement cycles for all classes of vehicles range from 7 to 12 year with a weighted average replacement cycle of 8.8 years for all vehicle. The 2018-2020 CIP has allocated a total of $5,990,000, which is for vehicles and other administrative equipment. Funds allocated for Administrative Equipment expenditures in 2018 total $2,855,000.

NEW PROJECTS

No new projects

ONGOING PROJECTS

***Commission Vehicle Wash Building Upgrades*-** Install system upgrades for the Commission's Vehicle Wash Building to improve building functionality. The Vehicle Wash Building was installed in 2001 as part of the original construction of the Commission's Headquarters. The performance of the vehicle wash system has become increasingly unreliable in recent years. Equipment and system components are outdated and prone to malfunctioning. Upgrading the wash system with modern components and equipment will ensure long-term reliability of the system for cleaning of the Commission's fleet. Planning for this project is expected to commence in April 2018 and will be followed by the construction which is expected to be completed by December 2018. The three year budget for this project is $450,000.

Commission Headquarters- HVAC Equipment: This project includes the replacement of six Make-Up Air Handling Units (MAU's) located on the lower roof at the Commission Headquarters Building with new state-of-the-art equipment as well as the replacement of the rubber membrane (EPDM) lower roof as part of the project. Also, the HVAC system at the Commission's Headquarters Building has been in operation since 2001. A recent energy audit/assessment of the HVAC System has identified opportunities for energy savings through improved process efficiencies and new state-of-the–art equipment. The audit has recommended replacement of the Make-Up Air Handling Units that provide gas-fired heating to the first floor garage, fleet Maintenance, Storeroom and Machine Shop areas. Improving the operational efficiencies of the HVAC System will limit the occurrence of system failures and reduce costs associated with equipment maintenance and energy consumption. The rubber membrane (EPDM) roof where MAU's are located will

also be replaced as part of this project. The project is expected to begin in January 2018 and be completed in October 2018. Total cost of the projected is projected to be $3,140,000.

Vehicles/Equipment: The Fleet department manages and coordinates all activities required for the efficient operation and maintenance of the Commission's fleet of vehicles including heavy equipment. In order to minimize fleet total cost of ownership (operating and capital costs) and sure the ability to provide required customer services using reliable transportation and equipment, vehicles should be replaced at regular intervals derived from optimal replacement cycle analyses. Vehicle replacement cycles provide the basis for long-term replacement plans for year-to-year replacement earmarking and budgeting. A recent study of the Commission's fleet by a professional fleet management consulting firm has determined that optimum replacement cycles for all classes of vehicles range from 7 to 12 years with a weighted average replacement cycle of 8.8 years for all vehicles. Funding is provided for the replacement of various vehicles for utility and operational purposes. The vehicles being replaced have reached their useful life. Three-year monies budgeted for Vehicles total $2,400,000.

PROJECT CASH FLOW

The 2018-2020 cash flow total $5,990,000 is presented in Table 20 on page 88. Monies allocated in 2018 for various vehicles total $2,855,000.

Table 10 - Administrative Equipment Category

Capital Improvement Program
2018 - 2020
Administrative Equipment

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New Projects																
No New Projects																
Ongoing																
Upgrades to Vehicle Wash Building at 980 Harrison Ave	-	-	-	-	50,000	-	100,000	300,000	-	-	-	-	450,000	-	-	450,000
Commission Headquarters - Renovations	-	110,000	152,000	140,000	110,000	93,000	-	100,000	175,000	238,000	237,000	250,000	1,605,000	1,255,000	280,000	3,140,000
Vehicles/Equipment	-	-	200,000	-	-	200,000	-	-	200,000	-	-	200,000	800,000	800,000	800,000	2,400,000
Totals	**-**	**110,000**	**352,000**	**140,000**	**160,000**	**293,000**	**100,000**	**400,000**	**375,000**	**238,000**	**237,000**	**450,000**	**2,855,000**	**2,055,000**	**1,080,000**	**5,990,000**
Bonds	-	110,000	352,000	140,000	160,000	293,000	100,000	400,000	375,000	238,000	237,000	450,000	2,855,000	2,055,000	1,080,000	5,990,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**-**	**110,000**	**352,000**	**140,000**	**160,000**	**293,000**	**100,000**	**400,000**	**375,000**	**238,000**	**237,000**	**450,000**	**2,855,000**	**2,055,000**	**1,080,000**	**5,990,000**

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STORMWATER/GREEN INFRASTRUCTURE/LOW IMPACT DEVELOPMENT PROJECTS

DESCRIPTION AND JUSTIFICATION

Funding is provided in the 2018-2020 CIP for the implementation of the Commission's Stormwater Program. This program consists of studies of existing and new drainage infrastructure, best management practices and implementation of programs designed to improve water quality, the environment and manage stormwater resources.

The primary purpose of the Stormwater Program is to participate in the Boston Harbor pollution abatement projects, implement green infrastructure/low impact development to improve the water quality of discharges to the local receiving waters and promote public awareness of stormwater quality issues. The goal is also to study existing conditions and make recommendations for placement of new best management practices designed to promote improved water quality, ensure compliance with state and federal regulations, minimize flooding and manage stormwater throughout the City of Boston.

The Green Infrastructure/Low Impact Development ("GI/LID") category provides funding for ("GI/LID") projects as needed in collaboration with public improvements in the City of Boston.

The Commission is under an obligation to meet the Phosphorus Total Maximum Daily Load ("TMDL") for the Lower Charles River Basin by reducing elevated levels of phosphorus discharged from its stormwater outfalls. The Commission was required by its Consent Decree with the U.S. EPA to develop a stormwater model to identify pollutant loadings (including phosphorus) from land areas that contribute stormwater runoff to the Commission's storm drain system. In addition, the Commission is currently developing a Best Management Practice ("BMP") Recommendations Report in compliance with the terms of the Consent Decree. The BMP Recommendations Report will provide a scheduled plan for implementation of structural BMPs to reduce pollutant loadings discharged to the twenty-seven sub-watersheds of the City of Boston.

The BMP Recommendations Report is intended to provide a plan for the Commission's whole stormwater collection system. According to the interim findings, the cost to implement this plan could be substantial. The purpose of this program is to make available funding to implement GI/LID projects (in collaboration with other city departments and/or private land owners) in the City of Boston as they become available. This program will further the Commission's goal of compliance with the Consent Decree.

Table 21 on page 90 illustrates Stormwater by Category. Three-year total expenditures are $6.9 million, of which $3.7 million is anticipated to be spent in 2018.

Table 21 - Stormwater

Capital Improvement Program
2018 - 2020
Stormwater

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
Stormwater																
Bonds	195,000	132,000	132,000	214,000	349,000	374,000	339,000	463,000	498,000	422,000	309,000	245,000	3,672,000	2,106,000	1,115,000	6,893,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**195,000**	**132,000**	**132,000**	**214,000**	**349,000**	**374,000**	**339,000**	**463,000**	**498,000**	**422,000**	**309,000**	**245,000**	**3,672,000**	**2,106,000**	**1,115,000**	**6,893,000**
Stormwater Total	**195,000**	**132,000**	**132,000**	**214,000**	**349,000**	**374,000**	**339,000**	**463,000**	**498,000**	**422,000**	**309,000**	**245,000**	**3,672,000**	**2,106,000**	**1,115,000**	**6,893,000**
Bonds	195,000	132,000	132,000	214,000	349,000	374,000	339,000	463,000	498,000	422,000	309,000	245,000	3,672,000	2,106,000	1,115,000	6,893,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**195,000**	**132,000**	**132,000**	**214,000**	**349,000**	**374,000**	**339,000**	**463,000**	**498,000**	**422,000**	**309,000**	**245,000**	**3,672,000**	**2,106,000**	**1,115,000**	**6,893,000**

NEW PROJECTS

Inundation Modeling: The purpose of this project is to utilize the Commission's model as a basis to identify areas of the City that may experience flooding during extreme weather events. The project is scheduled to commence in April 2018 and projected to be completed in April 2019. The three year budget for this project is $1,000,000.

Design of BMPS at City Hall: The purpose of this project is to design stormwater BMP's and Green Infrastructure components in the City Hall Plaza area of Boston. The components will have monitoring devices installed to determine the effectiveness of Green Infrastructure. The three year budget for this project is $150,000.

ONGOING PROJECTS

***Design Services for the Construction of GI at Five Boston Public Schools Contract 15-206-012*:** The stormwater report identified areas in Boston with high Phosphorus loadings. Boston Public Schools in areas with high Phosphorus loadings were identified. Five schools have been and selected for evaluation and construction of Green Infrastructure to treat stormwater runoff. This contract will provide design services. The planning phase of this project commenced in September 2015 and is expected to be completed in December 2018. The three-year budget for the project is $27,000.

Green infrastructure & Low Impact Development- North Beacon Street 15-206-013*:* As part of Consent Decree, the Commission developed a Stormwater BMP Implementation Plan. This plan developed goals for the Commission to comply with the limits in the TMDL. The North Beacon Street GI Project will identify potential sites and an estimate of the cost to install. The three year budget is $180,000.

Final Design of Constructed Wetland in Stormwater Tributary at Daisy Field: This project is to complete final designs for a vegetated subsurface gravel filter and bioretention feature to treat stormwater runoff in tributary area of Daisy Field. The stormwater runoff in tributary area 18GSDO233, also known as Daisy Field, is impacting the Muddy River and eventually the Charles River. Conceptual designs, completed by the UNH Stormwater Center, for a subsurface gravel filter and a parking lot perimeter bioretention feature that will improve the quality of stormwater runoff from the tributary area will be moved to final design. In addition, monitoring locations will be included to monitor the operation of the wetland. The design phase is set to commence in January 2018 and is expected to be completed by December 2020. The three-year budget is $100,000.

Stormwater Fee Feasibility Study Contract 15-207-003: This project is designed to study the possibility of implementing a city-wide stormwater fee or stormwater utility to capture costs associated with stormwater infrastructure expenses. The project began in November 2015 and is scheduled to be completed by December 2018. The three-budget is $896,000.

BMPs & Green Infrastructure at Beacon St. Park St CIP 16-21.: The purpose of this project is to install stormwater BMPs and Green Infrastructure components in the Audubon Circle area of Boston. The components

will have monitoring devices installed to determine the effectiveness of Green Infrastructure. Construction is scheduled to commence in March 2017 and is projected to be completed by March 2018. The three-year budget is $75,000.

Construction of Rain Gardens at Boston Public Schools BPS 15133 : The stormwater report identified areas in Boston with high phosphorus loadings. Boston Public Schools in areas with high phosphorus loadings were identified. Five schools have been and selected for evaluation and construction of Green Infrastructure to treat stormwater runoff. This contract will provide the construction services necessary to construct Green Infrastructure features. The three year budget for this project is $515,000.

Construct BMPs & Green Infrastructure at City Hall Plaza: This project is being undertaken as part of the Consent Decree requirements. The purpose of this project is to install stormwater BMPs and Green Infrastructure components in the City Hall Plaza area of Boston to serve as a demonstration project for such installations. The components will have monitoring devices installed to determine their effectiveness got stormwater retention and addressing pollutant discharges. Construction is scheduled to commence in March 2019 and is projected to be completed by December 2019. The three-year budget is $900,000.

Design Services for the Construction of GI/Stormwater Retention Structures for Low Lying Areas: The Wastewater and Storm Drainage System Facilities Plan included an evaluation of climate change adaptation strategies for changing wet weather conditions. The Plan recommended that the Commission identify areas for temporary surface storage of stormwater and the utilization of BMPs to alleviate the hydraulic stress of potential rainfall volumes and peak intensities of storms that may be experienced in the future. This project will provide design services for the construction of Green Infrastructure/Stormwater Retention Structures in specific topographic areas identified for acting as temporary surface storage for stormwater. The planning start day for this project is May 2018 with a completion date of June 2019. The start date for the design phase is January 2019 and a complete date of June 2019. The three year budget is $500,000.

Green Infrastructure Signage: The purpose of this project is to provide funding for Green Infrastructure signage as needed for Green Infrastructure projects. Construction is scheduled to commence in August 2017 and is projected to be completed by December 2020. The three-year budget is $50,000.

Green Infrastructure: The purpose of this project is to provide funding for Green Infrastructure projects as needed in collaboration with public improvements in the City of Boston. Construction is scheduled to commence in January 2017 and is projected to be completed by December 2019. The three-year budget is $2,500,000.

PROJECT CASH FLOW

Table 22 on page 93 illustrates Stormwater by Category. Three-year total expenditures are $6,893,000, of which $3,672,000 is anticipated to be spent in 2018.

Table 12 – Stormwater

Capital Improvement Program
2018 - 2020
STORMWATER/GREEN INFRASTRUCTURE/LOW IMPACT DEVELOPMENT

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018	2019	2020	Total 2018 - 2020
New																
Inundation Modeling	-	-	-	-	35,000	40,000	75,000	100,000	125,000	125,000	125,000	125,000	750,000	250,000	-	1,000,000
Design of BMPS at City Hall Plaza	-	-	-	-	-	-	-	-	-	-	25,000	25,000	50,000	100,000	-	150,000
Ongoing																
Design of Constructed Rain Gardens at Boston Public Schools	-	-	-	3,000	3,000	3,000	7,000	7,000	2,000	2,000	-	-	27,000	-	-	27,000
Green Infrastructure & Low Impact Development - North Beacon	30,000	30,000	30,000	30,000	30,000	30,000	-	-	-	-	-	-	180,000	-	-	180,000
Final Design of Constructed Wetland in Stormwater Tributary	-	10,000	10,000	15,000	15,000	15,000	10,000	10,000	-	-	-	-	85,000	10,000	5,000	100,000
Stormwater Fee Feasibilty Study	64,000	64,000	64,000	64,000	64,000	64,000	65,000	64,000	64,000	64,000	64,000	65,000	770,000	126,000	-	896,000
BMPS & Grn Infrstruct at Beacon St, Park St.	75,000	-	-	-	-	-	-	-	-	-	-	-	75,000	-	-	75,000
Constructed Rain Gardens at Boston Public Schools	-	-	-	25,000	50,000	50,000	25,000	100,000	150,000	100,000	15,000	-	515,000	-	-	515,000
Construct BMPs & Green Infrastruct at City Hall Plaza	-	-	-	-	-	-	-	-	-	-	-	-	-	300,000	600,000	900,000
Design Services for the construction of GI / Stormwater Retention Structures for Low Lying Areas	-	-	-	-	-	20,000	30,000	30,000	30,000	30,000	30,000	30,000	200,000	300,000	-	500,000
Green Infrastructure Signage	1,000	3,000	3,000	2,000	2,000	2,000	2,000	2,000	2,000	1,000	-	-	20,000	20,000	10,000	50,000
Green Infrastructure	25,000	25,000	25,000	75,000	150,000	150,000	125,000	150,000	125,000	100,000	50,000	-	1,000,000	1,000,000	500,000	2,500,000
Totals	**195,000**	**132,000**	**132,000**	**214,000**	**349,000**	**374,000**	**339,000**	**463,000**	**498,000**	**422,000**	**309,000**	**245,000**	**3,672,000**	**2,106,000**	**1,115,000**	**6,893,000**
Bonds	195,000	132,000	132,000	214,000	349,000	374,000	339,000	463,000	498,000	422,000	309,000	245,000	3,672,000	2,106,000	1,115,000	6,893,000
Rate	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LWSAP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I/I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totals	**195,000**	**132,000**	**132,000**	**214,000**	**349,000**	**374,000**	**339,000**	**463,000**	**498,000**	**422,000**	**309,000**	**245,000**	**3,672,000**	**2,106,000**	**1,115,000**	**6,893,000**

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APPENDIX A - GLOSSARY

ARB: A trademark for Schlumberger remote meter reader interfaces. See also R.M.I.

Board of Commissioners: The three-member governing board of the Commission.

Bond: A written promise to pay a specific sum of money (called the face value or principal amount) at a specific date or dates in the future (called the maturity dates), together with periodic interest at a specific or variable rate.

Bond Resolution: A document that contains terms and conditions relating to the issuance and sale of bonds and sets forth the obligations to bondholders.

BWSC: The Boston Water and Sewer Commission.

Capital Improvement Program (CIP): A plan which identifies and estimates the nature, schedule, cost, priority, and financing of long-term assets that the Commission intends to build or acquire during a specific period.

Cleaning and Lining: A process to improve unlined but structurally sound, older cast iron mains. The mains are cleaned and lined with cement (while still in place) to improve hydraulic capacity and extend useful life.

Collection System: The pipes, conduits, pumping stations and appurtenances involved in the collection and transport of wastewater and storm-water.

Combined Sewer: A sewer designed to receive both sanitary sewage and storm-water runoff.

CSO (Combined Sewer Overflow): The discharge from combined sewers which collect both sanitary sewage and storm-water runoff for wastewater treatment under normal (dry) weather conditions. During rainstorms, the system becomes overloaded and the excess is discharged directly into neighboring waterways from CSO outlets. In the City of Boston area there are 37 permitted combined sewer overflow outlets.

Current Expense Budget (CEB): A financial plan which estimates the revenues and expenses associated with the Commission's operations for a fiscal year.

Debt Service: In a given fiscal year, the amount of money necessary to pay interest and principal on outstanding debt instruments.

DEP (Department of Environment Protection): The Massachusetts agency that regulates water pollution control, water supplies, drinking water quality and waterways and certifies projects for eligibility under the Water Pollution Abatement Trust Loan programs.

Department: A sub-unit of a division.

Division: A major organizational unit within the Commission, encompassing the activities and resources for providing a major service or function.

Drain: A pipe or conduit which conveys storm-water.

Enabling Act: Chapter 436 of the Acts of the Commonwealth of Massachusetts of 1977, the legislation which established the BWSC and defined its purpose and responsibilities as of August 5, 1977.

EPA (Environmental Protection Agency): The federal government agency responsible for environmental enforcement and investigation. The EPA enforces the provisions of the Safe Drinking Water Act and the Clean Water Act.

Expenditures: Actual payment within a specified period for goods and services received.

Fiscal Year: The 12-month financial period used by the Commission which begins January 1 and ends December 31 of the same calendar year.

General Revenue Bonds: Bonds which are general obligations of the issuer where the full faith and credit of the issuer is pledged to the payment of the principal and interest thereon utilizing the revenue to be generated through the sale of a particular commodity, service or toll.

Hydrant: A device connected to a public water main for the purpose of providing water for firefighting or other authorized purposes.

Illegal Connection: A sanitary sewer service which is connected to a storm drain system, thus contributing sewerage.

Infiltration/Inflow: Extraneous sources of water that enter the sanitary system and are transported unnecessarily to the treatment facility. Infiltration is groundwater that leaks into the sanitary sewerage system through pipe joints and defects. Inflow refers to water that enters sewers from improperly connected catch basins, sump pumps, downspouts, basement drains and defective manholes. Inflow also enters through defective harbor CSO tide-gates when the tide is high.

Interceptors: The large pipes or culverts that convey wastewater from the localized collection system to the treatment plant.

Meter: An instrument for measuring the flow of water.

Meter Pit: An underground vault enclosing a meter.

MWRA (Massachusetts Water Resources Authority): An agency created by the Massachusetts Legislature through the passage of Chapter 372 of the Acts of 1984, responsible for providing wholesale potable water and wastewater collection, transport, delivery and treatment services to user Communities in Eastern Massachusetts. The Communities provide retail services directly to their customers or end users.

NPDES (National Pollutant Discharge Elimination System): A permit issued by EPA in conjunction with DEP to govern discharges into waterways.

Potable Water: Water fit for human consumption in conformance with the regulations of the Environmental Protection Agency and the Massachusetts Department of Environmental Protection.

Program: An organized group of activities and the resources to carry them out, aimed at achieving related goals.

Public Water Main: The piping and associated valves, hydrants and appurtenances installed in a public way, Commission-owned easement, or private way open to public travel, for the purpose of supplying water to one or more customers or for public fire protection.

R.M.I: Remote Meter Interface. A device for reading water meters using a hand held computer which is plugged into an outside box wired to the meter.

Rate Revenue: Income received in a specified period from user charges for providing water and sewer services.

Rehabilitation: Any process which serves to extend the useful life of a pipe or structure which is in need of repair.

Residential Meter: A meter two inches in size or smaller used to measure the flow of water to predominantly residential properties.

Sanitary Sewage: Liquid and water-carried human and domestic wastes from buildings, exclusive of ground, storm and surface water.

Sanitary Sewers: In a separated system, pipes that carry only domestic or commercial sanitary sewage as opposed to rainwater runoff.

Sewer: A pipe or conduit that carries wastewater

Sewer System: The combined Wastewater System and Storm Drainage System.

Storm Drain: A pipe or conduit designed to carry storm-water or surface water runoff.

Storm Drainage System: Storm drains, tidegates, flow regulators, catch basins, storm-water pumping stations and appurtenant facilities.

Storm Sewers: Storm drains or storm drainage system.

Stormwater: Any water resulting from rainfall or other precipitation that runs off surfaces during or after a storm.

Unaccounted-for Water: The difference between the volume of water withdrawn from the source of supply and the volume of water billed to customers. Unaccounted for water is caused by system losses, fire protection and construction activities.

Valve: A device used in water systems to control the flow of water.

Wastewater: The spent water of a community, which may be a combination of the liquid and water-carried domestic or industrial wastes from buildings, together with any groundwater and stormwater that may be present.

Wastewater System: The totality of the devices, equipment or works used in transportation, pumping, storage, treatment, recycling, or reclamation of wastewater or in the disposal of the effluent.

Water Service Pipe: The connection, piping and associated valves and appurtenances that extend from a public water main to a building or property for the purpose of supplying water.

APPENDIX B - KEY ABBREVIATIONS

SIZE	DESCRIPTION
4 W/ 8	4" PIPE IS REPLACED WITH 8" PIPE
6 W/ 8	6" PIPE IS REPLACED WITH 8" PIPE
8 W/ 12	8" PIPE IS REPLACED WITH 12" PIPE

TYPE	TYPE OF SEWER PIPE
CS	COMBINED SEWER
SD	STORM DRAIN
SS	SANITARY SEWER

APPENDIX C – STREET LISTING

WATER REPLACEMENT

Contract 18-308-001

Street	Limits	Neighborhood	Length	Size
Belvidere St	Huntington Ave. to Ring Rd.	Back Bay	434	12
Belvidere St	Huntington Ave. to Ring Rd.	Back Bay	419	12
Dalton St.	Scotia St. to Clearway St.	Back Bay	543	12
Alleyway	Court St. to Government ctr.	City Proper	248	8
Chauncy St.	Bedford St. to Summer St.	City Proper	450	12
Clinton St.	North st. to Commercial St.(Partial)	City Proper	264	8
Commercial Wharf East	Commercial St. to Atlantic Ave.	City Proper	233	8
Congress St.	Milk St. to Franklin St.	City Proper	543	8
Congress St.	Purchase St. to Franklin St.	City Proper	574	12
Congress St.	High St. to Milk St.	City Proper	550	10
Essex St.	Atlantic Ave. to Lincoln St.	City Proper	426	10
Essex St.	Washington St. to Kingston St.	City Proper	713	12
Essex St.	Washington St. to Kingston St.	City Proper	853	12
TOTAL			**6,247**	

Contract 18-308-002

Street	Limits	Neighborhood	Length	Size
Boston Common	Adjacent to Beacon St.	City Proper	1,150	48
Southwest Corridor Park	Tremont to Ruggles St.	Back Bay	1,800	30
Copley Place	St Botolph to Stuart	Back Bay	850	42

St Botolph Street	Harcourt to Gainsborough	Back Bay	2,650	42
TOTAL			**6,450**	

Contract 18-308-003

Street	Limits	Neighborhood	Length	Size
Neponset Ave	Gallivan Blvd N/B to Neponset Bridge	Dorchester	325	12
Neponset Ave	Gallivan Blvd N/B to Neponset Bridge	Dorchester	1050	8
Neponset Ave	Gallivan Blvd S/B to N/B	Dorchester	450	16
Morrisey Blvd S/B	Redfield St to Neponset Ave	Dorchester	150	10
TOTAL			1,975	

Contract 18-309-001

Street	Limits	Neighborhood	Length	Size
Kilmarnock St	Gallivan Blvd N/B to Neponset Bridge	Fenway	750	10,8
Jersey St	Gallivan Blvd N/B to Neponset Bridge	Fenway	1,000	12
Peterborough St	Gallivan Blvd S/B to N/B	Fenway	2,000	12
Queensberry	Redfield St to Neponset Ave	Fenway	1,800	8
TOTAL			**5,550**	

Contract 18-309-003

Street	Limits	Neighborhood	Length	Size
Destefano Rd	Hyde Park Ave to End	Fenway	460	8
Harding Rd	Stella Rd to Hadwin Wy	Fenway	400	10
Cummins Hwy	Harding Rd to American Legion Hwy	Fenway	345	16
Rowe St	Seymour St to Cummins Hwy	Fenway	514	8

Huntington Ave	Collins St to Thatcher St	Fenway	1,486	8
Hawthorne Ter	Hawthorne St to End	Fenway	163	8
Hawthorne St	Hawthorne Ter to Heathcote St	Fenway	205	10
Hawthorne St	Sycamore St to Florence St	Fenway	632	8
Brown Ave	Cummins Hwy to Allen St	Fenway	310	12
Cummins Hwy	Sycamore St to Florence St	Fenway	378	16
Westmore Rd	Gilmer St to Deering Road	Fenway	1,048	8
Wellington Hill St	Duke St to Hillsboro Rd	Fenway	509	12
Morton St	Blue Hill Ave to Leston St	Fenway	500	12
Wildwood St	Woolson St to Morton St	Fenway	596	12
Verrill St	Woolson St to Morton St	Fenway	529	12
Coronado Rd	Belnel Rd to End	Fenway	359	8
TOTAL			**8,434**	

Contract 17-308-001

Street	Limits	Neighborhood	Length	Size
Austin Ave.	Bennington St. to End	East Boston	850	10
Walley St.	Leydon to Waldemar Ave.	East Boston	700	12,10
Brooks St.	Bennington St. to Bremen St.	East Boston	200	12
Brooks St.	Bennington St. to Falcon St.	East Boston	2,000	12
Chelsea St.	Prescott St. to Chelsea LINE	East Boston	3,350	8
Gove St.	Havre St. to Chelsea St.	East Boston	620	8
Saratoga St.	Marion St. to Shelby St.	East Boston	2,700	8
Lubec St.	Gove to Porter Ave.	East Boston	600	8
Swan Ave.	Palermo St. to Leverett Ave.	East Boston	600	8
Palermo St.	Austin St. to Lawn Ave.	East Boston	450	8
Lawn Ave.	Palermo St. to Everett Ave.	East Boston	325	8
Leverett Ave.	Lawn Ave. to Bennington St.	East Boston	475	8
TOTAL			**12,870**	

Contract 17-308-002

Street	Limits	Neighborhood	Length	Size
Binney St.	Longwood Ave to End	Roxbury	155	8
Blackfan Ct.	Longwood Ave to End	Roxbury	645	12
Bower St.	Walnut Ave to End	Roxbury	340	6
Devon St.	Columbia Rd. to Vaughan Ave.	Roxbury	220	8
E. Cottage St.	Dudley St. to Robey St.	Roxbury	1,025	12
Elm Hill Ave.	Crawford St. to Warren St.	Roxbury	775	12
Intervale St.	Blue Hill Ave. to Normandy St.	Roxbury	645	10
Station St.	Mindoro St. to Parker St.	Roxbury	490	12
Adams St.	Washington St. to Bridge St.	Dorchester	340	12
Cedar St.	Sanford St. to Manchester St.	Dorchester	295	12
Dorchester Ave.	Kemp St. to Southampton St.	Dorchester	1,000	16
Morrissey Blvd.	Victory Rd. to #725	Dorchester	435	12
Morrissey Blvd.	Fox Point Rd.	Dorchester	295	6
Westglow St.	Adams St. to Garner Rd.	Dorchester	425	8
TOTAL			**7,085**	

Contract 17-308-003

Street	Limits	Neighborhood	Length	Size
Bismark St.	Cummins Hgwy. To End	Mattapan	295	8
Bradshaw St.	Esmond St. to McLellan St.	Mattapan	420	12
Harvard St.	Walkhill St. to End	Mattapan	1,180	6
West St.	Hyde Park Ave. to Hilton St.	Hyde Park	390	12
Railroad St.	Corey St. to 300’ Easterly Rd.	West Roxbury	465	10
Forest Hills St.	Williams St. to #199	Jamaica Plain	750	8
Morton St.	Forest Hill Ave. to Canterbury St.	Jamaica Plain	3,600	8,12
TOTAL			**7,100**	

Contract 17-308-004

Street	Limits	Neighborhood	Length	Size
Cross St	Hanover St to Cooper St	City Proper	720	**12,16" (SH**
Endicott St	Cooper St to Morton St	City Proper	220	**12"**
North Washington	Causeway St to Cooper St	City Proper	1370	**12, 16" (SH**
TOTAL			**2,310**	

Contract 17-308-04A

Street	Limits	Neighborhood	Length	Size
Bowdoin St	Derne St to Cambridge St	City Proper	1250	**10,16"**
Derne St	Hancock St to Bowdoin St	City Proper	800	**12,16"**
Hancock St	Mt. Vernon St. to Cambridge	City Proper	950	**12"**
Harvard St	Hudson St. to Tyler St.	City Proper	200	**12"**
High St	Batterymarch St. to Purchase	City Proper	350	**12"**
Lincoln St.	Kneeland St. to Bedford St.	City Proper	1055	**8"**
Lynde St	Cambridge St. to End	City Proper	150	**12"**
Mt. Vernon St	Joy St. to Hancock St.	City Proper	170	**12"**
Park Street Pl	Park St to End	City Proper	25	**4"**
South St	Kneeland St. to Beach St.	City Proper	325	**8"**
TOTAL			**5,275**	

Contract 17-308-005

Street	Limits	Neighborhood	Length	Size
Northampton St.	Washington to Harrison	South End	710	12
Northampton St.	Albany to Harrison Ave.	South End	670	12
Massachusetts Ave.	Tremont to Shawmut	South End	930	12
Massachusetts Ave.	Washington to Shawmut	South End	450	12
Massachusetts Ave.	Washington to Harrison	South End	750	12
Massachusetts Ave.	Albany to Harrison Ave.	South End	670	12 SL
Massachusetts Ave.	Albany to Harrison Ave.	South End	670	12 SH

Albany St.	Mass Ave. to E. Concord	South End	700	12
East Newton St.	Washington to Albany	South End	1,375	12
Wareham St.	Harrison Ave. to Albany	South End	850	12
Harrison Ave.	East Canton to Maiden	South End	700	12
TOTAL			**8,475**	

Curlew St. Betterment

Location	Limits	Neighborhood	Length	Size
Curlew St.	Maplewood St. to End	West Roxbury	280	2
TOTAL			280	

Contract 17-309-002

Street	Limits	Neighborhood	Length	Size
O'Connell Rd.	Washington St. to Valley Rd.	Dorchester	200	8
Valley Rd	Washington St. to O'Connell Rd	Dorchester	604	12
Fendale Ave	Nevada St. to Washington St.	Dorchester	750	8
TOTAL			**1,554**	

Contract 17-309-02A

Street	Limits	Neighborhood	Length	Size
Colborne Rd	Monastery Rd to Nottinghill	Citywide	605'	**12"**
Cawfield St	Eastman St to elder St	Citywide	364'	**8"**
Elder St	Cawfield St to Columbia Rd	Citywide	366'	**8"**
Fendale Ave	Nevada St to Washington St	Citywide	750'	**8"**
Barnes Ave	Saratoga St to End	Citywide	1,501'	**8"-12"**
Bennington St	Woodsworth St to Triden St	Citywide	1,500'	**8"**
Blackinton St	Bennington St to Leyden St	Citywide	313'	**12"**
Breed St	Bennington St to Leyden St	Citywide	796'	**8"-12"**
Humboldt Ave	Townsend St to Waumbeck	Citywide	1,026'	**12"**
Child St	Cleveland St to Winslow St	Citywide	520'	**10"**

Wilson Park	Commonwealth Ave to End	Citywide	385'	**6"**
Westview St	Stratton St to Ames St	Citywide	650'	**12'**
TOTAL			**7,659**	

Contract 17-309-005

Street	Limits	Neighborhood	Length	Size
Sumner St.	Lamson St. to Jefferies	East Boston	975	**12"**
Saratoga St.	Merdian St. to Marion St.	East Boston	880	**8"**
TOTAL			**1,755**	

Contract 15-309-011

Street	Limits	Neighborhood	Length	Size
Cambridge St.	Linden St. to Soldiers Field Rd.	Allston/Brighton	2,000	12
TOTAL			**2,000**	

Contract 16-309-005

Street	Limits	Neighborhood	Length	Size
Brooks Street	White Street to Condor Street	East Boston	750	**12**
Meridian Street*	Falcon Street to Condor Street	East Boston	200	**12**
White Street	Falcon Street to Condor Street	East Boston	785	**8**
TOTAL			**1,735**	

Contract 16-308-001

Street	Limits	Neighborhood	Length	Size
Castle Ct	Everett St To End	East Boston	87	**4**
Cottage St	Maverick St to Porter St	East Boston	1,803	10,24,16
Geneva St	Gove St To End	East Boston	60	8,4
Gove St	Chelsea St to Bremen St, Orleans St to Geneva St to End	East Boston	1,068	12

Hooten Ct	Everett St To End	East Boston	85	4
Lawson Pl	Princeton St To End	East Boston	118	4
Paris St	Porter St to Gove St	East Boston	689	10,8
Porter St	Chelsea St to Paris St	East Boston	346	12
Saratoga St	Shelby St to Swift St, Byron St to Addison St	East Boston	2360	12,16,12
Shelby St	Lexington St to Saratoga St	East Boston	502	**12**
TOTAL			**7,140**	

Contract 16-308-002

Street	Limits	Neighborhood	Length	Size
Crawford St.	Humboldt Ave. to Elm Hill Ave.	Roxbury	1,110	12
Cunningham St.	#17 to Hartford St.	Roxbury	250	8
Francis St.	Brookline Ave to Huntington Ave	Roxbury	1,370	12
Gore St.	Parker St. to Terrace St.	Roxbury	235	8
Kalada Park	Holborn St. to End	Roxbury	130	6
Mindoro St.	Station St. to Prentiss St.	Roxbury	435	6
Rockland St.	Mills St. to Walnut Ave.	Roxbury	490	10
St. Alphonses St.	Tremont St. to Smith St.	Roxbury	465	6
Thornton Place	Thornton St. to End	Roxbury	95	4
Tremont St.	St. Alphonses St. to Huntington Ave.	Roxbury	940	12
TOTAL			**5,520**	

Contract 16-308-003

Street	Limits	Neighborhood	Length	Size
Babson St.	Blue Hill Ave. to Norfolk St.	Mattapan	250	12"
Delnore Pl.	Freemont St. to End	Mattapan	145	8"
Elene St.	Alabama St. to Wabash St.	Mattapan	170	8"
Fairway St.	Cummins Hgwy. to Blue Hill Ave.	Mattapan	370	8"
Gillespie Lane	River St. to End	Mattapan	155	8"

Lucerne St.	Woodrow Ave. to Stratton St.	Mattapan	1,285	8" & 10"
Yuletide Rd.	Seminole St. to Hebron St.	Mattapan	185	8"
Hautevale St.	Claron St. to End	Mattapan	170	8"
Alpine St.	River St. to End	Mattapan	140	8"
Enneking Pkwy	Gordan Ave. to #53	Hyde Park	140	8"
Metropolitan Ave.	Providence St. to Hyde Park Ave.	Hyde Park	560	12" & 16"
Private Land	Sprague St. to West Milton St.	Hyde Park	775	12"
Private Land	Fairmount Ave. to 24 Walnut St.	Hyde Park	1025	8"
Ruffing St.	Lodgehill Rd. to #20	Hyde Park	325	8"
Tchapitoulas St.	Poydras St. to End	Hyde Park	285	12"
TOTAL			5,980	

Contract 16-308-004

Street	Limits	Neighborhood	Length	Size
Fenway	Brookline Ave. to Forsyth Way	Fenway/Kenmore	3625	12
Park Drive	Brookline Ave. to Boylston St.	Fenway/Kenmore	3720	12
TOTAL			**7,345**	

Contract 16-308-005

Street	Limits	Neighborhood	Length	Size
Carmen St.	Norwell St. to Vassar St.	Dorchester	465	8
Central Ave.	River St. to End	Dorchester	250	8
Cottrel St.	Mt. Vernon St. to End	Dorchester	340	8
Cushing Ave.	Columbia Rd. to Upham Ave.	Dorchester	545	8
East Cottage St.	Sumner St. to Chase St.	Dorchester	525	12
Milton Ave.	Woodrow Ave. to Norfolk St.	Dorchester	340	6
Mt. Cushing Ter.	Cushing Ave. to Upham Ave.	Dorchester	425	8
Savin Hill Ter.	Savin Hill Ave. to End	Dorchester	110	4
Albany St.	East Berkeley St. to East Canton	South End	2,700	16
Mather Court	Mather St. to End	Dorchester	120	6
Wormwood St.	A St. to End	South Boston	500	8
TOTAL			**6,320**	

Contract 16-308-006

Street	Limits	Neighborhood	Length	Size
Armington St.	Imrie Rd. to Barrows St.	Allston/ Brighton	185	8
Eatonia St.	N. Harvard St. to #33	Allston/ Brighton	340	8
Everett Sq.	Westford St. to End	Allston/ Brighton	280	6
Kilsyth Rd.	Lanark Rd. to Englewood Ave.	Allston/ Brighton	235	8
Private Land	Graymere Rd. to Dickinson St.	Allston/ Brighton	235	8
Beacon St.	Comm. Ave. to Turnpike Bridge	Back Bay	700	12
Edgerly Rd.	Burbank St. to Norway St.	Back Bay	310	12
Edgerly Rd.	Burbank St. to Norway St.	Back Bay	310	8
Fairfield St.	Malborough St. to Comm Ave.	Back Bay	250	10
Mass Ave.	Beacon St. to End	Back Bay	185	10
Mt. Vernon St.	River St. to Storrow Dr.	Beacon Hill	525	12
Silver Pl.	West Cedar St. to Charles St.	Beacon Hill	110	12
Ashburton Pl.	Bowdoin St. to Somerset St.	City Proper	355	12
Bowdoin St.	Beacon St. to Ashburton Pl.	City Proper	435	16
Bowdoin St.	Derne St. to Ashburton Pl.	City Proper	170	12
TOTAL			**4,625**	

Contract 15-308-001

Street	Limits	Neighborhood	Length	Size
Brookline Ave.	Fenwood Rd. to Pilgrim Rd.	Fenway/Kenmore	3,540	4-12
Fenway	At Brookline Ave, Riverway	Fenway/Kenmore	100	8-12
TOTAL			**3,640**	

Contract 15-308-004

Street	Limits	Neighborhood	Length	Size
Clarendon St	Stuart St. to Stanhope St.	S.End/Roxbury	345	12
Blagdon St.	Exeter St. to Dartmouth St.	S.End/Roxbury	530	12

Worcester St.	Columbus Ave to Warren Ave.	S.End/Roxbury	1,810	12
West Canton St.	Tremont St. to Warren Ave.	S.End/Roxbury	580	12
Shawmut St.	Mass Ave to W. Brookline St.	S.End/Roxbury	1,600	12
Rutland Square	Columbus Ave. to Tremont St.	S.End/Roxbury	745	12
Warren Ave	Berkeley St. to Columbus Ave.	S.End/Roxbury	2,100	12
Greenwich Court	Greenwich St. to End	S.End/Roxbury	100	6
Homestead St.	Elm Hill Ave. to Humbolt Ave	S.End/Roxbury	1,125	8
Tremont St	Hammond St. to Camden St.	S.End/Roxbury	930	12
TOTAL			**9,865**	

Contract 15-308-005

Street	Limits	Neighborhood	Length	Size
W. Bellflower St.	Boston St. to End	Dor/Hyde Park	210	10
Columbia Rd.	Boston St. to Dorch. St.	Dor/Hyde Park	1310	12
Manley St.	Victory Rd. to Newkirk St.	Dor/Hyde Park	320	8
Bellflower St.	Boston St. to Dorch. St.	Dor/Hyde Park	685	12
Dix St.	Dorch Ave to Adams St.	Dor/Hyde Park	1,420	8
E. Cottage St.	Norfolk Ave. to Columbia Rd.	Dor/Hyde Park	1,420	12
Morther Julia Rd.	Dorch. Ave to End	Dor/Hyde Park	200	6
Central Ave	Winthrop St. to Fairmont St/River	Dor/Hyde Park	390	8
Private Land	Wolcott Ct. to Truman Highway	Dor/Hyde Park	2,200	10
Winthrop St.	River St. to End	Dor/Hyde Park	650	8
TOTAL			**8,805**	

Contract 15-308-006

Street	Limits	Neighborhoodd	Length	Size
Medford St.	Main St. to Chelsea St.	Charlestown	5,630	
Lane Park.	Foster St. to Lane Park	Allston/Brighton	1,100	

Harvard Ter.	Harvard Ave. to End	Allston/Brighton	270
Hester St.	Turner St. to Beechcroft St	Allston/Brighton	200
Riverview Rd.	Brooks St. to Parsons St.	Allston/Brighton	960
Wexford St.	Leo M. Birmingham Pkwy. To End	Allston/Brighton	350
Ferrin St	Bunker Hill St. to End	Charlestown	450
Cambridge St.	Linden St. to North Harvard St.	Allston/Brighton	1,675
TOTAL			**10,635**

Contract 15-308-007

Street	Limits	Neighborhood	Length	Size
Robken Rd.	Hazelmere Rd. to Selwyn Rd.	Roslindale	680	8
Hazelmere Rd.	Knoll St. to End	Roslindale	740	8
Beech St.	Eugenia Rd. to Washington St.	Roslindale	345	12
Canterbury St.	Poplar St. to Cliffmont St.	Roslindale	1030	12
Marion St.	Harrison St to #28 Marion	Roslindale	220	8
Brookway Rd.	Archdale Rd. to Aldwin Rd.	Roslindale	810	8,12
Pinedale Rd.	Canterbury St. to Grew Ave.	Roslindale	675	8
Pomana Ave.	Chesborough Rd. to Sanborn Ave	W.Roxbury	235	8
Dana Ave.	Easton Ave. to Truman Highway	Hyde Park	510	12
Providence St.	Arlington St. to Metropolitan Ave.	Hyde Park	2,700	16
TOTAL			**7,945**	

Contract 14-308-003

Street	Limits	Neighborhood	Length	Size
Beech St.	Belgrade Ave. to Anawan Ave.	Roslindale	460	8,12
Brook Farm Rd.	LaGrange St. to Corey St.	West Roxbury	1980	8,12
Ferncroft Rd.	Kirk St. to Corey St.	West Roxbury	400	8
Gardner St.	VFW Parkway to End	West Roxbury	2070	12
Gilmore Terr.	Park St. to End	West Roxbury	210	8

Glenham St.	Carrol St. to VFW Parkway	West Roxbury	510	8
Ledgewood Rd.	Corey St. to Cricket Lane	West Roxbury	550	8
Lyall St.	Brook Farm Rd. to VFW Pwky.	West Roxbury	400	12,16
Park St.	March Ave. to Robin St	West Roxbury	3580	12
Park Terrace	Park St. to End	West Roxbury	215	8
Partridge St.	Cowing St. to Maplewood St.	West Roxbury	710	8
Spring St.	VFW Parkway to Centre St.	West Roxbury	4570	12
TOTAL			**15,655**	

Contract 14-308-004

Street	Limits	Neighborhood	Length	Size
Gainsborough St.	Hemenway St. to Huntington St.	Fenway/Kenmore	1,080	12
Hemenway St.	Forsyth St. to Boylston St.	Fenway/Kenmore	2,830	12
Gayhead St.	Edgehill St. to Centre St.	Jamaica Plain	410	8
Neillon Cr..	Pond St. to Pond St.	Jamaica Plain	660	8
Townsend St.	Humbolt Ave. to Warren St.	Roxbury	990	12
TOTAL			**5,970**	

Contract 14-308-005

Street	Limits	Neighborhood	Length	Size
F St.	W.8th St. to W. Broadway	South Boston	3,125	8
W. 8th St.	F St. to Dorchester St.	South Boston	230	12
Cheever Ct.	Sumner St to End	East Boston	155	4/6
Noble Ct.	Sumner St. to End	East Boston	155	4/6
Sumner Pl.	Sumer St. to End	East Boston	135	4/6
Wilbur Ct.	Sumner St. to End	East Boston	155	4/6
Webster Ave.	Sumner St to Webster St.	East Boston	290	6/8
Sumner St.	Cottage St. to S. Bremen St.	East Boston	920	12
Edgewater Dr.	Massasoit St. to #99 Edgewater Dr.	Hyde Park	985	10/8
Newacre Dr.	Washington St. to Garfield Ave.	Hyde Park	650	8

Summer St.	Parrot Ave. to West St.	Hyde Park	1,375	8
TOTAL			**8,175**	

Contract 14-309-001

Street	Limits	Neighborhood	Length	Size
Arborfield Rd	Mansur St to Metropolitan	Citywide	850	**8"**
Bradeen St	Washington St to End	Citywide	850	**8"**
Fawndale Rd	Washington St to Granfield	Citywide	1000	**12"**
Granfield Ave	Washington St to Fawndale	Citywide	890	**8"**
Stellman Rd	Washington St to Fawndale	Citywide	920	**12"**
Pheasant St	Swan St to Dead End	Citywide	330	**8"**
TOTAL			**4,840**	

Contract 14-308-006

Street	Limits	Neighborhood	Length	Size
Monastary Rd.	Colborne St. to Washington St.	All/Bright/DOT	760	12
Rugg Rd.	Cambridge St. to Braintree St.	All/Bright/DOT	560	8
Sidlaw Rd.	Chiswick Rd. to Comm. Ave.	All/Bright/DOT	265	8
Kenmare St.	Gallivan Blvd. to Minot St.	Dorchester	300	8
Morrissey Blvd.	Walnut St. to 170' feet northerly	Dorchester	170	12
Mt. Ida Rd.	Homes Ave. to Robinson St.	Dorchester	620	10
Neponset Ave.	Morr. Blvd. to Neponset Bridge	Dorchester	730	12
School St.	Harvard St. to Washington St.	Dorchester	1,100	8
Wilmington St.	Gallivan Blvd. to Nevada St.	Dorchester	1,710	8/12
TOTAL			**6,215**	

Contract 12-308-008

Street	Limits	Neighborhood	Length	Size
Boylston Pl.	Boylston St. to End	City Proper	240	8
Exeter St.	Boylston St. to Huntington Ave.	Back Bay	1,115	12 & 8
Huntington Ave.	Cumberland St. to Belvidere St.	Back Bay	40	8
State St.	Kilby St. to Commercial St.	City Proper	1,340	12 & 16
TOTAL			**2,735**	

SEWER RENEWAL & REPLACEMENT

Contract 18-309-004

Street	Limits	Neighborhood	Length	Size	Type
Lining					
Hyde Park Ave	Northborne Rd to Patten St	Roslindale	210	15	SS
Hyde Park Ave	Northborne Rd to Patten St	Roslindale	175	15	SD
Hyde Park Ave	Northborne Rd to Patten St	Roslindale	300	15	SD
Eldridge Rd	Hyde Park Ave to Wachusett St	Roslindale	190	12	SS
Rodman St	Wachusett St to Patten St	Roslindale	120	12	SD
Rodman St	Wachusett St to Patten St	Roslindale	440	10	SD
Walk Hill St	Hyde Park Ave to Wachusett St	Roslindale	660	12	SS
Walk Hill St	Wachusett St to Bourne St	Roslindale	280	12	SS
Grover Ave	End to Wyvern	Roslindale	140	10	SS
Wyvern	Neponset Ave to Grover Ave	Roslindale	280	10	SS
Philbrick St	Neponset Ave to Mount Hope St	Roslindale	400	10	SS
Philbrick St	Neponset Ave to Mount Hope St	Roslindale	155	10	SD
Philbrick St	Neponset Ave to Mount Hope St	Roslindale	150	10	SD
Sammett Ave	Neponset Ave to Holly Rd	Roslindale	200	12	SS
Sammett Ave	Holly Rd to Mount Hope St	Roslindale	275	12	SS
Harding Rd	Stella Rd to Hadwin Wy	Roslindale	190	10	SS
Cummins Hwy	Harding Rd to American Legion Hwy	Roslindale	185	8	SS
Hyde Park Ave	Ramsdell Av to American Legion Hwy	Hyde Park	165	18	SD
Hyde Park Ave	Ramsdell Av to American Legion Hwy	Hyde Park	180	10	SS
Hyde Park Ave	Collins St to American Legion Hwy	Hyde Park	455	24	SS
Hyde Park Ave	Collins St to American Legion Hwy	Hyde Park	155	10	SS
Hyde Park Ave	Collins St to Willow Av	Hyde Park	320	12	SS
Hawthorne St	Heathcote St to School Parking Lot	Roslindale	970	48	SD
Hawthorne St	Sherman St to Sycamore	Roslindale	200	12	SD
Hawthorne St	Hawthorne Ter to Sycamore St	Roslindale	775	12	SS
Heathcote St	Poplar St to Hawthorne St	Roslindale	500	42	SD
Florence St	Poplar St to Hawthorne St	Roslindale	195	12	SS

Florence St	Hawthorne St to Cummins Hwy	Roslindale	190	15	SS
Private Driveway	Florence St to End	Roslindale	130	8	SS
Cummins Hwy	Brown Av to Sherwood St	Roslindale	225	12	SD
Cummins Hwy	Sherwood St to Sheldon St	Roslindale	165	12	SD
Westmore Rd	Hillsboro Rd to Gilmer St	Mattapan	255	10	SS
Westmore Rd	Gilmer St to Deering Road	Mattapan	1,050	8	SS
Deering Rd	Westmore Rd to Harvard St	Mattapan	330	8	SS
Deering Rd	Westmore Rd to Harvard St	Mattapan	170	12	SD
Walkhill St	Almont St to Mulvey St	Mattapan	155	12	SD
Walkhill St	Mulvey St to Fottler Rd	Mattapan	190	18	SD
Walkhill St	Mulvey St to Fottler Rd	Mattapan	595	12	SS
Hazelton St	Hillsboro Rd to Fottler Rd	Mattapan	430	12	SD
Ormond St	Hillsboro Rd to Outlook Rd	Mattapan	200	10	SS
Ormond St	Hillsboro Rd to Outlook Rd	Mattapan	110	12	SD
Goodale Rd	Wellington Hill St to Blue Hill Av	Mattapan	195	10	SS
Wildwood St	Woolson St to Morton St	Mattapan	180	10	SD
Edgewater Dr	Mattakeeset to Monponset	Hyde Park	235	8	SS
Edgewater Dr	Holmfield to Monponset	Hyde Park	235	12	SS
Edgewater Dr	Wachusett to Massasoit	Hyde Park	250	12	SS
Edgewater Dr	Oscelola to Wachusett	Hyde Park	255	12	SS
Rodman St	Wachusett St to Patten St	Roslindale	120	12	SS
Hyde Park Ave	Northborne Rd to Patten St	Roslindale	175	15	SD
Walk Hill St	Wachusett St to Bourne St	Roslindale	280	12	SS
Grover Ave	End to Wyvern	Roslindale	25	10	SS
Philbrick St	Neponset Ave to Mount Hope St	Roslindale	150	10	SD
Jewett St	Neponset Ave to Holly Rd	Roslindale	115	10	SD
Sammett Ave	Neponset Ave to Holly Rd	Roslindale	225	12	SS
Hyde Park Ave	Mount Hope to Destefano Rd	Roslindale	200	12	SS
Hyde Park Ave	Mount Hope to Destefano Rd	Roslindale	125	12	SS
Harding Rd	Stella Rd to Hadwin Wy	Roslindale	80	10	SS
Stella Rd	Harding Rd to American Legion Hwy	Roslindale	105	10	SS
Canterbury St	Poplar St to Pinedale Rd	Roslindale	145	18	SS
Hyde Park Ave	Ramsdell Av to American Legion Hwy	Hyde Park	180	10	SS

Hyde Park Ave	Ramsdell Av to American Legion Hwy	Hyde Park	130	18	SD
Hyde Park Ave	Ramsdell Av to American Legion Hwy	Hyde Park	155	10	SS
Huntington Ave	Collins St to Thatcher St	Hyde Park	210	10	SS
Hawthorne St	School Parking lot to Sherman St	Roslindale	130	12	SD
Wilkins Pl	Sycamore St to End	Roslindale	230	10	SD
Brown St	Cummins Hwy to Allen St	Roslindale	170	12	SS
Florence St	Hawthorne St to Cummins Hwy	Roslindale	170	15	SD
Florence St	Hawthorne St to Cummins Hwy	Roslindale	140	12	SD
Cummins Hwy	Sherwood St to Sheldon St	Roslindale	200	12	SS
Westmore Rd	Hillsboro Rd to Gilmer St	Mattapan	235	10	SD
Wellington Hill St	Duke St to Ormond St	Mattapan	530	12	SD
Ormond St	Hillsboro Rd to Outlook Rd	Mattapan	110	12	SD
Goodale Rd	Wellington Hill St to Blue Hill Av	Mattapan	175	10	SD
Walk Hill St	Borne St to Canterbury	Roslindale	1	10	SS
Harding Rd	Stella Rd to End	Roslindale			SD
Varney St	Wachusett St to Wenham	Roslindale	1	12	SS
Harding Rd	Stella Rd to End	Roslindale	110	10	SS
Total			**17,750**		

Contract 18-309-001

Street	Limits	Neighborhood	Length	Size	Type
Abandon					
Queensberry St	Jersey St to Park Dr	Fenway	20	15	SD
Lining					
Jersey St	Peterborough St to Queensberry St	Fenway	50	30 x 36	SS
Jersey St	Peterborough St to Queensberry St	Fenway	125	18	SS
Jersey St	Peterborough St to Boylston St	Fenway	320	18	SS
Jersey St	Queensberry St to Parkway Dr	Fenway	35	12	SS
Jersey St	Queensberry St to Parkway Dr	Fenway	225	18	SS
Peterborough St	Park Dr to Kilmarnock St	Fenway	180	12	SD
Peterborough St	Kilmarnock St to Jersey St	Fenway	185	15	SD

Queensberry St	Park Dr to Kilmarnock St	Fenway	670	15	SD
Queensberry St	Kilmarnock St to Jersey St	Fenway	320	18	SD
Queensberry St	Jersey St to Park Dr	Fenway	80	15	SD
Queensberry St	Jersey St to Park Dr	Fenway	530	15	SD
Boylston	Park Dr to Jersey St	Fenway	240	18	SD
Boylston	Park Dr to Jersey St	Fenway	200	18	SD
Boylston	Park Dr to Jersey St	Fenway	200	18	SD
Boylston	Park Dr to Queensberry St	Fenway	220	12	SD
Boylston	Park Dr to Queensberry St	Fenway	205	15	SD
Park Dr	Jersey St to Queensberry St	Fenway	215	18	SD
Boylston	Park Dr to Jersey St	Fenway	125	18	SD
Relay					
Jersey St	Peterborough St to Queensberry St	Fenway	165	18	SS
Park Dr	Peterborough St to Queensberry St	Fenway	335	18 x15	SS
Park Dr	Queensberry St to End	Fenway	65	U 30 x 30	SD
Park Dr	Kilmarnock St to Jersey St	Fenway	205	18 x 24	SD
Peterborough St	Kilmarnock St to Jersey St	Fenway	250	30 x 36	SS
Peterborough St	Kilmarnock St to Jersey St	Fenway	245	30 x 36	SS
Peterborough St	Kilmarnock St to Jersey St	Fenway	130	30 x 36	SS
Peterborough St	Park Dr to Kilmarnock St	Fenway	40	12	SD
Peterborough St	Kilmarnock St to Jersey St	Fenway	35	15	SD
Queensberry St	Park Dr to Kilmarnock St	Fenway	130	15	SD
Total			**5,725**		

Contract 18-309-002

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Corey Rd	Westborne Ter to Washington St	Allston/Brighton	200	10	SS
Woodstock Ave	Summit Av to Vinal St	Allston/Brighton	350	10	SD
Woodstock Ave	Summit Av to Vinal St	Allston/Brighton	115	15	SD
Commonwealth Ave	Allston to Long Av	Allston/Brighton	250	36x40	SD
Commonwealth Ave	Griggs St to Royce Rd	Allston/Brighton	430	18	SD
Commonwealth Ave	Harvard Av to Linden St	Allston/Brighton	185	24	SS

Lining	Water St. to End	Dorchester	660	10	SS
Corey Rd	Jordan Rd to Bellvista	Allston/Brighton	265	12	SD
Corey Rd	Summit Av to Jordan Rd	Allston/Brighton	410	12	SD
Corey Rd	Westborne Ter to Washington St	Allston/Brighton	125	10	SS
Corey Rd	Westborne Ter to Washington St	Allston/Brighton	115	24	SD
Corey Rd	Westborne Ter to Washington St	Allston/Brighton	40	18	SD
Corey Rd	Westborne Ter to Washington St	Allston/Brighton	25	18	SD
Woodstock Ave	Vinal St to Bellvista Rd	Allston/Brighton	75	15	SD
Commonwealth Ave	Kelton St to Allston St	Allston/Brighton	265	12	SS
Commonwealth Ave	Allston to Long Av	Allston/Brighton	290	15	SS
Commonwealth Ave	Griggs St to Gorham St	Allston/Brighton	175	24	SS
Commonwealth Ave	Spofford Rd to Harvard Av	Allston/Brighton	220	18	SS
Commonwealth Ave	Royce Rd to Harvard Av	Allston/Brighton	590	28x42	SS
Commonwealth Ave	Reedsdale St to Chester St	Allston/Brighton	260	18	SS
Corey Rd	Summit Av to Jordan Rd	Allston/Brighton	390	12	SD
Corey Rd	Summit Av to Westborne Ter	Allston/Brighton	295	10	SS
Commonwealth Ave	Kelton St to Allston St	Allston/Brighton	165	12	SS
Commonwealth Ave	Allston to Redford St	Allston/Brighton	195	12	SS
Commonwealth Ave	Allston to Redford St	Allston/Brighton	270	15	SS
Commonwealth Ave	Spofford Rd to Harvard Av	Allston/Brighton	360	18	SS
Commonwealth Ave	Saint Lukes Rd to Brighton Av	Allston/Brighton	385	12	SS
Total			**6,445**		

Contract 18-309-003

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Herbertson Rd	Eldridge Rd to Northnourne Rd	Roslindale	105	10	SS
Rodman St	Wachusett St to Patten St	Roslindale	185	12	SS
Rodman St	Wachusett St to Patten St	Roslindale	110	12	SS
Wyvern	Grover Ave to Florian St	Roslindale	430	10	SS
Philbrick St	Neponset Ave to Mount Hope St	Roslindale	205	10	SS
Destefano Rd	Hyde Park Ave to End	Roslindale	328	10	SS
Cummins Hwy	Harding Rd to American Legion Hwy	Roslindale	175	8	SS

Rowe Ct	Seymour St to Cummins Hwy	Roslindale	255	12	SS
Clare Ave	Collins St to American Legion Hwy	Hyde Park	105	6	SS
Bradlee St/Navarre	End under American Legion Hwy	Hyde Park	360	18	SS
Huntington Ave	Collins St to Thatcher St	Hyde Park	215	12	SS
Hawthorne St	Sycamore St to Florence St	Roslindale	205	15	SS
Wilkins Pl	Sycamore St to End	Roslindale	195	6	SS
Sycamore St	Hawthorne St to Cummins Hwy	Roslindale	300	12	SS
Wellington Hill St	Duke St to Hillsboro Rd	Mattapan	330	10	SS
Wildwood St	Woolson St to Morton St	Mattapan	375	12	SS
Wildwood St	Woolson St to Morton St	Mattapan	350	12	SS
Verrill St	Woolson St to Morton St	Mattapan	205	10	SS
Coronado Rd	Belnel Rd to End	Hyde Park	225	10	SS
Total			**6,618**		

Contract 17-309-001

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Ericsson St	Walnut St to Lawley St	West Roxbury	415		
Lawley St	Water St to Ericsson St	West Roxbury	260		
Ledgedale Road	Buchanan Rd to Weld St	West Roxbury	310		
Port Norfolk St	Water St to Ericsson St	West Roxbury	800		
Seaport Blvd	at 200 Seaport	South Boston	15		
Taylor St	Water St to End	West Roxbury	660		
Walnut St	Ericsson St to Water St	West Roxbury	790		
Water St	Walnut St to Taylor St	West Roxbury	250		
Total			**13,500**		

Contract 17-309-002

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Ashford St.	Alcom St. to Babcock St.	Allston/Brighton	200	10	SS
Brighton Ave.	St. Lukes Rd. to Fordham Rd.	Allston/Brighton	30	15	SS
Dustin St.	Montcalm St. to Gardenia St.	Allston/Brighton	175	18	SS
Wilson Park	Service Rd (Comm Av EB) to End	Allston/Brighton	185	10	SS/SD

Wilson Park	Service Rd (Comm Av EB) to End	Allston/Brighton	185	10	SS/SD
Colonial Ave.	Millet St. to New England Ave.	Dorchester	215	15	SS
Devon St.	Normandy St. to Columbia Rd.	Dorchester	388	12	SS
Elder St.	Cawfield St. to Columbia Rd.	Dorchester	85	12	CS
Fendale Ave.	Nevada St. to Washington St.	Dorchester	350	10	SS/SD
Lorenzo St.	Woodworth St. to Walnut St.	Dorchester	185	10	SS
O'Connell Rd.	Washington St. to Valley Rd.	Dorchester	205	12	SS
Spencer St.	Athelwood St. to Park St.	Dorchester	50	12	SS
Valley Rd.	Washington St. to O'Connell Rd.	Dorchester	400	12	SS/SD
Barnes Ave.	Saratoga St. to End (Shawsheen)	East Boston	1100	10	SS
Bennington St.	Wordsworth St. to Trident St.	East Boston	850	12	SS
Blackinton St.	Bennington St. to Leydon St.	East Boston	250	12	SS
Breed St.	Bennington St. to Leydon St.	East Boston	175	12	SS
Breed St.	Bennington St. to Leydon St.	East Boston	250	10	SS
Saratoga St.	At Barnes Ave.	East Boston	1	12	SS
Child St.	Cleveland St. to Reservation Rd.	Hyde Park	30	8	SS
Rainier Rd.	Ralwood Rd. to Greenfield Rd.	Hyde Park	230	10	SS
River St.	Gladeside Ave. to Ridgeview Ave.	Hyde Park	40	10	SS
Blue Hill Ave.	Callender St. to Woodrow Ave.	Mattapan	420	12	SS
Blue Hill Ave.	Callender St. to Woodrow Ave.	Mattapan	40	12	SS
Evans St.	Morton St. to Nelson St.	Mattapan	585	12	SS
Evelyn St.	Blue Hill Ave. to Norfolk St.	Mattapan	875	12	SS
Stanton St.	Norfolk St. to Evans St.	Mattapan	615	12	SS
Westview St.	Stratton St. to Stratton St.	Mattapan	220	10	SS
Humboldt Ave.	Townsend St. to Waumbeck St.	Roxbury	975	10	SS
Ruggles St.	Albert St. to Tremont St.	Roxbury	325	12	CS
Vaughn Ave.	Geneva St. to Susi Yd.	Roxbury	250	10	SS
Black Falcon Ave.	Design Center Pl. to End	South Boston	215	10	SS
Tudor St.	D St. to E St.	South Boston	500	12	CS
Lining					
Allston St.	Vinal St. to Bellvista Rd.	Allston/Brighton	200	12	SS
Allston St.	Washington St. to Melvin Ave.	Allston/Brighton	135	24	SD
Ashford St.	Alcorn St. to Babcock St.	Allston/Brighton	200	10	SS
Ashford St.	Chester St. to Pratt St.	Allston/Brighton	150	10	SS

Brighton Ave.	Higgins St. to Allston St.	Allston/Brighton	330	24x30	SS(Brk)
Colborne Rd.	Monastery Rd. to Nottinghill Rd.	Allston/Brighton	85	10	SS
Commonwealth Ave.	Wallingford Rd. to Sutherland Rd.	Allston/Brighton	200	30	SD
Commonwealth Ave.	Wallingford Rd. to Sutherland Rd.	Allston/Brighton	200	12	SS
Commonwealth Ave.	At Warren St.	Allston/Brighton	140	24	SD
Commonwealth Ave.	Fidelis Way to Warren St.	Allston/Brighton	1050	10	SS
Dustin St.	Cambridge St. to Montcalm St.	Allston/Brighton	650	18	SS
Long Ave.	Allston St. to Glenville Ave.	Allston/Brighton	500	10	SS
Long Ave.	Allston St. to Glenville Ave.	Allston/Brighton	500	12	SD
Off Corey Rd (easement)	Corey Rd. to Brookline Town Line	Allston/Brighton	185	24	SD
Coleman St.	Hamilton St. to Hendry St.	Dorchester	550	15	SS
Devon St.	Normandy St. to Columbia Rd.	Dorchester	250	12	SS
Devon St.	Normandy St. to Columbia Rd.	Dorchester	640	15	SD
Hamilton St.	Bowdoin St. to Coleman St.	Dorchester	90	18	SS
Hamilton St.	Bowdoin St. to Coleman St.	Dorchester	240	12	SS
Park St.	Norwell St. to Merlin St.	Dorchester	725	18	SS
Spencer St.	Athelwood St. to Park St.	Dorchester	375	12	SS
Antrim St.	Bennington St. to Ashley St.	East Boston	300	10	SS
Breed St.	Bennington St. to Leydon St.	East Boston	440	12	SS
Breed St.	Bennington St. to Leydon St.	East Boston	400	18	SD
Public Alley 801	Gainsborough St. to St. Stepen St.	Fenway/Kenmore	435	12	SS
Belnel Rd.	Hopewell Rd. to Oseola St.	Hyde Park	825	10	SS
Hopewell St.	Oseola St. to Belnel Rd.	Hyde Park	300	10	SS
Oakdale St.	Larmartine St. to End	Jamaica Plain	600	12	SS
Blue Hill Ave.	(Arbutus St.) to Woodrow Ave.	Mattapan	700	12	SS
Stanton St.	Norfolk St. to Evans St.	Mattapan	525	12	SS
MH / Cleanout Install					
River St.	Gladeside Ave. to Ridgeview Ave.	Mattapan	2	8	SS
Total			2**2,521**		

Contract 17-309-012

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Alley 521	Alley 522 to Private Alley	South End	390	36	SS
Alley 522	Alley 521 to West Canton St.	South End	140	36	SS
Total			**530**		

Contract 17-309-013

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Beacon St.	Fairfield St. to Back St.	Back Bay	185	48	
DCR Land	Near DCR Police Station at McGrath Hwy	Back Bay	110	36	
Total			**295**		

Contract 16-309-001

Street	Limits	Neighborhood	Length	Size	Type
Lining					
Washington St	Allen Rd. to Malbert Rd.	Allston/Brighton	145	15	SS
Saunders St	Barstow St. to N. Beacon St.	Allston/Brighton	300	18	SS
Allston St.	Kelton St. to Comm. Ave.	Allston/Brighton	250	12	SS
Franklin St.	Hawley St. to Devonshire St.	CP	500	20X30	CS
Centre St.	Althea St to O'Donnell St.	Dorchester	245	12	SS
Adams St.	Butler St. to Richmond St.	Dorchester	655	12	SS
Butler St.	Richmond St. to Adams St.	Dorchester	175	12	SS
Butler St.	Richmond St. Adams St.	Dorchester	525	12	SD
Butler St.	Adams St. to Huntoon St.	Dorchester	155	20	SD
Southern Ave.	Ferndale St. to Elmhurst St.	Dorchester	200	12	SS
Montmorenci Ave.	Orient Ave to Drumlin St.	East Boston	190	10	SD
Waldemar Ave.	At McClellan Highway	East Boston	300	12	SS
Pleasantview St.	Roanoke Rd to Cummins Hwy.	Hyde Park	535	10	SS
Pleasantview St.	Roanoke Rd. to Cummins Hwy.	Hyde Park	400	10	SS
Annafran St.	Roakoke Rd. to Cummins Hwy.	Hyde Park	575	10	SS

Walden St.	Heath St. to Arklow St.	Jamaica Plain	380	15	SS
Bynner St.	Day St. to Creighton St.	Jamaica Plain	300	12	SD
Creighton Rd.	Sunnyside St. to Day St.	Jamaica Plain	75	15	SS
Grotto Glen Rd.	Day St. to End	Jamaica Plain	135	12	SS
Nira Ave	Day St. to End	Jamaica Plain	460	12	SS
Violet St.	Delhi St to French St.	Mattapan	215	10	SS
Violet St.	Delhi St. to French St.	Mattapan	100	10	SS
Morton St.	Evans St. to Lorna Rd.	Mattapan	150	15	SS
Selden St.	Morten St. to Nelson St.	Mattapan	200	15	SS
Wellington Hill St.	Goodale St. to Ormond St.	Mattapan	225	12	SD
Highland Ter.	Highfield Rd. to End	Roslindale	145	10	SD
Highfield Ter.	Highfield Rd. to End	Roslindale	145	10	SS
Catherine St.	Bourne St. to Meyer St.	Roslindale	475	12	SS
Kerwin St.	Bernard St. to Talbot Ave.	Roxbury	550	12	SS
Wren St.	Robin St. to Martin St.	W. Roxbury	245	8	SS
Wren St.	Robin St. to Martin St.	W. Roxbury	150	10	SD
Eastwood Ct. (Easement)	Sewer Easement	W. Roxbury	285	10	SS
Rosa St.	River St. to End	Hyde Park	590	8	SS
Bynner St.	Day St. to Creighton St.	Jamaica Plain	250	12	SS
Creighton St.	Sunnyside St. Day St.	Jamaica Plain	250	18	SD
Ceylon St.	Columbia Rd. to Quincy St.	Roxbury	200	18	SS
Weld St.	Theodor Parker to Greaton	W. Roxbury	670	10	SS
PT. Repair					
Washington St.	Allen Rd. to Malbert Rd.	Allston/Brighton	1	20	SD
Waldemar Ave.	Private Property	East Boston	1	12	SD
Walden St.	Heath St. to Arklow St.	Jamaica Plain	1	15	SS
Violet St.	Delhi St. to French St.	Mattapan	1	10	SS
Kerwin St.	Bernard St. to Talbot St.	Roxbury	1	12	SS
Spot Liner					
Turner St.	Washington St to Hester St.	Allston/Brighton	1	10	SS
Total		**11,351**			

Contract 16-309-002

Street	Limits	Neighborhood	Length	Size	Type
Aband					
West St.	Deforest St. to Poplar St.	Hyde Park	N/A	12	SS
PT. Repair					
Glenn St.	At Trull St.	Dorchester	1	12	SS
Norfolk St.	Nelson St. to Capen St.	Mattapan	1	12	SD
Norfolk St.	Nelson St. to Capen St.	Mattapan	1	12	SD
Norfolk St.	Charles St. to Milton Ave.	Mattapan	1	15	SD
Norfolk St.	At Capen St.	Mattapan	1	MH	SD
Off Norfolk St.	Private Property	Mattapan	1	12	SD
Off Norfolk St.	Private Property	Mattapan	1	10	SD
Lining					
Commonwealth Ave.	South St. to Chestnut Hill Ave.	Allston/Brighton	875	10	SS
Commonwealth Ave.	South St. to Chestnut Hill Ave.	Allston/Brighton	400	10	SS
Norfolk St.	Crowell St. to Capen St.	Mattapan	350	10	SS
Off Norfolk St.	Private Property	Mattapan	425	10	SS
Off Norfolk St.	Private Property	Mattapan	390	12	SD
Creston St.	Blue Hill Ave to Creston Park	Roxbury	175	12	SS
Quincy St.	Mascoma St. to Ceylon St.	Roxbury	360	12	SS
Quincy St.	Blue Hill Ave. to Dacia St.	Roxbury	175	15	CS
Quincy St.	Sweet Fern Ter. To Magnolia St.	Roxbury	125	10	SS
Quincy St.	Mascoma St. to Magnolia St.	Roxbury	235	12	SS
Relay					
Commonwealth Ave.	South St. to Chestnut Hill Ave.	All/Brighton	140	10	SS
Lanark Rd.	Kilsyth St. to Sutherland St.	All/Brighton	220	10	SS
Arlington St.	Boylston St. to Providence St.	City Proper	90	12	SD
Utica St.	Beach St. to Tufts St.	City Proper	300	20x24	CS
Tremont St.	Boylston St. to Stuart St.	City Proper	350	12	CS
Clarendon St.	Beacon St. to Back St.	Back Bay/B. Hill	190	12X16	SD
Beacon St.	Berkeley St. to Dartmouth St.	Back Bay/B. Hill	415	12X16	SD
Public Alley 430	Mass Ave. to Hereford St.	Back Bay/B. Hill	550	20X26	CS
Butler St.	Richmond St. to Huntoon St.	Dorchester	180	12	SS
Southern Ave.	Elmhurst St.	Dorchester	715	15	SS

Bennington St.	Westbrook St. to Trident St.	East Boston	170	12	SS
Chesterfield St.	Reynold Rd. to Manila Ave.	Hyde Park	150	15	SS
Manila Ave.	Norton St. to Chesterfield St.	Hyde Park	450	18	SS
Metropolitan Ave.	Hyde Park to Thatcher	Hyde Park	525	10&12	SS
Sprague St.	Private Property/Sewer Ease.	Hyde Park	600	12	SS
McBride St.	Washington St. to RR	Jamaica Plain	375	12	SS
Rossmore Rd.	Washington St. to Meehan St.	Jamaica Plain	250	12	SS
Morton St.	Evans St. to Lorna St.	Mattapan	75	12	SS
Poplar St.	Chisholm St. to Metro. Ave.	Roslindale	110	15	SS
Sherwood St.	Ridge St. to Florence St.	Roslindale	75	12	SS
75 Malcolm X Blvd.	School Property	Roxbury	60	15	CS
Guild St.	Lambert Ave. to Thornton St.	Roxbury	175	12	CS
Hartford Ct.	Hartford St. to End	Roxbury	150	10	SS
Quincy St.	Blue Hill Ave to Dacia St.	Roxbury	100	10	SS
Hartford St.	Sargent St. to Wayland St.	Roxbury	415	10	SS
Quincy St.	Columbia Rd. to Ceylon St.	Roxbury	400	15	SS/CS
Quincy St.	Blue Hill Ave to Dacia St.	Roxbury	170	15	CS
East Sixth St.	L St. to M St.	South Boston	570	12	CS
East Sixth St.	M St. to N St.	South Boston	560	15	CS
M St.	E. Fifth St. to E. Sixth St.	South Boston	220	12	SS
Total		**12,267**			

Contract 16-309-006

Street	Limits	Neighborhood	Length	Size	Type
Relay					
Endicott St.	Cooper St. to Stillman St.	North End	175	30	
Lewis St.	Moon St. to North St.	North End	205	12	
Margaret St.	Sheafe St. to Cleveland St.	North End	75	12	
Margaret St.	Sheafe St. to Prince St.	North End	155	12	
Prince St.	Bennet Pl. to Hanover St.	North End	110	20	
Pipe Lining					
Fulton St.	Cross St. to Lewis St.	North End	235	18	
Total			**955**		

Contract 16-309-005

Location	Limits	Neighborhood	Length	Size
Brooks St.	Falcon St. to Condor St.	East Boston	210	8 w/12
White St.	#81 White St. to Brooks St.	East Boston	230	16”x24”
Meridian St.	Eutaw St. to Monmouth St.	East Boston	260	24”x27”
Meridian St.	#312 Meridian St.. to Trenton St.	East Boston	190	24”x27”
Trenton St.	Marion St. to Meridian St.	East Boston	485	24”x27”
TOTAL			**1,375**	

Contract 15-309-001

Street	Limits	Neighborhood	Length	Size	Type
Pipe Replacement					
Norwell St	Washington St to Rupert St.	Dorchester	425	12	SS
Whittier St.	Cabot St. to Tremont St.	Roxbury	280	10	SS
Spencer St.	Park St. to Wheatly St.	Dorchester	530	12	SS
Tonawanda St.	Greenbriar St. to Waldeck St.	Dorchester	410	12	SS
Main St.	Pleasant St. to Winthrop St.	Charlestown	240	12	SS
Lincoln St.	Mansfield St. to Franklin St.	Allston/Brighton	240	12	SD
Franklin St.	Lincoln St. to Adamson St.	Allston/Brighton	245	12	SD
Bay St.	Dorchester Ave. to Auckland St.	Dorchester	205	12	SS
Bay St.	Dorchester Ave. to Auckland St.	Dorchester	190	12	SD
Colorado St.	Messinger St. to Currier St.	Mattapan	180	12	SS
Fabyan St.	Harvard St. to Blue Hill Ave.	Mattapan	250	12	SS
TOTAL			**3,195**		

Contract 15-309-007

Location	Limits	Neighborhood	Length	Size
Garden Ct	North St. to Fleet St.	North End	270	12
Hanover Ave.	Hanover St. to Commercial St.	North End	286	12x16
Hull St.	Commercial St. to Salem St.	North End	450	14
North St., North Sq.	Cross St. to Commercial St.	North End	425	18
Sheafe St.	Snow Hill St. to Margaret St.	North End	15	20
Snow Hill St..	Hull St. to Prince St.	North End	395	15

Sun Ct.	Moon St. to North St.	North End	145	12x14
Tileston St.	Hanover St. to Wiggen St.	North End	315	15
Baldwin Pl.	Salem St. to End	North End	140	6
Jerusalem Pl.	Salem St. to End	North End	100	3
TOTAL			**2,541**	

Contract 15-308-001

Location	Limits	Neighborhood	Length	Size
Brookline Ave	Francis St. to Riverway	Fenway	920	10w12
TOTAL			**920**	

Contract 14-309-001

Street	Limits	Neighborhood	Length	Size	Type
Pipe Replacement					
Arborfield Rd.	Mansur St. to Metropolitan Ave.	Roslindale	490	12, 15	relay
Bradeen St.	Washington St. to End	Roslindale	505	18, 22	relay
Fawndale Rd.	Washington St. to Granfield Ave.	Roslindale	320	10	relay
Gladstone St.	Breed St. to Walley St.	East Boston	180	12	relay
Granfield Ave.	Washington St. to Fawndale Rd.	Roslindale	185	10, 20	relay
Hyde Park Ave.	Willow St. to Greenwood Ave.	Roslindale	240	10	relay
Mallet St.	Adams St. to Florida St.	Dorchester	450	12	relay
Mallet St.	Dorchester Ave. to Range Rd.	Dorchester	320	10	relay
Porter St.	London St. to Meridian St.	East Boston	250	12	relay
Stellman Rd.	Washington St. to Fawndale Rd.	Roslindale	560	10, 18	relay
Webster St.	Seaver St. to Sumner St.	East Boston	700	12	relay
Barclay Rd.	Pender St. to Lagrange St.	West Roxbury	175	12,15, 18,24	line
Belmont St.	Medford St. to Bunker Hill St.	Charlestown	950	10, 18	line
Blake St.	Taunton Ave. to Ruskindale Rd.	Hyde Park	195	12	line
Bradeen St.	Washington St. to End	Roslindale	790	20	line
Commonwealth Ave.	Naples Rd. to University Bridge	Brighton	2,130	20	line
Fawndale Rd.	Washington St. to Granfield Ave.	Roslindale	700	15, 18	line
Gladstone St.	Breed St. to Walley St.	East Boston	295	10, 15, 18	line

Granfield Ave.	Washington St. to Fawndale Rd.	Roslindale	250	10	line
Lyford St.	Callender St. to Oakhurst St.	Dorchester	145	18	line
Nonantum St.	Letitia Way to Cufflin St.	Brighton	390	15, 20	line
Pheasant St.	Bobolink St. to Swan St.	West Roxbury	570	10, 12	line
Regina Rd.	Washington St. to Alpha Rd.	Dorchester	340		line
Southampton St.	Moore St. to Railroad Bridge	Dorchester	385		line
Stellman Rd.	Washington St. to Fawndale Rd.	Roslindale	380		line
VFW Parkway	#1220 to Gardner St.	West Roxbury	500		line
Barclay Rd.	Pender St. to Lagrange St.	West Roxbury			Pt Rep
Caledonian Ave.	Hemlock Rd. to Spring St.	West Roxbury			Pt Rep
Mallard Ave.	New England Ave. to Talbot Ave.	Dorchester			Pt Rep
Ocean St.	at Ashmont St.	Dorchester			Minor Drain
SDRELAY			4,200		
SDLINE			8,200		
TOTAL			**24,795**		

Contract 14-308-003

Street	Limits	Neighborhood	Length	Size	Type
Replace					
Gilmore Terrace	Park St to End	West Roxbury	35	12	SD
Partridge Street	Maple St to Cowing St	West Roxbury	1,100	10	SD
Spring Street	VFW Parkway to Centre St	West Roxbury	1,615	10-24	SD
Reline					
Park Street	March Ave. to Robin St.	West Roxbury	1,080	12	SD
Spring Street	VFW Parkway to Centre St	West Roxbury	275	27	SD
Total			**4,105**		

INCREASED CAPACITY

Curlew St. Betterment

Location	Limits	Neighborhood	Length	Size
Curlew St.	Maplewood St. to End	West Roxbury		
TOTAL				

SEPARATION

Contract 17-309-005

Street	Limits	Neighborhood	Length	Size	Type
Princeton St.	Meridian St to Marion St.	East Boston	400		SD
Meridian St.	Saratoga St. to Princeton St.	East Boston	300		SD
Bennington St.	Porter St. to Marion St.	East Boston	150		SD
Decatur St.	Border St. to Meridian St.	East Boston	750		SD
Liverpool St	Decatur St. to Meridian St.	East Boston	150		SD
London St.	Maverick St. to Meridian St.	East Boston	700		SD
Havre St.	Maverick St. to Decatur St.	East Boston	350		SD
Meridian St.	Paris St. to Decatur St.	East Boston	400		
Total			**3,200**		

Contract 16-309-005

Location	Limits	Neighborhood	Length	Size
Brooks St.	Falcon St. to Condor St.	East Boston	200	18
Brooks St.	Falcon St. to West eagle St.	East Boston	275	12
Meridian St.	Falcon St. to Condor St.	East Boston	200	18
White St.	Border St. to Brooks St.	East Boston	860	12
White St.	Border St. to Meridian St.	East Boston	250	18
Eutaw St.	Border St. to Meridian St.	East Boston	200	24
Eutaw St.	Meridian St. to Marion St.	East Boston	400	15
Eutaw St.	Marion St. St. to 61 Eutaw St.	East Boston	150	12
Meridian St.	Trenton St. to Monmouth St.	East Boston	540	18
Meridian St.	Trenton St. to #316 Meridian St.	East Boston	120	12
Monmouth St.	Meridian St. to Marion St.	East Boston	275	12
Trenton St.	Marion St. to Meridian St.	East Boston	510	15
TOTAL			**3,980**	

Contract 16-309-011

Street	Limits	Neighborhood	Length	Size	Type
Blue Hill Ave.	Dudley St. to Maywood St.	Roxbury	600		SD
Brookford St.	Blue Hill Ave. to Rand St.	Roxbury	210		SD
Clifford St.	At Blue Hill Ave.	Roxbury	320		SD
Edgewood St.	At Blue Hill Ave.	Roxbury	590		SD
Irwin Ave.	At Blue Hill Ave.	Roxbury	270		SD
Julian St.	Blue Hill Ave to Cottage St.	Roxbury	300		SD
La Grange Pl.	Blue Hill Ave to End	Roxbury	230		SD
Rand St.	Brookford St to #40	Roxbury	730		SD
West Cottage St.	Blue Hill Ave. to #80	Roxbury	840		SD
Total			**4,090**		

Contract 15-309-011

Street	Limits	Neighborhood	Length	Size	Type
Adams St.	Blue Hill Ave to Forest St.	Roxbury	310		SD
Dudley St.	Mt. Pleasant St. to Dudley St.	Roxbury	1680		SD
Forest Pl.	Forest St. to End	Roxbury	150		SD
Forest St.	Mt. Pleasant Ave. to Mt. Pleasant	Roxbury	1280		SD
Mt. Pleasant Ave.	Dudley St. to Dudley St.	Roxbury	1960		SD
Vine St.	Mt. Pleasant Ave to Dudley St.	Roxbury	420		SD
Total			**5,800**		

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